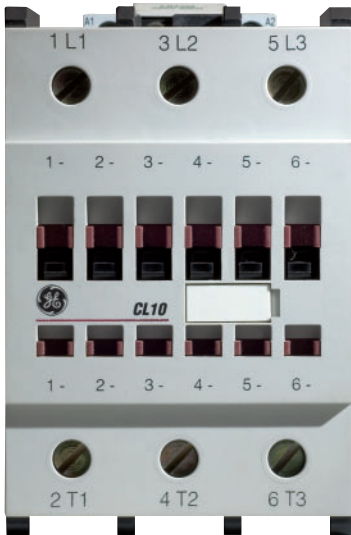


Control and Automation

For industrial applications ED.03

Everything is under control



GE imagination at work



| | |
|---|---|
| Plug-in relays and Auxiliary contactors | A |
| Motor protection devices | B |
| Contactors and Thermal overload relays | C |
| Motorstarters | D |
| Control and signalling units | E |
| Electronic relays | F |
| Limit switches | G |
| Speed drive units | H |
| Main switches | I |
| Numerical index | X |



A

Plug-in relays and Auxiliary contactors

Series PRC - Plug-in relays



Miniature plug-in relays
 Standard 8-11 pin plug-in relays
 Interface relay

● A.2

Series M - Auxiliary minicontactors



lth = 16A

● A.16

Series RL - Auxiliary contactors



lth = 20A

● A.22

B

Motor protection devices

Series SFK -

Motor protection circuit breaker



Thermal and magnetic protection of AC and DC motors
 Setting ranges from 0.1 to 25A

● B.2

Surion - Manual motor starter



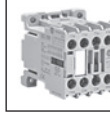
Thermal and magnetic protection - Magnetic protection
 Setting ranges from 0.1 to 63A

● B.8

C

Contactors and Thermal overload relays

Series M - Minicontactors



3 and 4P (4NO, 2NO+2NC, 4NC) 6,9 and 12A (AC-3) 20A (AC-1)
 Control circuit AC and DC

● C.2

Series CL - Contactors



3 and 4P (4NO, 2NO+2NC) 9 to 105A (AC-3) 25 to 140A (AC-1) AC, DC and with electronic module

● C.10

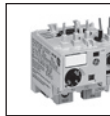
Series CK - Contactors



3 and 4P (4NO) 150 to 825A (AC-3) 200 to 1250A (AC-1) AC, DC and with electronic module

● C.18

Series MTO - Thermal overload relays



For minicontactors series M from 0.11 to 14A

● C.60

Series RT - Thermal overload relays



For contactors series CL and CK from 0.16 to 850A Class 10A, 10, 20, 30

● C.62

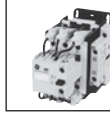
Series RE - Electronic overload relays



For contactors series CL from 0.1 to 150A

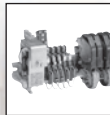
● C.66

Series CSCN - Contactors for capacitors switching



● C.78

Series 390.R - Clapper contactors

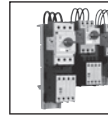


● C.86

D

Motorstarters

Coordination



Link modules for mechanical and electrical connection of the manual motor starter and the M/CL contactor ranges

● D.2

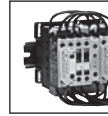
Direct-on-line starters



Series M: 6 to 12A (AC-3)
 Series CL: 9 to 105A (AC-3)
 Series CK: 150 to 825A (AC-3)

● D.18

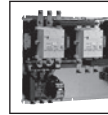
Reversing starters



Series M: 6 to 12A (AC-3)
 Series CL: 9 to 105A (AC-3)
 Series CK: 150 to 825A (AC-3)

● D.20

Star-delta starters



Series CL
 Series CK

● D.22

ASTAT S - Soft starter



Small soft starter with integral by-pass

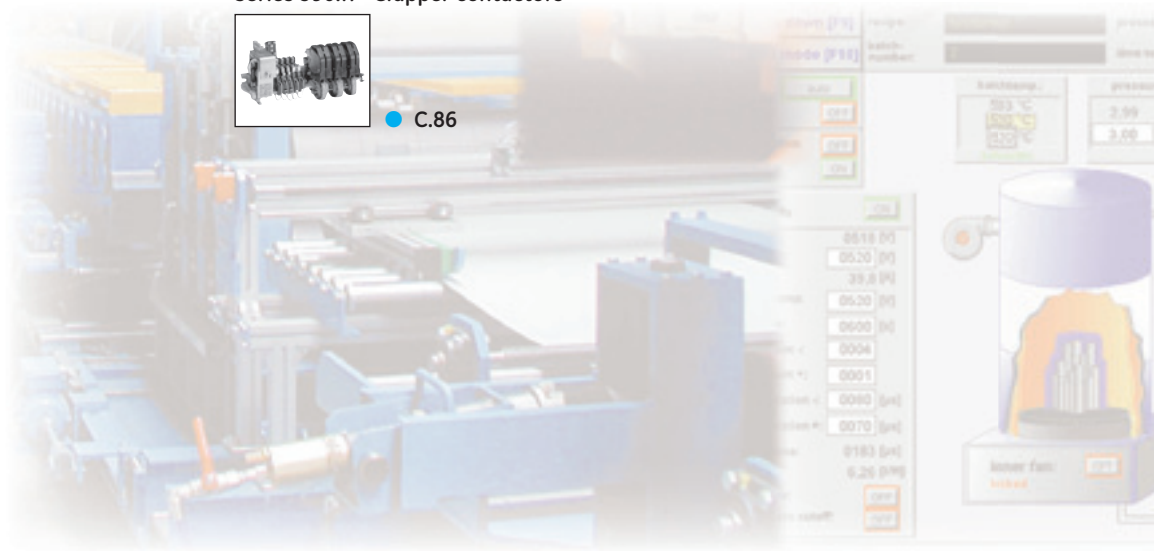
● D.66

ASTAT XT - Digital Soft Starter



Digital Soft Starter for 3 phase standard induction motors

● D.71



E

Control and signalling units

Series P9 - Panel mounting - Units Ø 22 mm



● E.8

Series P9 - Base mounting



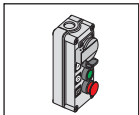
● E.23

Series P9 - Push-button stations



● E.24

Series P9 - Equipped boxes



● E.27

Series P9 - Common accessories



● E.30

Series 077 - Units Ø 30 mm



● E.42

Series NLT - Light towers



● E.60

Series IP - Foot switches



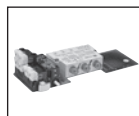
● E.66

Safety foot switches



● E.68

Series 105 - Signalling devices



● E.69

F

Electronic relays

Series NMV - Multivoltage relays



22.5mm module
Direct supply voltage (24-240V AC/DC)
With transformer

● F.3

Series D - Single voltage electronic timers



45mm module
Direct supply voltage

● F.4

Liquid level detectors



45 mm module
DIN mounting

● F.4

Earth leakage relays



45 mm module
Direct supply voltage
With transformer

● F.4

Protection relays



45 mm module
Direct supply voltage
With transformer

● F.5

Detection relays



Direct supply voltage
With transformer

● F.6

Control and protection relays



● F.6



G

Limit switches

Series IS and IM



Metal and Thermoplastic
EN 50041
Positive opening

● G.2

Series IUG



Thermoplastic EN 50047
Positive opening

● G.4

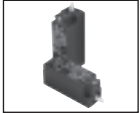
Series IZ



Thermoplastic miniature
design

● G.6

Series 114FCT



Three pole limit switches
Thermoplastic
Positive opening

● G.8

Series 115 - Pressure switches



Bellows type
Piston type

● G.16

H

Speed drive units

VAT20



Single-phase or three-phase
digital inverters for control-
ling the speed of three-
phase induction AC motors
from 0.2 to 2.2 kW
IP20 or IP65

● H.2

VAT200



From 0.4 to 2.2kW at 200V,
single phase power supply
From 0.4 to 7.5kW at 200V,
three phase power supply
From 0.75 to 11kW at 400V,
three phase power supply

● H.8

VAT300



Three phase drives for
AC motors 220-240V or
380-480V. Covering power
ratings from 0.75kW up to
475kW in normal duty, or up
to 400kW in heavy duty

● H.18

I

Main switches

Series ML - standard programme



Main switches and Emer-
gency-stop switches for
machinery

● I.4

Series ML - enclosed switches



● I.7



Go to www.ge.com/eu/powerprotection and click on e-Catalogue

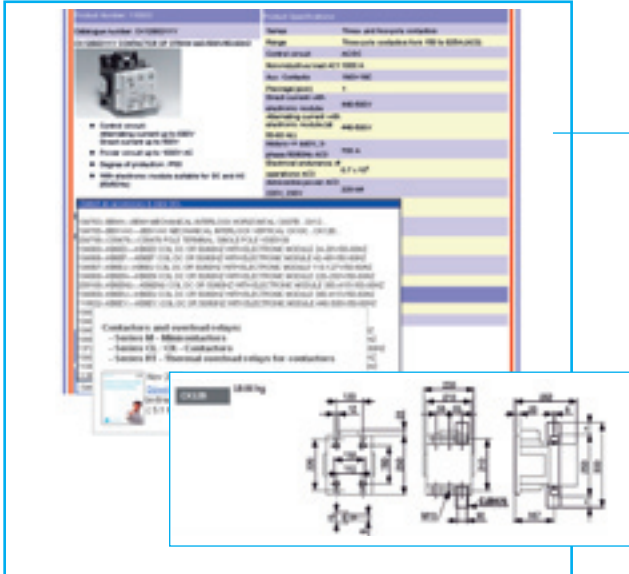


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Every product page contains all available data: [technical specifications](#), [mounting instructions](#), [dimensional drawings](#), [texts for tenders](#)...

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- ✓ All product info is [downloadable](#), [printable](#) and [emailable](#) !
- ✓ Always the [latest up-to-date info](#) at hand !

Everything is

Series PRC - Plug-in relays

- A.3 Order codes
- A.7 Technical data
- A.14 Dimensions

Series M - Auxiliary minicontactors

- A.17 Order codes
- A.26 Technical data
- A.31 Terminal numbering
- A.40 Dimensions

Plug-in relays and Auxiliary contactors

Series RL - Auxiliary contactors

- A.23 Order codes
- A.34 Technical data
- A.36 Terminal numbering
- A.42 Dimensions

Motor protection devices

Contactors and Thermal overload relays

Motorstarters

Control and signalling units

Electronic relays

Limit switches

Speed drive units

Main switches

Numerical index

A

B

C

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I

X

under control





Plug-in auxiliary relays

- AC or DC coils
- Lockable test button with mechanical flag indicator.
- Sockets with rear 35 mm rail (EN 50022) mounting.
- With LED indicator incorporated.

Miniature relays

| Types | Poles | AC ratings | Sockets |
|-----------|-------|------------|--------------|
| PRC4M2... | 2 CO | 12A/250V | PRCG-ES15/2N |
| PRC4M3... | 3 CO | 10A/250V | PRCG-ES15/3N |
| PRC4M4... | 4 CO | 6A/250V | PRCG-ES15/4N |

Standard 8-11 pin relays

| Types | Poles | AC ratings | Sockets |
|-----------|-------|------------|---------|
| PRC2P2... | 2 CO | 10A/250V | PRZ8 |
| PRC3P3... | 3 CO | 10A/250V | PRZ11 |

Interface relay module

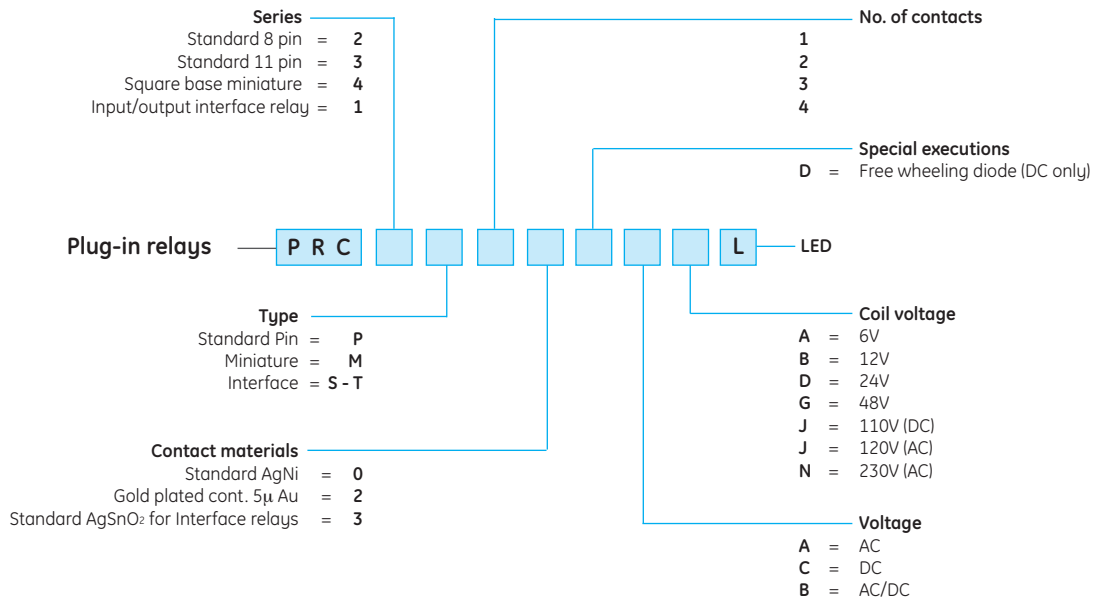
| Types | Poles | AC ratings | Sockets |
|---------------------------------|-------|------------|----------|
| PRC1S1... | 1 CO | 6A/250V | - |
| For use with PLC systems | | | |
| PRC1T1... | 1 CO | 16A/250V | PRCGZT80 |
| PRC1T2... | 2 CO | 8A/250V | PRCGZT80 |

Approvals

According to types:

| | |
|----------------|---------|
| Plug-in relays | Sockets |
| CE | CE |
| CSA | CSA |
| cUL | cUL |
| VDE | |

Catalogue number structure

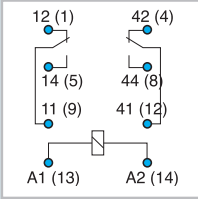


- Order codes ● pg. A.3
- Modules for sockets ● pg. A.6
- Technical characteristics ● pg. A.7
- Dimensions ● pg. A.14

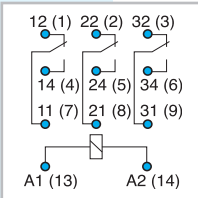
Miniature plug-in relays



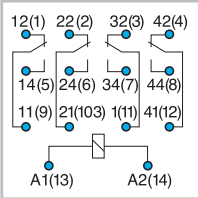
2 changeover contacts

| Ratings | Contacts Standard material | Voltage | | With LED | | Pack | |
|----------------|-------------------------------|---|----------------|-------------|-------------|-------------|--------|
| | | | | Cat. no. | Ref. no. | | |
| AC 12A/250V | 0 AgNi |  | AC 50/60 Hz | 12V | PRC4M20ABL | 220710 | 10 |
| | | | | 24V | PRC4M20ADL | 220711 | 10 |
| | | | | 48V | PRC4M20AGL | 220712 | 10 |
| | | | | 120V | PRC4M20AJL | 220715 | 10 |
| | | | | 230V | PRC4M20ANL | 220717 | 10 |
| | | | DC | 12V | PRC4M20CBL | 220713 | 10 |
| | | | | 24V | PRC4M20CDL | 220714 | 10 |
| | | | | 48V | PRC4M20CGL | 220716 | 10 |
| | | | | 110V | PRC4M20CJL | 220718 | 10 |
| | | | | DC Diode | 12V | PRC4M20DCBL | 220754 |
| | | | 24V | | PRC4M20DCDL | 220755 | 10 |
| | | | 48V | | PRC4M20DCGL | 220756 | 10 |
| | | | 110V | | PRC4M20DCJL | 220757 | 10 |

3 changeover contacts

| | | | | | | | |
|----------------|-----------|---|----------------|-------------|-------------|-------------|--------|
| AC 10A/250V | 0 AgNi |  | AC 50/60 Hz | 12V | PRC4M30ABL | 221051 | 10 |
| | | | | 24V | PRC4M30ADL | 221052 | 10 |
| | | | | 48V | PRC4M30AGL | 221053 | 10 |
| | | | | 120V | PRC4M30AJL | 221056 | 10 |
| | | | | 230V | PRC4M30ANL | 221058 | 10 |
| | | | DC | 12V | PRC4M30CBL | 221054 | 10 |
| | | | | 24V | PRC4M30CDL | 221055 | 10 |
| | | | | 48V | PRC4M30CGL | 221057 | 10 |
| | | | | 110V | PRC4M30CJL | 221059 | 10 |
| | | | | DC Diode | 12V | PRC4M30DCBL | 221074 |
| | | | 24V | | PRC4M30DCDL | 221075 | 10 |
| | | | 48V | | PRC4M30DCGL | 221076 | 10 |
| | | | 110V | | PRC4M30DCJL | 221077 | 10 |

4 changeover contacts

| | | | | | | | |
|---------------|-----------|---|----------------|-------------|-------------|-------------|--------|
| AC 6A/250V | 0 AgNi |  | AC 50/60 Hz | 12V | PRC4M40ABL | 221809 | 10 |
| | | | | 24V | PRC4M40ADL | 221810 | 10 |
| | | | | 48V | PRC4M40AGL | 221811 | 10 |
| | | | | 120V | PRC4M40AJL | 221814 | 10 |
| | | | | 230V | PRC4M40ANL | 221816 | 10 |
| | | | DC | 12V | PRC4M40CBL | 221812 | 10 |
| | | | | 24V | PRC4M40CDL | 221813 | 10 |
| | | | | 48V | PRC4M40CGL | 221815 | 10 |
| | | | | 110V | PRC4M40CJL | 221817 | 10 |
| | | | | DC Diode | 12V | PRC4M40DCBL | 221851 |
| | | | 24V | | PRC4M40DCDL | 221852 | 10 |
| | | | 48V | | PRC4M40DCGL | 221853 | 10 |
| | | | 110V | | PRC4M40DCJL | 221854 | 10 |

Sockets



**For PRC4M2...
2 changeover contacts**

| | | | Cat. no. | Ref. no. | Pack |
|-------------------------------|----------------------|---------------|--------------|----------|------|
| Screw terminals Two levels | Socket | | PRCG-ES15/2N | 220912 | 10 |
| | Fixing clip | Metal | PRCG1052 | 220914 | 10 |
| | Retainer/Extractor | White plastic | PRCMS35 | 220915 | 10 |
| | Identification plate | | PRCTR1 | 220916 | 10 |

**For PRC4M3...
3 changeover contacts**

| | | | | | |
|-------------------------------|----------------------|---------------|--------------|--------|----|
| Screw terminals Two levels | Socket | | PRCG-ES15/3N | 221442 | 10 |
| | Fixing clip | Metal | PRCG1052 | 220914 | 10 |
| | Retainer/Extractor | White plastic | PRCMS35 | 220915 | 10 |
| | Identification plate | | PRCTR1 | 220916 | 10 |

**For PRC4M4...
4 changeover contacts**

| | | | | | |
|-------------------------------|----------------------|---------------|--------------|--------|----|
| Screw terminals Two levels | Socket | | PRCG-ES15/4N | 221934 | 10 |
| | Fixing clip | Metal | PRCG1052 | 220914 | 10 |
| | Retainer/Extractor | White plastic | PRCMS35 | 220915 | 10 |
| | Identification plate | | PRCTR1 | 220916 | 10 |

Order codes

A

B

C

D

E

F



G

H



I

X


Standard 8-11 pin plug-in relays

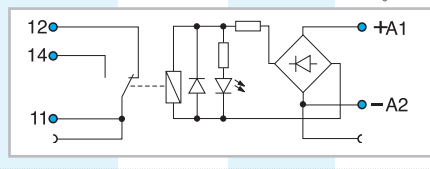
| | Ratings | Contacts Standard material | Voltage | | With LED | | | | | | |
|--|---|-------------------------------|----------|----------|----------|------------|--------|------|-------------|--------|----|
| | | | | | Cat. no. | Ref. no. | Pack | | | | |
|  | Standard 8 pin 2 changeover contacts 10A/250V | 0 AgNi | AC | 50/60 Hz | 12V | PRC2P20ABL | 220019 | 10 | | | |
| | | | | | 24V | PRC2P20ADL | 220020 | 10 | | | |
| | | | | | 48V | PRC2P20AGL | 220021 | 10 | | | |
| | | | | | 120V | PRC2P20AJL | 220024 | 10 | | | |
| | | | | | 230V | PRC2P20ANL | 220026 | 10 | | | |
| | | | | | 12V | PRC2P20CBL | 220022 | 10 | | | |
| | | | DC | | | | | 24V | PRC2P20CDL | 220023 | 10 |
| | | | | | | | | 48V | PRC2P20CGL | 220025 | 10 |
| | | | | | | | | 110V | PRC2P20CJL | 220027 | 10 |
| | | | | | | | | 12V | PRC2P20CDL | 220041 | 10 |
| | | | | | | | | 24V | PRC2P20CDL | 220042 | 10 |
| | | | | | | | | 48V | PRC2P20DCGL | 220043 | 10 |
| | | | DC diode | | | | | 110V | PRC2P20DCJL | 220044 | 10 |
| | | | | | | | | | | | |
|  | Standard 11 pin 3 changeover contacts 10A/250V | 0 AgNi | AC | 50/60 Hz | 12V | PRC3P30ABL | 220310 | 10 | | | |
| | | | | | 24V | PRC3P30ADL | 220311 | 10 | | | |
| | | | | | 48V | PRC3P30AGL | 220312 | 10 | | | |
| | | | | | 120V | PRC3P30AJL | 220315 | 10 | | | |
| | | | | | 230V | PRC3P30ANL | 220317 | 10 | | | |
| | | | | | 12V | PRC3P30CBL | 220313 | 10 | | | |
| | | | DC | | | | | 24V | PRC3P30CDL | 220314 | 10 |
| | | | | | | | | 48V | PRC3P30CGL | 220316 | 10 |
| | | | | | | | | 110V | PRC3P30CJL | 220318 | 10 |
| | | | | | | | | 12V | PRC3P30DCBL | 220335 | 10 |
| | | | | | | | | 24V | PRC3P30DCDL | 220336 | 10 |
| | | | | | | | | 48V | PRC3P30DCGL | 220337 | 10 |
| | | | DC diode | | | | | 110V | PRC3P30DCJL | 220338 | 10 |
| | | | | | | | | | | | |

Sockets


| | | | | Cat. no. | Ref. no. | Pack |
|---|--|------------------------------|-------------|----------|----------|------|
|  | For PRC2P20... Standard 8 pin | Screw terminals One level | Socket | PRCZ8 | 220216 | 10 |
| | | | Fixing clip | PRCPZ11 | 220218 | 10 |
| | | Solder terminal | Socket | PRCG8 | 220217 | 10 |
| | | | Fixing clip | PRCR159 | 220219 | 10 |
|  | For PRC3P30... Standard 11 pin | Screw terminals One level | Socket | PRCZ11 | 220647 | 10 |
| | | | Fixing clip | PRCPZ11 | 220218 | 10 |
| | | Solder terminal | Socket | PRCG11 | 220648 | 10 |
| | | | Fixing clip | PRCR159 | 220219 | 10 |

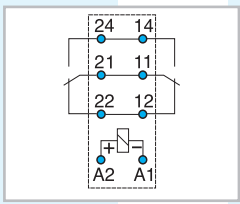
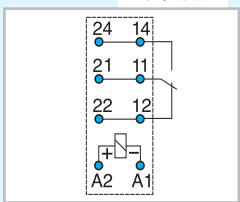
Interface relay

| | Ratings AC1 | Ratings DC1 | Contacts material | Voltage | | With LED | | | |
|--|-------------|-------------|-------------------|----------------------|--------------------|----------|----------------------|------------|--------|
| | | | | | | Cat. no. | Ref. no. | Pack | |
|  1 single pole 1 changeover contact | 6,2mm wide | 6A/250V | - | 3 AgSnO ₂ | AC/DC | 230V | PRC1S13BNL | 222013 | 10 |
| | | | | | | AC | 230V | PRC1S13ANL | 222012 |
| | | | | | DC | 12V | PRC1S13CBL | 222007 | 10 |
| | | | | | | 24V | PRC1S13CDL | 222008 | 10 |
| | | | | | AC/DC | 24V | PRC1S13BDL | 222004 | 10 |
| | | | | | | | Identification label | PRCTR1S | 222043 |
| | | | | | 20-way jumper link | PRCW20 | 222039 | 10 | |





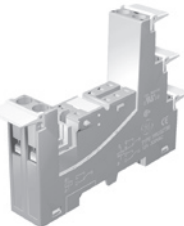
Interface relay for PLC systems

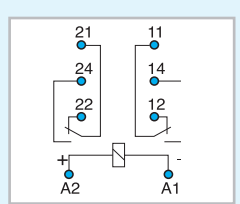
| | Ratings AC1 | Ratings DC1 | Contacts material | Voltage | | With LED | | | | | |
|---|-------------|-------------|-------------------|---------|---------|------------|------------|------------|------------|--------|----|
| | | | | | | Cat. no. | Ref. no. | Pack | | | |
|  1 changeover contact 2 changeover contacts | 16A/250V | 16A/24V | 0 AgNi | AC | 24V | PRC1T10ADL | 221868 | 10 | | | |
| | | | | | 120V | PRC1T10AJL | 221869 | 10 | | | |
| | | | | | 230V | PRC1T10ANL | 221870 | 10 | | | |
| | | | | | DC | 12V | PRC1T10CBL | 221860 | 10 | | |
| | | | | | | 24V | PRC1T10CDL | 221861 | 10 | | |
| | | | | | | 110V | PRC1T10CJL | 221862 | 10 | | |
| | | | | AC | 8A/250V | 8A/24V | 0 AgNi | 24V | PRC1T20ADL | 221883 | 10 |
| | | | | | | | | 120V | PRC1T20AJL | 221884 | 10 |
| | | | | | | | | 230V | PRC1T20ANL | 221885 | 10 |
| | | | | | DC | 12V | | PRC1T20CBL | 221875 | 10 | |
| 24V | PRC1T20CDL | 221876 | 10 | | | | | | | | |
| 110V | PRC1T20CJL | 221877 | 10 | | | | | | | | |



Complete set of relay, socket, module (diode+Led for DC-Varistor + Led for AC) and retaining clip + marking plate. 16mm width

Spare parts

| | | | | Voltage | | Cat. no. | Ref. no. | Pack |
|---|--------------------|--------------------|------|----------|--------|----------|----------|------|
| Miniature P.C.B. relays. 16A 1 changeover contact  | 50/60 Hz | AC | 24V | PRCT1AD | 221896 | 20 | | |
| | | | 120V | PRCT1AJ | 221897 | 20 | | |
| | | | 230V | PRCT1AN | 221898 | 20 | | |
| | | DC | 12V | PRCT1CB | 221890 | 20 | | |
| | | | 24V | PRCT1CD | 221891 | 20 | | |
| | | | 110V | PRCT1CJ | 221892 | 20 | | |
| Miniature P.C.B. relays. 8A 2 changeover contacts  | 50/60 Hz | AC | 24V | PRCT2AD | 221913 | 20 | | |
| | | | 120V | PRCT2AJ | 221914 | 20 | | |
| | | | 230V | PRCT2AN | 221915 | 20 | | |
| | | DC | 12V | PRCT2CB | 221905 | 20 | | |
| | | | 24V | PRCT2CD | 221906 | 20 | | |
| | | | 110V | PRCT2CJ | 221907 | 20 | | |
| Socket for miniature P.C.B. relays  | Three level screws | | | PRCGZT80 | 221918 | 10 | | |
| | | Retainer/Retractor | | PRCMS16 | 221920 | 10 | | |
| | | Plate | | PRCTR | 221921 | 10 | | |



NOTE: If more than 12A are applied to the relay contact, twin wiring is required. See the connection diagram of the relay

Order codes

A

B

C

D

E

F

G

H

I

X



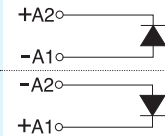
Modules for sockets



Diode

Protection against polarity inversion

For use with sockets:
PRCG-ES15/2N
PRCG-ES15/3N
PRCG-ES15/4N



6 / 230V DC

6 / 230V DC

Color
Led

Cat. no.

Ref. no.

Pack

PRCM21P

222100

10

PRCM21N

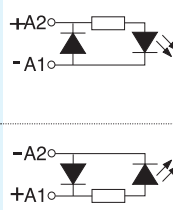
222101

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Diode
and Led

Protection against polarity inversion
Coil energizing indication

For use with sockets:
PRCG-ES15/2N
PRCG-ES15/3N
PRCG-ES15/4N
PRCGZT80



6 / 24V DC

24 / 60V DC

110 / 230V DC

6 / 24V DC

24 / 60V DC

110 / 230V DC

Red

Green

Red

Green

Red

Green

Red

Green

PRCM31R

PRCM31G

PRCM32R

PRCM32G

PRCM33R

PRCM33G

PRCM41R

PRCM41G

PRCM42R

PRCM42G

PRCM43R

PRCM43G

222102

222104

222103

222105

222109

222106

222110

222107

222111

222124

222112

222125

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10

10

10

10

10

10

10

10

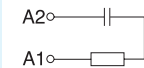
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RC group

Arc suppression circuit

For use with sockets:
PRCG-ES15/2N
PRCG-ES15/3N
PRCG-ES15/4N



6 / 24V AC

24 / 60V AC

110 / 240V AC

PRCM51

PRCM52

PRCM53

222113

222114

222115

10

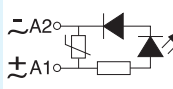
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10

Led
and varistor

No protection against polarity inversion
Coil energizing indication
AC/DC voltage allowed

For use with sockets:
PRCG-ES15/2N
PRCG-ES15/3N
PRCG-ES15/4N
PRCGZT80



6 / 24V AC

110 / 230V AC

Red

Green

Green

PRCM91R

PRCM91G

PRCM93G

222116

222126

222120

10

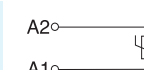
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Varistor group

No indication
Protection against overvoltage

For use with sockets:
PRCG-ES15/2N
PRCG-ES15/3N
PRCG-ES15/4N



24V AC

230V AC

PRCM71

PRCM73

222121

222122

10

10

Technical data

Sockets for miniature plug-in relays

| | | PRCG-ES15/2N | PRCG-ES15/3N | PRCG-ES15/4N |
|-----------------------|--------------------|-------------------------------|-------------------------------|-------------------------------|
| | | Screw terminals two levels | Screw terminals two levels | Screw terminals two levels |
| <i>Specifications</i> | | | | |
| Nominal load | (A) | 12 (300V) | 10 (300V) | 10 (300V) |
| Dielectric strength | | | | |
| Adjacent screws | (kV) | 3 | 3 | 3 |
| Screws - rail | (kV) | 3 | 3 | 3 |
| Terminals | | | | |
| Type | | Screw M4, Pozidriv | Screw M4, Pozidriv | Screw M3, Pozidriv |
| Max. torque | (Nm) | 0,7 | 0,7 | 0,7 |
| Protection category | | IP20 | IP20 | IP20 |
| Capacity | | 2x2.5 | 2x2.5 | 2x2.5 |
| Solid wire | (mm ²) | | | |
| Flexible wire | | 22-14 AWG | 22-14 AWG | 22-14 AWG |
| Ambient temperature | (°C) | -40 ... +70 | -40 ... +70 | -40 ... +70 |

Sockets for 8-11 pin standard plug-in relays

| | | PRCZ8 | PRCG08 | PRCZ11 | PRCG11 |
|-----------------------|--------------------|------------------------------|------------------------------------|------------------------------|------------------------------------|
| | | Screw terminals One level | 8 pin Solder terminal socket | Screw terminals One level | 11 pin Solder terminal socket |
| <i>Specifications</i> | | | | | |
| Nominal load | (A) | 10 (250V) | 10 (250V) | 10 (250V) | 10 (250V) |
| Dielectric strength | | | | | |
| Adjacent screws | (kV) | 2.5 | 2.5 | 2.5 | 2.5 |
| Screws - rail | (kV) | 3 | | 3 | |
| Terminals | | | | | |
| Type | | Screw M3, Pozidriv | Hard brass tin-plated terminals | Screw M3, Pozidriv | Hard brass tin-plated terminals |
| Max. torque | (Nm) | 0,7 | | 0,7 | |
| Protection category | | IP20 | | IP20 | |
| Capacity | | 2x2.5 | | 2x2.5 | |
| Solid wire | (mm ²) | | | | |
| Flexible wire | | 22-14 AWG | | 22-14 AWG | |
| Ambient temperature | (°C) | -40 ... +70 | | -40 ... +70 | |

Sockets for miniature P.C.B. relays

| | | PRCGZ80 |
|-----------------------|--------------------|-------------------------------|
| | | Screw terminals Two levels |
| <i>Specifications</i> | | |
| Nominal load | (A) | 12 (300V) |
| Dielectric strength | | |
| Adjacent screws | (kV) | 3 |
| Screws - rail | (kV) | 3 |
| Terminals | | |
| Type | | Screw M4, Pozidriv |
| Max. torque | (Nm) | 0,7 |
| Protection category | | IP20 |
| Capacity | | 2x2.5 |
| Solid wire | (mm ²) | |
| Flexible wire | | 22-14 AWG |
| Ambient temperature | (°C) | -40 ... +70 |

A

B

C

D

E

F

G

H

I

X

Miniature plug-in relays

| | | PRC4M20... | PRC4M30... | PRC4M40... |
|--|-------------|----------------------|----------------------|----------------------|
| | | 2 pole | 3 pole | 4 pole |
| Contacts | | | | |
| Number of contacts | | 2 changeover | 3 changeover | 4 changeover |
| Standard material | | AgNi | AgNi | AgNi |
| Optional material | | AgNi/Au 5μ | AgNi/Au 5μ | AgNi/Au 5μ |
| Voltage | | | | |
| Max. switching AC/DC (poll. 3) voltage | | 250V | 250V | 250V |
| AC (poll. 2) | | 400V | 400V | 400V |
| Min. switching voltage AC/DC | | 5V | 5V | 5V |
| Current | | | | |
| Rated load | | | | |
| AC1 | (A) | 12 (250V AC) | 10 (250V AC) | 6 (250V AC) |
| AC15 | (A) | 4 (250V AC) | 4 (250V AC) | 2,5 (250V AC) |
| DC1 | (A) | 12 (24V DC) | 10 (24V DC) | 6 (24V DC) |
| Min. switching current | (mA) | 5 | 5 | 5 |
| Max. inrush current | (A) | 24 | 20 | 12 |
| Rated current | (A) | 12 | 10 | 6 |
| Max. breaking capacity | (VA) | 3000 | 2500 | 1500 |
| Resistance | (mΩ) | ≤100 (100mA, 24V) | ≤100 (100mA, 24V) | ≤100 (100mA, 24V) |
| Max. operating frequency | | | | |
| At rated load | cycles/hour | 1200 | 1200 | 1200 |
| No load | cycles/hour | 18000 | 18000 | 18000 |
| Coil | | | | |
| Rated voltage | | | | |
| AC 50/60Hz | (V) | 6 ... 240 | 6 ... 240 | 6 ... 240 |
| DC | (V) | 5 ... 220 | 5 ... 220 | 5 ... 220 |
| Must release time voltage | | | | |
| AC | | ≥0.2 Un | ≥0.2 Un | ≥0.2 Un |
| DC | | ≥0.1 Un | ≥0.1 Un | ≥0.1 Un |
| Operating range of supply voltage | | Table 1, 2 | Table 1, 2 | Table 1, 2 |
| Rated power consumption | | | | |
| AC 50Hz | (VA) | 1.5 | 1.6 | 1.6 |
| 60Hz | (VA) | 1.3 | 1.3 | 1.3 |
| DC | (W) | 0.9 | 0.9 | 0.9 |
| AC/DC | (W) | - | - | - |
| Insulation | | | | |
| Insulation category | | C250 | C250 | B250 |
| Insulation rated voltage | (VAC) | 250 | 250 | 250 |
| Dielectric strength | | | | |
| Coil-Contact | (VAC) | 2500 | 2500 | 2500 |
| Contact-Contact | (VAC) | 1500 | 1500 | 1500 |
| Pole-Pole | (VAC) | 2500 | 2500 | 2000 |
| Contact coil distance | | | | |
| Clearance | mm | ≥ 2.5 | ≥ 2.5 | ≥ 1.6 |
| Creepage | mm | ≥ 4 | ≥ 4 | ≥ 3.2 |
| General data | | | | |
| Operating time (typical value) | | | | |
| AC | (ms) | 10 | 10 | 10 |
| DC | (ms) | 13 | 13 | 13 |
| Release time (typical value) | | | | |
| AC | (ms) | 8 | 8 | 8 |
| DC | (ms) | 3 | 3 | 3 |
| Electrical life | | | | |
| Resistive | | ≥ 10 ⁵ | ≥ 10 ⁵ | ≥ 10 ⁵ |
| | | (12A, 250V AC) | (10A, 250V AC) | (6A, 250V AC) |
| Cos φ | | See curves | See curves | See curves |
| Mechanical life (cycles) | | ≥ 10 ⁷ | ≥ 10 ⁷ | ≥ x10 ⁷ |
| Ambient temperature | | | | |
| Storage | (°C) | -40 ... +85 | -40 ... +85 | -40 ... +85 |
| Operating | | | | |
| AC | (°C) | -40 ... +55 | -40 ... +55 | -40 ... +55 |
| DC | (°C) | -40 ... +70 | -40 ... +70 | -40 ... +70 |
| Cover protection category | | IP40 | IP40 | IP40 |
| Shock resistance | (G) | 10 | 10 | 10 |
| Vibration resistance | | | | |
| | (G) | 5 | 5 | 5 |
| | | (for 10..150Hz) | (for 10..150Hz) | (for 10..150Hz) |

Table 1. Coil data DC version

| Rated voltage V DC | Coil resistance Ω | Coil operating range V DC | |
|-----------------------|----------------------|---------------------------|-------------------|
| | | Min. (at 20°C) | Max. (at 55°C) |
| 12 | 160 | 9.6 | 13.2 |
| 24 | 640 | 19.2 | 26.4 |
| 48 | 2600 | 38.4 | 52.8 |
| 110 | 13600 | 88 | 121 |
| 220 | 54000 | 176 | 242 |

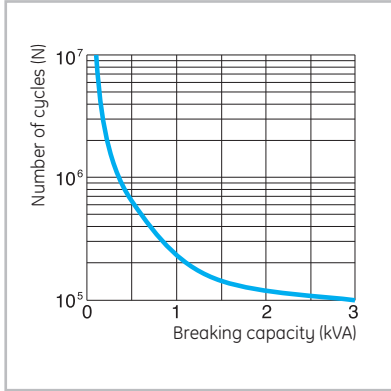
Table 2. Coil data AC 50/60Hz version

| Rated voltage V AC | Coil resistance Ω | Coil operating range V AC | |
|-----------------------|----------------------|---------------------------|-------------------|
| | | Min. (at 20°C) | Max. (at 55°C) |
| 12 | 39 | 9.6 | 13.2 |
| 24 | 158 | 19.2 | 26.4 |
| 48 | 640 | 38.4 | 52.8 |
| 120 | 3770 | 88 | 121 |
| 230 | 16100 | 184 | 253 |

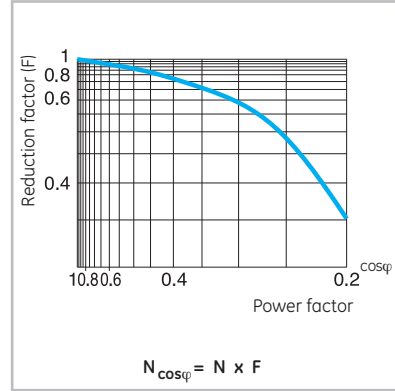


Miniature 2 pole plug-in relays

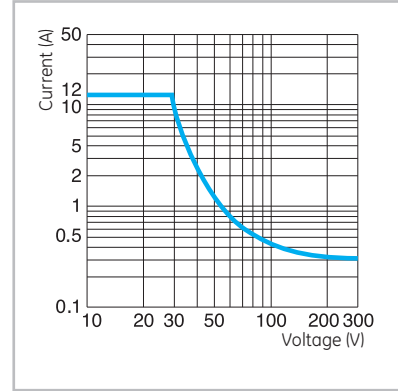
Electrical life at AC resistive load



Electrical life reduction factor at AC inductive load

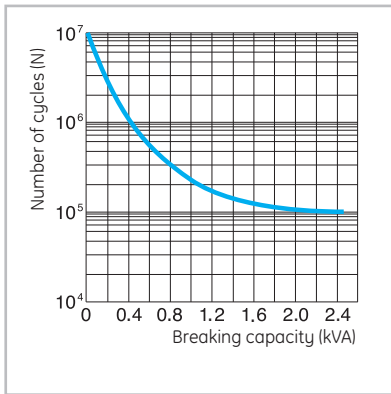


Max. DC resistive load breaking capacity

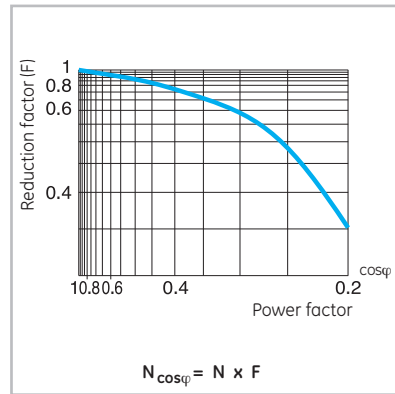


Miniature 3 pole plug-in relays

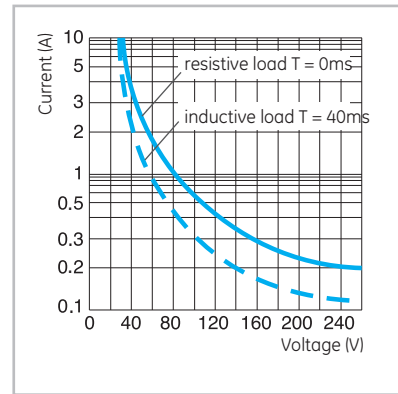
Electrical life at AC resistive load



Electrical life reduction factor at AC inductive load

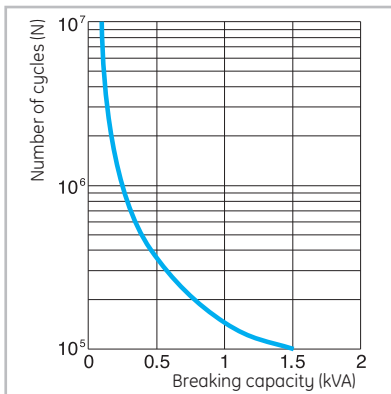


Max. DC load breaking capacity

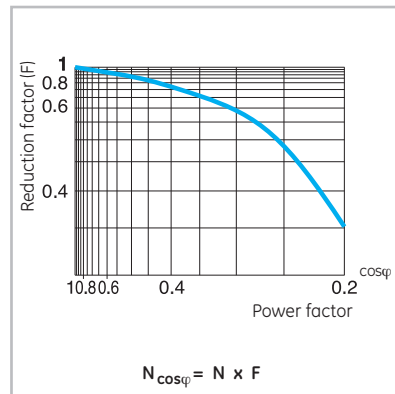


Miniature 4 pole plug-in relays

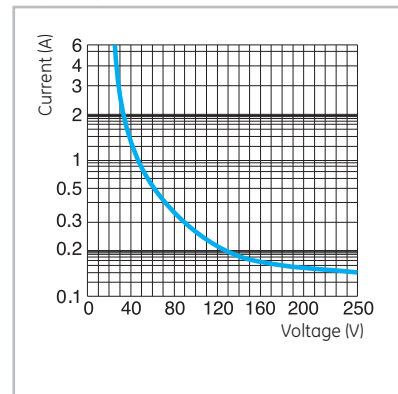
Electrical life at AC resistive load



Electrical life reduction factor at AC inductive load



Max. DC resistive load breaking capacity



Standard 8-11 pin plug-in relays

| | | PRC2P20... | PRC3P30... | |
|-----------------------------------|-----------------------|------------------------------------|------------------------------------|-------------|
| | | Standard 8-pin | Standard 11-pin | |
| Contacts | | | | |
| Number of contacts | | 2 changeover | 3 changeover | |
| Standard material | | AgNi | AgNi | |
| Optional material | | AgNi/Au 5μ | AgNi/Au 5μ | |
| Voltage | | | | |
| Max switching voltage | AC/DC (poll. 3) | 250V | 250V | |
| | AC (poll. 2) | 400V | 400V | |
| Min switching voltage AC/DC | | 10V (AgNi) 5V (AgNi/Au 5μ) | 10V (AgNi) 5V (AgNi/Au 5μ) | |
| Current | | | | |
| Rated load | AC1 (A) | 10 (250V AC) | 10 (250V AC) | |
| | AC15 (A) | 4 (250V AC) | 4 (250V AC) | |
| | DC1 (A) | 10 (24V DC) | 10 (24V DC) | |
| Min. switching current (mA) | | 5 | 5 | |
| Max. inrush current (A) | | 30 | 30 | |
| Rated current (A) | | 10 | 10 | |
| Max. breaking capacity (VA) | | 2500 | 2500 | |
| Resistance (mΩ) | | H100 (100mA, 24V) | H100 (100mA, 24V) | |
| Max. operating frequency | | | | |
| At rated load (cycles/hour) | | 1200 | 1200 | |
| No load (cycles/hour) | | 12000 | 12000 | |
| Coil | | | | |
| Rated voltage | AC 50/60Hz (V) | 6 ... 240 | 6 ... 240 | |
| | DC (V) | 6 ... 220 | 6 ... 220 | |
| Must release time voltage | AC | ≥0.15 Un | ≥0.15 Un | |
| | DC | ≥0.1 Un | ≥0.1 Un | |
| Operating range of supply voltage | | Table 1, 2 | Table 1, 2 | |
| Rated power consumption | AC 50Hz (VA) | 2,7 | 2,7 | |
| | 60Hz (VA) | 2,5 | 2,5 | |
| | DC (W) | 1,5 | 1,5 | |
| | AC/DC (W) | - | - | |
| Insulation | | | | |
| Insulation category | | C250 | C250 | |
| Insulation rated voltage (VAC) | | 250 | 250 | |
| Dielectric strength | Coil-Contact (VAC) | 2500 | 2500 | |
| | Contact-Contact (VAC) | 1500 | 1500 | |
| | Pole-Pole (VAC) | 2000 | 2000 | |
| Distance Clearance (mm) | | ≥ 3 | ≥ 3 | |
| contact coil Creepage (mm) | | ≥ 4.2 | ≥ 4.2 | |
| General | | | | |
| Operating time (typical value) | AC (ms) | 12 | 12 | |
| | DC (ms) | 12 | 12 | |
| Release time (typical value) | AC (ms) | 10 | 10 | |
| | DC (ms) | 7 | 7 | |
| Electrical life | Resistive | ≥ 2x10 ⁵ (10A, 250V AC) | ≥ 2x10 ⁵ (10A, 250V AC) | |
| | Cos φ | See curves | See curves | |
| Mechanical life (cycles) | | ≥ 2x10 ⁷ | ≥ 2x10 ⁷ | |
| Ambient temperature | Storage (°C) | -40 ... +85 | -40 ... +85 | |
| | Operating | AC (°C) | -40 ... +55 | -40 ... +55 |
| | | DC (°C) | -40 ... +70 | -40 ... +70 |
| Cover protection category | | IP40 | IP40 | |
| Shock resistance (G) | | 10 | 10 | |
| Vibration resistance (G) | | 5 | 5 | |

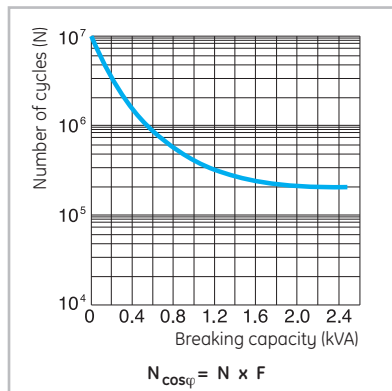
Table 1. Coil data DC version

| Rated voltage V DC | Coil resistance Ω | Coil operating range V DC | |
|--------------------|-------------------|---------------------------|----------------|
| | | Min. (at 20°C) | Max. (at 55°C) |
| 12 | 110 | 9.6 | 13.2 |
| 24 | 430 | 19.2 | 26.4 |
| 48 | 1750 | 38.4 | 52.8 |
| 110 | 9200 | 88 | 121 |
| 220 | 37000 | 176 | 242 |

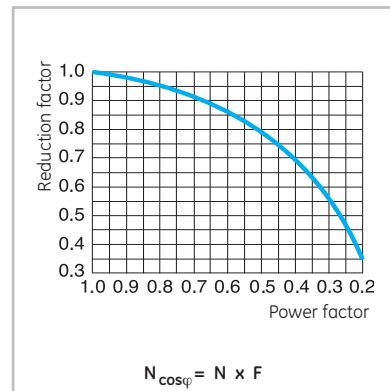
Table 2. Coil data AC 50/60Hz version

| Rated voltage V AC | Coil resistance Ω | Coil operating range V AC | |
|--------------------|-------------------|---------------------------|----------------|
| | | Min. (at 20°C) | Max. (at 55°C) |
| 12 | 18.5 | 9.6 | 13.2 |
| 24 | 75 | 19.2 | 26.4 |
| 48 | 305 | 38.4 | 52.8 |
| 120 | 1910 | 96 | 132 |
| 230 | 7080 | 184 | 253 |

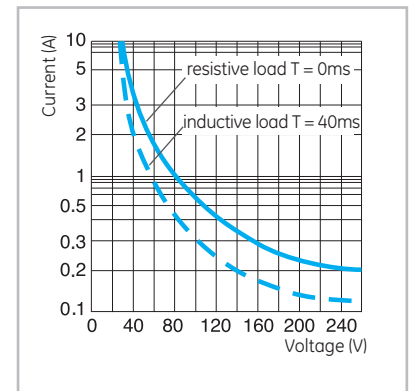
Electrical life at AC resistive load



Electrical life reduction factor at AC inductive load



Max. DC load breaking capacity



Interface plug-in relays

| PRC1S13... | | | |
|-----------------------------------|-----------------|----------------------------------|------------------|
| Contacts | | | |
| Number of contacts | | 1 changeover | |
| Standard material | | AgSnO ₂ | |
| Optional material | | | |
| Voltage | | | |
| Max switching voltage | AC/DC (poll. 3) | AC 250V / DC 150V | |
| | AC (poll. 2) | AC 400V / DC 300V | |
| Min switching voltage | AC/DC | 12V | |
| Current | | | |
| Rated load | AC1 | (A) 6 (250V AC) | |
| | AC15 | (A) 15 | |
| | DC1 | (A) 6 (24V DC) | |
| Min. switching current | (mA) | 10 | |
| Max. inrush current (A) | | 15 | |
| Rated current | (A) | 6 | |
| Max. breaking capacity | (VA) | 1500V | |
| Resistance | (mΩ) | ≤100 (100mA, 24V) | |
| Max. operating frequency | | | |
| At rated load | | 360 cycles/hour | |
| No load | | 72000 cycles/hour | |
| Coil | | | |
| Rated voltage | AC/DC | (V) 24, 230 | |
| | AC 50/60Hz | (V) 230 | |
| | DC | (V) 12, 24 | |
| Must release time voltage | AC | ≥0,2 Un | |
| | DC | ≥0,1 Un | |
| Operating range of supply voltage | | See Table 1 | |
| Rated power consumption | AC 50Hz | (VA) 0.6...1.9 | |
| | 60Hz | (VA) - | |
| | DC | (W) 0.33 | |
| | AC/DC | (W) 0.48 (at 24V), 1.8 (at 230V) | |
| Insulation | | | |
| Insulation category | | C250 | |
| Insulation rated voltage | (VAC) | 400 | |
| Dielectric strength | Coil-Contact | (VAC) 4000 | |
| | Contact-Contact | (VAC) 1000 | |
| | Pole-Pole | (VAC) - | |
| Distance contact coil | Clearance | mm ≥ 8 | |
| | Creepage | mm ≥ 8 | |
| General | | | |
| Operating time (typical value) | AC | (ms) 8 | |
| | DC | (ms) 6 | |
| Release time (typical value) | AC | (ms) 15 | |
| | DC | (ms) 8 | |
| Electrical life | Resistive | | |
| | Cos φ | | |
| Mechanical life (cycles) | | 20x10 ⁶ | |
| Ambient temperature | Storage | (°C) -40 ... +70 | |
| | Operating | AC | (°C) -20 ... +55 |
| | | DC | (°C) -20 ... +55 |
| Cover protection category | | IP20 | |
| Shock resistance | (G) | 10 | |
| Vibration resistance | (G) | 0.062" DA (10 ... 55Hz) | |

Table 1. Interface relay

| Rated voltage V | | Coil operating range V DC | |
|-----------------|-------|---------------------------|------|
| | | Min. | Max. |
| 12 | DC | 9 | 17 |
| 24 | DC | 17 | 30 |
| 24 | AC/DC | 18 | 30 |
| 230 | AC | 80 | 250 |
| 230 | AC/DC | 185 | 250 |

Interface relay for PLC systems

| PRC1T10... | | |
|-----------------------------------|-----------------|--|
| Contacts | | |
| Number of contacts | | 1 changeover |
| Standard material | | AgNi |
| Optimal material | | |
| Voltage | | |
| Max. switching voltage | AC/DC | AC 400V / DC 300V |
| Min. switching voltage | AC/DC | 5V |
| Current | | |
| Rated load | AC1 | (A) 16 (250V AC) |
| | DC1 | (A) 16 (24V DC) |
| Min. switching current | (mA) | 5 |
| Max. inrush current | (A) | 30 |
| Rated current | (A) | 16 |
| Max. breaking capacity | (VA) | 4000 |
| Min. breaking capacity | (W) | 0,3 |
| Resistance | (mΩ) | ≤100 (at 1A, 24V) |
| Max. operating frequency | | |
| At rated load | | 600 cycles/hour |
| No load | | 72000 cycles/hour |
| Coil | | |
| Rated voltage | AC 50/60Hz | (V) 24,120, 230 |
| | DC | (V) 12, 24, 110 |
| Must release time | AC | ≥0.15 Un |
| | DC | ≥0.1 Un |
| Operating range of supply voltage | | |
| Rated power consumption | AC | (VA) 0.75 |
| | DC | (W) 0.4 |
| Insulation | | |
| Insulation category | | |
| | | C250 |
| Insulation rated voltage | | |
| | (VAC) | 400 |
| Dielectric strength | | |
| | Coil-Contact | (VAC) 5000 |
| | Contact-Contact | (VAC) 1000 |
| | Pole-Pole | (VAC) - |
| Distance | Clearance | mm ≥ 10 |
| | Creepage | mm ≥ 10 |
| General | | |
| Operating time (typical value) | AC | (ms) 7 |
| | DC | (ms) 7 |
| Release time (typical value) | AC | (ms) 5 |
| | DC | (ms) 3 |
| Electrical life | Resistive | (s) ≥ 0.7 × 10 ⁵ (at 16A, 250VAC) |
| | Cos φ | See curves |
| | L/R = 40ms | ≥ 10 ⁵ (at 0.12A, 220VDC) |
| Mechanical life (cycles) | | |
| | | 3 × 10 ⁷ |
| Ambient temperature | Storage | (°C) -40 ... +70 |
| | Operating | (°C) -40 ... +70 |
| Cover protection category | | |
| | | IP40 |
| Shock resistance | | |
| | (G) | 30 |
| Vibration resistance | | |
| | (G) | 10 (for 10 ... 150Hz) |

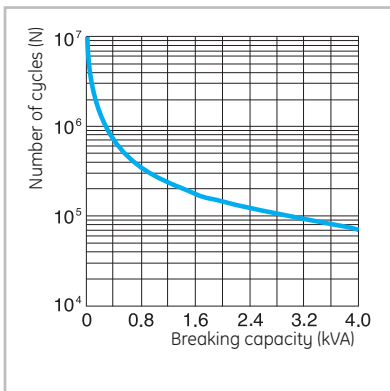
Table 1. Coil data DC version

| Rated voltage V DC | Coil resistance (±10%) at 20°C Ω | Coil operating range V DC | |
|--------------------|----------------------------------|---------------------------|--------|
| | | U Min. | U Max. |
| 12 | 360 | 8.4 | 30.6 |
| 24 | 1440 | 16.8 | 61.2 |
| 110 | 25200 | 77 | 280 |

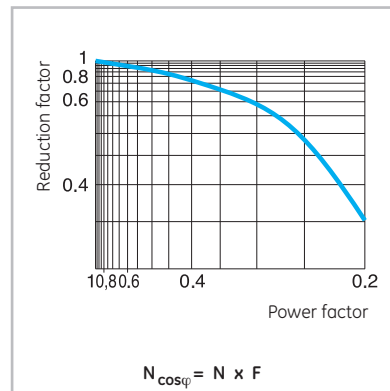
Table 2. Coil data AC 50/60Hz version

| Rated voltage V AC | Coil resistance (±10%) at 20°C Ω | Coil operating range V AC | |
|--------------------|----------------------------------|---------------------------|--------|
| | | U Min. | U Max. |
| 24 | 400 | 19.2 | 28.8 |
| 120 | 10200 | 96 | 144 |
| 230 | 38500 | 184 | 276 |

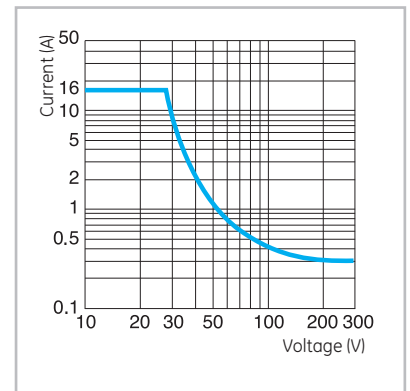
Electrical life at AC resistive load



Electrical life reduction factor at AC inductive load



Max. DC load breaking capacity



Interface relay for PLC systems

| | | PRC1T20... | |
|-----------------------------------|-----------------|-----------------------|---|
| Contacts | | | |
| Number of contacts | | 2 changeover | |
| Standard material | | AgNi | |
| Optional material | | | |
| Voltage | | | |
| Max. switching voltage | AC/DC | AC 400V / DC 300V | |
| Min. switching voltage | AC/DC | 5V | |
| Current | | | |
| Rated load | AC1 | (A) | 8 (250V AC) |
| | DC1 | (A) | 8 (24V DC) |
| Min. switching current | (mA) | 5 | |
| Max. inrush current | (A) | 15 | |
| Rated current | (A) | 8 | |
| Max. breaking capacity | (VA) | 2000 | |
| Min. breaking capacity | (W) | 0,3 | |
| Resistance | (mΩ) | ≤100 (at 1A, 24V) | |
| Max. operating frequency | | | |
| At rated load | | 600 cycles/hour | |
| No load | | 72000 cycles/hour | |
| Coil | | | |
| Rated voltage | AC 50/60Hz | (V) | 24, 230 |
| | DC | (V) | 12, 24 |
| Must release time voltage | AC | ≥0.15 Un | |
| | DC | ≥0.1 Un | |
| Operating range of supply voltage | | See Table 1, 2 | |
| Rated power consumption | AC | (VA) | 0.75 |
| | DC | (W) | 0.4 |
| Insulation | | | |
| Insulation category | | C250 | |
| Insulation rated voltage | (VAC) | 400 | |
| Dielectric strength | Coil-Contact | (VAC) | 5000 |
| | Contact-Contact | (VAC) | 1000 |
| | Pole-Pole | (VAC) | - |
| Distance contact coil | Clearance | mm | ≥ 10 |
| | Creepage | mm | ≥ 10 |
| General | | | |
| Operating time (typical value) | AC | (ms) | 7 |
| | DC | (ms) | 7 |
| Release time (typical value) | AC | (ms) | 5 |
| | DC | (ms) | 3 |
| Electrical life | Resistive | (s) | ≥ 0.7 × 10 ⁵ (at 8A, 250VAC) |
| | Cos φ | | See curves |
| | L/R = 40ms | | ≥ 10 ⁵ (at 0,12A, 220VDC) |
| Mechanical life (cycles) | | 3×10 ⁷ | |
| Ambient temperature | Storage | (°C) | -40 ... +70 |
| | Operating | (°C) | -40 ... +70 |
| Cover protection category | | IP40 | |
| Shock resistance | (G) | 20 | |
| Vibration resistance | (G) | 10 (for 10 ... 150Hz) | |

Technical data

A

B

C

D

E

F

G

H

I

X

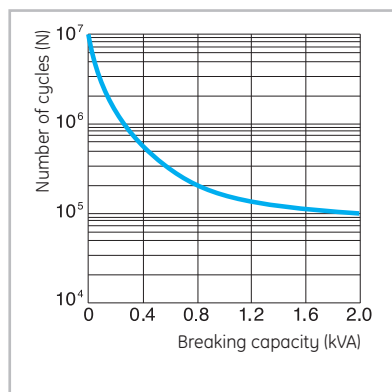
Table 1. Coil data DC version

| Rated voltage V DC | Coil resistance (±10%) at 20°C Ω | Coil operating range V DC | |
|-----------------------|--|---------------------------|--------|
| | | U Min. | U Max. |
| 12 | 360 | 8.4 | 30.6 |
| 24 | 1440 | 16.8 | 61.2 |
| 110 | 25200 | 77 | 280 |

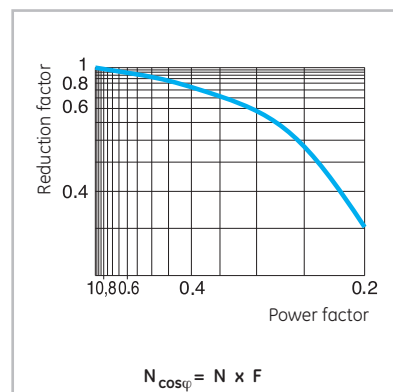
Table 2. Coil data AC 50/60 Hz version

| Rated voltage V AC | Coil resistance (±10%) at 20°C Ω | Coil operating range V AC | |
|-----------------------|--|---------------------------|--------|
| | | U Min. | U Max. |
| 24 | 400 | 19.2 | 28.8 |
| 120 | 10200 | 96 | 144 |
| 230 | 38500 | 184 | 276 |

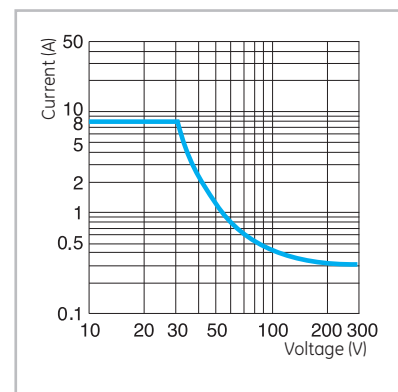
Electrical life at AC resistive load



Electrical life reduction factor at AC inductive load



Max. DC load breaking capacity



Series PRC

Plug-in relays

A

B

C

D

E

F

G

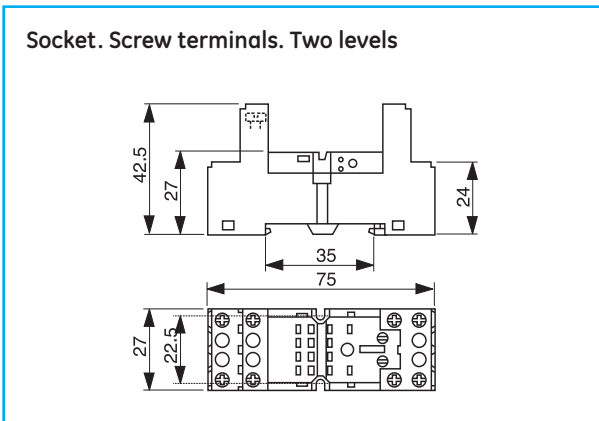
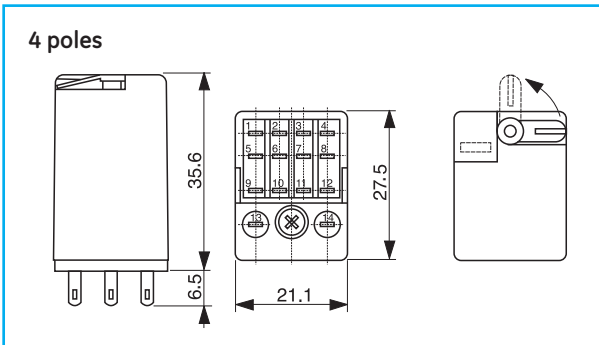
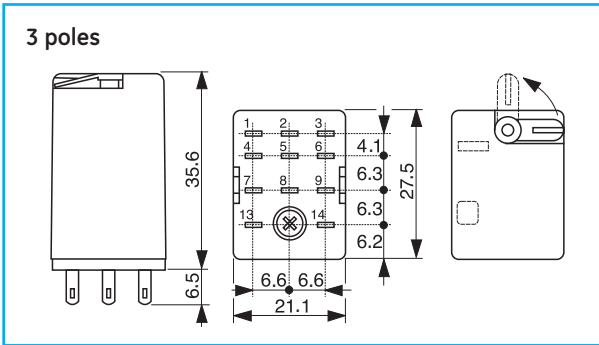
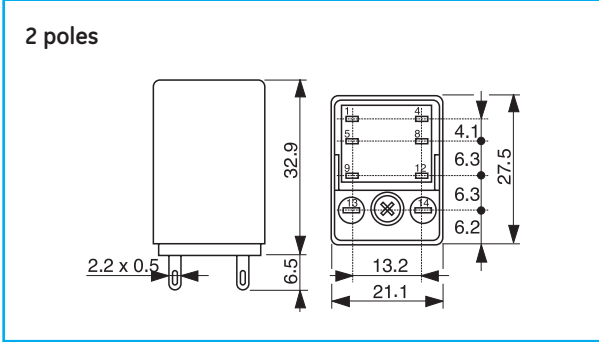
H

I

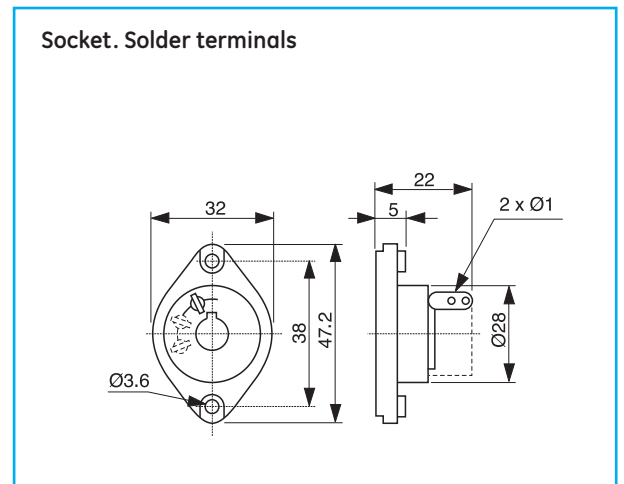
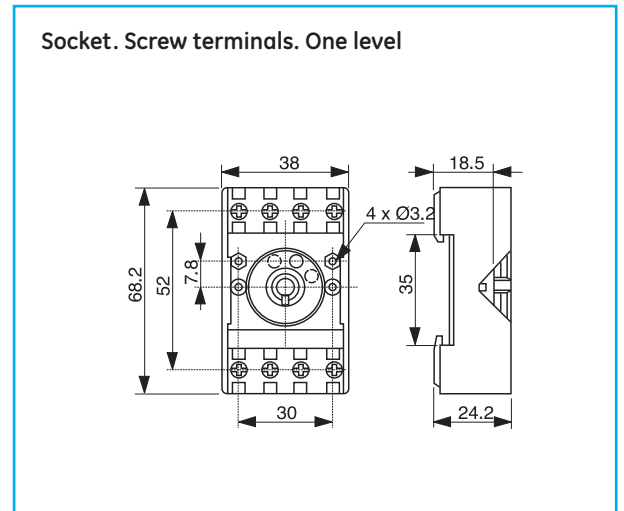
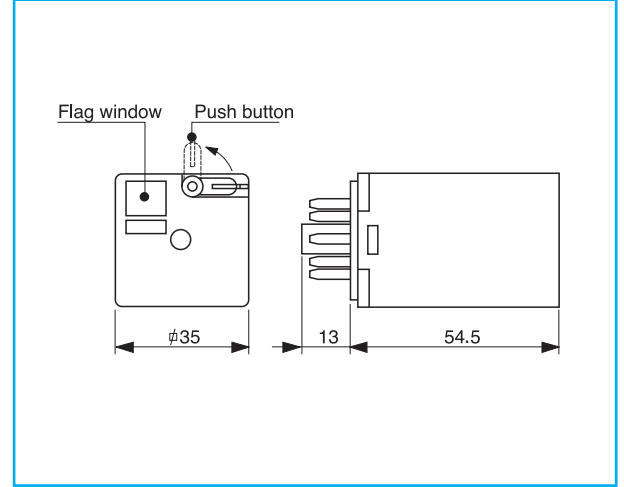
X

Dimensional drawings

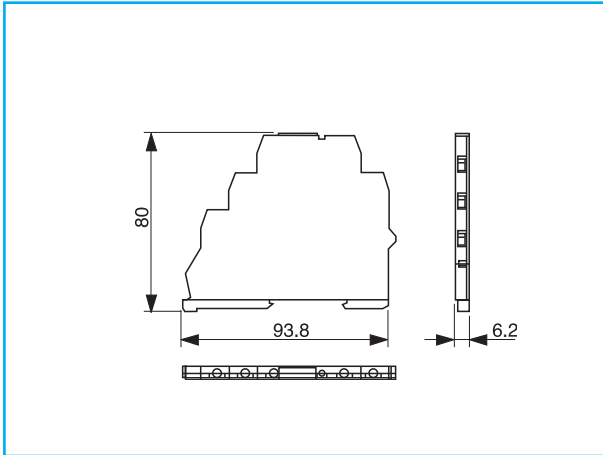
Miniature



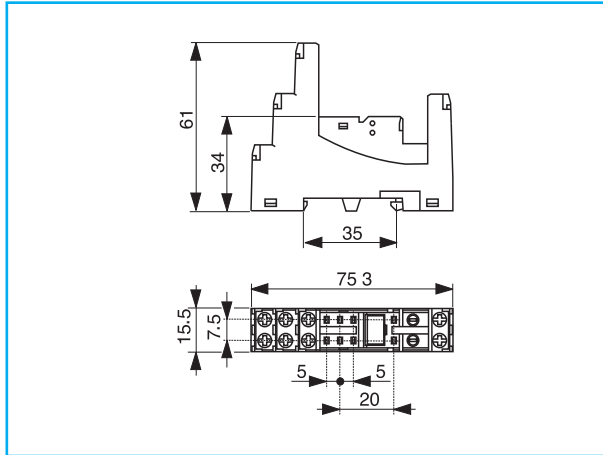
Standard 8-11 pin



Interface relay

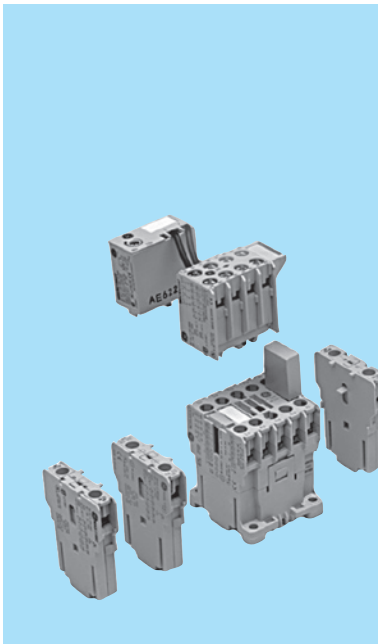


Socket for miniature P.C.B. relays



Dimensions

- A
- B
- C
- D
- E
- F
- G
- H
- I
- X



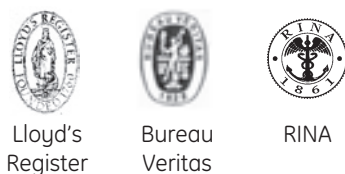
Auxiliary minicontactors *I_{th}* = 16A

- Control circuit: Alternating current up to 600V
Direct current up to 250V
- Terminal numbering in accordance with EN 50011
- Fixing system for rapid and simple mounting by clamping onto standard 35 mm DIN rail (EN 50022).
- Screw and push-on terminals protected against accidental contacts in accordance with VDE 0106 T.100 and VBG4.
- Printed circuit version.
- Ring terminal version.
- Facility to mount instant or timed auxiliary contact blocks and voltage suppressor blocks.
- Maximum number of auxiliary contacts to add: 6
- Degree of protection IP20 (EN 60529).
- According to IEC/EN 60947-1.

Standards

| | |
|------------------|----------------|
| IEC/EN 60947-5-1 | BS 4794 |
| IEC/EN 60947-1 | CENELEC HD 420 |
| EN 50002 | NFC 63-110 |
| EN 50005 | NFC 63-140 |
| EN 50011 | CSA C22.2/14 |
| UL 508 | VDE 0660 |

Approvals



- Order codes ● pg. A.17
- Auxiliary contacts blocks ● pg. A.18
- Accessories ● pg. A.20
- Technical data ● pg. A.26
- Combinations of contacts ● pg. A.32
- Dimensions ● pg. A.40

General data

| | |
|---|---------|
| Maximum number of contacts (MCR...) | 4 |
| Rated thermal current (I_{th}) θ ≤ 60° | (A) 16 |
| Rated operational voltage (U_e) acc. IEC 60947-1 | (V) 690 |
| Insulation voltage (U_i) acc. IEC 60947-1 | (V) 750 |

Utilisation category:

| | | | | | | | | |
|--------------|----------|-----|---------|---------|-----|-----|-----|---------|
| AC-15 | V | 110 | 220/240 | 380/400 | 415 | 440 | 500 | 660/690 |
| | A | 6 | 6 | 4 | 4 | 3 | 2.5 | 1.5 |

| | | | | | |
|--------------|----------|----|-----|-----|-----|
| DC-13 | V | 24 | 48 | 110 | 220 |
| | A | 5 | 3.5 | 1.2 | 0.6 |

Standard voltages

To complete the catalogue number, replace the symbol ◆ by the code corresponding to the voltage and frequency of the control circuit.

Alternating current (V). Bifrequency coil

| | | | | | | | | | | | | |
|----------------|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|
| ◆ | 10 | 1 | 2 | 9 | 3 | 4 | 5 | 6 | 7 | 8 | 12 | 13 |
| AC | 12 | 24 | 42 | 48 | 110 | 120 | 220 | 230 | 240 | 440 | 380 | 400 |
| 50/60Hz | | | | | 115 | | | | | | | |

Voltage operating limits of dual-frequency coil:

at 60Hz = 0.85 a 1.1 × U_s

at 50Hz = 0.8 a 1.1 × U_s for uninterrupted duty (ED=100%), temperature = 40°C

Alternating current (V)

| | | | | | | | | | | |
|-------------|---|----|----|-----|-----|-----|-----|-----|-----|-----|
| ◆ | A | E | G | K | M | N | S | U | W | Y |
| AC | | | 48 | 115 | | 220 | 260 | 380 | 415 | 500 |
| 50Hz | | | | 127 | | 240 | | 400 | 440 | |
| AC | 6 | 32 | 60 | | 208 | 240 | | 440 | 480 | 600 |
| 60Hz | | | | | 220 | 277 | | | | |

Direct current (V)

| | | | | | | | | | | | | | | | | | |
|-----------|---|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|
| ◆ | A | B | C | D | E | F | G | H | I | J | K | L | N | 17 | R | S | 16 |
| DC | 6 | 12 | 32 | 24 | 36 | 42 | 48 | 60 | 72 | 110 | 120 | 125 | 220 | 230 | 240 | 250 | 440 |

Direct current (V) - Wide voltage range

| | | | | | | |
|-----------|----|----|----|----|-----|-----|
| ◆ | WD | WE | WG | WI | WJ | WN |
| DC | 24 | 33 | 48 | 72 | 110 | 220 |



Auxiliary minicontactors

| | Contacts acc. EN 50011 | | Control circuit: alternating current | | | Control circuit: direct current | | | |
|-----|---|-----------|--------------------------------------|---------------------|------|---------------------------------|---------------------|------|----|
| | | | Cat. no. ⁽¹⁾ | Ref. no. see bottom | Pack | Cat. no. ⁽¹⁾ | Ref. no. see bottom | Pack | |
| | Screw terminal | | | | | | | | |
| | 40E | 4 0 | MCRA040AT | ◆ | 5 | MCRC040AT | ◆ | 10 | |
| | 31E | 3 1 | MCRA031AT | ◆ | 5 | MCRC031AT | ◆ | 10 | |
| | 22E | 2 2 | MCRA022AT | ◆ | 5 | MCRC022AT | ◆ | 10 | |
| | 13E | 1 3 | MCRA013AT | ◆ | 5 | | | | |
| 04E | 0 4 | MCRA004AT | ◆ | 5 | | | | | |
| | Ring terminal | | | | | | | | |
| | 40E | 4 0 | MCRA040AR | ◆ | 5 | MCRC040AR | ◆ | 10 | |
| | 31E | 3 1 | MCRA031AR | ◆ | 5 | MCRC031AR | ◆ | 10 | |
| | 22E | 2 2 | MCRA022AR | ◆ | 5 | MCRC022AR | ◆ | 10 | |
| | 13E | 1 3 | MCRA013AR | ◆ | 5 | | | | |
| 04E | 0 4 | MCRA004AR | ◆ | 5 | | | | | |
| | Terminal: faston 2x2,8 insulated (2) | | | | | | | | |
| | 40E | 4 0 | MCRA040AF | ◆ | 5 | MCRC040AF | ◆ | 10 | |
| | 31E | 3 1 | MCRA031AF | ◆ | 5 | MCRC031AF | ◆ | 10 | |
| | 22E | 2 2 | MCRA022AF | ◆ | 5 | MCRC022AF | ◆ | 10 | |
| | 13E | 1 3 | MCRA013AF | ◆ | 5 | | | | |
| 04E | 0 4 | MCRA004AF | ◆ | 5 | | | | | |
| | Terminal: printed circuit | | | | | | | | |
| | 40E | 4 0 | MCRA040AI | ◆ | 5 | MCRC040AI | ◆ | 10 | |
| | 31E | 3 1 | MCRA031AI | ◆ | 5 | MCRC031AI | ◆ | 10 | |
| | 22E | 2 2 | MCRA022AI | ◆ | 5 | MCRC022AI | ◆ | 10 | |
| | 13E | 1 3 | MCRA013AI | ◆ | 5 | | | | |
| 04E | 0 4 | MCRA004AI | ◆ | 5 | | | | | |
| | Spare coil | | MB0A ◆ | | | 10 | MBOC ◆ | | 10 |

- (1) To complete the catalogue number, replace the symbol ◆ by the code corresponding to the voltage and frequency of the control circuit. (see pg.A.16).
 (2) Terminal: - with wire 1.5 mm²: Ie = 16A - with wire 1 mm²: Ie = 10A
 Insulated terminal type B2.8x0.8 with wire 1 mm²: Ie = 8A to DIN 46247
 Faston terminal 1 x 6.3 on request, replace the letter **F** by **H** in the catalogue number

Auxiliary minicontactors interface

| | Contacts acc. to EN 50011 | | Control circuit: direct current 24V / 1.2W ⁽³⁾ | | | Control circuit: direct current 24V / 2W ⁽⁴⁾ | | | | |
|-----|---------------------------|------------|---|----------|------------|---|----------|------|--------|----|
| | | | Operating limits from 19 to 30V (0.8-1.25xUs) | | | Operating limits from 17 to 30V (0.7-1.25xUs) | | | | |
| | | | Cat. no. | Ref. no. | Pack | Cat. no. | Ref. no. | Pack | | |
| | Screw terminal | | | | | | | | | |
| | 40E | 4 0 | MCRI040ATD | 100530 | 10 | MCRK040ATD | 100533 | 10 | | |
| | 31E | 3 1 | MCRI031ATD | 100531 | 10 | MCRK031ATD | 100534 | 10 | | |
| 22E | 2 2 | MCRI022ATD | 100532 | 10 | MCRK022ATD | 100535 | 10 | | | |
| | Spare coil | | MB0ID | | | 100470 | MB0KD | | 100471 | 10 |

- (3) No possibility of adding instantaneous auxiliary blocks.
 (4) Facility to mount instantaneous auxiliary contact block of two contacts (MARN2..) or two instantaneous auxiliary contact blocks of one contact (MARL1...).

For reference numbers, see chapter X, pg. X.2



Order codes

A

B

C

D

E

F

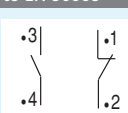
G

H

I

X

Instantaneous auxiliary contacts blocks

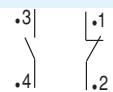
| Number of contacts | Combination with MCRA040AT♦ (40E) according to EN 50011 | Contacts acc. to EN 50005 | | Cat. no. | Ref. no. | Pack |
|---------------------------------|---|-----------------------------|---|-----------|----------|------|
| | | Designation (block marking) |  | | | |
| Front mounting | | | | | | |
| Screw terminal | | | | | | |
| 2 | 60E | 20 | 2 0 | MARN220AT | 100994 | 10 |
| 2 | 51E | 11 | 1 1 | MARN211AT | 100993 | 10 |
| 2 | 42E | 02 | 0 2 | MARN202AT | 100992 | 10 |
| Ring terminal | | | | | | |
| 2 | 60E | 20 | 2 0 | MARN220AR | 103349 | 10 |
| 2 | 51E | 11 | 1 1 | MARN211AR | 103350 | 10 |
| 2 | 42E | 02 | 0 2 | MARN202AR | 103351 | 10 |
| Screw terminal | | | | | | |
| 4 | 80E | 40 | 4 0 | MARN440AT | 100991 | 10 |
| 4 | 71E | 31 | 3 1 | MARN431AT | 100990 | 10 |
| 4 | 62E | 22 | 2 2 | MARN422AT | 100989 | 10 |
| 4 | 53E | 13 | 1 3 | MARN413AT | 100988 | 10 |
| 4 | 44E | 04 | 0 4 | MARN404AT | 100987 | 10 |
| Terminal : Ring terminal | | | | | | |
| 4 | 80E | 40 | 4 0 | MARN440AR | 103352 | 10 |
| 4 | 71E | 31 | 3 1 | MARN431AR | 103353 | 10 |
| 4 | 62E | 22 | 2 2 | MARN422AR | 103354 | 10 |
| 4 | 53E | 13 | 1 3 | MARN413AR | 103355 | 10 |
| 4 | 44E | 04 | 0 4 | MARN404AR | 103300 | 10 |



Instantaneous auxiliary contacts blocks

Lateral mounting



| Number of contacts | Combination with MCRA040AT♦ (40E) according to EN 50011 | Contacts acc. to EN 50005 | | Cat. no. | Ref. no. | Pack |
|--------------------|---|-----------------------------|--|----------|----------|------|
| | | Designation (Block marking) |  | | | |

• One or two blocks to cover combinations of 5 or 6 contacts without increasing the height of the basic unit.

| Screw terminal | | | | | | |
|----------------|-----|----|---|---|-----------|-----------|
| 1 | 50E | 10 | 1 | 0 | MARL110AT | 100513 10 |
| 1 | - | 01 | 0 | 1 | MARL101AT | 100514 10 |

| Ring terminal | | | | | | |
|---------------|-----|----|---|---|-----------|-----------|
| 1 | 50E | 10 | 1 | 0 | MARL110AR | 103556 10 |
| 1 | - | 01 | 0 | 1 | MARL101AR | 103557 10 |

| Terminal : Faston 2x2,8 insulated (1) | | | | | | |
|---------------------------------------|-----|----|---|---|-----------|-----------|
| 1 | 50E | 10 | 1 | 0 | MARL110AF | 100515 10 |
| 1 | - | 01 | 0 | 1 | MARL101AF | 100516 10 |

| Terminal : Printed circuit | | | | | | |
|----------------------------|-----|----|---|---|-----------|-----------|
| 1 | 50E | 10 | 1 | 0 | MARL110AI | 100517 10 |
| 1 | - | 01 | 0 | 1 | MARL101AI | 100518 10 |

• One or two additional blocks, when 9 or 10 contacts are required (combination possible with the front mounting block)
 • One or two additional blocks on both sides, to cover up to 8 contacts (combination only possible with lateral blocks)

| Screw terminal | | | | | | |
|----------------|-----|----|---|---|------------|-----------|
| 1 | 50E | 10 | 1 | 0 | MARL110ATS | 100519 10 |
| 1 | - | 01 | 0 | 1 | MARL101ATS | 100520 10 |

| Ring terminal | | | | | | |
|---------------|-----|----|---|---|------------|-----------|
| 1 | 50E | 10 | 1 | 0 | MARL110ARS | 103299 10 |
| 1 | - | 01 | 0 | 1 | MARL101ARS | 103298 10 |

| Terminal : Faston 2x2,8 insulated (1) | | | | | | |
|---------------------------------------|-----|----|---|---|------------|-----------|
| 1 | 50E | 10 | 1 | 0 | MARL110AFS | 100521 10 |
| 1 | - | 01 | 0 | 1 | MARL101AFS | 100522 10 |

| Terminal : Printed circuit | | | | | | |
|----------------------------|-----|----|---|---|------------|-----------|
| 1 | 50E | 10 | 1 | 0 | MARL110AIS | 100523 10 |
| 1 | - | 01 | 0 | 1 | MARL101AIS | 100524 10 |

(1) Terminal with wire 1 mm²: Ie = 10A
 Insulated terminal type B2.8x0.8 with wire 1 mm²: Ie = 8A

Order codes

A

B

C

D

E

F





G

H

I

X

Accessories

| | For use with: | Time | Function | Ue | Cat. no. | Ref. no. | Pack |
|---|--|---|----------|--------------------|-------------------|----------|------|
|  <p>Electronic timer block</p> | Lateral or front fixing on the contactor | | | | | | |
| | MCR..MC ... | 0.5 - 60 sec. | Delay ON | 24 to 250V AC/DC | MREBC10AC2 | 100541 | 10 |
| | MCR..MC ... | 0.2 - 24 sec. | Delay ON | 24 to 250V AC/DC | MREBC20AC2 | 100542 | 10 |
|  <p>Timer fitment</p> | For fixing onto 35mm DIN-rail (EN 5022) | | | | | | |
| | MREBC... | | | | MVB0R | 100543 | 10 |
|  <p>Voltage suppresor block</p> | Connection and (plug-in) fixing onto front of the contactor | | | | | | |
| | MCRA,MC ... | RC | AC | 12 to 60V 50/60Hz | MPOAAE1 | 100544 | 10 |
| | MCRA,MC ... | RC | AC | 72 to 250V 50/60Hz | MPOAAE2 | 100545 | 10 |
| | MCRC,MC ... | Diode | DC | 6 to 250V DC | MPOCAE3 | 100546 | 10 |
| | MCRC, MC ... | Varistor | AC/DC | 24-48V | MPODAE4 | 100536 | 10 |
|  <p>Mechanical interlock</p> | Kit comprising mechanical interlock and contactor jointing parts | | | | | | |
| | MCR, MC_ ... | | | | MMH0 | 100547 | 10 |
| <p>Identification</p> | For use with: | | | | | | |
| | MCR, MC_ ... | Sheets of labels (10 sheets of 260 labels each) | | | EAT 260 | 100548 | 1 |
| | MCR, MC_ ... | Labelling plate base. Plug-in labelling plate bases (50 pieces in one pack) | | | SPR | 100549 | 1 |

Notes

Grid area for notes.

Order codes

A

B

C

D

E

F

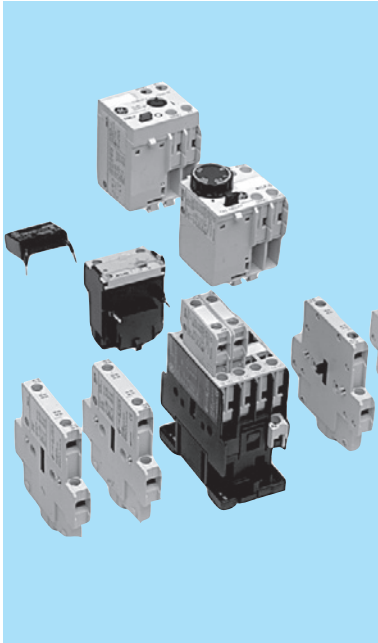
G

H

I

X





Auxiliary contactors *I_{th}* = 20A

- Control circuit: Alternating current up to 690V
Direct current up to 440V
- Terminal numbering in accordance with EN 50005 and EN 50011
- Fixing system for rapid and simple mounting onto standard 35mm DIN-rail (EN 50022-35)
- Terminals protected against accidental contact in accordance with VDE 0106 T.100, VBG4
- Ring terminal versions
- Three coil terminals
- Facility to mount side and/or front instantaneous contact blocks, timed auxiliary contacts, mechanical latch, voltage suppressor blocks and interface modules.
- Degree of protection IP20 (EN 60529)

Standards

| | |
|------------------|---------------|
| IEC/EN 60947-5-1 | BS 4794 |
| IEC/EN 60947-1 | CENELEC HD410 |
| EN 90947 | CENELEC HD420 |
| EN 60947 | NFC 63-110 |
| EN 50005 | NFC 63-140 |
| EN 50011 | CSA C22.2/14 |
| UL 508 | VDE 0660/102 |
| NEMA ICS 1 | |

Approvals



- Order codes ● pg. A.23
- Auxiliary contacts blocks ● pg. A.23
- Accessories ● pg. A.24
- Technical data ● pg. A.34
- Diagrams ● pg. A.36
- Combinations of contacts ● pg. A.38
- Dimensions ● pg. A.42

General data

| | |
|---|----------|
| Maximum number of contacts (RL...) | 4 |
| Rated thermal current (I_{th}) θ ≤ 55° | (A) 20 |
| Rated operational voltage (U_e) | (V) 690 |
| Insulation voltage (U_i) | (V) 1000 |

Utilisation category:

| AC-15 | V | 120 | 230/220 | 400/380 | 440/415 | 500 | 690/660 |
|-------|----|-----|---------|---------|---------|-----|---------|
| A | 10 | 10 | 6 | 5 | 4 | 2 | |
| DC-13 | V | 24 | 48 | 110 | 220 | 440 | |
| A | 6 | 4 | 2 | 0.7 | 0.35 | | |

Standard voltages

To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit.

Alternating current (V). Dual-frequency coil

| ♦ | 1 | 2 | 9 | 3 | 4 | 5 | 6 | 7 | 13 | 8 | 15 |
|---------|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| AC | 24 | 42 | 48 | 110 | 120 | 220 | 230 | 240 | 400 | 440 | 480 |
| 50/60Hz | | | 115 | | | | | | | | |

Alternating current (V)

| ♦ | A | B | E | K | L | N | T | U | W | Y | Z |
|------|---|----|----|-----|---|-----|-----|-----|-----|-----|-----|
| AC | | | 32 | 127 | | 220 | | 380 | 415 | 500 | 660 |
| 50Hz | | | | | | 230 | | 400 | | 690 | |
| AC | 6 | 12 | | | | 208 | 277 | 380 | 480 | 460 | 600 |
| 60Hz | | | | | | | | | | | |

Direct current (V)

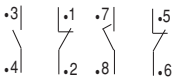
| ♦ | B | D | E | F | G | H | I | J | K | N | P | R | T |
|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|
| DC | 12 | 24 | 36 | 42 | 48 | 60 | 72 | 110 | 120 | 220 | 230 | 240 | 250 |

Direct current (V) - Wide voltage range

| ♦ | WB | WD | WE | WF | WG | WH | WI | WJ | WK | WN | WP | WR | WT |
|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|
| DC | 12 | 24 | 33 | 42 | 48 | 60 | 72 | 110 | 125 | 220 | 230 | 240 | 250 |



Auxiliary contactors

| Contacts | | Control circuit: Alternating current up to 690V | | Control circuit: Direct current up to 440V | | | |
|---|---|---|------|--|------|-------------|----|
|  | | Cat. no. ⁽¹⁾ | Pack | Cat. no. ⁽¹⁾ | Pack | | |
| | | Ref. no. see bottom | | Ref. no. see bottom | | | |
| Screw terminal | | | | | | | |
| 4 | 0 | 0 | 0 | RL4RA040T ♦ | 5 | RL4RD040T ♦ | 10 |
| 3 | 1 | 0 | 0 | RL4RA031T ♦ | 5 | RL4RD031T ♦ | 10 |
| 2 | 2 | 0 | 0 | RL4RA022T ♦ | 5 | RL4RD022T ♦ | 10 |
| 0 | 4 | 0 | 0 | RL4RA004T ♦ | 5 | RL4RD004T ♦ | 10 |
| 1 | 1 | 1 | 1 | RL4RA022G ♦ | 5 | RL4RD022G ♦ | 10 |
| Ring terminal | | | | | | | |
| 4 | 0 | 0 | 0 | RL4RA040R ♦ | 5 | RL4RD040R ♦ | 10 |
| 3 | 1 | 0 | 0 | RL4RA031R ♦ | 5 | RL4RD031R ♦ | 10 |
| 2 | 2 | 0 | 0 | RL4RA022R ♦ | 5 | RL4RD022R ♦ | 10 |
| 0 | 4 | 0 | 0 | RL4RA004R ♦ | 5 | RL4RD004R ♦ | 10 |
| Spare coil | | | | | | | |
| Screw terminal | | LB1A ♦ | | LB1D ♦ | | 5 | |
| Ring terminal | | LR1A ♦ | | LR1D ♦ | | 5 | |

(1) To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit. (see pg. A.22).

Auxiliary contacts

| Instantaneous | Number of contacts | Contacts | | | | Function | Time | Cat. no. | Ref. no. | Pack |
|-------------------------------|--|----------|----------|----------|----------|-------------|---------------|----------|----------|--------|
| | | .3 .4 | .1 .2 | .7 .8 | .5 .6 | | | | | |
| Frontal mounting | Screw terminal | | | | | | | | | |
| | 1 | 1 | 0 | 0 | 0 | | | BCLF10 | 104700 | 10 |
| | 1 | 0 | 1 | 0 | 0 | | | BCLF01 | 104701 | 10 |
| | 1 | 0 | 0 | 1 | 0 | | | BCLF10G | 104702 | 10 |
| | 1 | 0 | 0 | 0 | 1 | | | BCLF01G | 104703 | 10 |
| | Ring terminal | | | | | | | | | |
| | 1 | 1 | 0 | 0 | 0 | | | BCRF10 | 108901 | 10 |
| | 1 | 0 | 1 | 0 | 0 | | | BCRF01 | 108902 | 10 |
| Side mounting | Screw terminal | | | | | | | | | |
| | 2 | 2 | 0 | 0 | 0 | | | BRL10 | 104704 | 10 |
| | 2 | 1 | 1 | 0 | 0 | | | BRL11 | 104705 | 10 |
| | 2 | 0 | 2 | 0 | 0 | | | BRL02 | 106622 | 10 |
| Pneumatic timer blocks | | | | | | | | | | |
| Frontal mounting | Screw terminal | | | | | | | | | |
| | 2 | 0 | 0 | 1 | 1 | Delayed ON | 0.1 - 30 sec. | BTLF30C | 104709 | 10 |
| | 2 | 0 | 0 | 1 | 1 | Delayed ON | 1 - 60 sec. | BTLF60C | 104710 | 10 |
| | 2 | 0 | 0 | 1 | 1 | Delayed OFF | 0.1 - 30 sec. | BTLF30D | 104711 | 10 |
| | 2 | 0 | 0 | 1 | 1 | Delayed OFF | 1 - 60 sec. | BTLF60D | 104712 | 10 |
| | Ring terminal | | | | | | | | | |
| | 2 | 0 | 0 | 1 | 1 | Delayed ON | 0.1 - 30 sec. | BTRF30C | 108903 | 10 |
| | 2 | 0 | 0 | 1 | 1 | Delayed ON | 1 - 60 sec. | BTRF60C | 108904 | 10 |
| | 2 | 0 | 0 | 1 | 1 | Delayed OFF | 0.1 - 30 sec. | BTRF30D | 108905 | 10 |
| | 2 | 0 | 0 | 1 | 1 | Delayed OFF | 1 - 60 sec. | BTRF60D | 108906 | 10 |
| | Sealing cover protection for pneumatic timer | | | | | | | | BTLFX | 113001 |

For reference numbers, see chapter X, pg. X.3



Order codes

A

B

C

D

E

F

G

H

I

X

Accessories

| Number of contacts | Contacts | | | | Cat. no. | Ref. no. | Pack |
|----------------------|-------------------------|-----------|-----------|-----------|----------|----------|------|
| | .3 .4 | .1 .2 | .7 .8 | .5 .6 | | | |
| Mechanical interlock | Mechanical | | | | BELA | 104723 | 5 |
| | - | - | - | - | | | |
| | Mechanical / electrical | | | | BELA02 | 104724 | 5 |
| | 2 | 0 | 2 | - | | | |



| | | | | | | | |
|-------------------------|----------------------------------|--|--------------------|--|-----------------------|------------|----|
| Mechanical latch blocks | Frontal mounted to the contactor | | | | | | |
| | | | RL4RA..., RL4RD... | | RMLF ♦ ⁽¹⁾ | see bottom | 20 |



(1) To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit.

| | D | G | HC | J | N | U | Y |
|------|------------|--------|--------|--------------------|--------------------|-------------------------|--------------|
| 50Hz | 24, 32 | 42, 48 | | 110, 115, 120, 127 | 220, 230, 240 | 380, 400, 415, 440, 480 | 500, 660/690 |
| 60HZ | 24, 32 | 48, 60 | | 110, 115, 120, 127 | 208, 220, 240, 277 | 380, 400, 415, 440, 480 | 600 |
| DC | 24, 32, 36 | 42, 48 | 60, 72 | 110, 120, 125 | 220, 230, 240, 250 | 440 | |

| | For use with: | Type | Control circ. | Ue | Cat. no. | Ref. no. | Pack |
|-----------------------------------|---|---|---------------|---------------|----------|----------|------|
| Transient voltage supressor block | Directly connected parallel to the coil terminals, allows simultaneous use with auxiliary contact blocks. | | | | | | |
| | RL4RA... | R/C | AC | 12V ... 48V | BSLR2G | 104713 | 10 |
| | RL4RA... | R/C | AC | 50V ... 127V | BSLR2K | 104714 | 10 |
| | RL4RA... | R/C | AC | 130V ... 250V | BSLR2R | 104715 | 10 |
| | RL4RD... | Diode | DC | 12V ... 600V | BSLDZ | 104719 | 10 |
| | RL4RA..., RL4RD... | Varistor | AC / DC | 24V ... 48V | BSLV3G | 104720 | 10 |
| | RL4RA..., RL4RD... | Varistor | AC / DC | 50V ... 127V | BSLV3K | 104721 | 10 |
| | RL4RA..., RL4RD... | Varistor | AC / DC | 130V ... 250V | BSLV3R | 104722 | 10 |
| RL4RA..., RL4RD... | Varistor | AC / DC | 277V ... 500V | BSLV3U | 110836 | 10 | |
| Identification | For use with: | | | | Cat. no. | Ref. no. | Pack |
| | RL4RA..., RL4RD... | Sheets of labels (10 sheets of 260 labels each) | | | EAT 260 | 100548 | 1 |
| | RL4RA..., RL4RD... | Labelling plate base. Plug-in labelling plate bases (50 pieces in one pack) | | | SPR | 100549 | 1 |



For reference numbers, see chapter X, pg. X.3



Accessories (continued)

Electronic timer module



| For use with: | Control circuit | Function | Time | Cat. no. | Ref. no. | Pack |
|---|-----------------|-------------|---------------|----------------|----------|------|
| Directly connected parallel to the coil terminals, allows simultaneous use with auxiliary contact blocks. | | | | | | |
| RL4... | 24-250V AC/DC | Delayed ON | 0,1 - 2 sec. | BETL02C | 113602 | 5 |
| RL4... | 24-250V AC/DC | Delayed ON | 1,5 - 45 sec. | BETL45C | 113603 | 5 |
| RL4... | 24-250V AC/DC | Delayed OFF | 0,1 - 2 sec. | BETL02D | 113604 | 5 |
| RL4... | 24-250V AC/DC | Delayed OFF | 1,5 - 45 sec. | BETL45D | 113605 | 5 |

Order codes

A

B

C

D

E

F

G

H

I

X

Technical data

General

| | |
|--|------|
| Maximum number of contacts (MCR...) | 4 |
| Rated thermal current (I _{th}) θ ≤ 60° | 16A |
| Rated operational voltage (U _e) acc. IEC 60947.1 | 690V |
| Insulation voltage (U _i) acc. IEC 60947.1 | 750V |

Conformity to standards

| | | |
|--------------------|------------------|----------------|
| IEC / EN 60947-5-1 | IEC / EN 60947-1 | BS 4794 |
| EN 50002 | EN 50005 | EN 50011 |
| NFC 63-110 | NFC 63-140 | CENELEC HD 420 |
| CSA C22.2/14 | VDE 0660 | UL 508 |

Approvals

| | | |
|------------------|----------------|-------|
| cULus | DEMKO | NEMKO |
| SEMKO | SETI | RINA |
| Lloyd's Register | Bureau Veritas | CE |

Ambient conditions

| | | |
|-----------------------|--------------------|-------------------------------------|
| Storage temperature | -55°C to +80°C | |
| Operation temperature | -40°C to +60°C | |
| Altitude | up to 3000m | |
| | from 3000 to 4000m | 90%I _e 80%U _e |
| | from 4000 to 5000m | 80%I _e 75%U _e |

Climatic resistance (IEC 68-2)

| | | |
|---------------------------|-------------------------|--------------------|
| Continuous tests | 40 / 125 / 56 | |
| Cold (72h) | Temperature | -40°C |
| | Dry heat (96h) | Temperature +125°C |
| Humid heat (56 days) | Relative humidity | < 50% |
| | Temperature | +40°C |
| Cyclical tests (6 cycles) | Relative humidity | 95% |
| | Humid heat | Low temperature |
| First half-cycle (12h) | | Relative humidity |
| | Second half-cycle (12h) | Low temperature |
| | | Relative humidity |

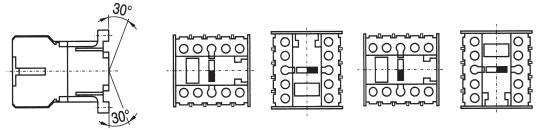
Shock resistance (IEC 68-2-27)

| | |
|----------------------------------|-------|
| Continuously closed (at 0,8Us) | |
| Admissible acceleration | 25 g |
| Impulse duration | 11 ms |
| Continuously opened (no voltage) | |
| Admissible acceleration | 20 g |
| Impulse duration | 11 ms |

Vibration resistance (IEC 68-2-6)

| | |
|----------------------------------|-------------------|
| Continuously closed (at 0,8Us) | |
| Admissible acceleration | 15 g |
| Sweep between | 10 - 200 Hz |
| Continuously opened (no voltage) | |
| Admissible acceleration | 5 g AC - 3.5 g DC |
| Sweep between | 10 - 200 Hz |

Mounting positions



With the same pick-up and drop-out voltage
 With the same rated power



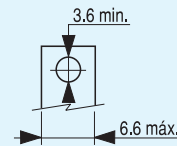
-7% of connection voltage
 +4% of disconnection voltage
 With the same rated power



-7% of connection voltage
 +4% of disconnection voltage
 With the same rated power

Terminal capacity

| | | |
|--|-----------------|------------------|
| Terminal with screw M3.5 Tightening torque (with pozidrive head and safety flange) | | 0.8 Nm - 7 Lb-in |
| Solid wire | mm ² | 0.75 to 2x2 w. |
| Flexible wire without terminal | mm ² | 0.75 to 2.5x2 w. |
| Flexible wire with terminal with cap | mm ² | 0.75 to 2.5x1 w |
| | mm ² | 0.75 to 1x2 w |
| Ring terminal cap | | 0.8 Nm - 7 Lb/in |

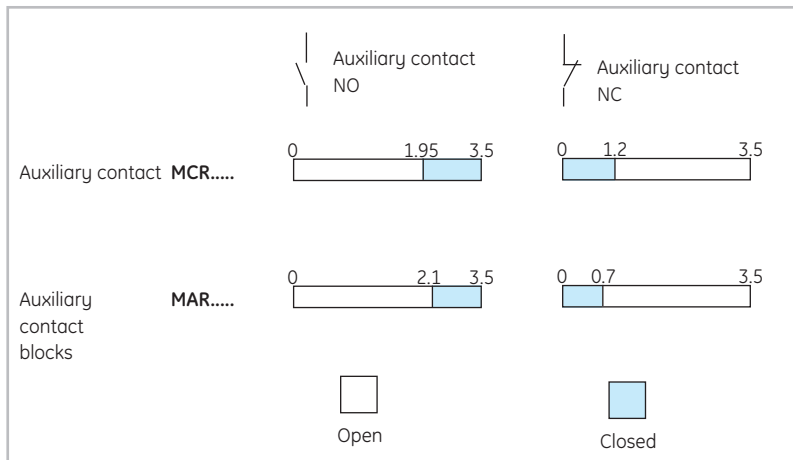


| | | |
|--|-----------------|----------|
| Fast-on 2.8 - 2 insulated terminals | mm ² | 1 x 2 w. |
| Terminal for printed circuit (Ø of PCB hole) | | 1.8mm |
| Ring terminal cap | | 7.8mm |
| Fork terminal cap | | 6.5mm |

Control circuit

| | | MCRA... | MCRC... | MCRC... | MCRI... | MCRK... |
|---|-----------------------|------------|-----------|-----------|-----------|------------|
| Rated insulation voltage (Ui) | (V) | 750 | 750 | 750 | 750 | 750 |
| Standard voltages (Us) | | | | | | |
| 50Hz | (V) | 24..690 | - | - | - | - |
| 60Hz | (V) | 6..600 | - | - | - | - |
| DC | (V) | - | 6..440 | 12..440 | 24 | 24 |
| Voltage ⁽¹⁾ | | | | | | |
| Operating limits | xUs | 0.8..1.1 | 0.8..1.1 | 0.7..1.3 | 0.8..1.25 | 0.7..1.25 |
| Drop-out | xUs | 0.35..0.55 | 0.15..0.3 | 0.15..0.3 | 0.15..0.3 | 0.13..0.35 |
| Consumption | | | | | | |
| Pick-up | (VA) | 26 | - | - | - | - |
| Seal | (VA) | 4 | - | - | - | - |
| DC | (W) | - | 3 | 4 | 1.2 | 2 |
| Power factor | | | | | | |
| Pick-up | (cos φ) | 0.8 | - | - | - | - |
| Seal | (cos φ) | 0.35 | - | - | - | - |
| Power dissipation | (W) | 1.4 | 3 | 4 | 1.2 | 2 |
| Opening and closing times | | | | | | |
| Values between ± %Us | % | +10...-20 | +10...-20 | +30...-30 | +25...-20 | +25...-20 |
| Time at energisation NO | (ms) | 6..13 | 22..36 | 17..28 | 30..70 | 20..50 |
| Time at de-energisation NC | (ms) | 8..16 | 9..12 | 9..12 | 9..16 | 9..16 |
| Time at energisation NC | (ms) | 5..11 | 18..27 | 12..25 | 20..45 | 18..35 |
| Time at de-energisation NO | (ms) | 6..13 | 5..7 | 5..7 | 5..9 | 5..9 |
| Values at Us | | | | | | |
| Time at energisation NO | (ms) | 7..12 | 24..27 | 19..23 | 25..45 | 25..40 |
| Time at de-energisation NC | (ms) | 8..16 | 9..11 | 9..11 | 9..16 | 9..16 |
| Time at energisation NC | (ms) | 6..10 | 20..26 | 15..21 | 25..35 | 20..30 |
| Time at de-energisation NO | (ms) | 6..13 | 5..8 | 5..8 | 5..9 | 5..9 |
| Maximum time without voltage (without effecting the closed magnetic circuit) | (ms) | 3 | 3 | 3 | 3 | 3 |
| Mechanical endurance | | | | | | |
| Monofrequency | x10 ⁶ ops. | 15 | - | - | - | - |
| Dual-frequency | x10 ⁶ ops. | 10 | - | - | - | - |
| DC | x10 ⁶ ops. | - | 10 | 10 | 10 | 10 |
| Maximum rate (no load) | | | | | | |
| Monofrequency | n° ops./h | 9000 | - | - | - | - |
| Dual-frequency | n° ops./h | 3600 | - | - | - | - |
| DC | n° ops./h | - | 9000 | 9000 | 9000 | 9000 |

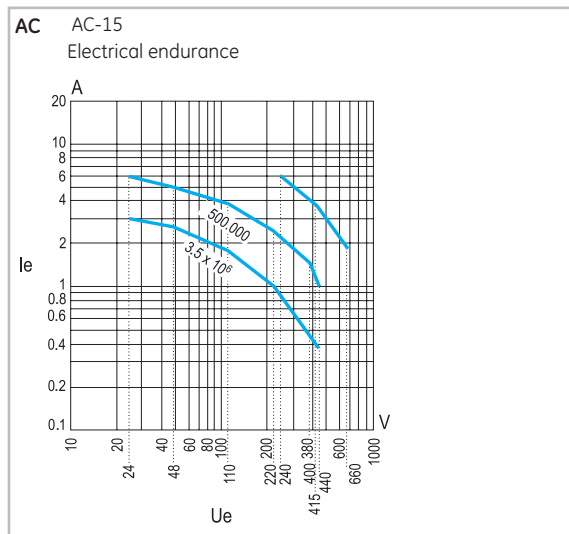
Contact sequence (distance in mm.)



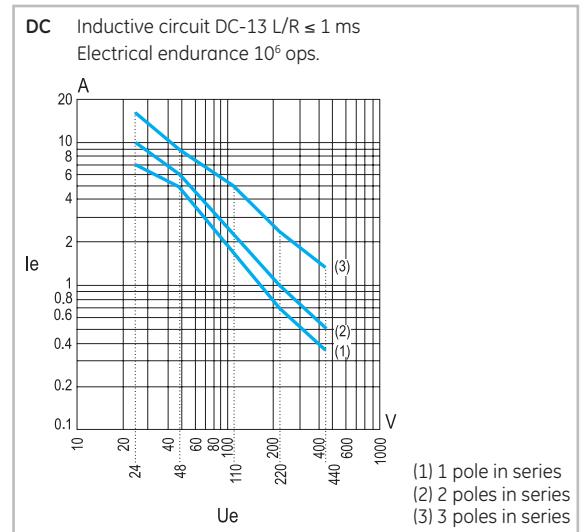
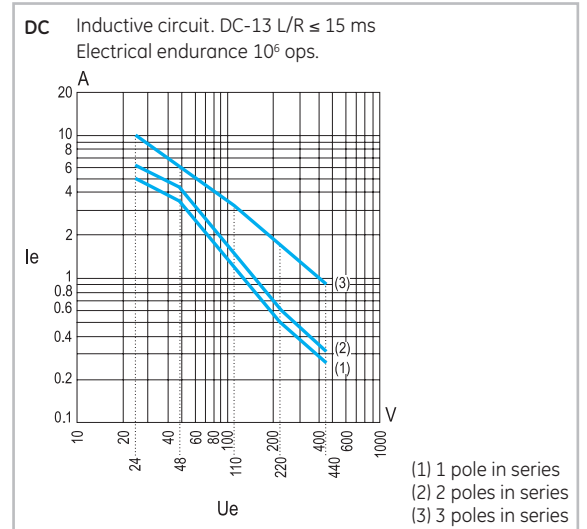
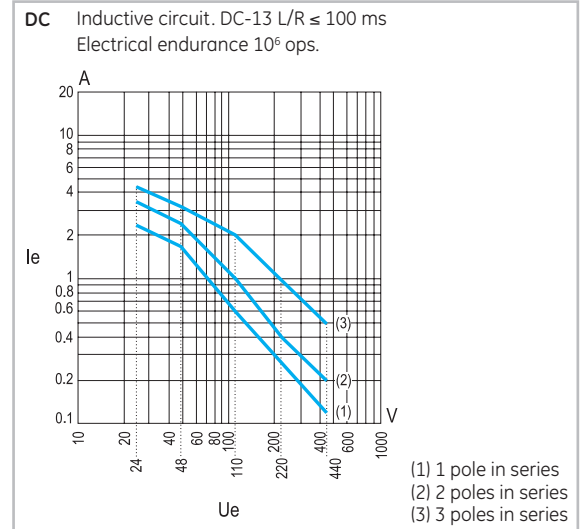
Internal auxiliary contacts

| | | MCR..... |
|---|----------------------------|--|
| Rated insulation voltage (Ui) acc. IEC 60947-1 | | 750V |
| Rated thermal current (Ith) $\theta \leq 60^{\circ}\text{C}$ ⁽¹⁾ | | 16A |
| Making capacity (r.m.s.) acc. IEC 60947-5 | | |
| AC-15 | Ue \leq 440V 50/60 Hz | 160A |
| DC-13 | Ue \leq 220V DC | 3A |
| Breaking capacity (r.m.s.) acc. IEC 60947-5 | | |
| AC-15 | Ue \leq 440V 50/60 Hz | 106A |
| DC-13 (L/R = 100 ms) | Ue \leq 220V DC | 1.2A |
| | Ue = 110V DC | 3A |
| | Ue = 48V DC | 10A |
| Rated voltage and rated current Ue-Ie | | |
| AC-15 | according to IEC 947 | 110/120V - 6A 220/240V - 6A 380/400V - 4A 415/440V - 4A 500V - 2.5A 660/690V - 1.5A |
| | according to UL, CSA | A600 |
| DC-13 | according to IEC | 24V - 5A 48V - 3.5 A 110V - 1.2A 220V - 0.6A 440V - 0.25A |
| | according to UL, CSA | P600 |
| Minimum operational power (operational safety) | | 5 mA, 17V |
| Short-circuit protection (max.class gI fuse without welding) | | 10A |
| Insulation resistance | | |
| | between contacts | > 10 m Ω |
| | between contacts and earth | > 10 m Ω |
| | between input and output | > 10 m Ω |
| Guaranteed no overlap of the contacts | | |
| | Space | 1,1 mm |
| | minimum time | > 2 ms |
| Impedance | | 2,3 m Ω |
| Terminal capacity | | Same as main circuit |

Tripping characteristics (AC)



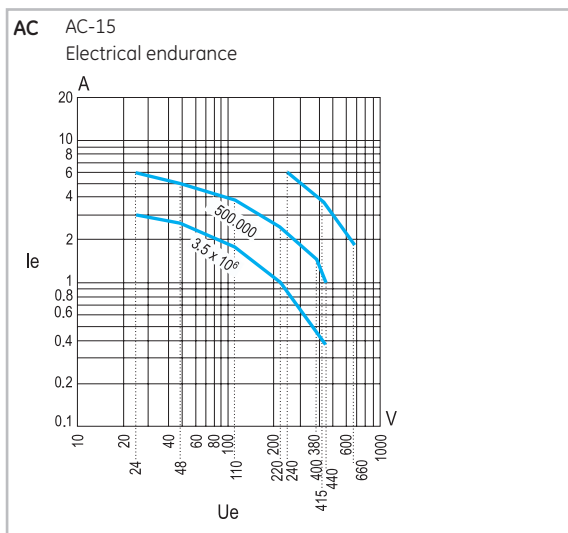
Tripping characteristics Ie/ue



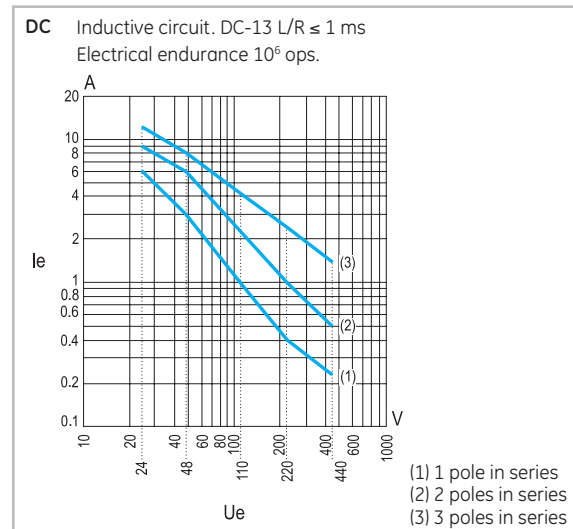
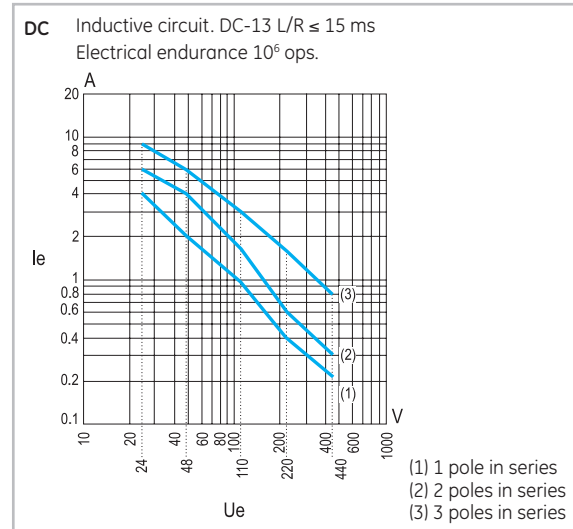
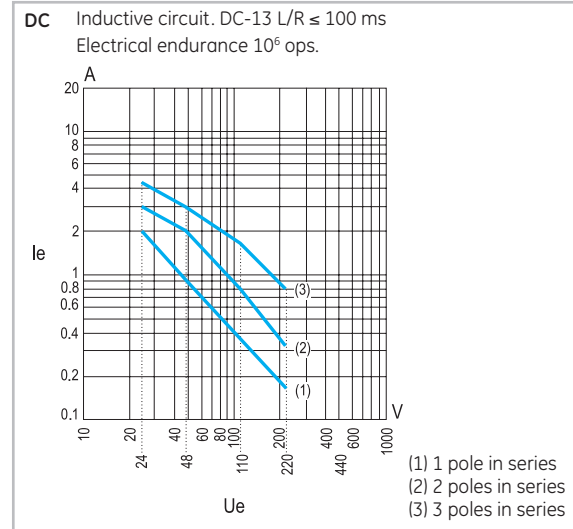
External auxiliary contact blocks

| | | MARN..., MARL... |
|---|--|----------------------|
| Rated insulation voltage (Ui) acc. IEC 60947-1 | | 750V |
| Rated thermal current (Ith) $\theta \leq 60^\circ\text{C}$ ⁽¹⁾ | | 10A |
| Making capacity (r.m.s.) acc. IEC 60947-5 | | |
| AC-15 | $U_e \leq 220\text{V } 50/60 \text{ Hz}$ | 73A |
| | $U_e = 380\text{V } 50/60 \text{ Hz}$ | 38A |
| | $U_e = 690\text{V } 50/60 \text{ Hz}$ | 22A |
| DC-13 L/R = 100 ms | $U_e \leq 100\text{V DC}$ | 2.6A |
| | $U_e = 220\text{V DC}$ | 1A |
| | $U_e = 440\text{V DC}$ | 0.6A |
| Breaking capacity (r.m.s.) acc. IEC 60947-5 | | |
| AC-15 | $U_e \leq 220\text{V } 50/60 \text{ Hz}$ | 73A |
| | $U_e = 380\text{V } 50/60 \text{ Hz}$ | 38A |
| | $U_e = 690\text{V } 50/60 \text{ Hz}$ | 22A |
| DC-13 L/R = 100 ms | $U_e \leq 100\text{V DC}$ | 2A |
| | $U_e = 220\text{V DC}$ | 0.8A |
| | $U_e = 440\text{V DC}$ | 0.4A |
| Rated voltage and rated current U_e -Ie | | |
| AC-15 | according to IEC 60947 | 110/120V - 6A |
| | | 220/240V - 6A |
| | | 380/400V - 3A |
| | | 415/440V - 3A |
| | | 500V - 1A |
| | | 660/680V - 1A |
| | according to UL, CSA | A600 |
| DC-13 | according to IEC 60947 | 24V - 4A |
| | | 48V - 2A |
| | | 110V - 0.7A |
| | | 220V - 0.3A |
| | | 440V - 0.1A |
| | according to UL, CSA | Q600 |
| Minimum operational power (operational safety) | | 5 mA, 17V |
| Short-circuit protection (max.class gI fuse without welding) | | 10A |
| Insulation resistance | | |
| | between contacts | > 10 m Ω |
| | between contacts and earth | > 10 m Ω |
| | between input and output | > 10 m Ω |
| Guaranteed no overlap of the contacts | | |
| | Space | 0.5 mm |
| | minimum time | > 2 ms |
| Impedance | | 2.4 m Ω |
| Terminal capacity | | Same as main circuit |

Tripping characteristics (AC)



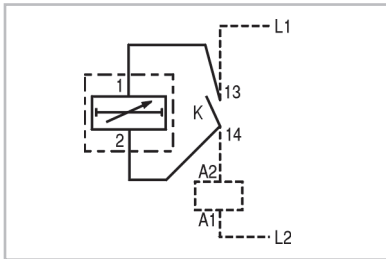
Tripping characteristics Ie/ue



Electronic timer block

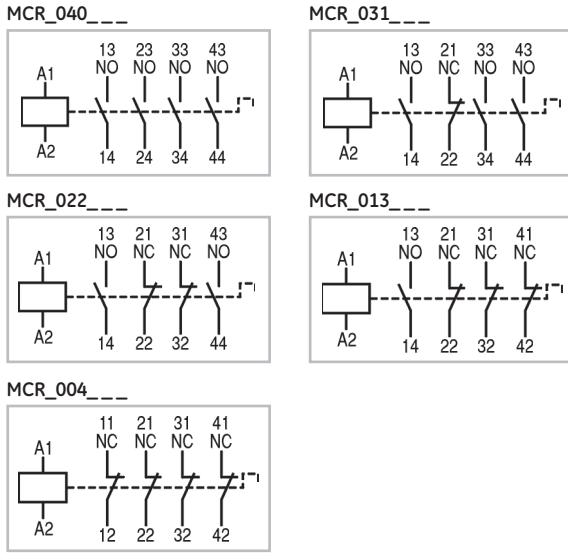
| | | MREBC... |
|---|-----------|---|
| Rated insulation voltage (Ui) | | 750V |
| Rated thermal current (Ith) $\theta \leq 60^{\circ}\text{C}$ ⁽¹⁾ | | 0.55V |
| Standard voltages (AC y DC) | | 24 to 250V |
| Operation limits | | 0.80 to 1.1 Us (0.85 to 1.1 Us at 12V) |
| Voltage drop | | < 3V |
| Maximum load current at | | |
| | 20°C | 0.9A |
| | 40°C | 0.72A |
| | 60°C | 0.55A |
| Minimum load for safe operation | | > 10 mA |
| Maximum current (peak) | | 10A for 40 ms |
| Leakage current at 220V | | < 5 mA |
| Operational current | | |
| | AC-15 | 0.7A |
| | DC-13 | 0.9A |
| Timing range (delay ON) | | 0.5 to 60 s (\pm 6 s) |
| Rearrangement time | | < 100 ms |
| Repeatability (accuracy) | | \pm 1 % |
| Ambient temperature | | |
| | Storage | from -55 up to + 80°C |
| | Operation | from -5 up to + 60°C |
| Degree of protection | | IP20 |
| Mounting position | | any |
| Terminals : 2 free cables | | 1 mm ² (AWG 17) 250 mm |

MREBC_0AC2



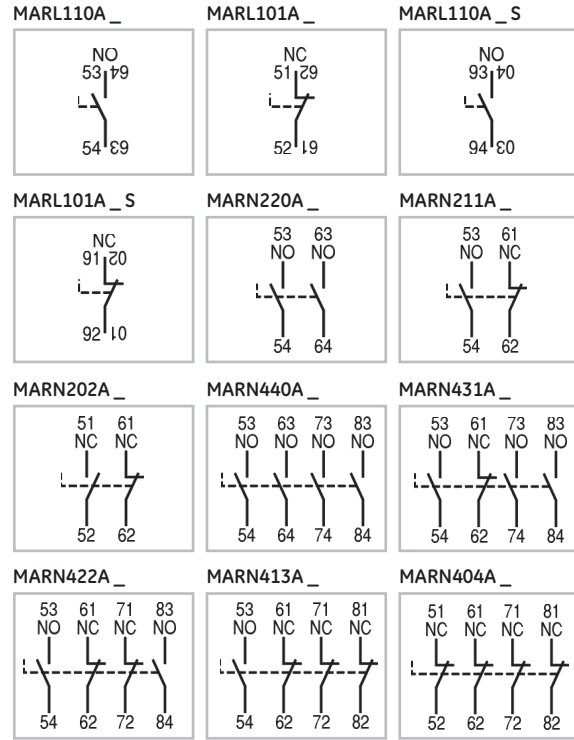
Terminal numbering

Auxiliary contactors. According to EN 50011

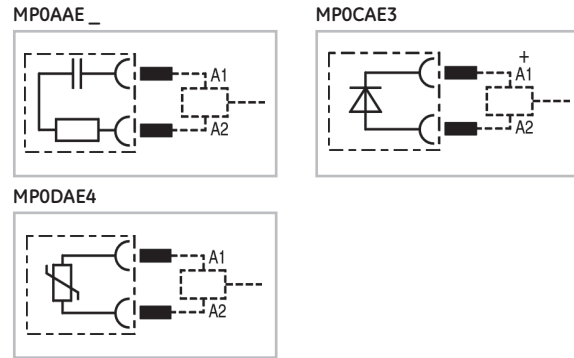


Auxiliary contact blocks.

According to EN 50005 & EN 50011



Transient voltage suppressor block



Terminal numbering in accordance with EN 50011

By combining other basic auxiliary contactors with auxiliary contact blocks MAR..., it is possible to obtain other combinations, and positions of contacts which are not covered by the table. But in all cases the maximum number of auxiliary contacts should be ten.

Type E

Standard contact combination in which the interchangeability of the devices does not affect the cabling or the diagram. Specifies a particular contact numbering and positioning.

Auxiliary minicontactors

A

B

C

D

E


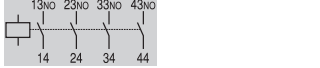



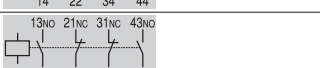

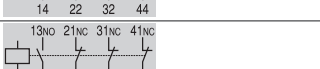

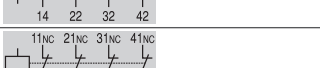

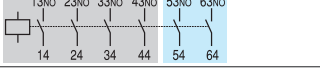

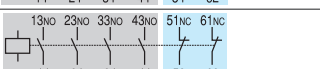

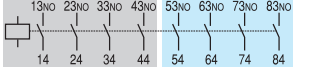
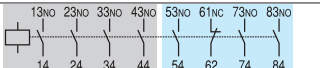
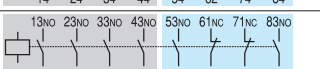
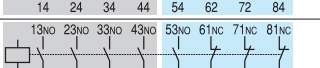


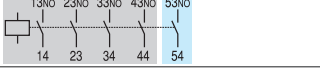
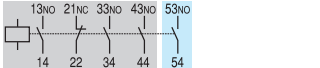

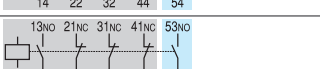
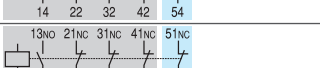

F

G

H

I

X

| | Final structure of the combination | Auxiliary contacts | | Auxiliary contactor + Auxiliary contact blocks to be added | |
|---|---|---|-------|--|-------------------------|
| | | Combination Description | NO NC | | |
| Type E |   | 40E | 4 0 | MCRA040A.. | |
| |   | 31E | 3 1 | MCRA031A.. | |
| |   | 22E | 2 2 | MCRA022A.. | |
| |   | 13E | 1 3 | MCRA013A.. | |
| |   | 04E | 0 4 | MCRA004A.. | |
| |  |  | 60E | 6 0 | MCRA040A.. + MARN220A.. |
| | |  | 51E | 5 1 | MCRA040A.. + MARN211A.. |
| | |  | 42E | 4 2 | MCRA040A.. + MARN202A.. |
| |  |  | 80E | 8 0 | MCRA040A.. + MARN440A.. |
| | |  | 71E | 7 1 | MCRA040A.. + MARN431A.. |
|  | | 62E | 6 2 | MCRA040A.. + MARN422A.. | |
|  | | 53E | 5 3 | MCRA040A.. + MARN413A.. | |
|  | | 44E | 4 4 | MCRA040A.. + MARN404A.. | |
|  | |  | 50E | 5 0 | MCRA040A.. + MARL110A.. |
| | |  | 41E | 4 1 | MCRA031A.. + MARL110A.. |
| |  | 32E | 3 2 | MCRA022A.. + MARL110A.. | |
| |  | 23E | 2 3 | MCRA013A.. + MARL110A.. | |
| |  | 14E | 1 4 | MCRA013A.. + MARL101A.. | |
| |  | 05E | 0 5 | MCRA004A.. + MARL101A.. | |



Terminal numbering in accordance with EN 50011 (continued)

By combining other basic auxiliary contactors with auxiliary contact blocks MAR..., it is possible to obtain other combinations, and positions of contacts which are not covered by the table. But in all cases the maximum number of auxiliary contacts should be ten.

Type Z

Contact combination the same as Type E. Interchangeability of the devices may affect the cabling and the diagram. Neither contact numbering nor positioning are retained.

Type X

Contact combination the same as Type E. Interchangeability of the devices may affect the cabling but not the diagram. The contact numbering is maintained but not their position.

Type Y

Contact combination which differs from Type E, although it is obtained by a combination of devices provided for this Type E.

| | Final structure of the combination | Auxiliary contacts | | Auxiliary contactor + Auxiliary contact blocks to be added | |
|--------|------------------------------------|--------------------|-------|--|--|
| | | Combination | NO NC | | |
| | | Description | | | |
| Type Z | | | 6 0 | MCRA040A.. + MARL110A.. + MARL110A.. | |
| | | | 5 1 | MCRA040A.. + MARL110A.. + MARL101A.. | |
| | | | 4 2 | MCRA040A.. + MARL101A.. + MARL101A.. | |
| | | | 10 0 | MCRA040A.. + MARN440A.. + MARL110A..S + MARL110A..S | |
| | | | 5 5 | MCRA040A.. + MARN413A.. + MARL101A..S + MARL101A..S | |
| | Type X | | | 8 0 | MCRA040A.. + MARL110A.. + MARL110A.. + MARL110A..S + MARL110A..S |
| | | | 7 1 | MCRA040A.. + MARL110A.. + MARL101A.. + MARL110A..S + MARL110A..S | |
| | | | 6 2 | MCRA040A.. + MARL110A.. + MARL101A.. + MARL101A..S + MARL110A..S | |
| | | | 5 3 | MCRA040A.. + MARL110A.. + MARL101A.. + MARL101A..S + MARL101A..S | |
| | | | 4 4 | MCRA040A.. + MARL101A.. + MARL101A.. + MARL101A..S + MARL101A..S | |
| | | | 9 1 | MCRA040A.. + MARN431A.. + MARL110A..S + MARL110A..S | |
| | | | 8 2 | MCRA040A.. + MARN431A.. + MARL101A..S + MARL110A..S | |
| | | | 7 3 | MCRA040A.. + MARN422A.. + MARL101A..S + MARL110A..S | |
| | | | 6 4 | MCRA040A.. + MARN422A.. + MARL101A..S + MARL101A..S | |
| Type Y | | | | 4 2 | MCRA031A.. + MARL110A.. + MARL101A.. |
| | | | | 3 3 | MCRA022A.. + MARL110A.. + MARL101A.. |
| | | | | 4 2 | MCRA031A.. + MARN211A.. |
| | | | 3 3 | MCRA022A.. + MARN211A.. | |
| | | | 5 3 | MCRA031A.. + MARN422A.. | |
| | | | 4 4 | MCRA022A.. + MARN422A.. | |

Technical data

A

B

C

D

E

F

G

H

I

X



General

| | |
|---|-------|
| Maximum number of contacts | 4 |
| Rated thermal current (I _{th}) θ < 55°C | 20A |
| Rated operational voltage (U _e) | 690V |
| Insulation voltage (U _i) | 1000V |

Conformity to standards

| | | |
|------------------|--------------------|----------------|
| IEC / EN 60947-1 | IEC / EN 60947-5-1 | ASE 1025 |
| EN 50005 | EN 50011 | VDE 0660 / 102 |
| NFC 63-110 | NFC 63-140 | |
| CENELEC HD 410 | CENELEC HD 420 | |
| NEMA ICS 1 | CSA C22.2/14 | |
| UL 508 | BS 4794 | |

Approvals

| | | |
|------------------|----------------|-------|
| cULus | DEMKO | NEMKO |
| SEMKO | FI | CE |
| Lloyd's Register | Bureau Veritas | |

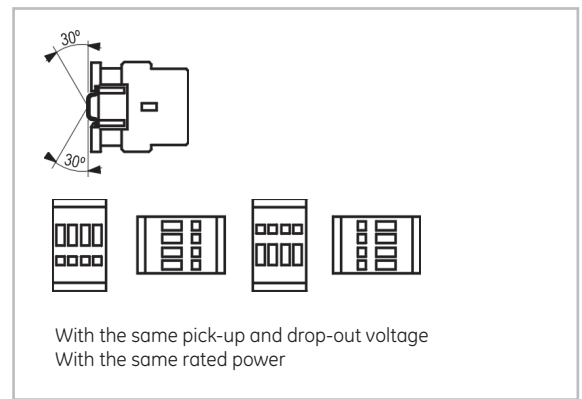
Ambient conditions

| | | |
|-----------------------|--------------------|----------------|
| Storage temperature | -55°C to +80°C | |
| Operation temperature | -40°C to +60°C | |
| Altitude | up to 3000m | Nominal values |
| | from 3000 to 4000m | 90%le 80%Ue |
| | from 4000 to 5000m | 80%le 75%Ue |

Climatic resistance (IEC 68-2)

| | | |
|---------------------------|-------------------|--------|
| Continuous tests | 40 / 125 / 56 | |
| Cold (72h) | Temperature | -40°C |
| | Relative humidity | < 50% |
| Dry heat (96h) | Temperature | +125°C |
| | Relative humidity | < 50% |
| Humid heat (56 days) | Temperature | +40°C |
| | Relative humidity | 95% |
| Cyclical tests (6 cycles) | | |
| Humid heat | Low temperature | +25°C |
| | Relative humidity | 93% |
| Second half-cycle (12h) | Low temperature | +55°C |
| | Relative humidity | 95% |

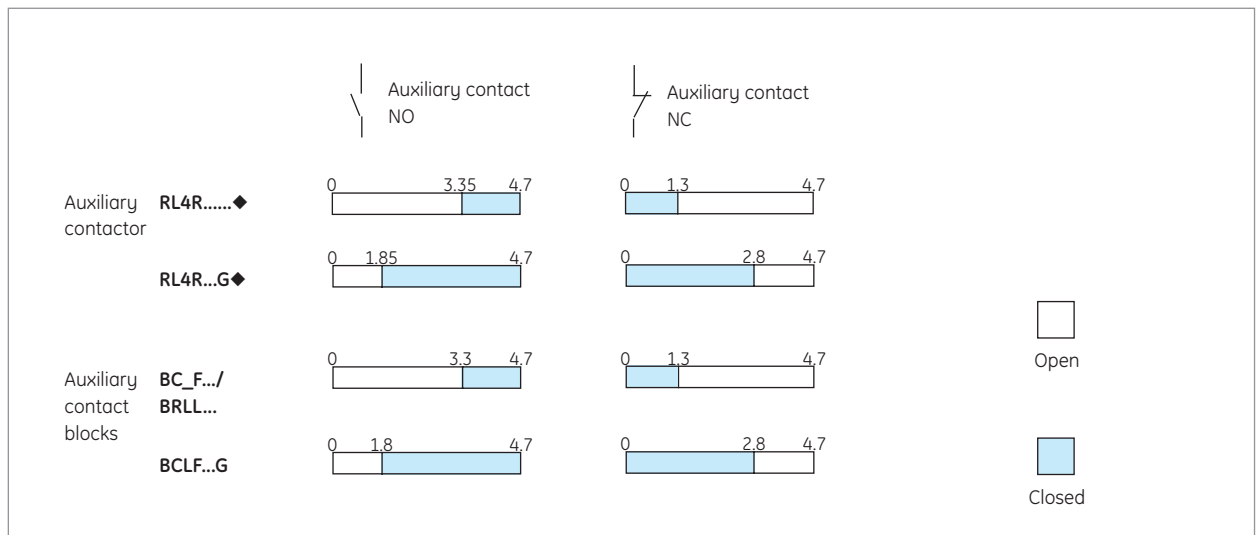
Mounting positions



Control circuit

| | | RL4RA... | RL4RD... | RL4RD...W |
|---|-------------------------|---------------|---------------|---------------|
| Rated insulation voltage U _i | (V) | 1000 | 1000 | 1000 |
| Standard voltages U _s | | | | |
| 50Hz (V) | | 24 ... 690 | - | - |
| 60Hz (V) | | 24 ... 600 | - | - |
| DC | (V) | - | 12 ... 440 | 12 ... 440 |
| Voltage ⁽¹⁾ | | | | |
| Operating limits | xUs | 0.8 ... 1.1 | 0.8 ... 1.1 | 0.7 ... 1.3 |
| Pick-up | xUs | 0.65 ... 0.75 | 0.45 ... 0.65 | 0.45 ... 0.55 |
| Seal | xUs | 0.4 ... 0.55 | 0.15 ... 0.3 | 0.15 ... 0.3 |
| Consumption | | | | |
| AC | Magnetic circuit closed | (VA) | 6 | - |
| | Magnetic circuit open | (VA) | 45 | - |
| DC | Magnetic circuit closed | (W) | - | 5.5 |
| | Magnetic circuit open | (W) | - | 5.5 |
| Power dissipation | (W) | 2.4 | 5.5 | 6.5 |
| Power factor | | | | |
| Magnetic circuit closed | cos φ | 0.34 | - | - |
| Magnetic circuit open | cos φ | 0.82 | - | - |
| Opening and closing times | | | | |
| at 0.8 to 1.1 U _s | | | | |
| Closing time NO | (ms) | 6 ... 25 | 35 ... 65 | 25 ... 65 |
| Opening time NO | (ms) | 6 ... 13 | 6 ... 13 | 6 ... 13 |
| at U _s | | | | |
| Closing time NO | (ms) | 8 ... 20 | 35 ... 45 | 25 ... 55 |
| Opening time NO | (ms) | 6 ... 13 | 7 ... 12 | 6 ... 13 |
| Mechanical endurance | 10 ⁶ ops | 15 | 15 | 15 |
| Maximum rate no load | ops/h | 9000 | 3600 | 3600 |

Contact sequence (distance in mm)

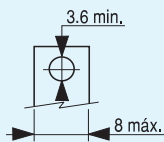


Internal auxiliary contacts

| | | RL4..... |
|--|---|--|
| Rated insulation voltage (Ui) acc. IEC 60947-5 | | 1000V |
| Rated thermal current (Ith) < 55°C | | 20A |
| Making capacity (r.m.s.) acc. IEC 60947-5 | | |
| AC-15 | Ue ≤ 400V, 50/60 Hz | 250A |
| DC-13 | Ue ≤ 220V DC | 250A |
| Breaking capacity (r.m.s.) acc. IEC 60947-5 | | |
| AC-15 | Ue ≤ 400V, 50/60 Hz | 250A |
| DC-13 | Ue ≤ 220V DC | 2A (4A with 2 contacts in series) |
| | Ue ≤ 110V DC | 7A (12A with 2 contacts in series) |
| | Ue ≤ 48V DC | 10A (18A with 2 contacts in series) |
| Rated voltage and rated current Ue-Ie | | |
| AC-15 | according to IEC | 110/120V - 10A 220/240V - 10A 380/400V - 6A 415/440V - 5A 500V - 4A 660/690V - 2A |
| | according to UL, CSA | A600 |
| DC-13 | according to IEC | 24V - 6A 48V - 4 A 110V - 2A 220V - 0,7A 440V - 0,35A |
| | according to UL, CSA | P600 |
| Electrical endurance | | 1 × 10 ⁶ ops. |
| Minimum operational voltage (operational safety) | | 17V |
| Minimum operational current | | 5mA |
| Short-circuit protection | | |
| | max. fus. class gL fuse without welding | 20A 10A |
| Insulation resistance | | |
| | between contacts | > 10 mΩ |
| | between contacts and earth | > 10 mΩ |
| | between input and output | > 10 mΩ |
| Guaranteed no overlap between NO and NC contacts | | |
| | space | 1.3 mm |
| | minimum time | 1.5 ms |
| Impedance | | 1.28 mΩ |

Terminal capacity

| | | |
|--|-----------------|-------------------|
| Solid, stranded and finely stranded without end sleeve | mm ² | 2 × 0.5 to 6 |
| Finely stranded with end sleeve | mm ² | 2 × 1 to 6 |
| AWG wires, solid and stranded | mm ² | 2 × 20 to 12 |
| Tightening torque | | 1.1 Nm / 10 Lb.in |
| Ring terminals | | 1.6 Nm / 15 Lb.in |

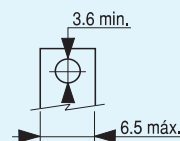


Instantaneous auxiliary contact blocks

| | | BCLF../BCRF../BRLL.. |
|--|----------------------------|--|
| Rated insulation voltage (Ui) acc. IEC 60947-5 | | 1000V |
| Rated thermal current (Ith) θ < 55°C | | 10A |
| Making capacity (r.m.s.) acc. IEC 60947-5 | | |
| AC-15 | Ue ≤ 440V, 50/60 Hz | 90A |
| DC-13 | Ue ≤ 220V DC | 90A |
| Breaking capacity (r.m.s.) acc. IEC 60947-5 | | |
| AC-15 | Ue ≤ 400V, 50/60 Hz | 60A |
| DC-13 | Ue ≤ 220V DC | 0,95A |
| Rated voltage and rated current Ue-Ie | | |
| AC-15 | according to IEC | 110/120V - 6A 220/240V - 6A 380/400V - 4A 415/440V - 3.5A 500V - 2.5A 660/690V - 1.5A |
| | according to UL, CSA | A600 |
| DC-13 | | 24V - 4A 48V - 2A 110V - 0.7A 220V - 0.3A 415/440V - 0.15A |
| | according to UL, CSA | Q600 |
| Electrical endurance | | 1 × 10 ⁶ ops. |
| Minimum operational voltage (operational safety) | | 17V |
| Minimum operational current | | 5mA |
| Short-circuit protection (without welding) gL | | 10A |
| Insulation resistance | | |
| | between contacts | > 10 mΩ |
| | between contacts and earth | > 10 mΩ |
| | between input and output | > 10 mΩ |
| Guaranteed no overlap between NO and NC contacts | | |
| | Space | 1.3 mm |
| | minimum time | 1.5 ms |
| Impedance of the contacts | | 1.28 mΩ |

Terminal capacity

| | | |
|--|-----------------|--------------------------------|
| Solid, stranded and finely stranded without end sleeve | mm ² | 2 × 0.5 to 2.5 2 × 2.5 to 4 |
| Finely stranded with end sleeve | mm ² | 2 × 0.5 to 2.5 2 × 2.5 to 4 |
| AWG wires, solid and stranded | mm ² | 2 × 20 to 10 |
| Tightening torque | | 0.8 Nm / 7 Lb.in |
| Ring terminals | | 0.8 Nm / 7 Lb.in |

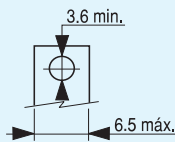


Timed auxiliary contact blocks

| | BTLF... / BTRF... |
|---|--|
| Rated insulation voltage (Ui) acc. IEC 60947-5 | 1000V |
| Rated thermal current (Ith) $\theta < 55^{\circ}\text{C}$ | 10A |
| Making capacity (r.m.s.) acc. IEC 60947-5 | |
| AC-15 $U_e \leq 440\text{V}, 50/60\text{ Hz}$ | 90A |
| DC-13 $U_e \leq 220\text{V DC}$ | 90A |
| Breaking capacity (r.m.s.) acc. IEC 60947-5 | |
| AC-15 $U_e \leq 400\text{V}, 50/60\text{ Hz}$ | 60A |
| DC-13 $U_e \leq 220\text{V DC}$ | 0.95A |
| Rated voltage and rated current U_e -Ie | |
| AC-15 according to IEC | 110/120V - 6A 220/240V - 6A 380/400V - 4A 415/440V - 3.5A 500V - 2.5A 660/690V - 1.5A |
| | according to UL, CSA A600 |
| DC-13 according to IEC | 24V - 4A 48V - 2A 110V - 0.7A 220V - 0.3A 415/440V - 0.15A |
| | according to UL, CSA Q600 |
| Electrical endurance | 1×10^6 ops. |
| Minimum operational voltage (operational safety) | 17V |
| Minimum operational current | 5mA |
| Short-circuit protection (without welding) gL | 10A |
| Insulation resistance | |
| between contacts | $> 10\text{ M}\Omega$ |
| between contacts and earth | $> 10\text{ M}\Omega$ |
| between input and output | $> 10\text{ M}\Omega$ |
| Guaranteed no overlap between NO and NC contacts | |
| space | 1.3 mm |
| minimum time | 1.5 ms |
| Timing | |
| (Ambient temperature between $- 25$ and $+ 55^{\circ}\text{C}$) | |
| Accuracy | $\pm 5\%$ |
| Loss of accuracy after 0.5×10^6 ops. | $+ 20\%$ |
| Loss of accuracy per rise $^{\circ}\text{C}$ ($0 - 55^{\circ}\text{C}$) | $+ 0.75\%$ per $^{\circ}\text{C}$ |
| Impedance of the contacts | 1.28 m Ω |
| Mechanical endurance | 5×10^6 ops. |
| Peak current | |
| during 1 s. | 50A |
| during 0.1 s. | 100A |

Terminal capacity

| | | |
|--|--------------------|--|
| Solid, stranded and finely stranded without end sleeve | (mm ²) | 2×0.5 to 2.5 |
| Finely stranded with end sleeve | (mm ²) | 2×0.5 to 2.5 2×2.5 to 4 |
| AWG wires, solid and stranded | (mm ²) | 2×20 to 10 |
| Tightening torque | | $0.8\text{ Nm} / 7\text{ Lb.in}$ |
| Ring terminals | | $0.8\text{ Nm} / 7\text{ Lb.in}$ |



Mechanical latch blocks

| | RMLF..... |
|--|--|
| Rated insulation voltage(Ui) | 1000V |
| Standard voltages (Us); 50-60Hz and direct current | 24 ... 690V |
| Operating limits | 0.75 to 1.1 xUs |
| Consumption for unlatching (auto cut-out) | 210W /VA (24-72V) 130W /VA (110-440V) |
| Unlatching control ⁽¹⁾ | |
| Electrical Min.impuls | 10 ms Maintained auto cut-out by integral contact 55-56 (only AC slots) |
| Manual | By local (0) push-button |
| Contactor control | |
| Electrical Min.impuls | 40 ms |
| Manual | By local (I) push-button |
| Mechanical endurance | CL00 ... CL45 3×10^6 (1200ops./h) CL05 ... CL10 0.1×10^6 (300 ops./h) |

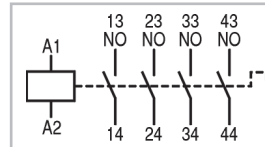
Terminal capacity

| | | |
|--|-----------------|--|
| Solid, stranded and finely stranded without end sleeve | mm ² | 2×0.5 to 2.5 2×2.5 to 4 |
| Finely stranded with end sleeve | mm ² | 2×0.5 to 2.5 2×2.5 to 4 |
| AWG wires, solid and stranded | mm ² | 2×20 to 10 |
| Tightening torque | | $0.8\text{ Nm} / 7\text{ Lb.in}$ |

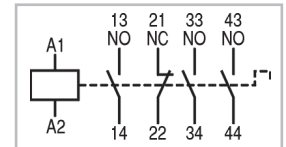
Terminal numbering

Auxiliary contactors

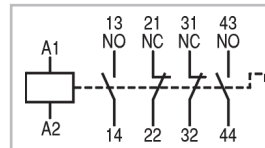
RL4R_040__



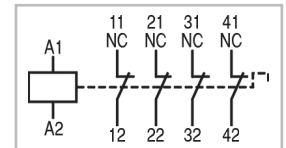
RL4R_031__



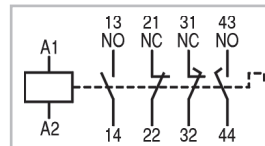
RL4R_022__



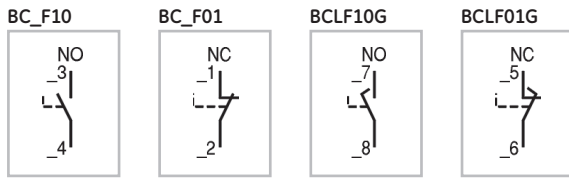
RL4R_004__



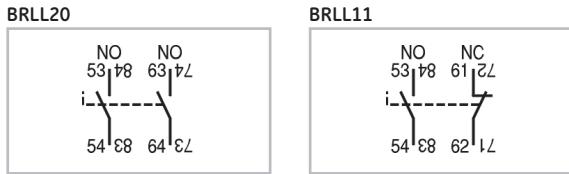
RL4R_022G__



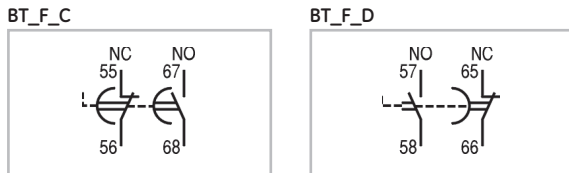
Auxiliary contact blocks. Front mounting



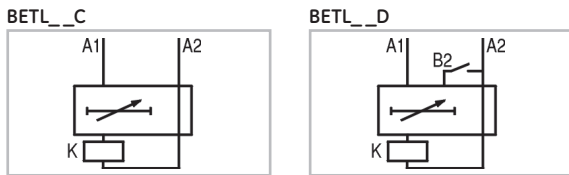
Auxiliary contact blocks. Lateral mounting



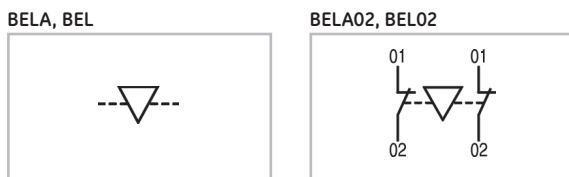
Pneumatic timer blocks



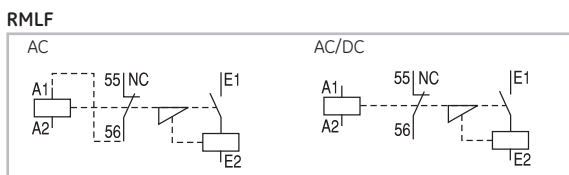
Electronic timer blocks



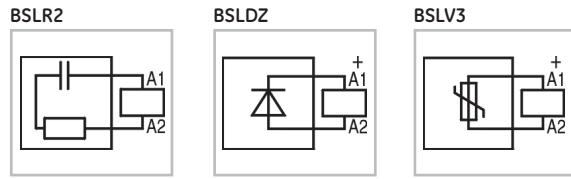
Mechanical (-/electrical) interlock



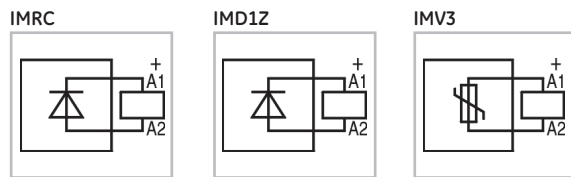
Mechanical latch block



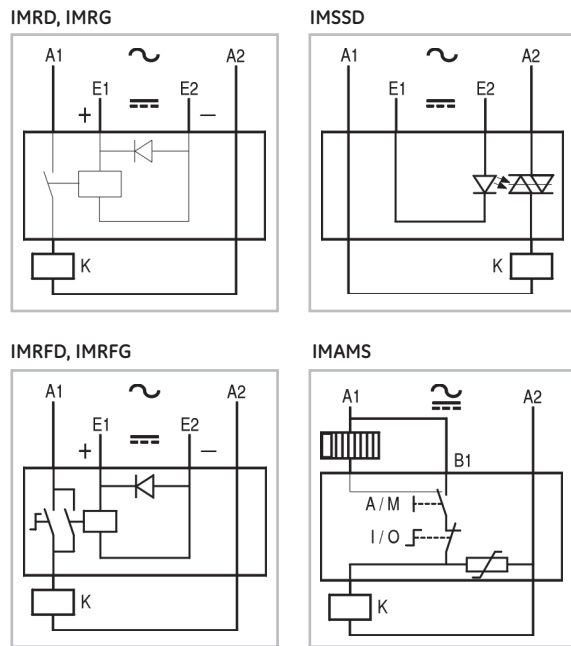
Voltage suppressor blocks



Voltage suppressor blocks to use with interface modules and electronic timer blocks



Interface modules



Technical data

A

B

C

D

E

F

G

H

I

X

Terminal numbering in accordance with EN 50011

By combining other basic auxiliary contactors with auxiliary contact blocks BLC..., it is possible to obtain other combinations, and positions of contacts which are not covered by the table. But in all cases the maximum number of auxiliary contacts should be four.

Type E

Standard contact combination in which the interchangeability of the devices does not affect the cabling or the diagram. Specifies a particular contact numbering and positioning.

Auxiliary contactors

A

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C

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E

F

G

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| Type | Final structure of the combination | Auxiliary contacts | | Auxiliary contactor +Auxiliary contact blocks to be added |
|--------|------------------------------------|----------------------------|-------|--|
| | | Combination Description | NO NC | |
| Type E | | 40E | 4 0 | RL4RA040... |
| | | 31E | 3 1 | RL4RA031... |
| | | 22E | 2 2 | RL4RA022... |
| | | 04E | 0 4 | RL4RA004... |
| Type E | | 50E | 5 0 | RL4RA040... + BC_F10 |
| | | 41E | 4 1 | RL4RA031... + BC_F10 |
| | | 32E | 3 2 | RL4RA022... + BC_F10 |
| | | 23E | 2 3 | RL4RA022... + BC_F01 |
| | | 14E | 1 4 | RL4RA004... + BC_F10 |
| | | 05E | 0 5 | RL4RA004... + BC_F01 |
| Type E | | 60E | 6 0 | RL4RA040... + BC_F10 + BC_F10 |
| | | 51E | 5 1 | RL4RA040... + BC_F10 + BC_F01 |
| | | 42E | 4 2 | RL4RA040... + BC_F01 + BC_F01 |
| Type E | | 80E | 8 0 | RL4RA040... + BC_F10 + BC_F10 + BC_F10 + BC_F10 |
| | | 71E | 7 1 | RL4RA040... + BC_F10 + BC_F01 + BC_F10 + BC_F10 |
| | | 62E | 6 2 | RL4RA040... + BC_F10 + BC_F01 + BC_F01 + BC_F10 |
| | | 53E | 5 3 | RL4RA040... + BC_F10 + BC_F01 + BC_F01 + BC_F01 |
| | | 44E | 4 4 | RL4RA040... + BC_F01 + BC_F01 + BC_F01 + BC_F01 |



Terminal numbering in accordance with EN 50011

By combining other basic auxiliary contactors with auxiliary contact blocks BLC..., it is possible to obtain other combinations, and positions of contacts which are not covered by the table. But in all cases the maximum number of auxiliary contacts should be four.
















Type Z

Contact combination the same as Type E.

Interchangeability of the devices may affect the cabling and the diagram. Neither contact numbering nor positioning are retained.

Type Y

Contact combination which differs from Type E, although it is obtained by a combination of devices provided for this Type E.

| | Final structure of the combination | Auxiliary contacts | | Auxiliary contactor +Auxiliary contact blocks to be added | |
|--------|--|--------------------|-------|--|---|
| | | Combination | NO NC | | |
| | | Description | | | |
| Type Z |  <pre> A1 13NO 23NO 33NO 43NO 53NO 63NO A2 14 24 34 44 54 64 </pre> | 60Z | 6 | 0 | RL4RA040... + BRL20 |
| |  <pre> A1 13NO 23NO 33NO 43NO 53NO 61NC A2 14 24 34 44 54 62 </pre> | 51Z | 5 | 1 | RL4RA040... + BRL11 |
| |  <pre> A1 13NO 23NO 33NO 43NO 53NO 63NO 73NO 83NO A2 14 24 34 44 54 64 74 84 </pre> | 80Z | 8 | 0 | RL4RA040... + BRL20 + BRL20 |
| |  <pre> A1 13NO 23NO 33NO 43NO 53NO 61NC 73NO 83NO A2 14 24 34 44 54 62 74 84 </pre> | 71Z | 7 | 1 | RL4RA040... + BRL11 + BRL20 |
| |  <pre> A1 13NO 23NO 33NO 43NO 53NO 61NC 71NC 83NO A2 14 24 34 44 54 62 72 84 </pre> | 62Z | 6 | 2 | RL4RA040... + BRL11 + BRL11 |
| |  <pre> A1 13NO 21NC 33NO 43NO 53NO 61NC A2 14 22 34 44 54 62 </pre> | 42Y | 4 | 2 | RL4RA031... + BC_F10 + BC_F01 |
| Type Y |  <pre> A1 13NO 21NC 33NO 43NO 53NO 61NC A2 14 22 34 44 54 62 </pre> | 42Y | 4 | 2 | RL4RA031... + BRL11 |
| |  <pre> A1 13NO 21NC 33NO 43NO 53NO 61NC 71NC 83NO A2 14 22 34 44 54 62 72 84 </pre> | 53Y | 5 | 3 | RL4RA031... + BC_F10 + BC_F01 + BC_F01 + BC_F10 |
| |  <pre> A1 13NO 21NC 31NC 43NO 53NO 61NC 71NC 83NO A2 14 22 32 44 54 62 72 84 </pre> | 44Y | 4 | 4 | RL4RA022... + BC_F10 + BC_F01 + BC_F01 + BC_F10 |
| |  <pre> A1 13NO 21NC 31NC 43NO 53NO 61NC A2 14 22 32 44 54 62 </pre> | 33Y | 3 | 3 | RL4RA022... + BC_F10 + BC_F01 |
| |  <pre> A1 13NO 21NC 31NC 43NO 53NO 61NC A2 14 22 32 44 54 62 </pre> | 33Y | 3 | 3 | RL4RA022... + BRL11 |
| |  <pre> A1 13NO 23NO 33NO 43NO 55NC 67NO 73NO 83NO A2 14 24 34 44 56 68 74 84 </pre> | | | | RL4RA040... + BTLF...C + BRL20 |
| |  <pre> A1 13NO 23NO 33NO 43NO 57NO 65NC 73NO 83NO A2 14 24 34 44 58 66 74 84 </pre> | | | | RL4RA040... + BTLF...D + BRL20 |
| |  <pre> A1 13NO 23NO 33NO 43NO 55NC 67NO 71NC 83NO A2 14 24 34 44 56 68 72 84 </pre> | | | | RL4RA040... + BTLF...C + BRL11 |
| |  <pre> A1 13NO 23NO 33NO 43NO 57NO 65NC 71NC 83NO A2 14 24 34 44 58 66 72 84 </pre> | | | | RL4RA040... + BTLF...D + BRL11 |

Technical data

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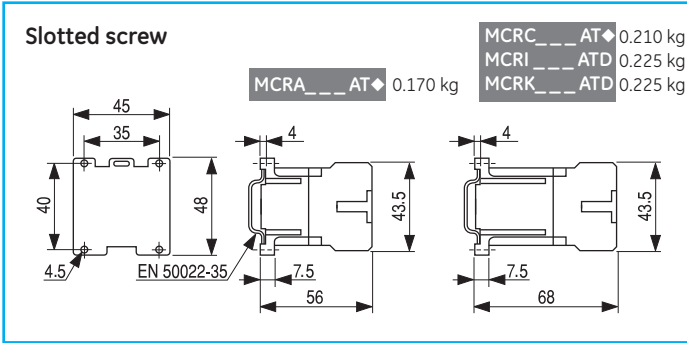
H

I

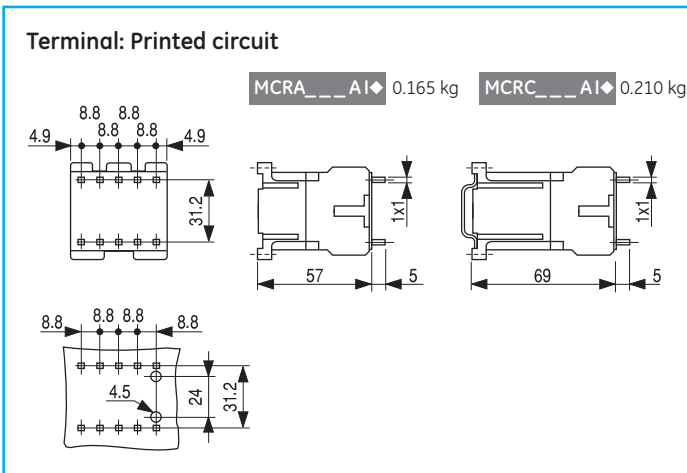
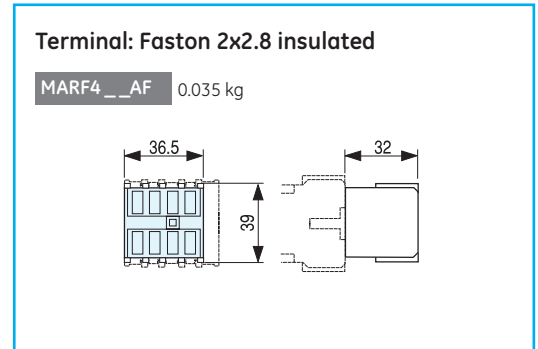
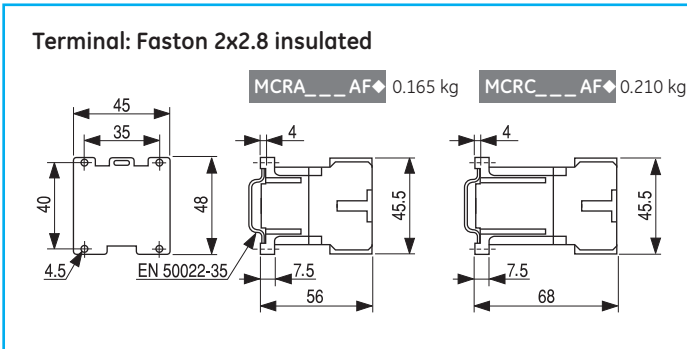
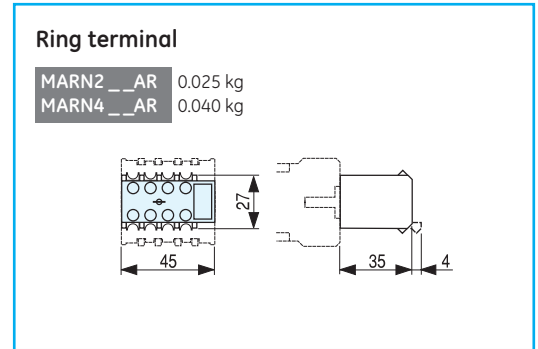
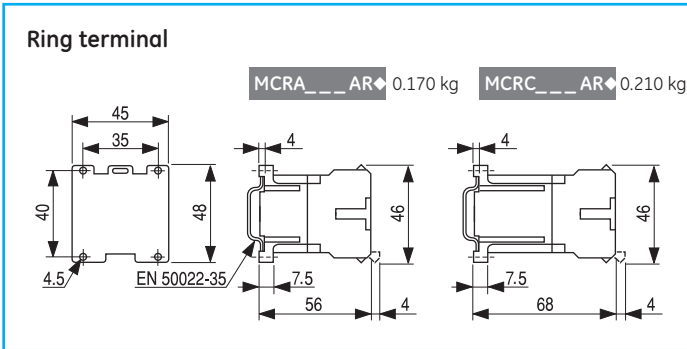
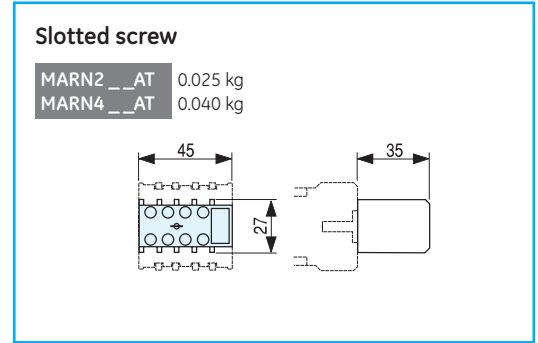
X

Dimensional drawings

Auxiliary minicontactors



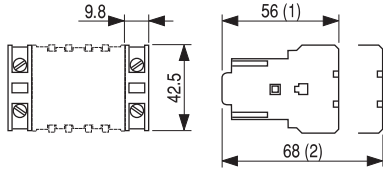
Auxiliary contact blocks. Front mounting



Auxiliary contact blocks. Lateral mounting

Slotted screw

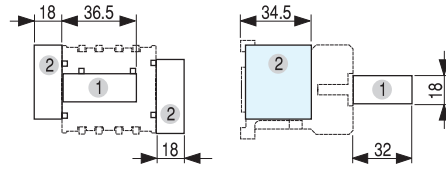
MARL__AT, ATS 0.013 kg



- (1) AC-control.
- (2) DC-control

Electronic timer block

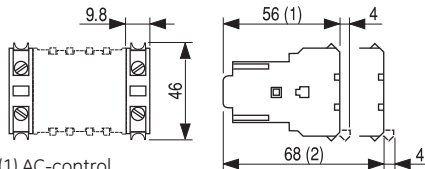
MREBC_0AC2 0.040 kg



- (1) Frontal mounting
- (2) Lateral mounting

Ring terminal

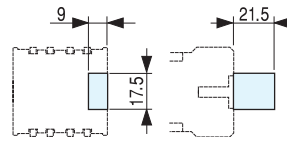
MARL__AR, ARS 0.013 kg



- (1) AC-control.
- (2) DC-control

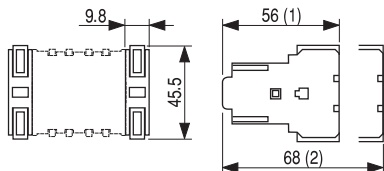
Voltage suppressor block

MP0A_AE_ 0.010 kg
MPOC_AE3 0.010 kg



Terminal: Faston 2x2.8 insulated

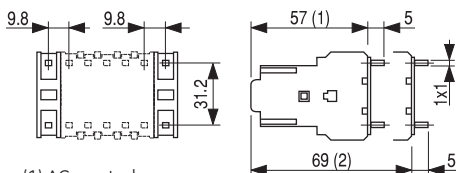
MARL__AF, AFS 0.009 kg



- (1) AC-control.
- (2) DC-control

Terminal: Printed circuit

MARL__AI, AIS 0.009 kg



- (1) AC-control
- (2) DC-control

A

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Series RL

Auxiliary contactors

A

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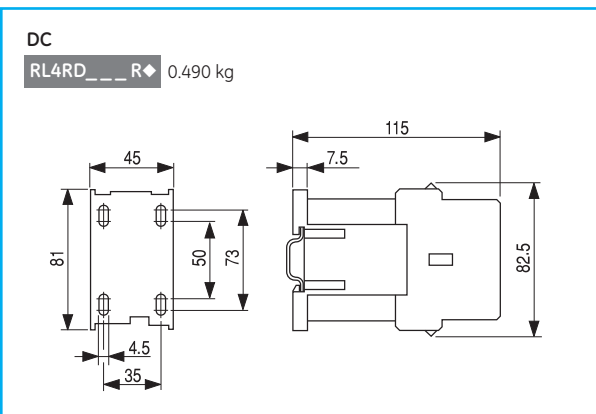
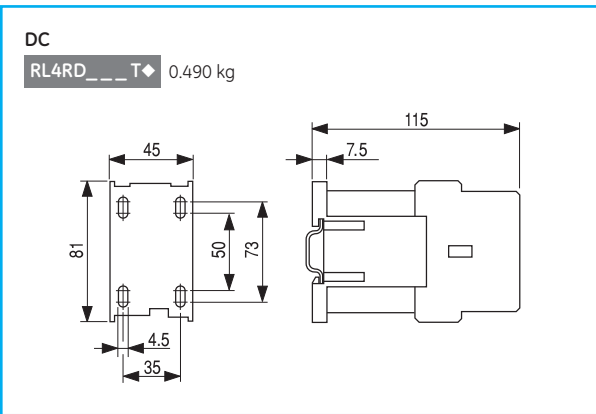
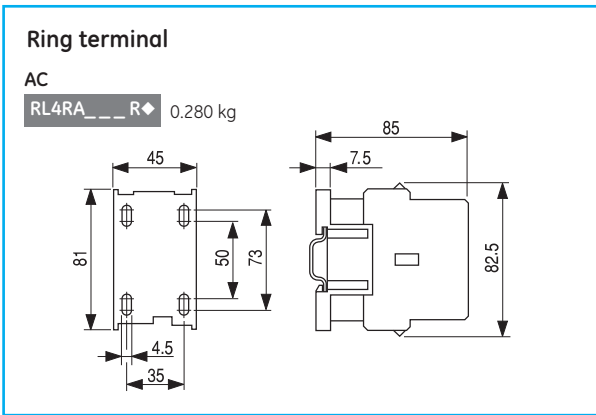
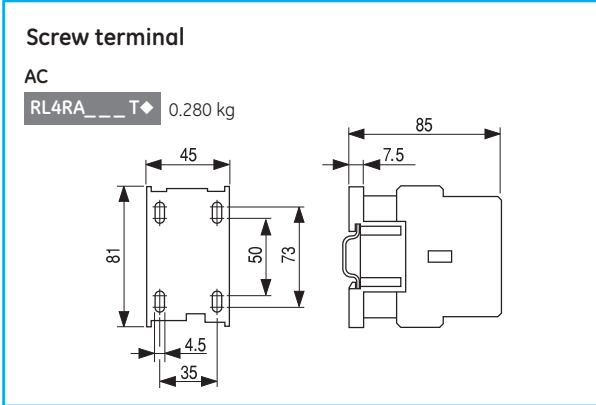
H

I

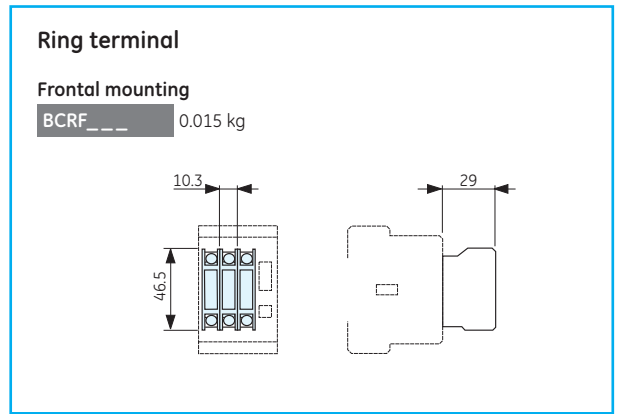
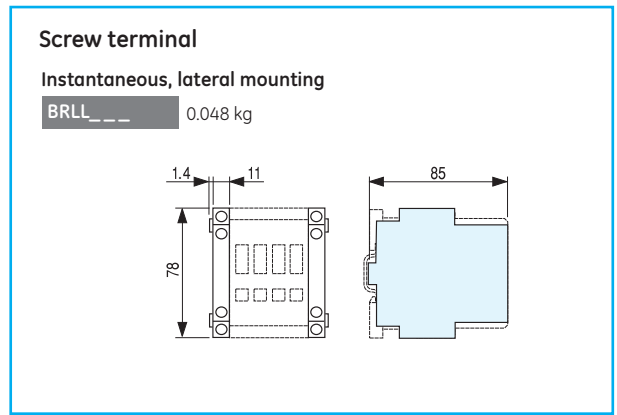
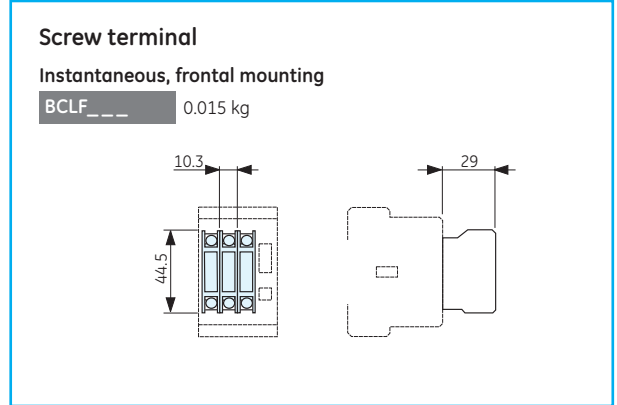
X

Dimensional drawings

Auxiliary contactors

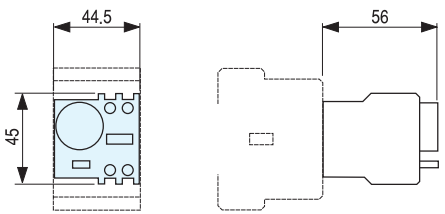


Instantaneous auxiliary contact blocks

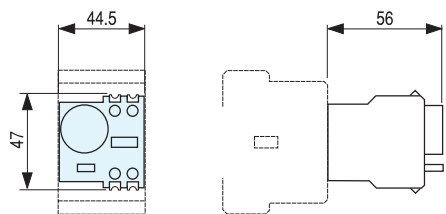


Timed auxiliary contact blocks

Screw terminal
Front mounting
BTLF___ 0.085 kg

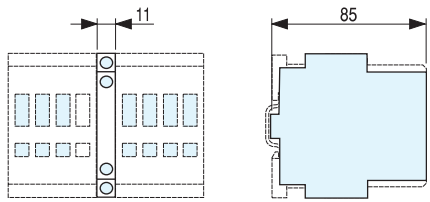


Ring terminal
Front mounting
BTRF___ 0.085 kg



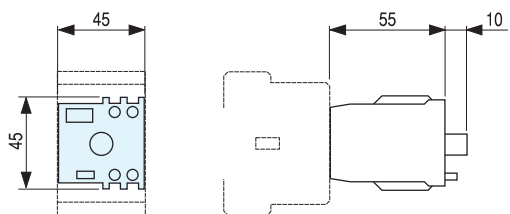
Mechanical (-/electrical) interlock

BELA 0.025 kg
BELA02 0.025 kg



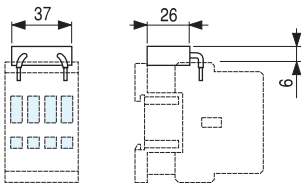
Mechanical latch block

RMLF___ 0.082 kg



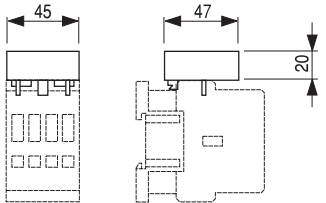
Voltage suppressor blocks

BSLR2_ 0.020 kg
BSLDZ_ 0.020 kg
BSLV3_ 0.020 kg



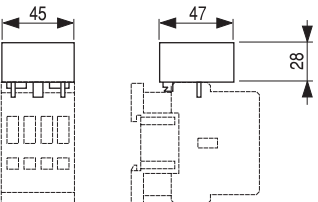
Electronic timer block

BETL__C 0.040 kg
BETL__D 0.040 kg



Interface

IMR_ 0.060 kg
IMRF_ 0.050 kg
IMSSD 0.045 kg
IMAMS 0.045 kg



A

B

C

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G

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Everything is

SFK - Motor protection circuit breaker

- B.2 Order codes
- B.3 Auxiliary contact blocks and auxiliary functions
- B.4 Enclosures and accessories
- B.5 Terminal numbering
- B.6 Technical data
- B.7 Dimensions

Plug-in relays and Auxiliary contactors

Motor protection devices

SURION - Manual motor starter

- B.8 GPS1B... - Thermal and magnetic protection
- B.10 GPS2B... - Thermal and magnetic protection
- B.12 GPS1M... - Magnetic protection
- B.14 GPS2M... - Magnetic protection
- B.16 Accessories
- B.20 Enclosures
- B.22 Technical data
- B.26 Mounting possibilities of the auxiliaries
- B.28 Dimensions

Contactors and Thermal overload relays

Motorstarters

Control and signalling units

Electronic relays

Limit switches

Speed drive units

Main switches

Numerical index

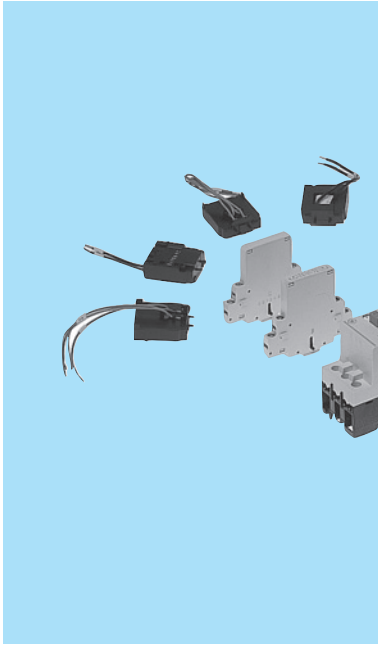
SURION

Manual Motor Starters and Coordination tables

see chapter D pages D2-D13

under control





Motor protection circuit breaker

- For thermal and magnetic protection of AC and DC motors
- Conformity to standards IEC 947-2, IEC 947-4-1 and VDE 0660
- Manual push-button operation
- Setting ranges from 0.1 to 25A at 690V AC and 220V DC
- Short-circuit capacity of 65kA up to setting range of 1.6-2.5A/400V

Standards

IEC 947-2
IEC 947-4-1
VDE 0660

Approvals




UL



CSA



CE

- Trip class 10
- Instant magnetic tripping (12 times the maximum operating current Ie)
- Single phase protection
- Ambient temperature compensation between - 5° C and + 40° C
- Internal and external accessories easy to mount
- Quick fixing on DIN rail EN 50022-35 and, with two screws, on plate or wall
- Terminals protected against accidental contacts (IP20)
- Suitable for isolation () and positive padlocking in open position (IEC 947-1 § 7-1-6)



Motor protection circuit breakers






| 3-phase motor AC3 380/415V kW | Magnetical tripping current A | Thermal tripping current (setting range) | | Cat. no. | Ref. no. | Pack |
|-------------------------------------|----------------------------------|--|-----------|----------|----------|------|
| | | Min. A | Max. A | | | |
| 0.02 | 1.9 | 0.1 | 0.16 | SFK0A | 120001 | 1/5 |
| 0.06 | 3.0 | 0.16 | 0.25 | SFK0B | 120002 | 1/5 |
| 0.06 / 0.09 | 4.8 | 0.25 | 0.4 | SFK0C | 120003 | 1/5 |
| 0.12 / 0.18 | 7.5 | 0.4 | 0.63 | SFK0D | 120004 | 1/5 |
| 0.25 | 12 | 0.63 | 1 | SFK0E | 120005 | 1/5 |
| 0.37 / 0.55 | 19 | 1 | 1.6 | SFK0F | 120006 | 1/5 |
| 0.75 | 30 | 1.6 | 2.5 | SFK0G | 120007 | 1/5 |
| 1.1 / 1.5 | 48 | 2.5 | 4 | SFK0H | 120008 | 5 |
| 2.2 | 75 | 4 | 6.3 | SFK0I | 120009 | 5 |
| 3.7 / 4.0 | 120 | 6.3 | 10 | SFK0J | 120010 | 5 |
| 5.5 / 7.5 | 190 | 10 | 16 | SFK0K | 120011 | 5 |
| 9.0 | 240 | 16 | 20 | SFK0L | 120012 | 1/5 |
| 11 / 12.5 | 300 | 20 | 25 | SFK0M | 120013 | 1/5 |

Circuit breaker to protect transformers on request

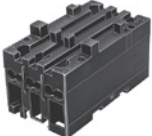
Auxiliary contact blocks

| | | | | | Cat. no. | Ref. no. | Pack | |
|---|---|-------------------------------|-----------------------|-----|----------|----------|------|--|
|  | Side mounting | | 1NO | 1NC | SFAL11N | 120020 | 5 | |
| | | | 2NO | | SFAL20N | 120021 | 5 | |
| | | | 1NO | 1NC | SFAL11D | 120022 | 5 | |
| | | | (advanced on closing) | | | | | |
| | | | 2NO | | SFAL20D | 120023 | 5 | |
| | | | (advanced on closing) | | | | | |
| | For lower energy levels ($\geq 4V, \geq 4mA$) | 1change-over PE + N conductor | | | SFAL11S | 120027 | 1 | |
| | | | | | SFALPEN | 264826 | 1 | |
|  | Internal mounting | | 1NO | 1NC | SFAI11 | 120024 | 5 | |
| | | Switch trip indicator-alarm | 1NO | | SFAK10 | 120025 | 5 | |
| | | | 1NC | | SFAK01 | 120026 | 5 | |
| | | | | | | | | |

Coils for internal mounting

| | | | | | Cat. no. | Ref. no. | Pack |
|---|--|--|-------------|-------------|----------|----------|------|
|  | Minimum power | Functioning range: $0.35U_e < U < 0.7U_e$ Manual reset Dissipated power 2.2VA / 1W | | | | | |
| | | | 110V / 50Hz | 120V / 60Hz | SFB0RJ | 120034 | 5 |
| | | | 220V / 50Hz | 240V / 60Hz | SFB0RN | 120035 | 5 |
| | | | 380V / 50Hz | 440V / 60Hz | SFB0RU | 120036 | 5 |
|  | Undervoltage release special for machinery | According to IEC204-1, DIN VDE 0113, INRS Art. L233-5 A combination of a special undervoltage release and auxiliary contact block SFAL20D | | | | | |
| | | | 110V / 50Hz | 120V / 60Hz | SFB0RJM | 107256 | 1 |
| | | | 220V / 50Hz | 240V / 60Hz | SFB0RNM | 120114 | 1 |
| | | | 380V / 50Hz | 440V / 60Hz | SFB0RUM | 120115 | 1 |
|  | Shunt trip | Functioning range: $0.7U_e < U < 1.2U_e$ Manual reset | | | | | |
| | | | 110V / 50Hz | 120V / 60Hz | SFB0AJ | 120030 | 5 |
| | | | 220V / 50Hz | 240V / 60Hz | SFB0AN | 120031 | 5 |
| | | | 380V / 50Hz | 440V / 60Hz | SFB0AU | 120032 | 5 |

Current limiter

| | | | | | Cat. no. | Ref. no. | Pack |
|---|-----------------|---|-------------|--|----------|----------|------|
|  | Current limiter | Combined with SFK. Upgrades breaking capacity to 50kA/3~400V Not available UL, CSA. | | | | | |
| | | | $I_n = 32A$ | | SFVH03 | 243713 | 1 |

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Series SFK

Motor protection devices

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Enclosures

| | | | | | Cat. no. | Ref. no. | Pack |
|---|------------------|--|--|---------------------|----------|----------|------|
|  | Surface mounting | | | IP41-PG16 | SFS04 | 120040 | 1 |
| | | | | Conversion kit IP55 | SFS0K2 | 120046 | 1 |
| | | | | IP55-PG16 | SFS05 | 120041 | 1 |
| | | | | IP41-M25 | SFS04M | 212558 | 1 |
| | | | | IP65-M25 | SFS05M | 212559 | 1 |
|  | Flush mounting | | | IP41 | SFE04 | 120042 | 1 |
| | | | | Conversion kit IP55 | SFE0K2 | 120047 | 1 |
| | | | | IP55 | SFE05 | 120043 | 1 |

Accessories for enclosures

| | | | | | Cat. no. | Ref. no. | Pack |
|--|---|--|--|--|----------|----------|------|
| | Neutral connection | For use with surface and flush mounting enclosures | | | SFVN0 | 101369 | 1 |
| |  | | | | | | |
| | Padlocking device | Up to 3 padlocks 6 - 8 mm | | | SFVCD | 120054 | 1 |
| |  | | | | | | |
| | Emergency mushroom push-buttons IP55 | Impulse function | | | SFPS0 | 120051 | 1 |
| | | Latched, pull to release | | | SFPR0 | 120052 | 1 |
| | | Key locked, turn to release | | | SFPE0 | 120053 | 5 |
| | | Conversion kit IP55 for SFS04 | | | SFS04K1 | 245217 | 1 |
| | | Conversion kit IP55 for SFE04 | | | SFE04K1 | 216604 | 1 |
| |  | Green 110/120V | | | GPELGAJ | 101375 | 1 |
| | | Green 220/240V | | | GPELGAN | 101376 | 1 |
| | | Green 380/440V | | | GPELGAU | 101377 | 1 |
| | | Green 480/500V | | | GPELGAX | 101378 | 1 |
| | | Green 600V | | | GPELGAY | 101379 | 1 |
| | | Red 110/120V | | | GPELRAJ | 101380 | 1 |
| | | Red 220/240V | | | GPELRAN | 101381 | 1 |
| | | Red 380/440V | | | GPELRAU | 101382 | 1 |
| | | Red 480/500V | | | GPELRAX | 101383 | 1 |
| | | Red 600V | | | GPELRAY | 101384 | 1 |
| | | Transparent 110/120V | | | GPELCAJ | 101385 | 1 |
| | | Transparent 220/240V | | | GPELCAN | 101386 | 1 |
| | | Transparent 380/440V | | | GPELCAU | 101387 | 1 |
| | | Transparent 480/500V | | | GPELCAX | 101388 | 1 |
| | | Transparent 600V | | | GPELCAY | 101389 | 1 |



Accessories for enclosures (continued)

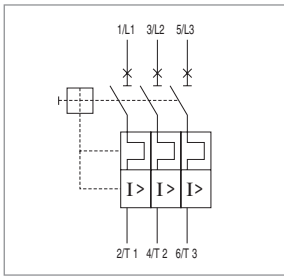
| | | | | Cat. no. | Ref. no. | Pack |
|---------------------------------|--------------------------------------|------------------|-----------|----------------|----------|------|
| Three phase busbar block | 4 units | Ui 690V / Ie 63A | L = 207mm | GPB104A | 101392 | 2 |
| | 5 units | Ui 690V / Ie 63A | L = 261mm | GPB105A | 101393 | 2 |
| | Plastic cover for 3 unused terminals | | | GPB1GA | 101408 | 2 |
| Supply block | Ie = 63A Fully insulated | | | SFVB8 | 254537 | 5 |

Motor protection circuit breaker

Terminal numbering

Motor protection circuit breaker

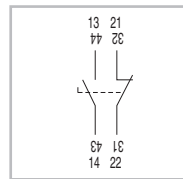
SFK...



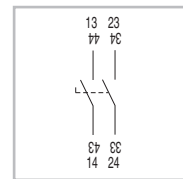
Auxiliary contact blocks

Side mounting

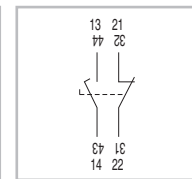
SFAL11N



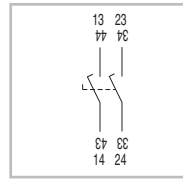
SFAL20N



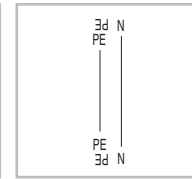
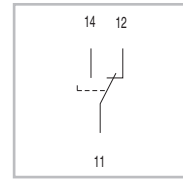
SFAL11D



SFAL20D

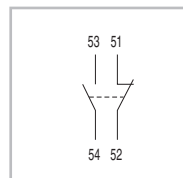


SFAL11S

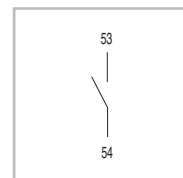


Internal mounting

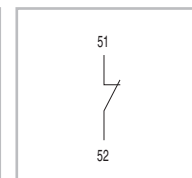
SFAI11



SFAK10



SFAK01



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Series SFK

Technical data

General

| | |
|-------------------------------------|-----------------------------|
| Rated thermal current (Ith) at 40°C | 25A |
| Rated insulation voltage (Ui) | 690V |
| Rated operational voltage (Ue) AC | 690V, 40/60Hz |
| (see application diagram) DC | 220V, with or without earth |

Standards

| | | |
|-----------|-------------|----------|
| IEC 947-2 | IEC 947-4-1 | VDE 0660 |
|-----------|-------------|----------|

Approvals

| | |
|----|-----|
| UL | CSA |
|----|-----|

Main circuit

| | |
|---|----------------------------|
| Category | AC3, DC4 |
| Operational frequency limits | 40 to 60 Hz |
| Opening time | aprox. 7 ms |
| Mechanical endurance | 10 ⁵ operations |
| Electrical endurance category AC3 | 10 ⁵ operations |
| Maximum operating rate | 40 operations/hour |
| Total dissipated power at rated thermal current and hot state | 6 W |

Tripping characteristics

| | |
|--|--|
| Thermal | |
| Symmetrical overloads | Class 10 (see curve 1, tripping curves) |
| Asymmetrical overloads (phase failure) | To IEC 947-4-1 (see curve 2, tripping curves) |
| Temperature compensation | - 5 to + 40°C |

Magnetic

| | |
|--|--|
| | 12 × Ie (Ie = max. thermal setting value) |
|--|--|

Shunt release

| | |
|--------------------------|------------------------------------|
| Operating voltage limits | 0.7 - 1.2 Ue 100% ED |
| Consumption | AC 1 W DC 0.85 - 1.1 Ue 100% ED |

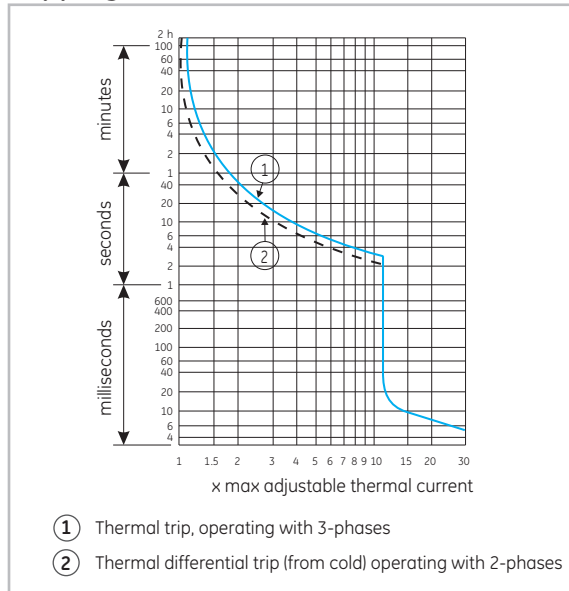
Undervoltage release

| | |
|--------------------------|----------------|
| Operating voltage limits | 0.75 - 0.35 Ue |
| Breaking voltage limits | 2.2 VA |
| Consumption | 1 W |

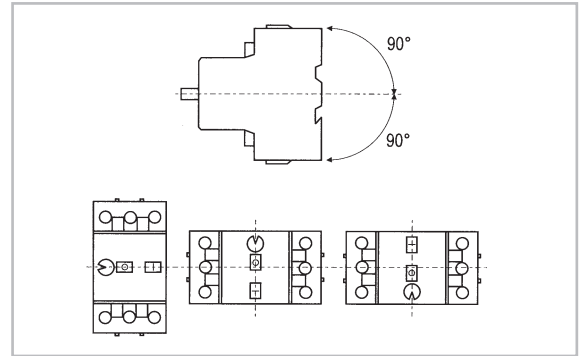
Wiring capacity

| | | |
|---------------|------|--------------------------------|
| Rigid wire | min. | 2 wires of 0,75mm ² |
| | max. | 2 wires of 6mm ² |
| Flexible wire | min. | 2 wires of 0,75mm ² |
| | max. | 2 wires of 4mm ² |

Tripping curve



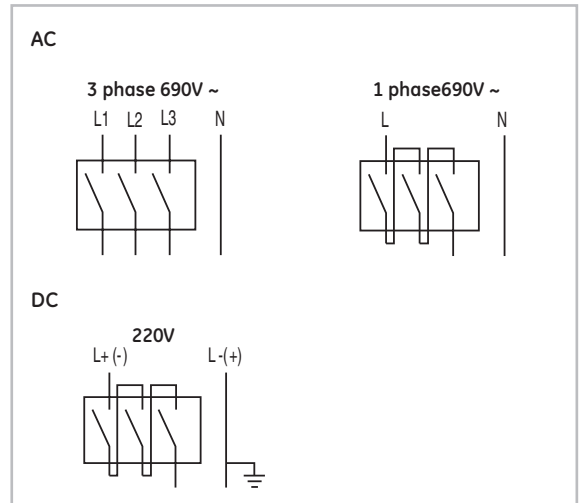
Mounting positions



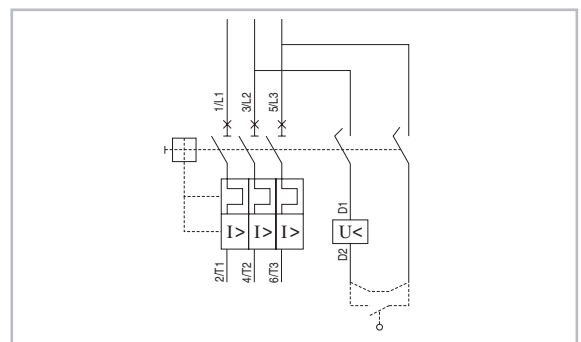
Auxiliary contact blocks

| | SFAL | SFAI - SFAK |
|--|---|---|
| Rated insulation voltage (Ui) according VDE 0110 | 500V | 500V |
| Rated thermal current (Ith) | 6A | 6A |
| AC-15 | Ue 230V 400V 500V Ie 3,5A 2A 1A | 230V 400V 500V 2A 1A 0,5A |
| DC-13 | Ue 60V 110V 220V Ie 1,5A 1A 0,5A | 60V 110V 220V 0,7A 0,55A 0,25A |
| Protective fuse gl | 6A | 6A |
| Wiring capacity, Flexible wire | min. 2 × 0.75mm ² max. 2 × 2.5mm ² | 2 × 0.75mm ² 2 × 2.5mm ² |
| Terminal type | M3,5, Pozidriv, safety flange screws | |

Wiring diagram



Application diagram for tooling machines



Short-circuit breaking capacity Icu/Ics according to IEC 947-2

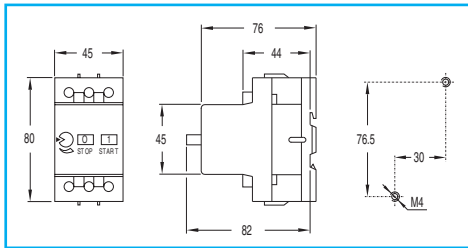
| Thermal adjustment (A) | 230V AC / 220V DC ⁽¹⁾ | | | | 400V AC | | | | 415V AC | | | | 500V AC | | | | 690V AC | | | |
|------------------------|----------------------------------|----------|----------|-------------------------|--------------------|----------|----------|-------------------------|--------------------|----------|----------|-------------------------|--------------------|----------|----------|-------------------------|--------------------|----------|----------|-------------------------|
| | 3ph motor AC3 (kW) | Icu (kA) | Ics (kA) | Fuse ⁽²⁾ (A) | 3ph motor AC3 (kW) | Icu (kA) | Ics (kA) | Fuse ⁽²⁾ (A) | 3ph motor AC3 (kW) | Icu (kA) | Ics (kA) | Fuse ⁽²⁾ (A) | 3ph motor AC3 (kW) | Icu (kA) | Ics (kA) | Fuse ⁽²⁾ (A) | 3ph motor AC3 (kW) | Icu (kA) | Ics (kA) | Fuse ⁽²⁾ (A) |
| 0.1 - 0.16 | - | 65 | 65 | (3) | 0.02 | 65 | 65 | (3) | 0.02 | 65 | 65 | (3) | 0.04 | 65 | 65 | (3) | 0.06 | 42 | 42 | (3) |
| 0.16 - 0.25 | - | 65 | 65 | (3) | 0.06 | 65 | 65 | (3) | 0.06 | 65 | 65 | (3) | 0.06 | 65 | 65 | (3) | 0.12 | 42 | 42 | (3) |
| 0.25 - 0.4 | 0.06 | 65 | 65 | (3) | 0.09 | 65 | 65 | (3) | 0.12 | 65 | 65 | (3) | 0.12 | 65 | 65 | (3) | 0.18 | 42 | 42 | (3) |
| 0.4 - 0.63 | 0.09 | 65 | 65 | (3) | 0.12 | 65 | 65 | (3) | 0.18 | 65 | 65 | (3) | 0.25 | 65 | 65 | (3) | 0.37 | 42 | 42 | (3) |
| 0.63 - 1 | 0.12 | 65 | 65 | (3) | 0.25 | 65 | 65 | (3) | 0.25 | 65 | 65 | (3) | 0.37 | 65 | 65 | (3) | 0.75 | 1 | 1 | 20 |
| 1 - 1.6 | 0.25 | 65 | 65 | (3) | 0.55 | 65 | 65 | (3) | 0.55 | 65 | 65 | (3) | 0.75 | 65 | 65 | (3) | 1.1 | 1 | 1 | 20 |
| 1.6 - 2.5 | 0.37 | 65 | 65 | (3) | 0.75 | 65 | 65 | (3) | 0.75 | 10 | 5 | 25 | 1.1 | 3 | 1.5 | 25 | 1.5 | 1 | 0.5 | 20 |
| 2.5 - 4 | 0.75 | 65 | 65 | (3) | 1.5 | 10 (4) | 5 (4) | 35 | 1.5 | 10 | 5 | 35 | 2.2 | 3 | 1.5 | 35 | 3 | 1 | 0.5 | 25 |
| 4 - 6.3 | 1.1 | 65 | 37.5(4) | (3) | 2.2 | 10 (4) | 5 (4) | 50 | 2.2 | 10 | 5 | 50 | 3 | 3 | 1.5 | 50 | 4 | 1 | 0.5 | 35 |
| 6.3 - 10 | 2.2 | 10 (4) | 5 (4) | 80 | 4 | 4 (4) | 2 (4) | 80 | 4 | 4 | 2 | 80 | 5.5 | 3 | 1.5 | 50 | 7.5 | 1 | 0.5 | 35 |
| 10 - 16 | 4 | 6 (4) | 3 (4) | 80 | 7.5 | 4 (4) | 2 (4) | 80 | 7.5 | 3.5 | 1.75 | 80 | 9 | 3 | 1.5 | 63 | 11 | 1 | 0.5 | 35 |
| 16 - 20 | 5 | 6 (4) | 3 (4) | 80 | 9 | 4 (4) | 2 (4) | 80 | 9 | 2.5 | 1.25 | 80 | 11 | 1.5 | 0.75 | 63 | 15 | 1 | 0.5 | 50 |
| 20 - 25 | 5.5 | 6 (4) | 3 (4) | 80 | 11 | 4 (4) | 2 (4) | 80 | 12.5 | 2.5 | 1.25 | 80 | 15 | 1.5 | 0.75 | 63 | 22 | 1 | 0.5 | 50 |

Icu = Ultimate short-circuit breaking capacity
 Ics = Service short-circuit breaking capacity

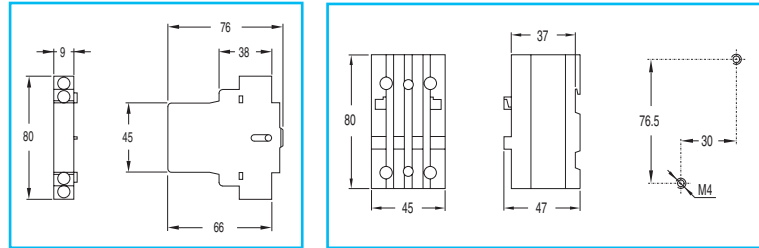
- (1) At 220V, t = 15 ms
- (2) Maximum value of the fuses when the presumed short circuit current is higher than the breaking capacity of the device. Type D, slow or NH type gG/gL.
- (3) No back-up fuse required to the Icu value
- (4) 50 kA in combination with current limiter

Dimensional drawings

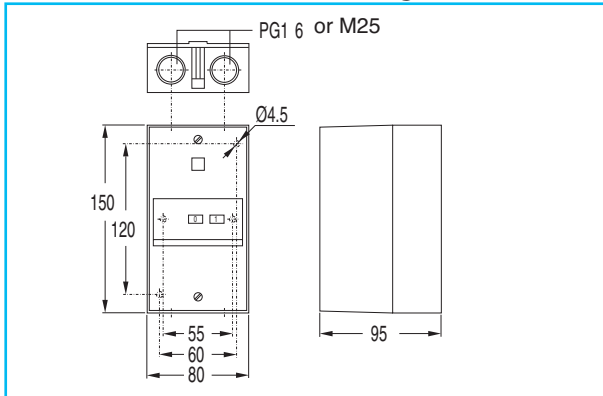
Motor protection circuit breaker



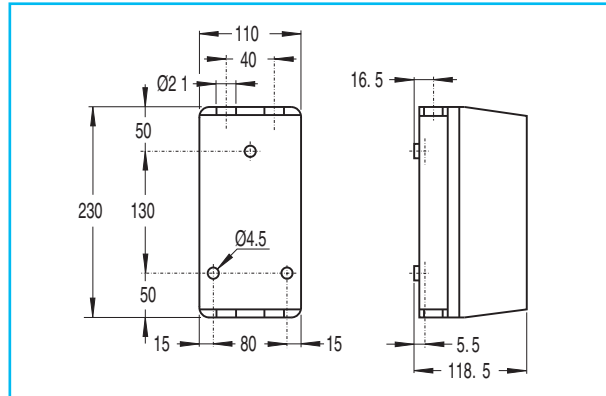
Auxiliary contact block Current limiter



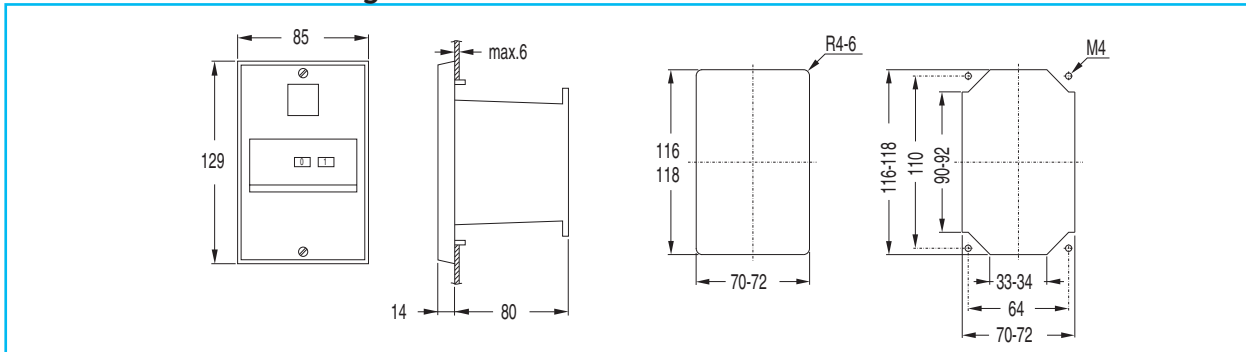
Enclosures: surface mounting



Enclosure to combine with contactor



Enclosures: flush mounting



Thermal and magnetic protection

GPS1B



Standards/Approvals

IEC 60947-1, 60947-2, 60947-4-1
 DIN VDE 0660T 100/101/102
 UL508/CSA - UL508/cULus
 Shipping approvals:



RINA



Bureau Veritas



Lloyd's Register
 Germanischer Lloyd



cULus

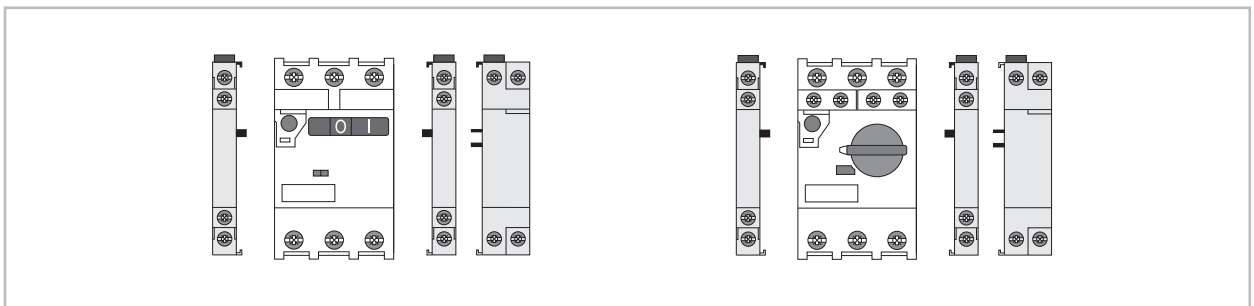


CE

Characteristics

- Rocker and rotary handle operator
- Thermal and magnetic protection
- Standard and high breaking capacity
 - $I_{cu} = 100kA \geq I_{cs} = 100\% I_{cu}$
 - $I_{cu} < 100kA \geq I_{cs} \text{ min. } 75\% I_{cu}$
- Clear identification of the operation state (ON-OFF-tripped)
- Ambient temperature compensation
- Phase failure protection

Auxiliaries



Technical performances

| | | |
|---|------|-------------|
| Rated current I_n | (A) | 0.1-32 |
| Rated operational current I_e (A) | | 0.1-32 |
| Rated power at 400Vac | (kW) | 0.02-15 |
| Utilisation category | | |
| IEC 60947-2 (circuit breaker) | | A |
| IEC 60947-4-1 (MMS) | | AC-3 |
| Tripping class IEC 60947-4-1 | | 10 |
| Magnetic release $I_e \text{ max.}$ | (A) | $\times 13$ |
| Mechanical/electrical endurance | | 100,000 |

Accessories

- Auxiliaries ● pg. B.16
- Busbar system ● pg. B.19

- Technical data ● pg. B.22
- Dimensions ● pg. B.28
- Fuseless starters ● pg. D.2
- Coordination tables ● pg. D.5

GPS1B - Standard breaking capacity

| CLASS 10 | Rated power 3 phase motors at 400Vac Pn | Rated current In (1) | Thermal current setting range | Instantaneous short-circuit release | Rated ultimate short-circuit breaking capacity at 400V Icu (kA) | Rated service short-circuit breaking capacity at 400V Ics (kA) | Cat. no. | Ref. no. | Pack. |
|----------|--|----------------------------|-------------------------------------|---|--|---|----------|----------|-------|
| | (kW) | (A) | (A) | (A) | | | | | |
| | | | | | | | | | |
| | 0.02 | 0.16 | 0.1 - 0.16 | 2.1 | 100 | 100 | GPS1BSAA | 101211 | 5 |
| | 0.06 | 0.25 | 0.16 - 0.25 | 3.3 | 100 | 100 | GPS1BSAB | 101212 | 5 |
| | 0.09 | 0.4 | 0.25 - 0.4 | 5.2 | 100 | 100 | GPS1BSAC | 101213 | 5 |
| | 0.12/0.18 | 0.63 | 0.4 - 0.63 | 8.2 | 100 | 100 | GPS1BSAD | 101214 | 5 |
| | 0.25 | 1 | 0.63 - 1 | 13 | 100 | 100 | GPS1BSAE | 101215 | 5 |
| | 0.37/0.55 | 1.6 | 1 - 1.6 | 20.8 | 100 | 100 | GPS1BSAF | 101216 | 5 |
| | 0.75 | 2.5 | 1.6 - 2.5 | 32.5 | 100 | 100 | GPS1BSAG | 101217 | 5 |
| | 1.5 | 4 | 2.5 - 4 | 52 | 100 | 100 | GPS1BSAH | 101218 | 5 |
| | 2.2 | 6.3 | 4 - 6.3 | 81.9 | 100 | 100 | GPS1BSAJ | 101219 | 5 |
| | 3/4 | 10 | 6.3 - 10 | 130 | 100 | 100 | GPS1BSAK | 101220 | 5 |
| | 5.5 | 13 | 9 - 13 | 169 | 50 | 38 | GPS1BSAL | 101221 | 5 |
| | 7.5 | 16 | 11 - 16 | 208 | 25 | 19 | GPS1BSAM | 101222 | 5 |
| | 10 | 20 | 14 - 20 | 260 | 25 | 19 | GPS1BSAN | 101223 | 5 |
| | 11 | 25 | 19 - 25 | 325 | 25 | 19 | GPS1BSAP | 101224 | 5 |
| | 15 | 32 | 24 - 32 | 416 | 25 | 19 | GPS1BSAR | 101225 | 5 |



Multipack by 40

To reduce the amount of waste packaging material and to save time during installation, we offer the opportunity to order manual motor starters in a multipack without the individual packaging.

| | | | | | | | | | |
|--|-----------|------|-------------|------|-----|-----|------------|--------|----|
| | 0.02 | 0.16 | 0.1 - 0.16 | 2.1 | 100 | 100 | GPS1BSAAMP | 101195 | 40 |
| | 0.06 | 0.25 | 0.16 - 0.25 | 3.3 | 100 | 100 | GPS1BSABMP | 101196 | 40 |
| | 0.09 | 0.4 | 0.25 - 0.4 | 5.2 | 100 | 100 | GPS1BSACMP | 101197 | 40 |
| | 0.12/0.18 | 0.63 | 0.4 - 0.63 | 8.2 | 100 | 100 | GPS1BSADMP | 101198 | 40 |
| | 0.25 | 1 | 0.63 - 1 | 13 | 100 | 100 | GPS1BSAEMP | 101199 | 40 |
| | 0.37/0.55 | 1.6 | 1 - 1.6 | 20.8 | 100 | 100 | GPS1BSAFMP | 101200 | 40 |
| | 0.75 | 2.5 | 1.6 - 2.5 | 32.5 | 100 | 100 | GPS1BSAGMP | 101201 | 40 |
| | 1.5 | 4 | 2.5 - 4 | 52 | 100 | 100 | GPS1BSAHMP | 101202 | 40 |
| | 2.2 | 6.3 | 4 - 6.3 | 81.9 | 100 | 100 | GPS1BSAJMP | 101203 | 40 |
| | 3/4 | 10 | 6.3 - 10 | 130 | 100 | 100 | GPS1BSAKMP | 101204 | 40 |
| | 5.5 | 13 | 9 - 13 | 169 | 50 | 38 | GPS1BSALMP | 101205 | 40 |
| | 7.5 | 16 | 11 - 16 | 208 | 25 | 19 | GPS1BSAMMP | 101206 | 40 |
| | 10 | 20 | 14 - 20 | 260 | 25 | 19 | GPS1BSANMP | 101207 | 40 |
| | 11 | 25 | 19 - 25 | 325 | 25 | 19 | GPS1BSAPMP | 101208 | 40 |
| | 15 | 32 | 24 - 32 | 416 | 25 | 19 | GPS1BSARMP | 101209 | 40 |

(1) Rated current: highest thermal current setting range value.

GPS1B - High breaking capacity.

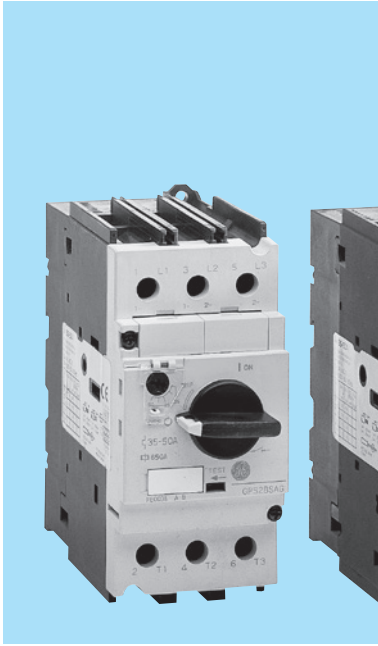
| CLASS 10 | Rated power 3 phase motors at 400Vac Pn | Rated current In (1) | Thermal current setting range | Instantaneous short-circuit release | Rated ultimate short-circuit breaking capacity at 400V Icu (kA) | Rated service short-circuit breaking capacity at 400V Ics (kA) | Cat. no. | Ref. no. | Pack. |
|----------|--|-------------------------|-------------------------------------|---|--|---|-----------|----------|-------|
| | (kW) | (A) | (A) | (A) | | | | | |
| | | | | | | | | | |
| | 0.02 | 0.16 | 0.1 - 0.16 | 2.1 | 100 | 100 | GPS1BHAA | 101234 | 5 |
| | 0.06 | 0.25 | 0.16 - 0.25 | 3.3 | 100 | 100 | GPS1BHAB | 101235 | 5 |
| | 0.09 | 0.4 | 0.25 - 0.4 | 5.2 | 100 | 100 | GPS1BHAC | 101236 | 5 |
| | 0.12/0.18 | 0.63 | 0.4 - 0.63 | 8.2 | 100 | 100 | GPS1BHAD | 101237 | 5 |
| | 0.25 | 1 | 0.63 - 1 | 13 | 100 | 100 | GPS1BHA E | 101238 | 5 |
| | 0.37/0.55 | 1.6 | 1 - 1.6 | 20.8 | 100 | 100 | GPS1BHAF | 101239 | 5 |
| | 0.75 | 2.5 | 1.6 - 2.5 | 32.5 | 100 | 100 | GPS1BHAG | 101240 | 5 |
| | 1.5 | 4 | 2.5 - 4 | 52 | 100 | 100 | GPS1BHAH | 101241 | 5 |
| | 2.2 | 6.3 | 4 - 6.3 | 81.9 | 100 | 100 | GPS1BHAJ | 101242 | 5 |
| | 3/4 | 10 | 6.3 - 10 | 130 | 100 | 100 | GPS1BHAK | 101243 | 5 |
| | 5.5 | 13 | 9 - 13 | 169 | 100 | 100 | GPS1BHAL | 101244 | 5 |
| | 7.5 | 16 | 11 - 16 | 208 | 50 | 38 | GPS1BHAM | 101245 | 5 |
| | 10 | 20 | 14 - 20 | 260 | 50 | 38 | GPS1BHAN | 101246 | 5 |
| | 11 | 25 | 19 - 25 | 325 | 50 | 38 | GPS1BHAP | 101247 | 5 |
| | 15 | 32 | 24 - 32 | 416 | 50 | 38 | GPS1BHAR | 101248 | 5 |



(1) Rated current: highest thermal current setting range value.

Thermal and magnetic protection

GPS2B



Standards/Approvals

IEC 60947-1, 60947-2, 60947-4-1
 DIN VDE 0660T 100/101/102
 UL508/CSA - UL508/cULus
 Shipping approvals:



RINA



Bureau Veritas



Lloyd's Register
 Germanischer Lloyd

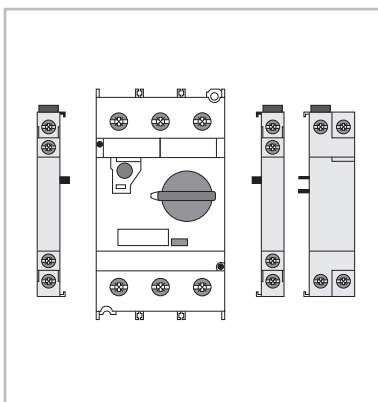


cULus



CE

Auxiliaries



Accessories

- Auxiliaries ● pg. B.16
- Busbar system ● pg. B.19

- Technical data ● pg. B.22
- Dimensions ● pg. B.28
- Fuseless starters ● pg. D.2
- Coordination tables ● pg. D.5


Characteristics

- Rotary handle operator
- Thermal and magnetic protection
- Standard and high breaking capacity
 - Icu = 100kA ≥ Ics = 100% Icu
 - Icu < 100kA ≥ Ics min. 75% Icu
- Clear identification of the operation state (ON-OFF-tripped)
- Ambient temperature compensation
- Phase failure protection

Technical performances


| | | |
|--|------|---------------|
| Rated current I_n | (A) | 10-63 |
| Rated operational current I_e | (A) | 10-63 |
| Rated power at 400Vac | (kW) | 4-30 |
| Utilisation category | | |
| IEC 60947-2 (circuit breaker) | | A |
| IEC 60947-4-1 (MMS) | | AC-3 |
| Tripping class IEC 60947-4-1 | | 10 |
| Magnetic release I_e max. | (A) | ×13 |
| Mechanical/electrical endurance | | 50,000/25,000 |

GPS2B - Standard breaking capacity

| CLASS 10 | Rated power 3 phase motors at 400Vac Pn | Rated current In (1) | Thermal current setting range | Instantaneous short-circuit release | Rated ultimate short-circuit breaking capacity at 400V Icu (kA) | Rated service short-circuit breaking capacity at 400V Ics (kA) | Cat. no. | Ref. no. | Pack. |
|---|--|-------------------------|-------------------------------------|---|--|---|----------|----------|-------|
| | (kW) | (A) | (A) | (A) | | | | | |
| | | | | | | | | | |
|  | 3/4 | 10 | 6.3 - 10 | 130 | 100 | 100 | GPS2BSAK | 101226 | 1 |
| | 5.5 | 13 | 9 - 13 | 169 | 50 | 38 | GPS2BSAL | 107119 | 1 |
| | 7.5 | 16 | 11 - 16 | 208 | 25 | 19 | GPS2BSAM | 101227 | 1 |
| | 10 | 20 | 14 - 20 | 260 | 25 | 19 | GPS2BSAN | 101228 | 1 |
| | 11 | 25 | 19 - 25 | 325 | 25 | 19 | GPS2BSAP | 101229 | 1 |
| | 15 | 32 | 24 - 32 | 416 | 25 | 19 | GPS2BSAR | 101230 | 1 |
| | 18.5 | 40 | 28 - 40 | 520 | 25 | 19 | GPS2BSAS | 101231 | 1 |
| | 22 | 50 | 35 - 50 | 650 | 25 | 19 | GPS2BSAT | 101232 | 1 |
| | 30 | 63 | 45 - 63 | 819 | 25 | 19 | GPS2BSAU | 101233 | 1 |

(1) Rated current: highest thermal current setting range value.

GPS2B - High breaking capacity

| CLASS 10 | Rated power 3 phase motors at 400Vac Pn | Rated current In (1) | Thermal current setting range | Instantaneous short-circuit release | Short-circuit breaking capacity at 400V Icu (kA) | Short-circuit breaking capacity at 400V Ics (kA) | Cat. no. | Ref. no. | Pack. |
|---|--|-------------------------|-------------------------------------|---|--|--|----------|----------|-------|
| | (kW) | (A) | (A) | (A) | | | | | |
| | | | | | | | | | |
|  | 3/4 | 10 | 6.3 - 10 | 130 | 100 | 100 | GPS2BHAK | 101249 | 1 |
| | 5.5 | 13 | 9 - 13 | 169 | 100 | 100 | GPS2BHAL | 107120 | 1 |
| | 7.5 | 16 | 11 - 16 | 208 | 50 | 38 | GPS2BHAM | 101250 | 1 |
| | 10 | 20 | 14 - 20 | 260 | 50 | 38 | GPS2BHAN | 101251 | 1 |
| | 11 | 25 | 19 - 25 | 325 | 50 | 38 | GPS2BHAP | 101252 | 1 |
| | 15 | 32 | 24 - 32 | 416 | 50 | 38 | GPS2BHAR | 101253 | 1 |
| | 18.5 | 40 | 28 - 40 | 520 | 50 | 38 | GPS2BHAS | 101254 | 1 |
| | 22 | 50 | 35 - 50 | 650 | 50 | 38 | GPS2BHAT | 101255 | 1 |
| | 30 | 63 | 45 - 63 | 819 | 50 | 38 | GPS2BHAU | 101256 | 1 |

(1) Rated current: highest thermal current setting range value.

Manual motor starter

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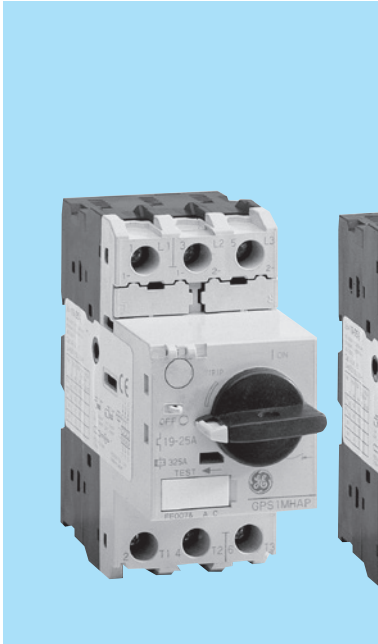
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Magnetic protection

GPS1M



Standards/Approvals

IEC 60947-1, 60947-2, 60947-4-1
DIN VDE 0660T 100/101/102
UL508/CSA - UL508/cULus
Shipping approvals:



RINA



Bureau Veritas



Lloyd's Register
Germanischer Lloyd



cULus

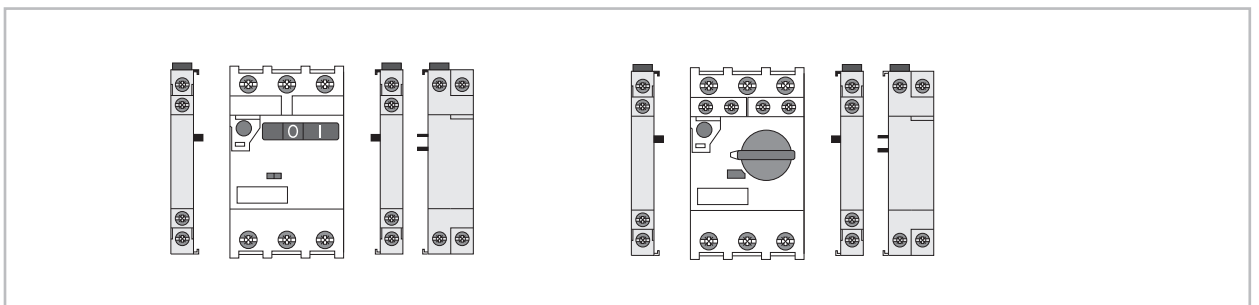


CE

Characteristics

- Short-circuit protection for starters
- Rocker and rotary handle operator
- Magnetic protection
- Standard and high breaking capacity
 $I_{cu} = 100kA \geq I_{cs} = 100\% I_{cu}$
 $I_{cu} < 100kA \geq I_{cs} \text{ min. } 75\% I_{cu}$
- Clear identification of the operation state (ON-OFF-tripped)

Auxiliaries



Accessories

- Auxiliaries ● pg. B.16
- Busbar system ● pg. B.19

- Technical data ● pg. B.22
- Dimensions ● pg. B.28
- Fuseless starters ● pg. D.2
- Coordination tables ● pg. D.5

Technical performances

| | | |
|---|-----|---------|
| Rated current I_n | (A) | 0.1-32 |
| Rated operational current I_e | (A) | 0.1-32 |
| Utilisation category | | A |
| IEC 60947-2 (circuit breaker) | | |
| Magnetic release $I_e \text{ max.}$ | (A) | x13 |
| Mechanical/electrical endurance | | 100.000 |

GPS1M - Standard breaking capacity



| Rated power 3 phase motors at 400Vac Pn | Rated current In | Thermal current setting range (1) | Instantaneous short-circuit release | Rated ultimate short-circuit breaking capacity at 400V Icu (kA) | Rated service short-circuit breaking capacity at 400V Ics (kA) | Cat. no. | Ref. no. | Pack. |
|--|---------------------|--|---|---|---|----------|----------|-------|
| (kW) | (A) | (A) | (A) | | | | | |
| 0.02 | 0.16 | - | 2.1 | 100 | 100 | GPS1MSAA | 101257 | 5 |
| 0.06 | 0.25 | - | 3.3 | 100 | 100 | GPS1MSAB | 101258 | 5 |
| 0.09 | 0.4 | - | 5.2 | 100 | 100 | GPS1MSAC | 101259 | 5 |
| 0.12/0.18 | 0.63 | - | 8.2 | 100 | 100 | GPS1MSAD | 101260 | 5 |
| 0.25 | 1 | - | 13 | 100 | 100 | GPS1MSAE | 101261 | 5 |
| 0.37/0.55 | 1.6 | - | 20.8 | 100 | 100 | GPS1MSAF | 101262 | 5 |
| 0.75 | 2.5 | - | 32.5 | 100 | 100 | GPS1MSAG | 101263 | 5 |
| 1.5 | 4 | - | 52 | 100 | 100 | GPS1MSAH | 101264 | 5 |
| 2.2 | 6.3 | - | 81.9 | 100 | 100 | GPS1MSAJ | 101265 | 5 |
| 3/4 | 10 | - | 130 | 100 | 100 | GPS1MSAK | 101266 | 5 |
| 5.5 | 13 | - | 169 | 50 | 38 | GPS1MSAL | 101267 | 5 |
| 7.5 | 16 | - | 208 | 25 | 19 | GPS1MSAM | 101268 | 5 |
| 10 | 20 | - | 260 | 25 | 19 | GPS1MSAN | 101269 | 5 |
| 11 | 25 | - | 325 | 25 | 19 | GPS1MSAP | 101270 | 5 |
| 15 | 32 | - | 416 | 25 | 19 | GPS1MSAR | 101271 | 5 |

(1) Select appropriate thermal overload relay for the starter. See chapter C pages C.62 - C.68.

GPS1M - High breaking capacity



| Rated power 3 phase motors at 400Vac Pn | Rated current In | Thermal current setting range (1) | Instantaneous short-circuit release | Rated ultimate short-circuit breaking capacity at 400V Icu (kA) | Rated service short-circuit breaking capacity at 400V Ics (kA) | Cat. no. | Ref. no. | Pack. |
|--|---------------------|--|---|---|---|----------|----------|-------|
| (kW) | (A) | (A) | (A) | | | | | |
| 0.02 | 0.16 | - | 2.1 | 100 | 100 | GPS1MHAA | 101280 | 5 |
| 0.06 | 0.25 | - | 3.3 | 100 | 100 | GPS1MHAB | 101281 | 5 |
| 0.09 | 0.4 | - | 5.2 | 100 | 100 | GPS1MHAC | 101282 | 5 |
| 0.12/0.18 | 0.63 | - | 8.2 | 100 | 100 | GPS1MHAD | 101283 | 5 |
| 0.25 | 1 | - | 13 | 100 | 100 | GPS1MHAE | 101284 | 5 |
| 0.37/0.55 | 1.6 | - | 20.8 | 100 | 100 | GPS1MHAF | 101285 | 5 |
| 0.75 | 2.5 | - | 32.5 | 100 | 100 | GPS1MHAG | 101286 | 5 |
| 1.5 | 4 | - | 52 | 100 | 100 | GPS1MHAH | 101287 | 5 |
| 2.2 | 6.3 | - | 81.9 | 100 | 100 | GPS1MHAJ | 101288 | 5 |
| 3/4 | 10 | - | 130 | 100 | 100 | GPS1MHAK | 101289 | 5 |
| 5.5 | 13 | - | 169 | 100 | 100 | GPS1MHAL | 101290 | 5 |
| 7.5 | 16 | - | 208 | 50 | 38 | GPS1MHAM | 101291 | 5 |
| 10 | 20 | - | 260 | 50 | 38 | GPS1MHAN | 101292 | 5 |
| 11 | 25 | - | 325 | 50 | 38 | GPS1MHAP | 101293 | 5 |
| 15 | 32 | - | 416 | 50 | 38 | GPS1MHAR | 101294 | 5 |

(1) Select appropriate thermal overload relay for the starter. See chapter C pages C.62 - C.68.

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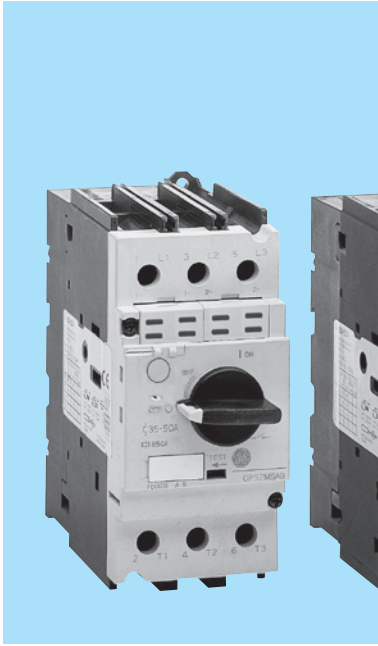
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Magnetic protection

GPS2M



Standards/Approvals

IEC 60947-1, 60947-2, 60947-4-1
DIN VDE 0660T 100/101/102
UL508/CSA - UL508/cULus
Shipping approvals:



RINA



Bureau Veritas



Lloyd's Register
Germanischer Lloyd

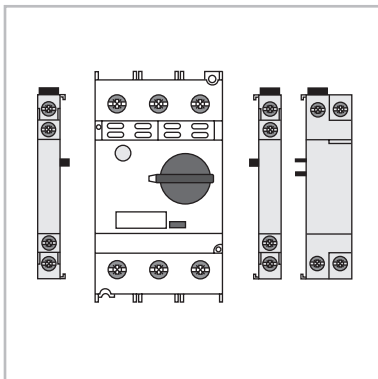


CE

Characteristics

- Short-circuit protection for starters
- Rotary handle operator
- Magnetic protection
- Standard and high breaking capacity
 $I_{cu} = 100kA \geq I_{cs} = 100\% I_{cu}$
 $I_{cu} < 100kA \geq I_{cs} \text{ min. } 75\% I_{cu}$
- Clear identification of the operation state (ON-OFF-tripped)

Auxiliaries



Technical performances

| | |
|-------------------------------------|---------------|
| Rated current I_n | (A) 10-63 |
| Rated operational current I_e | (A) 10-63 |
| Utilisation category | A |
| IEC 60947-2 (circuit breaker) | |
| Magnetic release $I_e \text{ max.}$ | (A) x13 |
| Mechanical/electrical endurance | 50,000/25,000 |

Accessories

- Auxiliaries ● pg. B.16
- Busbar system ● pg. B.19

- Technical data ● pg. B.22
- Dimensions ● pg. B.28
- Fuseless starters ● pg. D.2
- Coordination tables ● pg. D.5

GPS2M - Standard breaking capacity



| Rated power 3 phase motors at 400Vac Pn | Rated current In | Thermal current setting range (1) | Instantaneous short-circuit release | Rated ultimate short-circuit breaking capacity at 400V Icu (kA) | Rated service short-circuit breaking capacity at 400V Ics (kA) | Cat. no. | Ref. no. | Pack. |
|--|---------------------|--|---|---|---|----------|----------|-------|
| (kW) | (A) | (A) | (A) | (kA) | (kA) | | | |
| 4 | 10 | - | 130 | 100 | 100 | GPS2MSAK | 101272 | 1 |
| 5.5 | 13 | - | 169 | 50 | 38 | GPS2MSAL | 107121 | 1 |
| 7.5 | 16 | - | 208 | 25 | 19 | GPS2MSAM | 101273 | 1 |
| 10 | 20 | - | 260 | 25 | 19 | GPS2MSAN | 101274 | 1 |
| 11 | 25 | - | 325 | 25 | 19 | GPS2MSAP | 101275 | 1 |
| 15 | 32 | - | 416 | 25 | 19 | GPS2MSAR | 101276 | 1 |
| 18.5 | 40 | - | 520 | 25 | 19 | GPS2MSAS | 101277 | 1 |
| 22 | 50 | - | 650 | 25 | 19 | GPS2MSAT | 101278 | 1 |
| 30 | 63 | - | 819 | 25 | 19 | GPS2MSAU | 101279 | 1 |

(1) Select appropriate thermal overload relay for the starter. See chapter C pages C.64 - C.68.

GPS2M - High breaking capacity



| Rated power 3 phase motors at 400Vac Pn | Rated current In | Thermal current setting range (1) | Instantaneous short-circuit release | Rated ultimate short-circuit breaking capacity at 400V Icu (kA) | Rated service short-circuit breaking capacity at 400V Ics (kA) | Cat. no. | Ref. no. | Pack. |
|--|---------------------|--|---|---|---|----------|----------|-------|
| (kW) | (A) | (A) | (A) | (kA) | (kA) | | | |
| 4 | 10 | - | 130 | 100 | 100 | GPS2MHAK | 101295 | 1 |
| 5.5 | 13 | - | 169 | 100 | 100 | GPS2MHAL | 107122 | 1 |
| 7.5 | 16 | - | 208 | 50 | 38 | GPS2MHAM | 101296 | 1 |
| 10 | 20 | - | 260 | 50 | 38 | GPS2MHAN | 101297 | 1 |
| 11 | 25 | - | 325 | 50 | 38 | GPS2MHAP | 101298 | 1 |
| 15 | 32 | - | 416 | 50 | 38 | GPS2MHAR | 101299 | 1 |
| 18.5 | 40 | - | 520 | 50 | 38 | GPS2MHAS | 101300 | 1 |
| 22 | 50 | - | 650 | 50 | 38 | GPS2MHAT | 101301 | 1 |
| 30 | 63 | - | 819 | 50 | 38 | GPS2MHAU | 101302 | 1 |

(1) Select appropriate thermal overload relay for the starter. See chapter C pages C.63 - C.68.

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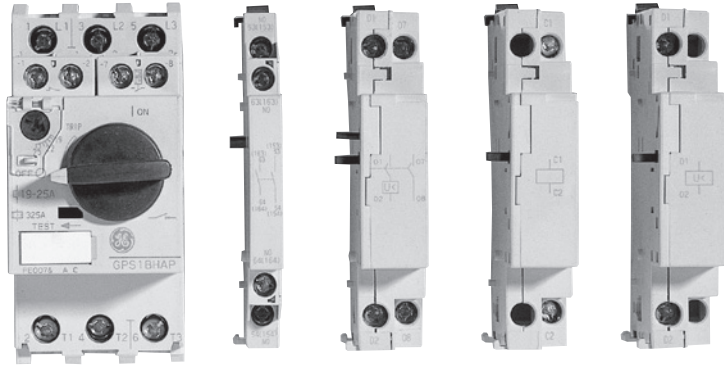
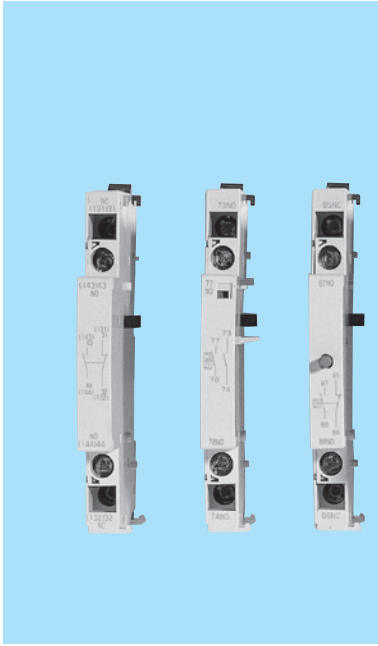
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Auxiliaries



Standards/Approvals

IEC 60947-1, 60947-2, 60947-4-1
DIN VDE 0660T 100/101/102
UL508/CSA - UL508/cULus
Shipping approvals:



RINA



Bureau Veritas



Lloyd's Register
Germanischer Lloyd



cULus

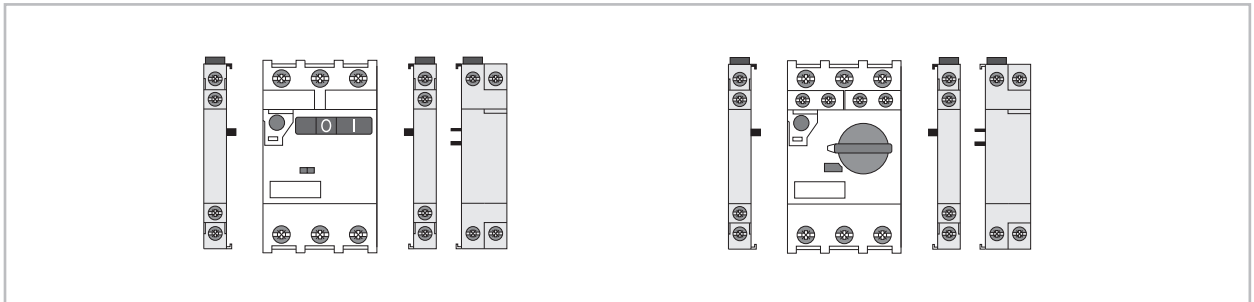


CE

Product range

- Auxiliary contacts (frontal & lateral)
- Alarm contact block
- Auxiliary and alarm contact block
- Short-circuit alarm contact block
- Shunt trip
- Undervoltage release
- Undervoltage release with 2NO early make contacts
- External handle operator
- Terminal protector
- Busbar system

Auxiliaries



Technical performances

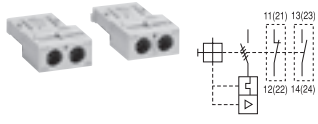
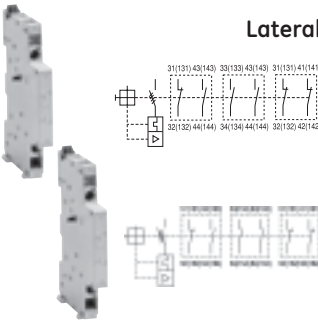
- All auxiliaries can be mounted and changed easily, without any tools
- Both frames GPS1 and GPS2 uses same auxiliaries
- All terminals are capable for 2 cables (0.5mm² - 2.5mm²)
- Side auxiliary contacts are rated to A600, P300 duty
- Frontal auxiliary contacts are rated to B300, Q300 duty
- Minimum operational contact 5mA, 17Vdc
- All terminal screwhead are Pozidriv 2 and slotted combination

Accessories

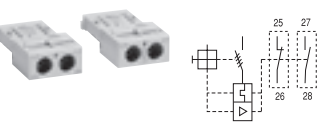
- Auxiliaries ● pg. B.16
- Busbar system ● pg. B.19

- Technical data ● pg. B.22
- Dimensions ● pg. B.28
- Fuseless starters ● pg. D.2
- Coordination tables ● pg. D.5

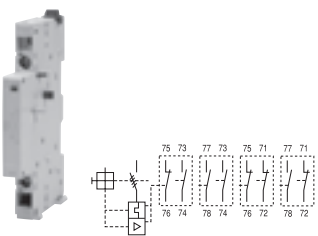
Auxiliary contact blocks

| | Description | For use with | Type | Cat. no. | Ref. no. | Pack. |
|---|---|---------------------|-------------|------------------|----------|-------|
| Frontal  | Maximum 2 auxiliary contact blocks per manual motor starter | GPS1... and GPS2... | 1 NO | GPAC10FBA | 101303 | 10 |
| | | GPS1... and GPS2... | 1 NC | GPAC01FBA | 101304 | 10 |
| Lateral  | Two contacts Side mounting on the left | GPS1... and GPS2... | 1 NO + 1 NC | GPAC11LLA | 101305 | 10 |
| | | GPS1... and GPS2... | 2 NO | GPAC20LLA | 101306 | 10 |
| | | GPS1... and GPS2... | 2 NC | GPAC02LLA | 101307 | 10 |
| | Two contacts Side mounting on the right | GPS1... and GPS2... | 1 NO + 1 NC | GPAC11LRA | 101308 | 10 |
| | | GPS1... and GPS2... | 2 NO | GPAC20LRA | 101309 | 10 |
| | | GPS1... and GPS2... | 2 NC | GPAC02LRA | 101310 | 10 |


Alarm contact block

| | Description | For use with | Type | Cat. no. | Ref. no. | Pack. |
|---|--|---------------------|------|------------------|----------|-------|
|  | Frontal mounting on the right Single contact | GPS1... and GPS2... | 1 NO | GPAL10FRA | 101311 | 10 |
| | | GPS1... and GPS2... | 1 NC | GPAL01FRA | 101312 | 10 |

Auxiliary / alarm contact block

| | Description | For use with | Type | Cat. no. | Ref. no. | Pack. |
|---|---|---------------------|-----------------------|--------------------|----------|-------|
|  | Side mounting on the left (front alarm contact block can not be used at the same time) | GPS1... and GPS2... | 1 NO(Alarm)+1 NO(Aux) | GPAD1010LLA | 101313 | 10 |
| | | GPS1... and GPS2... | 1 NO(Alarm)+1 NC(Aux) | GPAD1001LLA | 101314 | 10 |
| | | GPS1... and GPS2... | 1 NC(Alarm)+1 NO(Aux) | GPAD0110LLA | 101315 | 10 |
| | | GPS1... and GPS2... | 1 NC(Alarm)+1 NC(Aux) | GPAD0101LLA | 101316 | 10 |
| | Two contacts | GPS1... and GPS2... | 1 NC(Alarm)+1 NC(Aux) | GPAD0101LLA | 101316 | 10 |

Short-circuit alarm contact block

| | Description | For use with | Type | Cat. no. | Ref. no. | Pack. |
|---|---|---------------------|-------------|------------------|----------|-------|
|  | Side mounting on the left Two contacts NO + NC Mechanical indication marking | GPS1... and GPS2... | 1 NO + 1 NC | GPAE11LLA | 101317 | 10 |

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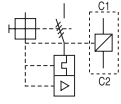
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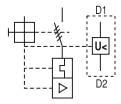
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Shunt trip device



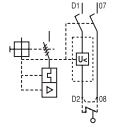
| Description | For use with | Coil voltage | Cat. no. | Ref. no. | Pack. |
|---|---------------------|-------------------------------|------------|----------|-------|
| Side mounting on the right Can not be used together with the undervoltage trip device | GPS1... and GPS2... | 24V 50/60Hz | GPASLRAA1 | 101318 | 5 |
| | GPS1... and GPS2... | 48V 60Hz | GPASLRAAF | 101319 | 5 |
| | GPS1... and GPS2... | 48V 50Hz / 60V 60Hz | GPASLRAAG | 101320 | 5 |
| | GPS1... and GPS2... | 110/127V 50Hz / 120V 60Hz | GPASLRAAJ | 101321 | 5 |
| | GPS1... and GPS2... | 208V 60Hz | GPASLRAAM | 101322 | 5 |
| | GPS1... and GPS2... | 220/230V 50Hz / 240/260V 60Hz | GPASLRAAN | 101323 | 5 |
| | GPS1... and GPS2... | 240V 50Hz / 277V 60Hz | GPASLRAAR | 101324 | 5 |
| | GPS1... and GPS2... | 380/400V 50Hz | GPASLRAAU | 101325 | 5 |
| | GPS1... and GPS2... | 415/440V 50Hz / 460/480V 60Hz | GPASLRAAW | 101326 | 5 |
| | GPS1... and GPS2... | 500V 50Hz / 600V 60Hz | GPASLRAAY | 101327 | 5 |
| | GPS1... and GPS2... | 24 to 60Vdc | GPASLRADD | 101328 | 5 |
| | GPS1... and GPS2... | 110 to 240Vdc | GPASLRADJ | 101329 | 5 |
| | GPS1... and GPS2... | 100V 50/60Hz | GPASLRAA11 | 101194 | 5 |

Undervoltage trip device



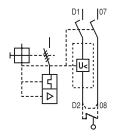
| Description | For use with | Coil voltage | Cat. no. | Ref. no. | Pack. |
|--|---------------------|-------------------------------|------------|----------|-------|
| Side mounting on the right Can not be used together with the shunt trip device | GPS1... and GPS2... | 24V 50Hz | GPAULRAAD | 101330 | 10 |
| | GPS1... and GPS2... | 24V 60Hz | GPAULRAAC | 101331 | 10 |
| | GPS1... and GPS2... | 48V 50Hz | GPAULRAAG | 101332 | 10 |
| | GPS1... and GPS2... | 48V 60Hz | GPAULRAAF | 101333 | 10 |
| | GPS1... and GPS2... | 110/127V 50Hz / 120V 60Hz | GPAULRAAJ | 101334 | 10 |
| | GPS1... and GPS2... | 208V 60Hz | GPAULRAAM | 101335 | 10 |
| | GPS1... and GPS2... | 220/230V 50Hz / 240/260V 60Hz | GPAULRAAN | 101336 | 10 |
| | GPS1... and GPS2... | 240V 50Hz / 277V 60Hz | GPAULRAAR | 101337 | 10 |
| | GPS1... and GPS2... | 380/400V 50Hz | GPAULRAAU | 101338 | 10 |
| | GPS1... and GPS2... | 415/440V 50Hz / 460/480V 60Hz | GPAULRAAW | 101339 | 10 |
| | GPS1... and GPS2... | 500V 50Hz / 600V 60Hz | GPAULRAAY | 101340 | 10 |
| | GPS1... and GPS2... | 100V 50/60Hz | GPAULRAA11 | 102625 | 10 |

With 2NO early make auxiliary contacts



| Description | For use with | Coil voltage | Cat. no. | Ref. no. | Pack. |
|--|--------------|-------------------------------|-------------|----------|-------|
| Side mounting on the right Can not be used together with the shunt trip device | GPS1*S... | 24V 50Hz | GPAU20LTAAD | 101341 | 10 |
| | GPS1*S... | 24V 60Hz | GPAU20LTAAC | 101342 | 10 |
| | GPS1*S... | 48V 50Hz | GPAU20LTAAG | 101343 | 10 |
| | GPS1*S... | 48V 60Hz | GPAU20LTAAF | 101344 | 10 |
| | GPS1*S... | 110/127V 50Hz / 120V 60Hz | GPAU20LTAAJ | 101345 | 10 |
| | GPS1*S... | 208V 60Hz | GPAU20LTAAM | 101346 | 10 |
| | GPS1*S... | 220/230V 50Hz / 240/260V 60Hz | GPAU20LTAAN | 101347 | 10 |
| | GPS1*S... | 240V 50Hz / 277V 60Hz | GPAU20LTAAR | 101348 | 10 |
| | GPS1*S... | 380/400V 50Hz | GPAU20LTAAU | 101349 | 10 |
| | GPS1*S... | 415/440V 50Hz / 460/480V 60Hz | GPAU20LTAAW | 101350 | 10 |
| | GPS1*S... | 500V 50Hz / 600V 60Hz | GPAU20LTAAY | 101351 | 10 |
| | GPS1*S... | 100V 50/60Hz | GPAU20LTA11 | 110360 | 10 |

With 2NO early make auxiliary contacts



| Description | For use with | Coil voltage | Cat. no. | Ref. no. | Pack. |
|--|--------------------|-------------------------------|-------------|----------|-------|
| Side mounting on the right Can not be used together with the shunt trip device | GPS1*H and GPS2... | 24V 50Hz | GPAU20LCAAD | 101352 | 10 |
| | GPS1*H and GPS2... | 24V 60Hz | GPAU20LCAAC | 101353 | 10 |
| | GPS1*H and GPS2... | 48V 50Hz | GPAU20LCAAG | 101354 | 10 |
| | GPS1*H and GPS2... | 48V 60Hz | GPAU20LCAAF | 101355 | 10 |
| | GPS1*H and GPS2... | 110/127V 50Hz / 120V 60Hz | GPAU20LCAAJ | 101356 | 10 |
| | GPS1*H and GPS2... | 208V 60Hz | GPAU20LCAAM | 101357 | 10 |
| | GPS1*H and GPS2... | 220/230V 50Hz / 240/260V 60Hz | GPAU20LCAAN | 101358 | 10 |
| | GPS1*H and GPS2... | 240V 50Hz / 277V 60Hz | GPAU20LCAAR | 101359 | 10 |
| | GPS1*H and GPS2... | 380/400V 50Hz | GPAU20LCAAU | 101360 | 10 |
| | GPS1*H and GPS2... | 415/440V 50Hz / 460/480V 60Hz | GPAU20LCAAW | 101361 | 10 |
| | GPS1*H and GPS2... | 500V 50Hz / 600V 60Hz | GPAU20LCAAY | 101362 | 10 |
| | GPS1*H and GPS2... | 100V 50/60Hz | GPAU20LCA11 | 112185 | 10 |

Terminal protector




101509

107182


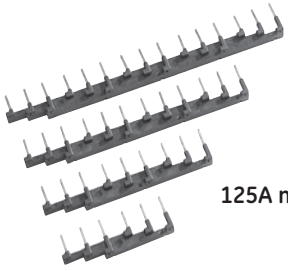

| Description | For use with | Cat. no. | Ref. no. | Pack. |
|--|---------------|----------|----------|-------|
| Snap-in tabs for screw mounting (set of 10) | GPS1* | GPAKS1A | 101509 | 1 |
| IP20 terminal covers | GPS2* | GPAPT2A | 107182 | 50 |
| DIN rail vibration clamps | GPS1* / GPS2* | GPVDA | 101514 | 2 |
| Panel vibration clamps | GPS1* / GPS2* | GPVPA | 101515 | 2 |
| Increases vibration resistance of GPS1* from 5G to 8G (5-150 Hz) in all directions. One clamp must be mounted on each side which increases total mounting width by 22 mm (0.87"). For vibration resistance of GPS2*, contact customers service. | | | | |



External handle operator

| | Description | For use with | Type | Cat. no. | Ref. no. | Pack. |
|---|--|--------------|------------------------|----------------|----------|-------|
|  | Used for distance mounting on a panel Lockable with 1, 2 or 3 padlocks diameter 4 to 8 mm Two types: standard and emergency applications ON/OFF/TRIPPING position marking Protection degree: IP54 Shaft mounting depths: 139.8 - 289.8 mm for GPA1HAB, GPA1HAR 161 - 311.1 mm for GPA2HAB, GPA2HAR Package parts and quantities: 1 handle unit 1 shaft 1 shaft guide 1 latch (screws) 4 mounting screws | GPS1*H... | Standard (black) | GPA1HAB | 101363 | 5 |
| | | GPS1*H ... | Emergency (red/yellow) | GPA1HAR | 101364 | 5 |
| | | GPS2... | Standard (black) | GPA2HAB | 101502 | 5 |
| | | GPS2 ... | Emergency (red/yellow) | GPA2HAR | 101503 | 5 |

Busbar system

| | Description | For use with | Connection | Cat. no. | Ref. no. | Pack. |
|--|---|---|--|-----------------|----------|-------|
|  <p>3-phase feed-in terminals</p> | Main feeding terminal Upper connection | GPS1... | Terminal capacity: 25 mm ² Pin | GPB1FA | 107186 | 10 |
| | | GPS2... | Terminal capacity: 50 mm ² Pin | GPB2FA | 107187 | 10 |
| | | GPS1... | Terminal capacity: 25mm ² Fork | SFVB8 | 254537 | 1 |
|  <p>Main busbar 63A max.</p> | Modular spacing 45 mm | for 2 GPS1... + frontal auxiliaries | Pin | GPB1B02A | 101390 | 5 |
| | | for 3 GPS1... + frontal auxiliaries | Pin | GPB1B03A | 101391 | 5 |
| | | for 4 GPS1... + frontal auxiliaries | Pin | GPB1B04A | 101392 | 5 |
| | | for 5 GPS1... + frontal auxiliaries | Pin | GPB1B05A | 101393 | 5 |
| | Modular spacing 54 mm | for 2 GPS1... + 9mm lateral aux. | Pin | GPB1B12A | 101394 | 5 |
| | | for 3 GPS1... + 9mm lateral aux. | Pin | GPB1B13A | 101395 | 5 |
| | | for 4 GPS1... + 9mm lateral aux. | Pin | GPB1B14A | 101396 | 5 |
| | | for 5 GPS1... + 9mm lateral aux. | Pin | GPB1B15A | 101397 | 5 |
| | Modular spacing 63 mm | for 2 GPS1... + 18mm lateral aux. or 2 x 9mm lateral auxiliary | Fork | GPB1B22A | 101398 | 10 |
| | | for 4 GPS1... + 18mm lateral aux. or 2 x 9mm lateral auxiliary | Fork | GPB1B24A | 101399 | 10 |
|  <p>125A max.</p> | Modular spacing 55 mm | for 2 GPS2... + frontal auxiliaries | Pin | GPB2B02A | 101400 | 1 |
| | | for 3 GPS2... + frontal auxiliaries | Pin | GPB2B03A | 101401 | 1 |
| | | for 4 GPS2... + frontal auxiliaries | Pin | GPB2B04A | 101402 | 1 |
| Modular spacing 64 mm | for 2 GPS2... + 9mm lateral aux. | Pin | GPB2B12A | 101403 | 1 | |
| | for 3 GPS2... + 9mm lateral aux. | Pin | GPB2B13A | 101404 | 1 | |
| | for 4 GPS2... + 9mm lateral aux. | Pin | GPB2B14A | 101405 | 1 | |
| Modular spacing 73 mm | for 2 GPS2... + 18mm lateral aux. or 2 x 9mm lateral auxiliary | Pin | GPB2B22A | 101406 | 1 | |
| | for 4 GPS2... + 18mm lateral aux. or 2 x 9mm lateral auxiliary | Pin | GPB2B24A | 101407 | 1 | |
| <p>Busbar cover</p> | Touch guard for non used space | GPS1... | Pin | GPB1GA | 101408 | 10 |
| | | GPS1... | Fork | GPB1GAF | 101511 | 1 |
| | | GPS2... | Pin | GPB2GA | 101409 | 10 |
| <p>Terminal cover type E</p> | For compliance UL508E | GPS1...H | - | GPAPT1E | 107315 | 1 |
| | When using a Surion GPS1*BH as a manual self-protected combination motor starter (Type E). Cover enables compliance with NEC Section 430-52, 1" over air creepage and over surface clearance, phase to phase on the line side. | | | | | |

Manual motor starter

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Enclosures for manual motor starters


Product range

- Surface and flush mounting plastic enclosures (IP41 and IP55)
- Neutral and ground connection
- Three different types of push-buttons
 - Mushroom with impulse function
 - Mushroom self latching, unlatching by turning
 - Mushroom self latching, unlatching with a key
- Indicator lamps
- Padlocking device for three padlocks
- Conversion kit IP41 to IP55


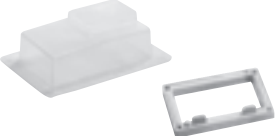

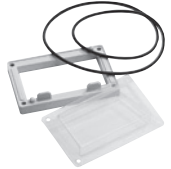


Technical performances

- Used with GPS1*S manual motor starters
- Protection degree IP41 or IP55
- Possibility to mount frontal/lateral auxiliary contact blocks with an undervoltage release (without or with 2NO early make auxiliary contacts) inside the enclosures

Enclosures for only GPS 1*S

| | | Description | Cat. no. | Ref. no. | Pack. |
|---|---------------------------|-----------------------|----------|----------|-------|
|  | Plastic enclosures | Surface mounting IP41 | GPES41A | 101365 | 1 |
| | | Surface mounting IP55 | GPES55A | 101366 | 1 |
| | | Flush mounting IP41 | GPEF41A | 101367 | 1 |
| | | Flush mounting IP55 | GPEF55A | 101368 | 1 |

Mounting accessories for all enclosures

| | | Description | Cat. no. | Ref. no. | Pack. |
|---|------------------------------------|---|----------|----------|-------|
|  | Neutral connection | To be used inside the enclosure | GPENA | 101369 | 1 |
|  | Adaptor set | For enclosures used with GPS1*S and undervoltage release with 2 NO auxiliary contacts | GPEUTA | 107097 | 1 |
|  | Padlocking device | For three padlocks with max. 8 mm shackle diameter Not to be used with emergency stop handle | GPEPA | 101370 | 1 |
|  | Conversion kit IP41 to IP55 | | GPECA | 101371 | 1 |
|  | Mushroom push-button | Mushroom spring return | GPEPMA | 101372 | 1 |
| | | Mushroom self latching, turn to release | GPEPLA | 101373 | 1 |
| | | Mushroom self latching, release with a key | GPEPKA | 101374 | 1 |
|  | Indicator lamps | Green 110/120V | GPELGAJ | 101375 | 1 |
| | | Green 220/240V | GPELGAN | 101376 | 1 |
| | | Green 380/440V | GPELGAU | 101377 | 1 |
| | | Green 480/500V | GPELGAX | 101378 | 1 |
| | | Green 600V | GPELGAY | 101379 | 1 |
| | | Red 110/120V | GPELRAJ | 101380 | 1 |
| | | Red 220/240V | GPELRAN | 101381 | 1 |
| | | Red 380/440V | GPELRAU | 101382 | 1 |
| | | Red 480/500V | GPELRAX | 101383 | 1 |
| | | Red 600V | GPELRAY | 101384 | 1 |
| | | Transparent 110/120V | GPELCAJ | 101385 | 1 |
| | | Transparent 220/240V | GPELCAN | 101386 | 1 |
| | | Transparent 380/440V | GPELCAU | 101387 | 1 |
| | | Transparent 480/500V | GPELCAX | 101388 | 1 |
| Transparent 600V | GPELCAV | 101389 | 1 | | |

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Technical data

General data

| Frame size | GPS1 | GPS2 |
|--|----------------------------|--|
| Rated insulation voltage U_i | 690V | 1000V |
| Rated operating voltage U_e | 690V ac | 690V ac |
| Rated impulse withstand strength U_{imp} | 6kV | 8kV |
| Rated frequency | 50/60Hz | 50/60Hz |
| Total power loss P (W) | 0.16 to 25A 7W 32A 8.5W | up to 32A 11W 40A to 50A 15W 63A 17W |
| Utilisation category: | | |
| IEC 947-2 (Circuit breaker) | Cat. A | Cat. A |
| IEC 947-4-1 (Motor starter) | AC3 | AC3 |
| Mechanical operational performance | 100,000 (70,000 for 32A) | 50,000 |
| Electrical operational performance | 100,000 (70,000 for 32A) | 25,000 |
| Max. operations per hour (motor start-up) | 25 | 25 |
| Ambient conditions: | | |
| Storage temperature | -40°C to +80°C | -40°C to +80°C |
| Operation temperature | -25°C to +60°C | -25°C to +60°C |
| Temperature compensation | -20°C to +60°C | -20°C to +60°C |
| Ambient temperature compensation | yes | yes |
| Operational altitude | up to 2000m | up to 2000m |
| Shock resistance (IEC 68) | 30g (width 20ms) | 30g (width 20ms) |
| Vibration resistance | 8g (5 to 150Hz) | 8g (5 to 150Hz) |
| Shock-hazard prot. (acc. DIN VDE 0106) | fingerproof | fingerproof |
| Protection degree (acc. to IEC529) | IP20 | IP10 (IP20 with acc. GPAPT2A) |
| Rated current I_e | up to 32A | up to 63A |
| Overload protection | IEC 947-4-1 | IEC 947-4-1 |
| Phase failure protection | yes | yes |
| Tripping class | 10 | 10 |
| Magnetic release (factory set) | 13 x lemax | 13 x lemax |
| Test trip button | yes | yes |
| Standards & Approvals | | |
| IEC 947-1 / -2 / -4-1 | yes | yes |
| DIN VDE 0660T 100 / 101 / 102 | yes | yes |
| UL508 | yes | yes |
| UL508 type E | Only GPS1*H | yes |
| CE | yes | yes |
| cULus | yes | yes |
| D / S / N / Fi | In process | - |
| Shipping approvals | yes | yes |

Mounting data

| | | |
|--|---|---|
| Terminal capacity: | | |
| Solid or stranded without end sleeve | 1 x 1...10 mm ² 2 x 1...6 mm ² | 1 or 2 x 1...25 mm ² |
| Stranded with end sleeve | 1 or 2 x 1...6 mm ² | 1 x 1...25 mm ² / 2 x 1...16 mm ² |
| AWG | 1 x 18...8 / 2 x 18...10 | 1 x 18...2 / 2 x 18...4 |
| Operating mechanism lockable in OFF position diameter (mm) | 3.5 to 4.5 | 3.5 to 4.5 |
| Terminal type | screw | box |
| Tightening torque | 2 Nm / 18Lb.in | 5 Nm / 45 Lb.in |
| Screwdriver | Pz2 / slotted combination | Pz2 / slotted combination |
| Mounting: | | |
| DIN-rail | yes | yes |
| Screws | no | yes |
| Operating position: | | |
| turning to the front | 30° | 30° |
| turning to the back | 90° | 90° |
| turning to both sides | 180° | 180° |
| Handle operation | Rocker level / Rotary | Rotary |
| Dimensions | | |
| width (mm) | 45 | 55 |
| height (mm) | 90 | 120 |
| depth (mm) | (GPS1*S) 75 / 92.5 (GPS1*H) | 107.5 |

Ultimate short-circuit breaking capacity (Icu) in kA

| Rated current (A) | For ranges GPS1BSA* / GPS1MSA* | | | | | | | | | | | | | | | | | | |
|--------------------------------|--------------------------------|------|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| | A | B | C | D | E | F | G | H | J | K | L | M | N | P | R | S | T | U | |
| | 1.6 | 0.25 | 0.4 | 0.63 | 1 | 1.6 | 2.5 | 4 | 6.3 | 10 | 13 | 16 | 20 | 25 | 32 | 40 | 50 | 63 | |
| 220/230V | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 50 | 50 | 50 | - | - | - | |
| 400/415V | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 50 | 25 | 25 | 25 | 25 | - | - | - | |
| 440V | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 50 | 15 | 10 | 10 | 10 | 10 | 10 | - | - | - | | |
| 500/525V | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 50 | 10 | 6 | 6 | 6 | 6 | 6 | - | - | - | | |
| 600V | 100 | 100 | 100 | 100 | 100 | 100 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | - | - | - | | |
| 690V | 100 | 100 | 100 | 100 | 100 | 100 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | - | - | - | | |
| For ranges GPS1BHA* / GPS1MHA* | | | | | | | | | | | | | | | | | | | |
| 220/230V | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | - | - | - | |
| 400/415V | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 50 | 50 | 50 | 50 | 50 | - | - | - | |
| 440V | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 50 | 50 | 35 | 35 | 35 | 35 | - | - | - | | |
| 500/525V | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 50 | 42 | 10 | 10 | 10 | 10 | - | - | - | | |
| 600V | 100 | 100 | 100 | 100 | 100 | 100 | 8 | 8 | 6 | 6 | 4 | 4 | 4 | 4 | - | - | - | | |
| 690V | 100 | 100 | 100 | 100 | 100 | 100 | 8 | 8 | 6 | 6 | 4 | 4 | 4 | 4 | - | - | - | | |
| For ranges GPS2BSA* / GPS2MSA* | | | | | | | | | | | | | | | | | | | |
| 220/230V | - | - | - | - | - | - | - | - | - | 100 | 100 | 100 | 50 | 50 | 50 | 50 | 50 | 50 | |
| 400/415V | - | - | - | - | - | - | - | - | - | 100 | 50 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | |
| 440V | - | - | - | - | - | - | - | - | - | 15 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| 500/525V | - | - | - | - | - | - | - | - | - | 10 | 6 | 6 | 6 | 6 | 6 | 5 | 5 | 5 | |
| 600V | - | - | - | - | - | - | - | - | - | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | |
| 690V | - | - | - | - | - | - | - | - | - | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | |
| For ranges GPS2BHA* / GPS2MHA* | | | | | | | | | | | | | | | | | | | |
| 220/230V | - | - | - | - | - | - | - | - | - | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | |
| 400/415V | - | - | - | - | - | - | - | - | - | 100 | 100 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | |
| 440V | - | - | - | - | - | - | - | - | - | 50 | 50 | 50 | 50 | 35 | 35 | 35 | 35 | 35 | |
| 500/525V | - | - | - | - | - | - | - | - | - | 50 | 42 | 12 | 12 | 12 | 10 | 10 | 10 | 10 | |
| 600V | - | - | - | - | - | - | - | - | - | 6 | 6 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | |
| 690V | - | - | - | - | - | - | - | - | - | 6 | 6 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | |

Short-circuit proof with an Icu = 100kA or 50kA

Rated service short-circuit breaking capacity (Ics) in kA

| Rated current (A) | For ranges GPS1BSA* / GPS1MSA* | | | | | | | | | | | | | | | | | | |
|--------------------------------|--------------------------------|------|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| | A | B | C | D | E | F | G | H | J | K | L | M | N | P | R | S | T | U | |
| | 1.6 | 0.25 | 0.4 | 0.63 | 1 | 1.6 | 2.5 | 4 | 6.3 | 10 | 13 | 16 | 20 | 25 | 32 | 40 | 50 | 63 | |
| 220/230V | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 38 | 38 | 38 | - | - | - | |
| 400/415V | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 38 | 19 | 19 | 19 | 19 | - | - | - | |
| 440V | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 38 | 11 | 8 | 8 | 8 | 8 | 8 | - | - | - | |
| 500/525V | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 38 | 8 | 5 | 5 | 5 | 5 | 5 | - | - | - | |
| 600V | 100 | 100 | 100 | 100 | 100 | 100 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | - | - | - | |
| 690V | 100 | 100 | 100 | 100 | 100 | 100 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | - | - | - | |
| For ranges GPS1BHA* / GPS1MHA* | | | | | | | | | | | | | | | | | | | |
| 220/230V | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | - | - | - | |
| 400/415V | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 38 | 38 | 25 | 25 | 25 | - | - | - | |
| 440V | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 38 | 38 | 25 | 25 | 25 | 25 | - | - | - | | |
| 500/525V | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 38 | 32 | 8 | 8 | 8 | 8 | - | - | - | | |
| 600V | 100 | 100 | 100 | 100 | 100 | 100 | 6 | 6 | 5 | 5 | 5 | 3 | 3 | 3 | 3 | - | - | - | |
| 690V | 100 | 100 | 100 | 100 | 100 | 100 | 6 | 6 | 5 | 5 | 5 | 3 | 3 | 3 | 3 | - | - | - | |
| For ranges GPS2BSA* / GPS2MSA* | | | | | | | | | | | | | | | | | | | |
| 220/230V | - | - | - | - | - | - | - | - | - | 100 | 100 | 100 | 38 | 38 | 38 | 38 | 38 | 38 | |
| 400/415V | - | - | - | - | - | - | - | - | - | 100 | 32 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | |
| 440V | - | - | - | - | - | - | - | - | - | 12 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | |
| 500/525V | - | - | - | - | - | - | - | - | - | 8 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | |
| 600V | - | - | - | - | - | - | - | - | - | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | |
| 690V | - | - | - | - | - | - | - | - | - | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | |
| For ranges GPS2BHA* / GPS2MHA* | | | | | | | | | | | | | | | | | | | |
| 220/230V | - | - | - | - | - | - | - | - | - | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | |
| 400/415V | - | - | - | - | - | - | - | - | - | 100 | 100 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | |
| 440V | - | - | - | - | - | - | - | - | - | 38 | 38 | 38 | 38 | 25 | 25 | 25 | 25 | 25 | |
| 500/525V | - | - | - | - | - | - | - | - | - | 38 | 32 | 9 | 9 | 9 | 8 | 8 | 8 | 8 | |
| 600V | - | - | - | - | - | - | - | - | - | 5 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | |
| 690V | - | - | - | - | - | - | - | - | - | 5 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | |

Back-up fuses are necessary in case of possibility of a short-circuit current higher than 100kA or 50kA at the installation point of the device (on request)

Ics = 100%Icu when Icu = 100kA

Ics = 75%Icu when Icu < 100kA



A

B

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H

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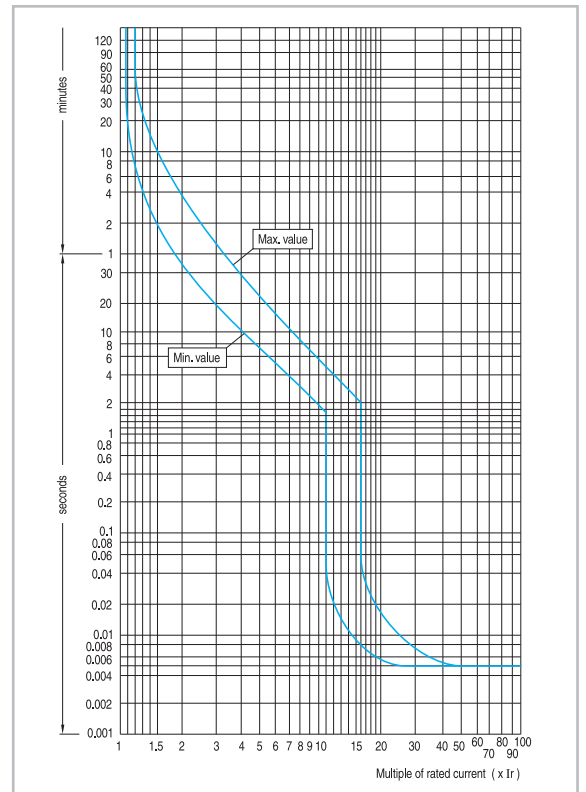
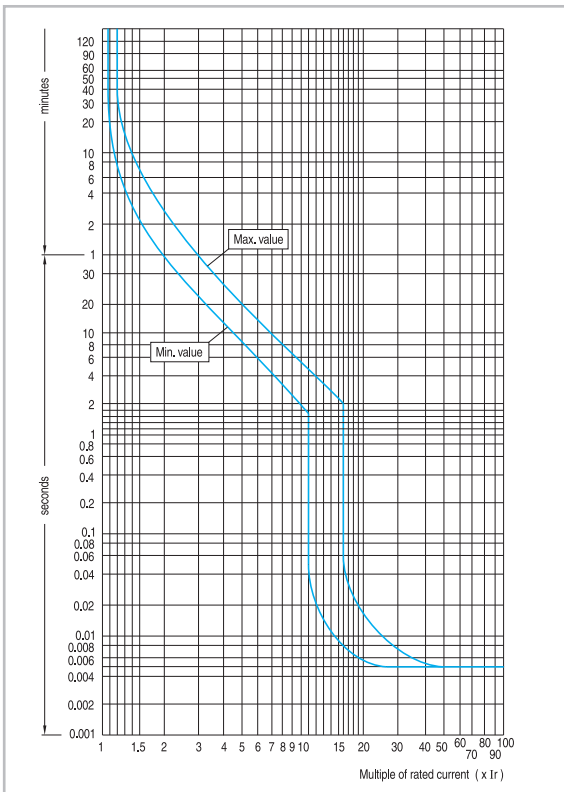
Back-up gl/gG fuses only if $I_{cs} > I_{cu}$ (kA)

| | | For ranges GPS1BSA* / GPS1MSA* | | | | | | | | | | | | | | | | | |
|-----------------|---|--------------------------------|------|-----|------|---|-----|-----|----|-----|----|----|-----|-----|-----|-----|-----|-----|-----|
| gl/gG fuses (A) | | A | B | C | D | E | F | G | H | J | K | L | M | N | P | R | S | T | U |
| | | 1.6 | 0.25 | 0.4 | 0.63 | 1 | 1.6 | 2.5 | 4 | 6.3 | 10 | 13 | 16 | 20 | 25 | 32 | 40 | 50 | 63 |
| 230V | # | # | # | # | # | # | # | # | # | # | # | # | # | 100 | 100 | 100 | - | - | - |
| 400V | # | # | # | # | # | # | # | # | # | # | # | 80 | 100 | 100 | 100 | 100 | - | - | - |
| 440V | # | # | # | # | # | # | # | # | # | 50 | 63 | 80 | 80 | 80 | 80 | 80 | - | - | - |
| 500V | # | # | # | # | # | # | # | # | # | 50 | 50 | 63 | 63 | 63 | 80 | 80 | - | - | - |
| 600V | # | # | # | # | # | # | # | 20 | 32 | 40 | 50 | 63 | 63 | 63 | 80 | 80 | - | - | - |
| 690V | # | # | # | # | # | # | # | 20 | 32 | 40 | 50 | 50 | 63 | 63 | 63 | 63 | - | - | - |
| | | For ranges GPS1BHA* / GPS1MHA* | | | | | | | | | | | | | | | | | |
| 230V | # | # | # | # | # | # | # | # | # | # | # | # | # | # | # | # | - | - | - |
| 400V | # | # | # | # | # | # | # | # | # | # | # | # | 100 | 125 | 125 | 125 | - | - | - |
| 440V | # | # | # | # | # | # | # | # | # | # | 63 | 63 | 80 | 80 | 100 | 100 | - | - | - |
| 500V | # | # | # | # | # | # | # | # | # | # | 50 | 63 | 80 | 80 | 80 | 80 | - | - | - |
| 600V | # | # | # | # | # | # | # | 25 | 40 | 50 | 50 | 63 | 63 | 63 | 80 | 80 | - | - | - |
| 690V | # | # | # | # | # | # | # | 25 | 40 | 50 | 50 | 63 | 63 | 63 | 63 | 63 | - | - | - |
| | | For ranges GPS2BSA* / GPS2MSA* | | | | | | | | | | | | | | | | | |
| 230V | - | - | - | - | - | - | - | - | - | - | # | # | # | 125 | 125 | 125 | 125 | 125 | 160 |
| 400V | - | - | - | - | - | - | - | - | - | - | # | 80 | 100 | 125 | 125 | 125 | 125 | 125 | 160 |
| 440V | - | - | - | - | - | - | - | - | - | - | 63 | 63 | 80 | 80 | 100 | 100 | 125 | 125 | 125 |
| 500V | - | - | - | - | - | - | - | - | - | - | 63 | 63 | 80 | 80 | 80 | 80 | 100 | 100 | 125 |
| 600V | - | - | - | - | - | - | - | - | - | - | 63 | 63 | 63 | 63 | 80 | 80 | 100 | 100 | 100 |
| 690V | - | - | - | - | - | - | - | - | - | - | 63 | 63 | 63 | 63 | 63 | 63 | 80 | 80 | 100 |
| | | For ranges GPS2BHA* / GPS2MHA* | | | | | | | | | | | | | | | | | |
| 230V | - | - | - | - | - | - | - | - | - | - | # | # | # | # | # | # | # | # | # |
| 400V | - | - | - | - | - | - | - | - | - | - | # | # | 100 | 125 | 125 | 125 | 125 | 125 | 160 |
| 440V | - | - | - | - | - | - | - | - | - | - | 63 | 63 | 80 | 80 | 100 | 100 | 125 | 125 | 125 |
| 500V | - | - | - | - | - | - | - | - | - | - | 63 | 63 | 80 | 80 | 80 | 80 | 100 | 100 | 125 |
| 600V | - | - | - | - | - | - | - | - | - | - | 80 | 63 | 63 | 63 | 80 | 80 | 100 | 100 | 100 |
| 690V | - | - | - | - | - | - | - | - | - | - | 80 | 63 | 63 | 63 | 63 | 63 | 63 | 80 | 100 |

Back-up gl/gG fuses only if $I_{cs} > I_{cu}$ (kA)

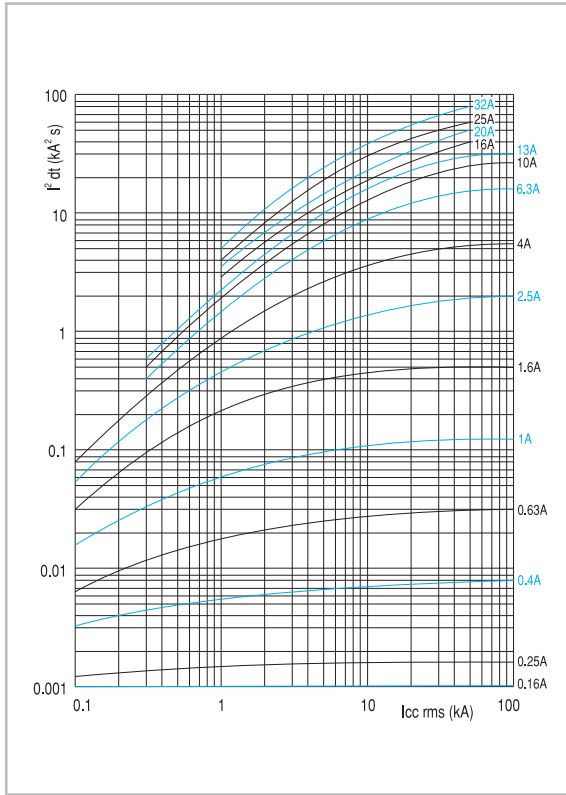
Manual motor starter: GPS1...

Manual motor starter: GPS2...

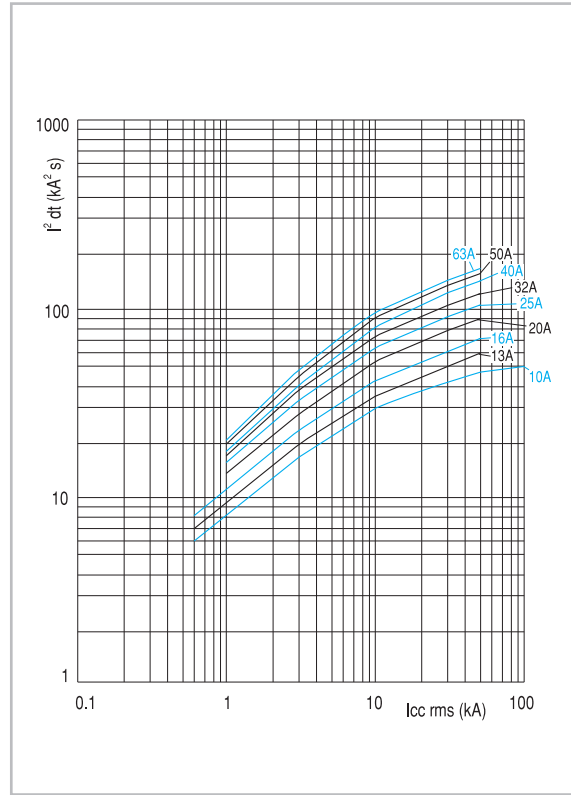


Specific let-through energy at $U_e = 400/415\text{ V}$

Manual motor starter: GPS1...

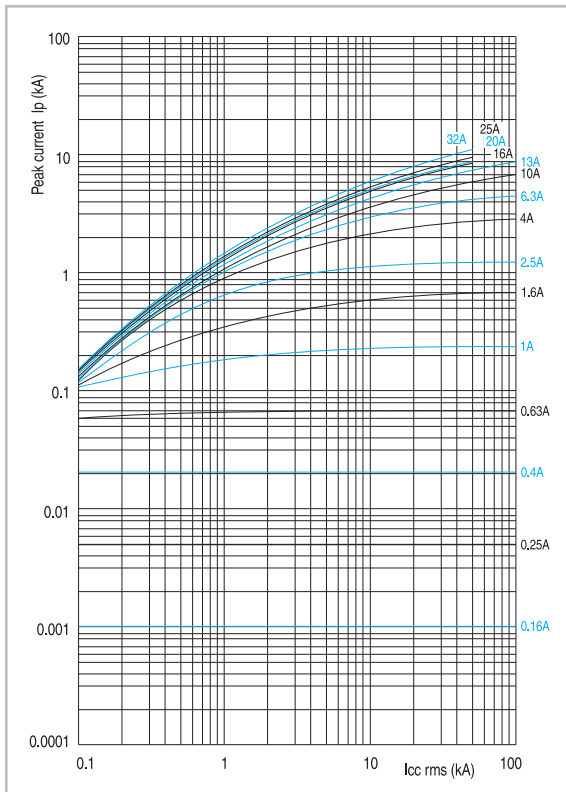


Manual motor starter: GPS2...

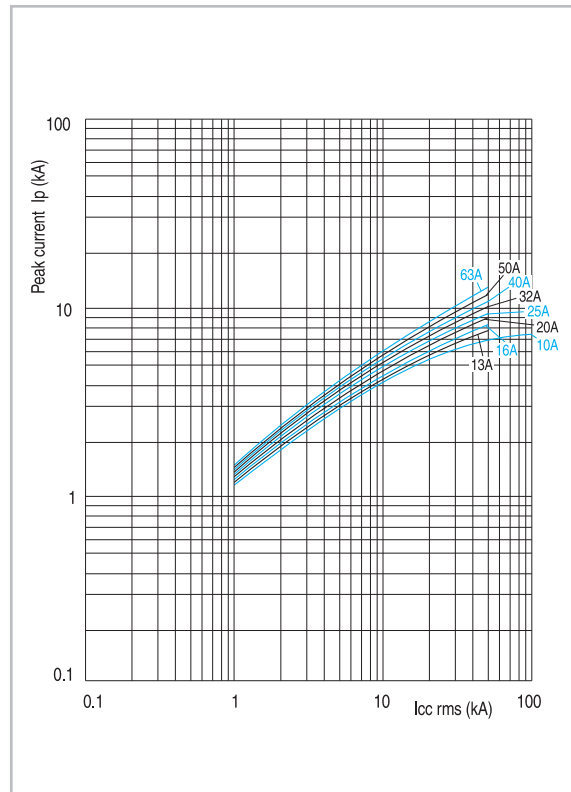


Peak current limitation at $U_e = 400/415\text{ V}$

Manual motor starter: GPS1...



Manual motor starter: GPS2...

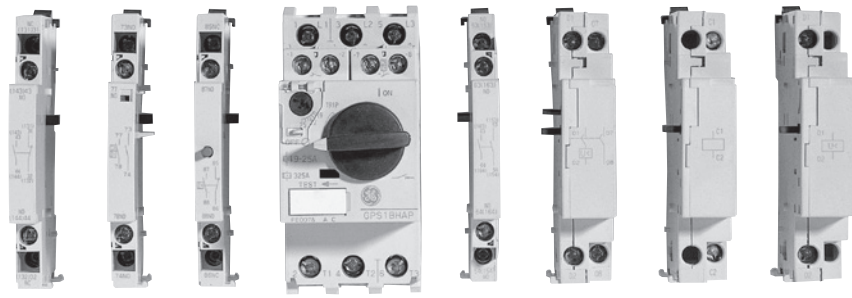


Manual motor starter

- A
- B**
- C
- D
- E
- F
- G
- H
- I
- X



Mounting possibilities of the auxiliaries



| Wiring diagram | Type | Description |
|----------------------------|--|--|
| Frontal auxiliaries | | |
| | Auxiliary contact block | 1NO or 1NC |
| | Alarm contact block | 1NO or 1NC |
| Lateral auxiliaries | | |
| | Auxiliary contact block | 2NO 1NO + 1NC 2NC |
| | Auxiliary/Alarm contact block | 1NO (alarm) + 1NO (auxiliary) 1NO (alarm) + 1NC (auxiliary) 1NC (alarm) + 1NO (auxiliary) 1NC (alarm) + 1NC (auxiliary) |
| | Short-circuit alarm contact block | 1NO + 1NC |
| | Shunt trip | |
| | Undervoltage trip | |
| | Undervoltage trip with 2NO early make auxiliary contacts | |

Shunt trip, undervoltage trip and undervoltage with 2NO contacts can be mounted together with any frontal block or left lateral block with above mentioned restrictions



Auxiliaries

| Catalogue reference | GPAC*F.. | GPAC*L.. | GPAL.. | GPAD.. | GPAE.. |
|---|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| | Aux. frontal block | Aux. lateral block | Alarm frontal block | Alarm/aux. lateral block | Short-circuit alarm block |
| Cont. cap. contacts class (UL508) | B300 / Q300 | A600 / P300 | B300 / Q300 | A600 / P300 | A600 / P300 |
| Back-up fuses gG, gI | 6A | 10A | 6A | 10A | 10A |
| Utilization category AC-15 | | | | | |
| Rated operating voltage Ue (Vac) | 48 125 230 | 48 125 230 400 500 690 | 48 125 230 | 48 125 230 400 500 690 | 48 125 230 400 500 690 |
| Rated operational current (A) | 5 3 1.5 | 6 4 4 2.2 1.5 0.6 | 5 3 1.5 | 6 4 4 2.2 1.5 0.6 | 6 4 4 2.2 1.5 0.6 |
| Utilization category DC-13 | | | | | |
| Rated operating voltage Ue (Vdc) | 48 110 220 | 48 110 220 | 48 110 220 | 48 110 220 | 48 110 220 |
| Rated operational current (A) | 1.38 0.55 0.27 | 5 1.3 0.5 | 1.38 0.55 0.27 | 5 1.3 0.5 | 5 1.3 0.5 |
| Mounting data | | | | | |
| Mounting side | Front | Left or right | Frontal right | Left | Left |
| Terminals capacity: Solid or stranded without end sleeve | 2x0.5...2.5 mm ² | 2x0.5...2.5 mm ² | 2x0.5...2.5 mm ² | 2x0.5...2.5 mm ² | 2x0.5...2.5 mm ² |
| AWG | 2x18...14 | 2x18...14 | 2x18...14 | 2x18...14 | 2x18...14 |
| Terminal type | screw | screw | screw | screw | screw |
| Tightening torque | 0.8Nm | 0.8Nm | 0.8Nm | 0.8Nm | 0.8Nm |
| Screwdriver | Pz2/Slotted | Pz2/Slotted | Pz2/Slotted | Pz2/Slotted | Pz2/Slotted |
| Dimensions width (mm) | Maintain same width | Increase width 9 mm | Maintain same width | Increase width 9 mm | Increase width 9 mm |

Detailed dimensions see page B.29

Auxiliaries

| Catalogue reference | GPAU | GPAS |
|---|---|---|
| | Undervoltage trip | Shunt trip |
| Power consumption: | | |
| Pick-up (VA/W) | 21/12 | 21/12 |
| Hold (VA/W) | 8/1.2 | - |
| Operating voltage | | |
| Tripping (V) | 0.35Ve-0.7Ve | 0.7Ve-1.1Ve |
| Pick-up (V) | 0.85Ve-1.1Ve | - |
| Max. operation supply (ms) | - | 5(DC) |
| Rated operating voltage Ue | 24V 50Hz 24V 60Hz 48V 50Hz 48V 60Hz 110/127V 50Hz / 120V 60Hz 208V 60Hz 220/230V 50Hz / 240/260V 60Hz 240V 50Hz / 277V 60Hz 380/400V 50Hz 415/440V 50Hz / 460/480V 60Hz 500V 50Hz / 600V 60Hz | 24V 50/60Hz 48V 60Hz 48V 50Hz / 60V 60Hz 110/127V 50Hz / 120V 60Hz 208V 60Hz 220/230V 50Hz / 240/260V 60Hz 240V 50Hz / 277V 60Hz 380/400V 50Hz 415/440V 50Hz / 460/480V 60Hz 500V 50Hz / 600V 60Hz 24 to 60Vdc 110 to 240Vdc |
| Contacts class (UL508) | - | - |
| Back-up fuses (gG,gI) | 10A | 10A |
| Mounting data | | |
| Mounting side | Right | Right |
| Terminals capacity: Solid or stranded without end sleeve | 2x0.5...2.5 mm ² | 2x0.5...2.5 mm ² |
| AWG | 2x18...14 | 2x18...14 |
| Terminal type | Screw | Screw |
| Tightening torque | 0.8Nm | 0.8Nm |
| Screwdriver | Pz2/Slotted | Pz2/Slotted |
| Dimensions width (mm) | Increase width 18 mm | Increase width 18 mm |

A

B

C

D

E

F

G

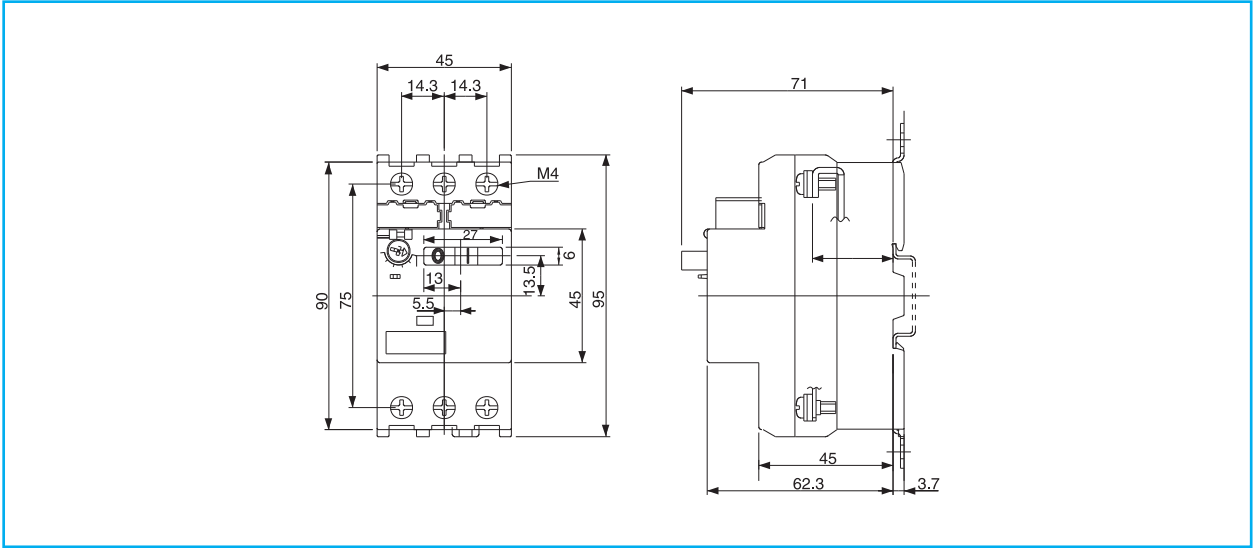
H

I

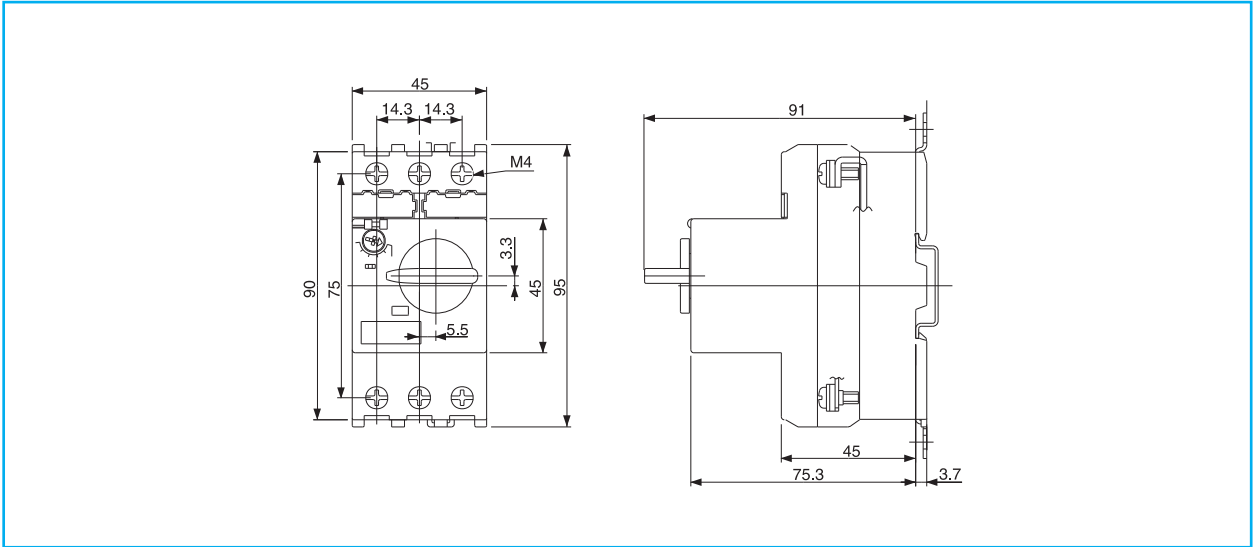
X

Dimensional drawings

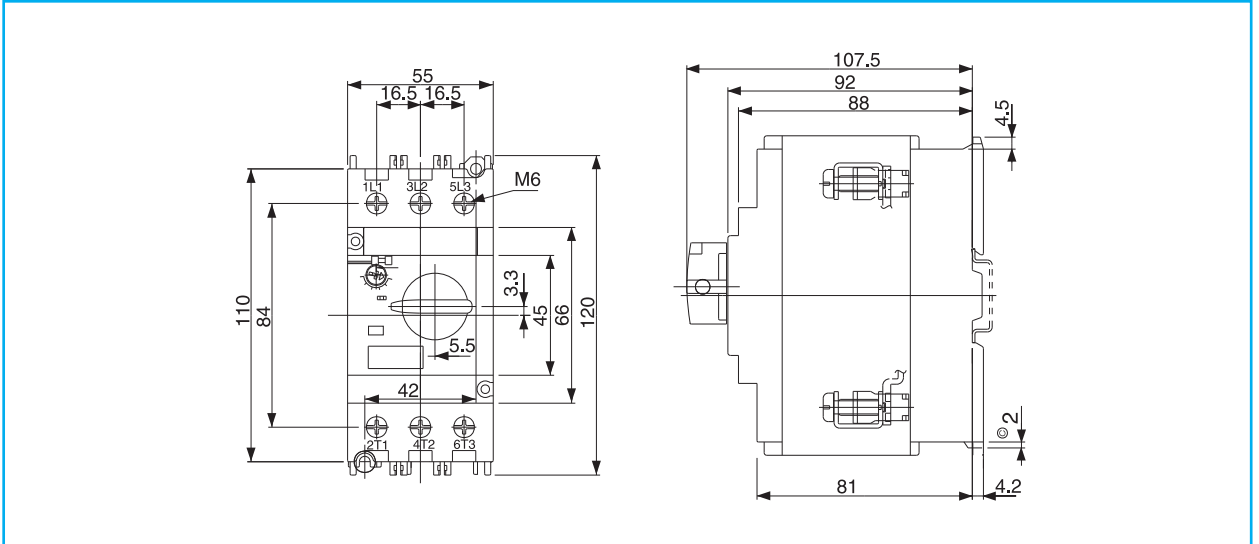
Manual Motor Starter - GPS1 rocker



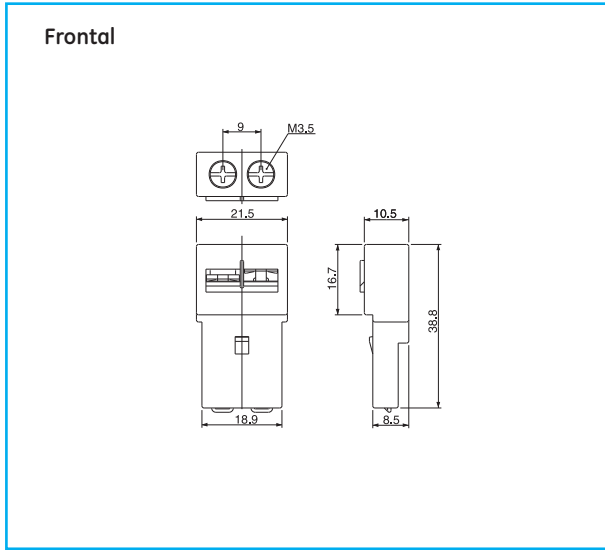
Manual Motor Starter - GPS1 rotary



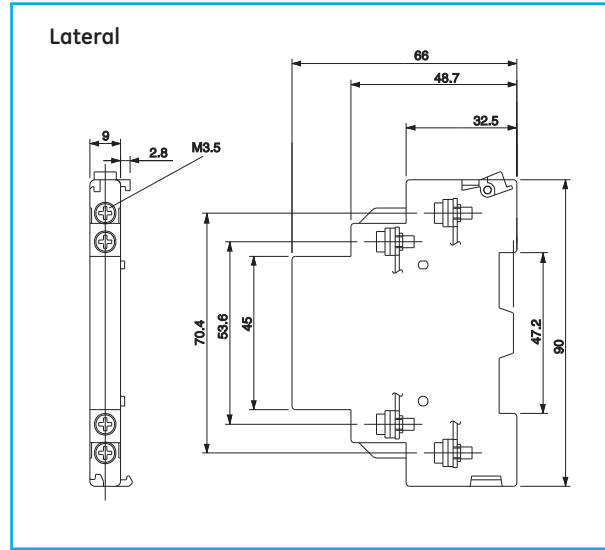
Manual Motor Starter - GPS2



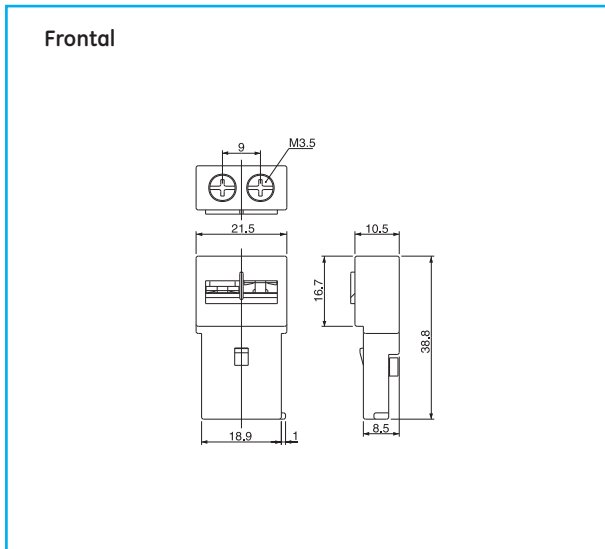
Auxiliary contact blocks



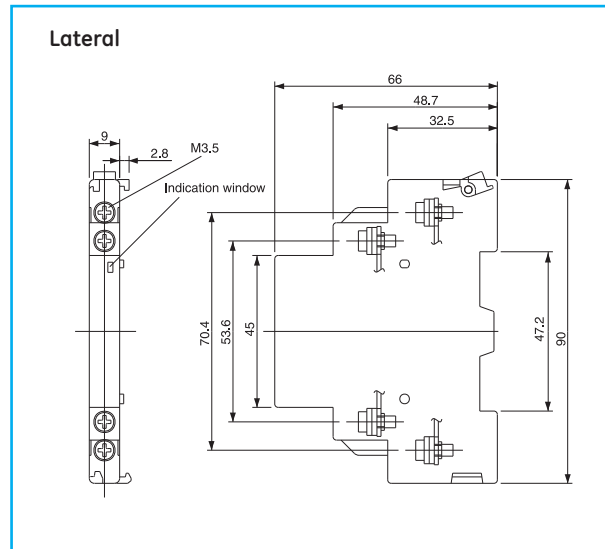
Auxiliary contact blocks



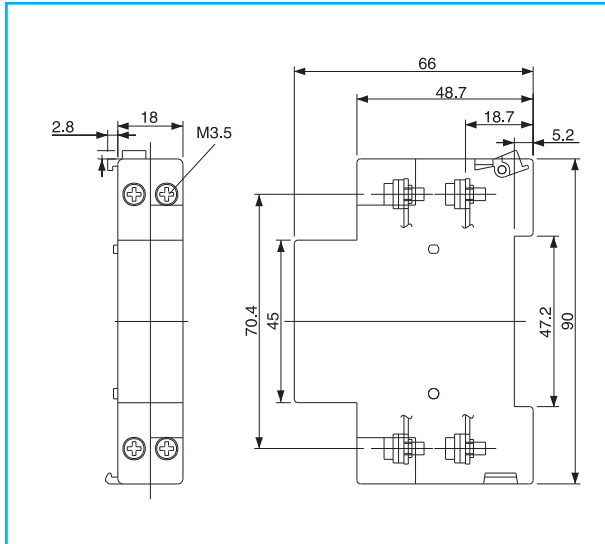
Alarm contact blocks



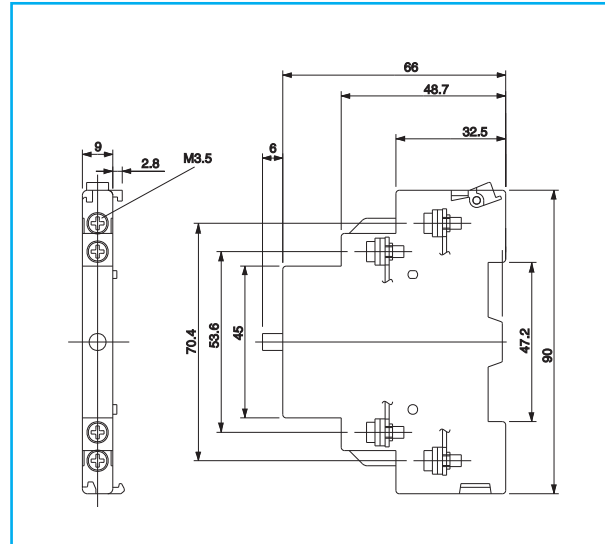
Alarm contact blocks



Shunt and undervoltage trip devices

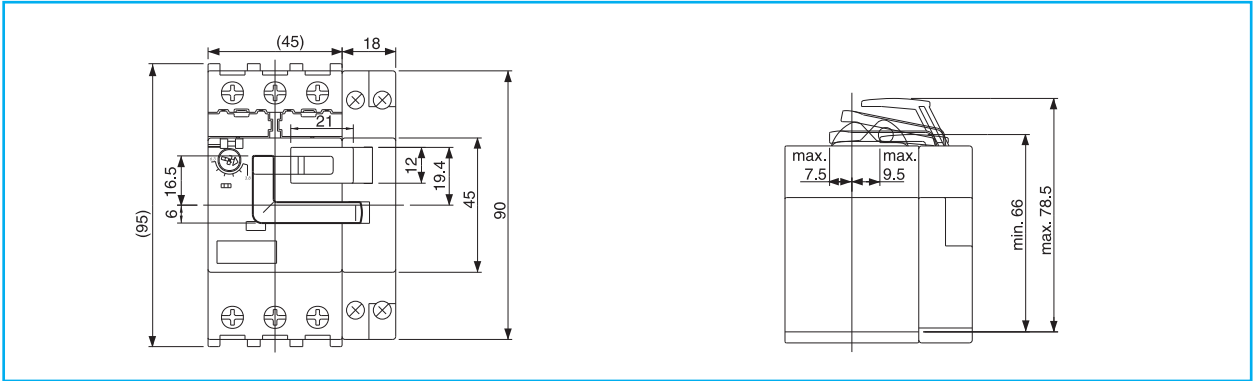


Short-circuit contact block

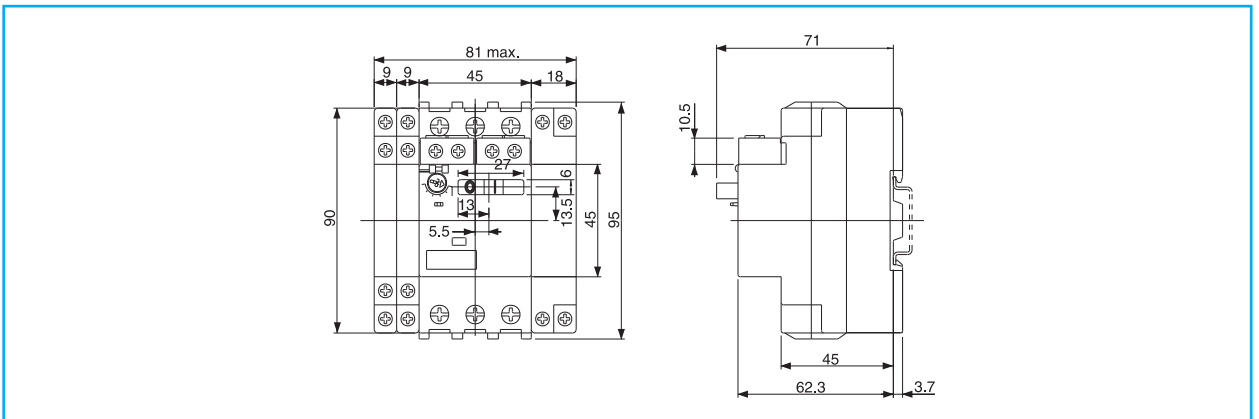


Dimensional drawings

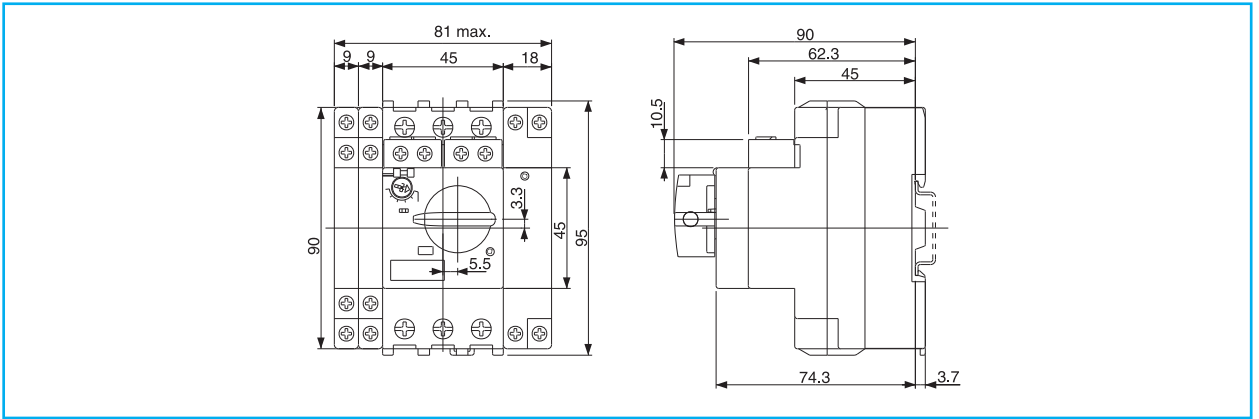
GPS1 rocker + Undervoltage trip device with 2NO contacts



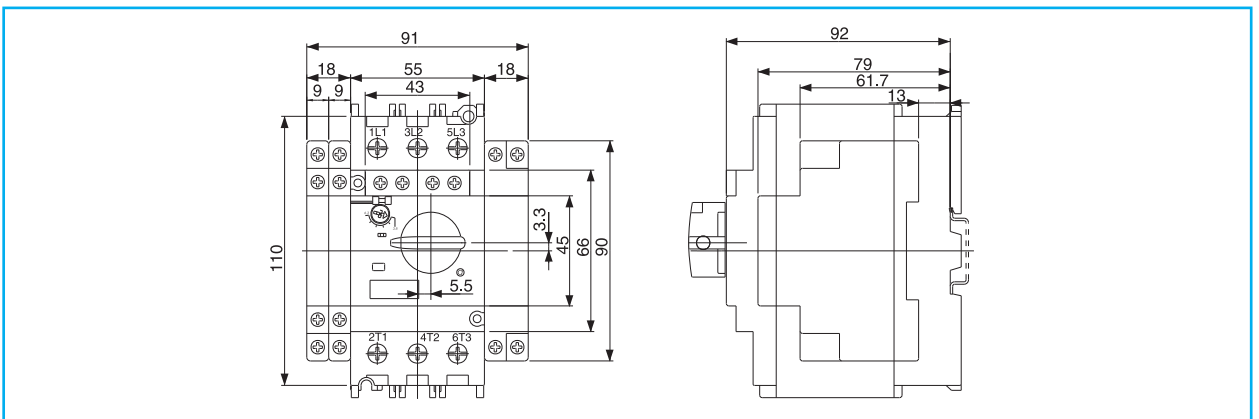
GPS1 rocker + Auxiliaries



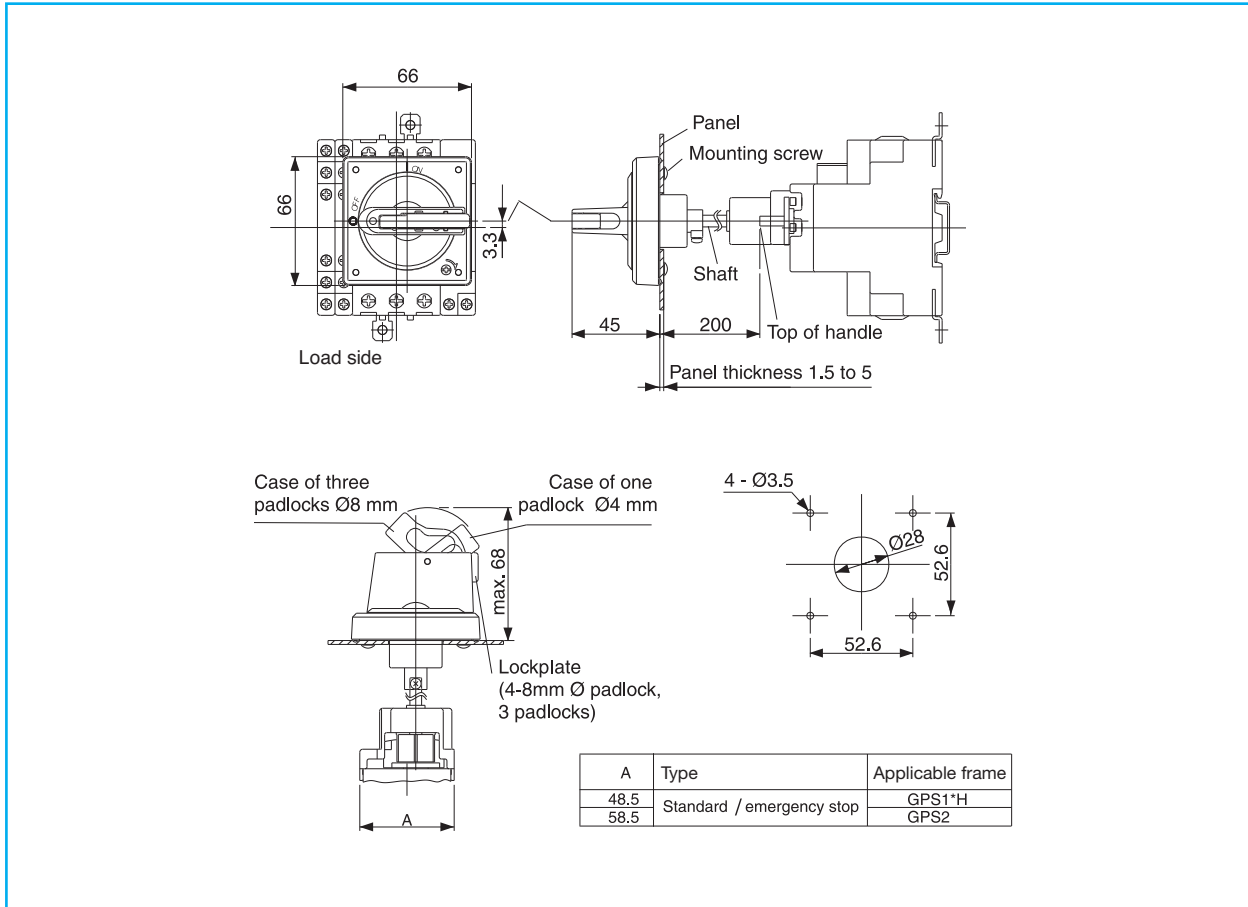
GPS1 rotary + Auxiliaries



GPS2 + Auxiliaries



External handle operator



Manual motor starter

A

B

C

D

E

F

G

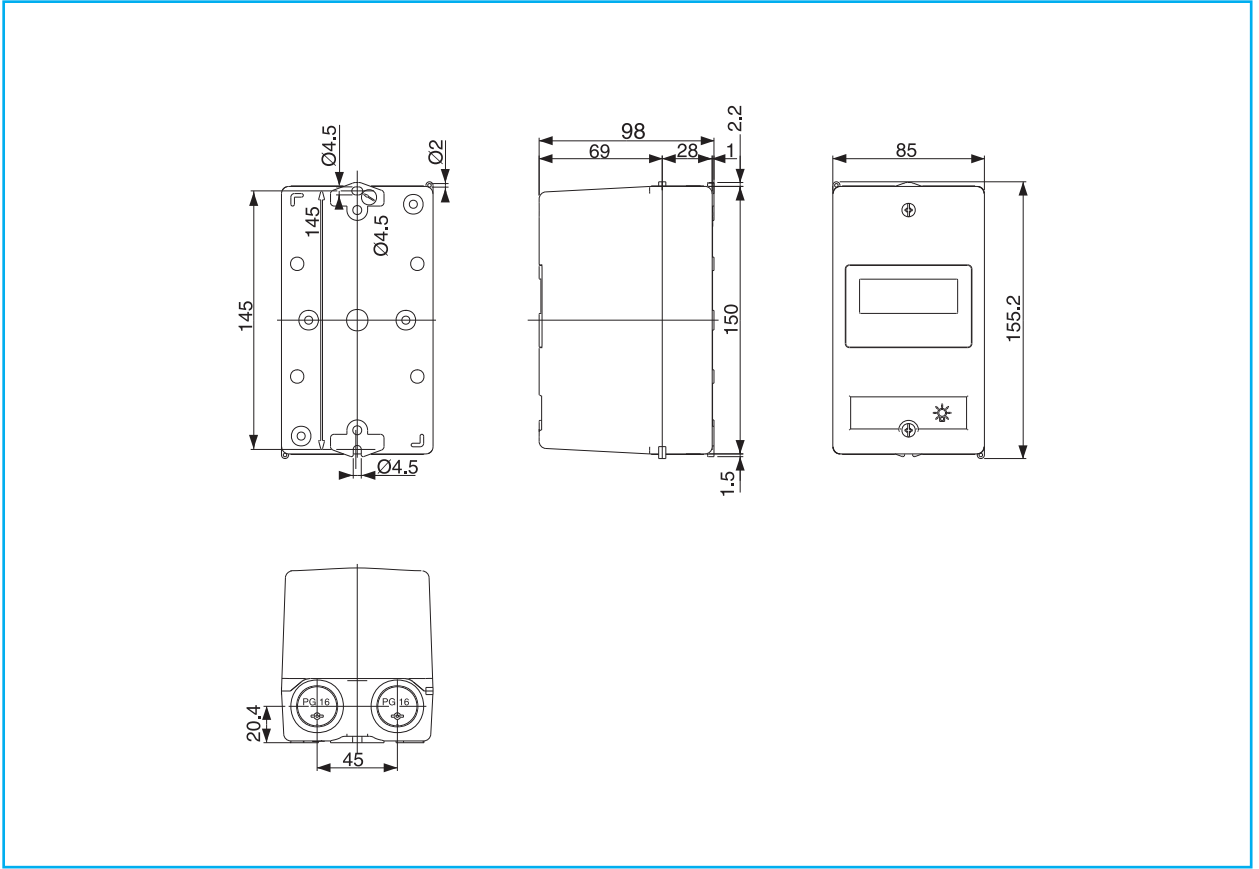
H

I

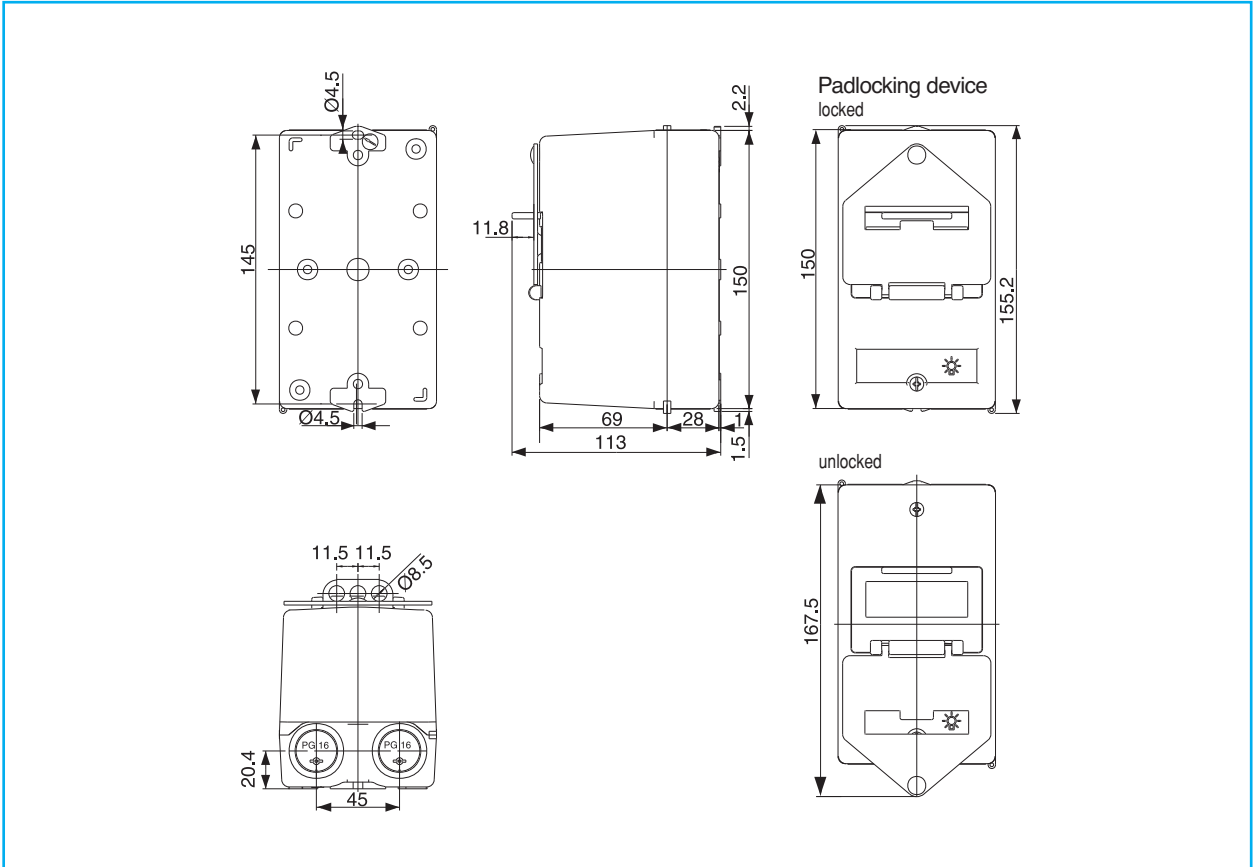
X

Dimensional drawings

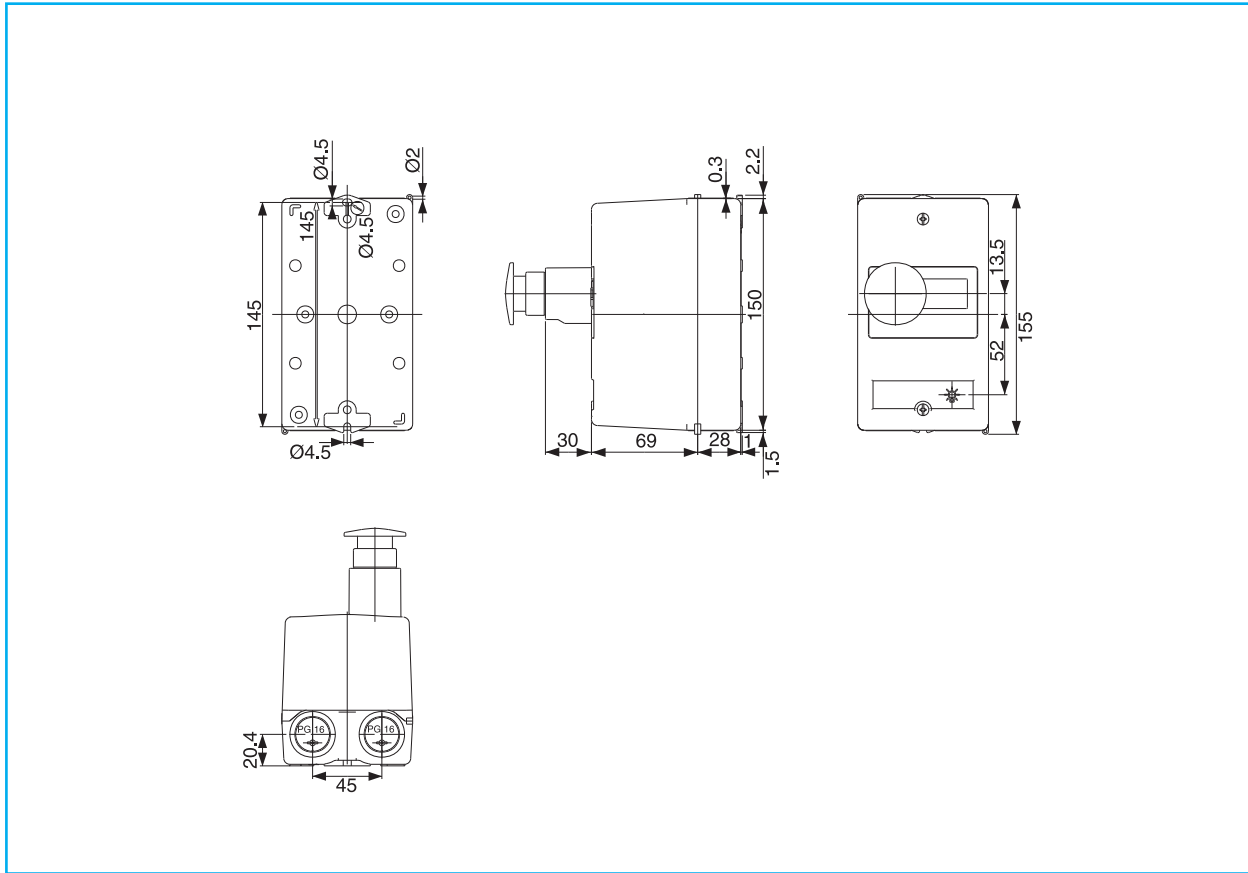
Enclosure for GPS1 - Surface mounting



Enclosure for GPS1 - Surface mounting with padlocking device



Enclosure for GPS1 - Surface mounting with emergency push-button



Manual motor starter

A

B

C

D

E

F

G

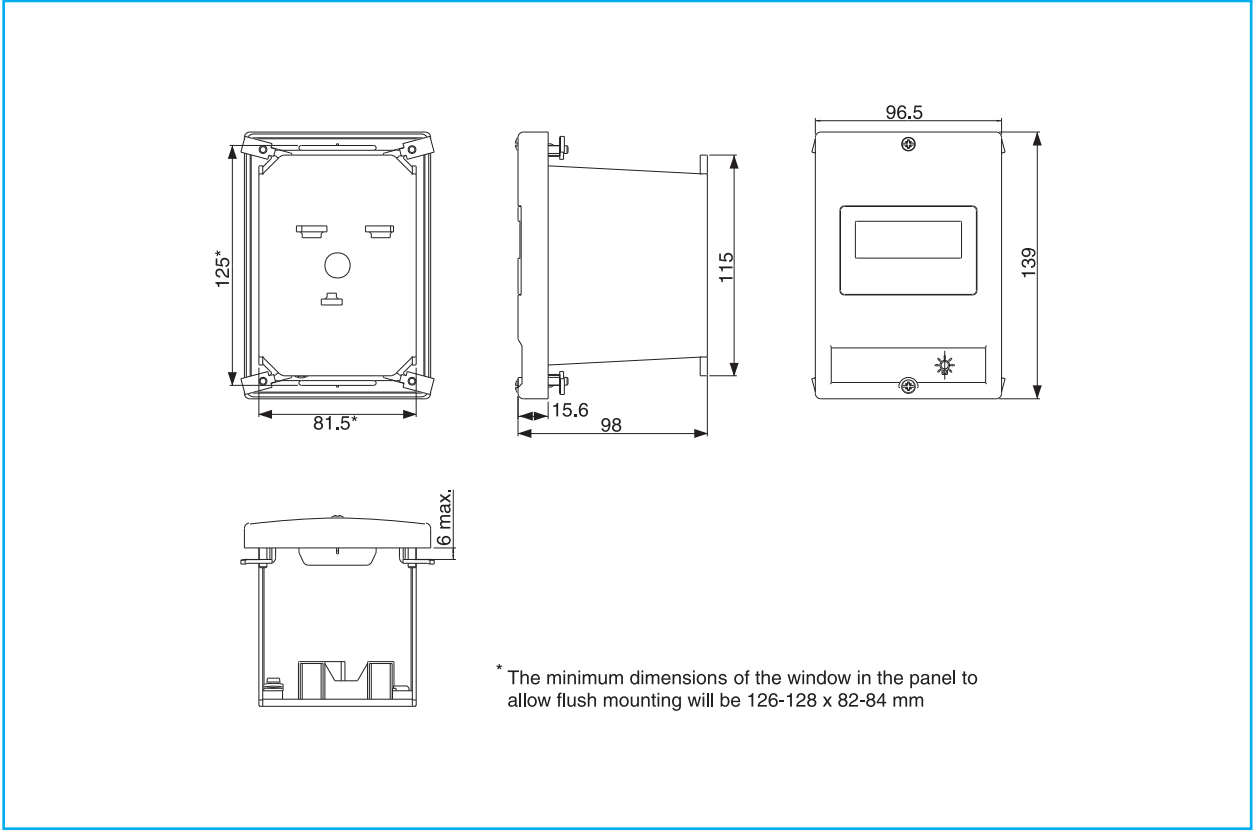
H

I

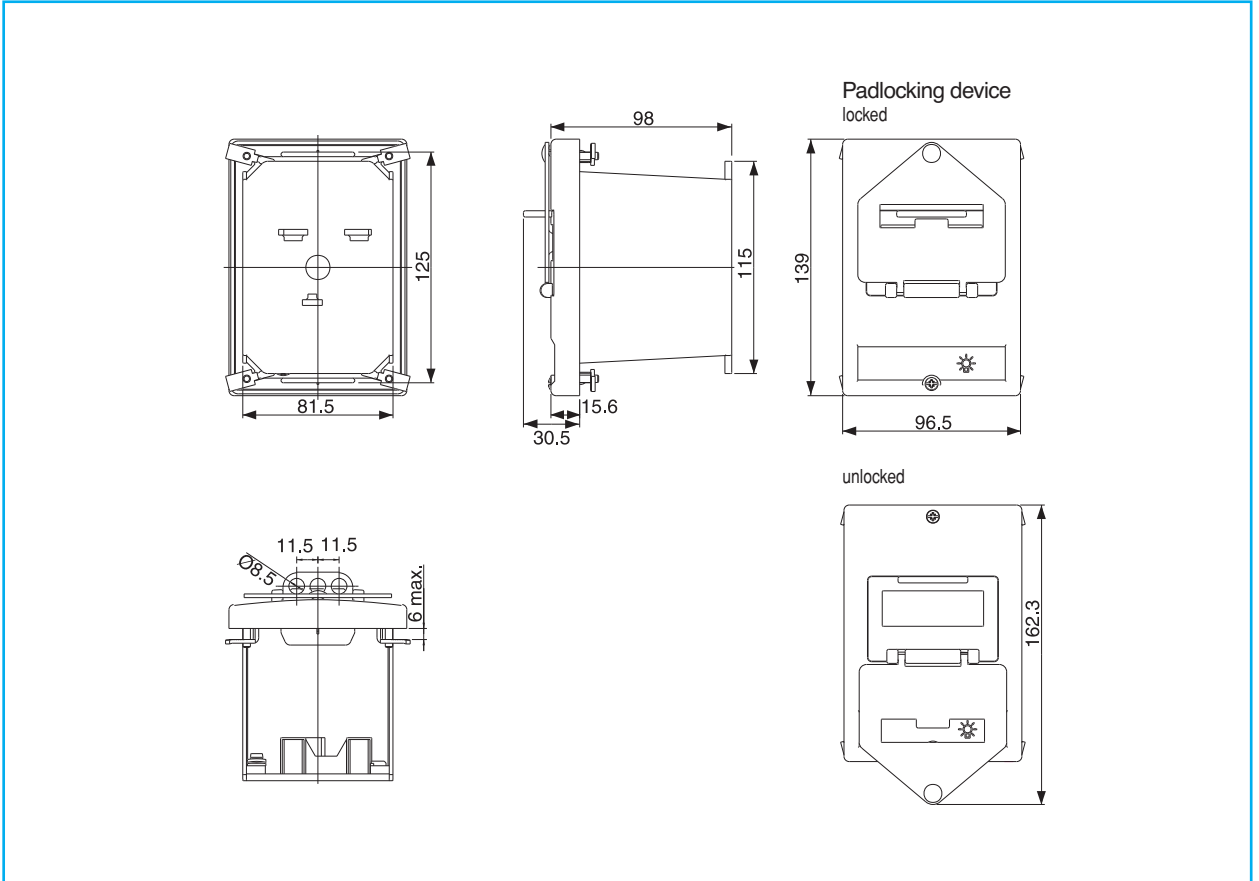
X

Dimensional drawings

Enclosure for GPS1 - Flush mounting



Enclosure for GPS1 - Flush mounting with padlocking device



Series M - Minicontactors

- C.3 Order codes
- C.23 Technical data
- C.29 Terminal numbering
- C.50 Dimensions

Series CL - Contactors

- C.11 Order codes
- C.31 Technical data
- C.39 Terminal numbering
- C.52 Dimensions

Series CK - Contactors

- C.19 Order Codes
- C.42 Technical data
- C.58 Dimensions

Plug-in relays and Auxiliary contactors

Series MT0 - Thermal overload relays for minicontactors

- C.61 Order codes
- C.68 Technical data
- C.69 Dimensions

Motor protection devices

Contactors and Thermal overload relays

Series RT - Thermal overload relays for contactors

- C.63 Order codes
- C.70 Technical data
- C.74 Dimensions

Motorstarters

Control and signalling units

Series RE - Electronic overload relays

- C.66 Order codes
- C.77 Technical data
- C.78 Dimensions

NEW

Electronic relays

Limit switches

Series CSCN - Contactors for capacitors

- C.81 Order codes
- C.82 Technical data
- C.84 Dimensions

NEW

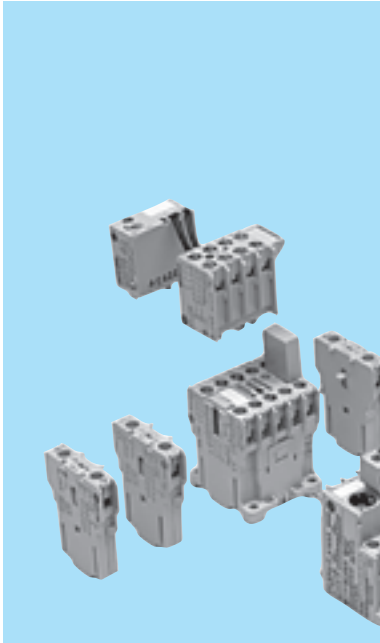
Speed drive units

Main switches

Series 390.R - Clapper contactors

- C.87 Order codes
- C.93 Technical data
- C.96 Dimensions

Numerical index



Three and four pole minicontactors 6, 9 and 12A (AC3) 20A (AC1)

- Control circuit: Alternating current up to 600V
Direct current up to 440V
- Terminal numbering in accordance with EN 50012
- Fixing by clipping onto 35 mm DIN rail (EN 50022-35) or by screws
- Screws and fast-on terminals protected against accidental contact in accordance with VDE 0106 T.100 and VBG4
- Versions: Ring terminal and printed circuit terminals
- Facility to mount instant and timed auxiliary contact blocks and voltage suppressor block
- Degree of protection IP20 (EN 60529).
- Maximum number of auxiliary contacts to be added: 6

Standards

| | |
|------------------|----------------|
| IEC/EN 60947-1 | BS 4794 |
| IEC/EN 60947-4-1 | NFC 63-110 |
| IEC/EN 60947-5-1 | CSA C22.2/14 |
| EN 50003 | VDE 0660 |
| EN 50005 | SEV 10254 |
| EN 50012 | JIS C8325 |
| UL 508 | JEM 1038 |
| NEMA ICS-1 | CENELEC HD 419 |

General data

| | MC0... | MC1... | MC2... |
|--|---------|--------|--------|
| Maximum number of poles | 4 | 4 | 4 |
| Rated thermal current (I_{th}) $\theta \leq 60^{\circ}\text{C}$ ⁽¹⁾ | (A) 20 | 20 | 20 |
| Rated operational current I_e ⁽²⁾ (3x440V, 50/60Hz, AC3) | (A) 6 | 9 | 12 |
| Rated insulation current U_i | (V) 750 | 750 | 750 |
| Rated operational current U_e | (V) 690 | 690 | 690 |

Approvals



- Order codes ● pg. C.3
- Auxiliary contact blocks ● pg. C.6
- Accessories ● pg. C.8
- Technical data ● pg. C.23
- Terminal numbering ● pg. C.29
- Dimensions ● pg. C.50

Standard voltages

To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit (other voltages on request)

Alternating current (V). Bifrequency coil

| ♦ | 10 | 1 | 2 | 9 | 3 | 4 | 5 | 6 | 7 | 8 | 12 | 13 |
|---------|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|
| AC | 12 | 24 | 42 | 48 | 110 | 120 | 220 | 230 | 240 | 440 | 380 | 400 |
| 50/60Hz | | | | | | | 115 | | | | | |

Operating voltages limits with bifrequency coils:

With 60Hz = 0.85 to 1.1 x U_s

With 50Hz = 0.8 to 1.1 x U_s in continuous service (ED=100%) with a maximum ambient temperature of 40°C

Alternating current (V).

| ♦ | A | E | G | K | M | N | S | U | W | Y |
|------|---|----|----|-----|-----|-----|-----|-----|-----|-----|
| AC | | | 48 | 115 | | 220 | 260 | 380 | 415 | 500 |
| 50Hz | | | | 127 | | 240 | | 400 | 440 | |
| AC | 6 | 32 | 60 | | 208 | 240 | | 440 | 480 | 600 |
| 60Hz | | | | | 220 | 277 | | | | |

Direct current (V)

| ♦ | A | B | C | D | E | F | G | H | I | J | K | L | N | 17 | R | S | 16 |
|----|---|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|
| DC | 6 | 12 | 32 | 24 | 36 | 42 | 48 | 60 | 72 | 110 | 120 | 125 | 220 | 230 | 240 | 250 | 440 |

Direct current (V) - Wide voltage range

| ♦ | WD | WE | WG | WI | WJ | WN |
|----|----|----|----|----|-----|-----|
| DC | 24 | 33 | 48 | 72 | 110 | 220 |



Three pole minicontactors

| Max.operat.current Non- inductive loads AC1 ⁽²⁾ A | Motors <440V, 3 ~ 50/60Hz AC3 ⁽³⁾ A | Admissible power AC3 | | | | | Aux. contacts | | Control circuit: Alternating current | | Control circuit: Direct current | |
|---|---|----------------------|-------------|--|------------|------------|------------------|----------|--|----------|------------------------------------|----------|
| | | 1-phase 115V 220V | | 3-phase 220V 380V 500V 230V 400V | | | .3 .4 | .1 .2 | Cat. no. ⁽¹⁾ | Pack | Cat. no. ⁽¹⁾ | Pack |
| | | kW HP | kW HP | kW HP | kW HP | kW HP | | | | | | |
| Terminal: screw | | | | | | | | | | | | |
| 20 | 6 | 0.37 0.5 | 0.75 1 | 1.5 2 | 2.2 3 | 3 4 | 1 0 | 0 1 | MC0A310AT ♦ MC0A301AT ♦ | 20 20 | MC0C310AT ♦ MC0C301AT ♦ | 10 10 |
| 20 | 9 | 0.56 0.75 | 1.12 1.5 | 2.2 3 | 4 5.5 | 4 5.5 | 1 0 | 0 1 | MC1A310AT ♦ MC1A301AT ♦ | 20 20 | MC1C310AT ♦ MC1C301AT ♦ | 10 10 |
| 20 | 12 | 0.75 1 | 2 2.6 | 3 4 | 5.5 7.3 | 5.5 7.3 | 1 0 | 0 1 | MC2A310AT ♦ MC2A301AT ♦ | 20 20 | MC2C310AT ♦ MC2C301AT ♦ | 10 10 |
| Terminal: ring terminal | | | | | | | | | | | | |
| 20 | 6 | 0.37 0.5 | 0.75 1 | 1.5 2 | 2.2 3 | 3 4 | 1 0 | 0 1 | MC0A310AR ♦ MC0A301AR ♦ | 20 20 | MC0C310AR ♦ MC0C301AR ♦ | 10 10 |
| 20 | 9 | 0.56 0.75 | 1.12 1.5 | 2.2 3 | 4 5.5 | 4 5.5 | 1 0 | 0 1 | MC1A310AR ♦ MC1A301AR ♦ | 20 20 | MC1C310AR ♦ MC1C301AR ♦ | 10 10 |
| 20 | 12 | 0.75 1 | 2 2.6 | 3 4 | 5.5 7.3 | 5.5 7.3 | 1 0 | 0 1 | MC2A310AR ♦ MC2A301AR ♦ | 20 20 | MC2C310AR ♦ MC2C301AR ♦ | 10 10 |
| Terminal: faston 2x2.8 insulated (5) | | | | | | | | | | | | |
| 16 ⁽⁴⁾ | 6 | 0.37 0.5 | 0.75 1 | 1.5 2 | 2.2 3 | 3 4 | 1 0 | 0 1 | MC0A310AF ♦ MC0A301AF ♦ | 20 20 | MC0C310AF ♦ MC0C301AF ♦ | 10 10 |
| 16 ⁽⁴⁾ | 9 | 0.56 0.75 | 1.12 1.5 | 2.2 3 | 4 5.5 | 4 5.5 | 1 0 | 0 1 | MC1A310AF ♦ MC1A301AF ♦ | 20 20 | MC1C310AF ♦ MC1C301AF ♦ | 10 10 |
| Terminal: printed circuit | | | | | | | | | | | | |
| 20 | 6 | 0.37 0.5 | 0.75 1 | 1.5 2 | 2.2 3 | 3 4 | 1 0 | 0 1 | MC0A310AI ♦ MC0A301AI ♦ | 20 20 | MC0C310AI ♦ MC0C301AI ♦ | 10 10 |
| 20 | 9 | 0.56 0.75 | 1.12 1.5 | 2.2 3 | 4 5.5 | 4 5.5 | 1 0 | 0 1 | MC1A310AI ♦ MC1A301AI ♦ | 20 20 | MC1C310AI ♦ MC1C301AI ♦ | 10 10 |
| 20 | 12 | 0.75 1 | 2 2.6 | 3 4 | 5.5 7.3 | 5.5 7.3 | 1 0 | 0 1 | MC2A310AI ♦ MC2A301AI ♦ | 20 20 | MC2C310AI ♦ MC2C301AI ♦ | 10 10 |
| Spare coil | | | | | | | | | MB0A ♦ | 10 | MB0C ♦ | 10 |

- To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit (other voltages on request) (see C.2)
- Electrical endurance AC-1: MC0... 0.2 × 10⁶ operations
MC1... 0.3 × 10⁶ operations
MC2... 0.35 × 10⁶ operations
- Electrical endurance AC-3: MC0... (6A) = 1.2 × 10⁶ operations
MC1... (9A) = 0.85 × 10⁶ operations
MC2... (12A) = 0.6 × 10⁶ operations
- Terminal with wire 1.5 mm²: I_e = 16A
with wire 1 mm²: I_e = 10A
Insulated terminal type B 2.8 × 0.8 and wire 1 mm² I_e = 8A in accordance with DIN 46247.
- Fast-on 1 × 6.3 terminals on request (replace letter F by H in the catalogue number)

For reference numbers,
see chapter X, pg. X.4



3P and 4P minicontactors

A

B

C

D

E

F

G

H

I

X

Three pole interface contactors

| Max. oper. current Non-inductive load AC1 A | Motors <440V, 3 ~ 50/60Hz AC3 ⁽³⁾ A | Admissible power AC3 | | | | | Aux. contacts | | Voltage 24V D.C. coil 1.2W ⁽¹⁾ | | | Voltage 24V D.C. coil 2W ⁽²⁾ | | |
|--|---|----------------------|------|---------|------|------|---------------|-----------|---|----------|------|---|----------|------|
| | | 1-phase | | 3-phase | | | .3 .4 | .1 .2 | Cat. no. ⁽¹⁾ | Ref. no. | Pack | Cat. no. ⁽¹⁾ | Ref. no. | Pack |
| | | 115V | 220V | 220V | 380V | 500V | | | | | | | | |
| | | kW | kW | kW | kW | kW | | | | | | | | |
| Terminal: screw | | | | | | | | | | | | | | |
| 20 | 6 | 0.37 | 0.75 | 1.5 | 2.2 | 3 | 1 | 0 | MC0I310ATD | 100570 | 10 | MC0K310ATD | 100574 | 10 |
| | | | | | | | 0 | 1 | MC0I301ATD | 100571 | 10 | MC0K301ATD | 100575 | 10 |
| 20 | 9 | 0.56 | 1.12 | 2.2 | 4 | 4 | 1 | 0 | MC1I310ATD | 100572 | 10 | MC1K310ATD | 100576 | 10 |
| | | | | | | | 0 | 1 | MC1I301ATD | 100573 | 10 | MC1K301ATD | 100577 | 10 |
| 20 | 12 | 0.75 | 2 | 3 | 5.5 | 5.5 | 1 | 0 | MC2I310ATD | 100559 | 10 | MC2K310ATD | 103590 | 10 |
| | | | | | | | 0 | 1 | MC2I301ATD | 100538 | 10 | MC2K301ATD | 103591 | 10 |
| Spare coil | | | | | | | | | MB0ID | 100470 | 10 | MB0KD | 100471 | 10 |



- (1) No possibility of adding instantaneous auxiliary contact blocks.
- (2) Facility to mount an instantaneous auxiliary contact block of two contacts or two instantaneous auxiliary contact blocks of one contact.
- (3) Electrical endurance AC-3:
 MC0... (6A) = 1.2 x 10⁶ operations.
 MC1... (9A) = 0.85 x 10⁶ operations.
 MC2... (12A) = 0.6 x 10⁶ operations.

Contactors

A

B

C

D

E

F

G

H



I

X



Four poles minicontactors



| Max.oper.current Non-inductive load AC1 ⁽²⁾ A | Motors <440V, 3 ~ 50/60Hz AC3 ⁽³⁾ A | Admissible power AC3 | | | | | Poles | | Control circuit: Alternating current | | Control circuit: Direct current | |
|---|---|----------------------|----------|--|----------|----------|---|---|---|------|------------------------------------|------|
| | | 1-phase 115V 220V | | 3-phase 220V 380V 500V 230V 400V | | | 4 | 2 | Cat. no. ⁽¹⁾ | Pack | Cat. no. ⁽¹⁾ | Pack |
| | | kW HP | kW HP | kW HP | kW HP | kW HP |  |  | Ref. no. see bottom | | Ref. no. see bottom | |
| Screw terminal | | | | | | | | | | | | |
| 20 | 6 | AC1 | | | | | 4 | 0 | MC0A400AT ♦ | 20 | MC0C400AT ♦ | 10 |
| | | 1.8 | 3.5 | 6.1 | 10.5 | 13.8 | 2 | 2 | MC0AB00AT ♦ | 20 | MC0CB00AT ♦ | 10 |
| | | - | - | - | - | - | 0 | 4 | MC0AA00AT ♦ | 20 | | |
| | | AC3 | | | | | | | | | | |
| | | 0.37 | 0.75 | 1.5 | 2.2 | 3 | | | | | | |
| | | 0.5 | 1 | 2 | 3 | 4 | | | | | | |
| 20 | 9 | AC1 | | | | | 4 | 0 | MC1A400AT ♦ | 20 | MC1C400AT ♦ | 10 |
| | | 2.3 | 4.4 | 7.5 | 13 | 17 | 2 | 2 | MC1AB00AT ♦ | 20 | MC1CB00AT ♦ | 10 |
| | | - | - | - | - | - | 0 | 4 | MC1AA00AT ♦ | 20 | | |
| | | AC3 | | | | | | | | | | |
| | | 0.56 | 1.12 | 2.2 | 4 | 4 | | | | | | |
| | | 0.75 | 1.5 | 3 | 5.5 | 5.5 | | | | | | |
| 20 | 12 | AC1 | | | | | 4 | 0 | MC2A400AT ♦ | 20 | MC2C400AT ♦ | 10 |
| | | 2.3 | 4.4 | 7.5 | 13 | 17 | 2 | 2 | MC2AB00AT ♦ | 20 | MC2CB00AT ♦ | 10 |
| | | - | - | - | - | - | | | | | | |
| | | AC3 | | | | | | | | | | |
| | | 0.75 | 2 | 3 | 5.5 | 5.5 | | | | | | |
| | | 1 | 2.6 | 4 | 7.3 | 7.3 | | | | | | |
| Terminal: faston 2x2.8 insulated (5) | | | | | | | | | | | | |
| 20 | 6 | AC1 | | | | | 4 | 0 | MC0A400AF ♦ | 20 | MC0C400AF ♦ | 10 |
| | | 1.8 | 3.5 | 6.1 | 10.5 | 13.8 | 2 | 2 | MC0AB00AF ♦ | 20 | MC0CB00AF ♦ | 10 |
| | | - | - | - | - | - | 0 | 4 | MC0AA00AF ♦ | 20 | | |
| | | AC3 | | | | | | | | | | |
| | | 0.37 | 0.75 | 1.5 | 2.2 | 3 | | | | | | |
| | | 0.5 | 1 | 2 | 3 | 4 | | | | | | |
| 16 ⁽⁴⁾ | 9 | AC1 | | | | | 4 | 0 | MC1A400AF ♦ | 20 | MC1C400AF ♦ | 10 |
| | | 2.3 | 4.4 | 7.5 | 13 | 17 | 2 | 2 | MC1AB00AF ♦ | 20 | MC1CB00AF ♦ | 10 |
| | | - | - | - | - | - | 0 | 4 | MC1AA00AF ♦ | 20 | | |
| | | AC3 | | | | | | | | | | |
| | | 0.56 | 1.12 | 2.2 | 4 | 4 | | | | | | |
| | | 0.75 | 1.5 | 3 | 5.5 | 5.5 | | | | | | |
| Terminal: printed circuit | | | | | | | | | | | | |
| 20 | 6 | AC1 | | | | | 4 | 0 | MC0A400AI ♦ | 20 | MC0C400AI ♦ | 10 |
| | | 1.8 | 3.5 | 6.1 | 10.5 | 13.8 | 2 | 2 | MC0AB00AI ♦ | 20 | MC0CB00AI ♦ | 10 |
| | | - | - | - | - | - | 0 | 4 | MC0AA00AI ♦ | 20 | | |
| | | AC3 | | | | | | | | | | |
| | | 0.37 | 0.75 | 1.5 | 2.2 | 3 | | | | | | |
| | | 0.5 | 1 | 2 | 3 | 4 | | | | | | |
| 20 | 9 | AC1 | | | | | 4 | 0 | MC1A400AI ♦ | 20 | MC1C400AI ♦ | 10 |
| | | 2.3 | 4.4 | 7.5 | 13 | 17 | 2 | 2 | MC1AB00AI ♦ | 20 | MC1CB00AI ♦ | 10 |
| | | - | - | - | - | - | 0 | 4 | MC1AA00AI ♦ | 20 | | |
| | | AC3 | | | | | | | | | | |
| | | 0.56 | 1.12 | 2.2 | 4 | 4 | | | | | | |
| | | 0.75 | 1.5 | 3 | 5.5 | 5.5 | | | | | | |
| Spare coil | | | | | | | | | MC0A ♦ | 10 | MC0C ♦ | 10 |

(1) To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit (see C.2)

(2) Electrical endurance AC-1: MC0... 0.2 × 10⁶ operations
MC1... 0.3 × 10⁶ operations
MC2... 0.35 × 10⁶ operations

(3) Electrical endurance AC-3: MC0... (6A) = 1.2 × 10⁶ operations
MC1... (9A) = 0.85 × 10⁶ operations
MC2... (12A) = 0.6 × 10⁶ operations

(4) Terminal with wire 1.5 mm²: le = 16A
with wire 1 mm²: le = 10A
Insulated terminal type B 2.8 × 0.8 and wire of 1 mm² le = 8A in accordance with DIN 46247.

(5) Faston 1 × 6.3 terminals on request, (replace letter F by H in the catalogue number).

For reference numbers, see chapter X, pg. X.4

3P and 4P minicontactors

A

B

C

D

E

F

G

H

I

X



Instantaneous auxiliary contact blocks

Front mounting

| Number contacts | Combinations with basic contactor 10E | Contacts in acc. with EN 50012 | Contacts in acc. with EN 50005 | Aux. contacts | | Cat. no. | Ref. no. | Pack |
|-----------------------|--|--------------------------------|--------------------------------|---------------|-----------|-----------|----------|------|
| | | | | .3 .4 | .1 .2 | | | |
| Screw terminal | | | | | | | | |
| 2 | 21E | 11 | | 1 | 1 | MACN211AT | 100999 | 10 |
| 2 | 12E | 02 | | 0 | 2 | MACN202AT | 100998 | 10 |
| 2 | | | 20 | 2 | 0 | MARN220AT | 100994 | 10 |
| 2 | | | 11 | 1 | 1 | MARN211AT | 100993 | 10 |
| 2 | | | 02 | 0 | 2 | MARN202AT | 100992 | 10 |
| 4 | 41E | 31 | | 3 | 1 | MACN431AT | 100997 | 10 |
| 4 | 32E | 22 | | 2 | 2 | MACN422AT | 100996 | 10 |
| 4 | 23E | 13 | | 1 | 3 | MACN413AT | 100995 | 10 |
| 4 | | | 40 | 4 | 0 | MARN440AT | 100991 | 10 |
| 4 | | | 31 | 3 | 1 | MARN431AT | 100990 | 10 |
| 4 | | | 22 | 2 | 2 | MARN422AT | 100989 | 10 |
| 4 | | | 13 | 1 | 3 | MARN413AT | 100988 | 10 |
| 4 | | | 04 | 0 | 4 | MARN404AT | 100987 | 10 |
| Ring terminal | | | | | | | | |
| 2 | 21E | 11 | | 1 | 1 | MACN211AR | 103557 | 10 |
| 2 | 12E | 02 | | 0 | 2 | MACN202AR | 103558 | 10 |
| 2 | | | 20 | 2 | 0 | MARN220AR | 103349 | 10 |
| 2 | | | 11 | 1 | 1 | MARN211AR | 103350 | 10 |
| 2 | | | 02 | 0 | 2 | MARN202AR | 103351 | 10 |
| 4 | 41E | 31 | | 3 | 1 | MACN431AR | 103559 | 10 |
| 4 | 32E | 22 | | 2 | 2 | MACN422AR | 103560 | 10 |
| 4 | 23E | 13 | | 1 | 3 | MACN413AR | 103561 | 10 |
| 4 | | | 40 | 4 | 0 | MARN440AR | 103352 | 10 |
| 4 | | | 31 | 3 | 1 | MARN431AR | 103353 | 10 |
| 4 | | | 22 | 2 | 2 | MARN422AR | 103354 | 10 |
| 4 | | | 13 | 1 | 3 | MARN413AR | 103355 | 10 |
| 4 | | | 04 | 0 | 4 | MARN404AR | 103300 | 10 |

• Two or four additional contacts, to cover combinations of 3 or 5 contacts without increasing the surface are of the basic contactor



Contactors

A

B

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

X



Instantaneous auxiliary contact blocks

Lateral mounting



| Number contacts | Combinations with basic contactor 10E | Contacts in acc. with EN 50012 | Contacts in acc. with EN 50005 | Aux. contacts | | Cat. no. | Ref. no. | Pack |
|-----------------|---------------------------------------|--------------------------------|--------------------------------|--|---|----------|----------|------|
| | | | |  |  | | | |

• One or two additional blocks, to cover combinations of 1 or 2 contacts without increasing the height of the basic unit contactor

| Screw terminal | | | | | | | | |
|--------------------------------------|-----|----|--|---|---|-----------|--------|----|
| 1 | 20 | 10 | | 1 | 0 | MACL110AT | 100560 | 10 |
| 1 | 11E | 01 | | 0 | 1 | MACL101AT | 100561 | 10 |
| Ring terminal | | | | | | | | |
| 1 | 20 | 10 | | 1 | 0 | MACL110AR | 103555 | 10 |
| 1 | 11E | 01 | | 0 | 1 | MACL101AR | 103556 | 10 |
| Terminal: faston 2x2.8 insulated (1) | | | | | | | | |
| 1 | 20 | 10 | | 1 | 0 | MACL110AF | 100562 | 10 |
| 1 | 11E | 01 | | 0 | 1 | MACL101AF | 100563 | 10 |
| Terminal: printed circuit | | | | | | | | |
| 1 | 20 | 10 | | 1 | 0 | MACL110AI | 100564 | 10 |
| 1 | 11E | 01 | | 0 | 1 | MACL101AI | 100565 | 10 |

- One or two additional blocks, when up to 6 or 7 contacts are needed (combination possible with frontal blocks)
- One or two additional blocks on both sides, to cover up to five contacts (combination possible only with lateral blocks)

| Screw terminal | | | | | | | | |
|--------------------------------------|--|--|----|---|---|------------|--------|----|
| 1 | | | 10 | 1 | 0 | MARL110ATS | 100519 | 10 |
| 1 | | | 01 | 0 | 1 | MARL101ATS | 100520 | 10 |
| Ring terminal | | | | | | | | |
| 1 | | | 10 | 1 | 0 | MARL110ARS | 103299 | 10 |
| 1 | | | 01 | 0 | 1 | MARL101ARS | 103298 | 10 |
| Terminal: faston 2x2.8 insulated (1) | | | | | | | | |
| 1 | | | 10 | 1 | 0 | MARL110AFS | 100521 | 10 |
| 1 | | | 01 | 0 | 1 | MARL101AFS | 100522 | 10 |
| Terminal: printed circuit | | | | | | | | |
| 1 | | | 10 | 1 | 0 | MARL110AIS | 100523 | 10 |
| 1 | | | 01 | 0 | 1 | MARL101AIS | 100524 | 10 |

(1) Terminal with wire 1 mm²: Ie = 10A
 Insulated terminal type B 2.8 x 0.8 with wire 1 mm²: Ie = 8A, in accordance with DIN 46247

3P and 4P mini contactors

A

B

C

D

E

F






G

H

I

X

Accessories

| | | For use with: | Time | Function | Ue | Cat. no. | Ref. no. | Pack |
|---|---|---|----------------------------|-------------------|-------------------|----------------|----------|------|
|  <p>Electronic timer block</p> | Lateral or front fixing to the contactor | | | | | | | |
| | MCR..MC ... | 0.5 - 60 seg. | delay ON | 24... 250V AC/DC | MREBC10AC2 | 100541 | 10 | |
| | MCR..MC ... | 0.2 - 24 seg. | delay ON | 24...250V AC/DC | MREBC20AC2 | 100542 | 10 | |
|  <p>DIN rail adaptor for electronic timer block</p> | For fixing onto EN 50022-35 | | | | | | | |
| | MREBC... | | | | MVBOR | 100543 | 10 | |
|  <p>Voltage suppressor block</p> | Connection and (plug-in) fixing on to the connector | | | | | | | |
| | MCRA,MC ... | R/C | AC | 12...60V 50/60Hz | MP0AAE1 | 100544 | 10 | |
| | MCRA,MC ... | R/C | AC | 72...250V 50/60Hz | MP0AAE2 | 100545 | 10 | |
| | MCRC,MC ... | Diode | DC | 6...250V DC | MP0CAE3 | 100546 | 10 | |
| | MCRC,MC ... | Varistor | AC/DC | 24-48V | MP0DAE4 | 100536 | 10 | |
|  <p>Pole paralleling links</p> | To connect two, three or four phases in parallel | | | | | | | |
| | MC ... | 2, 3, 4 (parallel) | Ø4.5mm - 16mm ² | | MVPOC | 100600 | 10 | |
|  <p>Mechanical interlock</p> | Mechanical interlock and pole jumpers | | | | | | | |
| | MCR, MC ... | | | | MMHO | 100547 | 10 | |
| <p>Identification</p> | For use with: | | | | | | | |
| | MCR, MC ... | Labels (10 sheets of 260 labels) | | | | EAT 260 | 100548 | 1 |
| | MCR, MC ... | Labelling plate base. Plug-in labelling plate bases (50 pieces in one pack) | | | | SPR | 100549 | 1 |

Multipack. Series M and Series CL

To reduce the amount of waste packaging material and to save time during installation, we offer the opportunity to order contactors in a multipack without the individual packaging.

| | Product | Type | Standard pack | Multipack (1) |
|--|----------------|------------------|---------------|---------------|
| | Minicontactors | MCOA...MC2A | 20 | 40 |
| | Contactors | CL00A...CL25A... | 20 | 40 |
| | | CL03...CL45... | 10 | 20 |

(1) The quantity ordered must be a multiple of the quantity in each multipack (with the same frame/size and coil voltage)

How to order

To order a multipack, add the suffix **MP** to the standard catalogue number

| Example | Standard pack | Multipack |
|---------|---------------|-------------------------------------|
| | MCOA310ATN | MCOA310ATN MP (40 pieces) |
| | CL03A400MJ | CL03A400MJ MP (20 pieces) |

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Three and four pole contactors 9 to 105A (AC3) 25 to 140A (AC1)

- Control circuit: Alternating current up to 690V
Direct current up to 440V
- Terminal numbering in accordance with EN 50005 and EN 50012
- Fixing by clipping onto 35mm DIN rail EN 50022-35 or by screws
- Screws protected against accidental contact in accordance with VDE 0106 T.100, VBG4.
- Ring terminal version
- Three coil terminals
- Mounting possibilities of front/side instantaneous auxiliary contact blocks, timed auxiliary contact blocks, mechanical latch, transient suppressor block and interface modules.
- Degree of protection: IP20 to CL00 ... CL02
IP10 to CL25 ... CL10
- Maximum number of auxiliary contacts: 4 for CL00 ... CL25
6 for CL04 ... CL45
8 for CL06 ... CL10

Standards

| | |
|------------------|----------------|
| IEC/EN 60947-1 | CSA 22.2/14 |
| IEC/EN 60947-4-1 | NFC 63-110 |
| IEC/EN 60947-5-1 | ASE 1025 |
| EN 50005 | VDE 0660/102 |
| UL 508 | CENELEC HD 419 |
| NEMA ICS 1 | |
| BS 5424 & 775 | |

Standard voltages

To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit.

Alternating current (V). Dual-frequency coil

| ♦ | 1 | 2 | 9 | 3 | 4 | 5 | 6 | 7 | 13 | 8 | 15 |
|---------|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|
| AC | 24 | 42 | 48 | 110 | 120 | 220 | 230 | 240 | 400 | 440 | 480 |
| 50/60Hz | | | | 115 | | | | | | | |

Alternating current (V).

| ♦ | E | K | L | N | T | U | W | Y | Z |
|------|----|-----|-----|-----|-----|-----|-----|-----|-----|
| AC | 32 | 127 | | 220 | | 380 | 415 | 500 | 660 |
| 50Hz | | | | 230 | | 400 | | 690 | |
| AC | | | 208 | 277 | 380 | 480 | 460 | 600 | |
| 60Hz | | | | | | | | | |

Direct current (V)

For contactors type CL...D / Operating limits: 0.80 ... 1.10 x Us

| ♦ | B | D | E | F | G | H | I | J | K | N | P | R | T | X |
|---------|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|
| Voltage | 12 | 24 | 36 | 42 | 48 | 60 | 72 | 110 | 120 | 220 | 230 | 240 | 250 | 440 |
| | | | | | | | | | | 125 | | | | |

Coil with electronic module for contactors CL...E (can also be used with alternating current)

| ♦ | D | F | H | J | N | Y |
|---------|----|----|----|-----|-----|-----|
| Voltage | 24 | 42 | 60 | 110 | 220 | 440 |
| | 28 | 48 | 72 | 125 | 250 | |

Direct current (V). Coil with wide voltage range (0.70 ... 1.30 x Us)

For contactors type CL...D

| ♦ | WB | WD | WE | WF | WG | WH | WI | WJ | WK | WN | WP | WR | WT | WX |
|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|
| DC | 12 | 24 | 33 | 42 | 48 | 60 | 72 | 110 | 125 | 220 | 230 | 240 | 250 | 440 |

Maximum number of add-on auxiliary contact blocks:

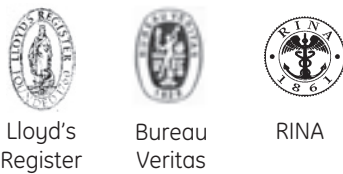
CL00D...CL02D : 2NO or 1NC
CL03D...CL45D : 1NO and 1NC
CL05D...CL10D : 4NO or 2NC
CL05E...CL10E : 4 cont. aux.

Coil with electronic module for contactors CL...E

| ♦ | WD | WE | WF | WH | WJ | WN |
|---------|----|----|----|----|-----|-----|
| Voltage | 24 | 33 | 48 | 72 | 110 | 220 |

Different auxiliary contact configurations, contact us.

Approvals



- Order codes ● pg. C.11
- Auxiliary contact blocks ● pg. C.15
- Accessories ● pg. C.16
- Technical data ● pg. C.31
- Terminal numbering ● pg. C.39
- Dimensions ● pg. C.52



Three pole contactors. Screw terminal

| Max.oper.current Non- inductive load AC1 A | Motors <440V, 3 ~ 50/60Hz AC3 A | Admissible power AC3 | | | | Electrical endurance Cat. AC3 Operations | Aux. contacts | | Control circuit: Alternating current | | Control circuit: Direct current | | Control circuit: Coil with electronic module (AC/DC) | |
|---|--|-------------------------|--------------|--------------|----------|--|------------------|-------------|--|------------------------|------------------------------------|------------------------|--|------------------------|
| | | 220V 230V | 380V 400V | 415V 440V | 500V | | .3 .4 | .1 .2 | Cat. no. ⁽¹⁾ | Pack ⁽³⁾ | Cat. no. ⁽¹⁾ | Pack ⁽³⁾ | Cat. no. ⁽¹⁾ | Pack ⁽³⁾ |
| | | kW HP | kW HP | kW HP | kW HP | | 0 1 0 | 0 1 0 | Ref. no. see bottom | | Ref. no. see bottom | | Ref. no. see bottom | |
| 25 | 9 | 2.2 3 | 4 | 4 | 5.5 | 2x10 ⁶ | 0 | 0 | CL00A300T♦ | 5 | | | | |
| | | | 5.5 | 5.5 | 7.5 | | 1 | 0 | CL00A310T♦ | 5 | CL00D310T♦ | 10 | | |
| | | | | | | | 0 | 1 | CL00A301T♦ | 5 | CL00D301T♦ | 10 | | |
| 25 | 12 | 3 4 | 5.5 | 5.5 | 7.5 | 2x10 ⁶ | 0 | 0 | CL01A300T♦ | 5 | | | | |
| | | | 7.5 | 7.5 | 10 | | 1 | 0 | CL01A310T♦ | 5 | CL01D310T♦ | 10 | | |
| | | | | | | | 0 | 1 | CL01A301T♦ | 5 | CL01D301T♦ | 10 | | |
| 32 | 18 | 4 5.5 | 7.5 | 7.5 | 10 | 1.7x10 ⁶ | 0 | 0 | CL02A300T♦ | 5 | | | | |
| | | | 10 | 10 | 13.5 | | 1 | 0 | CL02A310T♦ | 5 | CL02D310T♦ | 10 | | |
| | | | | | | | 0 | 1 | CL02A301T♦ | 5 | CL02D301T♦ | 10 | | |
| 45 | 25 | 7.5 10 | 11 | 11 | 15 | 1.2x10 ⁶ | 0 | 0 | CL25A300T♦ | 5 | | | | |
| | | | 15 | 15 | 20 | | | | | | | | | |
| | | | | | | | | | | | | | | |
| 45 | 25 | 7.5 10 | 12 | 12 | 15 | 2x10 ⁶ | 0 | 0 | CL03A300M♦ | 10 | | | | |
| | | | 16 | 16 | 20 | | 1 | 0 | CL03A310M♦ | 10 | CL03D310M♦ | 10 | | |
| | | | | | | | 0 | 1 | CL03A301M♦ | 10 | CL03D301M♦ | 10 | | |
| 60 | 32 | 9 12 | 16 | 16 | 18.5 | 2x10 ⁶ | 0 | 0 | CL04A300M♦ | 10 | | | | |
| | | | 22 | 22 | 25 | | 1 | 0 | CL04A310M♦ | 10 | CL04D310M♦ | 10 | | |
| | | | | | | | 0 | 1 | CL04A301M♦ | 10 | CL04D301M♦ | 10 | | |
| 60 | 40 | 11 15 | 18.5 | 22 | 25 | 2x10 ⁶ | 0 | 0 | CL45A300M♦ | 10 | | | | |
| | | | 25 | 30 | 34 | | 1 | 1 | CL45A311M♦ ⁽²⁾ | 10 | CL45D300M♦ | 10 | | |
| | | | | | | | | | | | | | | |
| 90 | 50 | 15 20 | 22 | 25 | 30 | 1.8x10 ⁶ | 0 | 0 | CL06A300M♦ | 1 | | | | |
| | | | 30 | 34 | 40 | | 1 | 1 | CL06A311M♦ ⁽²⁾ | 1 | CL06D300M♦ | 1 | CL06E300M♦ | 1 |
| | | | | | | | | | | | | | | |
| 110 | 65 | 18.5 25 | 30 | 37 | 40 | 1.7x10 ⁶ | 0 | 0 | CL07A300M♦ | 1 | | | | |
| | | | 40 | 50 | 55 | | 1 | 1 | CL07A311M♦ ⁽²⁾ | 1 | CL07D300M♦ | 1 | CL07E300M♦ | 1 |
| | | | | | | | | | | | | | | |
| 110 | 80 | 22 30 | 37 | 45 | 45 | 1.5x10 ⁶ | 0 | 0 | CL08A300M♦ | 1 | | | | |
| | | | 50 | 60 | 60 | | 1 | 1 | CL08A311M♦ ⁽²⁾ | 1 | CL08D300M♦ | 1 | CL08E300M♦ | 1 |
| | | | | | | | | | | | | | | |
| 140 | 95 | 25 34 | 45 | 50 | 55 | 1.7x10 ⁶ | 0 | 0 | CL09A300M♦ | 1 | | | | |
| | | | 60 | 68 | 75 | | 1 | 1 | CL09A311M♦ ⁽²⁾ | 1 | CL09D300M♦ | 1 | CL09E300M♦ | 1 |
| | | | | | | | | | | | | | | |
| 140 | 105 | 30 40 | 55 | 55 | 65 | 1.5x10 ⁶ | 0 | 0 | CL10A300M♦ | 1 | | | | |
| | | | 75 | 75 | 88 | | 1 | 1 | CL10A311M♦ ⁽²⁾ | 1 | CL10D300M♦ | 1 | CL10E300M♦ | 1 |
| | | | | | | | | | | | | | | |
| Spare coils | | | | | | | | | CL00 - CL25 | LB1A ♦ | 5 | LB1D ♦ | 5 | |
| | | | | | | | | | CL03 - CL45 | LB3A ♦ | 5 | LB3D ♦ | 5 | |
| | | | | | | | | | CL06 - CL10 | LB4A ♦ | 5 | LB4D ♦ | 1 | |
| | | | | | | | | | coil + electronic module CL06E - CL10E | | | | | LB4E ♦ |

- (1) To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit (see C.10).
- (2) Equipped with two blocks BCLF
- (3) Multipack, see C.9

For reference numbers, see chapter X, pg. X.6



3P and 4P contactors

A

B

C

D

E

F

G

H

I

X

Three pole contactors. Ring terminal

Contactors

A

B

C

D

E

F

G

H

I

X



| AC1 A | Max.oper.current Non-inductive load Motors <440V, 3 ~ 50/60Hz AC3 A | Admissible power AC3 | | | | Electrical endurance Cat. AC3 Operations | Aux. contacts | | Control circuit: Alternating current | | Control circuit: Direct current | |
|----------|---|----------------------|--------------|--------------|------------|--|---------------|-------------|--|---------------------|---|----------------|
| | | 220V 230V | 380V 400V | 415V 440V | 500V | | 3 | 1 | Cat. no. (1) | Pack (2) | Cat. no. (1) | Pack (2) |
| 25 | 9 | 2.2 3 | 4 5.5 | 4 5.5 | 5.5 7.5 | 2x10 ⁶ | 0 1 0 | 0 0 1 | CL00A300R ♦ CL00A310R ♦ CL00A301R ♦ | 5 5 5 | CL00D310R ♦ CL00D301R ♦ | 10 10 |
| 25 | 12 | 3 4 | 5.5 7.5 | 5.5 7.5 | 7.5 10 | 2x10 ⁶ | 0 1 0 | 0 0 1 | CL01A300R ♦ CL01A310R ♦ CL01A301R ♦ | 5 5 5 | CL01D310R ♦ CL01D301R ♦ | 10 10 |
| 32 | 18 | 4 5.5 | 7.5 10 | 7.5 10 | 10 13.5 | 1.7x10 ⁶ | 0 1 0 | 0 0 1 | CL02A300R ♦ CL02A310R ♦ CL02A301R ♦ | 5 5 5 | CL02D310R ♦ CL02D301R ♦ | 10 10 |
| 45 | 25 | 7.5 10 | 11 15 | 11 15 | 15 20 | 1.2x10 ⁶ | 0 1 0 | 0 0 1 | CL25A300R ♦ CL03A300R ♦ CL03A310R ♦ CL03A301R ♦ | 5 10 10 10 | CL25D300R ♦ CL03D310R ♦ CL03D301R ♦ | 10 10 10 |
| 60 | 32 | 9 12 | 16 22 | 16 22 | 18.5 25 | 2x10 ⁶ | 0 1 0 | 0 0 1 | CL04A300R ♦ CL04A310R ♦ CL04A301R ♦ | 10 10 10 | CL04D310R ♦ CL04D301R ♦ | 10 10 |
| 60 | 40 | 11 15 | 18.5 25 | 22 30 | 25 34 | 2x10 ⁶ | 0 1 0 | 0 0 1 | CL45A300R ♦ CL06A300R ♦ CL07A300R ♦ | 10 1 1 | CL45D300R ♦ CL06D300R ♦ CL07D300R ♦ | 10 1 1 |
| 90 | 50 | 15 20 | 22 30 | 25 34 | 30 40 | 1.8x10 ⁶ | 0 1 0 | 0 0 1 | CL08A300R ♦ CL09A300R ♦ CL10A300R ♦ | 1 1 1 | CL08D300R ♦ CL09D300R ♦ CL10D300R ♦ | 1 1 1 |
| 110 | 65 | 18.5 25 | 30 40 | 37 50 | 40 55 | 1.7x10 ⁶ | 0 1 0 | 0 0 1 | CL09A300R ♦ CL10A300R ♦ | 1 1 | CL09D300R ♦ CL10D300R ♦ | 1 1 |
| 110 | 80 | 22 30 | 37 50 | 45 60 | 45 60 | 1.5x10 ⁶ | 0 1 0 | 0 0 1 | CL08A300R ♦ CL09A300R ♦ CL10A300R ♦ | 1 1 1 | CL08D300R ♦ CL09D300R ♦ CL10D300R ♦ | 1 1 1 |
| 140 | 95 | 25 34 | 45 60 | 50 68 | 55 75 | 1.7x10 ⁶ | 0 1 0 | 0 0 1 | CL09A300R ♦ CL10A300R ♦ | 1 1 | CL09D300R ♦ CL10D300R ♦ | 1 1 |
| 140 | 105 | 30 40 | 55 75 | 55 75 | 65 88 | 1.5x10 ⁶ | 0 1 0 | 0 0 1 | CL10A300R ♦ | 1 | CL10D300R ♦ | 1 |

Spare coils

| | | | | |
|-------------|--------|---|--------|---|
| CL00 - CL25 | LB1A ♦ | 5 | LB1D ♦ | 5 |
| CL03 - CL45 | LB3A ♦ | 5 | LB3D ♦ | 5 |
| CL06 - CL10 | LB4A ♦ | 5 | LB4D ♦ | 1 |


(1) To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit (see C.10).

(2) Multipack, see C.9


For reference numbers, see chapter X, pg. X.6




Four pole contactors. Screw terminal



| Max.oper.current Non-inductive loads | | Admissible power AC1 | | | | Electrical endurance AC1 Operations | Power contacts | | Control circuit: Alternating current | | Control circuit: Direct current | | Control circuit: Coil with electronic module (AC/DC) | |
|---|----------|-------------------------|--------------|--------------|------|---|----------------|---------------------|---|---------------------|------------------------------------|---------------------|---|---------------------|
| AC1 A | AC3 A | 220V 230V | 380V 400V | 415V 440V | 500V | | d | b | Cat. no. ⁽¹⁾ | Pack ⁽²⁾ | Cat. no. ⁽¹⁾ | Pack ⁽²⁾ | Cat. no. ⁽¹⁾ | Pack ⁽²⁾ |
| | | kW | kW | kW | kW | | | Ref. no. see bottom | | Ref. no. see bottom | | Ref. no. see bottom | | |
| 25 | 12 | 9.5 | 16.5 | 18 | 21.5 | 1.5x10 ⁶ | 4 | 0 | CL01A400T♦ | 5 | CL01D400T♦ | 10 | | |
| 32 | 18 | 12 | 22 | 23 | 27.5 | 1.5x10 ⁶ | 4 | 0 | CL02A400T♦ | 5 | CL02D400T♦ | 10 | | |
| 45 | 25 | 17 | 29 | 32 | 39 | 2x10 ⁶ | 4 | 0 | CL03A400M♦ | 10 | CL03D400M♦ | 10 | | |
| 60 | 32 | 22.5 | 39.5 | 43 | 52 | 1.5x10 ⁶ | 4 | 0 | CL04A400M♦ | 10 | CL04D400M♦ | 10 | CL05E400M♦ 1 | |
| 90 | 50 | 34 | 59 | 64 | 78 | 1.5x10 ⁶ | 4 | 0 | CL05A400M♦ | 1 | CL05D400M♦ | 1 | CL07E400M♦ 1 | |
| 110 | 65 | 42 | 72.5 | 79 | 95 | 1.8x10 ⁶ | 4 | 0 | CL07A400M♦ | 1 | CL07D400M♦ | 1 | CL09E400M♦ 1 | |
| 140 | 95 | 53 | 92 | 100 | 121 | 1.8x10 ⁶ | 4 | 0 | CL09A400M♦ | 1 | CL09D400M♦ | 1 | | |



| Max.oper.current Non-inductive loads | | Admissible power AC3 | | | | Electrical endurance AC3 Operations | Power contacts | | Control circuit: Alternating current | | Control circuit: Direct current | | Control circuit: Coil with electronic module (AC/DC) | |
|---|---|-------------------------|--------------|--------------|------------|---|----------------|---------------------|---|---------------------|------------------------------------|---------------------|---|---------------------|
| AC1 A | Motors <440V, 3~ 50/60Hz AC3 A | 220V 230V | 380V 400V | 415V 440V | 500V | | d | b | Cat. no. ⁽¹⁾ | Pack ⁽²⁾ | Cat. no. ⁽¹⁾ | Pack ⁽²⁾ | Cat. no. ⁽¹⁾ | Pack ⁽²⁾ |
| | | kW HP | kW HP | kW HP | kW HP | | | Ref. no. see bottom | | Ref. no. see bottom | | Ref. no. see bottom | | |
| 25 | 12 | 3 4 | 5.5 7.5 | 5.5 7.5 | 7.5 10 | | 2 2 | CL01AB00T♦ | 5 | CL01DB00T♦ | 5 | | | |
| 32 | 18 | 4 5.5 | 7.5 10 | 7.5 10 | 10 13.5 | | 2 2 | CL02AB00T♦ | 5 | CL02DB00T♦ | 5 | | | |
| 45 | 25 | 7.5 10 | 12 16 | 12 16 | 15 20 | | 2 2 | CL03AB00M♦ | 10 | CL03DB00M♦ | 10 | | | |
| 60 | 32 | 9 12 | 16 22 | 16 22 | 18.5 25 | | 2 2 | CL04AB00M♦ | 10 | CL04DB00M♦ | 10 | | | |
| 90 | 40 | 11 15 | 18.5 25 | 22 30 | 25 34 | | 2 2 | CL05AB00M♦ | 1 | CL05DB00M♦ | 1 | CL05EB00M♦ | 1 | |
| 110 | 65 | 18.5 25 | 30 40 | 37 50 | 40 55 | | 2 2 | CL07AB00M♦ | 1 | CL07DB00M♦ | 1 | CL07EB00M♦ | 1 | |
| 110 | 80 | 22 30 | 37 50 | 45 60 | 45 60 | | 2 2 | CL08AB00M♦ | 1 | CL08DB00M♦ | 1 | CL08EB00M♦ | 1 | |



| Spare coils | Electrical endurance AC1 Operations | Control circuit: Alternating current | Pack ⁽²⁾ | Control circuit: Direct current | Pack ⁽²⁾ | Control circuit: Coil with electronic module (AC/DC) |
|--------------------------|---|---|---------------------|------------------------------------|---------------------|---|
| | CL00 - CL25 | LB1A ♦ | 5 | LB1D ♦ | 5 | |
| | CL03 - CL45 | LB3A ♦ | 5 | LB3D ♦ | 5 | |
| | CL05A - CL08A | LB4A ♦ | 5 | LB4D ♦ | 1 | |
| Coil + Electronic module | CL05E - CL08E | LB4E ♦ | 1 | | | LB4E ♦ 1 |

- (1) To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit (see C.10).
 (2) Multipack, see C.9

For reference numbers, see chapter X, pg. X.6



3P and 4P contactors

A

B

C

D

E

F

G

H

I

X

Four poles. Ring terminal



| Max.oper.current Non-inductive load | | Admissible power AC1 | | | | Electrical endurance Cat. AC1 Operations | Power contacts | | Control circuit: Alternating current | | Control circuit: Direct current | |
|--|----------|-------------------------|--------------|--------------|------|--|----------------|---------------------|---|---------------------|------------------------------------|---------------------|
| AC1 A | AC3 A | 220V 230V | 380V 400V | 415V 440V | 500V | | d | b | Cat. no. ⁽¹⁾ | Pack ⁽²⁾ | Cat. no. ⁽¹⁾ | Pack ⁽²⁾ |
| | | kW | kW | kW | kW | | | Ref. no. see bottom | | Ref. no. see bottom | | |
| 25 | 12 | 9.5 | 16.5 | 18 | 21.5 | 1.5x10 ⁶ | 4 | 0 | CL01A400R♦ | 5 | CL01D400R♦ | 10 |
| 32 | 18 | 12 | 22 | 23 | 27.5 | 1.5x10 ⁶ | 4 | 0 | CL02A400R♦ | 5 | CL02D400R♦ | 10 |
| 45 | 25 | 17 | 29 | 32 | 39 | 2x10 ⁶ | 4 | 0 | CL03A400R♦ | 10 | CL03D400R♦ | 10 |
| 60 | 32 | 22.5 | 39.5 | 43 | 52 | 1.5x10 ⁶ | 4 | 0 | CL04A400R♦ | 10 | CL04D400R♦ | 10 |
| 90 | 50 | 34 | 59 | 64 | 78 | 1.5x10 ⁶ | 4 | 0 | CL05A400R♦ | 1 | CL05D400R♦ | 1 |
| 110 | 65 | 42 | 72.5 | 79 | 95 | 1.8x10 ⁶ | 4 | 0 | CL07A400R♦ | 1 | CL07D400R♦ | 1 |
| 140 | 95 | 53 | 92 | 100 | 121 | 1.8x10 ⁶ | 4 | 0 | CL09A400R♦ | 1 | CL09D400R♦ | 1 |

A

B

C

D

E

F

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H

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X



| Max.oper.current Non-inductive load | | Admissible power AC3 | | | | Power contacts | Control circuit: Alternating current | | Control circuit: Direct current | | |
|--|---|-------------------------|--------------|--------------|------------|----------------|---|---------------------|------------------------------------|---------------------|-------------------------|
| AC1 A | Motors <440V, 3~ 50/60Hz AC3 A | 220V 230V | 380V 400V | 415V 440V | 500V | | d | b | Cat. no. ⁽¹⁾ | Pack ⁽²⁾ | Cat. no. ⁽¹⁾ |
| | | kW HP | kW HP | kW HP | kW HP | | | Ref. no. see bottom | | Ref. no. see bottom | |
| 25 | 12 | 3 4 | 5.5 7.5 | 5.5 7.5 | 7.5 10 | 2 | 2 | CL01AB00R♦ | 5 | CL01DB00R♦ | 5 |
| 32 | 18 | 4 5.5 | 7.5 10 | 7.5 10 | 10 13.5 | 2 | 2 | CL02AB00R♦ | 5 | CL02DB00R♦ | 5 |
| 45 | 25 | 7.5 10 | 12 16 | 12 16 | 15 20 | 2 | 2 | CL03AB00R♦ | 10 | CL03DB00R♦ | 10 |
| 60 | 32 | 9 12 | 16 22 | 16 22 | 18.5 25 | 2 | 2 | CL04AB00R♦ | 10 | CL04DB00R♦ | 10 |

Spare coils






| | | | | |
|---------------|--------|---|--------|---|
| CL00 - CL25 | LR1A ♦ | 5 | LR1D ♦ | 5 |
| CL03 - CL45 | LR3A ♦ | 5 | LR3D ♦ | 5 |
| CL05A - CL08A | LR4A ♦ | 5 | LR4D ♦ | 1 |

(1) To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit (see C.10).
(2) Multipack, see C.9



For reference numbers, see chapter X, pg. X.6



Auxiliary contact blocks

| Instantaneous | | Number of contacts | Contacts | | | | Type | Time | Cat. no. | Ref. no. | Pack |
|--|------------------|---|------------------|------------------|------------------|------------------|-----------|---------------|----------|----------|------|
| | | | .3 | .1 | .7 | .5 | | | | | |
| | | | .4 | .2 | .8 | .6 | | | | | |
|  | Frontal mounting | Terminal: screw | | | | | | | | | |
| | | 1 | 1 | 0 | 0 | 0 | | | BCLF10 | 104700 | 10 |
| | | 1 | 0 | 1 | 0 | 0 | | | BCLF01 | 104701 | 10 |
| | | 1 | 0 | 0 | 1 | 0 | | | BCLF10G | 104702 | 10 |
| | | 1 | 0 | 0 | 0 | 1 | | | BCLF01G | 104703 | 10 |
| | | Terminal: ring terminal | | | | | | | | | |
| 1 | 1 | 0 | 0 | 0 | | | BCRF10 | 108901 | 10 | | |
| 1 | 0 | 1 | 0 | 0 | | | BCRF01 | 108902 | 10 | | |
|  | Side mounting | Terminal: screw | | | | | | | | | |
| | | 2 | 2 | 0 | 0 | 0 | | | BCLL20 | 104706 | 10 |
| | | 2 | 1 | 1 | 0 | 0 | | | BCLL11 | 104707 | 10 |
| | | For combinations of more than 4 front-mounted and 2 side-mounted auxiliary contact blocks | | | | | | | | | |
| | | 2 | 2 | 0 | 0 | 0 | | | BRLL20 | 104704 | 10 |
| | | 2 | 1 | 1 | 0 | 0 | | | BRLL11 | 104705 | 10 |
| 2 | 0 | 2 | 0 | 0 | | | BRLL02 | 106622 | 10 | | |
| Pneumatic timer | | | | | | | | | | | |
|  | Front mounting | Terminal: screw | | | | | | | | | |
| | | 2 | 0 | 0 | 1 | 1 | Delay ON | 0.1 - 30 sec. | BTLF30C | 104709 | 10 |
| | | 2 | 0 | 0 | 1 | 1 | Delay ON | 1 - 60 sec. | BTLF60C | 104710 | 10 |
| | | 2 | 0 | 0 | 1 | 1 | Delay OFF | 0.1 - 30 sec. | BTLF30D | 104711 | 10 |
| | | 2 | 0 | 0 | 1 | 1 | Delay OFF | 1 - 60 sec. | BTLF60D | 104712 | 10 |
| | | Terminal: ring terminal | | | | | | | | | |
| | | 2 | 0 | 0 | 1 | 1 | Delay ON | 0.1 - 30 sec. | BTRF30C | 108903 | 10 |
| | | 2 | 0 | 0 | 1 | 1 | Delay ON | 1 - 60 sec. | BTRF60C | 108904 | 10 |
| | | 2 | 0 | 0 | 1 | 1 | Delay OFF | 0.1 - 30 sec. | BTRF30D | 108905 | 10 |
| | | 2 | 0 | 0 | 1 | 1 | Delay OFF | 1 - 60 sec. | BTRF60D | 108906 | 10 |
| Sealing cover protection for pneumatic timer | | | | | | | | BTLFX | 113001 | 5 | |

Accessories

| | | Number of contacts | Contacts | | | | For use with: | Cat. no. ⁽¹⁾ | Ref. no. | Pack | |
|---|-------------------------|----------------------------------|------------------|--------------------|--------------------|-------------------------|---------------|-------------------------|----------|------------|----|
| | | | .3 | .1 | .7 | .5 | | | | | |
| | | | .4 | .2 | .8 | .6 | | | | | |
|  | Interlock | Mechanical | | | | | | | | | |
| | | - | - | - | - | - | CL00 ... CL10 | BELA | 104723 | 5 | |
| | | Mech./ electrical | | | | | | | | | |
| | | 2 | 0 | 2 | - | - | CL00 ... CL10 | BELA02 | 104724 | 5 | |
| Support interlock | | | | | | | | | | | |
| Only for direct current contactors | | | | | | CL00D...CL10D | SBELA | 101017 | 5 | | |
|  | Mechanical latch blocks | Frontal mounted to the contactor | | | | | | | | | |
| | | | | | | | | CL00 ... CL10 | RMLF ♦ | see bottom | 10 |
| | | ♦ | D | G | HC | J | N | U | Y | | |
| 50Hz | 24, 32 | 42, 48 | | 110, 115, 120, 127 | 220, 230, 240 | 380, 400, 415, 440, 480 | 500, 660/690 | | | | |
| 60Hz | 24, 32 | 48, 60 | | 110, 115, 120, 127 | 208, 220, 240, 277 | 380, 400, 415, 440, 480 | 600 | | | | |
| DC | 24, 32, 36 | 42, 48 | 60, 72 | 110, 120, 125 | 220, 230, 240, 250 | 440 | | | | | |

1) To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit (see C.10).

For reference numbers, see chapter X, pg. X.6



Accessories

Transient voltage suppressor block



| For use with: | Type | Control circuit | Ue | Cat. no. | Ref. no. | Pack |
|---|----------|-----------------|---------------|---------------|----------|------|
| Fixation to the coil terminals, that allows simultaneous use with the auxiliary contact blocks. | | | | | | |
| CL00 ... CL45 | R/C | AC | 12V ... 48V | BSLR2G | 104713 | 10 |
| CL00 ... CL45 | R/C | AC | 50V ... 127V | BSLR2K | 104714 | 10 |
| CL00 ... CL45 | R/C | AC | 130V ... 250V | BSLR2R | 104715 | 10 |
| CL05A ... CL10A | R/C | AC | 12V ... 48V | BSLR3G | 104716 | 10 |
| CL05A ... CL10A | R/C | AC | 50V ... 127V | BSLR3K | 104717 | 10 |
| CL05A ... CL10A | R/C | AC | 130V ... 250V | BSLR3R | 104718 | 10 |
| CL ... D | Diode | DC | 12V ... 600V | BSLDZ | 104719 | 10 |
| CL00 ... CL10 | Varistor | AC / DC | 24V ... 48V | BSLV3G | 104720 | 10 |
| CL00 ... CL10 | Varistor | AC / DC | 50V ... 127V | BSLV3K | 104721 | 10 |
| CL00 ... CL10 | Varistor | AC / DC | 130V ... 250V | BSLV3R | 104722 | 10 |
| CL00 ... CL10 | Varistor | AC / DC | 277V ... 500V | BSLV3U | 110836 | 10 |

Electronic timer module



| For use with: | Control circ. | Type | Time | Cat. no. | Ref. no. | Pack |
|---|---------------|-----------|---------------|----------------|----------|------|
| Fixation to the coil terminals, that allows simultaneous use with the auxiliary contact blocks. | | | | | | |
| CL00 ... CL10 | 24-250V AC/DC | delay ON | 0.1 - 2 sec. | BETL02C | 113602 | 5 |
| CL00 ... CL10 | 24-250V AC/DC | delay ON | 1.5 - 45 sec. | BETL45C | 113603 | 5 |
| CL00 ... CL10 | 24-250V AC/DC | delay OFF | 0.1 - 2 sec. | BETL02D | 113604 | 5 |
| CL00 ... CL10 | 24-250V AC/DC | delay OFF | 1.5 - 45 sec. | BETL45D | 113605 | 5 |

Accessories

| | For use with: | | | Cat. no. | Ref. no. | Pack |
|-------------------------------|---------------|--|--|----------|----------|------|
| Identification | CL00 ... CL10 | Sheets of labels (sheets of 260 labels each) | | EAT 260 | 100548 | 1 |
| | CL00 ... CL10 | Labelling plate base (50 pieces in one pack) | | SPR | 100549 | 1 |
| Pole terminal protector IPXXB | CL03 ... CL04 | | | PTP04 | 113850 | 8 |
| | CL45 | | | PTP45 | 113851 | 6 |
| | CL05 ... CL08 | | | PTP08 | 113852 | 8 |
| | CL09 ... CL10 | | | PTP10 | 113853 | 8 |

Spares

| | For use with: | Number of sets | Type | | Cat. no. | Ref. no. | Pack |
|--------------|----------------|----------------|----------|--|----------|----------|------|
| Contact kits | CL00 | 3 | NO | | V31200B | 104738 | 1 |
| | CL01_3 /CL01_4 | 3 | NO | | V31201B | 104739 | 1 |
| | CL01_B | 4 | 2NO-2NC | | VB1201B | 104740 | 1 |
| | CL02_3 /CL02_4 | 3 | NO | | V31202B | 104741 | 1 |
| | CL02_B | 4 | 2NO-2NC | | VB1202B | 104742 | 1 |
| | CL25_3 | 3 | NO | | V31225B | 104757 | 1 |
| | CL03_3 /CL03_4 | 3 | NO | | V31203B | 104743 | 1 |
| | CL03_B | 4 | 2NAO-2NC | | VB1203B | 133170 | 1 |
| | CL04_3 /CL04_4 | 3 | NO | | V31204B | 104745 | 1 |
| | CL04_B | 4 | 2NO-2NC | | VB1204B | 133885 | 1 |
| | CL45_3 | 3 | NO | | V31245B | 104758 | 1 |
| | CL05_4 | 4 | NO | | V31205B | 104747 | 1 |
| | CL05_B | 4 | 2NO-2NC | | VB1205B | 104748 | 1 |
| | CL06 | 3 | NO | | V31206B | 104749 | 1 |
| | CL07_3 /CL07_4 | 3 | NO | | V31207B | 104750 | 1 |
| | CL07_B | 4 | 2NO-2NC | | VB1207B | 104751 | 1 |
| | CL08_3 /CL08_4 | 3 | NO | | V31208B | 104752 | 1 |
| | CL08_B | 4 | 2NO-2NC | | VB1208B | 104753 | 1 |
| | CL09 | 3 | NO | | V31209B | 104754 | 1 |
| | CL10 | 3 | NO | | V31210B | 104755 | 1 |

3P and 4P contactors

A

B

C

D

E

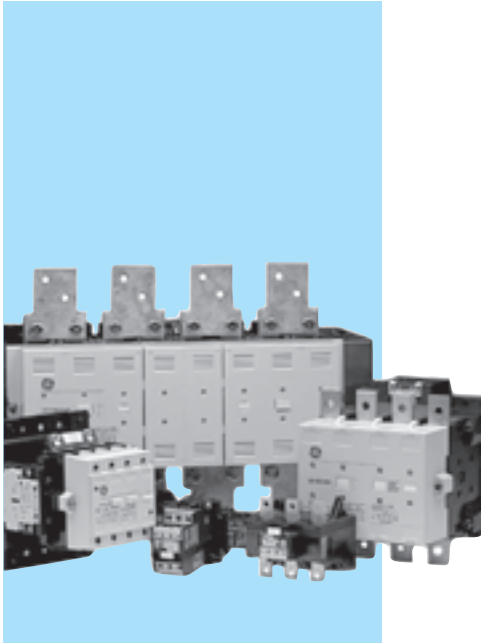
F

G

H

I

X



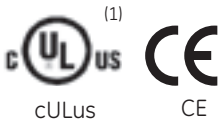
Three and four pole contactors 150 to 825A (AC3) 200 to 1250A (AC1)

- Control circuit: Alternating current up to 690V
Direct current up to 500V
- Degree of protection IP00 (IPxxB with accessories)
- CK07...CK13: auxiliary and coil terminals originally protected against accidental contacts.
Protection for power contacts on request (see accessories)
- Terminals protected against accidental contacts according to VDE 0106 T.100, VBG4.
- CK_ _E_with electronic module suitable for DC and AC. (50/60Hz)
- CK contactors always provided with one auxiliary contact block BCLL11 (1NO+1NC)

Standards

| | |
|------------------|----------------|
| IEC/EN 60947-1 | CSA 22.2/14 |
| IEC/EN 60947-4-1 | CENELEC HD 419 |
| IEC/EN 60947-5-1 | NFC 63-110 |
| EN 50005 | ASE 1025 |
| UL 508 | UNE 20109 |
| NEMA ICS 1 | VDE 0660/102 |
| BS 5424 & 775 | |

Approvals



Standard voltages

To complete the catalogue number, replace the symbol \blacklozenge by the code corresponding to the voltage and frequency of the control circuit.

Alternating current (V)

Three-pole contactors: CK75CA3..., CK08CA3..., CK85BA3...
Four-pole contactors: CK07BA4..., CK08BA4...

| \blacklozenge | C | D | F | G | H | I | J | K | M | N | R | S | T | U | V | W | X | Y | Z |
|-----------------|----|----|----|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 50Hz | 24 | 42 | 48 | | | | 110 | 127 | | 220 | 240 | | | 380 | | 415 | 440 | 500 | 660 |
| 60Hz | 24 | | 48 | | 110 | 120 | | | 220 | 277 | | 240 | 380 | 480 | 440 | | | | 600 |

Alternating current (V). Dual-frequency coil

Three-pole contactors: CK75CA3..., CK08CA3..., CK85BA3...
Four-pole contactors: CK07BA4..., CK08BA4...

| \blacklozenge | 1 | 2 | 3 | 6 | 13 |
|-----------------|----|----|-----|-----|-----|
| 50/60Hz | 24 | 48 | 110 | 230 | 400 |

Alternating current (V)

Three-pole contactors: CK13BA3...
Four-pole contactors: CK13BA4...

| \blacklozenge | J | N | U | Y | Z |
|-----------------|-----|-----|-----|-----|-----|
| 50/60Hz | 110 | 220 | 380 | 480 | 600 |
| | 240 | 440 | 500 | 660 | |

Control circuit with rectifier bridge

| \blacklozenge | J | N | U |
|-----------------|-----|-----|-----|
| 50Hz | 110 | 220 | 380 |
| | 230 | 400 | |
| 60Hz | 120 | 240 | 480 |

Direct current (V). With electronic module (0.7 ... 1.3 x Us)

Three-pole contactors: CK75CE3..., CK08CE3....

| \blacklozenge | WD | WE | WF | WH | WJ | WN |
|-----------------|----|----|----|----|-----|-----|
| Voltage | 24 | 33 | 48 | 72 | 110 | 220 |

Alternating c. / Direct c. (V). With electronic module (0.8 ... 1.10 x Us)

Three-pole & four-pole contactors: CK E.....

| \blacklozenge | D | F | J | N | U | Y |
|-----------------|----|----|-----|-----|-----|-----|
| Voltage | 24 | 42 | 110 | 220 | 380 | 440 |
| | 28 | 48 | 127 | 250 | 415 | 500 |

(1) CK13 not UL

- Order codes ● pg. C.19
- Aux. contact blocks ● pg. C.20
- Accessories & Spares ● pg. C.21
- Technical data ● pg. C.42
- Dimensions ● pg. C.58



Three pole contactors



| Max.oper.current | | Admissible power AC3 | | | | | Electrical endurance | Control circuit: Alternating current | | Control circuit: A.C. / D.C. | |
|---------------------|---------------------------|----------------------|------------|------------|------------|------------|-------------------------|--------------------------------------|---------------------|------------------------------|------|
| Non-inductive loads | Motors <440V, 3 ~ 50/60Hz | 220V 230V | 380V 400V | 415V 440V | 440V 440V | 500V | | Cat. no. (1) | Pack | Cat. no. (1) | Pack |
| AC1 A | AC3 A | kW HP | kW HP | kW HP | kW HP | kW HP | Cat. AC3 Operations | Ref. no. see bottom | Ref. no. see bottom | | |
| 250 | 150 | 45 60 | 75 100 | 80 108 | 80 108 | 100 135 | 1.7x10 ⁶ | CK75CA311 ♦ | 1 | CK75CE311 ♦ | 1 |
| 250 | 185 | 55 75 | 90 125 | 100 135 | 100 135 | 110 150 | 1.2x10 ⁶ | CK08CA311 ♦ | 1 | CK08CE311 ♦ | 1 |
| 315 | 205 | 65 88 | 110 150 | 125 170 | 125 170 | 132 180 | 1.7x10 ⁶ | CK85BA311 ♦ | 1 | CK85BE311 ♦ | 1 |
| 315 | 250 | 75 100 | 132 180 | 132 180 | 132 180 | 160 220 | 1.5x10 ⁶ | | | CK09BE311 ♦ | 1 |
| 450 | 309 | 90 125 | 160 220 | 160 220 | 185 250 | 200 270 | 1.1x10 ⁶ | | | CK95BE311 ♦ | 1 |
| 600 | 420 | 125 170 | 220 300 | 230 312 | 230 312 | 300 405 | 1x10 ⁶ | | | CK10CE311 ♦ | 1 |
| 700 | 550 | 160 220 | 280 380 | 315 425 | 315 425 | 400 540 | 0.8x10 ⁶ | | | CK11CE311 ♦ | 1 |
| 1000 | 700 | 220 300 | 375 510 | 400 540 | 425 540 | 480 650 | 0.7x10 ⁶ | | | CK12BE311 ♦ | 1 |
| 1250 | 825 | 250 340 | 450 610 | 450 610 | 450 610 | 500 680 | 0.7x10 ⁶ (2) | CK13BA311 ♦ | 1 | | |

Spare coil

| | | | |
|-------------------|--|----------|---|
| | CK75CA3 ... CK08CA3 | C12168 ♦ | 1 |
| | CK85BA3 | C04255 ♦ | 1 |
| | CK13BA3 | C08998 ♦ | 1 |
| | Control circuit with incorporated rectifier bridge CK13BA3 | C09120 ♦ | 1 |
| Coil | CK75CE3 ... CK08CE3 | KB4E ♦ | 1 |
| | CK85BE3 ... CK95BE3 | KB5E ♦ | 1 |
| | CK12BE3 | KB6E ♦ | 1 |
| | CK10CE3 ... CK11CE3 | KB7E ♦ | 1 |
| Electronic module | CK75CE3 ... CK08CE3 | KM4E ♦ | 1 |
| | CK85BE3 ... CK95BE3 | KM5E ♦ | 1 |
| | CK12BE3 | KM6E ♦ | 1 |
| | CK10CE3 ... CK11CE3 | KM7E ♦ | 1 |

- (1) To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit (see C.18).
 (2) CK13 non allow the aux. block in right side.

3P and 4P contactors

A

B

C

D

E

F

G

H

I

X

For reference numbers, see chapter X, pg. X.7



Four pole contactors



| Max.oper. current | Admissible power | | | | | | Electrical endurance | Control circuit: Alternating current | | Control circuit: A.C. / D.C. | | |
|---------------------------|------------------|-----|-----------|-----------|------|-----------|----------------------|--------------------------------------|-------------------------|------------------------------|-------------------------|------|
| | AC3 | | AC1 | | | | | Cat. AC3 | Cat. no. ⁽¹⁾ | Pack | Cat. no. ⁽¹⁾ | Pack |
| Non-inductive loads AC1 A | 380V 400V | | 220V 230V | 380V 400V | 415V | 440V 500V | Operations | Ref. no. see bottom | | Ref. no. see bottom | | |
| 200 | 55 | 105 | 76 | 131 | 143 | 151 | 173 | 1x10 ⁶ | CK07BA41 ♦ | 1 | CK07BE411 ♦ | 1 |
| 325 | 100 | 185 | 123 | 214 | 233 | 247 | 281 | 0.6x10 ⁶ | CK08BA411 ♦ | 1 | CK08BE411 ♦ | 1 |
| 400 | 132 | 250 | 152 | 263 | 287 | 304 | 346 | 0.6x10 ⁶ | | | CK09BE411 ♦ | 1 |
| 500 | 160 | 309 | 191 | 329 | 359 | 380 | 415 | 0.6x10 ⁶ | | | CK95BE411 ♦ | 1 |
| 600 | 220 | 408 | 228 | 395 | 431 | 456 | 519 | 0.5x10 ⁶ | | | CK10CE411 ♦ | 1 |
| 700 | 280 | 530 | 266 | 460 | 503 | 533 | 606 | 0.4x10 ⁶ | | | CK11CE411 ♦ | 1 |
| 1000 | 375 | 680 | 381 | 658 | 719 | 762 | 866 | 0.4x10 ⁶ | | | CK12BE411 ♦ | 1 |
| 1250 | 450 | 800 | 476 | 822 | 898 | 952 | 1082 | 0.6x10 ⁶ (2) | CK13BA411 ♦ | 1 | | |

Spare coil

| | | | | |
|-------------------|--|----------|---|----------|
| | CK07BA4 | C04255 ♦ | 1 | |
| | CK08BA4 | C04787 ♦ | 1 | |
| | CK13BA4 | C08998 ♦ | 1 | |
| | Control circuit with incorporated rectifier bridge CK13BA4 | C09120 ♦ | 1 | |
| Coil | CK07BE4 | | | KB5E ♦ 1 |
| | CK08BE4 ... CK95BE4, CK12BE4 | | | KB6E ♦ 1 |
| | CK10CE4 ... CK11CE4 | | | KB7E ♦ 1 |
| Electronic module | CK07BE4 | | | KM5E ♦ 1 |
| | CK08BE4 ... CK95BE4, CK12BE4 | | | KM6E ♦ 1 |
| | CK10CE4 ... CK11CE4 | | | KM7E ♦ 1 |

(1) To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit (see C.18).
 (2) CK13 non allow the aux. block in right side.

Auxiliary instantaneous contact block





Side mounting

| Number of contacts | Contacts | | | | Cat. no. | Ref. no. | Pack |
|------------------------------------|---------------|---------------|---------------|---------------|----------|----------|------|
| | •3 •4 | •1 •2 | •7 •8 | •5 •6 | | | |
| 2 | 2 | 0 | 0 | 0 | BCLL20 | 104706 | 10 |
| 2 | 1 | 1 | 0 | 0 | BCLL11 | 104707 | 10 |
| combinations of more than 2 blocks | | | | | | | |
| 2 | 2 | 0 | 0 | 0 | BRLL20 | 104704 | 10 |
| 2 | 1 | 1 | 0 | 0 | BRLL11 | 104705 | 10 |
| 2 | 0 | 2 | 0 | 0 | BRLL02 | 106622 | 10 |


For reference numbers, see chapter X, pg. X.9

Accessories

| | For use with: | Mounting | Voltage | Ue | Cat. no. | Ref. no. | Pack | |
|--|--|-----------------|---------------|-------------|-------------------|-------------|------------------|---|
|  <p>Transient voltage suppressor</p> | Fixation to the coil terminals, that allows simultaneous use with the auxiliary contact blocks. | | | | | | | |
| | CK75 ... CK08 | | AC | 24V - 48V | BSLR3G | 104716 | 10 | |
| | CK75 ... CK08 | | AC | 50V - 127V | BSLR3K | 104717 | 10 | |
| | CK75 ... CK08 | | AC | 130V - 240V | BSLR3R | 104718 | 10 | |
| | CK75 ... CK08 | | AC | 227V - 500V | BSLV3U | 110836 | 10 | |
| | CK85 ... CK13 | | AC | 24V | KRC24 | 104760 | 10 | |
| | CK85 ... CK13 | | AC | 260V | KRC48/260 | 104761 | 10 | |
| | CK85 ... CK13 | | AC | 415V | KRC380/415 | 104762 | 10 | |
| | <hr/> | | | | | | | |
| |  <p>Mechanical interlock</p> | CK07B ... CK12 | Horizontal | | | BEKH | 104763 | 1 |
| CK07B ... CK95 | | Vertical | | | BEKVS 1 | 104786 | 1 | |
| CK10C ... CK12B | | Vertical | | | BEKVA 1 | 104785 | 1 | |
| CK13 | | Vertical | | | BEKV | 104764 | 1 | |
| <hr/> | | | | | | | | |
| <p>Pole terminal protection</p> | CK75C ... CK08C | 1 pole. VDE0106 | | | CM1CA5F | 105200 | 1 | |
| | CK85B ... CK12B | 1 pole. VDE0106 | Contactors 3P | | C09476 | 104766 | 6 | |
| | CK08B ... CK12B | 1 pole. VDE0106 | Contactors 4P | | C09479 | 204800 | 8 | |
| | CK75C ... CK08C | 1 pole IPXXB | | | PTPCK75 | 103747 | 1 ⁽¹⁾ | |
| | CK85B ... CK95B | 1 pole IPXXB | | | PTPCK95 | 103748 | 3 ⁽²⁾ | |
| | CK10C ... CK12B | 1 pole IPXXB | | | PTPCK11 | 103749 | 1 ⁽¹⁾ | |
| | <hr/> | | | | | | | |

(1) One phase
(2) Three pole

Spares

| | For use with: | Type | | Cat. no. | Ref. no. | Pack | | |
|--|--|------|---------------|----------------|----------|------|--|--|
|  <p>Contact kits</p> | One set consists of two fixed contacts, one moving contact and accessory parts. When contact replacement is needed, it is recommended to replace all the contacts at the same time. | | | | | | | |
| | CK07B | NA | | V1107BA | 113612 | 1 | | |
| | CK75C | NA | | V1175CA | 113613 | 1 | | |
| | CK08C | NA | | V1108CA | 113614 | 1 | | |
| | CK08B | NA | Contactors 4P | V1108BA | 113505 | 1 | | |
| | CK85B | NA | | V1185BA | 113615 | 1 | | |
| | CK09B | NA | | V1109BA | 113616 | 1 | | |
| | CK09B | NA | Contactors 4P | V1109BA | 113899 | 1 | | |
| | CK95B | NA | | V1195BA | 113617 | 1 | | |
| | CK10C | NA | | V1110CE | 113618 | 1 | | |
| | CK11C | NA | | V1111CE | 113619 | 1 | | |
| | CK12B | NA | | V1112BA | 113620 | 1 | | |
| | CK13B | NA | | V1113BA | 113621 | 1 | | |
| | <hr/> | | | | | | | |

3P and 4P contactors

A

B

C

D

E

F

G

H

I

X

Series M

Notes

Grid area for notes.

Contactors

A

B

C

D

E

F

G

H

I

X



Technical data

General

| | | MC0... | MC1... | MC2... |
|--|-----|--------|--------|--------|
| Rated thermal current $I_{th} \theta \leq 60^{\circ C^{(1)}}$ | (A) | 20 | 20 | 20 |
| Rated operational current $I_e^{(2)}$ (3 x 440V, 50/60Hz, AC-3) | (A) | 6 | 9 | 12 |
| Maximum number of poles | | 4 | 4 | 4 |
| Rated insulation current U_i | (V) | 750 | 750 | 750 |
| Rated operational current U_e | (V) | 690 | 690 | 690 |

- (1) Insulated terminal type B 2.8 x 0.8 with wire 1 mm²:
 $I_e = 8A$, design DIN 46 247
 (2) Max.operational current AC3, 3 -phases $\leq 440V$,
 according to IEC 947-4-1

Conformity to standards

| | | |
|------------------|----------------|------------|
| IEC/EN 60947-1 | CSA C22.2/14 | SEV 10254 |
| IEC/EN 60947-4-1 | CENELEC HD 419 | JIS C8325 |
| IEC/EN 60947-5-1 | VDE 0660 | JEM 1038 |
| EN 50003 | NFC 63110 | NEMA ICS-1 |
| EN 50005 | BS 4794 | UL 508 |
| EN 50012 | | |

Approvals

| | | |
|------------------|----------------|-------|
| cULus | NEMKO | SEMKO |
| SETI | DEMKO | RINA |
| IMQ | | |
| Lloyd's Register | Bureau Veritas | CE |

Ambient conditions

| | | |
|-----------------------|-----------------------|---------------------|
| Storage temperature | -55°C to +80°C | |
| Operation temperature | -40°C to +60°C | |
| Altitude | up to 3000m | Nominal values |
| | from 3000 up to 4000m | 90% I_e 80% U_e |
| | from 4000 up to 5000m | 80% I_e 75% U_e |

Climatic resistance

| | | |
|--------------------------------|-------------------|--------|
| Continuous tests 40 / 125 / 56 | | |
| Cold (72h) | Temperature | -40°C |
| | Relative humidity | < 50% |
| Dry heat (96h) | Temperature | +125°C |
| | Relative humidity | < 50% |
| Humid heat (56h) | Temperature | +40°C |
| | Relative humidity | 95% |
| Cyclic tests | | |
| First half-cycle (12h) | Low temperature | +25°C |
| | Relative humidity | 93% |
| Second half-cycle (12h) | Low temperature | +55°C |
| | Relative humidity | 95% |
| Number of consecutive cycles | 6 | |

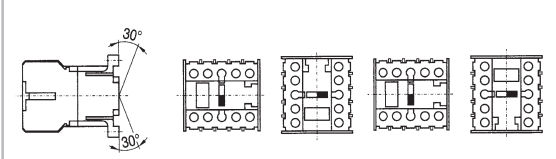
Shock resistance (IEC 68-2-27)

| | |
|----------------------------------|-------|
| Continuously closed (at 0.8Us) | |
| Admissible acceleration | 25 g |
| Impulse duration | 11 ms |
| Continuously opened (no voltage) | |
| Admissible acceleration | 20 g |
| Impulse duration | 11 ms |

Vibration resistance (IEC 68-2-6)

| | |
|----------------------------------|--------------------|
| Continuously closed (at 0.8Us) | |
| Admissible acceleration | 15 g |
| Sweep between | 10 - 200 Hz |
| Continuously opened (no voltage) | |
| Admissible acceleration | 5g (AC) - 35g (DC) |
| Sweep between | 10 - 200 Hz |

Mounting positions

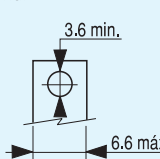


With the same pick-up and drop-out voltage
 With the same rated power

-7% of connection voltage
 +4% of disconnection voltage
 With the same rated power

7% of connection voltage
 +4% of disconnection voltage
 With the same rated power

Terminal capacity

| | | |
|--|-----------------|--------------------|
| Terminal with M3.5 screw (with pozidrive head and safety flange) | | Tightening torque |
| Solid wire | mm ² | 0.75 to 2 x 2 w. |
| Flexible wire without terminal | mm ² | 0.75 to 2.5 x 2 w. |
| Flexible wire without terminal with cap | mm ² | 0.75 to 2.5 x 1 w. |
| Ring terminal | mm ² | 0.75 to 1 x 2 w. |
| Ring terminal | | 0.8 Nm - 7 Lb/in |
|  | | |
| Faston terminal 2.8 - 2 insulated terminals | mm ² | 1 x 2 w. |
| Terminal for printed circuit (Ø of PCB hole) | | 1.8 mm |
| Ring terminal cap | | 7.8 mm |
| Fork terminal cap | | 6.5 mm |

Control circuit

| | | MC_A... | MC_C... | MC_I... | MC_K... | MC_C...W |
|--|----------------------|---------------|--------------|--------------|---------------|--------------|
| Rated insulation voltage (Ui) | (V) | 750 | 750 | 750 | 750 | 750 |
| Standard voltages (Us) | | | | | | |
| 50Hz(V) | | 24 ... 690 | - | - | - | - |
| 60Hz(V) | | 6 ... 600 | - | - | - | - |
| DC | (V) | - | 6 ... 440 | 24 | 24 | 12 ... 440 |
| Operating voltages limits | | | | | | |
| Operating ⁽¹⁾ | xUs | 0.8 ... 1.1 | 0.8 ... 1.1 | 0.8 ... 1.25 | 0.7 ... 1.25 | 0.7 ... 1.3 |
| Drop-out | xUs | 0.35 ... 0.55 | 0.15 ... 0.4 | 0.15 ... 0.3 | 0.15 ... 0.35 | 0.15 ... 0.3 |
| Operating voltages limits with coil 50/60 Hz | | | | | | |
| Operating | xUs | 0.8 ... 1.1 | - | - | - | - |
| Drop-out | xUs | 0.35 ... 0.55 | - | - | - | - |
| Consumption | | | | | | |
| 50 or 60Hz - monofrequency coil | | | | | | |
| Pick-up | (VA) | 26 | - | - | - | - |
| Seal | (VA) | 4 | - | - | - | - |
| 50/60Hz - bifrequency coil | | | | | | |
| Pick-up | (VA) | 32 | - | - | - | - |
| Seal | (VA) | 6 | - | - | - | - |
| DC | (W) | - | 3 | 1.2 | 2 | 4 |
| Power factor | | | | | | |
| Magnetic circuit open | (cos φ) | 0.8 | - | - | - | - |
| Magnetic circuit closed | (cos φ) | 0.35 | - | - | - | - |
| Power dissipation | (W) | 1.4 | 3 | 1.2 | 2 | 4 |
| Opening and closing times | | | | | | |
| Values between ± %Us | | | | | | |
| Time on energisation NO | (ms) | 6 ... 13 | 22 ... 36 | 30 ... 70 | 20 ... 50 | 17 ... 28 |
| Time on de-energisation NC | (ms) | 8 ... 16 | 9 ... 12 | 9 ... 16 | 9 ... 16 | 9 ... 12 |
| Time on energisation NC | (ms) | 5 ... 11 | 18 ... 27 | 20 ... 45 | 18 ... 35 | 12 ... 25 |
| Time on de-energisation NO | (ms) | 6 ... 13 | 5 ... 7 | 5 ... 9 | 5 ... 9 | 5 ... 7 |
| Values at Us | | | | | | |
| Time on excitation NO | (ms) | 7 ... 12 | 24 ... 27 | 25 ... 45 | 25 ... 40 | 11 ... 23 |
| Time on desexcitation NC | (ms) | 8 ... 16 | 9 ... 11 | 9 ... 16 | 9 ... 16 | 9 ... 11 |
| Time on excitation NC | (ms) | 6 ... 10 | 20 ... 26 | 25 ... 35 | 20 ... 30 | 15 ... 21 |
| Time on desexcitation NO | (ms) | 6 ... 13 | 5 ... 8 | 5 ... 9 | 5 ... 8 | 5 ... 8 |
| Maximum time without voltage | (ms) | 3 | 3 | 3 | 3 | 3 |
| Mechanical endurance | | | | | | |
| Monofrequency coil | 10 ⁶ ops. | >15 | - | - | - | - |
| Bifrequency coil | 10 ⁶ ops. | >10 | - | - | - | - |
| DC | 10 ⁶ ops. | - | 10 | 10 | 10 | 10 |
| Maximum rate | | | | | | |
| No load | Monofrequency coil | ops./h | 9000 | - | - | - |
| | Bifrequency coil | ops./h | 3600 | - | - | - |
| | DC | ops./h | - | 9000 | 9000 | 9000 |
| AC1 and AC3 (at rated power) | | ops./h | 1200 | 1200 | 1200 | 1200 |
| AC4 (at rated power) | | ops./h | 300 | 300 | 300 | 300 |

Contactors

A

B

C

D

E

F

G

H

I

X



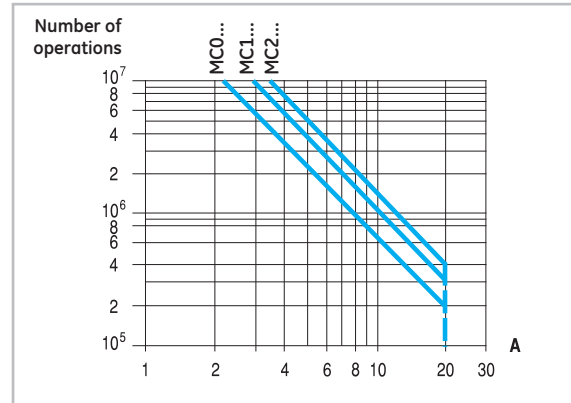
Main circuit (poles)

| | | MC 0... | MC1... | MC2... |
|---|------|---------|--------|--------|
| Rated insulation voltage (Ui) (acc. IEC 947-4) | (V) | 750 | 750 | 750 |
| Rated thermal current (Ith) $\theta \leq 60^\circ$ (1) | (A) | 20 | 20 | 20 |
| Frequency limits | (Hz) | 0..400 | 0..400 | 0..400 |
| Making capacity (r.m.s.) $U_e \leq 690V$ 50/60Hz | (A) | 160 | 160 | 160 |
| Breaking capacity (r.m.s.) $U_e \leq 440V$ | (A) | 106 | 106 | 106 |
| $U_e = 500V$ | (A) | 90 | 90 | 90 |
| $U_e = 690V$ | (A) | 80 | 80 | 90 |
| Short-time current | | | | |
| 0.3 sec. | (A) | 470 | 470 | 470 |
| 1 sec. | (A) | 250 | 250 | 250 |
| 5 sec. | (A) | 125 | 125 | 125 |
| 10 sec. | (A) | 95 | 95 | 95 |
| 30 sec. | (A) | 70 | 70 | 70 |
| 1 min. | (A) | 50 | 50 | 50 |
| 3 min. | (A) | 40 | 40 | 40 |
| Recovery time | min. | 10 | 10 | 10 |
| Protec. against short-circuits (IEC 947-4). w/o TOR | | | | |
| Coordination type "1" gL/gG | (A) | 32 | 32 | 32 |
| Coordination type "2" gL/gG | (A) | 16 | 20 | 20 |
| w/o welding contacts gL/gG | (A) | 12 | 16 | 16 |
| Circuit breaker rating (curve G CEE 19.1) | | 16 | 20 | 20 |
| Impedance per pole | (mΩ) | 1.5 | 1.5 | 1.5 |
| Power dissipation per pole | | | | |
| AC1 | (W) | 0.6 | 0.6 | 0.6 |
| AC3 | (W) | 0.06 | 0.128 | 0.228 |
| Insulation resistance | | | | |
| Between adjacent poles | (mΩ) | > 10 | > 10 | > 10 |
| Between pole and earth | (mΩ) | > 10 | > 10 | > 10 |
| Between input and output | (mΩ) | > 10 | > 10 | > 10 |
| Guaranteed no overlap between NO and NC contacts | | | | |
| Space | (mm) | 1 | 1 | 1 |
| Time | (ms) | > 2 | > 2 | > 2 |

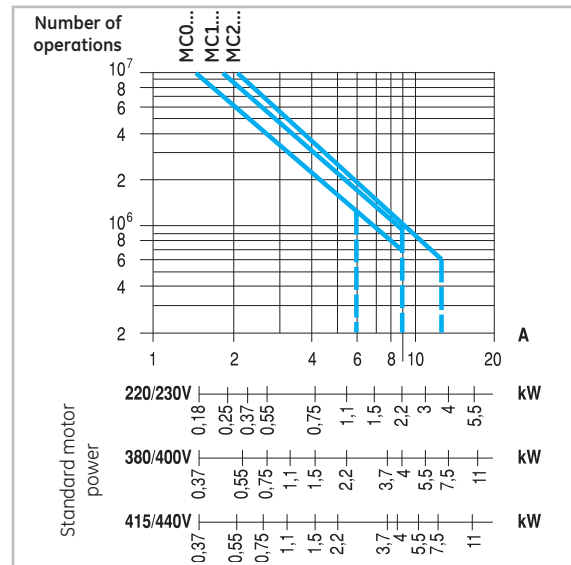
(1) Insulated terminal type B 2.8 x 0.8 with wire 1 mm² I_e = 8A acc. to DIN 46247

Electrical endurance

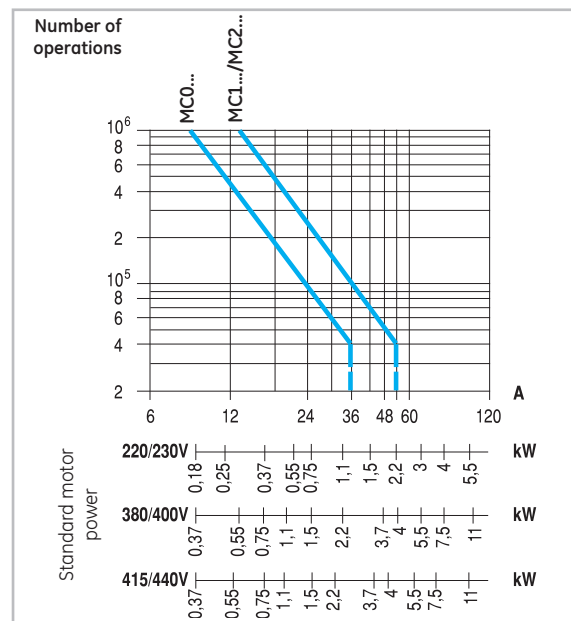
Category AC1



Category AC3



Category AC4



3P and 4P minicontactors

A

B

C

D

E

F

G

H

I

X

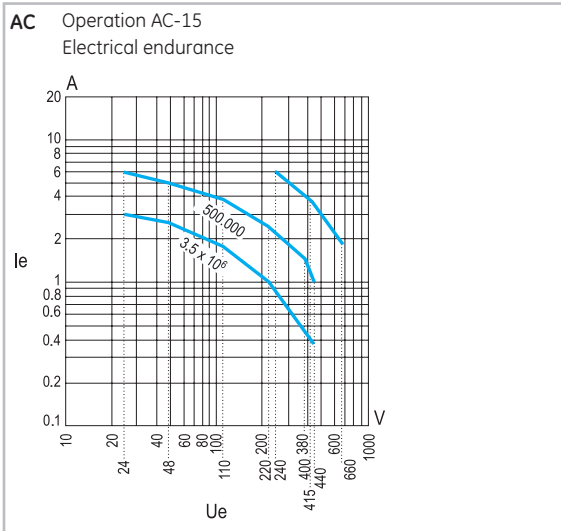


Internal auxiliary contacts

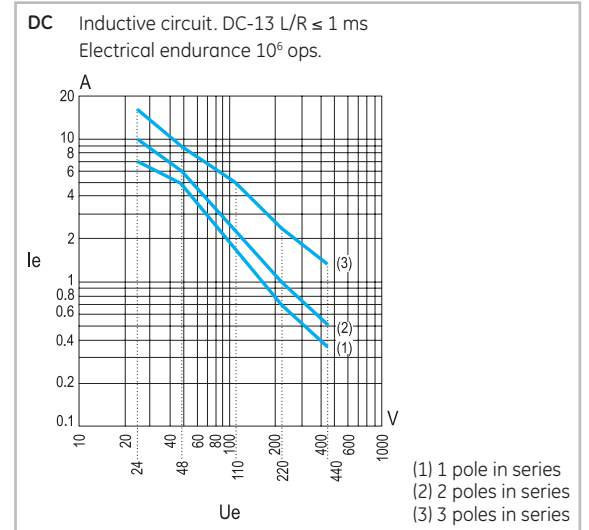
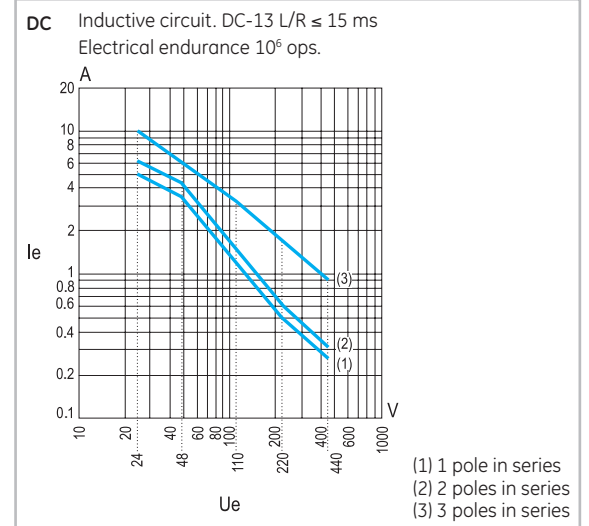
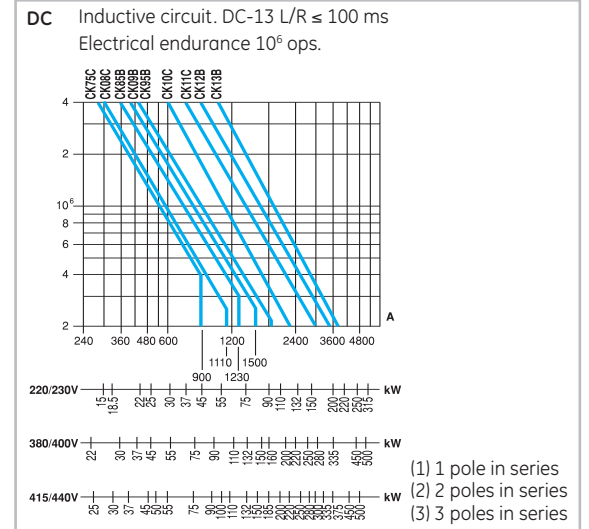
| | MC0 / MC1 / MC2 |
|--|----------------------|
| Rated insulation voltage (Ui) IEC 60947-5 | (V) 750 |
| Rated thermal current (Ith) $\theta \leq 60^{\circ}\text{C}$ (1) | (A) 16 |
| Making capacity according with IEC 60947-5-1 | |
| Ue \leq 690 50-60 Hz | (A) 160 |
| Ue \leq 440V DC | (A) 160 |
| Breaking capacity (r.m.s.) IEC 60947-5-1 | |
| AC-15 | |
| Ue \leq 440V / 50-60 Hz | (A) 106 |
| DC-13 | |
| Ue \leq 110V DC | (A) 3 |
| Ue = 220V DC | (A) 1.2 |
| Ue = 48V DC | (A) 10 |
| Minimum operational power (operational safety.) | 5mA, 17V |
| Short-circuit protection (max.class gI fuse) w/o welding | (A) 10 |
| Insulation resistance | |
| Between adjacent contacts | (m Ω) > 10 |
| Between contacts and earth | (m Ω) > 10 |
| Between input and output | (m Ω) > 10 |
| Guaranteed no overlap between NO and NC contacts | |
| Space | (mm) 0.5 |
| Minimal time | (ms) > 2 |
| Impedance | (m Ω) 2.3 |
| Terminal capacity | Same as main circuit |

(1) Insulated terminal type B 2.8 x 0.8 with wire 1 mm² Ie = 8A acc. with DIN 46247

Tripping characteristics (AC)



Tripping characteristics (DC)

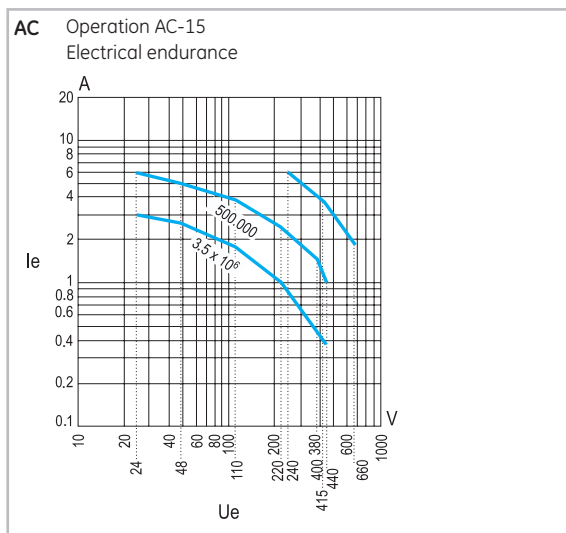


Instantaneous auxiliary contact blocks

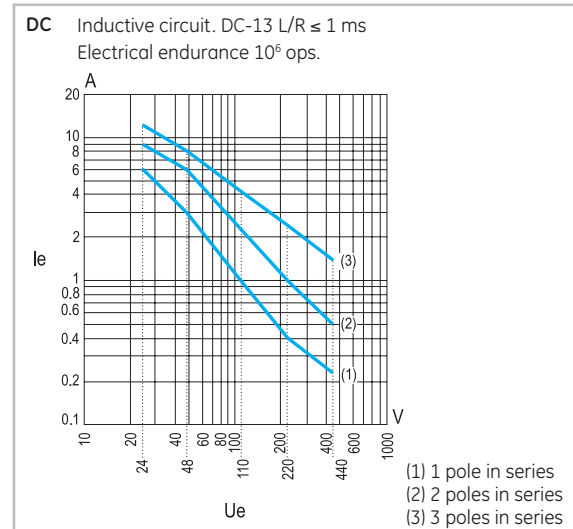
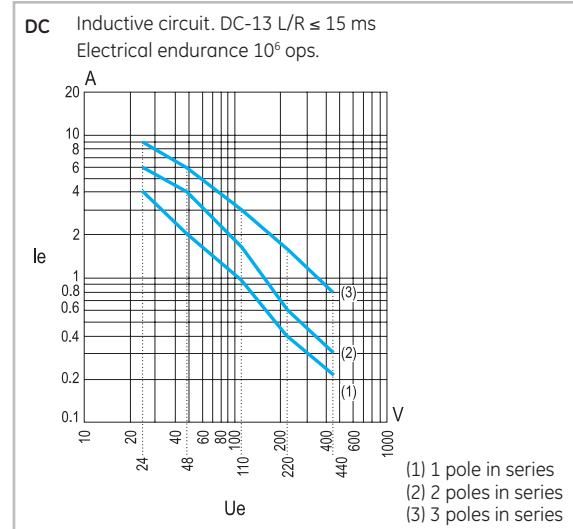
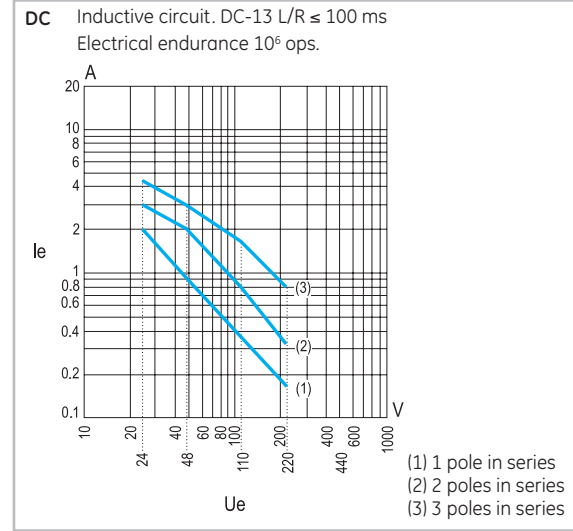
| | | MACN..., MACL... |
|---|-------------------------|----------------------|
| Rated insulation voltage (Ui) acc. IEC 60947-1 | (V) | 750 |
| Rated thermal current (Ith) $\theta \leq 60^\circ\text{C}$ ⁽¹⁾ | (A) | 10 |
| Making capacity (r.m.s.) according with IEC/EN 60947-5-1 | | |
| AC-15 | Ue \leq 220V 50/60 Hz | (A) 73 |
| | Ue = 380V 50/60 Hz | (A) 38 |
| | Ue = 690V 50/60 Hz | (A) 22 |
| DC-13 | Ue \leq 100V DC | (A) 2.6 |
| | L/R=100ms Ue = 220V DC | (A) 1 |
| | Ue = 440V DC | (A) 0.6 |
| Breaking capacity (r.m.s.) acc. IEC/EN 60947-5-1 | | |
| AC-15 | Ue \leq 220V 50/60 Hz | (A) 73 |
| | Ue = 380V 50/60 Hz | (A) 38 |
| | Ue = 690V 50/60 Hz | (A) 22 |
| DC-13 | Ue \leq 100V DC | (A) 2 |
| | LR=100ms Ue = 220V DC | (A) 0,8 |
| | Ue = 440V DC | (A) 0.4 |
| Rated voltage and rated current Ue-le | | |
| AC-15 | according to IEC 60947 | 120V - 6A |
| | | 230V - 6A |
| | | 400V - 4A |
| | | 500V - 1A |
| | | 600V - 1A |
| | | according to UL, CSA |
| DC-13 | according to IEC 60947 | 24V - 4A |
| | | 48V - 2A |
| | | 110V - 0.7A |
| | | 220V - 0.3A |
| | | 440V - 0.1A |
| | | according to UL, CSA |
| Minimum operational power (operational safety) | (A) | 5 mA, 17V |
| Short-circuit protection (max. class gI fuse) w/o welding | (A) | 10 |
| Insulation resistance | | |
| Between adjacent contacts | (m Ω) | > 10 |
| Between contacts an earth | (m Ω) | > 10 |
| Between input and output | (m Ω) | > 10 |
| Guaranteed no overlap between NO and NC contacts | | |
| Space | (mm) | 0,5 |
| Minimal time | (ms) | > 2 |
| Impedance | (m Ω) | 2.4 |
| Terminal capacity | | Same as main circuit |

(1) Insulated terminal type B 2.8 x 0.8 with wire 1 mm² Ie = 8A acc. with DIN 46247

Tripping characteristics (AC)



Tripping characteristics (DC)



3P and 4P minicontactors

A

B

C

D

E

F

G

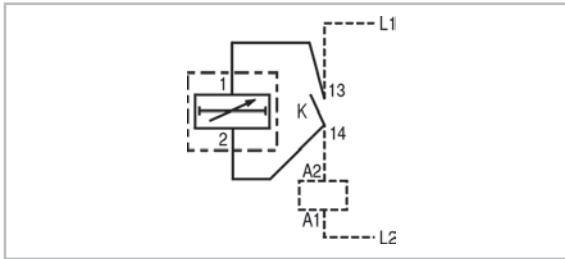
H

I

X

Electronic timer block




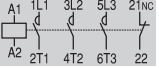
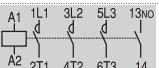

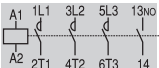
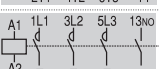
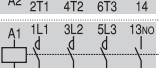

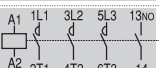
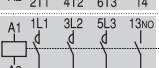
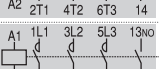
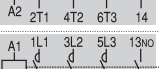

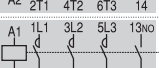
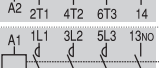

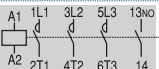

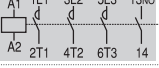
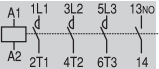
| | | MREBC... |
|--|------|---|
| Rated insulation voltage (Ui) | (V) | 750 |
| Rated thermal current (Ith) $\theta \leq 60^{\circ}\text{C}$ (1) | (V) | 0.55 |
| Supply voltage (AC and DC) | (V) | 24 to 250 |
| Operating limits | | 0.80 to 1.1 Us (0.85 to 1.1 Us to 12V) |
| Voltage drop | (V) | < 3 |
| Maximum load current at : | | |
| 20°C | (A) | 0.9 |
| 40°C | (A) | 0.72 |
| 60°C | (A) | 0.55 |
| Minimum load for safe operation | (A) | > 10 |
| Maximum current | (A) | 10A per 40 ms |
| Leakage current at 220V | (mA) | < 5 |
| Operational current | | |
| AC-15 | (A) | 0.7 |
| DC-13 | (A) | 0.9 |
| Timing range (delay ON) | (s) | 0.5 to 60 (± 6 s) |
| Rearrangement time | (ms) | < 100 |
| Repeatability (accuracy) (%) | | ± 1 |
| Ambient temperature | | |
| storage | (°C) | -55 to +80 |
| operation | (°C) | -5 to +60 |
| Degree of protection | | IP20 |
| Mounting positions | | Any |
| Terminals : 2 free cables | | 1 mm ² (AWG 17) 250 mm |



Contact sequence

| | Main contact (NO) | Main contact (NC) | Auxiliary contact (NO) | Auxiliary contact (NC) |
|---------------------------------|-------------------|-------------------|------------------------|------------------------|
| Three-pole minicontactor | | | | |
| MC...310... | 0 2 3.5 | | 0 2.3 3.5 | |
| MC...301... | 0 2 3.5 | | | 0 1.2 3.5 |
| Four-pole minicontactor | | | | |
| MC...400... | 0 2 3.5 | | | |
| MC...B00... | 0 2 3.5 | 0 1.2 3.5 | | |
| MC...A00... | | 0 1.2 3.5 | | |
| Auxiliary contact block | | | | |
| MAC... | | | 0 2.1 3.5 | 0 1 3.5 |
| MAR... | | | 0 2.1 3.5 | 0 1 3.5 |

Terminal numbering in accordance with EN 50012

| Final structure of the contactor | Auxiliary contactors | | Possible basic contactors + Auxiliary contact blocks to be added | |
|---|---|---|--|--------------------------------------|
| | Combination |   | | |
| | Description | | | |
| Without auxiliary contact blocks | | | | |
|  |  | <div style="border: 1px solid black; padding: 2px;">01E</div> 0 1 | MC_A301A... | |
| |  | <div style="border: 1px solid black; padding: 2px;">10E</div> 1 0 | MC_A310A... | |
| Auxiliary contact blocks front mounted with two or four contacts | | | | |
|  |  | <div style="border: 1px solid black; padding: 2px;">11E</div> 1 1 | MC_A310A... + MACN211A | |
| |  | <div style="border: 1px solid black; padding: 2px;">21E</div> 2 1 | MC_A310A... + MACN211A | |
| |  | <div style="border: 1px solid black; padding: 2px;">12E</div> 1 2 | MC_A310A... + MACN202A | |
| |  |  | <div style="border: 1px solid black; padding: 2px;">31E</div> 3 1 | MC_A310A... + MACN431A |
| | |  | <div style="border: 1px solid black; padding: 2px;">41E</div> 4 1 | MC_A310A... + MACN431A |
| | |  | <div style="border: 1px solid black; padding: 2px;">22E</div> 2 2 | MC_A310A... + MACN422A |
| | |  | <div style="border: 1px solid black; padding: 2px;">32E</div> 3 2 | MC_A310A... + MACN422A |
| |  |  | <div style="border: 1px solid black; padding: 2px;">13E</div> 1 3 | MC_A310A... + MACN413A |
|  | | <div style="border: 1px solid black; padding: 2px;">23E</div> 2 3 | MC_A310A... + MACN413A | |
| Auxiliary contact blocks lateral mounted with one contact | | | | |
|  |  | <div style="border: 1px solid black; padding: 2px;">11E</div> 1 1 | MC_A310A... + MACL101A | |
| |  |  | <div style="border: 1px solid black; padding: 2px;">21E</div> 2 1 | MC_A310A... + MACL101A + MACL110A |
| | |  | <div style="border: 1px solid black; padding: 2px;">12E</div> 1 2 | MC_A310A... + MACL101A + MACL101A |

3P and 4P minicontactors

A

B

C

D

E

F

G

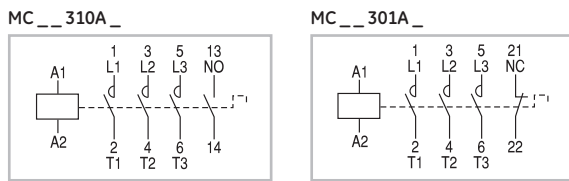
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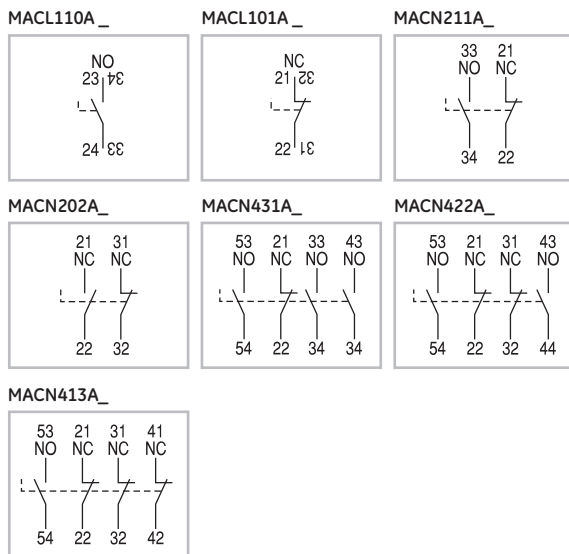
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Terminal numbering

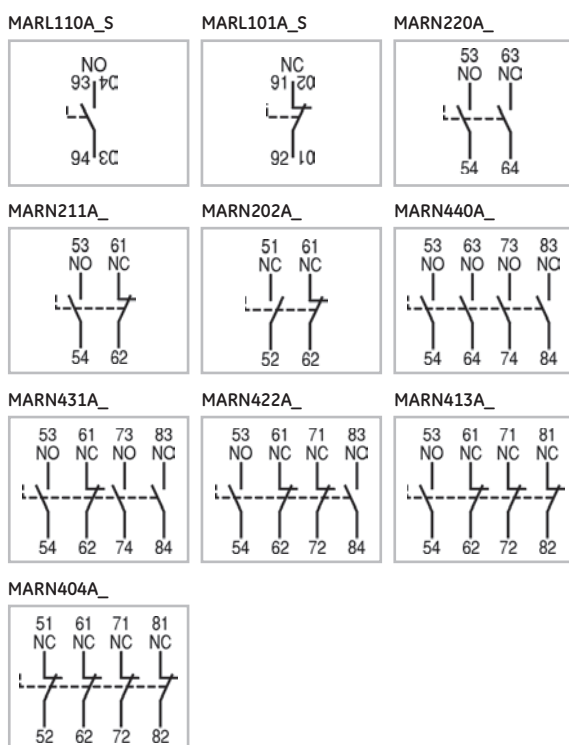
Basic three-pole contactors. (EN 50012)



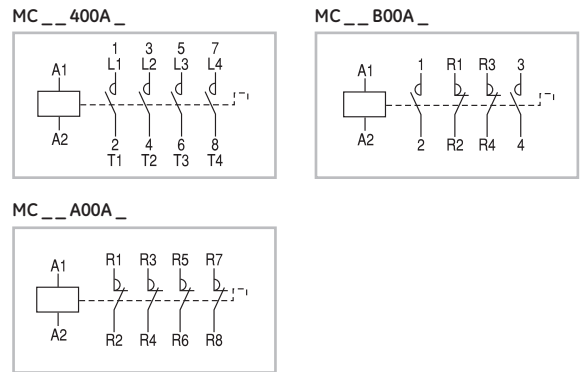
Instantaneous auxiliary contact blocks. (EN 50012)



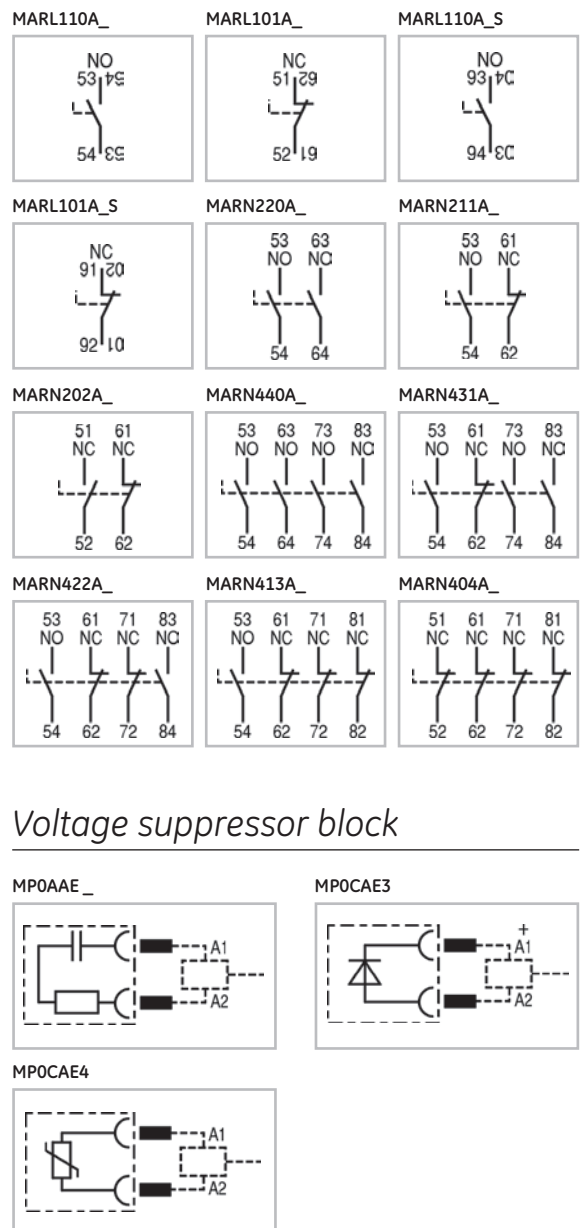
Instantaneous auxiliary contact blocks. (EN 50005)



Base four-pole contactors. (EN 50005)



Instantaneous auxiliary contact blocks. (EN 50005)



Conformity to standards

| | | |
|------------------|---------------|---------------|
| IEC/EN 60947-1 | EN 50005 | UNE 20109 |
| IEC/EN 60947-4-1 | CENELEC HD419 | BS 5424 & 775 |
| IEC/EN 60947-5-1 | NF C63-110 | NEMA ICS 1 |
| UL 508 | ASE 1025 | VDE 0660/102 |
| CSA 22.2/14 | | |

Approvals

| | | |
|------------------|---------------------|----|
| cULus | RINA | CE |
| SETI | IMQ (up to Ith:32A) | |
| Lloyd's Register | Bureau Veritas | |

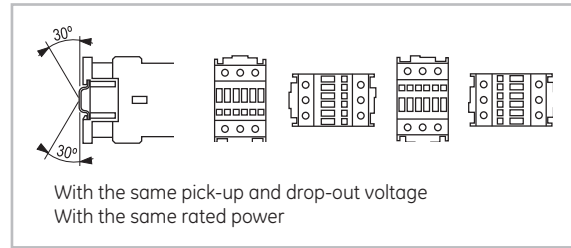
Ambient conditions

| | | |
|-----------------------|----------------------------|-------------|
| Storage temperature | -55°C to +80°C | |
| Operation temperature | -40°C to +60°C | |
| Altitude | up to 3000m Nominal values | |
| | from 3000 up to 4000m | 90%le 80%Ue |
| | from 4000 up to 5000m | 80%le 75%Ue |


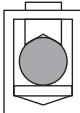
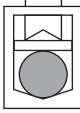
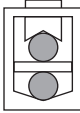
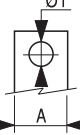
Climatic resistance (IEC 68-2)

| Continuous tests 40 / 125 / 56 | Cyclic test (6 cycles) |
|--------------------------------|-------------------------|
| Cold (72h) | Humid heat |
| Temperature -40°C | First half-cycle (12h) |
| Dry heat (96h) | Low temperature +25°C |
| Temperature +125°C | Relative humidity 93% |
| Relative humidity < 50% | Second half-cycle (12h) |
| Humid heat (56h) | Low temperature +55°C |
| Temperature +40°C | Relative humidity 95% |
| Relative humidity 95% | |

Mounting positions



Terminal capacity and tightening torque

| | | CL00 ... CL02 | CL25 | CL03 ... CL04 | CL45 | CL05 ... CL08 | CL09 ... CL10 |
|---|---|-----------------|-----------------|---------------|-------------|----------------|----------------|
|  | Solid, stranded and finely stranded without end sleeve (mm ²) | 2 x 0.5 ... 2.5 | 2 x 0.5 ... 2.5 | - | - | - | - |
| | Finely stranded with or without end sleeve (mm ²) | 2 x 1 ... 2.5 | 2 x 1 ... 2.5 | - | - | - | - |
| | AWG wires | 2 x 20 ... 12 | 2 x 20 ... 8 | - | - | - | - |
| | Tightening torque (Nm) | 1.6 | 2.2 | - | - | - | - |
| | (Lb x in.) | 15 | 20 | - | - | - | - |
|  | Solid, stranded and finely stranded without end sleeve (mm ²) | - | - | 0.75 ... 16 | 0.75 ... 16 | 1 ... 35 | 1.5 ... 50 |
| | Finely stranded with end sleeve (mm ²) | - | - | 0.75 ... 16 | 0.75 ... 16 | 1 ... 35 | 1.5 ... 50 |
| | Finely stranded w/o end sleeve (mm ²) | - | - | 1 ... 16 | 1 ... 16 | 1 ... 35 | 1.5 ... 50 |
| | AWG wires | - | - | 18 ... 6 | 18 ... 6 | 16 ... 2 | 16 ... 2 |
| | Tightening torque (Nm) | - | - | 1.4 | 1.8 | 4 | 5.6 |
| (Lb x in.) | - | - | 12 | 16 | 35 | 50 | |
|  | Solid (mm ²) | - | - | 0.75 ... 16 | 0.75 ... 16 | 1 ... 16 | 4 ... 35 |
| | Stranded (mm ²) | - | - | 0.75 ... 16 | 0.75 ... 16 | 1 ... 25 | 4 ... 35 |
| | Finely stranded w/o end sleeve (mm ²) | - | - | 0.75 ... 16 | 0.75 ... 16 | 1 ... 25 | 4 ... 35 |
| | Finely stranded with end sleeve (mm ²) | - | - | 1 ... 16 | 1 ... 16 | 1 ... 25 | 4 ... 35 |
| | AWG wires | - | - | 18 ... 6 | 18 ... 6 | 16 ... 4 | 10 ... 1 |
| Tightening torque (Nm) | - | - | 1.4 | 1.8 | 4 | 5.6 | |
| (Lb x in.) | - | - | 12 | 16 | 35 | 50 | |
|  | Solid, stranded and finely stranded without end sleeve (mm ²) | - | - | Max. 16 | Max. 16 | Max. 50 ... 4 | Max. 50 ... 35 |
| | Finely stranded w/o end sleeve (mm ²) | - | - | - | - | Max. 25 ... 16 | - |
| | Finely stranded with end sleeve (mm ²) | - | - | - | - | Max. 25 ... 16 | - |
| | AWG wires | - | - | Max. 6 | Max. 6 | Max. 25 ... 25 | Max. 1 |
| | Tightening torque (Nm) | - | - | 1.4 | 1.8 | 4 | 5.6 |
| (Lb x in.) | - | - | 12 | 16 | 35 | 50 | |
|  | Ring terminals (Ø i) | 3,6 | 4,2 | 4,2 | 4,2 | 6,2 | 6,2 |
| | (acc. with IEC/EN 60947-1) (A) | 8 | 10 | 10 | 10 | 12,5 | 12,5 |
| | Tightening torque (Nm) | 1,6 | 1,4 | 1,4 | 1,4 | 3 | 3 |
| (Lb x in.) | 15 | 12 | 12 | 12 | 26 | 26 | |

3P and 4P contactors

A

B

C

D

E

F

G

H

I

X

Power circuit

| | | CL00 | CL01 | CL02 | CL25 | CL03 | CL04 | CL45 | CL05 | CL06 | CL07 | CL08 | CL09 | CL10 |
|---|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Three pole version | | | | | | | | | | | | | | |
| Rated thermal current I _{th} at θ ≤ 55°C (A) | | 25 | 25 | 32 | 45 | 45 | 60 | 60 | - | 90 | 110 | 110 | 140 | 140 |
| Rated operational current I _e AC-3 (A) | | 9 | 12 | 18 | 25 | 25 | 32 | 40 | - | 50 | 65 | 80 | 95 | 105 |
| Rated operational voltage U _e (V) | | 690 | 690 | 690 | 690 | 690 | 690 | 690 | - | 690 | 690 | 690 | 690 | 690 |
| Four pole version (4NO and 2NO+2NC) | | | | | | | | | | | | | | |
| Rated thermal current I _{th} at θ ≤ 55°C (A) | | - | 25 | 32 | - | 45 | 60 | - | 90 | - | 110 | 110 | 140 | - |
| Rated operational voltage U _e (V) | | - | 690 | 690 | - | 690 | 690 | - | 690 | - | 690 | 690 | 690 | - |
| Three and four pole version | | | | | | | | | | | | | | |
| Rated insulation voltage U _i (V) | | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| Maximum continuous current AC-1 (A) | | 25 | 25 | 32 | 45 | 45 | 60 | 60 | 90 | 90 | 110 | 110 | 140 | 140 |
| Frequency limits (Hz) | | 25..400 | 25..400 | 25..400 | 25..400 | 25..400 | 25..400 | 25..400 | 25..400 | 25..400 | 25..400 | 25..400 | 25..400 | 25..400 |
| Making capacity (RMS) (IEC 947) (A) | | 450 | 450 | 450 | 450 | 550 | 550 | 550 | 1000 | 1000 | 1000 | 1000 | 1280 | 1280 |
| Breaking capacity (RMS) (IEC 947) | | | | | | | | | | | | | | |
| U _e ≤ 400V (A) | | 250 | 250 | 250 | 350 | 450 | 450 | 450 | 920 | 920 | 920 | 920 | 1050 | 1050 |
| U _e = 500V (A) | | 250 | 250 | 250 | 320 | 450 | 450 | 450 | 920 | 920 | 920 | 920 | 1050 | 1050 |
| U _e = 690V (A) | | 130 | 130 | 130 | 170 | 205 | 205 | 205 | 780 | 780 | 780 | 780 | 950 | 950 |
| Short-time current | | | | | | | | | | | | | | |
| 1 sec. (A) | | 455 | 455 | 570 | 630 | 1010 | 1010 | 1265 | 1580 | 1580 | 2530 | 2530 | 3300 | 3300 |
| 5 sec. (A) | | 205 | 205 | 254 | 280 | 450 | 450 | 450 | 565 | 710 | 1130 | 1130 | 1485 | 1485 |
| 10 sec. (A) | | 144 | 144 | 180 | 200 | 320 | 320 | 400 | 500 | 500 | 800 | 800 | 1050 | 1050 |
| 30 sec. (A) | | 85 | 85 | 104 | 115 | 185 | 185 | 230 | 290 | 290 | 460 | 460 | 600 | 600 |
| 1 min. (A) | | 60 | 60 | 74 | 80 | 130 | 130 | 165 | 205 | 205 | 325 | 325 | 430 | 430 |
| 3 min. (A) | | 35 | 35 | 46 | 50 | 90 | 90 | 100 | 120 | 120 | 185 | 185 | 250 | 250 |
| Recovery time (min.) | | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Protec. against short-circuit with fuses without TOR | | | | | | | | | | | | | | |
| Coordination type "1" | | | | | | | | | | | | | | |
| gL/gG (A) | | 50 | 50 | 63 | 63 | 100 | 100 | 125 | 200 | 200 | 200 | 200 | 250 | 250 |
| Coordination type "2" | | | | | | | | | | | | | | |
| gL-gG (A) | | 25 | 35 | 35 | 50 | 63 | 63 | 80 | 100 | 100 | 125 | 125 | 160 | 200 |
| Without welding | | | | | | | | | | | | | | |
| gL-gG (A) | | 10 | 10 | 25 | 35 | 35 | 35 | 50 | 80 | 80 | 100 | 100 | 140 | 160 |
| Impedance per pole (mΩ) | | 2.35 | 2.35 | 2.41 | 1.65 | 1.28 | 1.28 | 0.95 | 0.85 | 0.85 | 0.86 | 0.86 | 0.76 | 0.76 |
| Power dissipation per pole | | | | | | | | | | | | | | |
| AC-1 (W) | | 1.47 | 1.47 | 2.46 | 3.34 | 2.59 | 4.6 | 3.42 | 6.89 | 6.86 | 10.40 | 10.40 | 14.89 | 14.89 |
| AC-3 (W) | | 0.19 | 0.34 | 0.78 | 1.03 | 0.80 | 1.31 | 1.52 | 1.36 | 2.12 | 3.63 | 5.5 | 6.86 | 8.37 |
| Insulation resistance | | | | | | | | | | | | | | |
| Between adjacent poles (mΩ) | | >10 | >10 | >10 | >10 | >10 | >10 | >10 | >10 | >10 | >10 | >10 | >10 | >10 |
| Between poles and earth (mΩ) | | >10 | >10 | >10 | >10 | >10 | >10 | >10 | >10 | >10 | >10 | >10 | >10 | >10 |
| Between input and output (mΩ) | | >10 | >10 | >10 | >10 | >10 | >10 | >10 | >10 | >10 | >10 | >10 | >10 | >10 |



Control circuit

| | | CL00 ... CL25 | CL03 ... CL45 | CL05 ... CL08 | CL09 ... CL10 |
|--|----------------------|---------------|---------------|---------------|---------------|
| Alternating current | | | | | |
| Rated insulation voltage U_i | (V) | 1000 | 1000 | 1000 | 1000 |
| Standard voltages U_s 50 Hz | (V) | 24...690 | 24...690 | 24...690 | 24...690 |
| Standard voltages U_s 60 Hz | (V) | 24...600 | 24...600 | 24...600 | 24...600 |
| Voltage operating limits monofrequency coils | | | | | |
| Operating | x U_s | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 |
| Pick-up | x U_s | 0.6...0.8 | 0.65...0.8 | 0.65...0.8 | 0.65...0.8 |
| Seal | x U_s | 0.35...0.55 | 0.4...0.6 | 0.4...0.6 | 0.4...0.6 |
| Voltage operating limits 50/60 Hz coils | | | | | |
| Operating 50 Hz | x U_s | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 |
| Operating 60 Hz | x U_s | 0.85...1.1 | 0.85...1.1 | 0.85...1.1 | 0.85...1.1 |
| Pick-up 50 Hz | x U_s | 0.5...0.8 | 0.6...0.8 | 0.6...0.8 | 0.6...0.8 |
| Pick-up 60 Hz | x U_s | 0.65...0.85 | 0.7...0.85 | 0.7...0.85 | 0.7...0.85 |
| Seal 50 Hz | x U_s | 0.3...0.55 | 0.35...0.60 | 0.35...0.60 | 0.35...0.60 |
| Seal 60 Hz | x U_s | 0.35...0.65 | 0.4...0.6 | 0.4...0.6 | 0.4...0.6 |
| Consumption monofrequency coils | | | | | |
| Magnetic circuit closed | (VA) | 6 | 9 | 15.5 | 15.5 |
| Magnetic circuit opened (VA) | | 48 | 88 | 190 | 190 |
| Consumption bifrequency coils | | | | | |
| Magnetic circuit closed (50 Hz/60 Hz) | (VA) | 6.8 / 5.6 | 11.4 / 9.5 | 20 / 16.6 | 20 / 16.6 |
| Magnetic circuit opened (50 Hz/60 Hz) | (VA) | 53 / 44 | 120 / 100 | 245 / 204 | 245 / 204 |
| Thermal power dissipation (50 Hz/60 Hz) | (W) | 2.2 / 1.8 | 3.2 / 2.6 | 5.2 / 4.3 | 5.2 / 4.3 |
| Power factor | | | | | |
| Magnetic circuit closed | cos φ | 0.33 | 0.28 | 0.26 | 0.26 |
| Magnetic circuit opened | cos φ | 0.84 | 0.73 | 0.54 | 0.54 |
| Opening and closing times | | | | | |
| Values between + 10 % U_s and - 20 % U_s | | | | | |
| Time on energisation (NO) | (ms) | 6...20 | 7...25 | 9...35 | 9...35 |
| Time on de-energisation (NO) | (ms) | 6...13 | 5...25 | 9...15 | 9...15 |
| Values at U_s | | | | | |
| Time on energisation (NO) | (ms) | 8...20 | 10...19 | 15...30 | 15...30 |
| Time on de-energisation (NO) | (ms) | 6...13 | 5...25 | 9...15 | 9...15 |
| Mechanical endurance | | | | | |
| Monofrequency coils | 10 ⁶ ops. | 15 | 15 | 15 | 15 |
| Bifrequency coils (at 50 Hz) | 10 ⁶ ops. | 10 | 10 | 8 | 8 |
| Maximum rate | | | | | |
| Monofrequency coils. No load | ops./h | 9000 | 9000 | 9000 | 5000 |
| AC-1 at rated power | ops./h | 1200 | 1200 | 1200 | 1200 |
| AC-2 at rated power | ops./h | 1000 | 1000 | 1000 | 750 |
| AC-3 at rated power | ops./h | 1200 | 1200 | 1200 | 600 |
| AC-4 at rated power | ops./h | 360 | 360 | 200 | 200 |
| Bifrequency coils. No load | ops./h | 3600 | 3600 | 3600 | 3600 |

| | | CL00D ... CL25D | | Coils with electronic module | | Coils with wide voltage range | | |
|--|----------------------|-----------------|-----------------|------------------------------|-----------------|-------------------------------|-----------------------|-----------------------|
| | | CL00D ... CL25D | CL03D ... CL45D | CL05E ... CL08E | CL09E ... CL10E | CL00D..W ... CL25D..W | CL03D..W ... CL45D..W | CL05D..W ... CL10D..W |
| Direct current | | | | | | | | |
| Rated insulation voltage U_i | (V) | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| Standard voltages U_s | (V) | 12...440 | 12...440 | 24...440 | 24...440 | 12...440 | 12...440 | 12...440 |
| Operating limits | | | | | | | | |
| Operating | x U_s | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 | 0.7...1.3 | 0.7...1.3 | 0.7...1.3 |
| Pick-up | x U_s | 0.45...0.65 | 0.45...0.65 | 0.70...0.80 | 0.70...0.80 | 0.45...0.55 | 0.45...0.55 | 0.45...0.55 |
| Drop-out | x U_s | 0.15...0.3 | 0.15...0.3 | 0.4...0.6 | 0.4...0.6 | 0.15...0.3 | 0.15...0.3 | 0.15...0.3 |
| Consumption | | | | | | | | |
| Magnetic circuit closed | (W) | 5.5 | 8 | 10 | 10 | 6.5 | 10.4 | 20 |
| Magnetic circuit opened (W) | | 5.5 | 8 | 170 | 170 | 6.5 | 10.4 | 20 |
| Opening and closing times | | | | | | | | |
| Values between + 10 % U_s and - 20 % U_s | | | | | | | | |
| Time on energisation (NO) | (ms) | 35...65 | 35...70 | 60...80 | 60...80 | 26...55 | 30...65 | 64...133 |
| Time on de-energisation (NO) | (ms) | 6...15 | 40...65 | 40...50 | 40...50 | 6...15 | 5...10 | 20...23 |
| Values at U_s | | | | | | | | |
| Time on energisation (NO) | (ms) | 35...45 | 40...55 | 50...60 | 50...60 | 35...45 | 40...55 | 75...95 |
| Time on de-energisation (NO) | (ms) | 7...12 | 30...65 | 55...60 | 55...60 | 7...12 | 6...8 | 20...22 |
| Mechanical endurance | | | | | | | | |
| | 10 ⁶ ops. | 15 | 15 | 12 | 12 | 15 | 15 | 12 |
| Maximum rate | | | | | | | | |
| No load | ops./h | 3600 | 3600 | 2500 | 2500 | 3600 | 3600 | 3600 |
| AC1 and AC3 at rated power | ops./h | 1200 | 1200 | 1200 | 600 | 1200 | 1200 | 1200 |
| AC4 at rated power | ops./h | 360 | 360 | 200 | 200 | 360 | 360 | 200 |

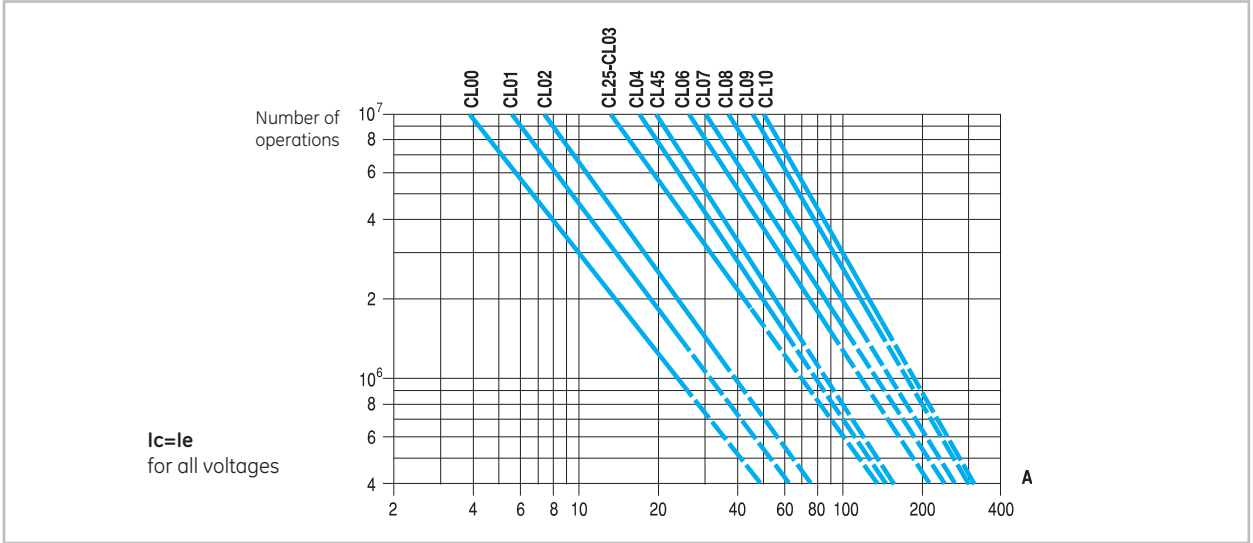
Electrical endurance

Mixed category AC4 / AC3

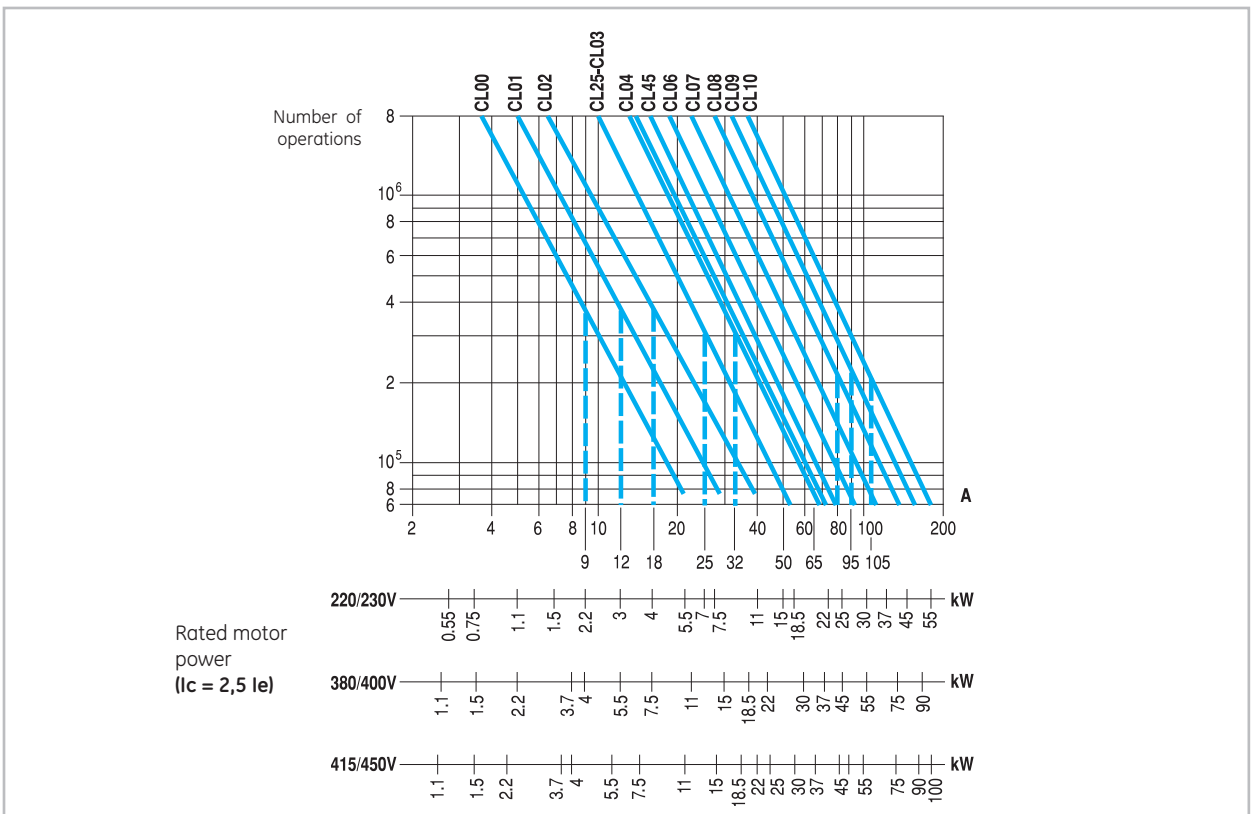
Electrical endurance for mixed category (AC-3/AC-4) is calculated with the following formula:

$$\text{Electrical endurance (AC-3/AC-4)} = \frac{\text{Electrical endurance (AC-3)}}{1 + \frac{\% \text{ oper AC-4}}{100}} \times \left(\frac{\text{Elec.endur. (AC-3)}}{\text{Elec.endur.(AC-4)}} - 1 \right)$$

Category AC1



Category AC2



Contactors

A

B

C

D

E

F

G

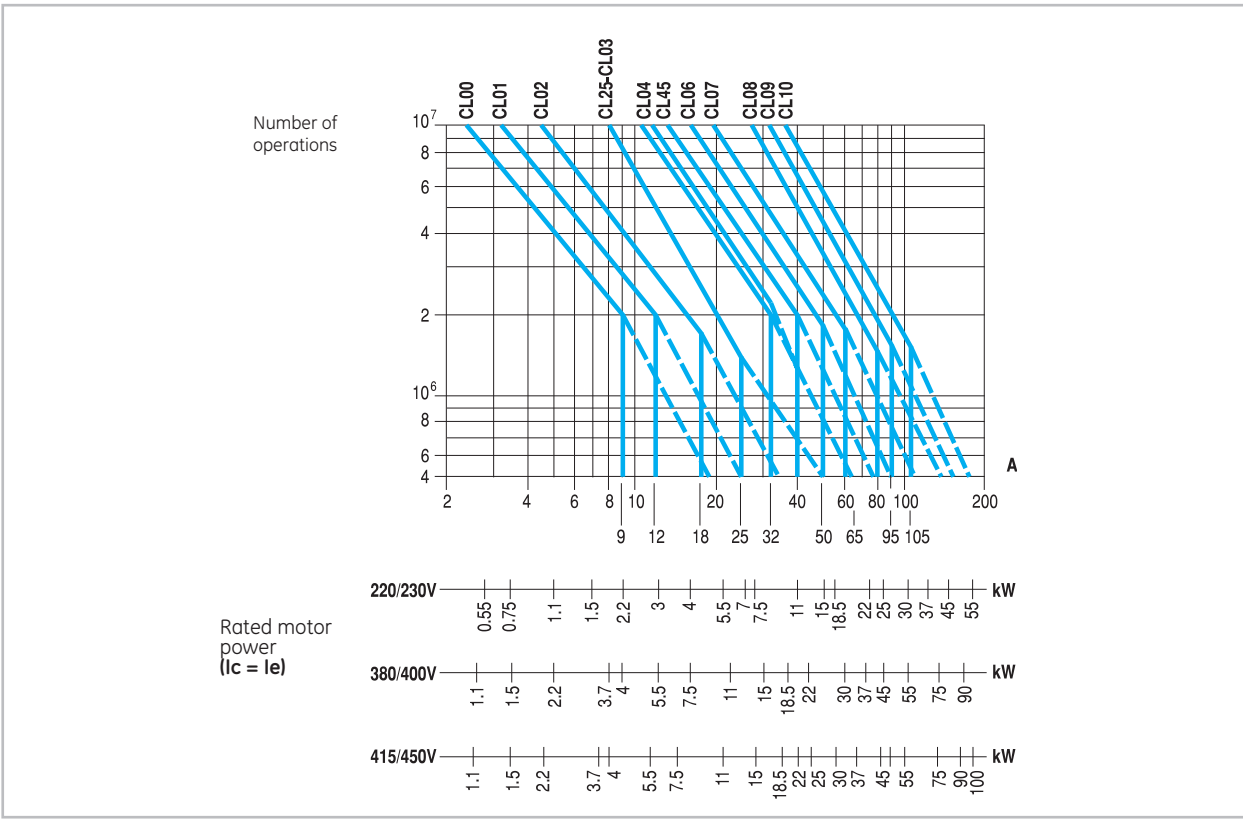
H

I

X



Category AC3



3P and 4P contactors

A

B

C

D

E

F

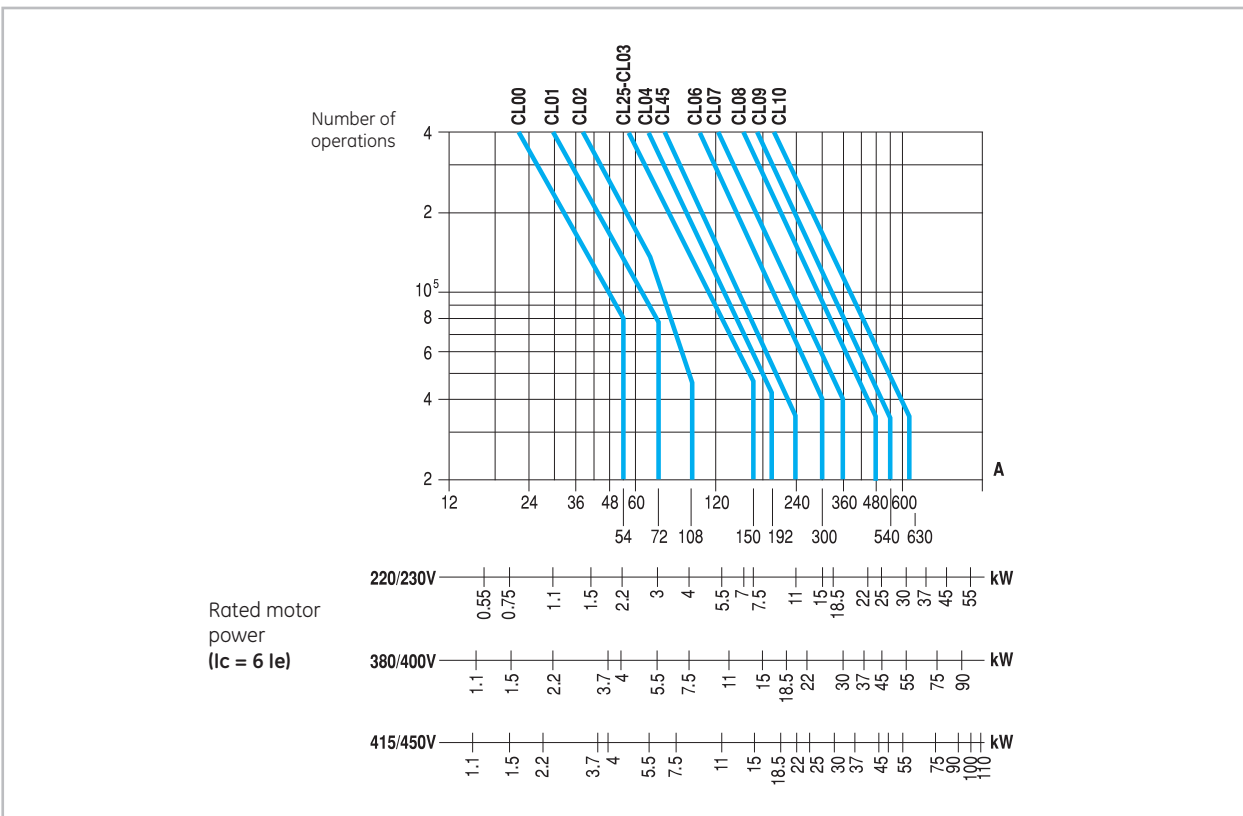
G

H

I

X

Category AC4



Internal auxiliary contacts

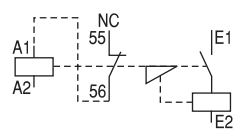
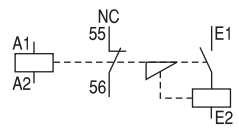
| | | | CL00 ... CL02 | | CL03 ... CL04 | |
|--|---|----------------------|--|--|--|--|
| Rated insulation voltage U_i according to IEC 60947 | (V) | | 1000 | | 1000 | |
| Rated thermal current I_{th} at $\theta \leq 55^\circ\text{C}$ | (A) | | 20 | | 20 | |
| Making capacity (r.m.s.) acc. to IEC 60947 | | | | | | |
| AC-15 | $U_e \leq 400\text{V}, 50/60\text{ Hz}$ | (A) | 250 | | 250 | |
| DC-13 | $U_e \leq 220\text{V DC}$ | (A) | 250 | | 250 | |
| Breaking capacity (r.m.s.) acc.to IEC 60947 | | | | | | |
| AC-15 | $U_e \leq 400\text{V}, 50/60\text{ Hz}$ | (A) | 250 | | 250 | |
| DC-13 | $U_e \leq 220\text{V DC}$ | (A) | 2 | | 2 | |
| AC-15 | Rated voltage and current U_e - I_e | according to IEC | 110/120V-10A 400/380V-6A 500V-4A | 220/230V-10A 415/450V-5A 690/660V-2A | 110/120V-10A 400/380V-6A 500V-4A | 230/220V-10A 415/450V-5A 690/660V-2A |
| | | according to UL, CSA | A600 | | A600 | |
| DC-13 | Rated voltage and current U_e - I_e | according to IEC | 24V-6A 110V-2A 440V-0.35A | 48V-4A 220V-0.7A | 24V-6A 110V-2A 440V-0.35A | 48V-4A 220V-0.7A |
| | | according to CSA | P600 | | P600 | |
| Electrical endurance | ops. | | 10^6 | | 10^6 | |
| Minimum operational power (operational safety) | | | 17V - 5mA | | 17V - 5mA | |
| Short-circuit protect. | Max.fuse class gI-gG without welding | (A) | 10 | | 10 | |
| Insulation resistance | Between contacts | ($m\Omega$) | > 10 | | > 10 | |
| | Between contacts and earth | ($m\Omega$) | > 10 | | > 10 | |
| | Between input and output | ($m\Omega$) | > 10 | | > 10 | |
| Guaranteed no overlap between NO and NC contacts | | | | | | |
| | Space | (mm) | 1.3 | | 2.6 | |
| | Time | (ms) | 1.5 | | 1.5 | |
| Impedance of the contacts | ($m\Omega$) | | 1.28 | | 1.28 | |

Auxiliary contact blocks

| | | | Instantaneous BCLF..., BCRF..., BCLL..., BRLL... | | Timed blocks BTLF..., BTRF... | |
|---|---|----------------------|---|---|---|---|
| Rated insulation voltage U_i according to IEC 60947 | (V) | | 1000 | | 1000 | |
| Rated thermal current I_{th} at $\theta \leq 55^\circ\text{C}$ | (A) | | 10 | | 10 | |
| Making capacity (Ieff) according to IEC 60947 | | | | | | |
| AC-15 | $U_e \leq 400\text{V}, 50/60\text{ Hz}$ | (A) | 90 | | 90 | |
| DC-13 | $U_e \leq 220\text{V DC}$ | (A) | 90 | | 90 | |
| Breaking capacity (Ieff) according to IEC 60947 | | | | | | |
| AC-15 | $U_e \leq 400\text{V}, 50/60\text{ Hz}$ | (A) | 60 | | 60 | |
| DC-13 | $U_e \leq 220\text{V DC}$ | (A) | 0.95 | | 0.95 | |
| AC-15 | Rated voltage and current U_e - I_e | according to IEC | 120/110V-6A 400/380V-4A 500V-2.5A | 230/220V-6A 440/415V-3.5A 690/660V-1.5A | 120/110V-6A 400/380V-4A 500V-2.5A | 230/220V-6A 440/415V-3.5A 690/660V-1.5A |
| | | according to UL, CSA | A600 | | A600 | |
| DC-13 | Rated voltage and current U_e - I_e | according to IEC | 24V-4A 110V-0.7A 440V-0.15A | 48V-2A 220V-0.3A | 24V-4A 110V-0.7A 440V-0.15A | 48V-2A 220V-0.3A |
| | | according to UL, CSA | Q600 | | Q600 | |
| Electrical endurance | 10^6 ops. | | 1 | | 1 | |
| Mechanical endurance | 10^6 ops. | | 10 | | 5 | |
| Minimum operational current (operational safety) | | | 17V - 5mA | | 17V - 5mA | |
| Short-circuit protect. | Max.fuse class gI-gG without welding | (A) | 10 | | 10 | |
| Insulation resistance | Between contacts | ($m\Omega$) | > 10 | | > 10 | |
| | Between contacts and earth | ($m\Omega$) | > 10 | | > 10 | |
| | Between input and output | ($m\Omega$) | > 10 | | > 10 | |
| Guaranted no overlap between NO and NC contacts | | | | | | |
| | Space | (mm) | 1.3 | | 1.3 | |
| | Time | (ms) | 1.5 | | 5 | |
| Impedance of the contacts | ($m\Omega$) | | 1.28 | | 1.28 | |
| Timing (ambient temperature between -25°C and $+55^\circ\text{C}$) | | | | | | |
| | Accuracy | | - | | $\pm 5\%$ | |
| | Loss of accuracy 0.5×10^6 ops. | | - | | $+ 20\%$ | |
| | Loss of accuracy per rise $^\circ\text{C}$ ($0 - 55^\circ\text{C}$) | | - | | $+ 0.75\%$ per $^\circ\text{C}$ | |

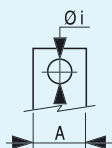


Mechanical latch blocks

| | RMLF... | |
|--|---|----------------|
| Rated insulation voltage U_i | 1000 V | |
| Standard voltages U_s : 50 to 60 Hz and DC | 24...690 V | |
| Operating limits | 0.75...1.1 x U_s | |
| Consumption for unlatching (auto cut-out) | 24 to 72 V | 210 W / VA |
| | 110 to 440 V | 130 W / VA |
| Electrical unlatching control ⁽¹⁾ | | |
| Minimum impulse | 10 ms | |
| Maintained | auto cut-out by integral contact | |
| Manual unlatching control | by local push-button | |
| Electrical making control | | |
| Minimum pulse | 40 ms auto cut-out by integral contact | |
| Manual making control | by local push-button | |
| Auxiliary contact NC | | |
| Utilisation AC-15 according to IEC | 120V - 6A | 500V - 1.5A |
| | 230V/220V - 4A 400V/380V - 2.5A | 690V/660V - 1A |
| according to UL/CSA | A600 | |
| Utilisation DC-13 according to IEC | 24V - 3A | 220V - 0.3A |
| | 48V - 1.5A | 400V - 0.15A |
| | 110V - 0.6A | |
| according to UL/CSA | Q600 | |
| Mechanical endurance | | |
| CL00...CL45 | 3 million (1200 ops./h) | |
| CL05...CL10 | 0.1 million (300 ops./h) | |
| Wiring diagram Alternating current |  | |
| Alternating current / Direct current |  | |

(1) The contactor coil and the unlatch control must not be energised simultaneously

Terminal capacity

| | Terminal: screw BCLF, BCLL, BTLF y RMLF | Terminal: ring terminal BCRF, BTRF |
|---|--|---------------------------------------|
| Solid | 2 x 0.5 to 2.5 or 1 x 4 | |
| Stranded and finely stranded without end sleeve | 2 x 0.5 to 2.5 or 1 x 4 | |
| Finely stranded with end sleeve | 2 x 0.5 to 2.5 or 1 x 4 | |
| AWG wires, solid and stranded | 12 - 22 AWG 75°C | |
| Tightening torque | 1.1 Nm / 10 Lb x in. | |
|  | Ring terminal | 3.6 min. 6.5 max. |
| | Tightening torque | 0.8 Nm / 7 Lb x in. |
| | | |

Contact sequence

Contactors

A

B

C

D

E

F

G

H

I

X

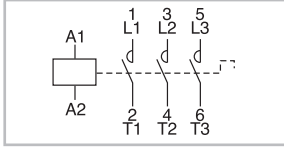
| | | Basic contactor | Auxiliary contact blocks Front mounted | | Auxiliary contact blocks Lateral mounted | | |
|--|---------------------------------|--------------------|---|--------------------|---|--------------------|--|
| | | | BCLF 10 BCRF 10 | BCLF 01 BCRF 01 | BCLL 20 BRLL 20 | BCLL 11 BRLL 11 | |
| Three pole contactors 3 NO | CL00... CL01... CL02... | | | | | | |
| | CL25... | | | | | | |
| | CL03... CL04... | | | | | | |
| | CL45... | | | | | | |
| | CL06... | | | | | | |
| | CL07... CL08... | | | | | | |
| | CL09... | | | | | | |
| | CL10... | | | | | | |
| | Four pole contactors 4 NO | CL01... CL02... | | | | | |
| | | CL03... CL04... | | | | | |
| CL05... | | | | | | | |
| CL07... | | | | | | | |
| CL09... | | | | | | | |
| Four pole contactors 2 NO + 2 NC | | CL01... CL02... | | | | | |
| | CL03... CL04... | | | | | | |
| | CL05... | | | | | | |
| | CL07... CL08... | | | | | | |
| | | | | | | | |



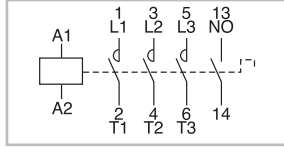
Terminal numbering

Three-pole and four-pole AC contactors

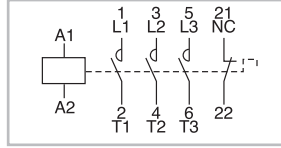
CL00A300 ... CL10A300 __
 CL25D300 ... CL45D300 __
 CL06E300 ... CL10E300 __



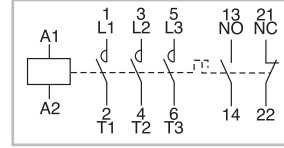
CL00_310 ... CL02_310 __
 CL03_310 ... CL04_310 __



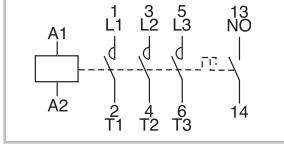
CL00_301 ... CL02_301 __
 CL03_301 ... CL04_301 __



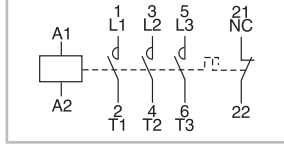
CL45A311 ... CL10A311 __



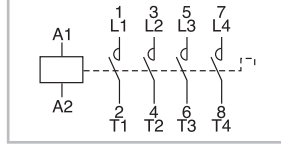
CL25_310 __



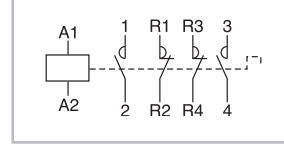
CL25_301 __



CL00A400 ... CL08A400 __
 CL01D400 ... CL04D400 __
 CL05E400 ... CL09E400 __

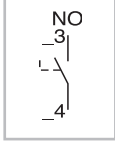


CL01AB00 ... CL08AB00 __
 CL01DB00 ... CL04DB00 __
 CL05EB00 ... CL08EB00 __

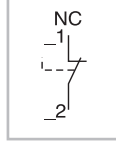


Auxiliary contact blocks. Front mounting

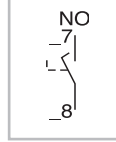
BC_F10



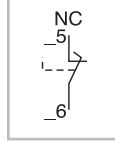
BC_F01



BCLF10G

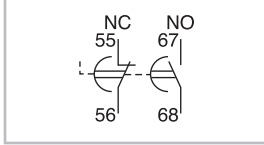


BCLF01G

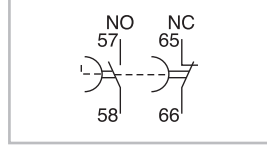


Pneumatic timer blocks

BT_F_C



BT_F_D

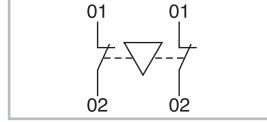


Mechanical and mechanical/electrical interlock

BELA

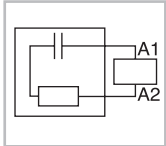


BELA02

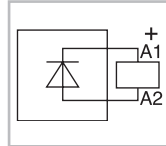


Voltage suppressor blocks

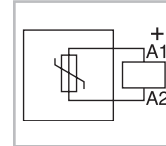
BSLR2, BSLR3
IMRC



BSLDZ
IMD1Z

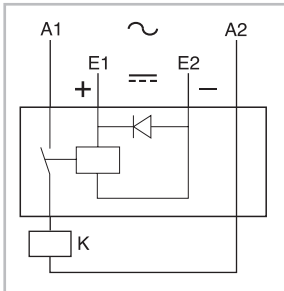


BSLV3
IMV3

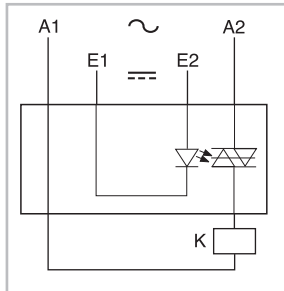


Interface modules

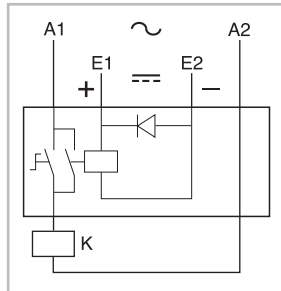
IMRD, IMRG



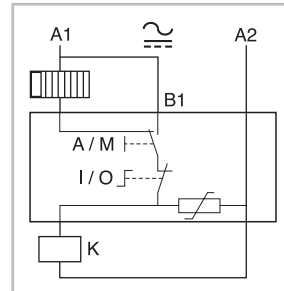
IMSSD



IMRFD, IMRFG

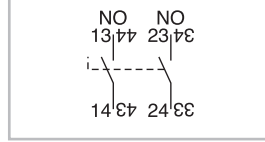


IMAMS

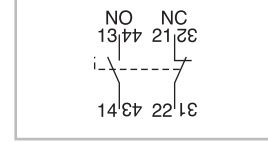


Auxiliary contact blocks. Lateral mounting

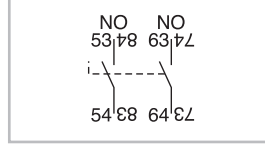
BCLL20



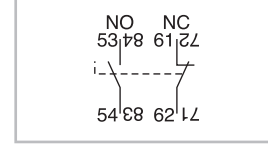
BCLL11



BRLL20

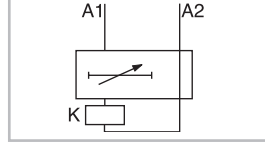


BRLL11

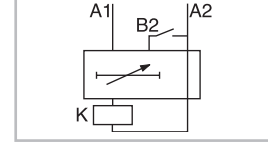


Electronic timer blocks

BETL_C

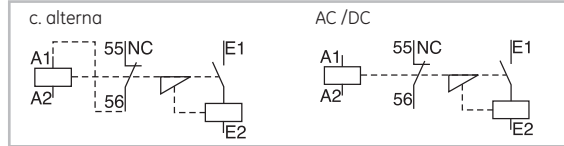


BETL_D



Mechanical latch block

RMLF



Terminal numbering according to EN 50012

| | | Auxiliary contacts | | Possible basic contactors + Auxiliary contacts blocks to be added | | |
|---|-----|--------------------|----|--|---|--|
| | | Combination | | | | |
| | | Description | NO | NC | | |
| Without auxiliary contact blocks | | | | | | |
| | 10E | 1 | 0 | | CL00_310... - CL04_310... | |
| | 01E | 0 | 1 | | CL00_301... - CL04_301... | |
| Front mounting auxiliary contact blocks with one contact each | | | | | | |
| | 11E | 1 | 1 | | CL00_310... - CL04_310... + BC_F01 | |
| | 21E | 2 | 1 | | CL00_310... - CL04_310... + BC_F01 + BC_F10 | |
| | 12E | 1 | 2 | | CL00_310... - CL04_310... + BC_F01 + BC_F01 | |
| | 31E | 3 | 1 | | CL00_310... - CL04_310... + BC_F01 + BC_F10 + BC_F10 | |
| | 41E | 4 | 1 | | CL00_310... - CL04_310... + BC_F01 + BC_F10 + BC_F10 + BC_F10 | |
| | 22E | 2 | 2 | | CL00_310... - CL04_310... + BC_F01 + BC_F01 + BC_F10 | |
| | 32E | 3 | 2 | | CL00_310... - CL04_310... + BC_F01 + BC_F01 + BC_F10 + BC_F10 | |
| | 13E | 1 | 3 | | CL00_310... - CL04_310... + BC_F01 + BC_F01 + BC_F01 | |
| | 23E | 2 | 3 | | CL00_310... - CL04_310... + BC_F01 + BC_F01 + BC_F10 + BC_F10 | |
| Lateral mounting auxiliary contact blocks with two contacts each | | | | | | |
| | 11E | 1 | 1 | | CL00_300... - CL45_300... + BCLL11 | |
| | 31E | 3 | 1 | | CL00_300... - CL45_300... + BCLL11 + BCLL20 | |
| | 22E | 2 | 2 | | CL00_300... - CL45_300... + BCLL11 + BCLL11 | |

The maximum number of auxiliary contacts is 4 for CL00 to CL25, 6 for CL03 -CL04 and 8 for CL45, CL06 to CL10. When using the pneumatic BTLF-block, these numbers are reduced to two, resp. four. (2 for CL00 to CL25, 4 for CL03 and CL04, etc.)

Terminal numbering according to EN 50012 (continued)

| Description | Auxiliary contacts Combination | | Possible basic contactors + Auxiliary contacts blocks to be added |
|---|-----------------------------------|-----|--|
| | NO | NC | |
| Without auxiliary contact blocks | | | |
| | | | CL25_300... - CL45_300... CL06_300... - CL10_300... |
| Front mounting auxiliary contact blocks with one contact each | | | |
| | 10E | 1 0 | CL25_300... - CL45_300... + BC_F10 CL06_300... - CL10_300... + BC_F10 |
| | 01E | 0 1 | CL25_300... - CL45_300... + BC_F01 CL06_300... - CL10_300... + BC_F01 |
| | 11E | 1 1 | CL25_300... - CL45_300... + BC_F10 + BC_F01 CL06_300... - CL10_300... + BC_F10 + BC_F01 |
| | 21E | 2 1 | CL25_300... - CL45_300... + BC_F10 + BC_F01 + BC_F10 CL06_300... - CL10_300... + BC_F10 + BC_F01 + BC_F10 |
| | 12E | 1 2 | CL25_300... - CL45_300... + BC_F10 + BC_F01 + BC_F01 CL06_300... - CL10_300... + BC_F10 + BC_F01 + BC_F01 |
| | 31E | 3 1 | CL25_300... - CL45_300... + BC_F10 + BC_F01 + BC_F10 + BC_F01 CL06_300... - CL10_300... + BC_F10 + BC_F01 + BC_F10 + BC_F01 |
| | 41E | 4 1 | CL06_300... - CL10_300... + BC_F10 + BC_F01 + BC_F10 + BC_F10 + BC_F10 |
| | 22E | 2 2 | CL25_300... - CL45_300... + BC_F10 + BC_F01 + BC_F01 + BC_F10 CL06_300... - CL10_300... + BC_F10 + BC_F01 + BC_F01 + BC_F10 |
| | 32E | 3 2 | CL06_300... - CL10_300... + BC_F10 + BC_F01 + BC_F01 + BC_F10 + BC_F10 |
| | 13E | 1 3 | CL25_300... - CL45_300... + BC_F10 + BC_F01 + BC_F01 + BC_F01 CL06_300... - CL10_300... + BC_F10 + BC_F01 + BC_F01 + BC_F01 |
| | 23E | 2 3 | CL06_300... - CL10_300... + BC_F10 + BC_F01 + BC_F01 + BC_F10 + BC_F10 |
| Lateral mounting auxiliary contact blocks with two contacts each | | | |
| | 11E | 1 1 | CL25_300... - CL45_300... + BCLL11 CL06_300... - CL10_300... + BCLL11 |
| | 31E | 3 1 | CL25_300... - CL45_300... + BCLL11 + BCLL20 CL06_300... - CL10_300... + BCLL11 + BCLL20 |
| | 22E | 2 2 | CL25_300... - CL45_300... + BCLL11 + BCLL11 CL06_300... - CL10_300... + BCLL11 + BCLL11 |

3P and 4P contactors

A
B
C
D
E
F
G
H

I
X

Conformity to standards

| | | |
|------------------|-------------|---------------|
| IEC/EN 60947-1 | NF C 63-110 | BS 5424 & 775 |
| IEC/EN 60947-4-1 | ASE 1025 | NEMA ICS 1 |
| CENELEC HD 419 | CSA 22.2/14 | VDE 0660/102 |
| UL 508 | UNE 20109 | |
| EN 50005 | | |

Approvals

| | | |
|------------------|----------------|----|
| cULus | RINA | CE |
| NOM | FI | |
| Lloyd's Register | Bureau Veritas | |

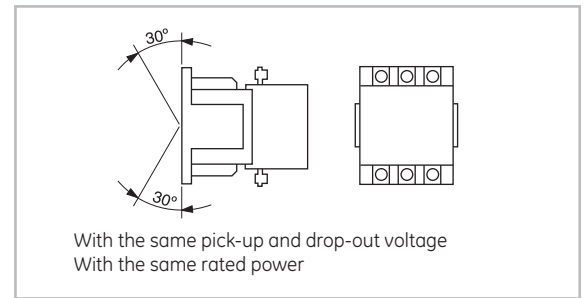
Ambient conditions

| | | |
|-----------------------|-----------------------|----------------|
| Storage temperature | -55°C to +80°C | |
| Operation temperature | -40°C to +60°C | |
| Altitude | up to 3000m | Nominal values |
| | from 3000 up to 4000m | 90%le 80%Ue |
| | from 4000 up to 5000m | 80%le 75%Ue |

Climatic resistance (IEC 68-2)

| | | |
|--------------------------------|-------------------|--------|
| Continuous tests 40 / 125 / 56 | | |
| Cold (72h) | Temperature | -40°C |
| | Dry heat (96h) | |
| | Temperature | +125°C |
| | Relative humidity | < 50% |
| Humid heat (56 days) | Temperature | +40°C |
| | Relative humidity | 95% |
| Cyclical test | | |
| First half-cycle (12h) | Low temperature | +25°C |
| | Relative humidity | 93% |
| Second half-cycle (12h) | Low temperature | +55°C |
| | Relative humidity | 95% |
| Number of consecutive cycles | 6 | |

Mounting positions



Contactors

A

B

C

D

E

F

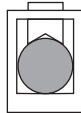
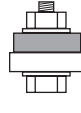
G

H

I

X

Terminal capacity and tightening torque

| | | CK07B | CK75C CK08C | CK08B CK95B | CK10C | CK11C | CK12B | CK13B |
|---|---|-----------|--------------------|--------------------|-------------|-------------|-------------|-------------|
|  | Solid (mm ²) | 1.5..95 | | | | | | |
| | Finely stranded w/end sleeve (mm ²) | 2..35 | | | | | | |
| | Finely stranded w/o end sleeve (mm ²) | 2..50 | | | | | | |
| | Stranded (mm ²) | 1.5..95 | | | | | | |
| | AWG wires (mm ²) | 16..00 | | | | | | |
| | Tightening torque (Nm) | 8 | | | | | | |
| | (Lb x in) | 70 | | | | | | |
|  | Finely stranded w/end sleeve (mm ²) | | 1 x 120 2 x 95 | 1 x 240 2 x 150 | 2 x 185 | 2 x 240 | - | - |
| | AWG wires with end sleeve (mm ²) | | 1 x 300 2 x 107 | 1 x 500 2 x 300 | 2 x 350 | 2 x 500 | - | - |
| | Busbars | | 2 (25 x 5) | 2 (25 x 5) | 2 (35 x 10) | 2 (35 x 10) | 2 (35 x 10) | 2 (60 x 10) |
| | Tightening torque (Nm) | | 8 | 23 | 31.5 | 31.5 | 31.5 | 31.5 |
| | | (Lb x in) | | 70 | 200 | 275 | 275 | 275 |

Power circuit

| | | | CK75C | CK08C | CK85B | CK09B | CK95B | CK10C | CK11C | CK12B | CK13B |
|---|---------------|-----|----------|-----------|----------|----------|----------|----------|----------|----------|----------|
| Three pole contactors | | | | | | | | | | | |
| Rated thermal current Ith at $\theta \leq 40^{\circ}\text{C}$ | (A) | | 250 | 250 | 315 | 315 | 450 | 600 | 700 | 1000 | 1250 |
| Rated operational current Ie AC-3 | (A) | | 150 | 185 | 205 | 250 | 309 | 420 | 550 | 700 | 825 |
| Rated operational voltage Ue | (V) | | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| Rated insulation voltage Ui | (V) | | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| Maximum continuous current AC-1 | (A) | | 250 | 250 | 315 | 315 | 450 | 600 | 700 | 1000 | 1250 |
| Frequency limits | (Hz) | | 25...400 | 25...400 | 25...400 | 25...400 | 25...400 | 25...400 | 25...400 | 25...400 | 25...400 |
| Making capacity (RMS) (IEC 947) | (A) | | 1850 | 2200 | 2500 | 2500 | 3700 | 6500 | 6500 | 8400 | 8250 |
| Breaking capacity (RMS) (IEC 947) | | | | | | | | | | | |
| Ue \leq 400V | (A) | | 1600 | 1850 | 2000 | 3500 | 3500 | 5600 | 5600 | 7300 | 6600 |
| Ue = 500V | (A) | | 1600 | 1850 | 2000 | 3500 | 3500 | 5600 | 5600 | 7000 | 6600 |
| Ue = 690V | (A) | | 1000 | 1200 | 1660 | 2200 | 2200 | 5000 | 5000 | 6700 | 6000 |
| Ue = 1000V | (A) | | 350 | 350 | 850 | 1100 | 1100 | 3000 | 3000 | 3500 | 3500 |
| Short-time current | | | | | | | | | | | |
| | 1 sec. | (A) | 2500 | 2500 | 4000 | 5500 | 5500 | 7500 | 7500 | 9700 | 11600 |
| | 5 sec. | (A) | 2500 | 2500 | 3200 | 3500 | 3500 | 5200 | 5200 | 7700 | 8800 |
| | 10 sec. | (A) | 2300 | 2300 | 2400 | 2500 | 2500 | 4000 | 4000 | 6100 | 7350 |
| | 30 sec. | (A) | 1250 | 1250 | 1400 | 1600 | 1600 | 2800 | 2800 | 4400 | 5300 |
| | 1 min. | (A) | 900 | 900 | 1000 | 1200 | 1200 | 1800 | 1800 | 3500 | 4500 |
| | 3 min. | (A) | 600 | 600 | 750 | 900 | 900 | 1200 | 1200 | 2300 | 2800 |
| Short-time current | (min.) | | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Protec. against short-circuit with fuses without TOR | | | | | | | | | | | |
| Coord. type "1" | gL/gG | (A) | 355 | 355 | 500 | 500 | 630 | 1250 | 1250 | 1250 | 2x800 |
| Coord. type "2" | gL/gG | (A) | 250 | 250 | 315 | 400 | 500 | 630 | 800 | 1000 | 1250 |
| Without welding | gL/gG | (A) | 200 | 200 | 250 | 315 | 425 | 500 | 630 | 800 | 1000 |
| Impedance per pole | (m Ω) | | 0.30 | 0.30 | 0.28 | 0.28 | 0.28 | 0.15 | 0.13 | 0.14 | 0.11 |
| Power dissipation per pole | AC-1 | (W) | 19 | 19 | 27.7 | 27.7 | 56.7 | 54.3 | 63.7 | 140 | 171.8 |
| | AC-3 | (W) | 6.8 | 10.3 | 11.7 | 17.5 | 26.7 | 26.5 | 45.3 | 68.6 | 74.8 |
| Insulation resistance | | | | | | | | | | | |
| Between adjacent poles | (m Ω) | | > 10 | > 10 | > 10 | > 10 | > 10 | > 10 | > 10 | > 10 | > 10 |
| Between poles and earth | (m Ω) | | > 10 | > 10 | > 10 | > 10 | > 10 | > 10 | > 10 | > 10 | > 10 |
| Between input and output | (m Ω) | | > 10 | > 10 | > 10 | > 10 | > 10 | > 10 | > 10 | > 10 | > 10 |
| | | | CK07B | CK08B | | CK09B | CK95B | CK10C | CK11C | CK12B | CK13B |
| Four pole contactors | | | | | | | | | | | |
| Rated thermal current Ith at $\theta \leq 40^{\circ}\text{C}$ | (A) | | 200 | 325 | | 400 | 500 | 600 | 700 | 1000 | 1250 |
| Rated operational voltage Ue | (V) | | 690 | 1000 | | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| Rated insulation voltage Ui | (V) | | 1000 | 1000 | | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| Maximum continuous current AC-1 | (A) | | 200 | 325 | | 400 | 500 | 600 | 700 | 1000 | 1250 |
| Frequency limits | (Hz) | | 25...400 | 25...4000 | | 25...400 | 25...400 | 25...400 | 25...400 | 25...400 | 25...400 |
| Making capacity (RMS) (IEC 947) | (A) | | 1150 | 1850 | | 2500 | 3700 | 6500 | 6500 | 6700 | 8250 |
| Breaking capacity (RMS) (IEC 947) | | | | | | | | | | | |
| Ue \leq 400V | (A) | | 950 | 1600 | | 3500 | 3500 | 5600 | 5600 | 6700 | 6600 |
| Ue = 500V | (A) | | 950 | 1600 | | 3500 | 3500 | 5600 | 5600 | 6700 | 6600 |
| Ue = 690V | (A) | | 800 | 1000 | | 2200 | 2200 | 3500 | 3500 | 6000 | 6000 |
| Ue = 1000V | (A) | | - | 350 | | 1100 | 1100 | 2000 | 2000 | 3500 | 3500 |
| Short-time current | | | | | | | | | | | |
| | 1 sec. | (A) | 2100 | 2500 | | 5500 | 5500 | 7500 | 7500 | 9700 | 11600 |
| | 5 sec. | (A) | 1500 | 2500 | | 3500 | 3500 | 5200 | 5200 | 7700 | 8800 |
| | 10 sec. | (A) | 1150 | 2300 | | 2500 | 2500 | 4000 | 4000 | 6100 | 7350 |
| | 30 sec. | (A) | 750 | 1250 | | 1600 | 1600 | 2800 | 2800 | 4400 | 5300 |
| | 1 min. | (A) | 550 | 900 | | 1200 | 1200 | 1800 | 1800 | 3500 | 4500 |
| | 3 min. | (A) | 350 | 600 | | 900 | 900 | 1200 | 1200 | 2300 | 2800 |
| Recovery time | min. | | 10 | 10 | | 10 | 10 | 10 | 10 | 10 | 10 |
| Short-circuit protection with fuse without TOR | | | | | | | | | | | |
| Coord. type "1" | gL/gG | (A) | 315 | 500 | | 500 | 630 | 1250 | 1250 | 1250 | 2x800 |
| Coord. type "2" | gL/gG | (A) | 250 | 400 | | 400 | 500 | 630 | 800 | 1000 | 1250 |
| Without welding | gL/gG | (A) | 200 | 315 | | 315 | 425 | 500 | 630 | 800 | 1000 |
| Impedance per pole | (m Ω) | | 0.45 | 0.32 | | 0.28 | 0.28 | 0.15 | 0.13 | 0.14 | 0.11 |
| Power dissipation per pole | AC-1 | (W) | 18 | 33.8 | | 44.8 | 56.7 | 61.2 | 68.6 | 140 | 171.8 |
| Insulation resistance | | | | | | | | | | | |
| Between adjacent poles | (m Ω) | | > 10 | > 10 | | > 10 | > 10 | > 10 | > 10 | > 10 | > 10 |
| Between poles and earth | (m Ω) | | > 10 | > 10 | | > 10 | > 10 | > 10 | > 10 | > 10 | > 10 |
| Between input and output | (m Ω) | | > 10 | > 10 | | > 10 | > 10 | > 10 | > 10 | > 10 | > 10 |

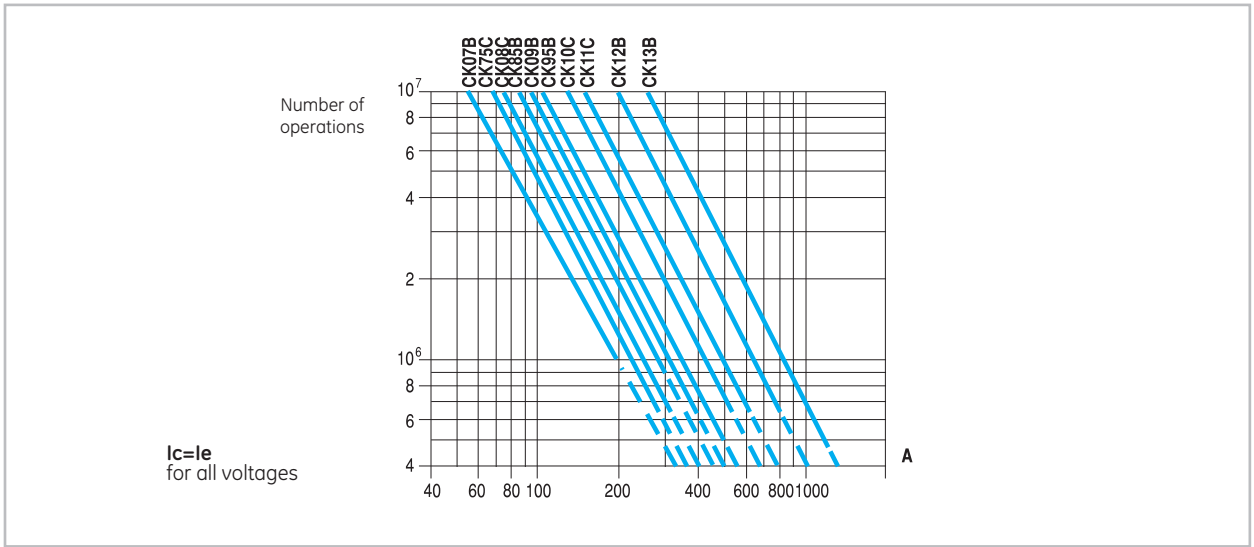
Electrical endurance

Mixed category AC4 / AC3

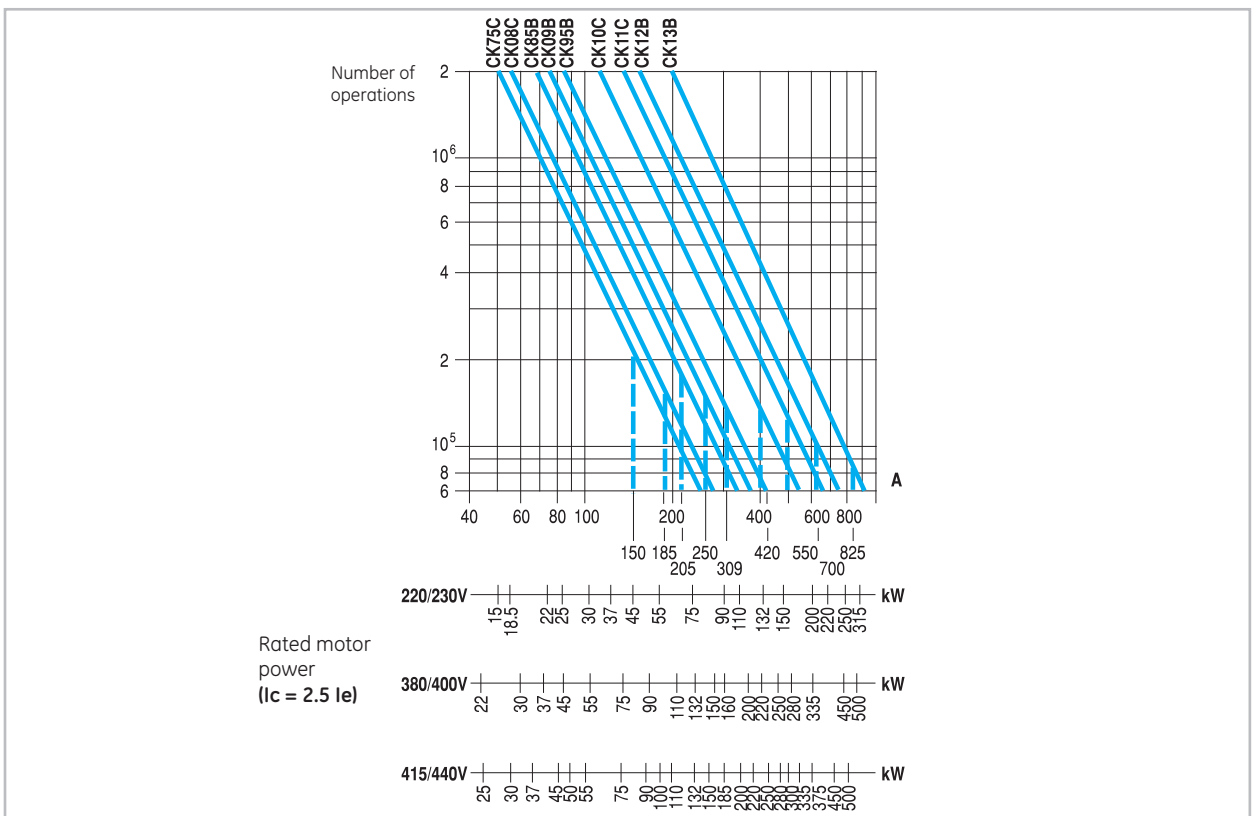
Electrical endurance for mixed category (AC-3/AC-4) is calculated with the following formula:

$$\text{Electrical endurance (AC-3/AC-4)} = \frac{\text{Electrical endurance (AC-3)}}{1 + \frac{\% \text{ oper AC-4}}{100} \times \left(\frac{\text{Elec.endur. (AC-3)}}{\text{Elec.endur. (AC-4)}} - 1 \right)}$$

Category AC1



Category AC2



Contactors

A

B

C

D

E

F

G

H

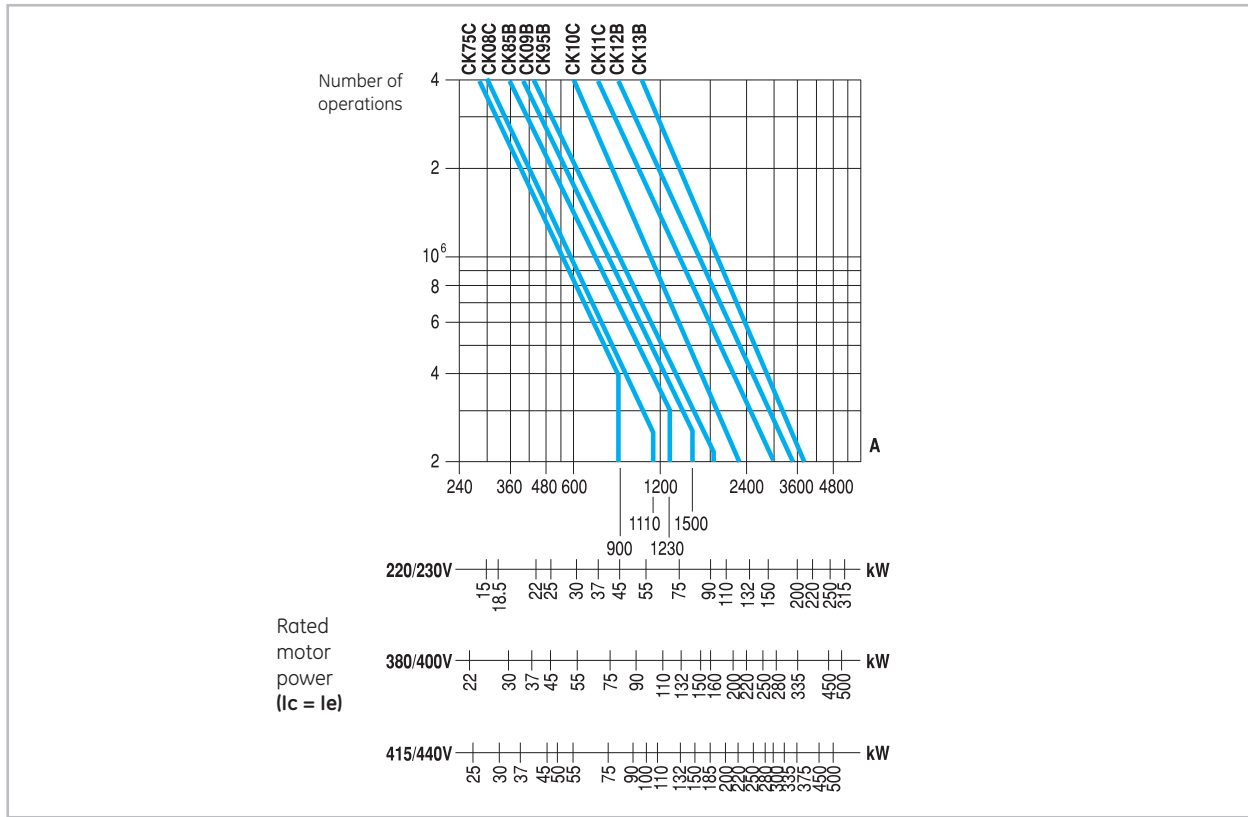
I

X

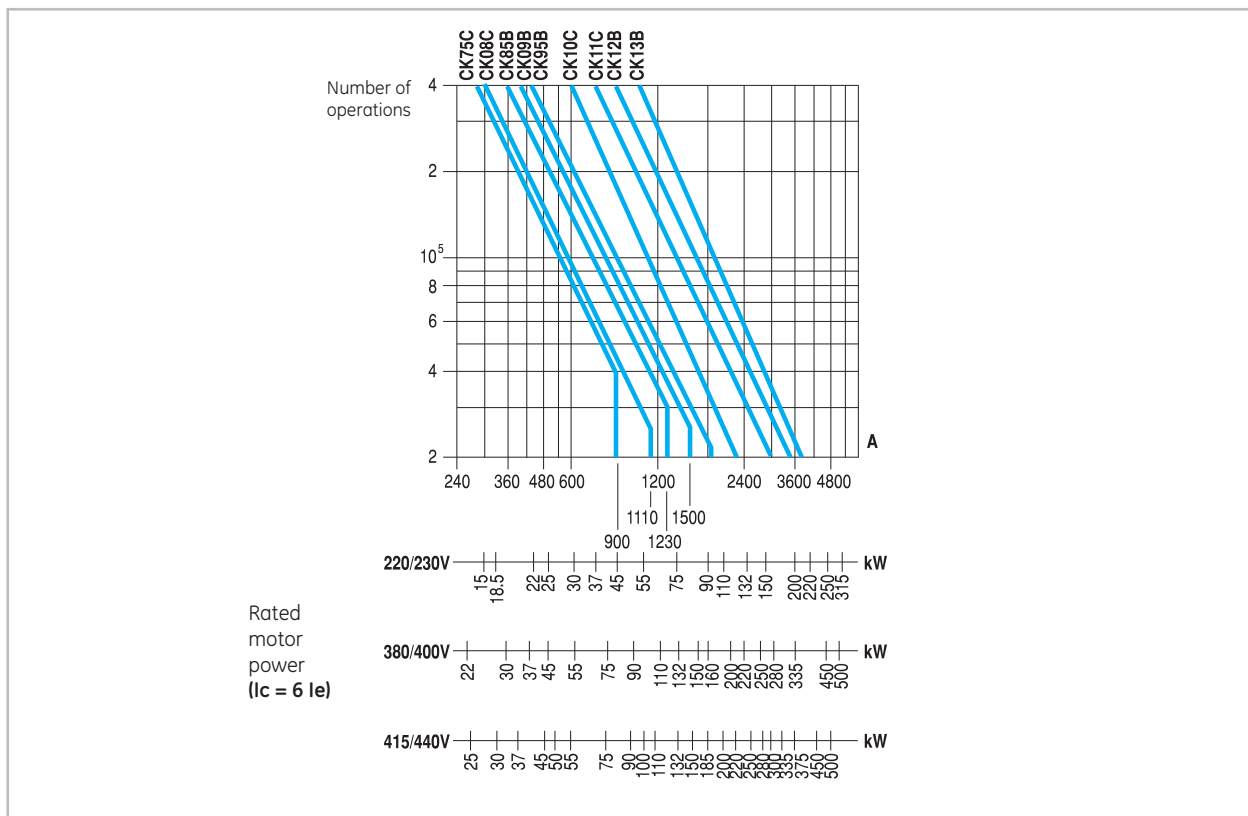


Electrical endurance (continued)

Category AC3



Category AC4



3P and 4P contactors

- A
- B
- C**
- D
- E
- F
- G
- H
- I
- X



Three pole contactors. Control circuit

Alternating current

| | | CK75CA | CK08CA | CK85BA CK85BE | CK09BE | CK95BE | CK10CE | CK11CE | CK12BE | CK13BA |
|---------------------------------------|-------------------------|-----------|-----------|------------------|-----------|-----------|-----------|-----------|-----------|-------------|
| Rated insulation voltage U_i | (V) | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| Standard voltages U_s (50/60 Hz) | (V) | 24...690 | 24...690 | 24...690 | 24...690 | 24...690 | 24...690 | 24...690 | 24...690 | 24...440 |
| Operating limits | | | | | | | | | | |
| Switch-on | xUs | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 |
| Switch-off | xUs | 0.4...0.6 | 0.4...0.6 | 0.4...0.6 | 0.4...0.6 | 0.4...0.6 | 0.4...0.6 | 0.4...0.6 | 0.4...0.6 | 0.25...0.55 |
| Consumption. Monofrequency coils | | | | | | | | | | |
| Magnetic circuit closed | CK...A (VA) | 42 | 42 | 46 | - | - | - | - | - | 6 |
| Magnetic circuit open | CK...E (VA) | - | - | 20 | 20 | 20 | 23 | 23 | 25 | - |
| Power dissipation | CK...A (W) | 500 | 500 | 830 | - | - | - | - | - | 2760 |
| | CK...E (W) | - | - | 425 | 425 | 425 | 680 | 680 | 750 | - |
| Consumption. Bifrequency coils | | | | | | | | | | |
| Magnetic circuit closed (CK...A) | 50Hz (VA) | 46 | 46 | 60 | - | - | - | - | - | - |
| | 60Hz (VA) | 38.3 | 38.3 | 50 | - | - | - | - | - | - |
| Magnetic circuit open (CK...A) | 50Hz (VA) | 568 | 568 | 1082 | - | - | - | - | - | - |
| | 60Hz (VA) | 473 | 473 | 901 | - | - | - | - | - | - |
| Power dissipation (CK...A) | 50Hz (W) | 23 | 23 | 22.2 | - | - | - | - | - | - |
| | 60Hz (W) | 19.1 | 19.1 | 18.5 | - | - | - | - | - | - |
| Power factor | | | | | | | | | | |
| Magnetic circuit closed | CK...A (cos φ) | 0.4 | 0.4 | 0.37 | - | - | - | - | - | approx. 1 |
| | CK...E (cos φ) | - | - | - | - | - | - | - | - | - |
| Magnetic circuit open | CK...A (cos φ) | 0.6 | 0.6 | 0.6 | - | - | - | - | - | approx. 1 |
| | CK...E (cos φ) | - | - | - | - | - | - | - | - | - |
| Opening and closing times at Us | | | | | | | | | | |
| Making time at excitation (NO) | (ms) | 20...25 | 20...25 | 36...40 | 60...70 | 60...70 | 80...90 | 80...90 | 70...80 | 50...55 |
| Breaking time at de-energisation (NO) | (ms) | 10...13 | 10...13 | 10...15 | 13...17 | 13...17 | 40...50 | 40...50 | 70...80 | 115...130 |
| Mechanical endurance | | | | | | | | | | |
| Maximum rate | 10^6 ops | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 3 |
| No load | ops./h | 2400 | 2400 | 2400 | 1200 | 1200 | 900 | 900 | 900 | 600 |
| AC-1/AC-3 at rated power | ops./h | 600 | 600 | 600 | 600 | 600 | 300 | 300 | 300 | 120 |
| AC-2 at rated power | ops./h | 250 | 250 | 250 | 250 | 250 | 200 | 200 | 200 | 120 |
| AC-4 at rated power | ops./h | 150 | 150 | 150 | 150 | 150 | 120 | 120 | 120 | 120 |

Direct current

| | | CK75CE | CK08CE | CK85BE | CK09BE | CK95BE | CK10CE | CK11CE | CK12BE |
|--|-------------|-----------|-----------|------------|-----------|-----------|-----------|-----------|-----------|
| Rated insulation voltage U_i | (V) | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| Standard voltages U_s (50/60 Hz) | (V) | 24...500 | 24...500 | 24...500 | 24...500 | 24...500 | 24...500 | 24...500 | 24...500 |
| Operating limits | | | | | | | | | |
| Switch-on | xUs | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 |
| Switch-off | xUs | 0.4...0.6 | 0.4...0.6 | 0.35...0.5 | 0.4...0.6 | 0.4...0.6 | 0.4...0.6 | 0.4...0.6 | 0.4...0.6 |
| Consumption | | | | | | | | | |
| Magnetic circuit closed | (W) | 2 | 2 | 3.5 | 3.5 | 3.5 | 4 | 4 | 4.5 |
| Magnetic circuit open | (W) | 135 | 135 | 350 | 350 | 350 | 405 | 405 | 650 |
| Opening and closing times at Us | | | | | | | | | |
| Making time at excitation (NO contacts) | (ms) | 60...70 | 60...70 | 60...70 | 60...70 | 60...70 | 80...90 | 80...90 | 70...80 |
| Breaking time at de-energisation (NO contacts) | (ms) | 13...17 | 13...17 | 13...17 | 13...17 | 13...17 | 40...50 | 40...50 | 40...50 |
| Mechanical endurance | | | | | | | | | |
| Maximum rate | 10^6 ops. | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| No load | ops./h | 1200 | 1200 | 1200 | 1200 | 1200 | 900 | 900 | 900 |
| AC-3 at rated power | ops./h | 600 | 600 | 600 | 600 | 600 | 300 | 300 | 300 |
| AC-4 at rated power | ops./h | 150 | 150 | 150 | 150 | 150 | 120 | 120 | 120 |



Four pole contactors. Control circuit

Alternating current

| | | CK07BA CK07BE | CK08BA CK08BE | CK09BE | CK95BE | CK10CE | CK11CE | CK12BE | CK13BA |
|---------------------------------------|----------------------|------------------|------------------|-----------|-----------|-----------|-----------|-----------|-------------|
| Rated insulation voltage Ui | (V) | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| Standard voltages Us (50/60 Hz) | (V) | 24...690 | 24...690 | 24...690 | 24...690 | 24...690 | 24...690 | 24...690 | 110...440 |
| Operating limits | | | | | | | | | |
| Switch-on | xUs | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 |
| Switch-off | xUs | 0.4...0.6 | 0.4...0.6 | 0.4...0.6 | 0.4...0.6 | 0.4...0.6 | 0.4...0.6 | 0.4...0.6 | 0.25...0.55 |
| Consumption. Monofrequency coils | | | | | | | | | |
| Magnetic circuit closed | CK...A (VA) | 46 | 130 | - | - | - | - | - | 6 |
| | CK...E (VA) | 20 | 25 | 25 | 25 | 23 | 23 | 25 | - |
| Magnetic circuit open | CK...A (VA) | 830 | 2860 | - | - | - | - | - | 2760 |
| | CK...E (VA) | 425 | 750 | 750 | 750 | 680 | 680 | 750 | - |
| Power dissipation | CK...A (W) | 17 | 53 | - | - | - | - | - | 5 |
| | CK...E (W) | 3.5 | 4.5 | 4.5 | 4.5 | 4 | 4 | 4.5 | - |
| Consumption. Bifrequency coils | | | | | | | | | |
| Magnetic circuit closed (CK...A) | 50Hz (VA) | 60 | 159.3 | - | - | - | - | - | - |
| | 60Hz (VA) | 50 | 132.7 | - | - | - | - | - | - |
| Magnetic circuit open (CK...A) | 50Hz (VA) | 1082 | 3509 | - | - | - | - | - | - |
| | 60Hz (VA) | 901 | 2924 | - | - | - | - | - | - |
| Power dissipation (CK...A) | 50Hz (W) | 22.2 | 65.3 | - | - | - | - | - | - |
| | 60Hz (W) | 18.5 | 54.4 | - | - | - | - | - | - |
| Power factor | | | | | | | | | |
| Magnetic circuit closed | CK...A (cos φ) | 0.37 | 0.37 | - | - | - | - | - | approx. 1 |
| | CK...E (cos φ) | - | - | - | - | - | - | - | - |
| Magnetic circuit open | CK...A (cos φ) | 0.6 | 0.6 | - | - | - | - | - | approx. 1 |
| | CK...E (cos φ) | - | - | - | - | - | - | - | - |
| Opening and closing times at Us | | | | | | | | | |
| Making time at excitation (NO) | (ms) | 36...40 | 60...70 | 70...80 | 70...80 | 110...115 | 80...90 | 110...115 | 50...55 |
| Breaking time at de-energisation (NO) | (ms) | 10...15 | 13...17 | 70...80 | 70...80 | 70...80 | 40...50 | 70...80 | 70...80 |
| Mechanical endurance | 10 ⁶ ops. | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 3 |
| Maximum rate | | | | | | | | | |
| No load | ops./h | 2400 | 900 | 900 | 900 | 900 | 900 | 900 | 600 |
| AC-1/AC-3 at rated power | ops./h | 600 | 600 | 600 | 600 | 300 | 300 | 300 | 120 |

3P and 4P contactors

A

B

C

D

E

F

G

H

I

X

Direct current

| | | CK07BE | CK08BE | CK08BE | CK95BE | CK10CE | CK11CE | CK12BE |
|--|----------------------|------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Rated insulation voltage Ui | (V) | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| Standard voltages Us | (V) | 24...500 | 24...500 | 24...500 | 24...500 | 24...500 | 24...500 | 24...500 |
| Operating limits | | | | | | | | |
| Switch-on | xUs | 0.75...1.1 | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 |
| Switch-off | xUs | 0.4...0.6 | 0.4...0.6 | 0.4...0.6 | 0.4...0.6 | 0.4...0.6 | 0.4...0.6 | 0.4...0.6 |
| Consumption. | | | | | | | | |
| Magnetic circuit closed | (W) | 3.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Magnetic circuit open | (W) | 350 | 650 | 650 | 650 | 650 | 650 | 650 |
| Opening and closing times at Us | | | | | | | | |
| Making time at excitation (NO contacts) | (ms) | 60...70 | 70...80 | 70...80 | 70...80 | 80...90 | 80...90 | 110...115 |
| Breaking time at de-energisation (NO contacts) | (ms) | 13...17 | 70...80 | 70...80 | 70...80 | 40...50 | 40...50 | 70...80 |
| Mechanical endurance | 10 ⁶ ops. | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Maximum rate | | | | | | | | |
| No load | ops./h | 1200 | 900 | 900 | 900 | 900 | 900 | 900 |
| AC-3 at rated power | ops./h | 600 | 600 | 600 | 600 | 600 | 300 | 300 |

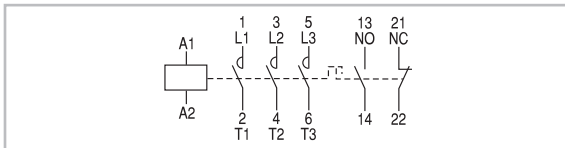
Contact sequence

| | | Basic contactor | Auxiliary contact blocks Lateral mounted | |
|----------------------------------|----------------------------------|-----------------|---|--------------------|
| | | | BCLL 20 BRLL 20 | BCLL 11 BRLL 11 |
| Three-pole contactors 3 NO | CK75C... CK08C... | 0 7.3 10.4 | 0 3.5 10.4 | 0 3.5 10.4 |
| | CK85B... CK09B... CK95B... | 0 10.4 14 | 0 3.5 14 | 0 3.5 14 1.8 |
| | CK10C... CK11C... | 0 12 17 | 0 3.5 17 | 0 3.5 17 1.8 |
| | CK12B... CK13B... | 0 12.6 17.5 | 0 3.5 17.5 | 0 3.5 17.5 1.8 |
| | CK07B... | 0 7.7 10.7 | 0 3.5 10.7 | 0 3.5 10.7 1.8 |
| | CK08B... CK09B... CK95B... | 0 10.4 14 | 0 3.5 14 | 0 3.5 14 1.8 |
| | CK10C... CK11C... | 0 12 17 | 0 3.5 17 | 0 3.5 17 1.8 |
| | CK12B... CK13B... | 0 12.6 17.5 | 0 3.5 17.5 | 0 3.5 17.5 1.8 |

Numbering of the terminals

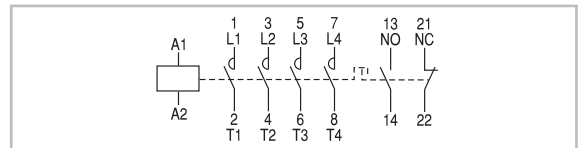
Three pole contactors

CK75C__3__... CK13B__3__



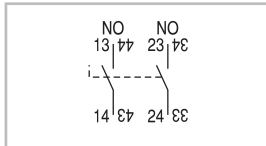
Four pole contactors

CK07B__4__... CK13B__4__

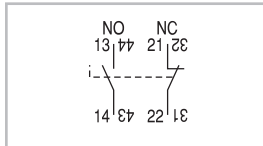


Auxiliary contact blocks. Lateral mounting

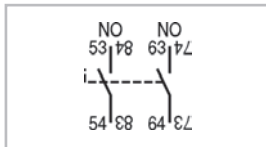
BCLL20



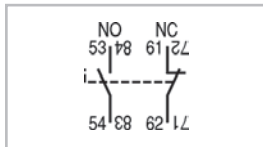
BCLL11



BRLL20

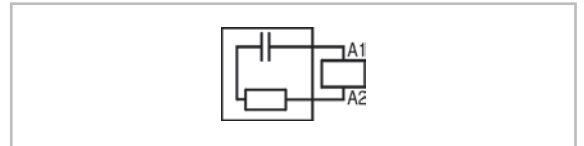


BRLL11



Voltage suppressor block

K/RC...



Mechanical interlock

BEKV, BEKVA1, BEKVS1, BEKVH



Notes

Grid area for notes.

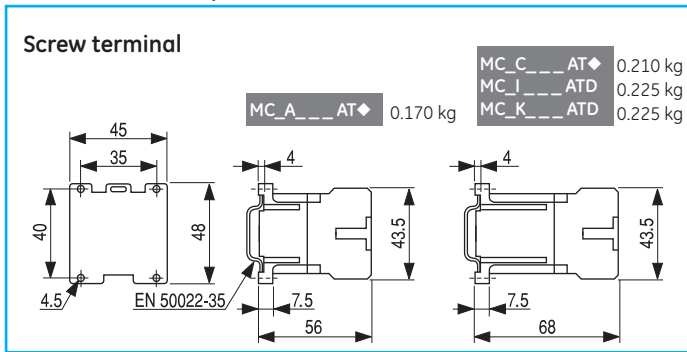
3P and 4P contactors

- A
- B
- C
- D
- E
- F
- G
- H
- I
- X

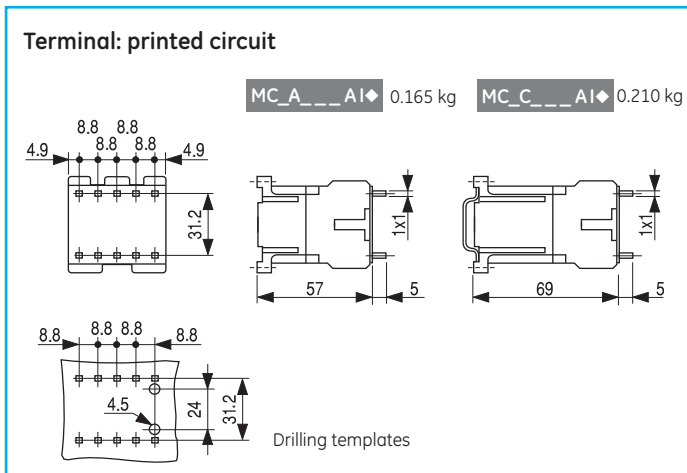
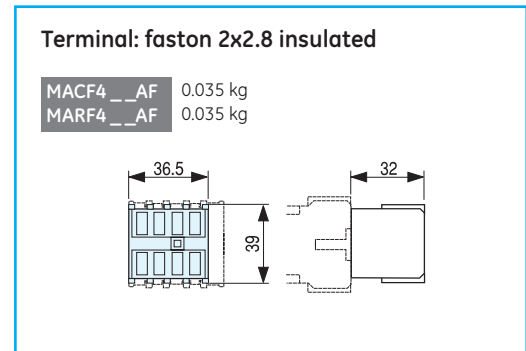
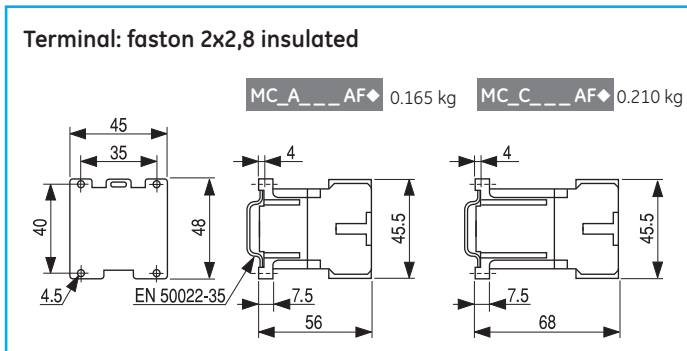
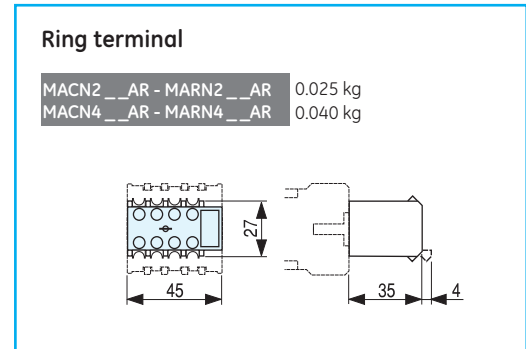
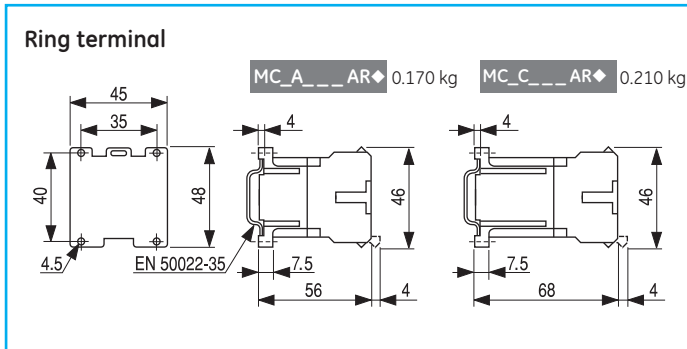
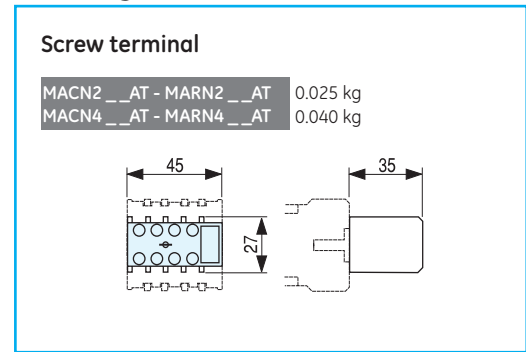


Dimensional drawings

Three and four pole minicontactors



Auxiliary contact block. Lateral mounting



Contactors

A

B

C

D

E

F

G

H

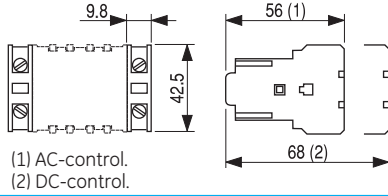
I

X

Auxiliary contact blocks. Lateral mounting

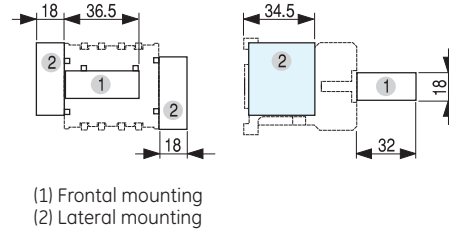
Screw terminal

MACL__AT 0.013 kg
MARL__ATS 0.013 kg



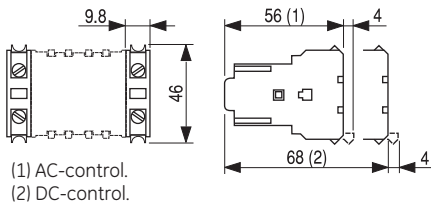
Electronic timer block

MREBC_0AC2 0.040 kg



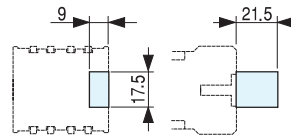
Ring terminal

MACL__AR 0.013 kg
MARL__ARS 0.013 kg



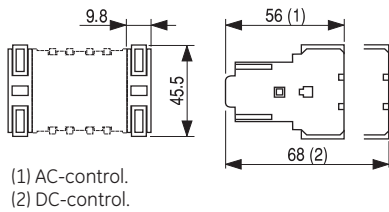
Voltage suppressor block

MP0A_AE 0.010 kg
MPOC_AE3 0.010 kg



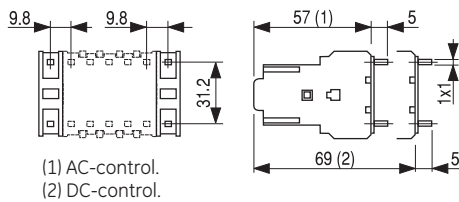
Terminal: faston 2x2.8 insulated

MACL__AF 0.009 kg
MARL__AFS 0.009 kg



Terminal: printed circuit

MACL__AI 0.009 kg
MARL__AIS 0.009 kg



3P and 4P minicontactors

A

B

C

D

E

F

G

H

I

X

Series CL

Dimensional drawings. Three pole contactors

Alternating current

Contactors

A

B

C

D

E

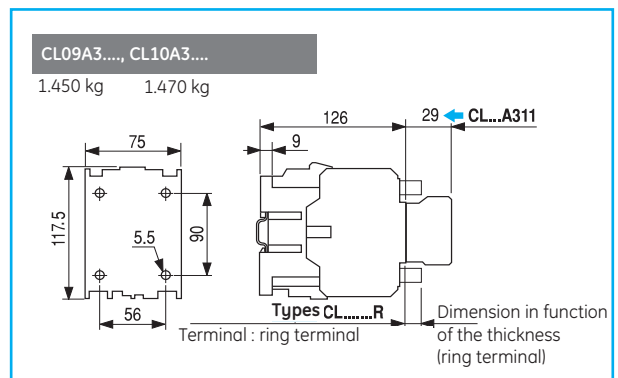
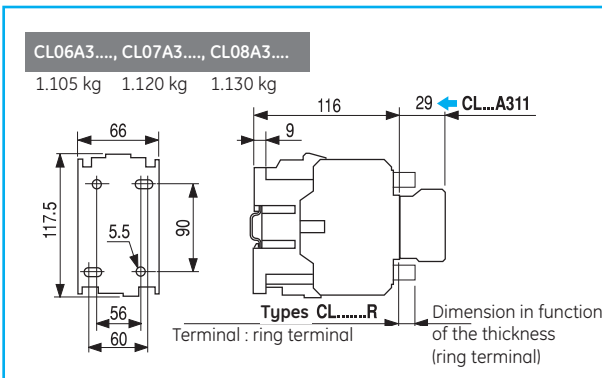
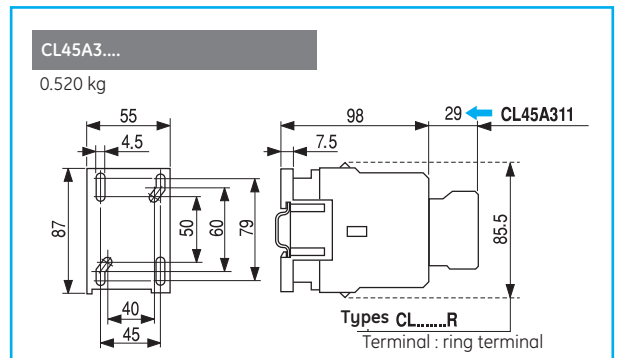
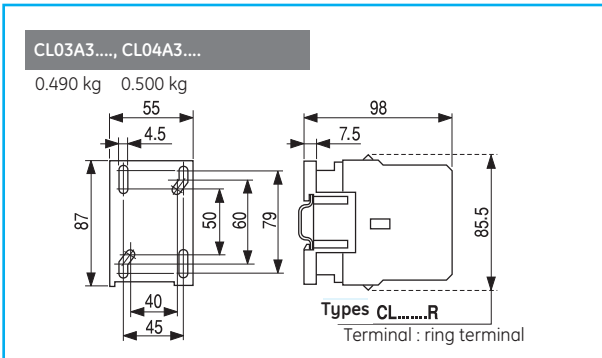
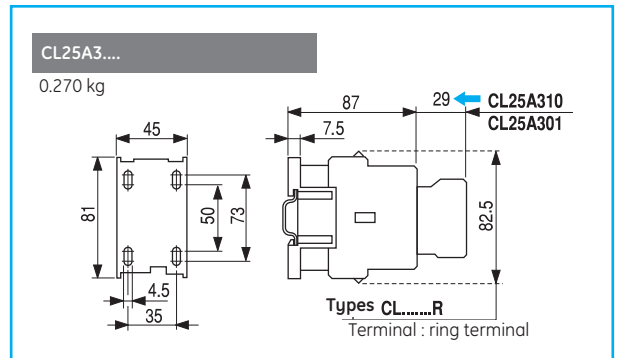
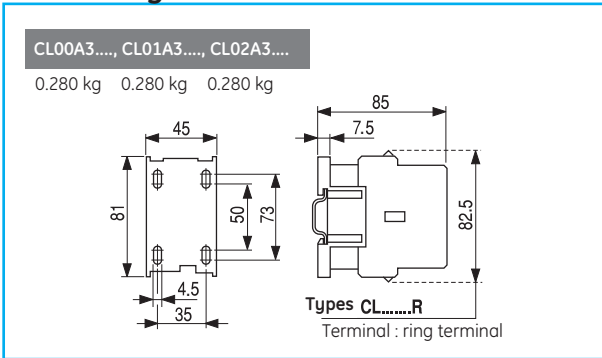
F

G

H

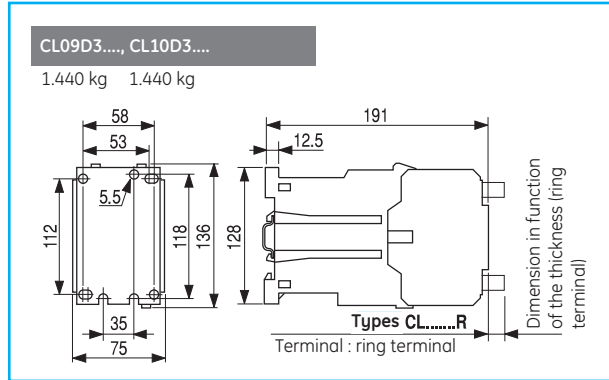
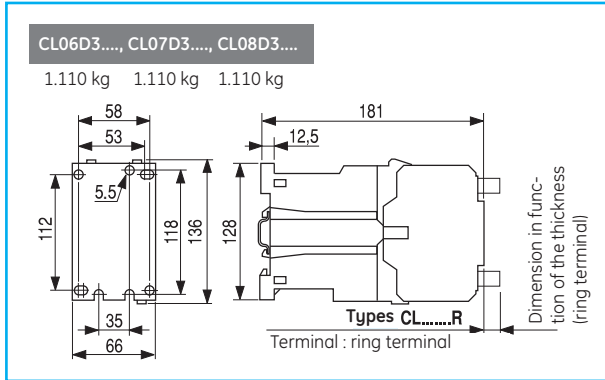
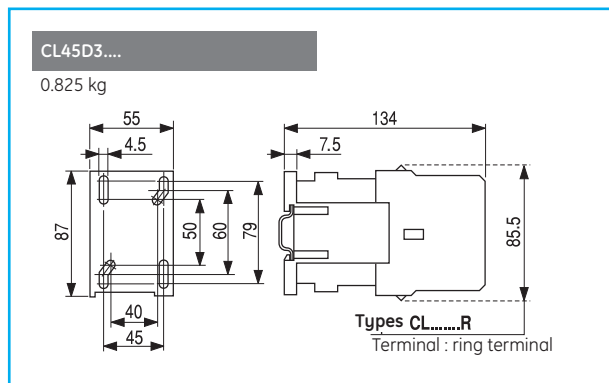
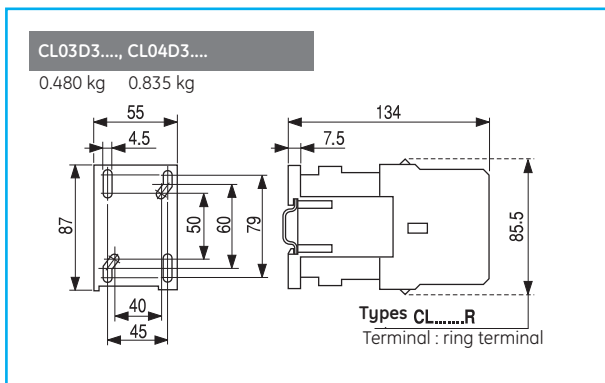
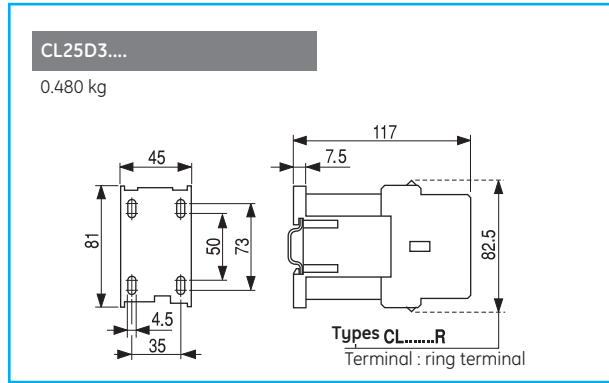
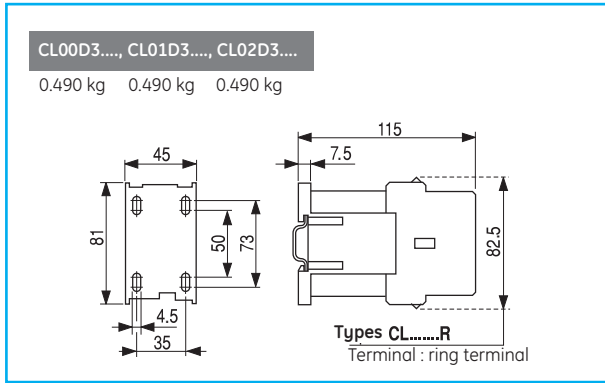
I

X

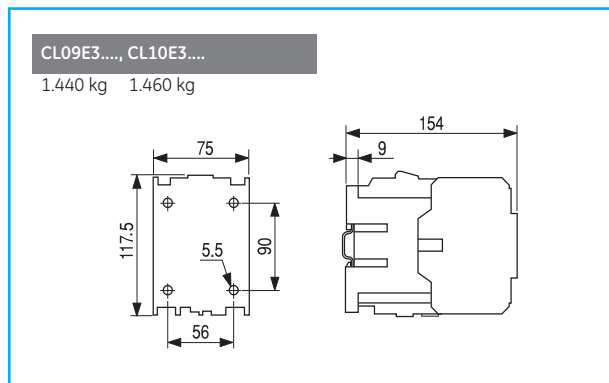
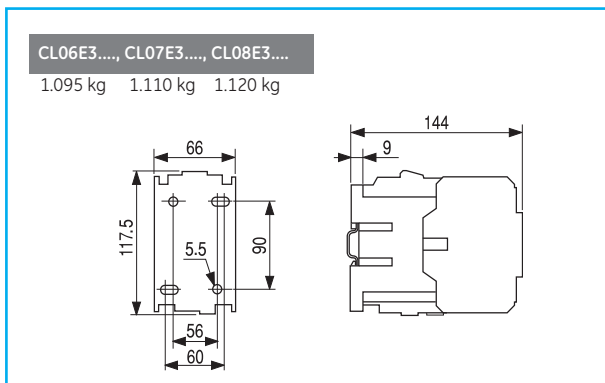


Three pole contactors

Direct current



Coil with electronic module



3P and 4P contactors

A

B

C

D

E

F

G

H

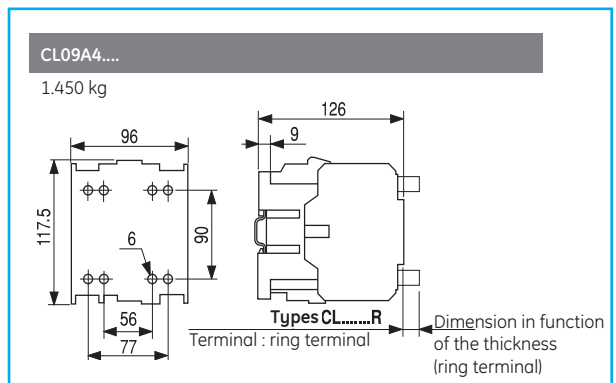
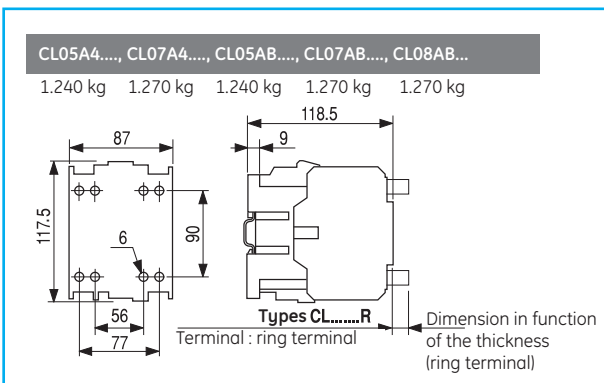
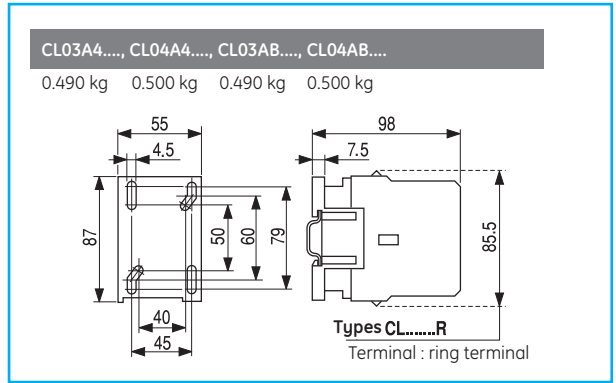
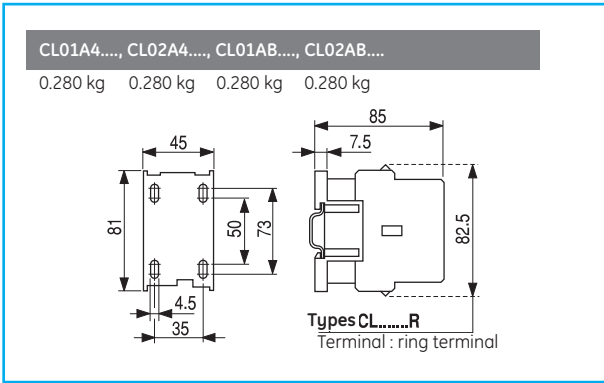
I

X

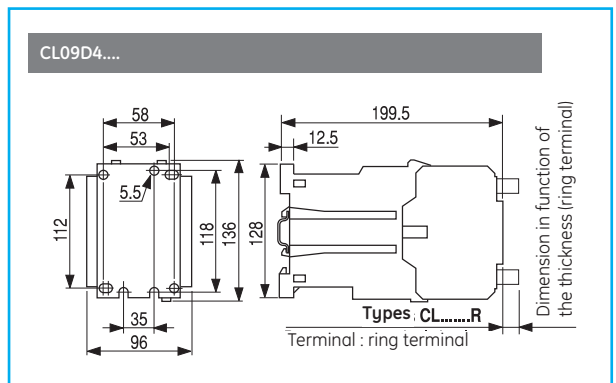
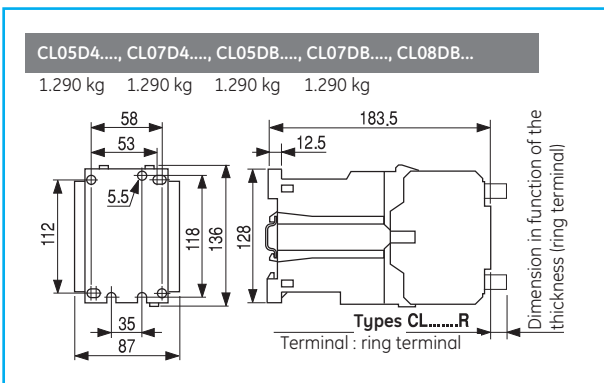
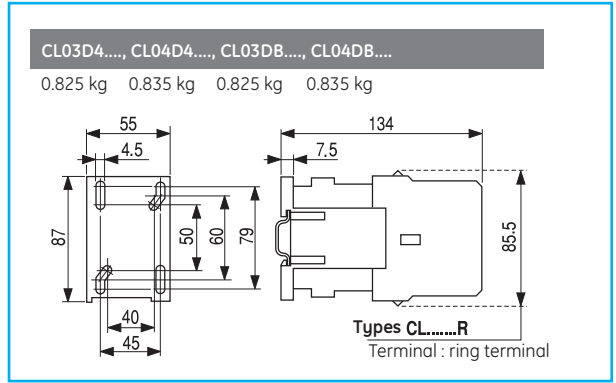
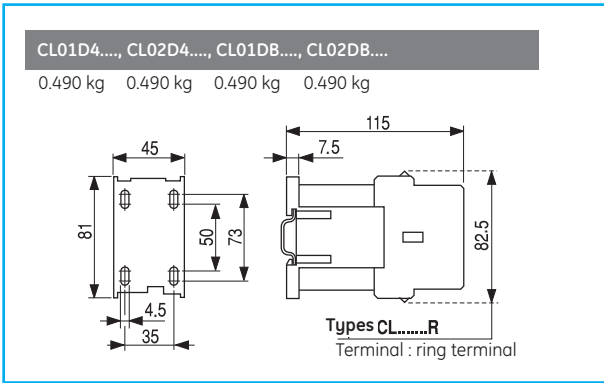
Series CL

Dimensional drawings. Four pole contactors

Alternating current



Direct current



Contactors

A

B

C

D

E

F

G

H

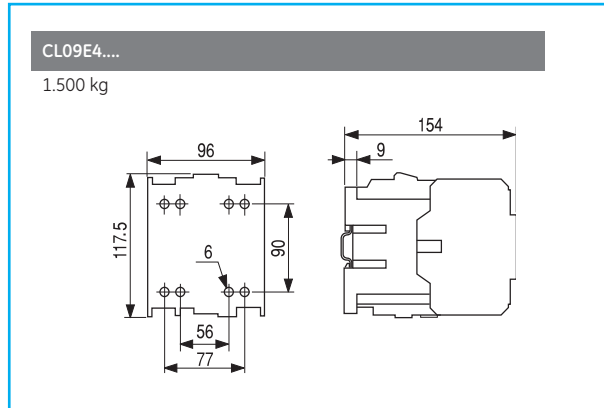
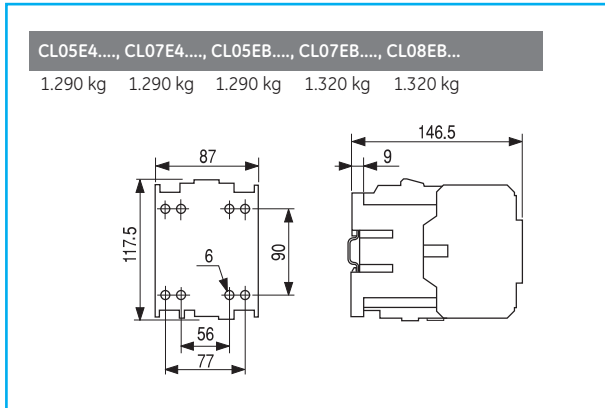
I

X



Four pole contactors

Coil with electronic module

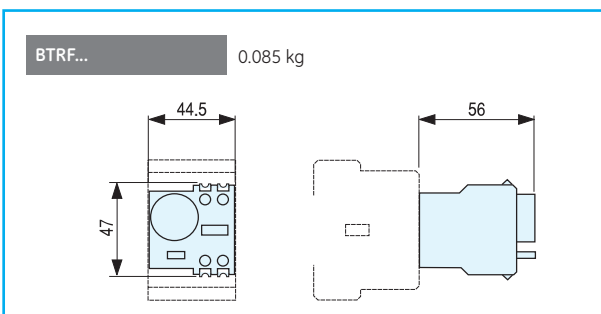
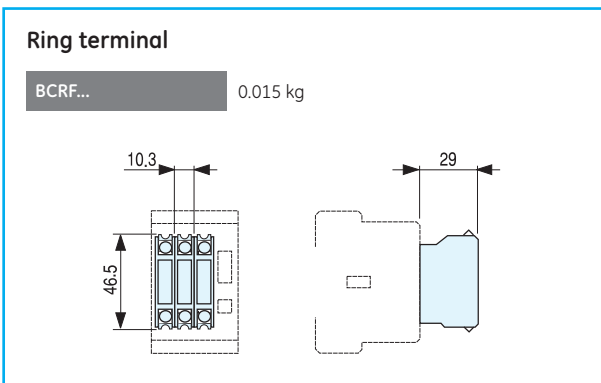
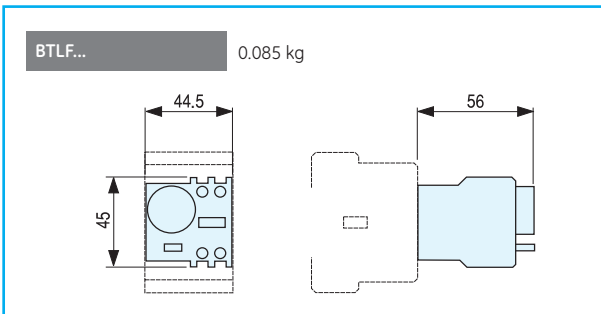
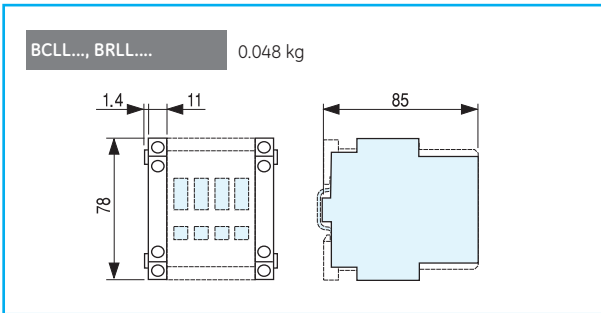
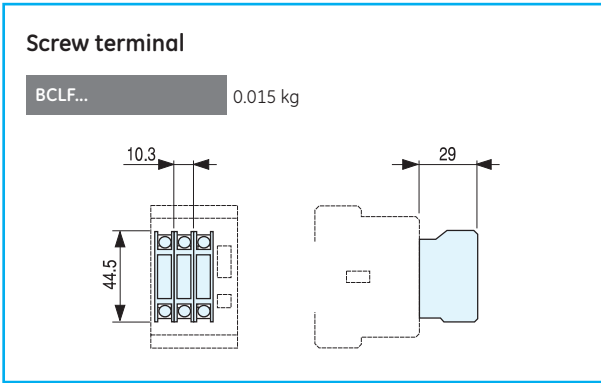


3P and 4P contactors

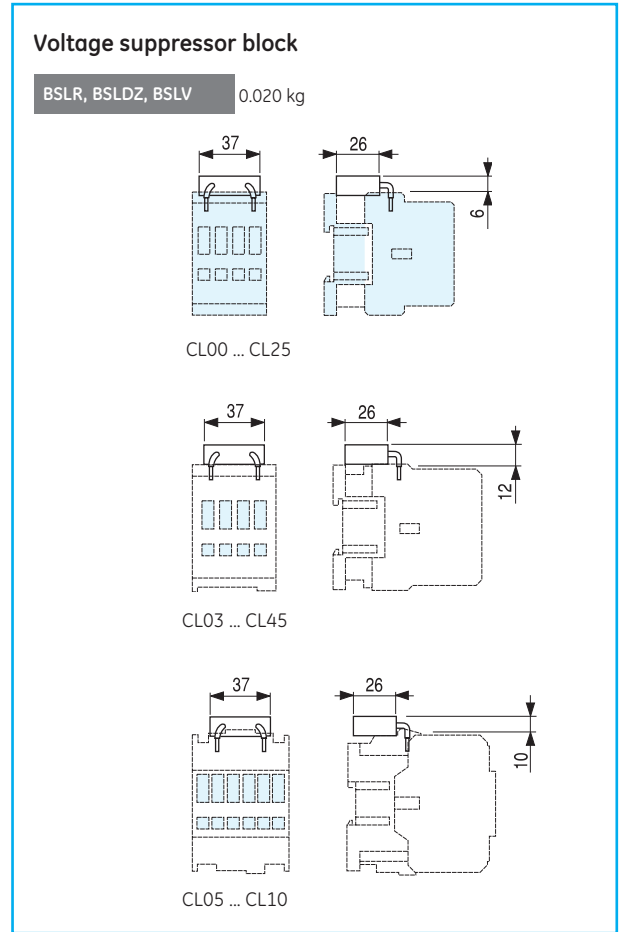
- A
- B
- C
- D
- E
- F
- G
- H
- I
- X

Dimensional drawings

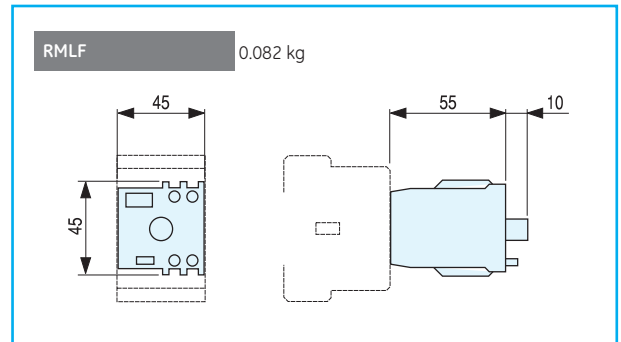
Auxiliary contact blocks



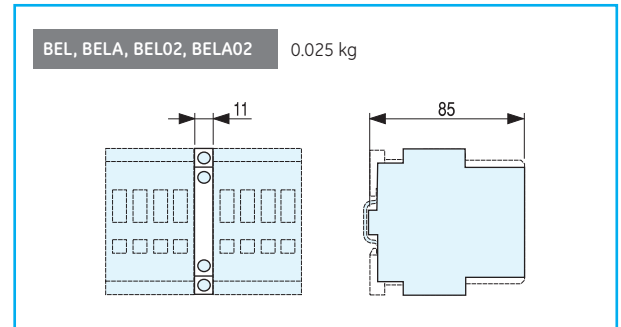
Accessories



Mechanical latch block

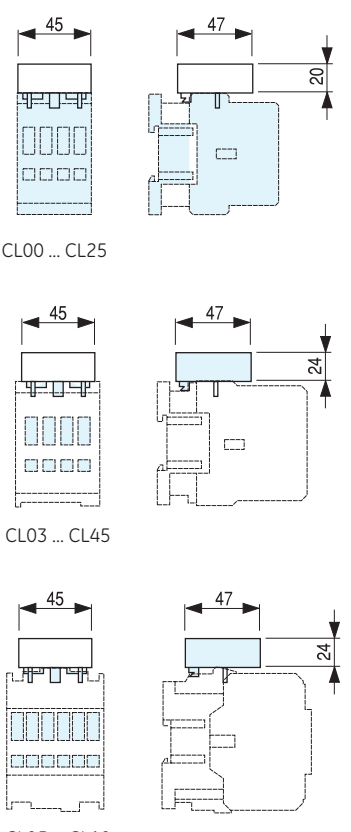


Mechanical / mechanical-electrical interlock



Electronic timer block

BETL02, BETL45 0.040 kg



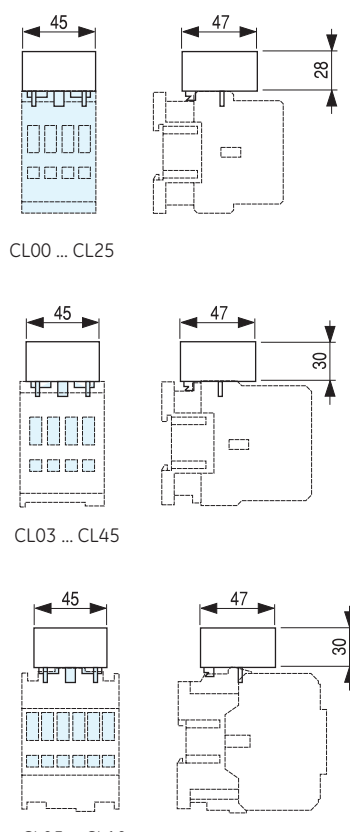
CL00 ... CL25

CL03 ... CL45

CL05 ... CL10

Interface modules

IMR..., IMRF..., IMSSD, IMAMS 0.020 kg



CL00 ... CL25

CL03 ... CL45

CL05 ... CL10

3P and 4P contactors

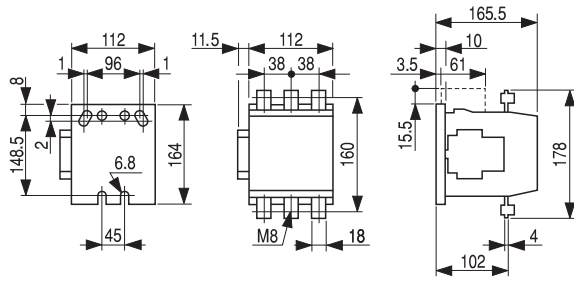
- A
- B
- C**
- D
- E
- F
- G
- H
- I
- X

Series CK

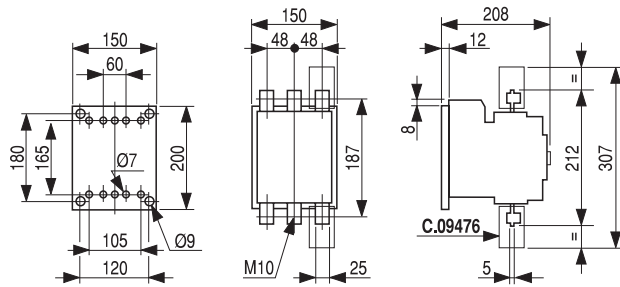
Dimensional drawings

Three pole contactors

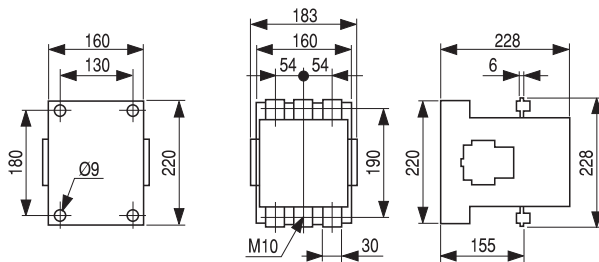
CK75C 3.500 kg
 CK08C 3.500 kg



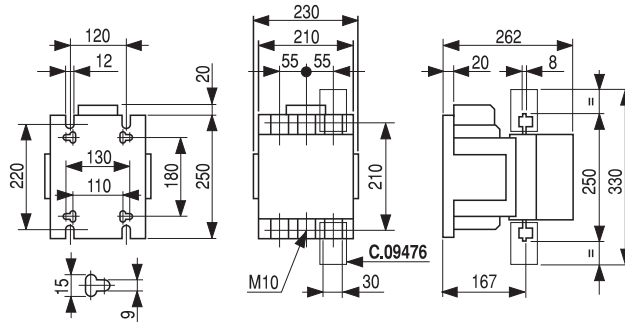
CK85B 6.100 kg
 CK09B 6.200 kg
 CK95B 6.300 kg



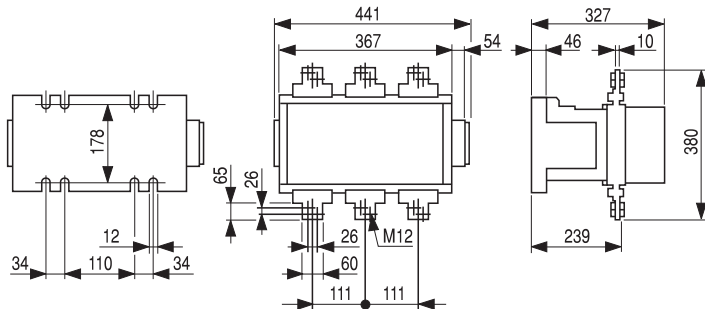
CK10C 11.00 kg
 CK11C 11.00 kg



CK12B 18.00 kg



CK13B 35.00 kg



Contactors

A

B

C

D

E

F

G

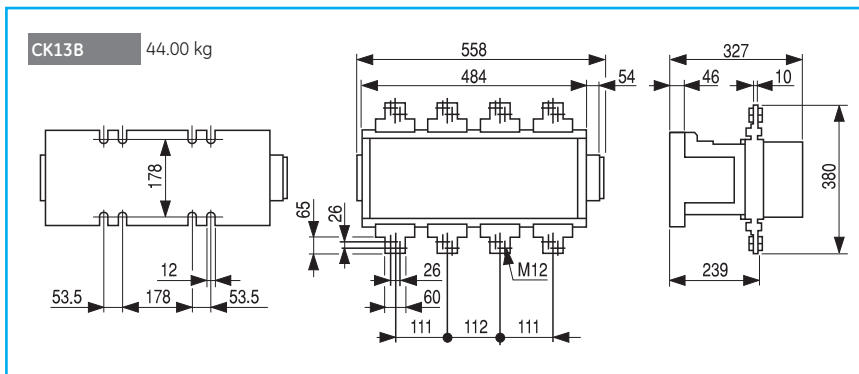
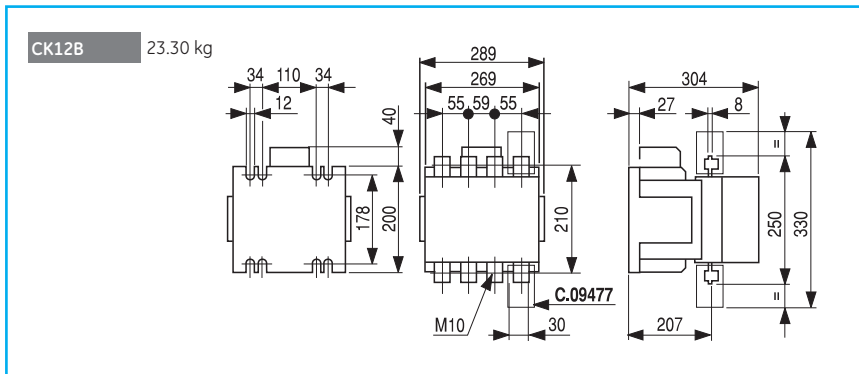
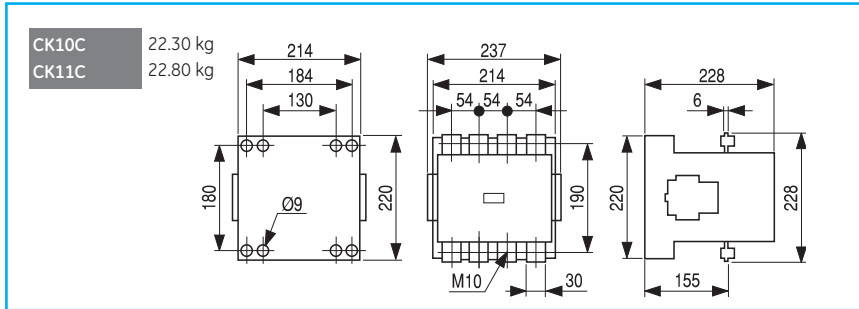
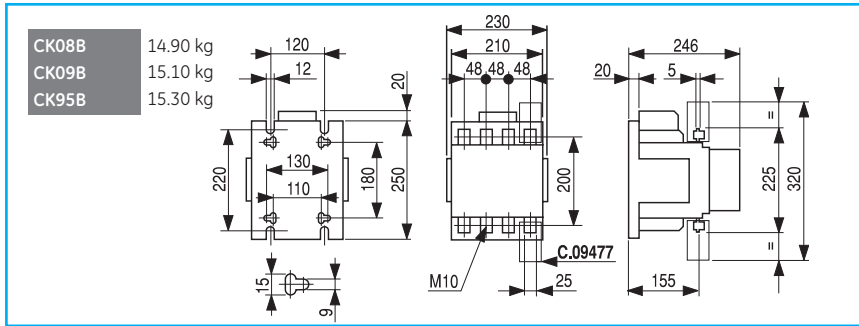
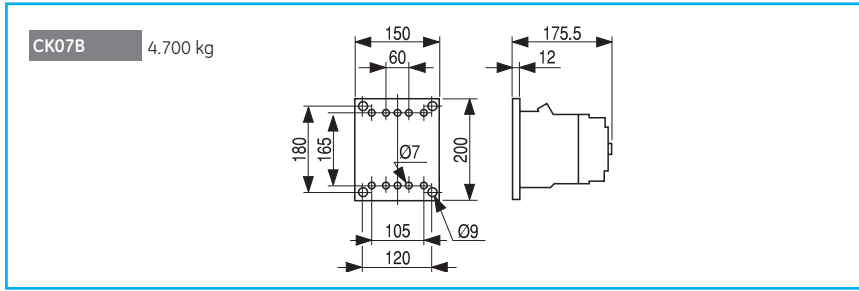
H

I

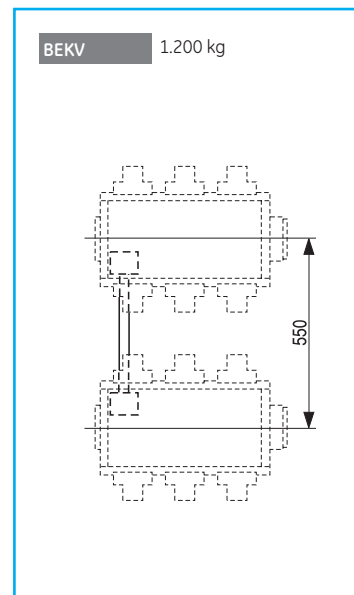
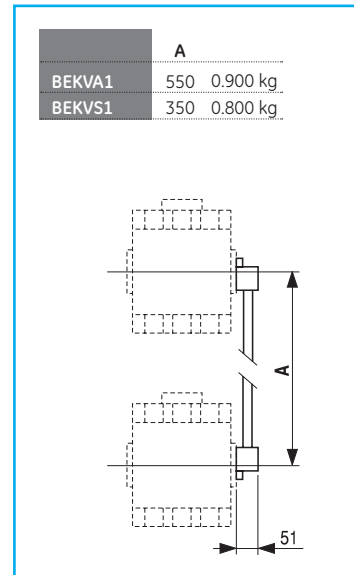
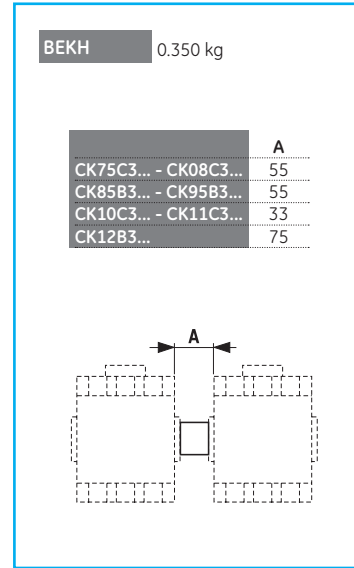
X



Four pole contactors



Mechanical interlock



3P and 4P contactors

A

B

C

D

E

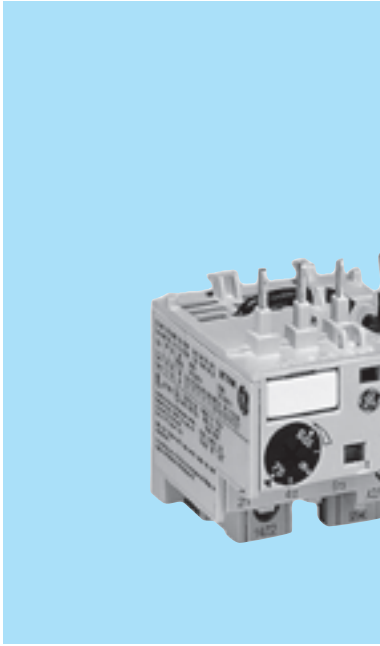
F

G

H

I

X



Thermal overload relays for minicontactors from 0.11 to 14A

- Control circuit up to 690V
- Power circuit up to 690V
- Three-pole differential (phase unbalance protection)
- Automatic ambient temperature compensation between -25°C and + 60°C
- Choice of manual or automatic reset
- Direct connection to contactor or independent mounting using accessories.
- Screw and Ring terminal versions
- Terminals protected against accidental contact in accordance with VDE 0106 T.100 and VBG4.
- Terminal numbering in accordance with EN 50005
- Degree of protection IP20 (EN 60529)
- Additional auxiliary contact block 1NO (with manual reset only)

Standards

| | |
|------------------|-------------|
| IEC/EN 60947-4-1 | CSA 22.2/14 |
| IEC/EN 60947-5-1 | NI C 63-650 |
| UNE 115 | VDE 0660 |
| NFC 63-650 | UL 508 |

Approvals


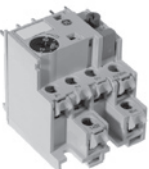


General characteristics




- Thermal protection against balanced overload.
- Three-pole differential (phase unbalance protection).
- Automatic ambient temperature compensation.
- Front mounted selector for choosing utilisation current.
- Reset button, 2 positions :
Manual(H) and Automatic(A) by turning the blue selector.
- Stop push button, independent of reset (red).
- Manual trip lever (tripping test).
- Tripping indicator (0-1).
- To facilitate wiring arrangements terminal 96 fits directly onto coil terminal (A2) and terminal 14/22 fits directly onto the feedback auxiliary contact.

Order codes ● pg. C.61
 Technical data ● pg. C.68
 Dimensions ● pg. C.69

Thermal overload relays for minicontactors

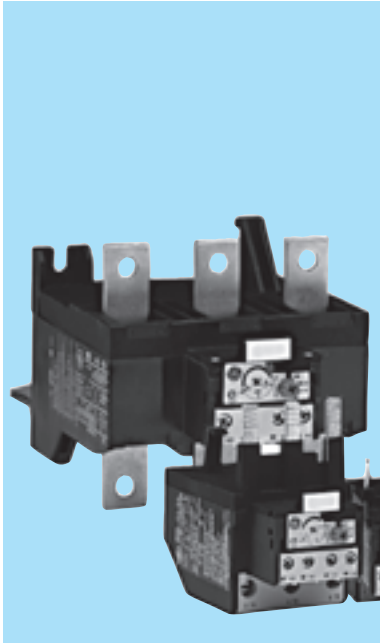
| | For use with: | Setting range (regulation) | | Fuse | | | | Terminal: screw | | Terminal: ring terminal | | Pack |
|---|---------------|----------------------------|--------|--------|--------|--------|--------|-----------------|----------|-------------------------|----------|------|
| | | | | aM | | gL | | Cat. no. | Ref. no. | Cat. no. | Ref. no. | |
| | | | | Type 2 | Type 1 | Type 2 | Type 1 | | | | | |
|  | MC0... | min. A | max. A | A | A | A | A | MT03A | 101000 | MT03RA | 103540 | 10 |
| | MC1... | 0.11 | 0.17 | 0.5 | 0.5 | 0.5 | 0.5 | MT03B | 101001 | MT03RB | 103541 | 10 |
| | MC2... | 0.17 | 0.26 | 0.85 | 1 | 1 | 1 | MT03C | 101002 | MT03RC | 103542 | 10 |
|  | | 0.26 | 0.43 | 1 | 2 | 2 | 4 | MT03D | 101003 | MT03RD | 103543 | 10 |
| | | 0.43 | 0.65 | 1 | 4 | 2 | 8 | MT03E | 101004 | MT03RE | 103544 | 10 |
| | | 0.65 | 1 | 2 | 6 | 4 | 12 | MT03F | 101005 | MT03RF | 103545 | 10 |
| | | 0.85 | 1.3 | 2 | 6 | 4 | 12 | MT03G | 101006 | MT03RG | 103546 | 10 |
| | | 1.1 | 1.6 | 2 | 10 | 4 | 16 | MT03H | 101007 | MT03RH | 103547 | 10 |
| | | 1.35 | 2 | 4 | 10 | 6 | 16 | MT03I | 101008 | MT03RI | 103548 | 10 |
| | | 1.7 | 2.4 | 4 | 16 | 6 | 25 | MT03J | 101009 | MT03RJ | 103549 | 10 |
| | | 2.2 | 3.2 | 4 | 20 | 6 | 32 | MT03K | 101010 | MT03RK | 103550 | 10 |
| | | 2.5 | 4 | 4 | 20 | 6 | 32 | MT03L | 101011 | MT03RL | 103551 | 10 |
| | | 3 | 4.7 | 6 | 20 | 10 | 32 | MT03M | 101012 | MT03RM | 103552 | 10 |
| | | 4 | 6.3 | 10 | 32 | 16 | 50 | MT03N | 101013 | MT03RN | 103553 | 10 |
| | | 5.5 | 8 | 12 | 50 | 20 | 63 | MT03P | 101014 | MT03RP | 103554 | 10 |
| | | 7.5 | 10.5 | 16 | 50 | 25 | 80 | | | | | |
| | | 10 | 14 | 20 | 32 | 32 | 100 | | | | | |

Accessories

| | | Terminal | Cat. no. | Ref. no. | Pack |
|---|-------------------------|---|----------|----------|------|
|  | Input terminals | Screw | MVE0T | 101020 | 5 |
| | | Ring terminal | MVE0R | 103562 | 5 |
|  | Base | For separate mounting onto standard EN 50022-35 profile | MVB0T | 101021 | 5 |
|  | Auxiliary contact block | Screw | MATV10AT | 101022 | 10 |
| | | Ring terminal | MATV10AR | 103563 | 10 |
| | Identification | Sheets of labels (sheets of 260 labels each) | EAT 260 | 100548 | 1 |
| | | Labeling plate base (50 pieces in one pack) | SPR | 100549 | 1 |

Order codes

A
B
C
D
E
F
G
H
I
X



Thermal overload relays for contactors from 0.16 to 850A

- Control circuit up to 690V AC
- Power circuit:
 - RT1, RT12: up to 690V
 - RT2, RT22, RT3, RT32, RT4/4L, RT5/5L & RT6/6L: up to 1000V
- Thermal protection against normal overloads.
- Three pole differential (phase unbalance protection).
- Protection against long starting times.
- Automatic ambient temperature compensation between - 25°C y + 60°C.
- Front mounted test button.
- Trip indication.
- Independent auxiliary contacts with double rupture (1NO + 1NC).
- Function selector:
 - Manual RESET
 - Manual RESET and STOP
 - Automatic RESET with STOP
 - Automatic RESET without STOP

Standards

| | |
|------------------|-------------|
| IEC/EN 60947-4-1 | CSA 22.2/14 |
| IEC/EN 60947-5-1 | NI C 63-650 |
| UNE 115 | VDE 0660 |
| NFC 63-650 | UL 508 |
| CEI 17-50 | |

Approvals



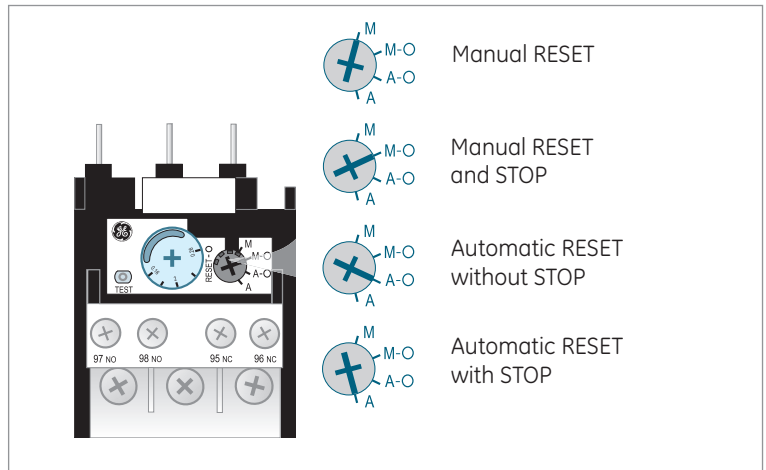
Lloyd's Register



Bureau Veritas



RINA



Order codes ● pg. C.63
 Technical data ● pg. C.70
 Dimensions ● pg. C.74



Thermal overload relays for contactors



| | For use with: | Setting range (regulation) | | Fuses ⁽¹⁾ | | Srew terminal | | Ring terminal | | Pack | |
|------------------|---------------|----------------------------|------|----------------------|---------|---------------|----------|---------------|----------|--------|---|
| | | | | aM | gL - gG | | | | | | |
| | | | | min. A | max. A | Cat. no. | Ref. no. | Cat. no. | Ref. no. | | |
| Class 10A | CL00 | 0.16 | 0.26 | 2 | 2 | RT1B | 113700 | RT1RB | 114087 | 5 | |
| | CL01 | 0.25 | 0.41 | 2 | 2 | RT1C | 113701 | RT1RC | 114088 | 5 | |
| | CL02 | 0.4 | 0.65 | 2 | 2 | RT1D | 113702 | RT1RD | 114089 | 5 | |
| | CL25 | 0.65 | 1.1 | 2 | 4 | RT1F | 113703 | RT1RF | 114090 | 5 | |
| | CL03 | 1.0 | 1.5 | 4 | 6 | RT1G | 113704 | RT1RG | 114091 | 5 | |
| | CL04 | 1.3 | 1.9 | 4 | 6 | RT1H | 113705 | RT1RH | 114092 | 5 | |
| | CL45 | 1.8 | 2.7 | 6 | 10 | RT1J | 113706 | RT1RJ | 114093 | 5 | |
| | | 2.5 | 4.0 | 8 | 16 | RT1K | 113707 | RT1RK | 114094 | 5 | |
| | | 4.0 | 6.3 | 12 | 20 | RT1L | 113708 | RT1RL | 114095 | 5 | |
| | | 5.5 | 8.5 | 16 | 20 | RT1M | 113709 | RT1RM | 114096 | 5 | |
| | | 8.0 | 12.0 | 20 | 25 | RT1N | 113710 | RT1RN | 114097 | 5 | |
| | | 10.0 | 16.0 | 25 | 35 | RT1P | 113711 | RT1RP | 114098 | 5 | |
| | | 14.5 | 18.0 | 32 | 50 | RT1S | 113712 | RT1RS | 114099 | 5 | |
| | | 17.5 | 22.0 | 40 | 50 | RT1T | 113713 | RT1RT | 114100 | 5 | |
| | | 21.0 | 26.0 | 40 | 63 | RT1U | 113714 | RT1RU | 114101 | 5 | |
| | | 25.0 | 32.0 | 50 | 80 | RT1V | 113715 | RT1RV | 114102 | 5 | |
| | | 30.0 | 40.0 | 63 | 100 | RT1W | 113716 | RT1RW | 114103 | 5 | |
| Class 10 | CL05 | 11.5 | 15.0 | 32 | 35 | RT2A | 113717 | RT2RA | 114104 | 1 | |
| | CL06 | 14.5 | 19.0 | 40 | 50 | RT2B | 113718 | RT2RB | 114105 | 1 | |
| | CL07 | 18.5 | 25.0 | 50 | 63 | RT2C | 113719 | RT2RC | 114106 | 1 | |
| | CL08 | 24.0 | 32.0 | 63 | 100 | RT2D | 113720 | RT2RD | 114107 | 1 | |
| | CL09 | 30.0 | 43.0 | 80 | 125 | RT2E | 113721 | RT2RE | 114108 | 1 | |
| | CL10 | 42.0 | 55.0 | 100 | 160 | RT2G | 113722 | RT2RG | 114109 | 1 | |
| | | 54.0 | 65.0 | 125 | 160 | RT2H | 113723 | RT2RH | 114110 | 1 | |
| | | 64.0 | 82.0 | 125 | 200 | RT2J | 113724 | RT2RJ | 114111 | 1 | |
| | | 78.0 | 97.0 | 125 | 200 | RT2L | 113725 | RT2RL | 114112 | 1 | |
| | | 90.0 | 110 | 160 | 250 | RT2M | 113726 | RT2RM | 114113 | 1 | |
| Class 20 | CL00 | 0.4 | 0.65 | 2 | 2 | RT12D | 139138 | RT12RD | 114060 | 5 | |
| | CL01 | 0.65 | 1.1 | 2 | 4 | RT12F | 139139 | RT12RF | 114061 | 5 | |
| | CL02 | 1 | 1.5 | 4 | 6 | RT12G | 139140 | RT12RG | 114062 | 5 | |
| | CL25 | 1.3 | 1.9 | 4 | 6 | RT12H | 139141 | RT12RH | 114063 | 5 | |
| | CL03 | 1.8 | 2.7 | 8 | 10 | RT12J | 139142 | RT12RJ | 114159 | 5 | |
| | CL04 | 2.5 | 4.1 | 8 | 16 | RT12K | 113640 | RT12RK | 114114 | 5 | |
| | CL45 | 4 | 6.3 | 12 | 20 | RT12L | 113641 | RT12RL | 114115 | 5 | |
| | | 5.5 | 8.5 | 16 | 20 | RT12M | 113642 | RT12RM | 114116 | 5 | |
| | | 8 | 12 | 20 | 35 | RT12N | 113643 | RT12RN | 114117 | 5 | |
| | | 10 | 16 | 25 | 35 | RT12P | 113644 | RT12RP | 114118 | 5 | |
| | | 14.5 | 18 | 32 | 50 | RT12S | 113645 | RT12RS | 114119 | 5 | |
| | | 17.5 | 22 | 40 | 50 | RT12T | 113646 | RT12RT | 114120 | 5 | |
| | | 21 | 26 | 40 | 63 | RT12U | 113647 | RT12RU | 114121 | 5 | |
| | | 25 | 32 | 50 | 80 | RT12V | 113648 | RT12RV | 114122 | 5 | |
| | | 30 | 40 | 63 | 100 | RT12W | 113649 | RT12RW | 114123 | 5 | |
| | | CL05 | 24 | 32 | 63 | 80 | RT22D | 113650 | RT22RD | 114124 | 1 |
| | | CL06 | 30 | 43 | 80 | 100 | RT22E | 113651 | RT22RE | 114125 | 1 |
| | | CL07 | 42 | 55 | 100 | 160 | RT22G | 113652 | RT22RG | 114126 | 1 |
| | | CL08 | 54 | 65 | 125 | 160 | RT22H | 113653 | RT22RH | 114127 | 1 |
| | | CL09 | 64 | 82 | 125 | 200 | RT22J | 113654 | RT22RJ | 114128 | 1 |
| | | CL10 | 78 | 97 | 125 | 200 | RT22L | 113655 | RT22RL | 114129 | 1 |
| | | | 90 | 110 | 160 | 250 | RT22M | 113656 | RT22RM | 114130 | 1 |

(1) Most suitable fuse in accordance with IEC 60947-4-1.

Order codes

A

B

C

D

E

F

G


H

I

X






Thermal overload relays for contactors

| | For use with: | Setting range (regulation) | | Fuses ⁽¹⁾ | | Cat.no. (Screw terminal) | Ref. no. | Pack | |
|---|--|----------------------------|------|----------------------|---------|-----------------------------|----------|--------|--------|
| | | min. | max. | aM | gL - gG | | | | |
| | | A | A | A | A | | | | |
|  | Class 10 Direct mounting | CK75 | 55 | 80 | 125 | 200 | RT3B | 113727 | 1 |
| | | CK08 | 63 | 90 | 125 | 200 | RT3C | 113728 | 1 |
| | | | 90 | 120 | 160 | 250 | RT3D | 113729 | 1 |
| | | | 110 | 140 | 200 | 315 | RT3E | 113730 | 1 |
| | | | 140 | 190 | 250 | 355 | RT3F | 113731 | 1 |
| | | CK85 | 120 | 190 | 250 | 315 | RT4N | 113732 | 1 |
| | | CK09 | 175 | 280 | 315 | 400 | RT4P | 113733 | 1 |
| | | CK95 ⁽²⁾ | 200 | 310 | 400 | 500 | RT4R | 113734 | 1 |
| | | CK10 | 120 | 190 | 250 | 315 | RT5A | 113750 | 1 |
| | | CK11 | 175 | 280 | 315 | 400 | RT5B | 113751 | 1 |
| | | CK12 ⁽³⁾ | 250 | 400 | 500 | 630 | RT5C | 113752 | 1 |
| | | | 315 | 500 | 630 | 800 | RT5D | 113753 | 1 |
| | | | 430 | 700 | 800 | 1000 | RT5E | 113754 | 1 |
| | | CK13 ⁽⁴⁾ | 500 | 850 | 100 | 1250 | RT6A | 113760 | 1 |
| | Class 20 | Direct mounting | CK75 | 63 | 90 | 125 | 200 | RT32C | 113657 |
| CK08 | | | 90 | 120 | 160 | 250 | RT32D | 113658 | 1 |
| | | | 110 | 140 | 200 | 315 | RT32E | 113659 | 1 |
| | | | 140 | 190 | 250 | 355 | RT32F | 113660 | 1 |
| | | | | | | | | | |
| Class 30 | CL... CK... Mounting with screws | | 2.5 | 4 | 10 | 16 | RT4LA | 113735 | 1 |
| | | | 4 | 6.5 | 12 | 20 | RT4LB | 113736 | 1 |
| | | | 5.5 | 8.5 | 16 | 25 | RT4LC | 113737 | 1 |
| | | | 7.5 | 11 | 20 | 32 | RT4LD | 113738 | 1 |
| | | | 10 | 16 | 25 | 40 | RT4LE | 113739 | 1 |
| | | | 12.5 | 20 | 32 | 50 | RT4LF | 113740 | 1 |
| | | | 17 | 27 | 50 | 80 | RT4LG | 113741 | 1 |
| | | | 26 | 40 | 80 | 125 | RT4LH | 113742 | 1 |
| | | | 32 | 52 | 100 | 160 | RT4LJ | 113743 | 1 |
| | | | 45 | 70 | 125 | 160 | RT4LK | 113744 | 1 |
| | | | 60 | 90 | 160 | 200 | RT4LL | 113745 | 1 |
| | | | 80 | 125 | 200 | 250 | RT4LM | 113746 | 1 |
| | | | CK85 | 120 | 190 | 250 | 315 | RT4LN | 113747 |
| | | CK09 | 175 | 280 | 315 | 400 | RT4LP | 113748 | 1 |
| | | CK95 ⁽²⁾ | 200 | 310 | 400 | 500 | RT4LR | 113749 | 1 |
| | | CK10 | 120 | 190 | 250 | 315 | RT5LA | 113755 | 1 |
| | | CK11 | 175 | 280 | 315 | 400 | RT5LB | 113756 | 1 |
| | | CK12 ⁽³⁾ | 250 | 400 | 500 | 630 | RT5LC | 113757 | 1 |
| | | | 315 | 500 | 630 | 800 | RT5LD | 113758 | 1 |
| | | 430 | 700 | 800 | 1000 | RT5LE | 113759 | 1 | |
| | CK13 ⁽⁴⁾ | 500 | 850 | 1000 | 1250 | RT6LA | 113761 | 1 | |

- (1) Most suitable fuse in accordance with IEC 60947-4-1.
- (2) Fitting direct to the contactor.
- (3) Fitting direct to the contactor: by means of a coupling and connection set. Separate mounting with screws on DIN rail / with cable connection.
- (4) RT6A = RT1 with right setting range plus RTXP, independent mounting base adaptor, to be utilised with current transformer connected by passing cable chosen by customer. Current transformer data on request.

Accessories

| | | | Cat. no. | Ref. no. | Pack |
|--|---|--------------|-----------------|----------|------|
|  Base for separate mounting | DIN EN50022-35 | | | | |
| | RT1 | | RTXP | 105170 | 1 |
| | RT2 | | RT2XP | 113764 | 1 |
| Setting range cover protection | RT... | | RTX3 | 113762 | 1 |
| | | | | | |
|  Push-button with flexible cable | for distance RESET | | | | |
| | RT1... - RT6... (front) | 0.5 meters | RTXS | 113855 | 1 |
| | RT1... - RT6... (front) | 1 meters | RTXSL | 113856 | 1 |
| | RT1..., RT2..., RT4..., RT5..., RT6... (back) | | RTXBS | 108864 | 1 |
| Terminal protection | for RT3 or CK75C/CK08C | | | | |
| | Thermal overload relay | 1 pole IPxxB | PTPCK75 | 103747 | 1 |
| | Connection contactor-relay | 3 poles | RT3PXX3P | 110565 | 1 |
|  Remote electrical reset | RT1... - RT6... | | RTXRR ♦ | | 1 |

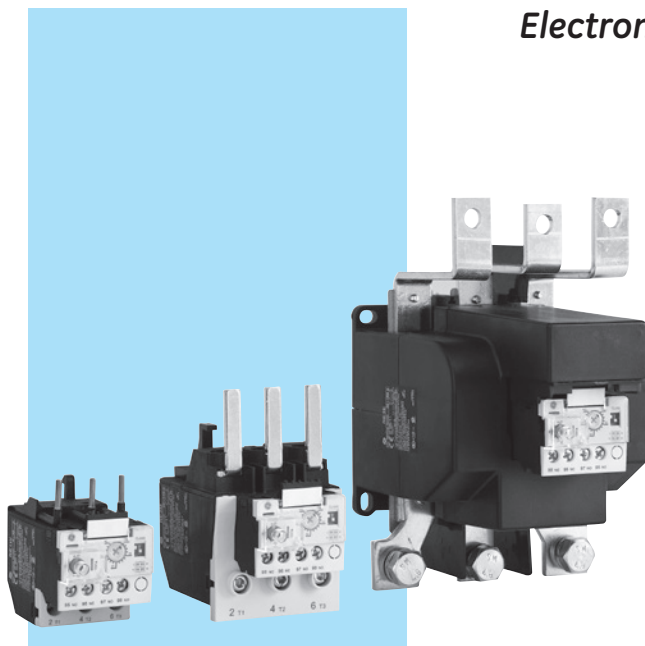
Available coil voltages (V)

| | ♦ | B | D | G | J | N | U | X |
|-------|---|----|----|----|-----|-----|-----|-----|
| AC/DC | | 12 | 24 | 48 | 110 | 220 | 380 | 440 |
| | | | | | 240 | 415 | 480 | |

Order codes

- A
- B
- C
- D
- E
- F
- G
- H
- I
- X

Electronic overload relay



Approvals



Product features

➤ Your benefits

- | | |
|---|---|
| Lower power consumption | ➤ Saving space into cabinet |
| Great accuracy | ➤ Better motor protection |
| Full reliability | ➤ Low risk to burn motor |
| Phase unbalance protection | ➤ Better motor protection and current control |
| Direct fitting to contactors Series CL | ➤ Compact starter |
| Interchangeable with thermal overload relay | ➤ No need to redesign existing cabinet |
| Multiple trip class selection | ➤ One device cover for start time motor |
| Manual / Auto reset | ➤ One device for two solutions |




Main characteristics

- Setting range from 0.1 up to 150A
- Self powered
- Thermal memory
- Phase loss protection
- Phase unbalance protection
- Direct fitting to contactors Series CL
- Interchangeable with thermal overload relay
- Multiple trip class selection
- Manual / Auto reset
- Increased flexibility, less order codes, less stock
- Tripp class: 5 - 10 - 20 - 30


Order codes ● pg. C.67
 Technical data ● pg. C.76
 Dimensions ● pg. C.78



Electronic overload relay for contactors

| | Suitable for | Setting range (A) | | Fuses (A) ⁽¹⁾ | Cat. no. | Ref. no. | Pack. |
|---|--------------|---|-------------|--------------------------|-------------|----------|-------------|
| | | Min. | Max. | gL - gG | | | |
|  Frame 1 | CL00...CL45 | 0,1 | 0,5 | 2 | RE1D | 101866 | 5 |
| | | 0,4 | 2 | 4 | RE1H | 101867 | 5 |
| | | 1,0 | 5 | 10 | RE1K | 101868 | 5 |
| | | 1,6 | 8 | 20 | RE1M | 101869 | 5 |
| | | 6,4 | 32 | 63 | RE1S | 101870 | 5 |
| | | 9,0 | 45 | 80 | RE1W | 101871 | 5 |
| | |  Frame 2 | CL05...CL10 | 15 | 75 | 125 | RE2H |
| 22 | 110 | | | 125 | RE2M | 101873 | 1 |
|  Frame 3 | CK75-CK08 | 30 | 150 | 250 | RE3E | 101874 | 1 |

Accessories

| | | Cat. no. | Ref. no. | Pack. |
|--|---------|--------------|----------|-------|
|  Independent mounting base adaptor | Frame 1 | RE1XP | 247302 | 1 |
| | Frame 2 | RE2XP | 247303 | 1 |

(1) Most suitable fuse in accordance with IEC 60947-4-1, see coordination table on pg. C.76.

Order codes

A

B

C

D

E

F

G

H

I

X

Technical data

General

- Thermal protection against balanced overload.
- Three-pole differential (phase unbalance protection).
- Automatic ambient temperature compensation.
- Front mounted selector for choosing utilisation current.
- Reset button, 2 positions :
Manual(H) and Automatic(A) by turning the blue selector.
- Stop push button, independent of reset (red).
- Manual trip lever (tripping test).
- Tripping indicator (0-1).
- To facilitate wiring arrangements terminal 96 fits directly onto coil terminal (A2) and terminal 14/22 fits directly onto the feedback auxiliary contact.

Conformity to standards

| | | |
|-------------|------------|--------|
| IEC 60947-4 | CEI 17-50 | VDE660 |
| UNE 115 | NI C63-650 | UL508 |
| NFC63-650 | | |

Approvals

| | | |
|------|-------|-------|
| UL | CSA | SEMKO |
| SETI | NEMKO | CE |

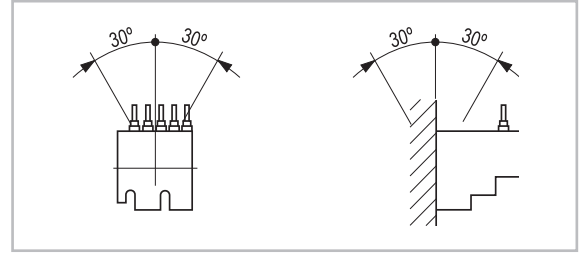
Ambient conditions

| | | |
|-----------------------|--------------------|----------------|
| Storage temperature | -55°C to +80°C | |
| Operation temperature | -25°C to +60°C | |
| Altitude | up to 3000m | Nominal values |
| | from 3000 to 4000m | 90%Ie 80%Ue |
| | from 4000 to 5000m | 80%Ie 75%Ue |
| Degree of protection | IP20 | |
| Protection treatment | Tropical finish | |

Climatic resistance

| | | |
|--------------------------------|-------------------|--------|
| Continuous tests 40 / 125 / 56 | | |
| Cold (72h) | Temperature | -40°C |
| | Dry heat (96h) | |
| | Temperature | +125°C |
| | Relative humidity | < 50% |
| Humid heat (56 days) | Temperature | +40°C |
| | Relative humidity | 95% |
| Cyclical tests | | |
| First half-cycle (12h) | Low temperature | +25°C |
| | Relative humidity | 93% |
| Second half-cycle (12h) | Low temperature | +55°C |
| | Relative humidity | 95% |
| Number of consecutive cycles | 6 | |

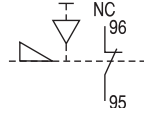
Mounting positions



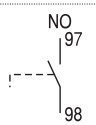
Main circuit (poles)

| | | MT0... |
|--|--------|-------------------|
| Rated insulation voltage (Ui) according to IEC 947 | (V) | 750 |
| Frequency | (Hz) | 0..400 |
| Power dissipation per pole | (W) | min. 1 / max. 2.5 |
| Terminal capacity | | |
| Screw M 3.5 (pozidrive head) safety flange | | |
| Maximum capacity : | | |
| Solid | (Ø mm) | 2 x 2 wires |
| Stranded without end sleeve | (mm²) | 2 wires Ø 2.5 |
| Stranded with end sleeve | | |
| pen (2 end sleeves) | (mm²) | 2 wires Ø 0.75 |
| pen (1 end sleeve) | (mm²) | 2 wires Ø 1 |
| | | 1 wires Ø 2.5 |
| Tightening torque | (Nm) | 0.8 |

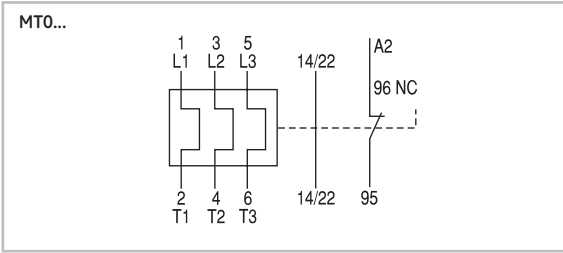
Control circuit (incorporated auxiliary contact)

| | | MT0... |
|--|-------|---|
| Rated insulation voltage (Ui) according to IEC 947 | (V) | 750 |
| Rated thermal current (Ith) $\theta \leq 60^\circ\text{C}$ | (A) | 10 |
| Tripping currents | | |
| AC-15 | Ue-Ie | (V-A) 223-3, 380-2, 500-1 |
| DC-13 | Ue-Ie | (V-A) 60-0.5, 110-0.2, 220-0.1 |
| Short-circuit protection (max.glass gL fuse - w/h welding) | (A) | 6 |
| Number and type of contacts | | |
| | |  |

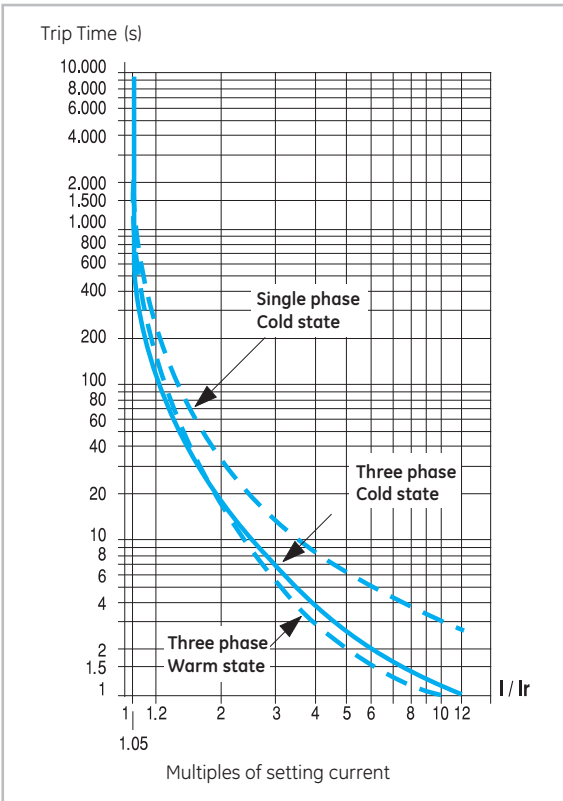
Control circuit (auxiliary contact block)

| | | MATV10AT |
|--|-------|---|
| Rated insulation voltage (Ui) according to IEC 947 | (V) | 750 |
| Rated thermal current (Ith) $\theta \leq 60^\circ\text{C}$ | (A) | 10 |
| Tripping currents | | |
| AC-15 | Ue-Ie | (V-A) 223-1, 380-0.5 |
| DC-13 | Ue-Ie | (V-A) 60-0.1, 110-0.5 |
| Short-circuit protection (max.glass gL fuse - w/h welding) | (A) | 6 |
| Number and type of contacts | | |
| | |  |

Numbering of the terminals

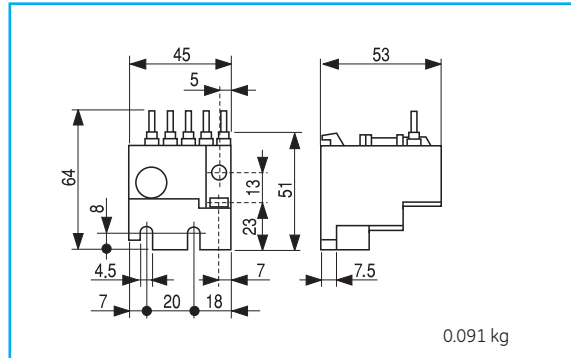


Tripping curves

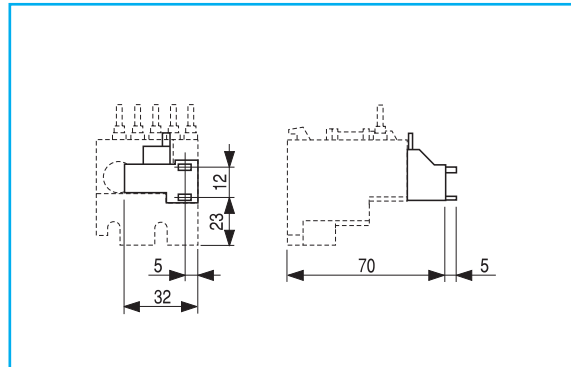


Dimensional drawings

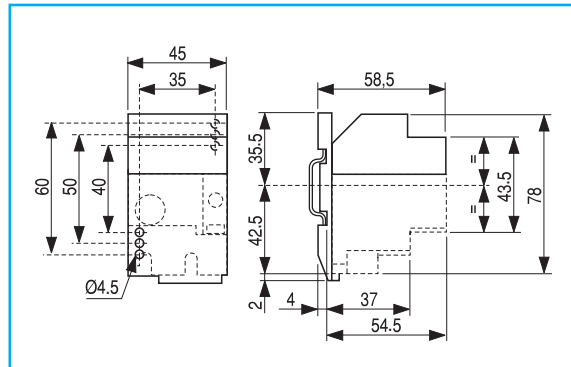
Thermal overload relay



Thermal overload relay + aux. contact block (front mounting)



Independent mounting of the thermal overload relay



Technical data

A

B

C

D

E

F

G

H

I

X

Technical data

| | RT1... | RT2... | RT3... | RT4.../ 4L... | RT5.../ 5L... | RT6.../ 6L... |
|---|---|--------------|-------------|---------------|---------------|---------------|
| General | | | | | | |
| Class | 10A / 20 | 10 / 20 | 10 / 20 | 10 / 30 | 10 / 30 | 10 / 30 |
| Setting range (A) | 0.16 ... 40 | 11.5 ... 110 | 55 ... 190 | 2.5 ... 310 | 120 ... 700 | 500 ... 850 |
| Suitable for | CL00...CL45 | CL05...CL10 | CK75...CK08 | CL,CK | CK10...CK12 | CK13 |
| Main circuit | | | | | | |
| Rated insulation voltage (V) (IEC947-4) Ui | 690 | 1000 | 1000 | 1000 | 1000 | 1000 |
| Frequency limits (Hz) | 0...400 | 0...400 | 0...400 | 50...60 | 50...60 | 50...60 |
| Terminal capacity | | | | | | |
| Clamp terminal - solid (mm ²) | 16 | 50 | 120 | - | - | - |
| Clamp terminal - flexible (mm ²) | 10 | 50 | 120 | - | - | - |
| Flat terminal (mm) | - | - | 25 x 5 | - | - | 80 x 10 |
| Passing by hole (wire) through C.T. core (mm ²) | - | - | - | - | 400 | - |
| Passing by hole (bar) through C.T. core (mm) | - | - | - | 30 x 10 | 30 x 10 | - |
| Tightening torque (Nm) | 2.5 | 4.5 | 6.5 | 23 | 31.5 | - |
| Control circuit | | | | | | |
| Rated insulation voltage (V) (IEC60947-4) Ui | 690 | | | | | |
| Rated thermal current I _{th} (A) | 10 | | | | | |
| Operation current | | | | | | |
| AC-15 - Ue-Ie (V - A) | 110/120 - 3 ; 220/240 - 2 ; 380/415 - 1 ; 480/500 - 0.8 ; 660/690 - 0.3 | | | | | |
| DC-13 - Ue-Ie (V - A) | 24 - 2 ; 48 - 1.4 ; 110 - 0.6 ; 250 - 0.3 ; 440 - 0.1 | | | | | |
| Utilisation according UL and CSA | B600 - Q600 | | | | | |
| Protective fuse type gL (A) | 10 | | | | | |
| Terminal capacity (mm ²) | 2.5 | | | | | |
| Tightening capacity (Nm) | 0.8 | | | | | |

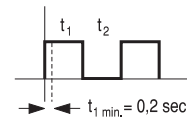
Conformity to standards

| | | |
|------------------|-------------|-------------|
| IEC/EN 60947-4-1 | NFC 63-650 | NI C 63-650 |
| IEC/EN 60947-5-1 | CEI 17-50 | VDE 0660 |
| UNE 115 | CSA 22.2/14 | UL 508 |

Remote electrical reset

| | | |
|-------------------|------|-----|
| Power consumption | | |
| AC | (VA) | 100 |
| DC | (W) | 100 |

Coils not suitable for continuous operating duty



- t₁ = 1 sec. ♦ t₂ = 30 sec.
 - t₁ = 5 sec. ♦ t₂ = 90 sec.
 - t₁ = 10 sec. ♦ t₂ = 180 sec.
- (t₁ = ON time t₂ = OFF time)

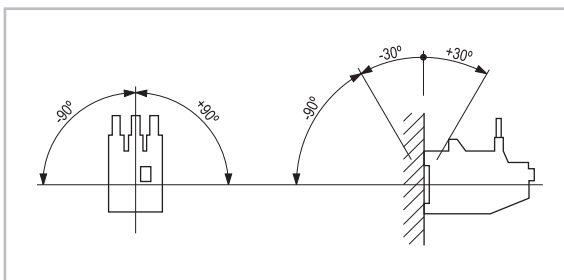
Approvals

| | | |
|------------------|----------------|----|
| cULus | RINA | CE |
| Lloyd's Register | Bureau Veritas | |

Ambient conditions

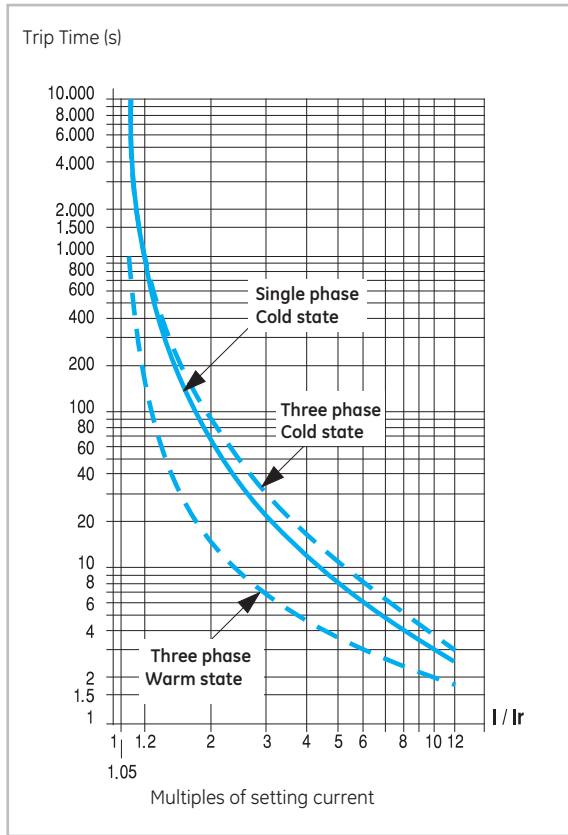
| | |
|-------------------------------------|------------------------------------|
| Storage temperature | -40°C to +70°C |
| Operation temperature (compensated) | -25°C to +60°C |
| Altitude | up to 3000m |
| | w/o any changes in characteristics |
| Relative humidity | 98% |
| Protection treatment | Tropical finish |

Mounting positions

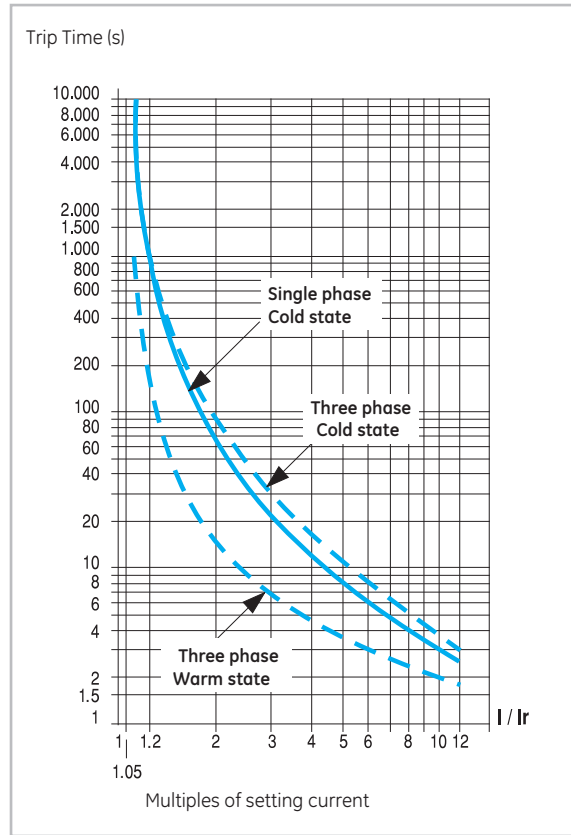


Tripping curves

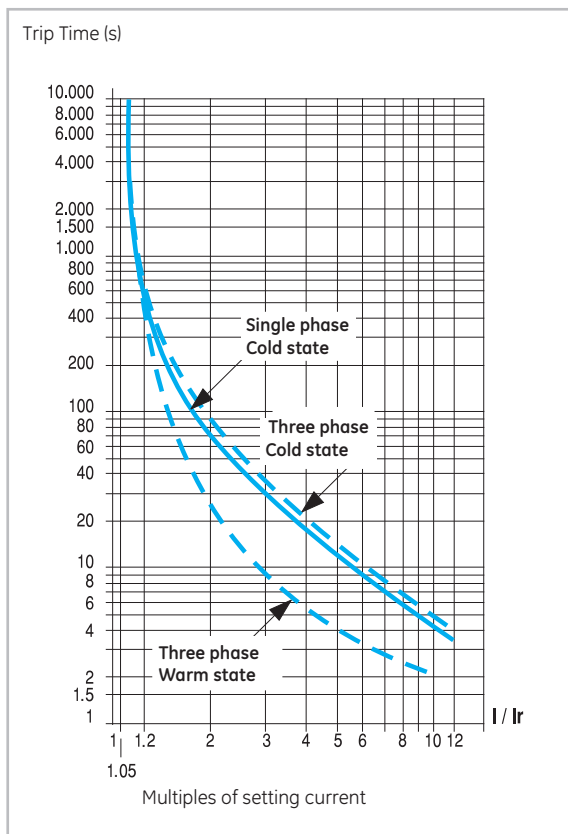
RT1 Class 10A



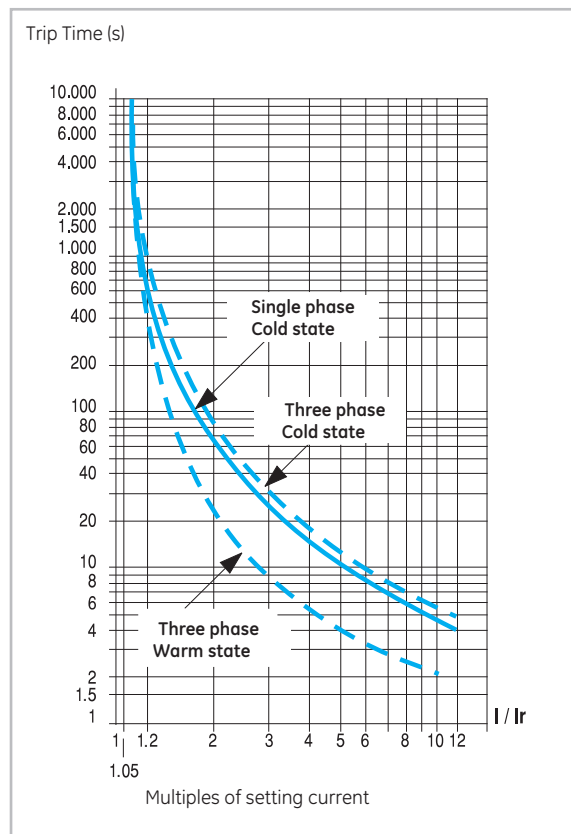
RT2 Class 10



RT12 Class 20



RT22 Class 20



Technical data

A

B

C

D

E

F

G

H

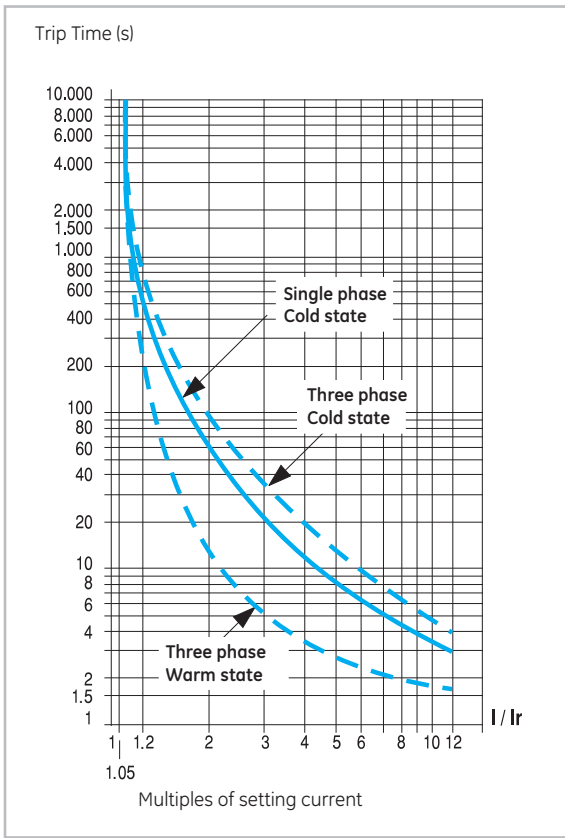
I

X

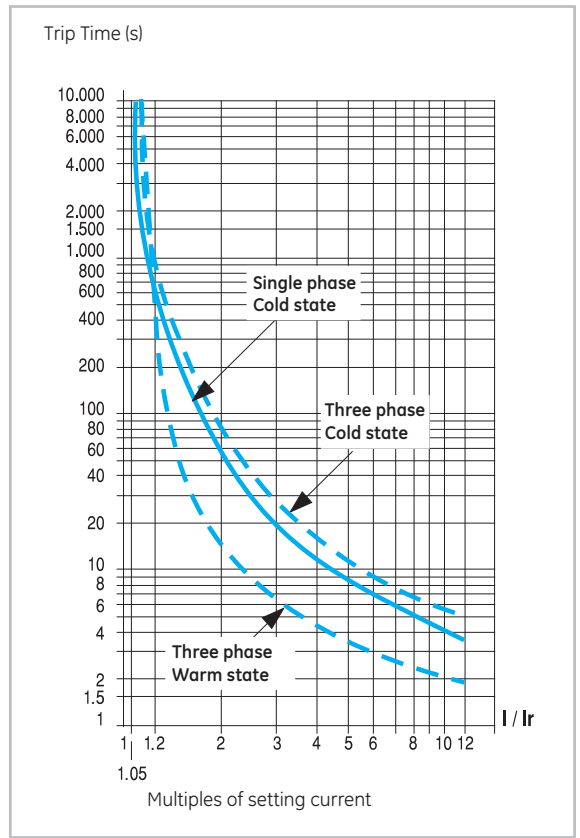


Tripping curves

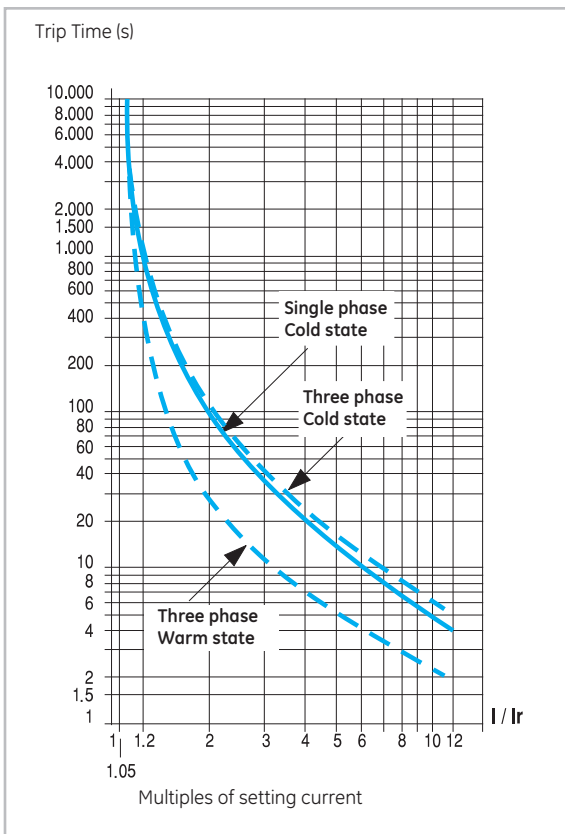
RT3 Class 10



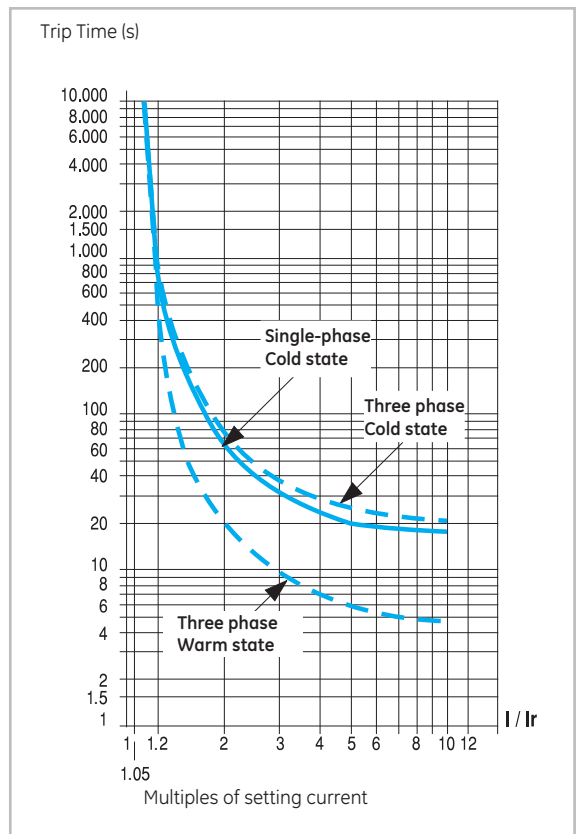
RT4 Class 10



RT32 Class 20

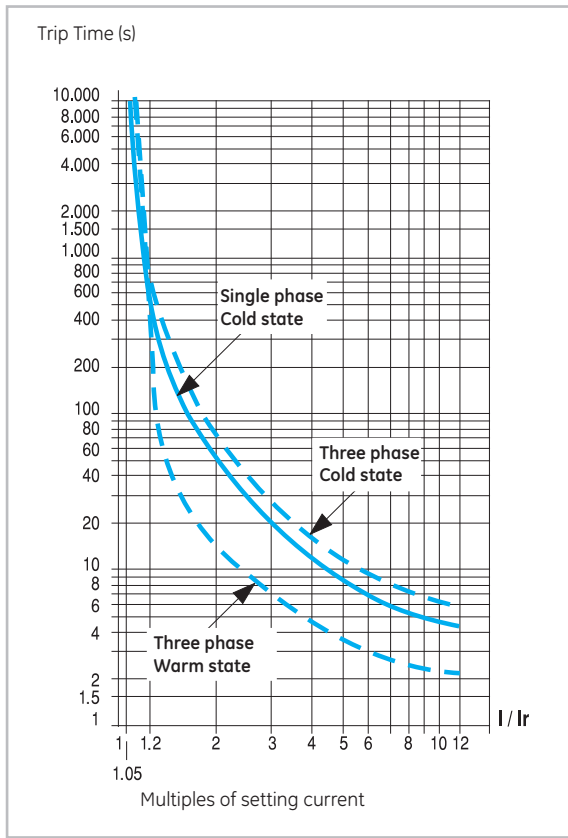


RT4L Class 30

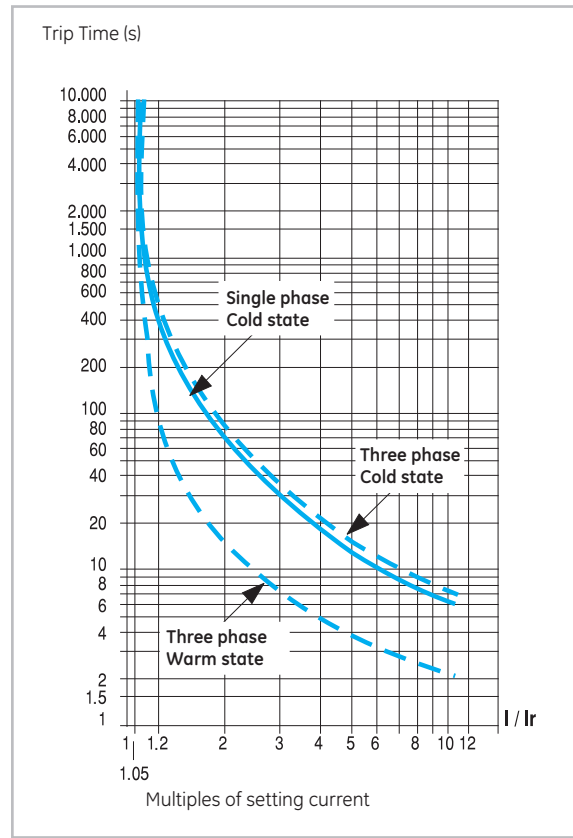


Tripping curves

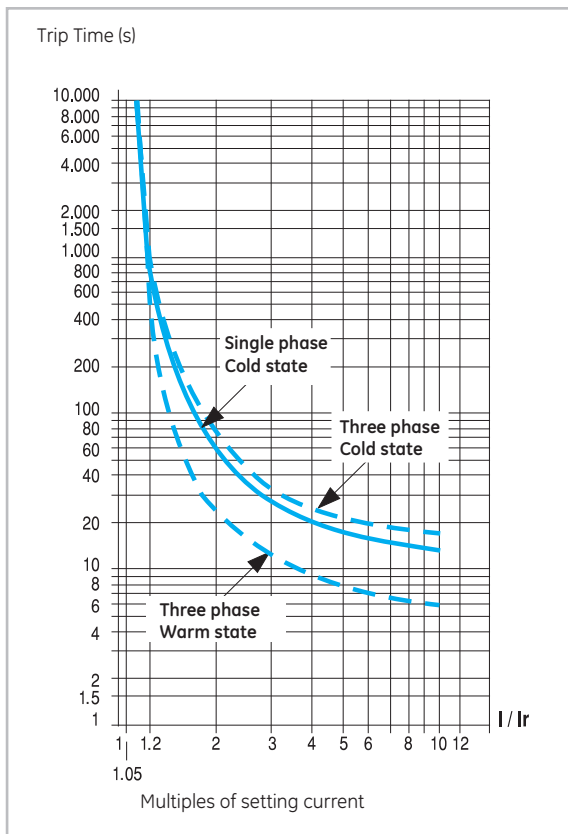
RT5 Class 10



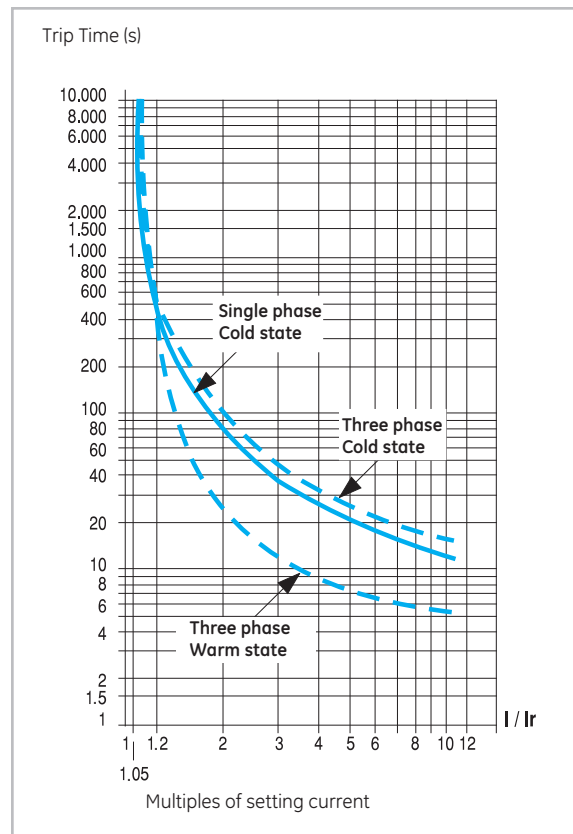
RT6 Class 10



RT5L Class 30



RT6L Class 30



Technical data

A

B

C

D

E

F

G

H

I

X

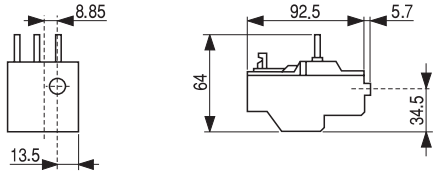


Series RT

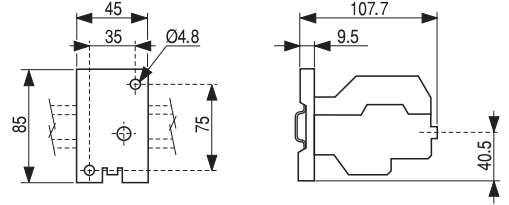
Dimensional drawings

Thermal overload relay for contactors

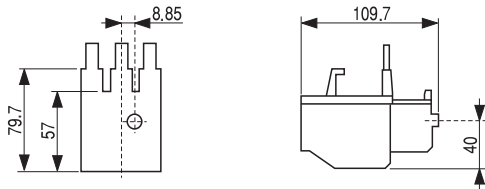
RT1 - RT12
0.190 kg



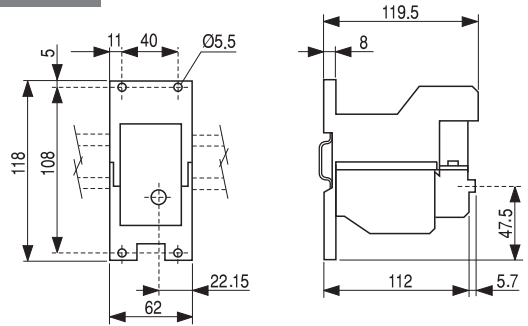
**RT1 + RT XP
RT12 + RTXP**



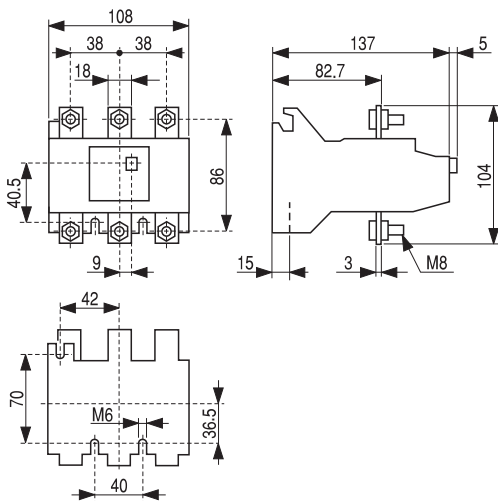
RT2 - RT22
0.400 kg



**RT2 + RT XP
RT22 + RTXP**



RT3 - RT32
0.900 kg



Thermal overload relays

A

B

C

D

E

F

G

H

I

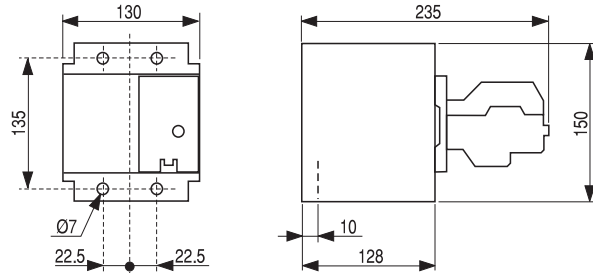
X



Thermal overload relay for contactors

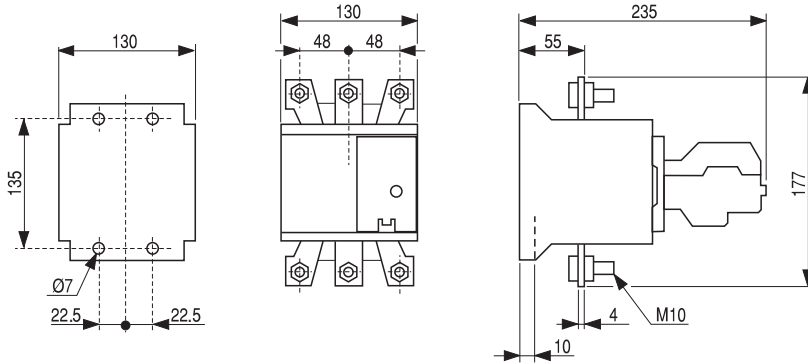
RT4LA...RT4LM

2.400 kg



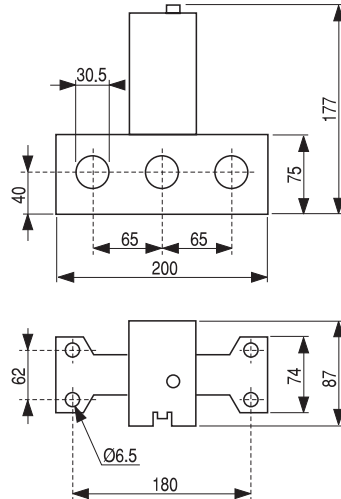
RT4/4LN...RT4/4LR

2.400 kg

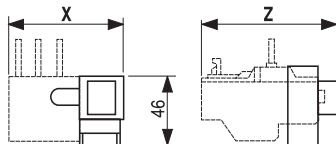


RT5 / 5L

0.875 kg



Remote electrical reset



| RTXRR + ... | X | Z |
|-------------|-----|-----|
| RT1 | 75 | 110 |
| RT2 | 84 | 121 |
| RT3 | 108 | 153 |
| RT4 | 150 | 240 |
| RT5 | 200 | 196 |

Dimensions

A

B

C

D

E

F

G

H

I

X

Coordination tables

Coordination Type 2 - 65kA at 380/400V and 415V - 50/60Hz

| Rated power (kW) | MOTOR ⁽¹⁾ | | Cat. no. # | BREAKER | | | CONTACTOR Series | OVERLOAD RELAY | | WIRE | |
|---------------------|----------------------|------|---------------|----------------------------|--|----------------------------|---------------------|----------------|-------------------------|--|-------------------------------|
| | Rated current | | | Rated current In (A) | Magnetic setting 1m Pick-up ±20% Im (A) | Magnetic current (A) | | Series | Setting range (A) | Smallest wire Cu (PVC) ⁽²⁾ (mm ²) | Min frontal safety (mm) |
| | 380/400V (A) | 415V | | | | | | | | | |
| 0.06 | 0.23 | 0.21 | GPS1MHAB | 0.25 | - | 3.3 | CLOO | RE1D | 0.1-0.5 | 1 | 20 |
| 0.09 | 0.34 | 0.31 | GPS1MHAC | 0.4 | - | 5.2 | CLOO | RE1D | 0.1-0.5 | 1 | 20 |
| 0.12 | 0.44 | 0.4 | GPS1MHAD | 0.63 | - | 8.2 | CLOO | RE1D | 0.1-0.5 | 1 | 20 |
| 0.18 | 0.65 | 0.63 | GPS1MHA E | 1 | - | 13 | CLOO | RE1H | 0.4-2.0 | 1 | 20 |
| 0.25 | 0.9 | 0.8 | GPS1MHA E | 1 | - | 13 | CLOO | RE1H | 0.4-2.0 | 1 | 20 |
| 0.37 | 1.25 | 1.1 | GPS1MHAF | 1.6 | - | 20.8 | CLOO | RE1H | 0.4-2.0 | 1 | 20 |
| 0.55 | 1.6 | 1.5 | GPS1MHAF | 1.6 | - | 20.8 | CLOO | RE1H | 0.4-2.0 | 1 | 20 |
| 0.75 | 2 | 1.9 | GPS1MHAG | 2.5 | - | 32.5 | CLOO | RE1K | 1.5-5.0 | 1 | 20 |
| 1.1 | 2.6 | 2.5 | GPS1MHAH | 4 | - | 52 | CL25 | RE1K | 1.5-5.0 | 1 | 20 |
| 1.5 | 3.5 | 3.4 | GPS1MHAH | 4 | - | 52 | CL25 | RE1K | 1.5-5.0 | 1 | 20 |
| 2.2 | 5 | 4.5 | GPS1MHAJ | 6.3 | - | 81.9 | CL25 | RE1K | 1.5-5.0 | 1 | 20 |
| 3 | 7 | 6.5 | GPS1MHA K | 10 | - | 130 | CL25 | RE1M | 1.6-8.0 | 1.5 | 20 |
| 4 | 9 | 8 | GPS1MHA K | 10 | - | 130 | CL25 | RE1S | 6.4-32.0 | 1.5 | 20 |
| 5.5 | 12 | 11 | GPS1MHAL | 13 | - | 169 | CL25 | RE1S | 6.4-32.0 | 2.5 | 20 |
| 7.5 | - | 14 | GPS1MHAM | 16 | - | 208 | CL25 | RE1S | 6.4-32.0 | 2.5 | 20 |
| 8.8 | 16 | - | GPS1MHAM | 16 | - | 208 | CL25 | RE1S | 6.4-32.0 | 2.5 | 20 |
| 11 | 22.5 | 21 | GPS1MHAP | 25 | - | 325 | CL25 | RE1S | 6.4-32.0 | 4 | 20 |
| 15 | 30 | 28 | GPS1MHAR | 32 | - | 416 | CL04 | RE1S | 6.4-32.0 | 6 | 20 |
| 11 | 22.5 | 21 | GPS2MHAR | 25 | - | 325 | CL04 | RE1S | 6.4-32.0 | 4 | 20 |
| 15 | 30 | 28 | GPS2MHAP | 32 | - | 416 | CL04 | RE1S | 6.4-32.0 | 6 | 20 |
| 18.5 | 37 | 35 | GPS2MHAS | 40 | - | 520 | CL45 | RE1W | 9.0-45.0 | 10 | 20 |
| 22 | - | 40 | GPS2MHAT | 50 | - | 650 | CL06 | RE2H | 15.0-75.0 | 10 | 25 |
| - | 44 | -- | GPS2MHAT | 50 | - | 650 | CL06 | RE2H | 15.0-75.0 | 10 | 25 |
| 30 | 60 | 55 | GPS2MHAU | 63 | - | 819 | CL07 | RE2H | 15.0-75.0 | 16 | 25 |
| 35 | 65 | 60 | FDH36MC080GD | 80 | 900-1300 | 1100 | CL08 | RE2H | 15.0-75.0 | 25 | 25 |
| 45 | 85 | 80 | FDH36MC100GD | 100 | 1000-1500 | 1400 | CL09 | RE2M | 22.0-110.0 | 25 | 30 |
| 55 | - | 100 | FDH36MC100GD | 100 | 1000-1500 | 1400 | CL10 | RE2M | 22.0-110.0 | 25 | 30 |
| 55 | 105 | - | FEH36MC125JF | 125 | 1250-1875 | 1250 | CL10 | RE2M | 22.0-110.0 | 25 | 30 |
| 75 | 138 | 135 | FEH36MC200KF | 200 | 2250-3350 | 2800 | CK75 | RE3E | 30.0-150.0 | 50 | 40 |

Coordination Type 2 - 100kA at 500 - 525V - 50/60Hz

| Rated power kW | MOTOR ⁽¹⁾ | | gL/gG Fuses | | EOL | | | CONTACTOR | | WIRE | |
|-------------------|----------------------|------|-------------|--------|------|----------------------|------------|--------------|----------|--------------------------|--------|
| | Rated current | | Size | Series | Type | Setting range (A) | Series | PAC3 (kW) | Seco min | Safety clearance (mm) | |
| | 500V (A) | 525V | | | | | | | | | In (A) |
| 0.06 | 0.17 | 0.16 | 2 | 000 | RE1 | D | 0.1-0.5 | CLOO | 5.5 | 1 | 20 |
| 0.03 | 0.24 | 0.22 | 2 | 000 | RE1 | D | 0.1-0.5 | CLOO | 5.5 | 1 | 20 |
| 0.12 | 0.33 | 0.3 | 2 | 000 | RE1 | D | 0.1-0.5 | CLOO | 5.5 | 1 | 20 |
| 0.18 | 0.48 | 0.46 | 2 | 000 | RE1 | D | 0.1-0.5 | CLOO | 5.5 | 1 | 20 |
| 0.25 | 0.66 | 0.64 | 2 | 000 | RE1 | H | 0.4-2.0 | CLOO | 5.5 | 1 | 20 |
| 0.37 | 0.3 | 0.85 | 4 | 000 | RE1 | H | 0.4-2.0 | CLOO | 5.5 | 1 | 20 |
| 0.55 | 1.2 | 1.15 | 4 | 000 | RE1 | H | 0.4-2.0 | CLOO | 5.5 | 1 | 20 |
| 0.75 | 1.5 | 1.45 | 4 | 000 | RE1 | H | 0.4-2.0 | CLOO | 5.5 | 1 | 20 |
| 1.1 | 2.1 | 1.3 | 6 | 000 | RE1 | K | 1.5-5.0 | CLOO | 5.5 | 1 | 20 |
| 1.5 | 2.8 | 2.6 | 10 | 000 | RE1 | K | 1.5-5.0 | CLOO | 5.5 | 1 | 20 |
| 1.1 | 2.1 | 1.3 | 6 | 000 | RE1 | K | 1.5-5.0 | CL01 | 7.5 | 1 | 20 |
| 1.5 | 2.8 | 2.6 | 10 | 000 | RE1 | K | 1.5-5.0 | CL01 | 7.5 | 1 | 20 |
| 2.2 | 3.3 | 3.6 | 10 | 000 | RE1 | K | 1.5-5.0 | CL01 | 7.5 | 1 | 20 |
| 1.5 | 2.8 | 2.6 | 10 | 000 | RE1 | K | 1.5-5.0 | CL25 | 15 | 1 | 20 |
| 2.2 | 3.3 | 3.6 | 10 | 000 | RE1 | K | 1.5-5.0 | CL25 | 15 | 1 | 20 |
| 3 | 5.3 | 5 | 16 | 000 | RE1 | M | 1.6-8.0 | CL25 | 15 | 1 | 20 |
| 4 | 6.8 | 6.5 | 20 | 000 | RE1 | M | 1.6-8.0 | CL25 | 15 | 1 | 20 |
| 5.5 | 3.1 | 8.6 | 25 | 000 | RE1 | S | 6.4-32.0 | CL25 | 15 | 1.5 | 20 |
| 7.5 | 12 | 11.4 | 32 | 000 | RE1 | S | 6.4-32.0 | CL25 | 15 | 2.5 | 20 |
| 10 | 15.5 | 14.8 | 40 | 000 | RE1 | S | 6.4-32.0 | CL25 | 15 | 2.5 | 20 |
| 11 | 17.6 | 17 | 40 | 000 | RE1 | S | 6.4-32.0 | CL25 | 15 | 2.5 | 20 |
| 15 | 23 | 22 | 50 | 000 | RE1 | S | 6.4-32.0 | CL04 | 18.5 | 4 | 20 |
| 18.5 | 28.5 | 27 | 63 | 000 | RE1 | S | 6.4-32.0 | CL04 | 18.5 | 6 | 20 |
| 4 | 6.8 | 6.5 | 20 | 000 | RE1 | M | 1.6-8.0 | CL45 | 25 | 1.5 | 20 |
| 5.5 | 3.1 | 8.6 | 25 | 000 | RE1 | S | 6.4-32.0 | CL45 | 25 | 2.5 | 20 |
| 7.5 | 12 | 11.4 | 32 | 000 | RE1 | S | 6.4-32.0 | CL45 | 25 | 2.5 | 20 |
| 11 | 17.6 | 17 | 40 | 000 | RE1 | S | 6.4-32.0 | CL45 | 25 | 2.5 | 20 |
| 15 | 23 | 22 | 50 | 000 | RE1 | S | 6.4-32.0 | CL45 | 25 | 4 | 20 |
| 18.5 | 28.5 | 27 | 63 | 000 | RE1 | W | 3.0-45.0 | CL45 | 25 | 5 | 20 |
| 22 | 33 | 31.5 | 80 | 000 | RE1 | H | 15.0-75.0 | CL45 | 25 | 5 | 20 |
| 18.5 | 28.5 | 27 | 63 | 000 | RE2 | H | 15.0-75.0 | CL06 | 30 | 5 | 25 |
| 22 | 33 | 31.5 | 80 | 000 | RE2 | H | 15.0-75.0 | CL06 | 30 | 5 | 25 |
| 30 | 45 | 43 | 80 | 000 | RE2 | H | 15.0-75.0 | CL06 | 30 | 10 | 25 |
| 37 | 53 | 52 | 100 | 000 | RE2 | H | 15.0-75.0 | CL07 | 40 | 10 | 25 |
| 40 | 53 | 56 | 100 | 000 | RE2 | H | 15.0-75.0 | CL08 | 45 | 16 | 25 |
| 45 | 65 | 62 | 125 | 00 | RE2 | H | 15.0-75.0 | CL09 | 55 | 16 | 30 |
| 55 | 80 | 76 | 125 | 00 | RE2 | M | 22.0-110.0 | CL10 | 65 | 25 | 30 |
| 75 | 105 | 100 | 160 | 01/1 | RE3 | E | 30.0-150.0 | CK75 | 100 | 35/25 | 40 |
| 30 | 130 | 124 | 250 | 01/1 | RE3 | E | 30.0-150.0 | CK08 | 110 | 50 | 40 |

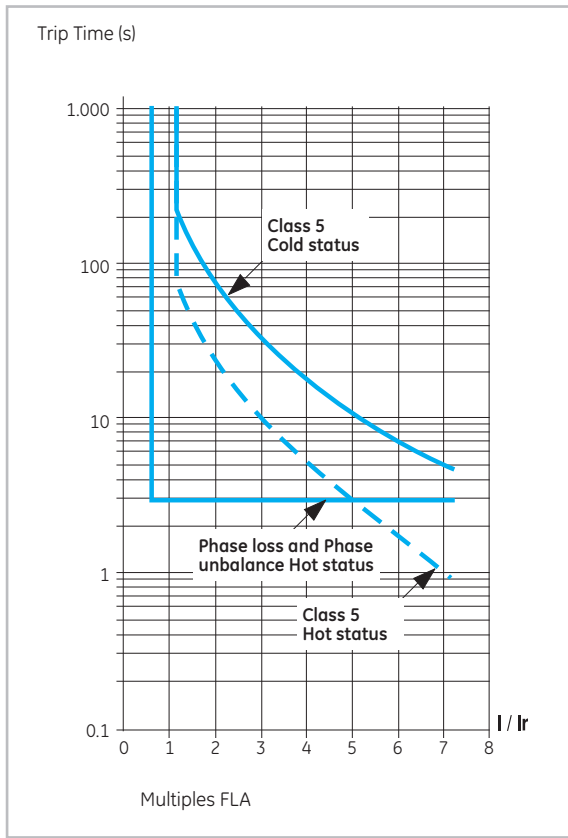
(1) Current are relevant to four pole motors not having special characteristics of torque.

(2) The minimum cycle cross-sections are referred to an ambient temperature of 30°C max. in free air and are selected to withstand the maximum let-through energy and the motor rated current. Besides the user has to consider the drop voltage, the type of laying and ambient temperature if it is different.

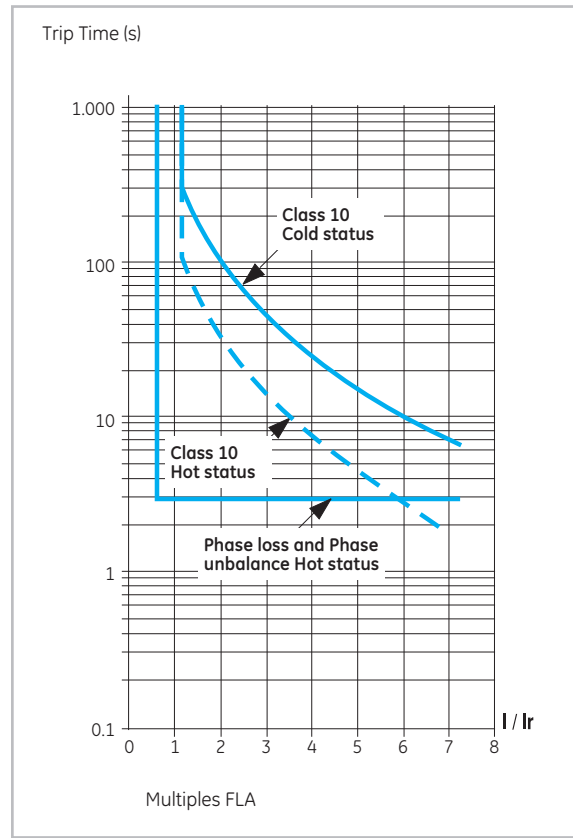


Tripping curves

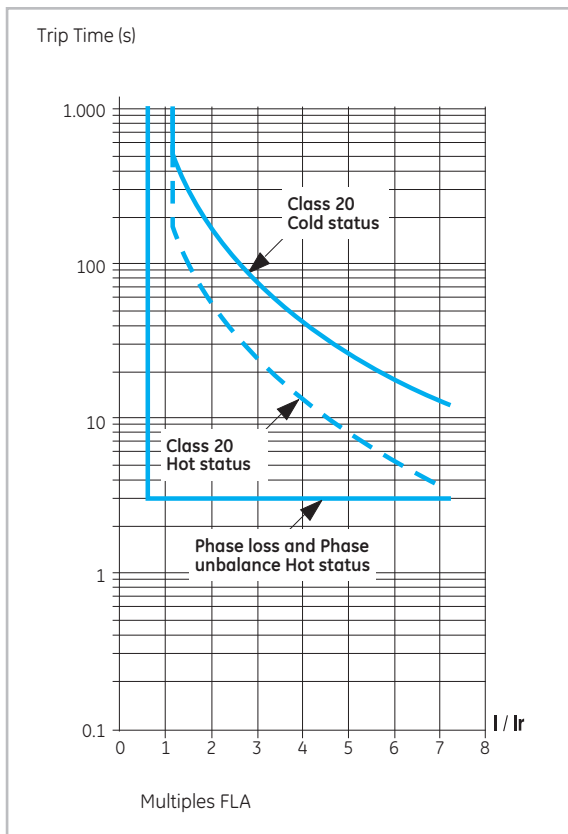
Class 5



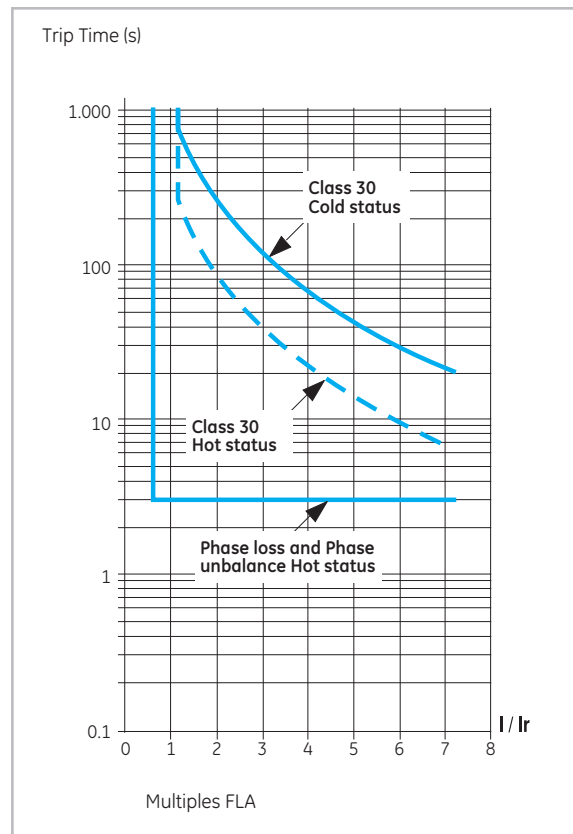
Class 10



Class 20



Class 30



Technical data

A

B

C

D

E

F

G

H

I

X

Series RE

Electronic overload relays

A

B

C

D

E

F

G

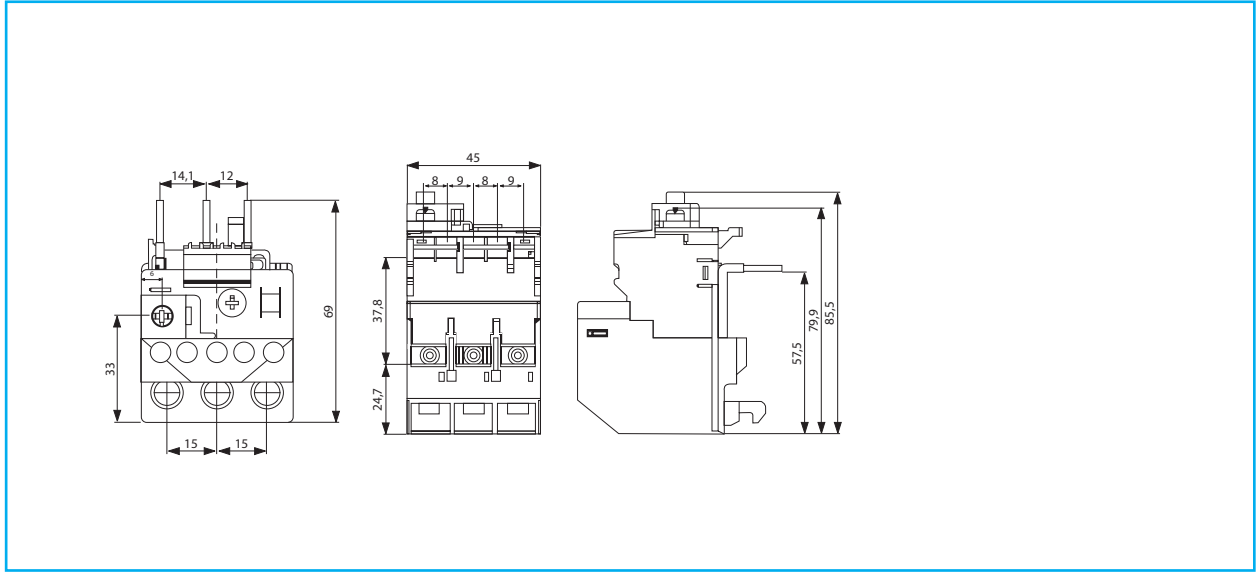
H

I

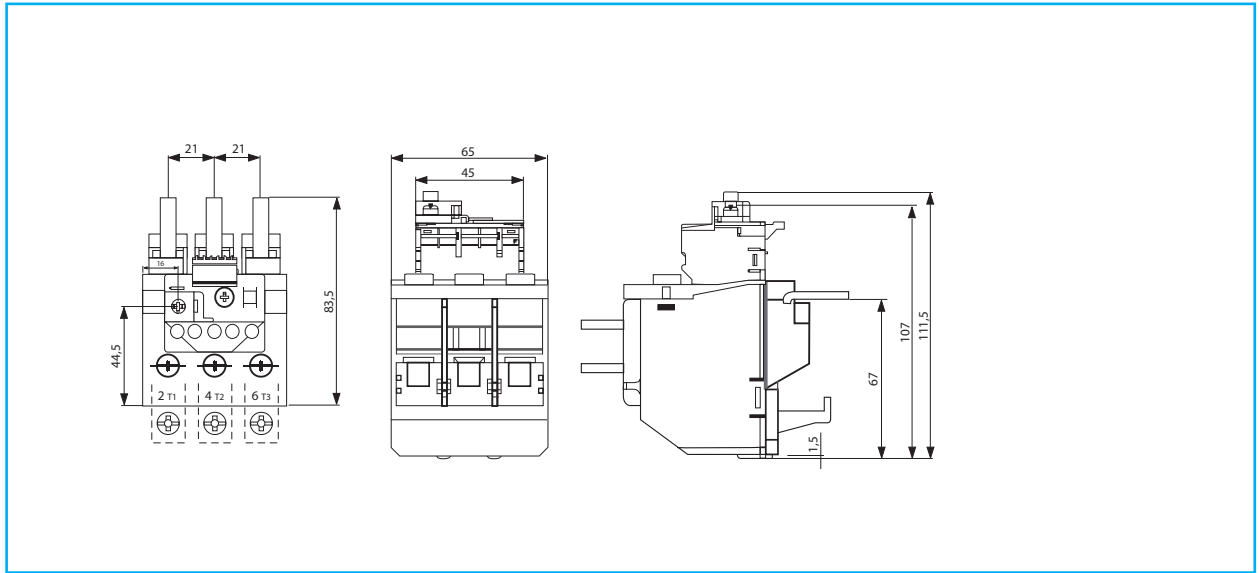
X

Dimensional drawings

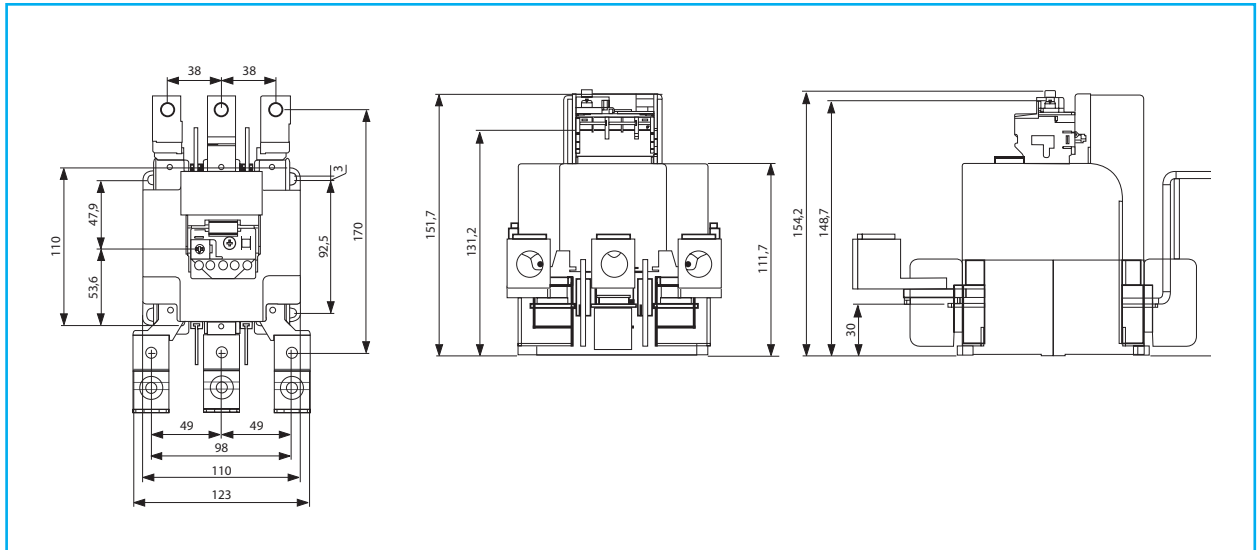
Frame 1



Frame 2



Frame 3



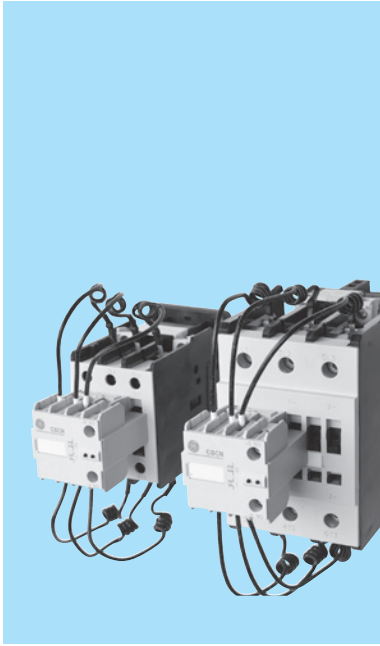
Notes

Grid area for notes.

Dimensions

- A
- B
- C
- D
- E
- F
- G
- H
- I
- X





Contactors for capacitors switching

With built-in resistance to switch three phase capacitor banks

“CSCN” contactors incorporate a front block with three early-make auxiliary contacts together with 6 quick discharge resistors (two per phase) through which the capacitors are switched to the network, reducing the current peak. Once the resistors have damped the current peak, the main contacts short-circuit the resistors, carrying the uninterrupted current. A few milliseconds later the early-make auxiliary contact closes to guarantee that all current flows through the main contacts.

Standards / Marking

| | |
|------------------|----------------|
| IEC/EN 60947-1 | CENELEC HD 419 |
| IEC/EN 60947-4-1 | VDE 0660/102 |
| IEC/EN 60947-5-1 | NFC 63-110 |
| EN 50005 | ASE 1025 |
| UL 508 | UNE 20109 |
| CSA C22.2/14 | |

Approvals



Standard voltages

To complete the catalogue number, replace the symbol \blacklozenge by the code corresponding to the voltage and frequency of the control circuit, other voltages on request.

Alternating current (V). Dual-frequency

| \blacklozenge | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|-----------------|----|----|-----|-----|-----|-----|-----|-----|----|
| 50/60Hz | 24 | 42 | 110 | 120 | 220 | 230 | 240 | 440 | 48 |
| | | | 115 | | | | | | |



Alternating current (V)

| \blacklozenge | E | K | L | N | T | U | W | Y | Z |
|-----------------|----|-----|-----|-----|-----|-----|-----|-----|-----|
| 50Hz | 32 | 127 | | 220 | | 380 | 415 | 500 | 660 |
| | | | | 230 | | 400 | | | 690 |
| 60Hz | | | 208 | 277 | 380 | 480 | 460 | 600 | |

Order codes ● pg. C.81
 Technical data ● pg. C.82
 Dimensional drawings ● pg. C.84



Contactors for capacitors switching

| Ith | Ambient temperature | | | | | | | | | | Fuse gI - gG | Contacts | | Cat. no. ⁽¹⁾ | Ref. no. see bottom | Pack |
|---|----------------------------------|--------------|--------------|--------------|----------------------|----------------------------------|--------------|--------------|--------------|----------------------|-----------------|------------|-----------|-------------------------|---------------------------|------|
| | $\theta \leq 55^{\circ}\text{C}$ | | | | | $\theta \leq 70^{\circ}\text{C}$ | | | | | | .3 .4 | .1 .2 | | | |
| | 230V 240V kvar | 400V kvar | 415V kvar | 500V kvar | 660V 690V kvar | 230V 240V kvar | 400V kvar | 415V kvar | 500V kvar | 660V 690V kvar | | | | | | |
|  | 25 | 7.5 | 12.5 | 13 | 16 | 15 | 3.7 | 7.5 | 8 | 9.5 | 10 | 25 | 2 | 0 | CSCN12A320 ♦ | 1 |
| | | | | | | | | | | | | | 1 | 1 | CSCN12A311 ♦ | 1 |
| | | | | | | | | | | | | | 0 | 2 | CSCN12A302 ♦ | 1 |
| | 32 | 10 | 16.7 | 17 | 21 | 20 | 5 | 10 | 11 | 12.5 | 12.5 | 35 | 2 | 0 | CSCN16A320 ♦ | 1 |
| | | | | | | | | | | | | | 1 | 1 | CSCN16A311 ♦ | 1 |
| | | | | | | | | | | | | | 0 | 2 | CSCN16A302 ♦ | 1 |
| | 45 | 12.5 | 20 | 21 | 25 | 25 | 7.5 | 12.5 | 13 | 16 | 15 | 40 | 1 | 0 | CSCN20A310 ♦ | 1 |
| | | | | | | | | | | | | | 0 | 1 | CSCN20A301 ♦ | 1 |
| | | | | | | | | | | | | | 2 | 1 | CSCN20A321 ♦ | 1 |
| | | | | | | | | | | | | | 1 | 2 | CSCN20A312 ♦ | 1 |
| | 45 | 15 | 25 | 26 | 31 | 30 | 10 | 15 | 16 | 18 | 20 | 50 | 1 | 0 | CSCN25A310 ♦ | 1 |
| | | | | | | | | | | | | | 0 | 1 | CSCN25A301 ♦ | 1 |
| | | | | | | | | | | | | 2 | 1 | CSCN25A321 ♦ | 1 | |
| | | | | | | | | | | | | 1 | 2 | CSCN25A312 ♦ | 1 | |
| 60 | 20 | 30 | 31 | 38 | 35 | 16 | 22 | 23 | 27 | 25 | 63 | 1 | 0 | CSCN30A310 ♦ | 1 | |
| | | | | | | | | | | | | 0 | 1 | CSCN30A301 ♦ | 1 | |
| | | | | | | | | | | | | 2 | 1 | CSCN30A321 ♦ | 1 | |
| | | | | | | | | | | | | 1 | 2 | CSCN30A312 ♦ | 1 | |
| 90 | 25 | 45 | 47 | 56 | 55 | 20 | 35 | 36 | 44 | 40 | 80 | 1 | 0 | CSCN45A310 ♦ | 1 | |
| | | | | | | | | | | | | 0 | 1 | CSCN45A301 ♦ | 1 | |
| | | | | | | | | | | | | 2 | 0 | CSCN45A320 ♦ | 1 | |
| | | | | | | | | | | | | 1 | 1 | CSCN45A311 ♦ | 1 | |
| | | | | | | | | | | | | 1 | 1 | CSCN45A312 ♦ | 1 | |
| 110 | 35 | 55 | 57 | 69 | 65 | 30 | 45 | 47 | 56 | 50 | 125 | 1 | 0 | CSCN55A310 ♦ | 1 | |
| | | | | | | | | | | | | 0 | 1 | CSCN55A301 ♦ | 1 | |
| | | | | | | | | | | | | 2 | 0 | CSCN55A320 ♦ | 1 | |
| | | | | | | | | | | | | 1 | 1 | CSCN55A311 ♦ | 1 | |
| | | | | | | | | | | | | 1 | 2 | CSCN55A312 ♦ | 1 | |
| 140 | 45 | 70 | 73 | 88 | 85 | 35 | 60 | 62 | 75 | 70 | 160 | 1 | 0 | CSCN70A310 ♦ | 1 | |
| | | | | | | | | | | | | 0 | 1 | CSCN70A301 ♦ | 1 | |
| | | | | | | | | | | | | 2 | 0 | CSCN70A320 ♦ | 1 | |
| | | | | | | | | | | | | 1 | 1 | CSCN70A311 ♦ | 1 | |
| | | | | | | | | | | | | 1 | 2 | CSCN70A312 ♦ | 1 | |
|  | Spare coils | | | | | | | | | | | | | | | |
| | For series CSCN12 ... CSCN25 | | | | | | | | | | | | LB1A ♦ | | 5 | |
| | For series CSCN30 | | | | | | | | | | | | LB3A ♦ | | 5 | |
| For series CSCN45 ... CSCN70 | | | | | | | | | | | | LB4A ♦ | | 5 | | |

(1) To complete the reference, replace ♦ by the code corresponding to the voltage and frequency of the control circuit. (see pg. C.80)

Order codes

A

B

C

D

E

F

G

H

I

X

Technical data

Technical characteristics

| | | CSCN12 | CSCN16 | CSCN20 | CSCN25 | CSCN30 | CSCN45 | CSCN55 | CSCN70 |
|--|--------------------------|---------|---------|---------|---------|---------|---------|---------|--------|
| Main circuit (poles) | | | | | | | | | |
| Rated operational voltage | (V) | 690 | 690 | 690 | 690 | 690 | 690 | 690 | 690 |
| Rated insulation voltage according to IEC947 | (V) | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| Rated thermal current | (A) | 25 | 32 | 45 | 45 | 60 | 90 | 110 | 140 |
| Max. power utilization at 55°C | 230/240V (kvar) | 7,5 | 10 | 12,5 | 15 | 20 | 25 | 35 | 45 |
| | 380/400V (kvar) | 12,5 | 16,7 | 20 | 25 | 30 | 45 | 55 | 70 |
| | 660/690V (kvar) | 15 | 20 | 25 | 30 | 35 | 55 | 65 | 85 |
| Electrical endurance | (ops.) | 280.000 | 280.000 | 280.000 | 250.000 | 200.000 | 150.000 | 120.000 | 90.000 |
| Max. ops./hour | (ops./hour) | 350 | 350 | 350 | 240 | 240 | 150 | 150 | 150 |
| Control circuit | | | | | | | | | |
| Standard voltages | 50Hz (V) | 24-690 | 24-690 | 24-690 | 24-690 | 24-690 | 24-690 | 24-690 | 24-690 |
| | 60Hz (V) | 24-600 | 24-600 | 24-600 | 24-600 | 24-600 | 24-600 | 24-600 | 24-600 |
| Consumption | | | | | | | | | |
| Single frequency | Mar. circuit open (VA) | 45 | 45 | 48 | 48 | 88 | 191 | 191 | 198 |
| | Mar. circuit closed (VA) | 6 | 6 | 7 | 7 | 9 | 15,5 | 15,5 | 17 |
| Dual frequency | Mar. circuit open (VA) | 54 | 54 | 58 | 58 | 125 | 245 | 245 | 250 |
| | Mar. circuit closed (VA) | 7 | 7 | 8 | 8 | 11,5 | 20 | 20 | 23 |
| 50Hz | Mar. circuit open (VA) | 35 | 35 | 39 | 39 | 110 | 215 | 215 | 220 |
| | Mar. circuit closed (VA) | 5 | 5 | 6 | 6 | 11 | 15 | 15 | 19 |


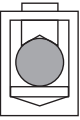
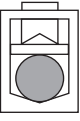
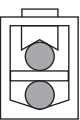
Instantaneous auxiliary contact blocks

| | | |
|-----------------------------|-----|------|
| Rated insulation voltage Ui | (V) | 1000 |
| Rated thermal current Ith | (A) | 10 |

Ambient conditions

| | | |
|-----------------------|------|-------------------------------|
| Storage temperature | (°C) | -50 ... +80 |
| Operating temperature | (°C) | -25 to +55 (without derating) |
| Altitude up to 3000m | | Nominal values |
| Mounting positions | | Vertical mounting +/- 30° |

Terminal capacity and tightening torque

| | | CSCN12 | CSCN16 | CSCN20 | CSCN25 | CSCN30 | CSCN45 | CSCN55 | CSCN70 |
|---|--|-----------------|--------|-----------------|--------|-------------|-----------------|------------|--------|
|  | Solid, stranded and finely stranded without end sleeve (mm²) | 1 x 0.5 ... 2,5 | | 1 x 0.5 ... 2,5 | | - | - | - | - |
| | Finely stranded with or without end sleeve (mm²) | 1 x 1 ... 2,5 | | 1 x 1 ... 2,5 | | - | - | - | - |
| | AWG wires | 1 x 20 ... 12 | | 1 x 20 ... 8 | | - | - | - | - |
| | Tightening torque (Nm) | 1.6 | | 2.2 | | - | - | - | - |
| | (Lb x in.) | 15 | | 20 | | - | - | - | - |
|  | Solid, stranded and finely stranded without end sleeve (mm²) | - | | - | | 0.75 ... 16 | 1 ... 35 | 1.5 ... 50 | |
| | Finely stranded with end sleeve (mm²) | - | | - | | 0.75 ... 16 | 1 ... 35 | 1.5 ... 50 | |
| | Finely stranded without end sleeve (mm²) | - | | - | | 1 ... 16 | 1 ... 35 | 1.5 ... 50 | |
| | AWG wires | - | | - | | 18 ... 6 | 16 ... 2 | 16 ... 2 | |
| | Tightening torque (Nm) | - | | - | | 1.8 | 4 | 5.6 | |
| (Lb x in.) | - | | - | | 16 | 35 | 50 | | |
|  | Solid (mm²) | - | | - | | 0.75 ... 16 | 1 ... 16 | 4 ... 35 | |
| | Stranded (mm²) | - | | - | | 0.75 ... 16 | 1 ... 25 | 4 ... 35 | |
| | Finely stranded without end sleeve (mm²) | - | | - | | 0.75 ... 16 | 1 ... 25 | 4 ... 35 | |
| | Finely stranded with end sleeve (mm²) | - | | - | | 1 ... 16 | 1 ... 25 | 4 ... 35 | |
| | AWG wires | - | | - | | 18 ... 6 | 16 ... 4 | 10 ... 1 | |
| Tightening torque (Nm) | - | | - | | 1.8 | 4 | 5.6 | | |
| (Lb x in.) | - | | - | | 16 | 35 | 50 | | |
|  | Solid, stranded and finely stranded without end sleeve (mm²) | - | | - | | Max. 16 | Max. 50 ... 4 | Max. | |
| | Finely stranded without end sleeve (mm²) | - | | - | | Max. 16 | Max. 25 ... 16 | 50 ... 35 | |
| | Finely stranded with end sleeve (mm²) | - | | - | | Max. 16 | Max. 35 ... 2,5 | Max. 35 | |
| | AWG wires | - | | - | | Max. 6 | Max. 2 ... 12 | Max. 1 | |
| | Tightening torque (Nm) | - | | - | | 1.8 | 4 | 5.6 | |
| (Lb x in.) | - | | - | | 16 | 35 | 50 | | |



Standard contactors

Series "CL" and "CK" contactors, to switch three phase capacitor banks

Electrical endurance: >100,000 operations

| Contactor | | $\theta \leq 55^{\circ}\text{C}$ | | | | | $\theta \leq 70^{\circ}\text{C}$ | | | | | Fuse gl - gG A | I max. (peak) A |
|---------------------|------|----------------------------------|--------------|--------------|--------------|----------------------|----------------------------------|--------------|--------------|--------------|----------------------|----------------------|-----------------------|
| Type ⁽¹⁾ | Ith | 220V 230V 240V kvar | 400V kvar | 415V kvar | 500V kvar | 690V 660V kvar | 220V 230V 240V kvar | 400V kvar | 415V kvar | 500V kvar | 690V 660V kvar | | |
| CL00A | 25 | 3 | 5 | 5.5 | 6.5 | 5.7 | 2.4 | 4 | 4.5 | 5.2 | 4.5 | 10 | 1000 |
| CL01A | 25 | 4.5 | 9.5 | 10.5 | 12.5 | 11 | 3.6 | 6 | 6.5 | 10 | 7 | 16 | 1000 |
| CL02A | 32 | 6.5 | 11 | 12 | 14.5 | 12.5 | 5.2 | 8.5 | 9 | 11.5 | 10 | 25 | 1000 |
| CL25A | 45 | 7.5 | 12.5 | 14 | 16 | 15 | 6.5 | 10 | 11 | 13 | 12 | 25 | 1000 |
| CL03A | 45 | 9 | 15 | 16.5 | 20 | 17.5 | 7.2 | 12 | 13 | 16 | 14 | 35 | 2500 |
| CL04A | 60 | 12.5 | 21 | 23 | 27.5 | 24 | 10 | 17 | 18 | 22 | 19.5 | 40 | 2500 |
| CL45A | 60 | 16.5 | 25 | 27 | 32 | 30 | 13 | 20 | 22 | 25 | 22 | 50 | 2500 |
| CL06A | 90 | 22 | 40 | 43 | 52 | 50 | 17 | 30 | 33 | 41 | 35 | 80 | 3500 |
| CL07A | 110 | 25 | 45 | 48 | 58 | 65 | 19 | 35 | 37 | 46 | 40 | 125 | 3500 |
| CL08A | 110 | 30 | 50 | 54 | 65 | 70 | 22 | 40 | 43 | 52 | 50 | 125 | 3500 |
| CL09A | 140 | 40 | 65 | 70 | 85 | 95 | 35 | 58 | 62 | 75 | 85 | 160 | 3500 |
| CL10A | 140 | 50 | 80 | 85 | 105 | 120 | 43 | 70 | 75 | 90 | 105 | 160 | 3500 |
| CK75C | 250 | 60 | 110 | 118 | 145 | 150 | 48 | 88 | 94 | 116 | 120 | 250 | 5000 |
| CK08C | 250 | 70 | 125 | 135 | 162 | 170 | 56 | 100 | 107 | 130 | 136 | 250 | 5000 |
| CK85B | 315 | 80 | 150 | 160 | 195 | 200 | 64 | 120 | 130 | 156 | 160 | 315 | 5000 |
| CK09B | 315 | 95 | 165 | 177 | 215 | 230 | 85 | 148 | 160 | 192 | 205 | 315 | 5000 |
| CK95B | 450 | 105 | 190 | 205 | 250 | 288 | 95 | 175 | 188 | 230 | 265 | 450 | 5500 |
| CK10C | 600 | 135 | 260 | 280 | 340 | 370 | 120 | 235 | 252 | 375 | 330 | 630 | 10000 |
| CK11C | 700 | 190 | 325 | 350 | 425 | 450 | 152 | 260 | 280 | 340 | 360 | 800 | 10000 |
| CK12B | 1000 | 250 | 400 | 430 | 520 | 600 | 200 | 320 | 344 | 416 | 480 | 1000 | 12000 |
| CK13B | 1250 | 315 | 525 | 565 | 685 | 650 | 252 | 420 | 452 | 548 | 520 | 1250 | 15000 |

(1) To complete contactor reference, see C.10 for CL and C.18 for CK

Technical data

A

B

C

D

E

F

G

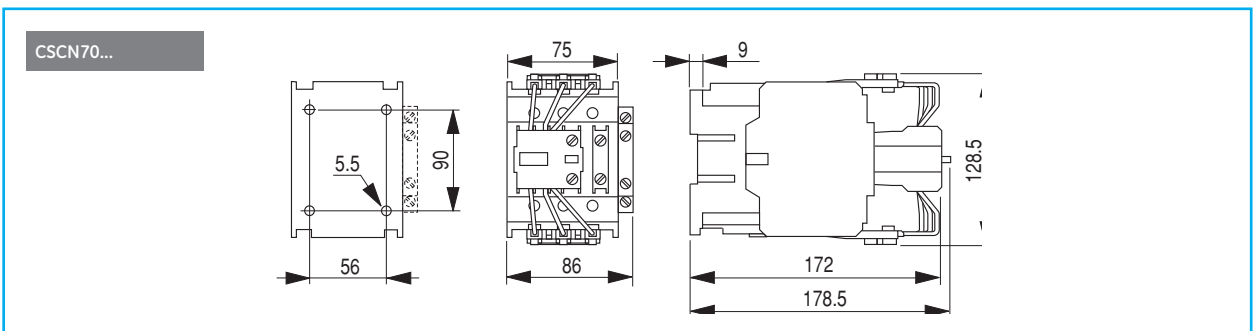
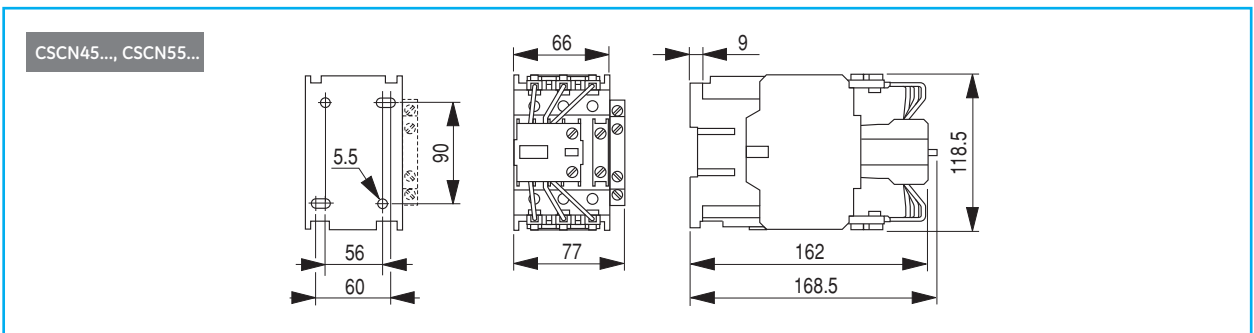
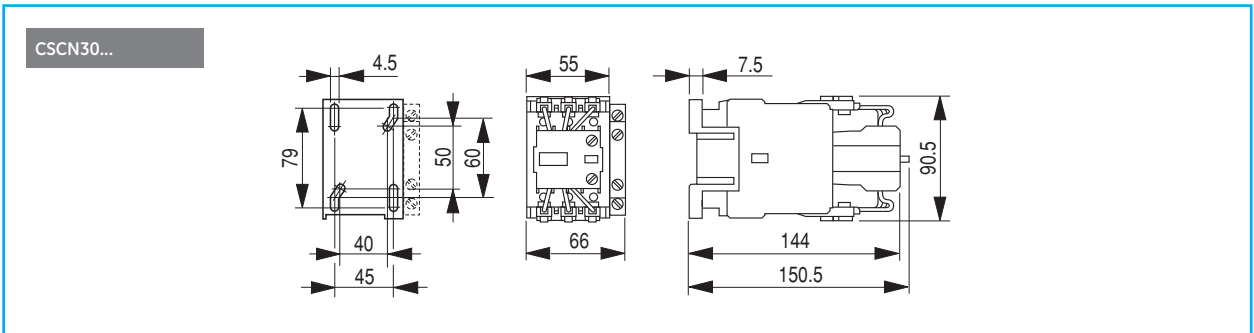
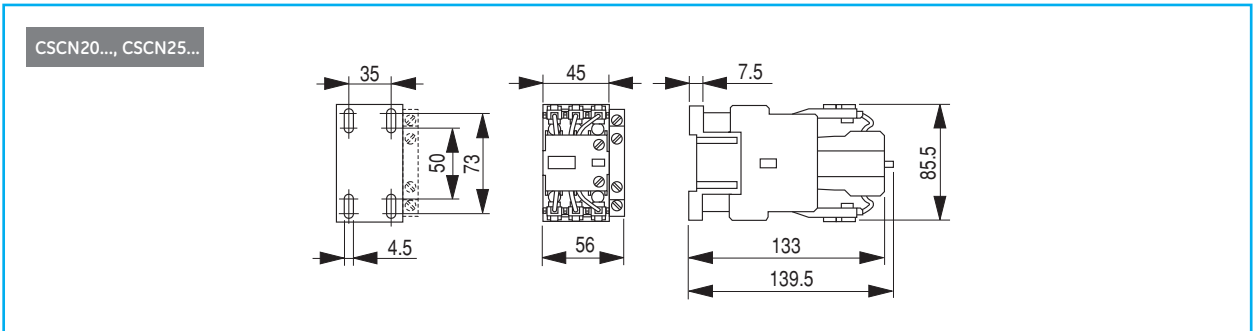
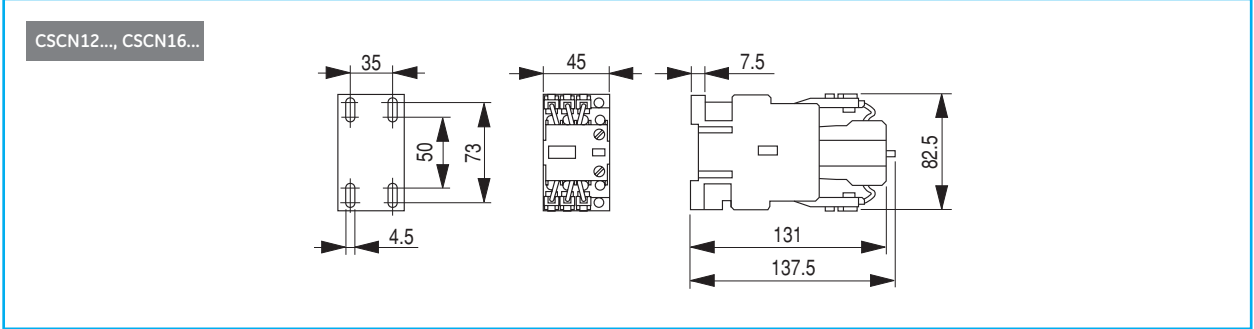
H

I

X

Dimensional drawings

Contactors for capacitors switching



Notes

Grid area for notes.

Dimensions

A

B

C

D

E

F

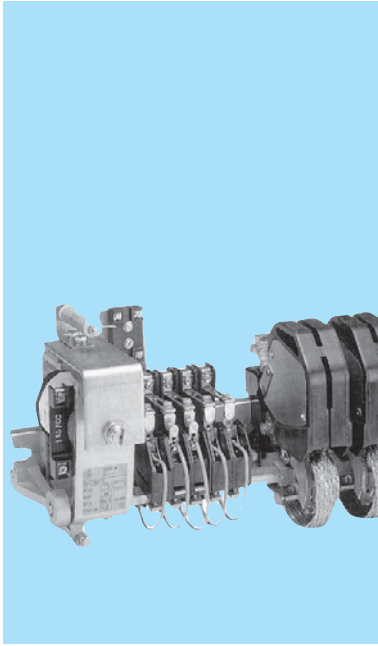
G

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I

X





Clapper contactors 40A to 800A (AC-3) / 45A to 1200A (AC-1)

AC and DC control using a bridge rectifier, designed to meet the most recent stringent requirements in terms of reliability, service life and performance.

Main characteristics

- Sliding contact holder, set on self-centering and self-lubricating bronze bushings
- Minitubes made of high-strength, high electrical resistance material
- Individual auxiliary contacts

Construction

Variable composition contactors (the number of main poles and auxiliary contacts may vary), preferably secured on mounts

Control circuit

Solid iron magnetic circuit with coil powered by direct or rectified current, particularly for heavy-duty applications (e.g., cranes, roll mills, reversing winches, etc.).

The coils are sized for intermittent operation. For continuous operation, insert an economy resistor in series with the coil using the respective auxiliary contact.

Main contacts

The sintered main contacts are classified as Type 4/2 for intermittent operation and Type 5/2 for continuous operation.

The 4/2 sintered contact may be used only for heavy-duty operation when the number of switching operations per hour is above 60 and the operating intermittence is equal or less than 60% (cranes, roll mills, etc.).

If used for continuous operation, the contact will overheat.

The 5/2 sintered contact may be used only for normal duty when the number of switching operations per hour is equal to or less than 60% and the operating intermittence is above 60%.

Auxiliary contacts

Individual NO or NC single-broke contacts
 Possibility to advance or delay contact making or breaking

Special versions

The following items may be supplied upon request:

- Contactors with coils having an operating limit that exceeds the limits required by the standards
- Contactors with an operating voltage up to 3000V (rotary disconnect switches, induction furnaces, etc.)
- Vertical mechanical interlocks ideal for interlocking 3 contactors.

Spare parts and additional components

Spare parts and additional components for the contactors are listed on page C.91.

Standards

- IEC/EN 60947-1
- IEC/EN 60947-4-1
- IEC/EN 60947-5-1

Standard voltages

Alternating current (V) Dual-frequency coils

| | AP | CP | EP | GP |
|---------|----|----|-----|-----|
| 50/60Hz | 24 | 48 | 110 | 220 |

Direct current (V)

| | A | B | C | D | E | F | G | H | M | R |
|---------|----|----|----|----|----|-----|-----|-----|-----|-----|
| Voltage | 20 | 24 | 40 | 48 | 97 | 110 | 197 | 220 | 230 | 125 |

Order codes ● pg. C.87

Coils ● pg. C.90

Spare parts ● pg. C.91

Technical data ● pg. C.94

Dimensional drawings ● pg. C.96

Control voltage and normal combinations

Normal rated voltages, shaft spacing and combinations (main and auxiliary poles) have been defined for each switchgear unit, thereby allowing the contactor to be rapidly selected.

AC rated voltages: 24V - 48V - 110V - 220/230V

DC rated voltages: 24V - 48V - 110V - 220/230V

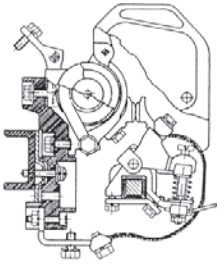
Spacing between standardised shafts and combinations:

See pages C.96 to C.98

Standard center-to-center spacing (mm): 150, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000

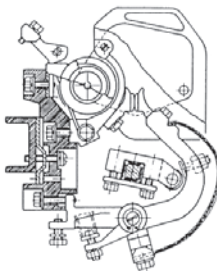
Main poles

The poles can be constructed as follows, depending on the operating conditions:



Z design (NO)

- For load breaking, with high breaking capacity
- For AC or DC use
- Equipped with magnetic arc-quenching coil. In the case of AC, the poles are normally supplied with an appropriate arc-quenching coil for the maximum rated current of the pole.
- Arc-quenching coils for medium rated currents with respect to the expected peak current are available for DC use upon request, for more effective pole performance (see table on page C.90).



RN design (NC)

- Based on the use of break poles, which are open when the coil is energized and closed when the coil is de-energized.
- For AC or DC use in special circuits where high interrupting capacities are not required.
- This design is intended to be used with contactors R1, R2, R3, R4, R5, R7.

| Poles | R1 | R2 | R3 | R4 | R5 | R6 | R7 | R8 | R9 |
|-------|----|----|----|----|----|----|----|----|----|
| Z | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| RN | ■ | ■ | ■ | ■ | ■ | | ■ | | |

Order codes - Clapper contactors

| Peak operating current | AC-3 admissible rated powers | | | | | Electric endurance | AC or DC | Pack. |
|------------------------|------------------------------|---------------------------|-----------|-----------|-----------|-------------------------------------|---|-------|
| | Resistive loads | Motors <440V, 3 ~ 50/60Hz | 220V 230V | 380V 400V | 415V 440V | | | |
| AC1 A | AC3 A | kW HP | kW HP | kW HP | kW HP | Cat. AC3 Switching operations | See the following pages C.84 and C.85 on how to complete the catalogue number | |
| 45 | 40 | 11,5 | 20 | 20 | 20 | 1 × 10 ⁶ | R1 ... | 1 |
| 90 | 90 | 26 | 45 | 45 | 45 | 1 × 10 ⁶ | R2 ... | 1 |
| 125 | 120 | 36.5 | 62 | 62 | 73.5 | 1 × 10 ⁶ | R3 ... | 1 |
| 250 | 200 | 72.5 | 100 | 100 | 120 | 1 × 10 ⁶ | R4 ... | 1 |
| 320 | 320 | 93 | 160 | 160 | 165 | 1.2 × 10 ⁶ | R5 ... | 1 |
| 450 | 450 | 130 | 225 | 225 | 300 | 1.5 × 10 ⁶ | R6 ... | 1 |
| 630 | 630 | 184 | 315 | 315 | 400 | 1 × 10 ⁶ | R7 ... | 1 |
| 800 | 800 | 232 | 400 | 400 | 500 | 0.9 × 10 ⁶ | R8 ... | 1 |
| 1500 | - | - | - | - | - | - | R9 ... | 1 |

Order codes

A

B

C

D

E

F

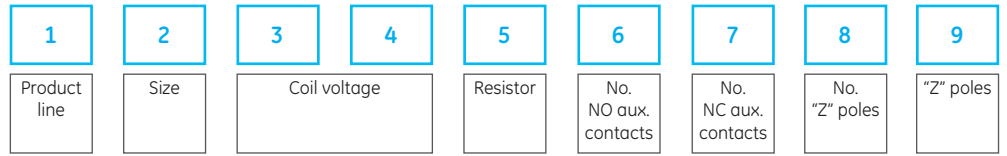
G

H

I

X

Catalogue number structure



Clapper contactors

A

B

C

D

E

F

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I

X

| Size | | 1 | 2 |
|------|---------|------|-----|
| 1 | Max. | 45 | R 1 |
| | 500V AC | 90 | R 2 |
| 2 | 250V DC | 125 | R 3 |
| | | 250 | R 4 |
| | | 320 | R 5 |
| | | 450 | R 6 |
| | | 630 | R 7 |
| | | 800 | R 8 |
| | | 1200 | R 9 |

| Auxiliary contacts | | 6 | 7 |
|--------------------|----|---|---|
| 6 | NO | | |
| | 1 | 1 | |
| | 2 | 2 | |
| | 3 | 3 | |
| | 4 | 4 | |
| | 5 | 5 | |
| 7 | 6 | 6 | |
| | | 1 | 1 |
| | | 2 | 2 |
| | | 3 | 3 |
| | 4 | | |

| "RN" poles" (NC) | | 11 |
|------------------|------------|----|
| "RN" poles | "RN" poles | |
| 0 | 0 | - |
| 1 | 1 | 1 |
| 2 | 2 | 2 |
| 3 | 3 | 3 |
| 4 | 4 | 4 |

Note: The "RN" poles are not available for the R6, R8 and R9 types.

| Coil voltage | | 3 | 4 |
|-----------------|------|---|---|
| AC | DC | | |
| Types R1 ... R7 | | | |
| 24V | | A | P |
| 48V | | C | P |
| 110V | | E | P |
| 220V | | G | P |
| | 20V | A | - |
| | 24V | B | - |
| | 40V | C | - |
| | 48V | D | - |
| | 97V | E | - |
| | 110V | F | - |
| | 197V | G | - |
| | 220V | H | - |
| | 230V | M | - |
| | 125V | R | - |
| Types R8 and R9 | | | |
| 110V | | E | P |
| 220V | 97V | G | P |
| | 110V | E | - |
| | 197V | F | - |
| | 220V | G | - |
| | 230V | H | - |
| | 125V | M | - |

| "Z" poles" (N) | | 8 |
|----------------|-----------|---|
| 8 | "Z" poles | |
| | 0 | - |
| | 1 | 1 |
| | 2 | 2 |
| | 3 | 3 |
| | 4 | 4 |

| "RN" poles | | 12 |
|---------------|---|----|
| Type of pole | | |
| RN | V | |
| No "RN" poles | - | |

Note: The "RN" poles are not available for the R6, R8 and R9 types.

| Economy resistor | | 5 |
|------------------|----------------------------|---|
| | If required (5/2 contacts) | R |
| | If not required | - |

| "Z" poles | | 9 |
|-----------|--------------|---|
| 9 | Type of pole | |
| | Z | Z |
| | No "Z" poles | - |

| Type | Arc-quenching coil "Z" poles | | |
|------|------------------------------|------|------|
| | A | B | C |
| R1 | 45A | 14A | 25A |
| R2 | 90A | 45A | - |
| R3 | 125A | 75A | - |
| R4 | 200A | 50A | 130A |
| R5 | 320A | 150A | - |
| R6 | 450A | 270A | - |
| R7 | 630A | 320A | - |
| R8 | 800A | 320A | 400A |
| R9 | 1200A | - | - |

| Type | Arc-quenching coil «RN» poles | | |
|------|-------------------------------|------|------|
| | A | B | C |
| R1 | 45A | 14A | 25A |
| R2 | 90A | 45A | - |
| R3 | 125A | 75A | - |
| R4 | 200A | 50A | 130A |
| R5 | 320A | 150A | - |
| R6 | - | - | - |
| R7 | 630A | 320A | - |
| R8 | - | - | - |
| R9 | - | - | - |

Note: The "RN" poles are not available for the R6, R8 and R9 types.

| Type of contacts | | 14 |
|------------------|------------------|----|
| Type | | |
| 4/2 | Intermittent op. | 4 |
| 5/2 | Continuous op. | 5 |



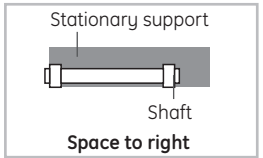
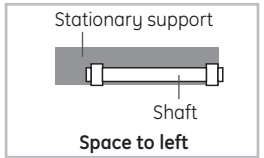
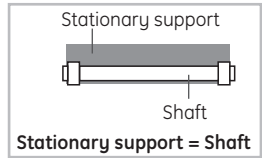
- | | | | | | | | | |
|------------------------------|----------------|------------|-------------------------------|------------------|--------------------|-----------|-----------|-----------|
| 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| Arc-quenching coil "Z" poles | No. "RN" poles | "RN" poles | Arc-quenching coil "RN" poles | Type of contacts | Stationary support | Space | Shaft | Isolation |

| | Stationary support | Contactor type | | | |
|-----------|--------------------|----------------|----------|----------------|----|
| | | R1 R2 R3 | R4 R5 | R6 R7 R8 | R9 |
| 15 | Length (mm) | | | | |
| | 150 | A | - | - | - |
| | 200 | B | - | - | - |
| | 250 | C | C | - | - |
| | 300 | D | D | - | - |
| | 350 | E | E | E | - |
| | 400 | F | F | F | F |
| | 450 | G | G | G | G |
| | 500 | H | H | H | H |
| | 600 | I | I | I | I |
| | 700 | L | L | L | L |
| | 800 | M | M | M | M |
| | 900 | N | N | N | N |
| | 1000 | O | O | O | O |

| | Schaft (≤stat. sup.) | Contactor type | | | |
|-----------|----------------------|----------------|----------|----------------|----|
| | | R1 R2 R3 | R4 R5 | R6 R7 R8 | R9 |
| 17 | Length (mm) | | | | |
| | 150 | A | - | - | - |
| | 200 | B | - | - | - |
| | 250 | C | C | - | - |
| | 300 | D | D | - | - |
| | 350 | E | E | E | - |
| | 400 | F | F | F | F |
| | 450 | G | G | G | G |
| | 500 | H | H | H | H |
| | 600 | I | I | I | I |
| | 700 | L | L | L | L |
| | 800 | M | M | M | M |
| | 900 | N | N | N | N |
| | 1000 | O | O | O | O |

| | Isolation | 18 |
|-----------|--------------------|-----------|
| 18 | For more isolation | M |
| | Not required | - |

| | Space | 16 |
|-----------|----------|-----------------------|
| 16 | No space | Station. sup.=Shaft - |
| | Space | Left S |
| | | Right - |



- Order codes**
- A
 - B
 - C
 - D
 - E
 - F
 - G
 - H
 - I
 - X

Standardised DC or rectified coils

The DC coils are suitable for intermittent operation; for continuous operation, an economy resistor must be used.
 The coils for rectified rated voltages 20-40-97-197V obtained from AC power supplies. (before the rectifier). 24-48-110-220V are available upon request. For the contactor of "RN" break poles, contact GE.

Clapper contactors

A

B

C

D

E

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G

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X

| Contactor | Voltage VDC | Coil | | Economy resistor for continuous operation ± 5% | | | | Single-phase bridge rectifier for AC power | | |
|-----------|-------------|------------|----------|--|------|----------------|----------|--|------------------|----------|
| | | Cat. no. | Ref. no. | W | Ω | Cat. no. | Ref. no. | V 50/60Hz | Cat. no. | Ref. no. |
| R1 R2 | 20 | 39012Y20D | 244107 | 4 | 8.2 | RSS13/64TA8,2 | 204177 | 24 | MSK-B250/220-1,5 | 209997 |
| | 24 | 39012Y24D | 202327 | | 18 | RSS13/64TA18 | 211727 | - | | |
| | 40 | 39012Y40D | 244106 | | 33 | RSS13/64TA33 | 211728 | 48 | | |
| | 48 | 39012Y48D | 244734 | | 68 | RSS13/64TA6,8 | 214869 | - | | |
| | 97 | 39012Y97D | 202328 | | 220 | RSS13/64TA220 | 212702 | 110 | | |
| | 110 | 39012Y110D | 202323 | | 330 | RSS13/64TA330 | 211745 | - | | |
| | 197 | 39012Y197D | 202325 | | 680 | RSS13/64TA680 | 214580 | 220 | | |
| | 220 | 39012Y220D | 202326 | | 1200 | RSS13/64TA1200 | 213034 | - | | |
| | 230 | 39012Y230D | 211706 | | 1200 | RSS13/64TA1200 | 213034 | - | | |
| | 125 | 39012Y125D | 202324 | | 330 | RSS13/64TA300 | 211714 | - | | |
| R3 | 20 | 3903Y20D | 215278 | 4 | 8.2 | RSS13/64TA8,2 | 204177 | 24 | MSK-B250/220-1,5 | 209997 |
| | 24 | 3903Y24D | 244735 | | 18 | RSS13/64TA18 | 211727 | - | | |
| | 40 | 3903Y40D | 244088 | | 39 | RSS13/64TA39 | 211730 | 48 | | |
| | 48 | 3903Y48D | 212705 | | 47 | RSS13/64TA47 | 211731 | - | | |
| | 97 | 3903Y97D | 213691 | | 270 | RSS13/64TA270 | 214399 | 110 | | |
| | 110 | 3903Y110D | 202437 | | 330 | RSS13/64TA330 | 211745 | - | | |
| | 197 | 3903Y197D | 214442 | | 820 | RSS13/64TA820 | 214400 | 220 | | |
| | 220 | 3903Y220D | 202438 | | 1200 | RSS13/64TA1200 | 213034 | - | | |
| | 230 | 3903Y230D | 211107 | | 1200 | RSS13/64TA1200 | 213034 | - | | |
| | 125 | 3903Y125D | 216100 | | 330 | RSS13/64TA300 | 211714 | - | | |
| R4 | 20 | 3904Y20D | 244084 | 6 | 8.2 | RSS13/64TA8,2 | 204177 | 24 | MSK-B250/220-1,5 | 209997 |
| | 24 | 3904Y24D | 202483 | | 18 | RSS13/64TA18 | 211727 | - | | |
| | 40 | 3904Y40D | 244083 | | 33 | RSS13/64TA33 | 211728 | 48 | | |
| | 48 | 3904Y48D | 213814 | | 33 | RSS13/64TA33 | 211728 | - | | |
| | 97 | 3904Y97D | 213601 | | 180 | RSS13/64TA180 | 211744 | 110 | | |
| | 110 | 3904Y110D | 202479 | | 180 | RSS13/64TA180 | 211744 | - | | |
| | 197 | 3904Y197D | 202481 | | 680 | RSS13/64TA680 | 214580 | 220 | | |
| | 220 | 3904Y220D | 202482 | | 680 | RSS13/64TA680 | 214580 | - | | |
| | 230 | 3904Y230D | 211708 | | 680 | RSS13/64TA680 | 214580 | - | | |
| | 125 | 3904Y125D | 202480 | | 180 | RSS13/64TA180 | 211744 | - | | |
| R5 | 20 | 3905Y20D | 244073 | 10 | 6.8 | RSS13/64TA6,8 | 214869 | 24 | SKB-B80/70-4 | 211716 |
| | 24 | 3905Y24D | 244072 | | 10 | RSS13/64TA10 | 211742 | - | | |
| | 40 | 3905Y40D | 244071 | | 27 | RSS13/64TA27 | 244192 | 48 | | |
| | 48 | 3905Y48D | 244736 | | 27 | RSS13/64TA27 | 244192 | - | | |
| | 97 | 3905Y97D | 202513 | | 120 | RSS13/64TA120 | 243281 | 110 | | |
| | 110 | 3905Y110D | 202512 | | 180 | RSS13/64TA180 | 211744 | - | | |
| | 197 | 3905Y197D | 244074 | | 470 | RSS13/64TA470 | 244191 | 220 | | |
| | 220 | 3905Y220D | 212706 | | 680 | RSS13/64TA680 | 214580 | - | | |
| | 230 | 3905Y230D | 211709 | | 680 | RSS13/64TA680 | 214580 | - | | |
| | 125 | 3905Y125D | 242260 | | 180 | RSS13/64TA180 | 211744 | - | | |
| R6 | 20 | 3906Y20D | 244065 | 10 | 6.8 | RSS13/64TA6,8 | 214869 | 24 | SKB-B80/70-4 | 211716 |
| | 24 | 3906Y24D | 244064 | | 8.2 | RSS13/64TA8,2 | 204177 | - | | |
| | 40 | 3906Y40D | 244063 | | 27 | RSS13/64TA27 | 244192 | 48 | | |
| | 48 | 3906Y48D | 212707 | | 27 | RSS13/64TA27 | 244192 | - | | |
| | 97 | 3906Y97D | 202533 | | 100 | RSS13/64TA100 | 211744 | 110 | | |
| | 110 | 3906Y110D | 202532 | | 180 | RSS13/64TA180 | 211744 | - | | |
| | 197 | 3906Y197D | 244066 | | 470 | RSS13/64TA470 | 244191 | 220 | | |
| | 220 | 3906Y220D | 213612 | | 680 | RSS13/64TA680 | 214580 | - | | |
| | 230 | 3906Y230D | 211770 | | 680 | RSS13/64TA680 | 214580 | - | | |
| | 125 | 3906Y125D | 211711 | | 180 | RSS13/64TA180 | 211744 | - | | |
| R7 | 20 | 3907Y20D | 244058 | 16 | 5.6 | RSS13/64TA5,6 | 211735 | 24 | SKB-B80/70-4 | 211716 |
| | 24 | 3907Y24D | 244057 | | 5.6 | RSS13/64TA5,6 | 211735 | - | | |
| | 40 | 3907Y40D | 244056 | | 15 | RSS13/64TA15 | 211737 | 48 | | |
| | 48 | 3907Y48D | 244737 | | 18 | RSS13/64TA18 | 211727 | - | | |
| | 97 | 3907Y97D | 244738 | | 82 | RSS13/64TA82 | 204177 | 110 | | |
| | 110 | 3907Y110D | 202547 | | 100 | RSS13/64TA100 | 211743 | - | | |
| | 197 | 3907Y197D | 244059 | | 330 | RSS13/64TA330 | 211745 | 220 | | |
| | 220 | 3907Y220D | 202548 | | 390 | RSS13/64TA390 | 211746 | - | | |
| | 230 | 3907Y230D | 211712 | | 1200 | RSS13/64TA1200 | 213034 | - | | |
| | 125 | 3907Y125D | 211713 | | 330 | RSS13/64TA330 | 211745 | - | | |
| R8 | 97 | 3908Y97D | 212959 | 16 | 82 | RSS20/165TA82 | 214081 | 110 | SKB-B250/220-4 | 212165 |
| | 110 | 3908Y110D | 202565 | | 120 | RSS20/165TA120 | 213664 | - | | |
| | 197 | 3908Y197D | 214066 | | 390 | RSS20/165TA390 | 211748 | 220 | | |
| | 220 | 3908Y220D | 202566 | | 470 | RSS20/165TA470 | 211739 | - | | |
| R9 | 97 | 3909Y97D | 214146 | 140 | 100 | RSS20/165TA100 | 213663 | 110 | SKB-B30/08 | 211720 |
| | 110 | 3909Y110D | 202572 | | 150 | RSS20/165TA150 | 215004 | - | | |
| | 197 | 3909Y197D | 204181 | | 390 | RSS20/165TA390 | 211748 | 220 | | |
| | 220 | 3909Y220D | 244739 | | 560 | RSS20/165TA560 | 244987 | - | | |

(1) To insert the resistors, use NC auxiliary contacts in series.
 (2) Two 20x165 resistors connected in parallel, each with a resistive value listed in the table.



Spare parts

| Contactora | Description | Cat. no. | Ref. no. | Pack (units) | |
|---|---|---|------------------|--------------|---|
| R1 | "Z" stationary part with 14A arc-quenching coil and spark suppressor | 390/3921PFZCS14 | 202273 | 1 | |
| | "Z" stationary part with 25A arc-quenching coil and spark suppressor | 390/3921PFZCS25 | 244172 | 1 | |
| | "Z" stationary part with 45A arc-quenching coil and spark suppressor | 390/3921PFZCS45 | 202274 | 1 | |
| | "RN" stationary part with spark suppressor | 390/3921PFRN | 244173 | 1 | |
| | "Z" moving part (with pressure spring and strap) | 390/3921PMZI | 202276 | 1 | |
| | "RN" moving part (with pressure spring and strap) | 390/3921PMRN | 202275 | 1 | |
| | Stationary and moving main contact, type 4/2 (intermittent operation) | 390/3921/2FOM4/2 | 214120 | 1 | |
| | Stationary and moving main contact, type 5/2 (continuous operation) | 390/3922FOM5/2 | 214121 | 1 | |
| | Spark suppressor for "Z" and "RN" poles | 390/3921PZ | 202277 | 1 | |
| | R2 | "Z" stationary part with 45A arc-quenching coil and spark suppressor | 390/3922PFZCS45 | 244744 | 1 |
| "Z" stationary part with 90A arc-quenching coil and spark suppressor | | 390/3922PFZCS90 | 202278 | 1 | |
| "RN" stationary part with spark suppressor | | 390/3922PFRN | 212709 | 1 | |
| "Z" moving part (with pressure spring and strap) | | 390/3922PMZI | 202279 | 1 | |
| "RN" moving part (with pressure spring and strap) | | 390/3922PMRN | 213014 | 1 | |
| Stationary and moving main contact, type 4/2 (intermittent operation) | | 390/3921/2FOM4/2 | 214120 | 1 | |
| Stationary and moving main contact, type 5/2 (continuous operation) | | 390/3922FOM5/2 | 214121 | 1 | |
| Spark suppressor for "Z" and "RN" poles | | 390/3922PZ | 202280 | 1 | |
| R3 | | "Z" stationary part with 75A arc-quenching coil and spark suppressor | 390/3923PFZCS75 | 244745 | 1 |
| | | "Z" stationary part with 125A arc-quenching coil and spark suppressor | 390/3923PFZCS125 | 202281 | 1 |
| | "RN" stationary part with spark suppressor | 390/3923PFRN | 213986 | 1 | |
| | "Z" moving part (with pressure spring and strap) | 390/3923PMZI | 202283 | 1 | |
| | "RN" moving part (with pressure spring and strap) | 390/3923PMRN | 202282 | 1 | |
| | Stationary and moving main contact, type 4/2 (intermittent operation) | 390/3923/2FOM4/2 | 214122 | 1 | |
| | Stationary and moving main contact, type 5/2 (continuous operation) | 390/3923FOM5/2 | 214123 | 1 | |
| | Spark suppressor for "Z" and "RN" poles | 390/3923PZ | 202284 | 1 | |
| | R4 | "Z" stationary part with 125A arc-quenching coil and spark suppressor | 390/3924PFZCS125 | 202288 | 1 |
| | | "Z" stationary part with 200A arc-quenching coil and spark suppressor | 390/3924PFZCS200 | 202289 | 1 |
| "RN" stationary part with spark suppressor | | 390/3924PFRN | 202287 | 1 | |
| "Z" moving part (with pressure spring and strap) | | 390/3924PMZI | 202291 | 1 | |
| "RN" moving part (with pressure spring and strap) | | 390/3924PMRN | 202290 | 1 | |
| Stationary main contact, type 4/2 (intermittent operation) | | 390/3924F4 | 214124 | 1 | |
| Moving main contact, type 4/2 (intermittent operation) | | 390/3924M4/2 | 214126 | 1 | |
| Stationary main contact, 5/2 type (continuous operation) | | 390/3924F5/2 | 204178 | 1 | |
| Moving main contact, type 5/2 (continuous operation) | | 390/3924M5/2 | 214127 | 1 | |
| Spark suppressor for "Z" and "RN" poles | | 390/3924PZ | 202292 | 1 | |
| R5 | "Z" stationary part with 125A arc-quenching coil and spark suppressor | 390/3925PFZCS150 | 213573 | 1 | |
| | "Z" stationary part with 320A arc-quenching coil and spark suppressor | 390/3925PFZCS320 | 202295 | 1 | |
| | "RN" stationary part with spark suppressor | 390/3925PFRN | 244746 | 1 | |
| | "Z" moving part (with pressure spring and strap) | 390/3925PMZI | 202298 | 1 | |
| | "RN" moving part (with pressure spring and strap) | 390/3925PMRN | 202297 | 1 | |
| | Stationary main contact, type 4/2 (intermittent operation) | 390/3925F4/2 | 214128 | 1 | |
| | Moving main contact, type 4/2 (intermittent operation) | 390/3925M4/2 | 214130 | 1 | |
| | Stationary main contact, 5/2 type (continuous operation) | 390/3925F5/2 | 214129 | 1 | |
| | Moving main contact, type 5/2 (continuous operation) | 390/3925M5/2 | 214131 | 1 | |
| | Spark suppressor for "Z" and "RN" poles | 390/3925PZ | 202299 | 1 | |
| R5 | "Z" stationary part with 270A arc-quenching coil and spark suppressor | 390/3926PFZCS270 | 202303 | 1 | |
| | "Z" stationary part with 450A arc-quenching coil and spark suppressor | 390/3926PFZCS450 | 213574 | 1 | |
| | "Z" moving part (with pressure spring and strap) | 390/3926PMZI | 202304 | 1 | |
| | Stationary main contact, type 4/2 (intermittent operation) | 390/3926F4/2 | 214133 | 1 | |
| | Moving main contact, type 4/2 (intermittent operation) | 390/3926M4/2 | 214135 | 1 | |
| | Stationary main contact, 5/2 type (continuous operation) | 390/3926F5/2 | 214134 | 1 | |
| | Moving main contact, type 5/2 (continuous operation) | 390/3926M5/2 | 214136 | 1 | |
| Spark suppressor for "Z" and "RN" poles | 390/3926PZ | 202654 | 1 | | |

Order codes

A

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Spare parts (continued)

| Contactor | Description | Cat. no. | Ref. no. | Pack (units) |
|--|---|------------------|----------|--------------|
| R7 | "Z" stationary part with 320A arc-quenching coil and spark suppressor | 390/3927PFZCS320 | 202307 | 1 |
| | "Z" stationary part with 630A arc-quenching coil and spark suppressor | 390/3927PFZCS630 | 202308 | 1 |
| | "RN" stationary part with spark suppressor | 390/3927PFRN | 202306 | 1 |
| | "Z" moving part (with pressure spring and strap) | 390/392PMZI | 202310 | 1 |
| | "RN" moving part (with pressure spring and strap) | 390/3927PMRN | 202309 | 1 |
| | Stationary main contact, type 4/2 (intermittent operation) | 390/3927F4/2 | 214137 | 1 |
| | Moving main contact, type 4/2 (intermittent operation) | 390/3927M4/2 | 214139 | 1 |
| | Stationary main contact, 5/2 type (continuous operation) | 390/3927F5/2 | 214138 | 1 |
| | Moving main contact, type 5/2 (continuous operation) | 390/3927M5/2 | 214140 | 1 |
| | Spark suppressor for "Z" and "RN" poles | 390/3927PZ | 202311 | 1 |
| R8 | "Z" stationary part with 400A arc-quenching coil and spark suppressor | 3908PFZCS400 | 202555 | 1 |
| | "Z" stationary part with 800A arc-quenching coil and spark suppressor | 3908PFZCS800 | 202562 | 1 |
| | "Z" moving part (with pressure spring and strap) | 3908PMZ | 202563 | 1 |
| | Stationary main contact, type 4/2 (intermittent operation) | 3908F4/2 | 214144 | 1 |
| | Moving main contact, type 4/2 (intermittent operation) | 3908/9M4/2 | 214141 | 1 |
| | Stationary main contact, 5/2 type (continuous operation) | 3908F5/2 | 214145 | 1 |
| | Moving main contact, type 5/2 (continuous operation) | 3908/9M5/2 | 214142 | 1 |
| | Spark suppressor for "Z" and "RN" poles | 3908PZ | 202564 | 1 |
| R8 | "Z" stationary part with 1200A arc-quenching coil and spark suppr. | 3909PFZCS120 | 244983 | 1 |
| | "Z" moving part (with pressure spring and strap) | 3909PMZ | 212962 | 1 |
| | Stationary main contact, type 4/2 (intermittent operation) | 3909F4/2 | 204179 | 1 |
| | Moving main contact, type 4/2 (intermittent operation) | 3908/9M4/2 | 214141 | 1 |
| | Stationary main contact, 5/2 type (continuous operation) | 3909F5/2 | 204180 | 1 |
| Moving main contact, type 5/2 (continuous operation) | 3908/9M5/2 | 214142 | 1 | |

Clapper contactors

A

B

C

D

E

F

G

H

I

X



Operating categories

| | | | R1... | R2... | R3... | R4... | R5... | R6... | R7... | R8... | R9... |
|---------------------------|--------------------------|---------------|-------|-------|-------|-------|------------|------------|------------|------------|-------|
| AC-1 | Peak operating current | 40°C (A) | 45 | 90 | 125 | 250 | 320 | 450 | 630 | 800 | 1200 |
| | at ambient temp. of: | 55°C (A) | 45 | 90 | 125 | 250 | 320 | 450 | 600 | 750 | 1200 |
| | (for all rated voltages) | 70°C (A) | 30 | 70 | 100 | 200 | 280 | 360 | 500 | 700 | 950 |
| | Max. operating power | 230/220V (kW) | 17 | 30 | 45 | 90 | 114 | 170 | 195 | 240 | 450 |
| | Resistor III | 400/380V (kW) | 29 | 55 | 75 | 155 | 196 | 310 | 330 | 410 | 750 |
| | | 440/415V (kW) | 32 | 57 | 85 | 180 | 227 | 340 | 330 | 500 | 900 |
| | | 500V (kW) | 39 | 69 | 102 | 200 | 250 | 390 | 420 | 550 | 1030 |
| Conductor | (mm ²) | 10 | 35 | 50 | 120 | 185 | 2 x (30x5) | 2 x (40x5) | 2 x (60x5) | 4 x (50x5) | |
| Operation in % of peak | 120 ops/h (%) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 50 |
| operating current | 300 ops/h (%) | 50 | 50 | 50 | 50 | 30 | 30 | 20 | 10 | 10 | |
| AC-3 | Peak operating current | Ue = 400V (A) | 40 | 90 | 110 | 200 | 320 | 450 | 630 | 800 | - |
| | Max. operating power | 230/220V (kW) | 11.5 | 26 | 36.5 | 72.5 | 93 | 130 | 184 | 232 | - |
| | | 400/380V (kW) | 20 | 45 | 62 | 100 | 160 | 225 | 315 | 400 | - |
| | | 440/415V (kW) | 20 | 45 | 68 | 100 | 160 | 225 | 315 | 400 | - |
| | | 500V (kW) | 20 | 45 | 72.5 | 120 | 165 | 280 | 400 | 500 | - |
| Use in % of peak | 120 ops/h (%) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | - | |
| operating current | 300 ops/h (%) | 50 | 50 | 50 | 50 | 50 | 50 | 30 | 30 | - | |
| AC-4 | Peak operating current | Ue = 500V (A) | 18.5 | 44 | 55 | 110 | 125 | 150 | 165 | 250 | - |
| | Operating power | 230/220V (kW) | 4 | 11 | 15 | 33 | 37 | 45 | 50 | 80 | - |
| | (200,000 switching) | (HP) | 5.3 | 14.6 | 19.9 | 43.9 | 49.2 | 59.8 | 66.5 | 106 | - |
| | | 400/380V (kW) | 9 | 22 | 28 | 55 | 63 | 80 | 90 | 132 | - |
| | | (HP) | 11.9 | 29.2 | 37.2 | 73.1 | 83.8 | 106 | 119.7 | 175.5 | - |
| | | 500V (kW) | 11 | 25 | 33 | 75 | 90 | 100 | 110 | 225 | - |
| | | (HP) | 14.6 | 33.2 | 43.9 | 99.7 | 119.7 | 133 | 146 | 299 | - |
| Peak operating current | ≤ 400V (A) | 40 | 90 | 110 | 185 | 280 | 420 | 590 | 700 | - | |
| Max. operating power | 400/380V (kW) | 18.5 | 38 | 55 | 90 | 150 | 220 | 300 | 375 | - | |
| | | | R1... | R2... | R3... | R4... | R5... | R6... | R7... | R8... | R9... |
| DC1 L/R ≤ 1ms | Ue | Series poles | R1... | R2... | R3... | R4... | R5... | R6... | R7... | R8... | R9... |
| | 125V | 1 | 40 | 85 | 115 | 180 | 300 | 400 | 600 | 700 | 900 |
| | | 2 | 60 | 90 | 125 | 200 | 320 | 450 | 630 | 750 | 1000 |
| | | 3 | 60 | 90 | 125 | 200 | 320 | 450 | 630 | 800 | 1250 |
| | | 4 | 60 | 90 | 125 | 200 | 320 | 450 | 630 | 800 | 1250 |
| | 220V | 1 | 20 | 75 | 110 | 160 | 275 | 350 | 500 | 600 | 800 |
| | | 2 | 30 | 90 | 115 | 200 | 300 | 370 | 560 | 650 | 900 |
| | | 3 | 40 | 90 | 125 | 250 | 320 | 400 | 630 | 750 | 1000 |
| | | 4 | 40 | 90 | 125 | 250 | 320 | 450 | 630 | 800 | 1250 |
| | 440V | 1 | - | - | - | - | - | - | - | - | - |
| | | 2 | - | 75 | 100 | 200 | 275 | 350 | 500 | 600 | 800 |
| | | 3 | 20 | 90 | 125 | 250 | 320 | 400 | 600 | 700 | 900 |
| | | 4 | 20 | 90 | 125 | 250 | 320 | 450 | 630 | 800 | 1000 |
| DC3 L/R ≤ 2.5ms | 125V | 1 | 30 | 75 | 100 | 170 | 280 | 380 | 550 | 650 | - |
| | | 2 | 40 | 80 | 110 | 200 | 320 | 450 | 630 | 800 | - |
| | | 3 | 45 | 90 | 110 | 200 | 320 | 450 | 630 | 800 | - |
| | | 4 | 45 | 100 | 120 | 220 | 340 | 480 | - | - | - |
| | 220V | 1 | - | - | - | - | - | - | - | - | - |
| | | 2 | 15 | 65 | 90 | 155 | 245 | 340 | 460 | 550 | - |
| | | 3 | 20 | 90 | 110 | 200 | 320 | 450 | 630 | 800 | - |
| | | 4 | 25 | 90 | 110 | 200 | 320 | 450 | 630 | 800 | - |
| | 440V | 1 | - | - | - | - | - | - | - | - | - |
| | | 2 | - | - | - | - | - | - | - | - | - |
| | | 3 | 10 | 55 | 75 | 120 | 200 | 300 | 400 | 500 | - |
| | | 4 | 13 | 70 | 100 | 160 | 260 | 400 | 550 | 660 | - |
| DC5 L/R ≤ 15ms | 125V | 1 | 27 | 50 | 70 | 90 | 240 | 320 | 400 | 500 | - |
| | | 2 | 35 | 70 | 90 | 150 | 280 | 380 | 450 | 550 | - |
| | | 3 | 40 | 90 | 100 | 200 | 320 | 420 | 500 | 600 | - |
| | | 4 | 40 | 90 | 110 | 200 | 320 | 450 | 500 | 650 | - |
| | 220V | 1 | - | - | - | - | - | - | - | - | - |
| | | 2 | 13 | 55 | 80 | 140 | 220 | 300 | 410 | 490 | - |
| | | 3 | 18 | 80 | 100 | 180 | 290 | 400 | 560 | 700 | - |
| | | 4 | 22 | 80 | 100 | 180 | 290 | 400 | 560 | 700 | - |
| | 440V | 1 | - | - | - | - | - | - | - | - | - |
| | | 2 | - | - | - | - | - | - | - | - | - |
| | | 3 | 9 | 50 | 67 | 100 | 180 | 270 | 360 | 450 | - |
| | | 4 | 11 | 60 | 90 | 130 | 224 | 360 | 480 | 600 | - |

Technical data

A

B

C

D

E

F

G

H

I

X

Technical data

Standards

IEC/EN 60947-1
IEC/EN 60947-4-1
IEC/EN 60947-5-1

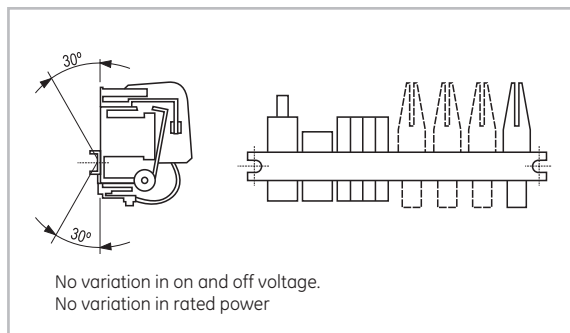
Ambient conditions

| | | |
|-----------------------|----------------|--------------|
| Storage temperature | -55°C to +80°C | |
| Operating temperature | -40°C to +60°C | |
| Altitude | up to 2500m | Rated values |
| | 3000 to 4000m | 90%Ie 80%Ue |
| | 4000 to 5000m | 80%Ie 75%Ue |

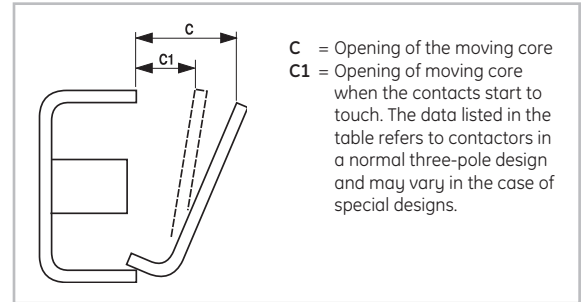
Climatic withstand capacity (IEC 68-2)

| | | | |
|------------------------------|-------------------|--------|--|
| Continuous testing 40/125/56 | | | |
| Cold (72h) | Temperature | -40°C | |
| Dry heat (96h) | Temperature | +125°C | |
| | Relative humidity | < 50% | |
| Moist heat (56 days) | Temperature | +40°C | |
| | Relative humidity | 95% | |
| Cyclic testing | | | |
| First half-cycle (12h) | Low temperature | +25°C | |
| | Relative humidity | 93% | |
| Second half-cycle (12h) | Low temperature | +55°C | |
| | Relative humidity | 95% | |
| No. consecutive cycles | 6 | | |

Mounting positions



Maintenance



| DC power supply | | Pressure of closed contact in kg (+10% / -30%) |
|-----------------|------------|--|
| C (mm) ±1 | C1 (mm) ±1 | |
| 18 | 5 | 0.750 |
| 18 | 5 | 0.750 |
| 20 | 6 | 0.750 |
| 22 | 6 | 1.300 |
| 24 | 7 | 2.000 |
| 28 | 8 | 3.500 |
| 28 | 8 | 5.500 |
| 34 | 10 | 8.000 |
| 34 | 10 | 15.000 |

Replacement of main contact

The replacement (due to wear) of the main contacts requires an adjustment to ensure proper distance between the moving and the stationary contacts. The respective adjustment screws should be turned until the main contacts start to touch simultaneously when the gap indicated by A1 or C1 exists between the stationary and the moving magnetic circuit. Make sure that all contactor poles have the same stroke by manually closing the magnetic circuit; if the poles are properly adjusted, they should come into contact at the same time. If contact wear is abnormal, please contact the manufacturer since the apparatus has been improperly chosen for the application conditions. To replace the contacts, loosen the screw securing the contacts to the respective contact holder, making sure that the screws are well-tightened when installing the new contacts. GE Power Controls warrants proper operation of the contactors only if the contacts are replaced with OEM contacts.

Capacity of terminals and torque

| | | R1... R2... | R3... | R4... | R5... | R6... | R7... | R8... | R9... |
|--|--|----------------|----------|----------|-------------------|--------------------|------------|------------|------------|
| | Single-core conductor | (mm²) | 2.5...25 | 2.5...50 | | | | | |
| | Multi-strand conductor with terminal sheath | (mm²) | 2.5...25 | 2.5...50 | | | | | |
| | Multi-strand conductor without terminal sheath | (mm²) | 2.5...25 | 2.5...50 | | | | | |
| | Multi-strand | (mm²) | 4...25 | 4...50 | | | | | |
| | Single- and multi-strand AWG | (mm²) | 16..4 | 16..2 | | | | | |
| | Torque | (Nm) | 4 | 5,6 | | | | | |
| | | (Lb x in) | 35 | 50 | | | | | |
| | Multi-strand with terminal | (mm²) | | | 1 x 120 2 x 95 | 1 x 185 2 x 150 | - | - | - |
| | Clappers | | | | - | - | 2 x (30x5) | 2 x (40x5) | 2 x (60x5) |
| | Torque | (Nm) | | | 7 | 23 | 31 | 31 | 31 |
| | | (Lb x in) | | | 60 | 200 | 275 | 275 | 275 |

Power circuit

| | | R1... | R2... | R3... | R4... | R5... | R6... | R7... | R8... | R9... |
|---|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Thermal rated current I _{th} at $\theta \leq 55^\circ\text{C}$ | (A) | 45 | 90 | 125 | 250 | 320 | 450 | 630 | 800 | 1500 |
| Rated operating current I _e AC-3 | (A) | 40 | 90 | 110 | 200 | 320 | 450 | 630 | 800 | - |
| Rated operating voltage U _e (1) | (V) | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 |
| 3-pole contactors | | | | | | | | | | |
| Rated isolation voltage U _i | (V) | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| Maximum continuous current AC-1 | (A) | 45 | 90 | 125 | 250 | 320 | 450 | 630 | 800 | 1200 |
| Frequency limits (Hz) | (Hz) | | | | | | | | | |
| Making capacity (RMS) (IEC947) | (A) | 540 | 1200 | 1250 | 2400 | 3800 | 5400 | 7500 | 9600 | 4000 |
| Breaking capacity (RMS) (IEC 947) | U _e ≤ 400V (A) | 450 | 960 | 1250 | 1900 | 3050 | 4350 | 6000 | 7700 | 4000 |
| | U _e = 500V (A) | - | 650 | 1050 | 1900 | 3050 | 4350 | 6000 | 7700 | 4000 |
| Short-time current | 1 s. (A) | 1200 | 1500 | 2000 | 2500 | 3000 | 4250 | 5000 | 6000 | 10000 |
| | 5 s. (A) | 800 | 900 | 1500 | 2200 | 2800 | 4000 | 4800 | 5700 | 9000 |
| | 10 s. (A) | 500 | 650 | 1200 | 1600 | 2500 | 3900 | 4600 | 5500 | 8800 |
| | 30 s. (A) | 250 | 300 | 750 | 1100 | 2000 | 3700 | 4400 | 5200 | 8500 |
| | 1 min. (A) | 180 | 200 | 450 | 800 | 1500 | 2500 | 3000 | 4000 | 5000 |
| | 3 min. (A) | 100 | 150 | 250 | 500 | 600 | 900 | 1500 | 2300 | 3000 |
| Recovery time | (min.) | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Fused short-circuit protection | aM (A) | 50 | 125 | 160 | 250 | 400 | 630 | 800 | 1000 | - |
| | gL-gG (A) | 80 | 160 | 200 | 315 | 425 | 630 | 800 | 1000 | - |
| Impedance per pole | (mΩ) | 1 | 1 | 0.5 | 0.4 | 0.2 | 0.3 | 0.2 | 0.25 | 0.10 |
| Power dissipated per pole | AC-1 (W) | 2.1 | 8.1 | 7.8 | 25 | 20 | 60 | 79 | 160 | 144 |
| | AC-3 (W) | 1.6 | 8.1 | 6 | 16 | 20 | 60 | 79 | 160 | - |
| Isolation resistance | | | | | | | | | | |
| Pole-to-pole | (mΩ) | >10 | >10 | >10 | >10 | >10 | >10 | >10 | >10 | >10 |
| Pole-to-ground | (mΩ) | >10 | >10 | >10 | >10 | >10 | >10 | >10 | >10 | >10 |
| Input-to-output | (mΩ) | >10 | >10 | >10 | >10 | >10 | >10 | >10 | >10 | >10 |

(1) For rated voltages above 500V, contact the manufacturer.

Control circuit

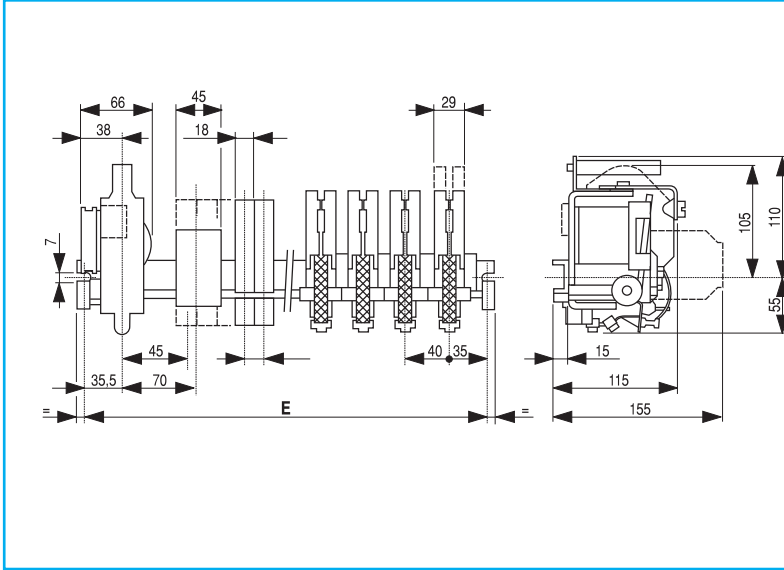
| | | R1... | R2... | R3... | R4... | R5... | R6... | R7... | R8... | R9... |
|--|----------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Alternating current | | | | | | | | | | |
| Rated isolation voltage U _i | (V) | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| Standardized voltages U _s at 50/60 Hz | (V) | 24...220 | 24...220 | 24...220 | 24...220 | 24...220 | 24...220 | 24...220 | 24...220 | 24...220 |
| Single-frequency coil voltage limits | | | | | | | | | | |
| Operation | xU _s | 0.85...1.1 | 0.85...1.1 | 0.85...1.1 | 0.85...1.1 | 0.85...1.1 | 0.85...1.1 | 0.85...1.1 | 0.85...1.1 | 0.85...1.1 |
| Off | xU _s | 0.22...0.55 | 0.22...0.55 | 0.22...0.55 | 0.22...0.55 | 0.22...0.55 | 0.22...0.55 | 0.22...0.55 | 0.22...0.55 | 0.22...0.55 |
| Consumption of dual-frequency coils (1) | | | | | | | | | | |
| Closed magnetic circuit (50 Hz/60 Hz) | (VA) | 19 | 19 | 20 | 25 | 35 | 38 | 53 | 100 | 190 |
| Open magnetic circuit (50 Hz/60 Hz) | (VA) | 27 | 27 | 38 | 41 | 57 | 60 | 90 | 440 | 1400 |
| Dissipated thermal power (50 Hz/60 Hz) | (W) | 19 | 19 | 20 | 25 | 35 | 38 | 53 | 100 | 190 |
| On and off times. Values at U _s | | | | | | | | | | |
| Making time at de-energisation (NA) | (ms) | 60/70 | 60/70 | 60/70 | 110/120 | 150/160 | 180/200 | 200/210 | 150/160 | - |
| Making time at de-energisation (NA) | (ms) | 80/95 | 80/95 | 80/95 | 160/170 | 200/210 | 350/450 | 240/250 | 150/160 | - |
| Mechanical endurance | | | | | | | | | | |
| Dual-frequency coils (at 50 Hz) | 10 ⁶ ops. | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 8 | 8 |
| Maximum rate | | | | | | | | | | |
| Dual-frequency coils. No-load | ops./h | 1200 | 1200 | 600 | 400 | 400 | 400 | 400 | 300 | 300 |
| AC-1 with rated power | ops./h | 600 | 600 | 300 | 120 | 120 | 120 | 120 | 90 | 60 |
| AC-2 with rated power | ops./h | 250 | 250 | 200 | 120 | 120 | 120 | 120 | 90 | - |
| AC-3 with rated power | ops./h | 600 | 600 | 300 | 120 | 120 | 120 | 120 | 90 | - |
| AC-4 with rated power | ops./h | 150 | 150 | 100 | 60 | 60 | 60 | 60 | 30 | - |
| Direct current | | | | | | | | | | |
| Rated isolation voltage U _i | (V) | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| Standardized voltages U _s | (V) | 24...230 | 24...230 | 24...230 | 24...230 | 24...230 | 24...230 | 24...230 | 24...230 | 24...230 |
| Voltage limits | | | | | | | | | | |
| Operating | xU _s | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 | 0.8...1.1 |
| Off | xU _s | 0.15...0.5 | 0.15...0.5 | 0.15...0.5 | 0.15...0.5 | 0.15...0.5 | 0.15...0.5 | 0.15...0.5 | 0.15...0.5 | 0.15...0.5 |
| Power consumption | | | | | | | | | | |
| Closed magnetic circuit | (W) | 14 | 14 | 16 | 22 | 28 | 30 | 42 | 80 | 140 |
| Open magnetic circuit | (W) | 21 | 21 | 25 | 31 | 45 | 46 | 65 | 400 | 1000 |
| On and off time | | | | | | | | | | |
| Values at U _s | | | | | | | | | | |
| Making time at energization (NA) | (ms) | 60/70 | 60/70 | 60/70 | 110/120 | 150/160 | 180/200 | 200/210 | 150/160 | - |
| Breaking time at de-energization (NA) | (ms) | 19/20 | 19/20 | 19/20 | 28/30 | 40/45 | 59/60 | 30/35 | 25/30 | - |
| Mechanical endurance | | | | | | | | | | |
| | 10 ⁶ ops. | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 8 | 8 |
| Maximum rate | | | | | | | | | | |
| No-load | ops./h | 1200 | 1200 | 600 | 400 | 400 | 400 | 400 | 300 | 300 |
| AC1 and AC3 with rated power | ops./h | 600 | 600 | 300 | 120 | 120 | 120 | 120 | 90 | - |
| AC4 with rated power | ops./h | 150 | 150 | 100 | 60 | 60 | 60 | 60 | 30 | - |

(1) With 5/2 contact

Series 390.R

Dimensional drawings

R1..., R2...

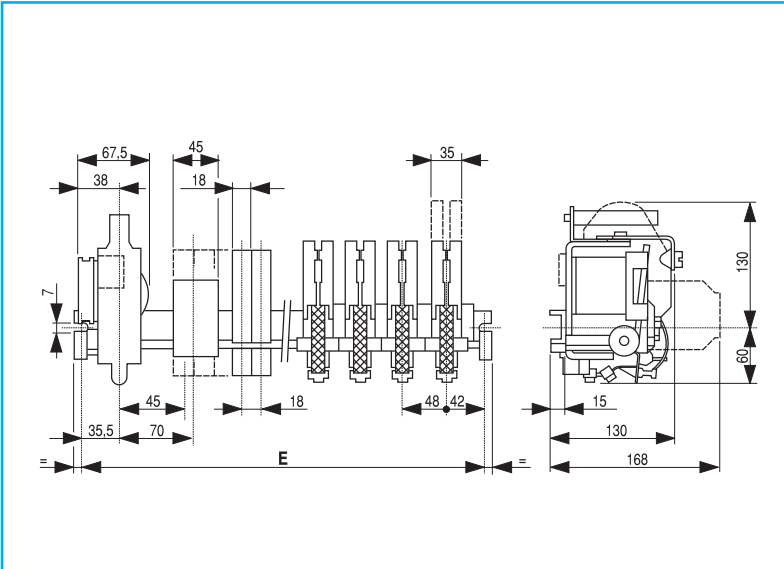


Contact combination

| "Z" main pole (1) | Max. no. of aux. contacts | Max. NO | Max. NC | Center-to-center spacing |
|-------------------|---------------------------|---------|---------|--------------------------|
| 1 | 1 | 1 | 1 | 150 |
| | 3 | 3 | 3 | 200 |
| | 6 | 6 | 4 | 250 |
| | 9 | 6 | 4 | 300 |
| | 10 | 6 | 4 | 350 |
| 2 | 10 | 6 | 4 | 400 |
| | 1 | 1 | 1 | 200 |
| | 4 | 4 | 4 | 250 |
| | 7 | 6 | 4 | 300 |
| 3 | 9 | 6 | 4 | 350 |
| | 9 | 6 | 4 | 400 |
| | 2 | 2 | 2 | 250 |
| | 5 | 5 | 4 | 300 |
| 4 | 7 | 6 | 4 | 350 |
| | 7 | 6 | 4 | 400 |
| | 5 | 5 | 4 | 350 |
| 4 | 5 | 5 | 4 | 400 |

(1) A "RN" pole can be used to replace one of the "Z" poles. To use a higher number of "RN" poles, contact the manufacturer.

R3...

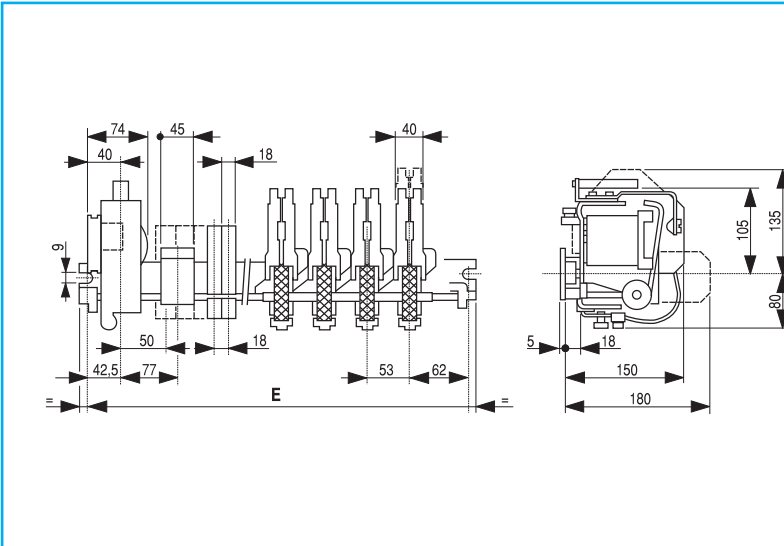


Contact combination

| "Z" main pole (1) | Max. no. of aux. contacts | Max. NO | Max. NC | Center-to-center spacing |
|-------------------|---------------------------|---------|---------|--------------------------|
| 1 | - | - | - | 150 |
| | 3 | 3 | 3 | 200 |
| | 6 | 6 | 4 | 250 |
| | 9 | 6 | 4 | 300 |
| | 10 | 6 | 4 | 350 |
| 2 | 10 | 6 | 4 | 400 |
| | - | - | - | 200 |
| | 3 | 3 | 3 | 250 |
| | 6 | 6 | 4 | 300 |
| 3 | 8 | 6 | 4 | 350 |
| | 9 | 6 | 4 | 400 |
| | - | - | - | 250 |
| 4 | 3 | 3 | 3 | 300 |
| | 6 | 6 | 4 | 350 |
| | 7 | 6 | 4 | 400 |
| 4 | - | - | - | 300 |
| | 3 | 3 | 3 | 350 |
| | 4 | 4 | 4 | 400 |

(1) A "RN" pole can be used to replace one of the "Z" poles. To use a higher number of "RN" poles, contact the manufacturer.

R4...

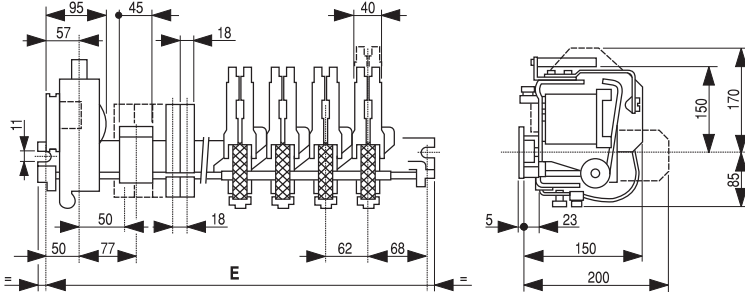


Contact combination

| "Z" main pole (1) | Max. no. of aux. contacts | Max. NO | Max. NC | Center-to-center spacing |
|-------------------|---------------------------|---------|---------|--------------------------|
| 1 | 3 | 3 | 3 | 250 |
| | 6 | 6 | 4 | 300 |
| | 9 | 6 | 4 | 350 |
| | 10 | 6 | 4 | 400 |
| | 10 | 6 | 4 | 450 |
| 2 | - | - | - | 250 |
| | 3 | 3 | 3 | 300 |
| | 6 | 6 | 4 | 350 |
| | 9 | 6 | 4 | 400 |
| 3 | 10 | 6 | 4 | 450 |
| | - | - | - | 300 |
| | 3 | 3 | 3 | 350 |
| 4 | 6 | 6 | 4 | 400 |
| | 9 | 6 | 4 | 450 |
| | 3 | 3 | 3 | 400 |
| 4 | 4 | 4 | 3 | 450 |

(1) A "RN" pole can be used to replace one of the "Z" poles. To use a higher number of "RN" poles, contact the manufacturer.

R5...

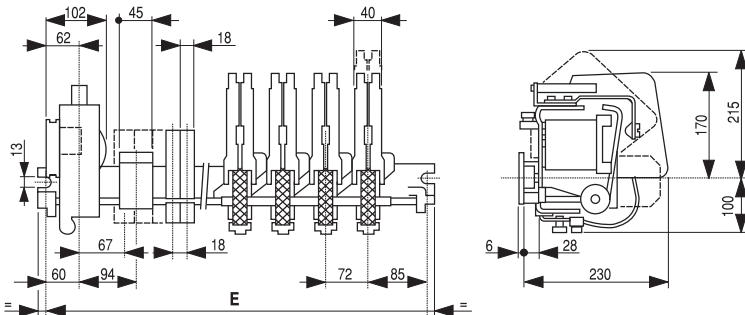


Contact combination

| "Z" main pole (1) | Max. no. of aux. contacts | Max. NO | Max. NC | Center-to-center spacing |
|-------------------|---------------------------|---------|---------|--------------------------|
| 1 | 2 | 2 | 2 | 250 |
| | 5 | 5 | 4 | 300 |
| | 8 | 6 | 4 | 350 |
| | 10 | 6 | 4 | 400 |
| | 10 | 6 | 4 | 450 |
| 2 | 10 | 6 | 4 | 500 |
| | 2 | 2 | 2 | 300 |
| | 4 | 4 | 4 | 350 |
| | 7 | 6 | 4 | 400 |
| 3 | 10 | 6 | 4 | 450 |
| | 10 | 6 | 4 | 500 |
| | 1 | - | - | 350 |
| | 4 | 4 | 4 | 400 |
| 4 | 6 | 6 | 4 | 450 |
| | 7 | 6 | 4 | 500 |
| | - | - | - | 400 |
| | 3 | 3 | 3 | 450 |
| | 3 | 3 | 3 | 500 |

(1) A "RN" pole can be used to replace one of the "Z" poles. To use a higher number of "RN" poles, contact the manufacturer.

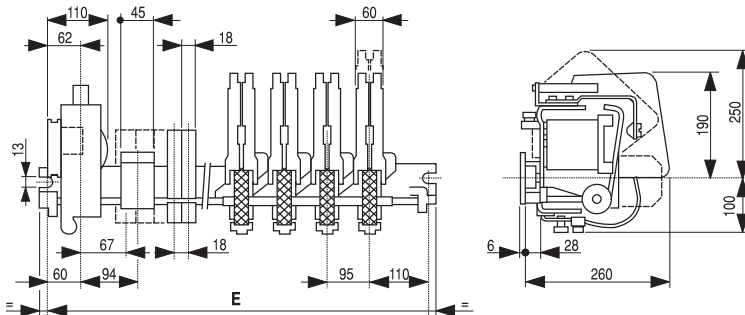
R6...



Contact combination

| "Z" main pole | Max. no. of aux. contacts | Max. NO | Max. NC | Center-to-center spacing |
|---------------|---------------------------|---------|---------|--------------------------|
| 1 | 5 | 2 | 4 | 350 |
| | 8 | 6 | 4 | 400 |
| | 10 | 6 | 4 | 450 |
| | 10 | 6 | 4 | 500 |
| | 10 | 6 | 4 | 600 |
| 2 | 10 | 6 | 4 | 700 |
| | 1 | 1 | 1 | 350 |
| | 4 | 4 | 4 | 400 |
| | 7 | 6 | 4 | 450 |
| 3 | 9 | 6 | 4 | 500 |
| | 10 | 6 | 4 | 600 |
| | 10 | 6 | 4 | 700 |
| | 2 | 2 | 2 | 450 |
| 4 | 5 | 5 | 4 | 500 |
| | 7 | 6 | 4 | 600 |
| | 7 | 6 | 4 | 700 |
| | 1 | 1 | 1 | 500 |
| | 2 | 2 | 2 | 600 |
| | 2 | 2 | 2 | 700 |

R7...



Contact combination

| "Z" main pole (1) | Max. no. of aux. contacts | Max. NO | Max. NC | Center-to-center spacing |
|-------------------|---------------------------|---------|---------|--------------------------|
| 1 | 4 | 4 | 4 | 350 |
| | 6 | 6 | 4 | 400 |
| | 9 | 6 | 4 | 450 |
| | 10 | 6 | 4 | 500 |
| | 10 | 6 | 4 | 600 |
| 2 | 10 | 6 | 4 | 700 |
| | 1 | 1 | 1 | 400 |
| | 4 | 4 | 4 | 450 |
| | 7 | 6 | 4 | 500 |
| 3 | 10 | 6 | 4 | 600 |
| | 10 | 6 | 4 | 700 |
| | 1 | 1 | 1 | 500 |
| | 7 | 6 | 4 | 600 |
| 4 | 8 | 6 | 4 | 700 |
| | 2 | 2 | 2 | 600 |
| | 5 | 5 | 3 | 700 |

(1) A "RN" pole can be used to replace one of the "Z" poles. To use a higher number of "RN" poles, contact the manufacturer.

Dimensions

A

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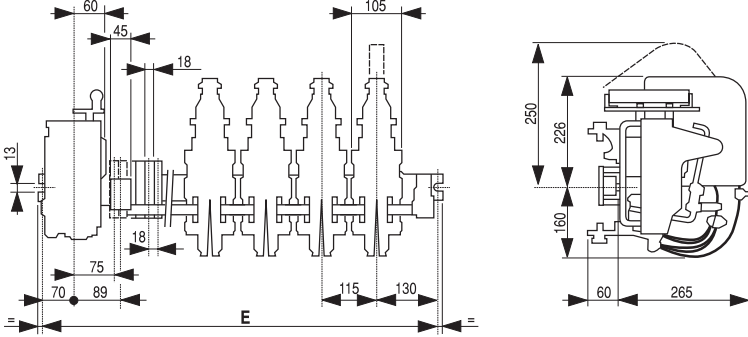
H

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X

Dimensional drawings

R8...

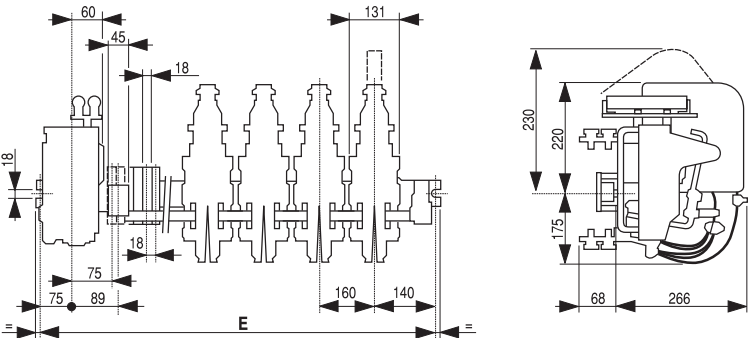


Front view dimensions: 60, 45, 18, 105, 13, 75, 70, 89, 115, 130, E.

Side view dimensions: 250, 226, 160, 60, 265.

| "Z" main pole | Max. no. of aux. contacts | Max. NO | Max. NC | Center-to-center spacing |
|---------------|---------------------------|---------|---------|--------------------------|
| 1 | 1 | 1 | 1 | 350 |
| | 4 | 4 | 4 | 400 |
| | 6 | 6 | 4 | 450 |
| | 9 | 6 | 4 | 500 |
| | 10 | 6 | 4 | 600 |
| | 10 | 6 | 4 | 700 |
| 2 | 3 | 3 | 3 | 450 |
| | 8 | 6 | 4 | 600 |
| | 10 | 6 | 4 | 700 |
| | 10 | 6 | 4 | 800 |
| 3 | 2 | 2 | 2 | 600 |
| | 8 | 6 | 4 | 700 |
| | 8 | 6 | 4 | 800 |
| 4 | 1 | 1 | 1 | 700 |
| | 4 | 3 | 3 | 800 |

R9...



Front view dimensions: 60, 45, 18, 131, 18, 75, 75, 89, 160, 140, E.

Side view dimensions: 230, 220, 175, 68, 266.

| "Z" main pole | Max. no. of aux. contacts | Max. NO | Max. NC | Center-to-center spacing |
|---------------|---------------------------|---------|---------|--------------------------|
| 1 | 2 | 2 | 2 | 400 |
| | 4 | 4 | 4 | 450 |
| | 7 | 6 | 4 | 500 |
| | 10 | 6 | 4 | 600 |
| | 10 | 6 | 4 | 700 |
| | 10 | 6 | 4 | 800 |
| | 10 | 6 | 4 | 900 |
| 2 | 4 | 4 | 4 | 600 |
| | 9 | 6 | 4 | 700 |
| | 10 | 6 | 4 | 800 |
| | 10 | 6 | 4 | 900 |
| | 10 | 6 | 4 | 1000 |
| 3 | - | - | - | 700 |
| | 6 | 6 | 4 | 800 |
| | 8 | 6 | 4 | 900 |
| 4 | 3 | 3 | 3 | 1000 |
| | 4 | 3 | 3 | 900 |

A

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X

SURION - Fuseless starters

- D.2 Fuseless starters
- D.5 Coordination tables
- D.14 Dimensions

Series M, CL, CK - Direct-on-line starters

- D.19 Order codes
- D.24 Diagrams
- D.32 Dimensions

Series M, CL, CK - Reversing starters

- D.21 Order codes
- D.28 Diagrams
- D.34 Dimensions

Series CL, CK - Star-delta starters

- D.23 Order codes
- D.30 Diagrams
- D.37 Dimensions

Applications

- D.39 Utilisation categories
- D.42 Electrical endurance
- D.46 DC utilisation categories

Plug-in relays and Auxiliary contactors

Motor protection devices

Selection tables

- D.49 Direct-on-line starters
- D.52 Star-delta starters
- D.56 Autotransformer starters

Contactors and Thermal overload relays

Motorstarters

A

B

C

D

- D.58 Contactors for rotor starters
- D.60 Contactors for rotor speed drives
- D.62 Contactors for connection of power transformers
- D.63 Contactors for capacitors (category AC6b)
- D.64 Contactors for control lighting circuits

Control and signalling units

Electronic relays

ASTAT S - Softstarters

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- D.70 Dimensions

Limit switches

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ASTAT XT Digital Soft Starters

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- D.75 Technical Data
- D.76 Functions
- D.77 Overload protections
- D.78 I/O Wiring
- D.79 I/O terminal board specifications
- D.80 Wiring diagrams
- D.84 Coordination tables
- D.86 Dimensions and weights



Main switches

Numerical index

E

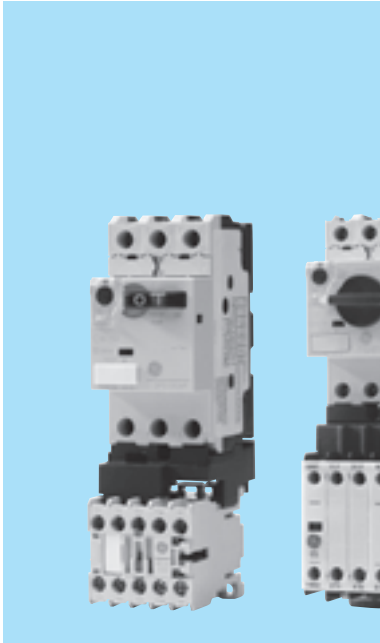
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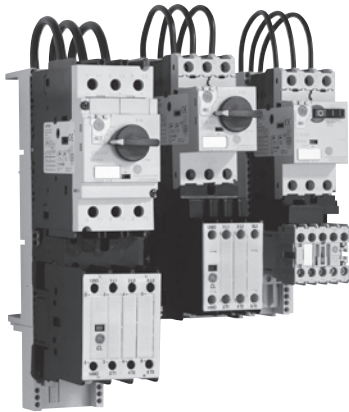
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Fuseless starters and busbar adapter plates



Product range

- Link modules for mechanical and electrical connection of the manual motor starter and the M / CL contactor range
- Base plates for Din rail and busbar adapters
- Wiring kits for reversing applications
- Link connection for two base plates for three phase busbar system with 40 and 60mm center line spacing and 5 to 10mm thickness
- Accessories

Technical performances

- Compact and high performance solution
- Easy accessibility to the contactor coil terminal A1-A2
- Save spacing only using 45 and 55mm width base plates for busbar adapters
- Quick “clip on” and secure connections
- Minimum 50kA short-circuit breaking capacity applies throughout

Thermal and magnetic protection

- GPS1B ● pg. B.8
- GPS2B ● pg. B.10
- GPS1M ● pg. B.12
- GPS2M ● pg. B.14

Contactors

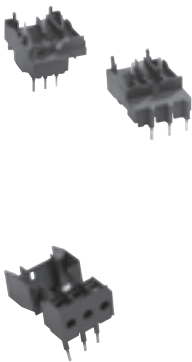





- Serie M ● pg. C.2
- Serie CL ● pg. C.10

- Coordination tables ● pg. D.5
- Dimensions ● pg. D.14

For fuseless starter application turn the contactor 180° to have direct accessibility to the A1-A2 coil terminals when contactor is assembled to the manual motor starter. Then fit the contactor plastic cover into the contactor front to have the terminal numbering in the correct position.

Note: when turning the contactor 180° the built-in auxiliary contact (in case) will be located on the first left side terminal.

Fuseless starters

| | Description | For use with contactor | ac/dc | Frame size | Cat. no. | Ref. no. | Pack. |
|---|---|--|---------------------|-------------------|-------------------|------------------|--------|
|  <p>Link modules</p> | For mechanical and electrical connection between contactors and manual motor starters | MC0... MC1.. | ac/dc | GPS1 | GPF1LMCBA | 101410 | 5 |
| | | CL00A... CL01A... CL02A.. | ac | GPS1 | GPF1L02AA | 101411 | 5 |
| | | CL00D... CL01D... CL02D.. | dc | GPS1 | GPF1L02DA | 101412 | 5 |
| | | CL25A.. | ac | GPS1 | GPF1L25AA | 101413 | 5 |
| | | CL25D.. | dc | GPS1 | GPF1L25DA | 101414 | 5 |
| | | CL03A... CL04A | ac | GPS1 | GPF1L04AA | 107165 | 5 |
| | | CL03D... CL04D | dc | GPS1 | GPF1L04DA | 107166 | 5 |
| | | CL03A... CL04A.. | ac | GPS2 | GPF2L04AA | 107190 | 5 |
| | | CL45A.. | ac | GPS2 | GPF2L45AA | 101415 | 5 |
| | | CL03D... CL04D.. | dc | GPS2 | GPF2L04DA | 107191 | 5 |
| | | CL45D.. | dc | GPS2 | GPF2L45DA | 101416 | 5 |
| | | CL06A... CL07A.. | ac | GPS2 | GPF2L07AA | 101417 | 5 |
| | | For use with MCCB Record Plus with CL09/10A | - | - | - | GPF3L09AA | 107252 |
| | For mechanical and electrical connection between contactor and thermal overload relays RT1 | CL00... - CL25 | ac/dc | GPS1 | GPF1L25CT1 | 101512 | 5 |
| CL03... - CL45 | | ac/dc | GPS2 | GPF1L45CT1 | 101513 | 5 | |
|  <p>Base plates</p> | Plastic plates for mounting the fuseless starter in panels or in 35 mm DIN rail | CL00... CL01... CL02... CL25.. | ac/dc | GPS1 | GPF1B1A | 101418 | 5 |
| | | CL03... CL04... and CL45.. | ac/dc | GPS2 | GPF2B2A | 101419 | 5 |
| | | CL06... CL07.. | ac/dc | GPS2 | GPF2B3A | 101420 | 5 |
| | | CL03... CL04.. | ac/dc | GP | GPF1B4A | 107163 | 5 |
|  <p>Base plates</p> | For use with MCCB Record Plus | - | - | - | GPF3B5A | 107253 | 1 |
| |  <p>Link connector</p> | For two base plates for reversing applications | - | - | - | GPF1CBA | 101427 |
|  <p>Wiring kits for reversing starters</p> | | Suitable to be used with link modules Upper and lower connections without overload relays | MC0... MC1... MC2.. | ac/dc | | WKMIU | 101421 |
| | CL00... CL01... CL02.. | | ac/dc | | WKLI02P | 101422 | 1 |
| | CL25.. | | ac/dc | | WKLI25P | 101423 | 1 |
| | CL03... CL04... | | ac/dc | | WKLI04P | 101424 | 1 |
| | CL45.. | | ac/dc | | WKLI45P | 101425 | 1 |
| | CL06A... CL07A.. | | ac | | WKLI07P | 101426 | 1 |
|  <p>Plastic cover</p> | Fit the plastic cover into the front of the correspondent contactor to allow a clear identification of the terminal numbering | For use with contactor | | | | | |
| | | CL00... CL01.. and CL02 without built-in auxiliary contact | | GPF00C02 | 107098 | 5 | |
| | | CL00... CL01.. and CL02 with built-in 1NO auxiliary contact | | GPF10C02 | 107099 | 5 | |
| | | CL00... CL01.. and CL02 with built-in 1NC auxiliary contact | | GPF01C02 | 107100 | 5 | |
| | | CL25.. | | GPF00C25 | 107101 | 2 | |
| | | CL03... CL04.. without built-in auxiliary contact | | GPF00C04 | 107102 | 5 | |
| | | CL03... CL04.. with built-in 1NO auxiliary contact | | GPF10C04 | 107103 | 5 | |
| | | CL03... CL04.. with built-in 1NC auxiliary contact | | GPF01C04 | 107105 | 5 | |
| | | CL45.. | | GPF00C45 | 107106 | 5 | |
| | | CL06... CL07.. | | GPF00C08 | 107107 | 5 | |

Order codes

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Notes

Manual motorstarter

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Grid area for notes.



Technical data

Surion GPS-B: Coordination Type 1 65kA at 380/400V and 415V

| MOTOR (1) | | | MANUAL MOTOR STARTER | | | | CONTACTOR | | | LINKS |
|---------------------|-----------------|-------------|----------------------|----------------------------|--|----------------------------|------------|--|---|----------------------|
| Rated power (kW) | Rated current | | Cat. no. | Rated current In (A) | Thermal current Setting range (A) | Magnetic current (A) | Series | Smallest wire Cu (PVC)(2) 380/415V (mm ²) | Minimum frontal electrical safety clearance (mm) | Cat. no. (3) |
| | 380/400V (A) | 415V (A) | | | | | | | | |
| 0.06 | 0.23 | 0.21 | GPS1BSAB | 0.25 | 0.16 - 0.25 | 3.2 | MC0 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 0.09 | 0.34 | 0.31 | GPS1BSAC | 0.4 | 0.25 - 0.4 | 5.2 | MC0 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 0.12 | 0.44 | 0.4 | GPS1BSAD | 0.63 | 0.4 - 0.63 | 8.2 | MC0 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 0.18 | 0.65 | 0.63 | GPS1BSAE | 1 | 0.63 - 1 | 13 | MC0 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 0.25 | 0.9 | 0.8 | GPS1BSAE | 1 | 0.63 - 1 | 13 | MC0 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 0.37 | 1.25 | 1.1 | GPS1BSAF | 1.6 | 1 - 1.6 | 20.5 | MC0 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 0.55 | 1.6 | 1.5 | GPS1BSAF | 1.6 | 1 - 1.6 | 20.5 | MC0 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 0.75 | 2 | 1.9 | GPS1BSAG | 2.5 | 1.6 - 2.5 | 32.5 | MC0 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 1.1 | 2.6 | 2.5 | GPS1BSAH | 4 | 2.5 - 4 | 52 | MC0 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 1.5 | 3.5 | 3.4 | GPS1BSAH | 4 | 2.5 - 4 | 52 | MC0 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 2.2 | 5 | 4.5 | GPS1BSAJ | 6.3 | 4 - 6.3 | 82 | MC0 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 3 | 7 | 6.5 | GPS1BSAK | 10 | 6.3 - 10 | 130 | MC1 / CL00 | 1.5 | 20 | GPF1LMCBA / GPF1L02* |
| 4 | 9 | 8 | GPS1BSAK | 10 | 6.3 - 10 | 130 | MC1 / CL00 | 1.5 | 20 | GPF1LMCBA / GPF1L02* |
| 5.5 | 12 | 11 | GPS1BHAL | 13 | 9 - 13 | 169 | CL01 | 2.5 | 20 | GPF1L02* |
| 7.5 | 16 | 14 | GPS1BHAM | 16 | 11 - 16 | 208 | CL02 | 2.5 | 20 | GPF1L02* |
| 11 | 22.5 | 21 | GPS1BHAP | 25 | 19 - 25 | 325 | CL25 | 4 | 20 | GPF1L25* |
| 15 | 30 | 28 | GPS1BHAR | 32 | 24 - 32 | 416 | CL04 | 6 | 20 | GPF1L04* |
| 11 | 22.5 | 21 | GPS2BHAP | 25 | 19 - 25 | 325 | CL04 | 4 | 20 | GPF2L04* |
| 15 | 30 | 28 | GPS2BHAR | 32 | 24 - 32 | 416 | CL04 | 6 | 20 | GPF2L04* |
| 18.5 | 37 | 35 | GPS2BHAS | 40 | 28 - 40 | 520 | CL45 | 10 | 20 | GPF2L45* |
| 22 | 44 | 41 | GPS2BHAT | 50 | 35 - 50 | 650 | CL06 | 10 | 25 | GPF2L07AA |
| 30 | 60 | 55 | GPS2BHAU | 63 | 45 - 63 | 820 | CL07 | 16 | 25 | GPF2L07AA |

Technical data

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Surion GPS-B: Coordination Type 2 65kA at 380/400V and 415V

| MOTOR (1) | | | MANUAL MOTOR STARTER | | | | CONTACTOR | | | LINKS |
|---------------------|-----------------|-------------|----------------------|----------------------------|--|----------------------------|-----------|--|---|-----------------|
| Rated power (kW) | Rated current | | Cat. no. | Rated current In (A) | Thermal current Setting range (A) | Magnetic current (A) | Series | Smallest wire Cu (PVC)(2) 380/415V (mm ²) | Minimum frontal electrical safety clearance (mm) | Cat. no. (3) |
| | 380/400V (A) | 415V (A) | | | | | | | | |
| 0.06 | 0.23 | 0.21 | GPS1BHAB | 0.25 | 0.16 - 0.25 | 3.2 | CL00 | 1 | 20 | GPF1L02* |
| 0.09 | 0.34 | 0.31 | GPS1BHAC | 0.4 | 0.25 - 0.4 | 5.2 | CL00 | 1 | 20 | GPF1L02* |
| 0.12 | 0.44 | 0.4 | GPS1BHAD | 0.63 | 0.4 - 0.63 | 8.2 | CL00 | 1 | 20 | GPF1L02* |
| 0.18 | 0.65 | 0.63 | GPS1BHAE | 1 | 0.63 - 1 | 13 | CL00 | 1 | 20 | GPF1L02* |
| 0.25 | 0.9 | 0.8 | GPS1BHAE | 1 | 0.63 - 1 | 13 | CL00 | 1 | 20 | GPF1L02* |
| 0.37 | 1.25 | 1.1 | GPS1BHAF | 1.6 | 1 - 1.6 | 20.5 | CL00 | 1 | 20 | GPF1L02* |
| 0.55 | 1.6 | 1.5 | GPS1BHAF | 1.6 | 1 - 1.6 | 20.5 | CL00 | 1 | 20 | GPF1L02* |
| 0.75 | 2 | 1.9 | GPS1BHAG | 2.5 | 1.6 - 2.5 | 32.5 | CL00 | 1 | 20 | GPF1L02* |
| 1.1 | 2.6 | 2.5 | GPS1BHAH | 4 | 2.5 - 4 | 52 | CL25 | 1 | 20 | GPF1L25* |
| 1.5 | 3.5 | 3.4 | GPS1BHAH | 4 | 2.5 - 4 | 52 | CL25 | 1 | 20 | GPF1L25* |
| 2.2 | 5 | 4.5 | GPS1BHAJ | 6.3 | 4 - 6.3 | 82 | CL25 | 1 | 20 | GPF1L25* |
| 3 | 7 | 6.5 | GPS1BHAK | 10 | 6.3 - 10 | 130 | CL25 | 1.5 | 20 | GPF1L25* |
| 4 | 9 | 8 | GPS1BHAK | 10 | 6.3 - 10 | 130 | CL25 | 1.5 | 20 | GPF1L25* |
| 5.5 | 12 | 11 | GPS1BHAL | 13 | 9 - 13 | 169 | CL25 | 2.5 | 20 | GPF1L25* |
| 7.5 | 16 | 14 | GPS1BHAM | 16 | 11 - 16 | 208 | CL25 | 2.5 | 20 | GPF1L25* |
| 11 | 22.5 | 21 | GPS1BHAP | 25 | 19 - 25 | 325 | CL25 | 4 | 20 | GPF1L25* |
| 15 | 30 | 28 | GPS1BHAR | 32 | 24 - 32 | 416 | CL04 | 6 | 20 | GPF1L04* |
| 11 | 22.5 | 21 | GPS2BHAP (4) | 25 | 19 - 25 | 325 | CL04 | 4 | 20 | GPF2L04* |
| 15 | 30 | 28 | GPS2BHAR (4) | 32 | 24 - 32 | 416 | CL04 | 6 | 20 | GPF2L04* |
| 18.5 | 37 | 35 | GPS2BHAS (4) | 40 | 28 - 40 | 520 | CL45 | 10 | 20 | GPF2L45* |
| 22 | 44 | 41 | GPS2BHAT (4) | 50 | 35 - 50 | 650 | CL06 | 10 | 25 | GPF2L07* |
| 30 | 60 | 55 | GPS2BHAU (4) | 63 | 45 - 63 | 820 | CL07 | 16 | 25 | GPF2L07* |

(1) Currents are relevant to four pole motors not having special characteristics of torque.
Inrush currents: 8 time rated current for 1s.

(2) The minimum cycle cross-sections are referred to an ambient temperature of 30°C max. in free air.
Cables are to withstand the maximum let-through energy and the motor rated current. Besides the user should consider the drop voltage on the cables, the type of laying and the ambient temperature.

(3) Complete cat. nrs., see page D.3

(4) Test running.



Surion GPS-B: Coordination Type 1 50kA at 500V and 525V

Manual motorstarter

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| MOTOR (1) | | | MANUAL MOTOR STARTER | | | | CONTACTOR | | | LINKS |
|---------------------|---------------|-------------|----------------------|----------------------------|--|----------------------------|------------|---|---|----------------------|
| Rated power (kW) | Rated current | | Cat. no. | Rated current In (A) | Thermal current Setting range (A) | Magnetic current (A) | Series | Smallest wire Cu (PVC)(2) 380/415V (mm²) | Minimum frontal electrical safety clearance (mm) | Cat. no. (3) |
| | 500V | 525V (A) | | | | | | | | |
| 0.06 | 0.17 | 0.16 | GPS1BSAB | 0.25 | 0.16 - 0.25 | 3.2 | MC0 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 0.09 | 0.24 | 0.22 | GPS1BSAB | 0.25 | 0.16 - 0.25 | 3.2 | MC0 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 0.12 | 0.33 | 0.3 | GPS1BSAC | 0.4 | 0.25 - 0.4 | 5.2 | MC0 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 0.18 | 0.48 | 0.46 | GPS1BSAD | 0.63 | 0.4 - 0.63 | 8.2 | MC0 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 0.25 | 0.66 | 0.64 | GPS1BSAE | 1 | 0.63 - 1 | 13 | MC0 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 0.37 | 0.9 | 0.85 | GPS1BSAE | 1 | 0.63 - 1 | 13 | MC0 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 0.55 | 1.2 | 1.15 | GPS1BSAF | 1.6 | 1 - 1.6 | 20.5 | MC0 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 0.75 | 1.5 | 1.45 | GPS1BSAF | 1.6 | 1 - 1.6 | 20.5 | MC0 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 1.1 | 2.1 | 1.9 | GPS1BSAG | 2.5 | 1.6 - 2.5 | 32.5 | MC0 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 1.5 | 2.8 | 2.6 | GPS1BSAH | 4 | 2.5 - 4 | 52 | MC0 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 2.2 | 3.9 | 3.6 | GPS1BSAH | 4 | 2.5 - 4 | 52 | MC0 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 3 | 5.3 | 5 | GPS1BSAJ | 6.3 | 4 - 6.3 | 82 | MC0 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 4 | 6.8 | 6.5 | GPS1BHAK | 10 | 6.3 - 10 | 130 | MC1 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 5.5 | 9.1 | 8.6 | GPS1BHAK | 10 | 6.3 - 10 | 130 | CL00 | 1.5 | 20 | GPF1L02* |
| 7.5 | 12 | 11.4 | GPS1BHAL | 13 | 9 - 13 | 169 | CL01 | 2.5 | 20 | GPF1L02* |
| 10 | 15.5 | 14.8 | GPS1BHAM | 16 | 11 - 16 | 208 | CL02 | 2.5 | 20 | GPF1L02* |
| 11 | 17.6 | 17 | GPS1BHAN | 20 | 14 - 20 | 260 | CL25 | 2.5 | 20 | GPF1L25* |
| 15 | 23 | 22 | GPS1BHAP | 25 | 19 - 25 | 325 | CL25 | 4 | 20 | GPF2L25* |
| 18.5 | 28.5 | 27 | GPS1BHAR | 32 | 24 - 32 | 416 | CL04 | 6 | 20 | GPF1L04* |
| 11 | 17.6 | 17 | GPS2BHAN | 20 | 14 - 20 | 260 | CL04 | 2.5 | 20 | GPF2L04* |
| 15 | 23 | 22 | GPS2BHAP | 25 | 19 - 25 | 325 | CL04 | 4 | 20 | GPF2L04* |
| 18.5 | 28.5 | 27 | GPS2BHAR | 32 | 24 - 32 | 416 | CL04 | 6 | 20 | GPF2L04* |
| 22 | 33 | 31.5 | GPS2BHAS | 40 | 28 - 40 | 520 | CL45 | 6/10 | 20 | GPF2L45* |
| 30 | 45 | 43 | GPS2BHAT | 50 | 35 - 50 | 650 | CL06 | 10 | 25 | GPF2L07* |
| 37 | 53 | 52 | GPS2BHAU | 63 | 45 - 63 | 820 | CL07 | 16 | 25 | GPF2L07* |

Surion GPS-B: Coordination Type 2 50kA at 500V and 525V

| MOTOR (1) | | | MANUAL MOTOR STARTER | | | | CONTACTOR | | | LINKS |
|---------------------|---------------|-------------|----------------------|----------------------------|--|----------------------------|------------|---|---|----------------------|
| Rated power (kW) | Rated current | | Cat. no. | Rated current In (A) | Thermal current Setting range (A) | Magnetic current (A) | Series | Smallest wire Cu (PVC)(2) 380/415V (mm²) | Minimum frontal electrical safety clearance (mm) | Cat. no. (3) |
| | 500V | 525V (A) | | | | | | | | |
| 0.06 | 0.17 | 0.16 | GPS1BS/HAB | 0.25 | 0.16 - 0.25 | 3.2 | MC1 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 0.09 | 0.24 | 0.22 | GPS1BS/HAB | 0.25 | 0.16 - 0.25 | 3.2 | MC1 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 0.12 | 0.33 | 0.3 | GPS1BS/HAC | 0.4 | 0.25 - 0.4 | 5.2 | MC1 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 0.18 | 0.48 | 0.46 | GPS1BS/HAD | 0.63 | 0.4 - 0.63 | 8.2 | MC1 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 0.25 | 0.66 | 0.64 | GPS1BS/HAE | 1 | 0.63 - 1 | 13 | MC1 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 0.37 | 0.9 | 0.85 | GPS1BS/HAE | 1 | 0.63 - 1 | 13 | MC1 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 0.55 | 1.2 | 1.15 | GPS1BS/HAF | 1.6 | 1 - 1.6 | 20.5 | MC1 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 0.75 | 1.5 | 1.45 | GPS1BS/HAF | 1.6 | 1 - 1.6 | 20.5 | MC1 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 1.1 | 2.1 | 1.9 | GPS1BS/HAG | 2.5 | 1.6 - 2.5 | 32.5 | CL00 | 1 | 20 | GPF1L02* |
| 1.5 | 2.8 | 2.6 | GPS1BS/HAH | 4 | 2.5 - 4 | 52 | CL25 | 1 | 20 | GPF1L25* |
| 2.2 | 3.9 | 3.6 | GPS1BS/HAH | 4 | 2.5 - 4 | 52 | CL25 | 1 | 20 | GPF1L25* |
| 3 | 5.3 | 5 | GPS1BS/HAJ | 6.3 | 4 - 6.3 | 82 | CL25 | 1 | 20 | GPF1L25* |
| 4 | 6.8 | 6.5 | GPS1BHAK | 10 | 6.3 - 10 | 130 | CL25 | 1 | 20 | GPF1L25* |
| 5.5 | 9.1 | 8.6 | GPS1BHAK | 10 | 6.3 - 10 | 130 | CL25 | 1.5 | 20 | GPF1L25* |
| 7.5 | 12 | 11.4 | GPS1BHAL | 13 | 9 - 13 | 169 | CL25 | 2.5 | 20 | GPF1L25* |
| 10 | 15.5 | 14.8 | GPS1BHAM | 16 | 11 - 16 | 208 | CL25 | 2.5 | 20 | GPF1L25* |
| 11 | 17.6 | 17 | GPS1BHAN | 20 | 14 - 20 | 260 | CL25 | 2.5 | 20 | GPF1L25* |
| 15 | 23 | 22 | GPS1BHAP | 25 | 19 - 25 | 325 | CL04 | 4 | 20 | GPF1L04* |
| 18.5 | 28.5 | 27 | GPS1BHAR | 32 | 24 - 32 | 416 | CL04 | 6 | 20 | GPF1L04* |
| 11 | 17.6 | 17 | GPS2BHAN | 20 | 14 - 20 | 260 | CL04 | 2.5 | 20 | GPF2L04* |
| 15 | 23 | 22 | GPS2BHAP | 25 | 19 - 25 | 325 | CL04 | 4 | 20 | GPF2L04* |
| 18.5 | 28.5 | 27 | GPS2BHAR | 32 | 24 - 32 | 416 | CL45 | 6 | 20 | GPF2L45* |
| 22 | 33 | 31.5 | GPS2BHAS | 40 | 28 - 40 | 520 | CL06 | 6/10 | 25 | GPF2L07* |
| 30 | 45 | 43 | GPS2BHAT | 50 | 35 - 50 | 650 | CL06 | 10 | 25 | GPF2L07* |
| 37 | 53 | 52 | GPS2BHAU | 63 | 45 - 63 | 820 | CL07 | 16 | 25 | GPF2L07* |

- (1) Currents are relevant to four pole motors not having special characteristics of torque. Inrush currents: 8 time rated current for 1s.
- (2) The minimum cycle cross-sections are referred to an ambient temperature of 30°C max. in free air. Cables are to withstand the maximum let-through energy and the motor rated current. Besides the user should consider the drop voltage on the cables, the type of laying and the ambient temperature.
- (3) Complete cat. nrs., see page D.3



Surion GPS-M and Record Plus: Coordination Type 1 65kA at 380/400V and 415V

| MOTOR (1) | | | BREAKER | | | | CONTACTOR | OVERLOAD RELAY | | | |
|---------------------|-----------------|------|--------------|-------------------------|--|-------------------------|-----------|----------------|---------------|--|--------------------------------------|
| Rated power (kW) | Rated current | | Cat. no. | Rated current In (A) | Magnetic setting Im Pick-up band ± 20% Im (A) | Magnetic current (A) | Series | Series | Setting range | Smallest wire Cu (PVC) (2) 380/415V (mm ²) | Min frontal safety clearance (mm) |
| | 380/400V (A) | 415V | | | | | | | | | |
| 0.06 | 0.23 | 0.21 | GPS1MSAB | 0.25 | - | 3.3 | CL00 | RT1B | 0.16-0.26 | 1 | 20 |
| 0.09 | 0.34 | 0.31 | GPS1MSAC | 0.4 | - | 5.2 | CL00 | RT1C | 0.25-0.41 | 1 | 20 |
| 0.12 | 0.44 | 0.4 | GPS1MSAD | 0.63 | - | 8.2 | CL00 | RT1D | 0.4-0.65 | 1 | 20 |
| 0.18 | 0.65 | 0.63 | GPS1MSAE | 1 | - | 13 | CL00 | RT1D | 0.4-0.65 | 1 | 20 |
| 0.25 | 0.9 | 0.8 | GPS1MSAE | 1 | - | 13 | CL00 | RT1F | 0.65-1.1 | 1 | 20 |
| 0.37 | 1.25 | 1.1 | GPS1MSAF | 1.6 | - | 20.8 | CL00 | RT1G | 1-1.5 | 1 | 20 |
| 0.55 | 1.6 | 1.5 | GPS1MSAF | 1.6 | - | 20.8 | CL00 | RT1H | 1.3-1.9 | 1 | 20 |
| 0.75 | 2 | 1.9 | GPS1MSAG | 2.5 | - | 32.5 | CL00 | RT1J | 1.8-2.7 | 1 | 20 |
| 1.1 | 2.6 | 2.5 | GPS1MSAH | 4 | - | 52 | CL00 | RT1K | 2.5-4 | 1 | 20 |
| 1.5 | 3.5 | 3.4 | GPS1MSAH | 4 | - | 52 | CL00 | RT1K | 2.5-4 | 1 | 20 |
| 2.2 | 5 | 4.5 | GPS1MSAJ | 6.3 | - | 81.9 | CL00 | RT1L | 4-6.3 | 1 | 20 |
| 3 | 7 | 6.5 | GPS1MSAK | 10 | - | 130 | CL00 | RT1M | 5.5-8.5 | 1.5 | 20 |
| 4 | 9 | 8 | GPS1MSAK | 10 | - | 130 | CL00 | RT1N | 8-12 | 1.5 | 20 |
| 5.5 | 12 | 11 | GPS1MHAL | 13 | - | 169 | CL01 | RT1P | 10-16 | 2.5 | 20 |
| 7.5 | - | 14 | GPS1MHAM | 16 | - | 208 | CL02 | RT1P | 10-16 | 2.5 | 20 |
| 7.5 | 16 | - | GPS1MHAM | 16 | - | 208 | CL02 | RT1S | 14.5-18 | 2.5 | 20 |
| 11 | 22.5 | 21 | GPS1MHAP | 25 | - | 325 | CL25 | RT1U | 21-26 | 4 | 20 |
| 15 | 30 | 28 | GPS1MHAR | 32 | - | 416 | CL04 | RT1V | 25-32 | 6 | 20 |
| 11 | 22.5 | 21 | GPS2MHAP | 25 | - | 325 | CL04 | RT1U | 21-26 | 4 | 20 |
| 15 | 30 | 28 | GPS2MHAR | 32 | - | 416 | CL04 | RT1V | 25-32 | 6 | 20 |
| 18.5 | 37 | 35 | GPS2MHAS | 40 | - | 520 | CL45 | RT1W | 30-40 | 10 | 20 |
| 22 | - | 40 | GPS2MHAT | 50 | - | 650 | CL06 | RT2E | 30-43 | 10 | 25 |
| 22 | 44 | - | GPS2MHAT | 50 | - | 650 | CL06 | RT2G | 42-55 | 10 | 25 |
| 30 | 60 | 55 | GPS2MHAU | 63 | - | 819 | CL07 | RT2H | 54-65 | 16 | 25 |
| 45 | 85 | 80 | FDH36MC100GD | 100 | 1000 - 1500 | 1140 | CL09 | RT2L | 78 - 97 | 35 | 30 |
| 55 | - | 100 | FDH36MC160JF | 160 | 1600 - 2400 | 1400 | CL10 | RT2M | 90 - 110 | 35 | 30 |
| 55 | 105 | - | FDH36MC160JF | 160 | 1600 - 240 | 1400 | CL10 | RT2M | 90 - 110 | 35 | 30 |

Technical data

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Surion GPS-M and Record Plus: Coordination Type 2 65kA at 380/400V and 415V

| MOTOR (1) | | | BREAKER | | | | CONTACTOR | OVERLOAD RELAY | | | |
|---------------------|-----------------|------|--------------|-------------------------|--|-------------------------|-----------|----------------|---------------|--|--------------------------------------|
| Rated power (kW) | Rated current | | Cat. no. | Rated current In (A) | Magnetic setting Im Pick-up band ± 20% Im (A) | Magnetic current (A) | Series | Series | Setting range | Smallest wire Cu (PVC) (2) 380/415V (mm ²) | Min frontal safety clearance (mm) |
| | 380/400V (A) | 415V | | | | | | | | | |
| 0.06 | 0.23 | 0.21 | GPS1MHAB | 0.25 | - | 3.3 | CL00 | RT1B | 0.16-0.26 | 1 | 20 |
| 0.09 | 0.34 | 0.31 | GPS1MHAC | 0.4 | - | 5.2 | CL00 | RT1C | 0.25-0.41 | 1 | 20 |
| 0.12 | 0.44 | 0.4 | GPS1MHAD | 0.63 | - | 8.2 | CL00 | RT1D | 0.4-0.65 | 1 | 20 |
| 0.18 | 0.65 | 0.63 | GPS1MHA E | 1 | - | 13 | CL00 | RT1D | 0.4-0.65 | 1 | 20 |
| 0.25 | 0.9 | 0.8 | GPS1MHA E | 1 | - | 13 | CL00 | RT1F | 0.65-1.1 | 1 | 20 |
| 0.37 | 1.25 | 1.1 | GPS1MHA F | 1.6 | - | 20.8 | CL00 | RT1G | 1-1.5 | 1 | 20 |
| 0.55 | 1.6 | 1.5 | GPS1MHA F | 1.6 | - | 20.8 | CL00 | RT1H | 1.3-1.9 | 1 | 20 |
| 0.75 | 2 | 1.9 | GPS1MHA G | 2.5 | - | 32.5 | CL00 | RT1J | 1.8-2.7 | 1 | 20 |
| 1.1 | 2.6 | 2.5 | GPS1MHA H | 4 | - | 52 | CL25 | RT1K | 2.5-4 | 1 | 20 |
| 1.5 | 3.5 | 3.4 | GPS1MHA H | 4 | - | 52 | CL25 | RT1K | 2.5-4 | 1 | 20 |
| 2.2 | 5 | 4.5 | GPS1MHA J | 6.3 | - | 81.9 | CL25 | RT1L | 4-6.3 | 1 | 20 |
| 3 | 7 | 6.5 | GPS1MHA K | 10 | - | 130 | CL25 | RT1M | 5.5-8.5 | 1.5 | 20 |
| 4 | 9 | 8 | GPS1MHA K | 10 | - | 130 | CL25 | RT1N | 8-12 | 1.5 | 20 |
| 5.5 | 12 | 11 | GPS1MHA L | 13 | - | 169 | CL25 | RT1P | 10-16 | 2.5 | 20 |
| 7.5 | - | 14 | GPS1MHA M | 16 | - | 208 | CL25 | RT1P | 10-16 | 2.5 | 20 |
| 7.5 | 16 | - | GPS1MHA M | 16 | - | 208 | CL25 | RT1S | 14.5-18 | 2.5 | 20 |
| 11 | 22.5 | 21 | GPS2MHAP | 25 | - | 325 | CL25 | RT1U | 21-26 | 4 | 20 |
| 15 | 30 | 28 | GPS2MHAR | 32 | - | 416 | CL04 | RT1V | 25-32 | 6 | 20 |
| 11 | 22.5 | 21 | GPS2MHAP | 25 | - | 325 | CL04 | RT1U | 21-26 | 4 | 20 |
| 15 | 30 | 28 | GPS2MHAR | 32 | - | 416 | CL04 | RT1V | 25-32 | 6 | 20 |
| 18.5 | 37 | 35 | GPS2MHAS | 40 | - | 520 | CL45 | RT1W | 30-40 | 10 | 20 |
| 22 | - | 40 | GPS2MHAT | 50 | - | 650 | CL06 | RT2E | 30-43 | 10 | 25 |
| 22 | 44 | - | GPS2MHAT | 50 | - | 650 | CL06 | RT2G | 42-55 | 10 | 25 |
| 30 | 60 | 55 | GPS2MHAU | 63 | - | 819 | CL07 | RT2H | 54-65 | 16 | 25 |
| 45 | 85 | 80 | FDH36MC100GD | 100 | 1000 - 1500 | 1140 | CL09 | RT2L | 78 - 97 | 35 | 30 |
| 55 | - | 100 | FDH36MC100GD | 100 | 1000 - 1500 | 1400 | CL10 | RT2M | 90 - 110 | 35 | 30 |
| 55 | 105 | - | FDH36MC160JF | 160 | 1600 - 2400 | 1400 | CL10 | RT2M | 90 - 110 | 35 | 30 |

- (1) Current are relevant to four pole motors not having special characteristics of torque. Inrush currents: ≤ 8 time rated current for ≤ 1s.
- (2) The minimum cycle cross-sections are referred to an ambient temperature of 30°C max. in free air and are selected to withstand the maximum let-through energy and the motor rated current. Besides the user has to consider the drop voltage, the type of laying and ambient temperature.



Surion GPS-B: Coordination Type 2 50kA at 380/400V and 415V

Manual motorstarter

| MOTOR (1) | | | MANUAL MOTOR STARTER | | | | CONTACTOR | | | LINKS |
|---------------------|-----------------|------|----------------------|----------------------------|--|----------------------------|------------|--|---|----------------------|
| Rated power (kW) | Rated current | | Cat. no. | Rated current In (A) | Thermal current Setting range (A) | Magnetic current (A) | Series | Smallest wire Cu (PVC)(2) 380/415V (mm ²) | Minimum frontal electrical safety clearance (mm) | Cat. no. (3) |
| | 380/400V (A) | 415V | | | | | | | | |
| 0.06 | 0.23 | 0.21 | GPS1BS/HAB | 0.25 | 0.16 - 0.25 | 3.2 | MC1 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 0.09 | 0.34 | 0.31 | GPS1BS/HAC | 0.4 | 0.25 - 0.4 | 5.2 | MC1 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 0.12 | 0.44 | 0.4 | GPS1BS/HAD | 0.63 | 0.4 - 0.63 | 8.2 | MC1 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 0.18 | 0.65 | 0.63 | GPS1BS/HAE | 1 | 0.63 - 1 | 13 | MC1 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 0.25 | 0.9 | 0.8 | GPS1BS/HAE | 1 | 0.63 - 1 | 13 | MC1 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 0.37 | 1.25 | 1.1 | GPS1BS/HAF | 1.6 | 1 - 1.6 | 20.5 | MC1 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 0.55 | 1.6 | 1.5 | GPS1BS/HAF | 1.6 | 1 - 1.6 | 20.5 | MC1 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 0.75 | 2 | 1.9 | GPS1BS/HAG | 2.5 | 1.6 - 2.5 | 32.5 | MC1 / CL00 | 1 | 20 | GPF1LMCBA / GPF1L02* |
| 1.1 | 2.6 | 2.5 | GPS1BS/HAH | 4 | 2.5 - 4 | 52 | CL01 | 1 | 20 | GPF1L02* |
| 1.5 | 3.5 | 3.4 | GPS1BS/HAH | 4 | 2.5 - 4 | 52 | CL01 | 1 | 20 | GPF1L02* |
| 2.2 | 5 | 4.5 | GPS1BS/HAJ | 6.3 | 4 - 6.3 | 82 | CL02 | 1 | 20 | GPF1L02* |
| 3 | 7 | 6.5 | GPS1BS/HAK | 10 | 6.3 - 10 | 130 | CL25 | 1.5 | 20 | GPF1L25* |
| 4 | 9 | 8 | GPS1BS/HAK | 10 | 6.3 - 10 | 130 | CL25 | 1.5 | 20 | GPF1L25* |
| 5.5 | 12 | 11 | GPS1BHAL | 13 | 9 - 13 | 169 | CL25 | 2.5 | 20 | GPF1L25* |
| 7.5 | 16 | 14 | GPS1BHAM | 16 | 11 - 16 | 208 | CL25 | 2.5 | 20 | GPF1L25* |
| 11 | 22.5 | 21 | GPS1BHAP | 25 | 19 - 25 | 325 | CL25 | 4 | 20 | GPF1L25* |
| 15 | 30 | 28 | GPS1BHAR | 32 | 24 - 32 | 416 | CL04 | 6 | 20 | GPF1L04* |
| 11 | 22.5 | 21 | GPS2BHAP | 25 | 19 - 25 | 325 | CL04 | 4 | 20 | GPF2L04* |
| 15 | 30 | 28 | GPS2BHAR | 32 | 24 - 32 | 416 | CL04 | 6 | 20 | GPF2L04* |
| 18.5 | 37 | 35 | GPS2BHAS | 40 | 28 - 40 | 520 | CL45 | 10 | 20 | GPF2L45* |
| 22 | 44 | 41 | GPS2BHAT | 50 | 35 - 50 | 650 | CL06 | 10 | 25 | GPF2L07* |
| 30 | 60 | 55 | GPS2BHAU | 63 | 45 - 63 | 820 | CL07 | 16 | 25 | GPF2L07* |

- (1) Currents are relevant to four pole motors not having special characteristics of torque. Inrush currents: ≤ 8 time rated current for ≤ 1s.
- (2) The minimum cycle cross-sections are referred to an ambient temperature of 30°C max. in free air. Cables are to withstand the maximum let-through energy and the motor rated current. Besides the user should consider the drop voltage on the cables, the type of laying and the ambient temperature.
- (3) Complete cat. nrs., see page D.3

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Surion GPS-M and Record Plus: Coordination Type 1 65kA at 380/400V and 415V

| MOTOR (1) | | | BREAKER | | | CONTACTOR | OVERLOAD RELAY | | Smallest wire Cu (PVC) (2) 380/415V (mm ²) | Min frontal safety clearance (mm) | |
|------------------|-------------------|------|--------------|----------------------|---------------------|----------------------|----------------|---------------|--|-----------------------------------|----|
| Rated power (kW) | Rated current (A) | | Cat. no. | Rated current In (A) | Thermal current (A) | Magnetic current (A) | Series | Setting range | | | |
| 0.06 | 0.23 | 0.21 | GPS1MS/HAB | 0.25 | - | 3.3 | CL00 | RT1B | 0.16-0.26 | 1 | 20 |
| 0.09 | 0.34 | 0.31 | GPS1MS/HAC | 0.4 | - | 5.2 | CL00 | RT1C | 0.25-0.41 | 1 | 20 |
| 0.12 | 0.44 | 0.4 | GPS1MS/HAD | 0.63 | - | 8.2 | CL00 | RT1D | 0.4-0.65 | 1 | 20 |
| 0.18 | 0.65 | 0.63 | GPS1MS/HAE | 1 | - | 13 | CL00 | RT1D | 0.4-0.65 | 1 | 20 |
| 0.25 | 0.9 | 0.8 | GPS1MS/HAE | 1 | - | 13 | CL00 | RT1F | 0.65-1.1 | 1 | 20 |
| 0.37 | 1.25 | 1.1 | GPS1MS/HAF | 1.6 | - | 20.8 | CL00 | RT1G | 1-1.5 | 1 | 20 |
| 0.55 | 1.6 | 1.5 | GPS1MS/HAF | 1.6 | - | 20.8 | CL00 | RT1H | 1.3-1.9 | 1 | 20 |
| 0.75 | 2 | 1.9 | GPS1MS/HAG | 2.5 | - | 32.5 | CL00 | RT1J | 1.8-2.7 | 1 | 20 |
| 1.1 | 2.6 | 2.5 | GPS1MS/HAH | 4 | - | 52 | CL00 | RT1K | 2.5-4 | 1 | 20 |
| 1.5 | 3.5 | 3.4 | GPS1MS/HAH | 4 | - | 52 | CL00 | RT1K | 2.5-4 | 1 | 20 |
| 2.2 | 5 | 4.5 | GPS1MS/HAJ | 6.3 | - | 81.9 | CL00 | RT1L | 4-6.3 | 1 | 20 |
| 3 | 7 | 6.5 | GPS1MS/HAK | 10 | - | 130 | CL00 | RT1M | 5.5-8.5 | 1.5 | 20 |
| 4 | 9 | 8 | GPS1MS/HAK | 10 | - | 130 | CL00 | RT1N | 8-12 | 1.5 | 20 |
| 5.5 | 12 | 11 | GPS1MHAL | 13 | - | 169 | CL01 | RT1P | 10-16 | 2.5 | 20 |
| 7.5 | - | 14 | GPS1MHAM | 16 | - | 208 | CL02 | RT1P | 10-16 | 2.5 | 20 |
| 7.5 | 16 | - | GPS1MHAM | 16 | - | 208 | CL02 | RT1S | 14.5-18 | 2.5 | 20 |
| 11 | 22.5 | 21 | GPS1MHAP | 25 | - | 325 | CL25 | RT1U | 21-26 | 4 | 20 |
| 15 | 30 | 28 | GPS1MHAR | 32 | - | 416 | CL04 | RT1V | 25-32 | 6 | 20 |
| 11 | 22.5 | 21 | GPS2MHAP | 25 | - | 325 | CL25 | RT1U | 21-26 | 4 | 20 |
| 15 | 30 | 28 | GPS2MHAR | 32 | - | 416 | CL04 | RT1V | 25-32 | 6 | 20 |
| 18.5 | 37 | 35 | GPS2MHAS | 40 | - | 520 | CL45 | RT1W | 30-40 | 10 | 20 |
| 22 | - | 40 | GPS2MHAT | 50 | - | 650 | CL06 | RT2E | 30-43 | 10 | 25 |
| 22 | 44 | - | GPS2MHAT | 50 | - | 650 | CL06 | RT2G | 42-55 | 10 | 25 |
| 30 | 60 | 55 | GPS2MHAU | 63 | - | 819 | CL07 | RT2H | 54-65 | 16 | 25 |
| 37 | 72 | 68 | FDN36MC080GD | 80 | - | 950 | CL08 | RT2J | 64-82 | 25 | 25 |
| 45 | 85 | 80 | FDN36MC100GD | 100 | - | 1140 | CL09 | RT2L | 78-97 | 35 | 30 |
| 55 | 105 | 100 | FDN36MC100GD | 100 | - | 1400 | CL10 | RT2M | 90-110 | 35 | 30 |

Technical data

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Surion GPS-M and Record Plus: Coordination Type 2 50kA at 380/400V and 415V

| MOTOR (1) | | | BREAKER | | | CONTACTOR | OVERLOAD RELAY | | Smallest wire Cu (PVC) (2) 380/415V (mm ²) | Min frontal safety clearance (mm) | |
|------------------|-------------------|------|--------------|----------------------|---------------------|----------------------|----------------|---------------|--|-----------------------------------|----|
| Rated power (kW) | Rated current (A) | | Cat. no. | Rated current In (A) | Thermal current (A) | Magnetic current (A) | Series | Setting range | | | |
| 0.06 | 0.23 | 0.21 | GPS1MS/HAB | 0.25 | - | 3.3 | CL00 | RT1B | 0.16-0.26 | 1 | 20 |
| 0.09 | 0.34 | 0.31 | GPS1MS/HAC | 0.4 | - | 5.2 | CL00 | RT1C | 0.25-0.41 | 1 | 20 |
| 0.12 | 0.44 | 0.4 | GPS1MS/HAD | 0.63 | - | 8.2 | CL00 | RT1D | 0.4-0.65 | 1 | 20 |
| 0.18 | 0.65 | 0.63 | GPS1MS/HAE | 1 | - | 13 | CL00 | RT1D | 0.4-0.65 | 1 | 20 |
| 0.25 | 0.9 | 0.8 | GPS1MS/HAE | 1 | - | 13 | CL00 | RT1F | 0.65-1.1 | 1 | 20 |
| 0.37 | 1.25 | 1.1 | GPS1MS/HAF | 1.6 | - | 20.8 | CL00 | RT1G | 1-1.5 | 1 | 20 |
| 0.55 | 1.6 | 1.5 | GPS1MS/HAF | 1.6 | - | 20.8 | CL00 | RT1H | 1.3-1.9 | 1 | 20 |
| 0.75 | 2 | 1.9 | GPS1MS/HAG | 2.5 | - | 32.5 | CL00 | RT1J | 1.8-2.7 | 1 | 20 |
| 1.1 | 2.6 | 2.5 | GPS1MS/HAH | 4 | - | 52 | CL01 | RT1K | 2.5-4 | 1 | 20 |
| 1.5 | 3.5 | 3.4 | GPS1MS/HAH | 4 | - | 52 | CL01 | RT1K | 2.5-4 | 1 | 20 |
| 2.2 | 5 | 4.5 | GPS1MS/HAJ | 6.3 | - | 81.9 | CL02 | RT1L | 4-6.3 | 1 | 20 |
| 3 | 7 | 6.5 | GPS1MS/HAK | 10 | - | 130 | CL25 | RT1M | 5.5-8.5 | 1.5 | 20 |
| 4 | 9 | 8 | GPS1MS/HAK | 10 | - | 130 | CL25 | RT1N | 8-12 | 1.5 | 20 |
| 5.5 | 12 | 11 | GPS1MHAL | 13 | - | 169 | CL25 | RT1P | 10-16 | 1.5 | 20 |
| 7.5 | - | 14 | GPS1MHAM | 16 | - | 208 | CL25 | RT1P | 10-16 | 2.5 | 20 |
| 7.5 | 16 | - | GPS1MHAM | 16 | - | 208 | CL25 | RT1S | 14.5-18 | 2.5 | 20 |
| 11 | 22.5 | 21 | GPS1MHAP | 25 | - | 325 | CL25 | RT1U | 21-26 | 4 | 20 |
| 15 | 30 | 28 | GPS1MHAR | 32 | - | 416 | CL04 | RT1V | 25-32 | 6 | 20 |
| 11 | 22.5 | 21 | GPS2MHAP | 25 | - | 325 | CL04 | RT1U | 21-26 | 4 | 20 |
| 15 | 30 | 28 | GPS2MHAR | 32 | - | 416 | CL04 | RT1V | 25-32 | 6 | 20 |
| 18.5 | 37 | 35 | GPS2MHAS | 40 | - | 520 | CL45 | RT1W | 30-40 | 6 | 20 |
| 22 | - | 40 | GPS2MHAT | 50 | - | 650 | CL06 | RT2E | 30-43 | 10 | 25 |
| 22 | 44 | - | GPS2MHAT | 50 | - | 650 | CL06 | RT2G | 42-55 | 10 | 25 |
| 30 | 60 | 55 | GPS2MHAU | 63 | - | 819 | CL07 | RT2H | 54-65 | 16 | 25 |
| 37 | 72 | 68 | FDN36MC080GD | 80 | - | 950 | CL08 | RT2J | 64-82 | 25 | 25 |
| 45 | 85 | 80 | FDN36MC100GD | 100 | - | 1140 | CL09 | RT2L | 78-97 | 35 | 30 |
| 55 | 105 | 100 | FDN36MC100GD | 100 | - | 1400 | CL10 | RT2M | 90-110 | 35 | 30 |

(1) Current are relevant to four pole motors not having special characteristics of torque. Inrush currents: ≤ 8 time rated current for ≤ 1s.
 (2) The minimum cycle cross-sections are referred to an ambient temperature of 30°C max. in free air and are selected to withstand the maximum let-through energy and the motor rated current. Besides the user has to consider the drop voltage, the type of laying and ambient temperature.



Surion GPS-M and Record Plus: Coordination Type 1 50kA at 500 and 525V

Manual motorstarter

| MOTOR (1) | | | BREAKER | | | | CONTACTOR | OVERLOAD RELAY | | | |
|---------------------|----------------------|------|--------------|----------------------------|--|----------------------------|-----------|----------------|------------------|--|---|
| Rated power (kW) | Rated current (A) | | Cat. no. | Rated current In (A) | Magnetic setting Im Pick-up band ± 20% Im (A) | Magnetic current (A) | Series | Series | Setting range | Smallest wire Cu (PVC) (2) 380/415V (mm ²) | Min frontal safety clearance (mm) |
| | 500V | 525V | | | | | | | | | |
| 0.06 | 0.17 | 0.16 | GPS1MSAB | 0.25 | - | 3.2 | CL00 | RT1B | 0.16-0.26 | 1 | 20 |
| 0.09 | 0.24 | 0.22 | GPS1MSAB | 0.25 | - | 3.2 | CL00 | RT1B | 0.16-0.26 | 1 | 20 |
| 0.12 | 0.33 | 0.3 | GPS1MSAC | 0.4 | - | 5.2 | CL00 | RT1C | 0.25-0.41 | 1 | 20 |
| 0.18 | 0.48 | 0.46 | GPS1MSAD | 0.63 | - | 8.2 | CL00 | RT1D | 0.4-0.65 | 1 | 20 |
| 0.25 | - | 0.64 | GPS1MSAE | 1 | - | 13 | CL00 | RT1D | 0.4-0.65 | 1 | 20 |
| 0.25 | 0.66 | - | GPS1MSAE | 1 | - | 13 | CL00 | RT1F | 0.65-1.1 | 1 | 20 |
| 0.37 | 0.9 | 0.85 | GPS1MSAE | 1 | - | 13 | CL00 | RT1F | 0.65-1.1 | 1 | 20 |
| 0.55 | 1.2 | 1.15 | GPS1MSAF | 1.6 | - | 20.5 | CL00 | RT1G | 1.0-1.5 | 1 | 20 |
| 0.75 | 1.5 | 1.45 | GPS1MSAF | 1.6 | - | 20.5 | CL00 | RT1H | 1.3-1.9 | 1 | 20 |
| 1.1 | 2.1 | 1.9 | GPS1MSAG | 2.5 | - | 32.5 | CL00 | RT1J | 1.8-2.7 | 1 | 20 |
| 1.5 | 2.8 | 2.6 | GPS1MSAH | 4 | - | 52 | CL00 | RT1K | 2.5-4 | 1 | 20 |
| 2.2 | 3.9 | 3.6 | GPS1MSAH | 4 | - | 52 | CL00 | RT1K | 2.5-4 | 1 | 20 |
| 3 | 5.3 | 5 | GPS1MSAJ | 6.3 | - | 82 | CL00 | RT1L | 4.0-6.3 | 1 | 20 |
| 4 | 6.8 | 6.5 | GPS1MHAK | 10 | - | 130 | CL00 | RT1M | 5.5-8.5 | 1 | 20 |
| 5.5 | 9.1 | 8.6 | GPS1MHAK | 10 | - | 130 | CL00 | RT1N | 8.0-12.0 | 1.5 | 20 |
| 7.5 | 12 | 11.4 | GPS1MHAL | 13 | - | 169 | CL01 | RT1P | 10-16 | 2.5 | 20 |
| 10 | 15.5 | 14.8 | GPS1MHAM | 16 | - | 208 | CL02 | RT1S | 14.5-18 | 2.5 | 20 |
| 11 | 17.6 | 17 | GPS1MHAN | 20 | - | 260 | CL25 | RT1S | 14.5-18 | 2.5 | 20 |
| 15 | 23 | 22 | GPS1MHAP | 25 | - | 325 | CL25 | RT1U | 21-26 | 4 | 20 |
| 18.5 | 28.5 | 27 | GPS1MHAR | 32 | - | 416 | CL04 | RT1V | 25-32 | 6 | 20 |
| 11 | 17.6 | 17 | GPS2MHAN | 20 | - | 260 | CL04 | RT1S | 14.5-18 | 2.5 | 20 |
| 15 | 23 | 22 | GPS2MHAP | 25 | - | 325 | CL04 | RT1U | 21-26 | 4 | 20 |
| 18.5 | 28.5 | 27 | GPS2MHAR | 32 | - | 416 | CL04 | RT1V | 25-32 | 6 | 20 |
| 22 | 33 | 31.5 | GPS2MHAS | 40 | - | 520 | CL45 | RT2E | 30-43 | 6/10 | 20 |
| 30 | 45 | 43 | GPS2MHAT | 50 | - | 650 | CL06 | RT2G | 42-55 | 10 | 25 |
| 37 | 53 | 52 | GPS2MHAU | 63 | - | 820 | CL07 | RT2G | 42-55 | 16 | 25 |
| 45 | - | 62 | FDN36MC080GD | 80 | 800 - 1200 | 1000 | CL08 | RT2H | 54 - 65 | 16 | 30 |
| 45 | 65 | - | FDN36MC080GD | 80 | 800 - 1200 | 1000 | CL08 | RT2J | 64 - 82 | 25 | 30 |
| 55 | 80 | 76 | FDN36MC100GD | 100 | 1000 - 1500 | 1200 | CL09 | RT2J | 64 - 82 | 25 | 30 |

Surion GPS-M and Record Plus: Coordination Type 2 50kA at 500 and 525V

D

| MOTOR (1) | | | BREAKER | | | | CONTACTOR | OVERLOAD RELAY | | | |
|---------------------|----------------------|------|--------------|----------------------------|--|----------------------------|-----------|----------------|------------------|--|---|
| Rated power (kW) | Rated current (A) | | Cat. no. | Rated current In (A) | Magnetic setting Im Pick-up band ± 20% Im (A) | Magnetic current (A) | Series | Series | Setting range | Smallest wire Cu (PVC) (2) 380/415V (mm ²) | Min frontal safety clearance (mm) |
| | 500V | 525V | | | | | | | | | |
| 0.06 | 0.17 | 0.16 | GPS1MS/HAB | 0.25 | - | 3.2 | CL00 | RT1B | 0.16-0.26 | 1 | 20 |
| 0.09 | 0.24 | 0.22 | GPS1MS/HAB | 0.25 | - | 3.2 | CL00 | RT1B | 0.16-0.26 | 1 | 20 |
| 0.12 | 0.33 | 0.3 | GPS1MS/HAC | 0.4 | - | 5.2 | CL00 | RT1C | 0.25-0.41 | 1 | 20 |
| 0.18 | 0.48 | 0.46 | GPS1MS/HAD | 0.63 | - | 8.2 | CL00 | RT1D | 0.4-0.65 | 1 | 20 |
| 0.25 | - | 0.64 | GPS1MS/HAE | 1 | - | 13 | CL00 | RT1D | 0.4-0.65 | 1 | 20 |
| 0.25 | 0.66 | - | GPS1MS/HAE | 1 | - | 13 | CL00 | RT1F | 0.65-1.1 | 1 | 20 |
| 0.37 | 0.9 | 0.85 | GPS1MS/HAE | 1 | - | 13 | CL00 | RT1F | 0.65-1.1 | 1 | 20 |
| 0.55 | 1.2 | 1.15 | GPS1MS/HAF | 1.6 | - | 20.5 | CL00 | RT1G | 1.0-1.5 | 1 | 20 |
| 0.75 | 1.5 | 1.45 | GPS1MS/HAF | 1.6 | - | 20.5 | CL00 | RT1H | 1.3-1.9 | 1 | 20 |
| 1.1 | 2.1 | 1.9 | GPS1MS/HAG | 2.5 | - | 32.5 | CL01 | RT1J | 1.8-2.7 | 1 | 20 |
| 1.5 | 2.8 | 2.6 | GPS1MS/HAH | 4 | - | 52 | CL25 | RT1K | 2.5-4 | 1 | 20 |
| 2.2 | 3.9 | 3.6 | GPS1MS/HAH | 4 | - | 52 | CL25 | RT1K | 2.5-4 | 1 | 20 |
| 3 | 5.3 | 5 | GPS1MS/HAJ | 6.3 | - | 82 | CL25 | RT1L | 4.0-6.3 | 1 | 20 |
| 4 | 6.8 | 6.5 | GPS1MHAK | 10 | - | 130 | CL25 | RT1M | 5.5-8.5 | 1 | 20 |
| 5.5 | 9.1 | 8.6 | GPS1MHAK | 10 | - | 130 | CL25 | RT1N | 8.0-12 | 1.5 | 20 |
| 7.5 | 12 | 11.4 | GPS1MHAL | 13 | - | 169 | CL25 | RT1P | 10-16 | 2.5 | 20 |
| 10 | 15.5 | 14.8 | GPS1MHAM | 16 | - | 208 | CL25 | RT1S | 14.5-18 | 2.5 | 20 |
| 11 | 17.6 | 17 | GPS1MHAN | 20 | - | 260 | CL25 | RT1S | 14.5-18 | 2.5 | 20 |
| 15 | 23 | 22 | GPS1MHAP | 25 | - | 325 | CL04 | RT1U | 21-26 | 4 | 20 |
| 18.5 | 28.5 | 27 | GPS1MHAR | 32 | - | 416 | CL04 | RT1V | 25-32 | 6 | 20 |
| 11 | 17.6 | 17 | GPS2MHAN | 20 | - | 260 | CL04 | RT1S | 14.5-18 | 2.5 | 20 |
| 15 | 23 | 22 | GPS2MHAP | 25 | - | 325 | CL04 | RT1U | 21-26 | 4 | 20 |
| 18.5 | 28.5 | 27 | GPS2MHAR | 32 | - | 416 | CL45 | RT1V | 25-32 | 6 | 20 |
| 22 | 33 | 31.5 | GPS2MHAS | 40 | - | 520 | CL06 | RT2E | 30-43 | 6/10 | 25 |
| 30 | 45 | 43 | GPS2MHAT | 50 | - | 650 | CL06 | RT2G | 42-55 | 10 | 25 |
| 37 | 53 | 52 | GPS2MHAU | 63 | - | 820 | CL07 | RT2G | 42-55 | 16 | 25 |
| 45 | - | 62 | FDN36MC080GD | 80 | 800 - 1200 | 1000 | CL09 | RT2H | 54 - 65 | 16 | 30 |
| 45 | 65 | - | FDN36MC080GD | 80 | 800 - 1200 | 1000 | CL09 | RT2J | 64 - 82 | 25 | 30 |
| 55 | 80 | 76 | FDN36MC100GD | 100 | 1000 - 1500 | 1200 | CL10 | RT2J | 64 - 82 | 25 | 30 |



Surion GPS-B and Record Plus: Coordination Type 2 65kA at 380/400V and 415V

| MOTOR | | | MOTOR PROTECTION CIRCUITBREAKER | | | CONTACTOR | THERMAL RELAY |
|------------------|--------------|----------|---------------------------------|------------------|---------------------|------------|--|
| Rated power (kW) | le | le | Cat. no. | Setting range In | Magnetic setting Im | Series (A) | Class 10 |
| | 380/400V (A) | 415V (A) | | (A) | (A) | | |
| 0.25 | 0.9 | 0.8 | GPS1BHAE | 0.63-1 | 13 | CL00 | Integrated into the motor protection circuit breaker |
| 0.37 | 1.25 | 1.1 | GPS1BHAF | 1-1.6 | 20.5 | CL00 | Integrated into the motor protection circuit breaker |
| 0.55 | 1.6 | 1.5 | GPS1BHAF | 1-1.6 | 20.5 | CL00 | Integrated into the motor protection circuit breaker |
| 0.75 | 2 | 1.9 | GPS1BHAG | 1.6-2.5 | 32.5 | CL00 | Integrated into the motor protection circuit breaker |
| 1.1 | 2.6 | 2.5 | GPS1BHAH | 2.5-4 | 52 | CL25 | Integrated into the motor protection circuit breaker |
| 1.5 | 3.5 | 3.45 | GPS1BHAH | 2.5-4 | 52 | CL25 | Integrated into the motor protection circuit breaker |
| 2.2 | 5 | 4.7 | GPS1BHAJ | 4-6.3 | 82 | CL25 | Integrated into the motor protection circuit breaker |
| 3 | 7 | 6.5 | GPS1BHAK | 6.3-10 | 130 | CL25 | Integrated into the motor protection circuit breaker |
| 4 | 9 | 8 | GPS1BHAK | 6.3-10 | 130 | CL25 | Integrated into the motor protection circuit breaker |
| 5.5 | 12 | 11 | GPS1BHAL | 9.0-13 | 169 | CL25 | Integrated into the motor protection circuit breaker |
| 7.5 | 16 | 14 | GPS1BHAM | 11.0-16 | 208 | CL25 | Integrated into the motor protection circuit breaker |
| 11 | 22.5 | 21 | GPS1BHAP | 19-25 | 325 | CL25 | Integrated into the motor protection circuit breaker |
| 15 | 30 | 28 | GPS1BHAR | 24-32 | 416 | CL04 | Integrated into the motor protection circuit breaker |
| 18.5 | 37 | 35 | GPS2BHAS | 28-40 | 520 | CL45 | Integrated into the motor protection circuit breaker |
| 22 | 44 | 41 | GPS2BHAT | 25-50 | 650 | CL06 | Integrated into the motor protection circuit breaker |
| 30 | 60 | 55 | GPS2BHAU | 45-63 | 820 | CL07 | Integrated into the motor protection circuit breaker |
| 37 | 72.5 | 65 | FDH36MC080 | 80 | 950 | CL08 | RT2J (64-82A) |
| 45 | 85 | 79 | FDH36MC100 | 100 | 1140 | CL09 | RT2L (78-97A) |

Surion GPS-B and Record Plus: Coordination Type 2 80kA at 380/400V and 415V

| MOTOR | | | MOTOR PROTECTION CIRCUITBREAKER | | | CONTACTOR | THERMAL RELAY |
|------------------|--------------|----------|---------------------------------|------------------|---------------------|------------|--|
| Rated power (kW) | le | le | Cat. no. | Setting range In | Magnetic setting Im | Series (A) | Class 10 |
| | 380/400V (A) | 415V (A) | | (A) | (A) | | |
| 0.25 | 0.9 | 0.8 | GPS1BHAE | 0.63-1 | 13 | CL00 | Integrated into the motor protection circuit breaker |
| 0.37 | 1.25 | 1.1 | GPS1BHAF | 1-1.6 | 20.5 | CL00 | Integrated into the motor protection circuit breaker |
| 0.55 | 1.6 | 1.5 | GPS1BHAF | 1-1.6 | 20.5 | CL00 | Integrated into the motor protection circuit breaker |
| 0.75 | 2 | 1.9 | GPS1BHAG | 1.6-2.5 | 32.5 | CL00 | Integrated into the motor protection circuit breaker |
| 1.1 | 2.6 | 2.5 | GPS1BHAH | 2.5-4 | 52 | CL25 | Integrated into the motor protection circuit breaker |
| 1.5 | 3.5 | 3.45 | GPS1BHAH | 2.5-4 | 52 | CL25 | Integrated into the motor protection circuit breaker |
| 2.2 | 5 | 4.7 | GPS1BHAJ | 4-6.3 | 82 | CL25 | Integrated into the motor protection circuit breaker |
| 3 | 7 | 6.5 | GPS1BHAK | 6.3-10 | 130 | CL25 | Integrated into the motor protection circuit breaker |
| 4 | 9 | 8 | GPS1BHAK | 6.3-10 | 130 | CL25 | Integrated into the motor protection circuit breaker |
| 5.5 | 12 | 11 | GPS1BHAL | 9.0-13 | 169 | CL05 | Integrated into the motor protection circuit breaker |
| 7.5 | 16 | 14 | FDH36MC020 | 20 | 210 | CL04 | RT1S (14.5-18A) |
| 11 | 22.5 | 21 | FDH36MC030 | 30 | 300 | CL45 | RT1U (21-26A) |
| 15 | 30 | 28 | FDH36MC030 | 30 | 450 | CL45 | RT1V (25-32A) |
| 18.5 | 37 | 35 | FDH36MC050 | 50 | 500 | CL45 | RT1W (30-40A) |
| 22 | 44 | 41 | FDH36MC050 | 50 | 580 | CL06 | RT2G (42-55A) |
| 30 | 66 | 55 | FDH36MC080 | 80 | 800 | CL07 | RT2H (54-65A) |
| 37 | 72.5 | 65 | FDH36MC080 | 80 | 950 | CL08 | RT2J (64-82A) |
| 45 | 85 | 79 | FDH36MC100 | 100 | 1140 | CL09 | RT2L (78-97A) |

- (1) Current are relevant to four pole motors not having special characteristics of torque. Inrush currents: ≤ 8 time rated current for $\leq 1s$.
(2) The minimum cycle cross-sections are referred to an ambient temperature of 30°C max. in free air and are selected to withstand the maximum let-through energy and the motor rated current. Besides the user has to consider the drop voltage, the type of laying and ambient temperature.

Technical data

A

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Record Plus: Coordination Type 2 150kA at 380/400V and 415V (Class 10 protection)

| MOTOR (1) | | | THERMAL-MAGNETIC CIRCUIT BREAKER | | | | | CONTACTOR | | |
|---------------------|---------------|------|----------------------------------|--|----------------------------------|------------------------------|--------------------------------|-----------|--|--------------------------------------|
| Rated power (kW) | Rated current | | Cat. no. (3) | Magnetic setting I _m pick-up band ± 20% I _m (A) | Magnetic current Setpoint (A) | Thermal setting range (A) | Thermal setpoint (400V) (A) | Series | Smallest wire Cu (PVC) (2) 380/415V (mm ²) | Min frontal safety clearance (mm) |
| | 380/400V (A) | 415V | | | | | | | | |
| 7.5 | 16 | 14 | FD*36TD016ED | 160 | 160 | 12.8 - 16 | 16 | CL45 | 2.5 | 20 |
| 11 | 22.5 | 21 | FD*36TD025ED | 250 | 250 | 20 - 25 | 22.5 | CL45 | 4 | 20 |
| 15 | 30 | 28 | FD*36TD032ED | 320 | 320 | 26 - 32 | 30 | CL45 | 6 | 20 |
| 18.5 | 37 | 35 | FD*36TD040ED | 400 | 400 | 32 - 40 | 37 | CL45 | 10 | 20 |
| 22 | 44 | 40 | FD*36TD050ED | 500 | 500 | 40 - 50 | 40 | CL06 | 10 | 25 |
| 30 | 60 | 55 | FD*36TD063ED | 630 | 630 | 50 - 63 | 55 | CL07 | 16 | 25 |
| 37 | 72 | 68 | FD*36TD080GD | 800 | 800 | 64 - 80 | 68 | CL08 | 25 | 25 |
| 45 | 85 | 80 | FD*36TD100GD | 1000 | 1000 | 80 - 100 | 80 | CL09 | 35 | 30 |
| 55 | 105 | 100 | FD*36TD125GD | 1250 | 1250 | 100 - 125 | 100 | CL10 | 35 | 30 |
| 75 | 138 | 135 | FD*36TD160GD | 1280 | 1280 | 128 - 160 | 135 | CK75 | 50 | 40 |
| 90 | 170 | 165 | FE*36TD200KF | 1000 - 2000 | 1700 | 160 - 200 | 165 | CK08 | 70 | 40 |
| 110 | 211 | 200 | FE*36TD250KF | 1250 - 2500 | 2100 | 200 - 250 | 200 | CK85 | 95 | 40 |
| 132 | 245 | 240 | FE*36TD250KF | 1250 - 2500 | 2500 | 200 - 250 | 240 | CK09 | 120 | 40 |

(*) Max I_q rating in kA: type N = 50 kA, type H = 80 kA, type L = 150 kA.

- (1) Current are relevant to four pole motors not having special characteristics of torque.
Inrush currents: ≤ 8 times rated current for ≤ 1s (Normal starting) or H 5s (Heavy starting).
- (2) The minimum cycle cross-sections are referred to an ambient temperature of 30°C max. in free air and are selected to withstand the maximum let-through energy and the motor rated current. Besides the user has to consider the drop voltage, the type of laying and ambient temperature.
- (3) Foreseen values for E-frame.

Manual motorstarter

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Record Plus: Coordination Type 2 Up to 150kA at 380/400V and 415V (Class 10 protection)

| MOTOR (1) | | | ONLY MAGNETIC CIRCUIT BREAKER | | | CONTACTOR | OVERLOAD RELAY | | Smallest wire Cu (PVC) (2) 380/415V (mm ²) | Min frontal safety clearance (mm) |
|------------------|---------------|------|-------------------------------|---|-------------------------------|-----------|----------------|-------------------|--|-----------------------------------|
| Rated power (kW) | Rated current | | Cat. no. (3) | Magnetic setting Im pick-up band ± 20% Im (A) | Magnetic current Setpoint (A) | Series | Series | Setting range (A) | | |
| | 380/400V (A) | 415V | | | | | | | | |
| 4 | 9 | 8 | FD*36MC012ED | 125 - 188 | 120 | CL04 | RT1N | 8 - 12 | 1.5 | 20 |
| 5.5 | 12 | 11 | FD*36MC012ED | 125 - 188 | 150 | CL04 | RT1P | 10 - 16 | 2.5 | 20 |
| 7.5 | - | 14 | FD*36MC020ED | 200 - 300 | 200 | CL04 | RT1P | 10 - 16 | 2.5 | 20 |
| 7.5 | 16 | - | FD*36MC020ED | 200 - 300 | 210 | CL04 | RT1S | 14.5 - 18 | 2.5 | 20 |
| 11 | 22.5 | 21 | FD*36MC030ED | 300 - 450 | 450 | CL45 | RT1U | 21 - 26 | 4 | 20 |
| 15 | 30 | 28 | FD*36MC030ED | 300 - 450 | 500 | CL45 | RT1V | 25 - 32 | 6 | 20 |
| 18.5 | 37 | 35 | FD*36MC050ED | 500 - 750 | 500 | CL45 | RT1W | 30 - 40 | 10 | 20 |
| 22 | - | 40 | FD*36MC050ED | 500 - 750 | 540 | CL06 | RT2E | 30 - 43 | 10 | 25 |
| 22 | 44 | - | FD*36MC050ED | 500 - 750 | 580 | CL06 | RT2G | 42 - 55 | 10 | 25 |
| 30 | 60 | 55 | FD*36MC080GD | 800 - 1200 | 800 | CL07 | RT2H | 54 - 65 | 16 | 25 |
| 37 | 72 | 68 | FD*36MC080GD | 800 - 1200 | 950 | CL08 | RT2J | 64 - 82 | 25 | 25 |
| 45 | 85 | 80 | FD*36MC100GD | 1000 - 1500 | 1140 | CL09 | RT2L | 78 - 97 | 35 | 30 |
| 55 | - | 100 | FD*36MC100GD | 1000 - 1500 | 1400 | CL10 | RT2M | 90 - 110 | 35 | 30 |
| 55 | 105 | - | FE*36MC160JF | 1600 - 2400 | 1400 | CL10 | RT2M | 90 - 110 | 35 | 30 |
| 75 | 138 | 135 | FE*36MC160JF | 1600 - 2400 | 1900 | CK75 | RT3E | 110 - 140 | 50 | 40 |
| 90 | 170 | 165 | FE*36MC250KF | 2500 - 3750 | 2500 | CK08 | RT3F | 140 - 190 | 70 | 40 |
| 110 | 211 | 200 | FE*36MC250KF | 2500 - 3750 | 2800 | CK85 | RT4P | 175 - 280 | 95 | 40 |
| 132 | 245 | 240 | FE*36MC250KF | 2500 - 3750 | 3150 | CK09 | RT4P | 175 - 280 | 120 | 40 |

Technical data

Record Plus: Coordination Type 2 Up to 150kA at 380/400V and 415V (Class 30 protection)

| MOTOR (1) | | | ONLY MAGNETIC CIRCUIT BREAKER | | | CONTACTOR | OVERLOAD RELAY | | Smallest wire Cu (PVC) (2) 380/415V (mm ²) | Min frontal safety clearance (mm) |
|------------------|---------------|------|-------------------------------|---|-------------------------------|-----------|----------------|-------------------|--|-----------------------------------|
| Rated power (kW) | Rated current | | Cat. no. (3) | Magnetic setting Im pick-up band ± 20% Im (A) | Magnetic current Setpoint (A) | Series | Series | Setting range (A) | | |
| | 380/400V (A) | 415V | | | | | | | | |
| 2.2 | 5 | 4.5 | FD*36MC008ED | 80 - 120 | 80 | CL25 | RT4LB | 4 - 6.5 | 1.5 | 20 |
| 3 | 7 | 6.5 | FD*36MC008ED | 80 - 120 | 90 | CL04 | RT4LC | 5.5 - 8.5 | 1.5 | 20 |
| 4 | 9 | 8 | FD*36MC012ED | 125 - 188 | 120 | CL04 | RT4aLD | 7.5 - 11 | 1.5 | 20 |
| 5.5 | 12 | 11 | FD*36MCa012ED | 125 - 188 | 150 | CL45 | RT4LE | 10 - 16 | 2.5 | 20 |
| 7.5 | - | 14 | FD*36MC020EaD | 200 - 300 | 200 | CL45 | RT4LE | 10 - 16 | 2.5 | 20 |
| 7.5 | 16 | - | FD*36MC020ED | 200 - 300 | 210 | CL45 | RT4LF | 12.5 - 20 | 2.5 | 20 |
| 11 | 22.5 | 21 | FD*36MC030ED | 300 - 450 | 450 | CL45 | RT4LG | 17 - 27 | 4 | 20 |
| 15 | 30 | 28 | FD*36MC030ED | 300 - 450 | 500 | CL45 | RT4LH | 26 - 40 | 6 | 20 |
| 18.5 | 37 | 35 | FD*36MC050ED | 500 - 750 | 500 | CL06 | RT4LH | 26 - 40 | 10 | 25 |
| 22 | - | 40 | FD*36MC050ED | 500 - 750 | 540 | CL06 | RT4LJ | 32 - 52 | 10 | 25 |
| 22 | 44 | - | FD*36MC050ED | 500 - 750 | 580 | CL06 | RT4LJ | 32 - 52 | 10 | 25 |
| 30 | 60 | 55 | FD*36MC080GD | 800 - 1200 | 800 | CL07 | RT4LK | 45 - 70 | 16 | 25 |
| 37 | 72 | 68 | FD*36MC080GD | 800 - 1200 | 950 | CL08 | RT4LL | 60 - 90 | 25 | 25 |
| 45 | 85 | 80 | FD*36MC100GD | 1000 - 1500 | 1140 | CL09 | RT4LL | 60 - 90 | 35 | 30 |
| 55 | - | 100 | FD*36MC100GD | 1000 - 1500 | 1400 | CL10 | RT4LM | 80 - 125 | 35 | 30 |
| 55 | 105 | - | FE*36MC160JF | 1600 - 2400 | 1400 | CL10 | RT4LM | 80 - 125 | 35 | 30 |
| 75 | 138 | 135 | FE*36MC160JF | 1600 - 2400 | 1900 | CK75 | RT4LN | 120 - 190 | 50 | 40a |
| 90 | 170 | 165 | FE*36MC250KF | 2500 - 3750 | 2500 | CK08 | RT4LN | 120 - 190 | 70 | 40 |
| 110 | 211 | 200 | FE*36MC250KF | 2500 - 3750 | 2800 | CK85 | RT4LR | 200 - 310 | 95 | 40 |
| 132 | 245 | 240 | FE*36MC250KF | 2500 - 3750 | 3150 | CK09 | RT4LR | 200 - 310 | 120 | 40 |

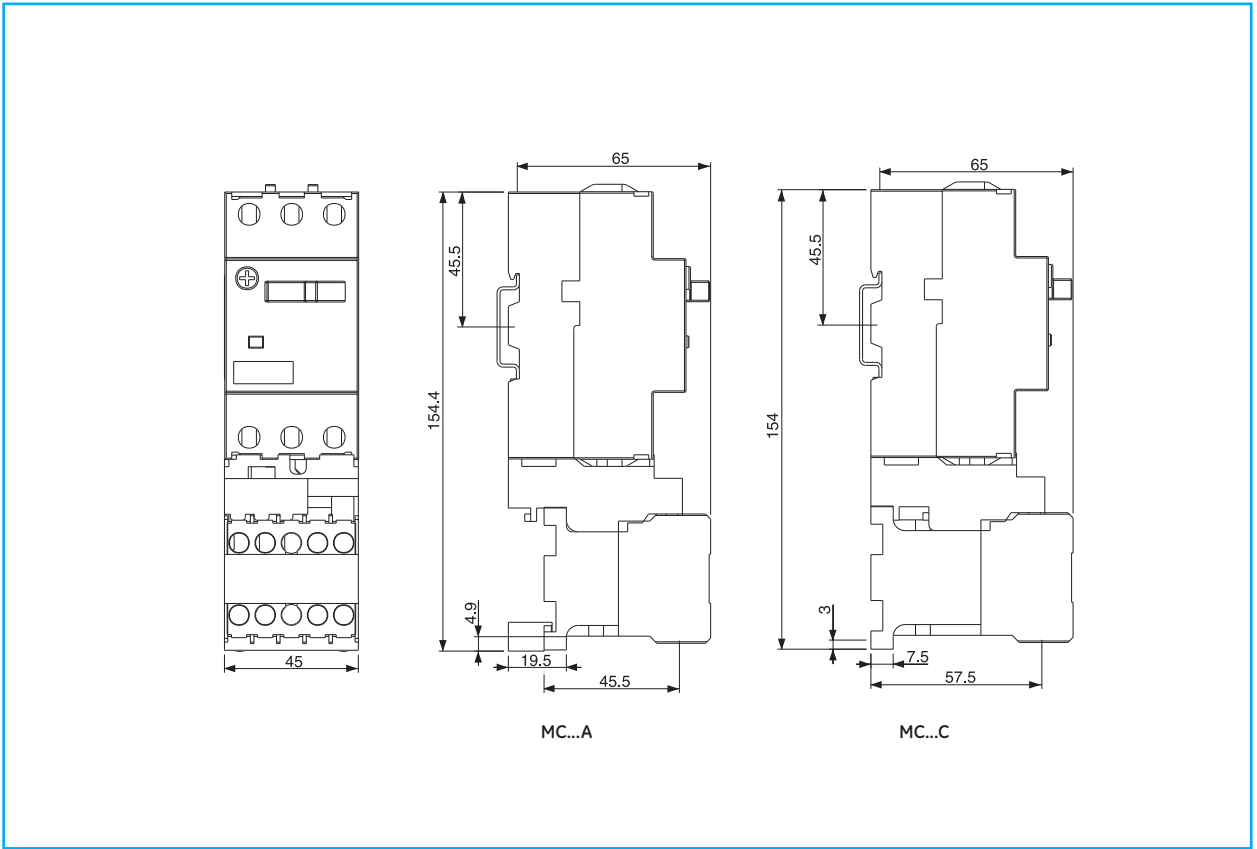
(*) Max Iq rating in kA: type N = 50 kA, type H = 80 kA, type L = 150 kA.

- (1) Current are relevant to four pole motors not having special characteristics of torque.
Inrush currents: ≤ 8 times rated current for ≤ 1s (Normal starting) or H 5s (Heavy starting).
- (2) The minimum cycle cross-sections are referred to an ambient temperature of 30°C max. in free air and are selected to withstand the maximum let-through energy and the motor rated current. Besides the user has to consider the drop voltage, the type of laying and ambient temperature.
- (3) Foreseen values for E-frame.

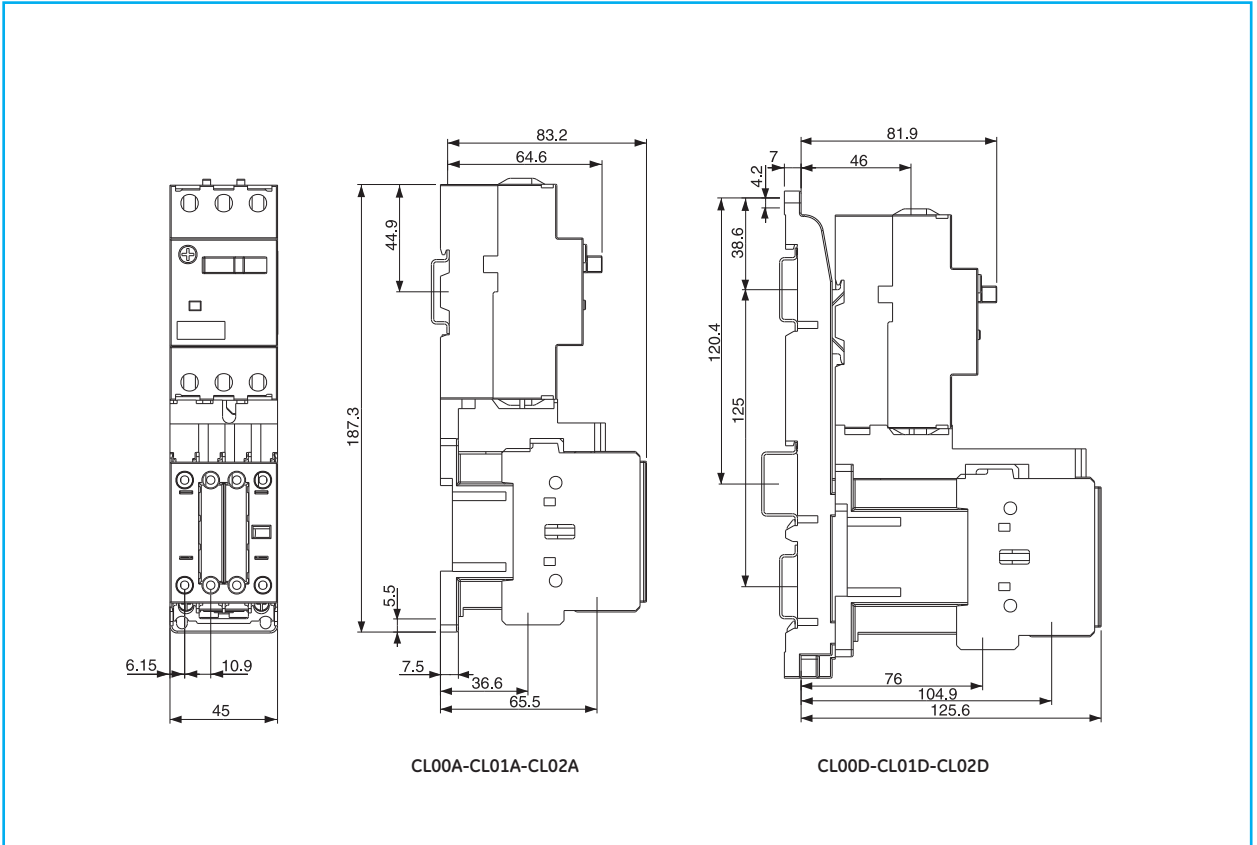


Dimensional drawings

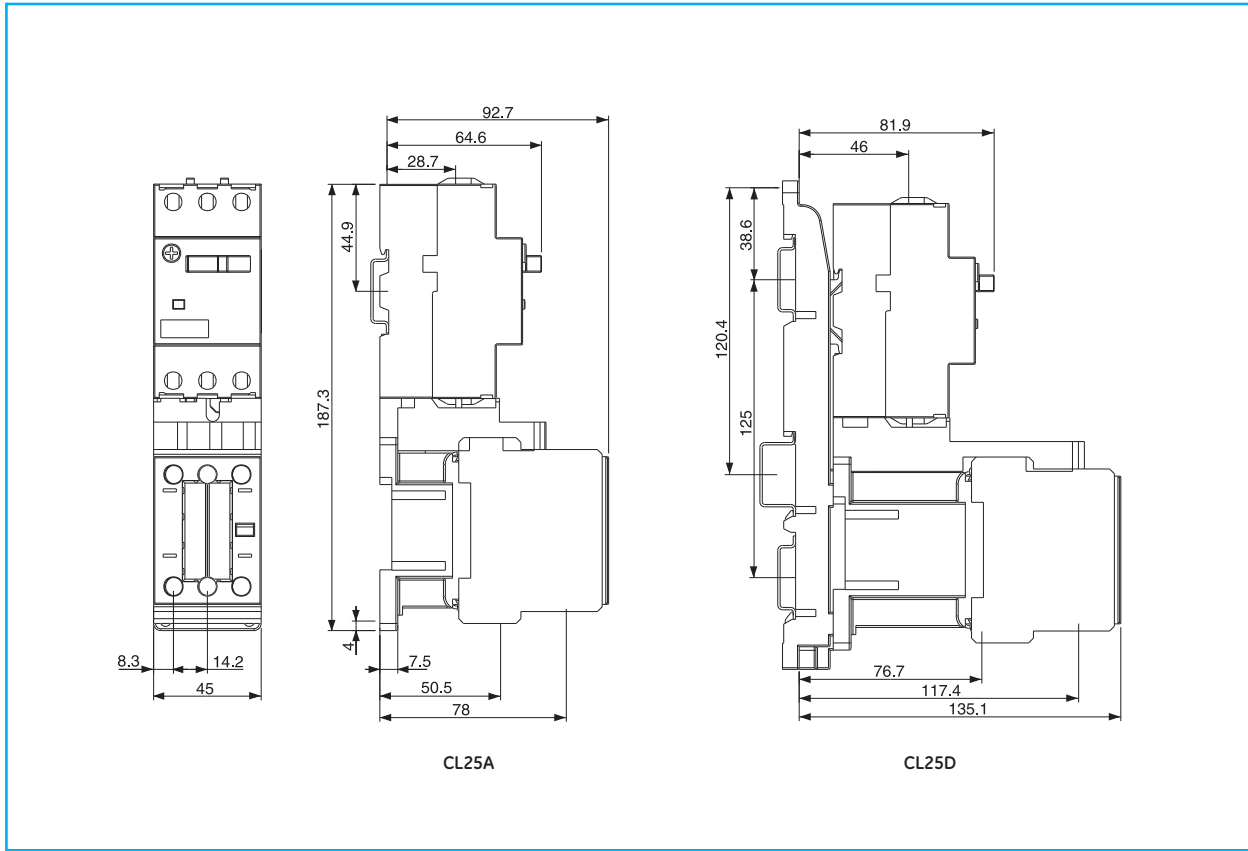
Fuseless starter - GPS1 rocker + Minicontactor MC



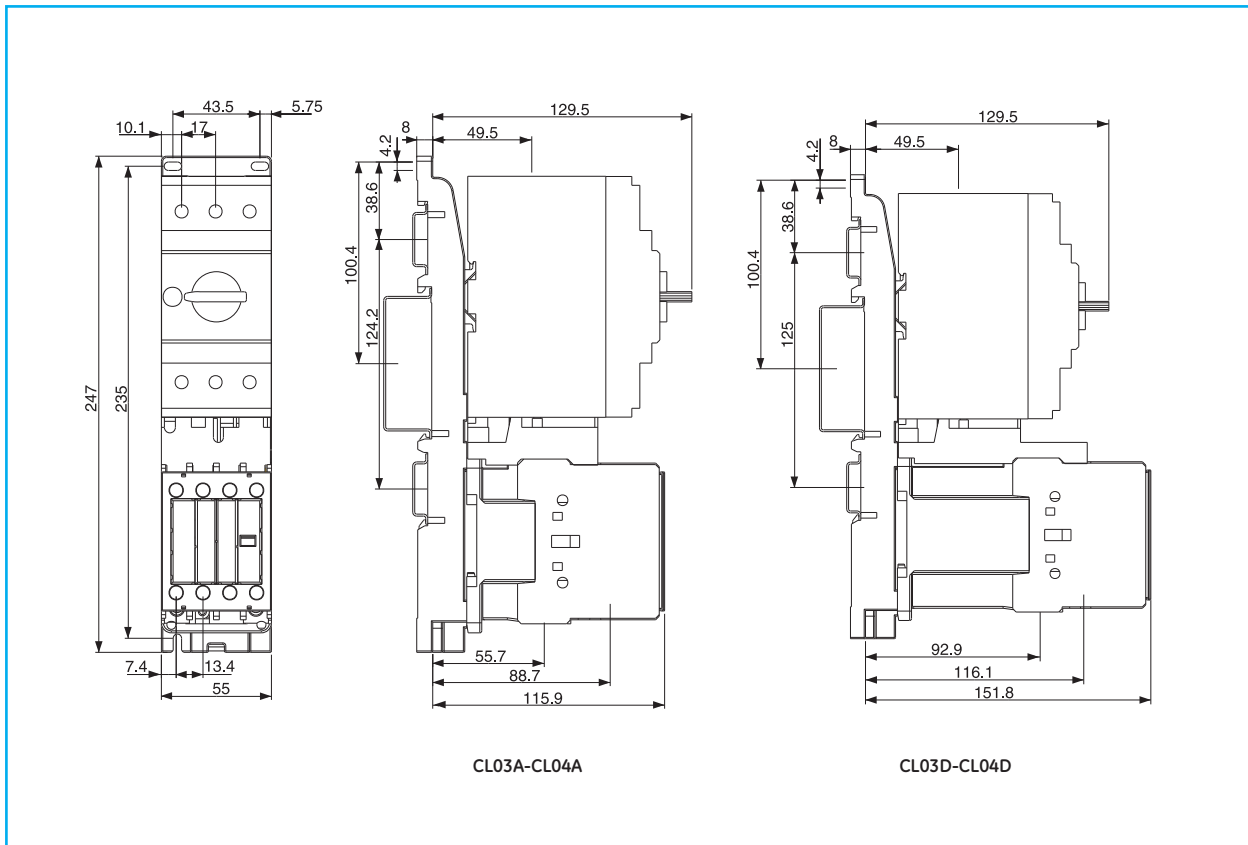
Fuseless starter - GPS1 rocker + Contactor CL00-CL01-CL02



Fuseless starter - GPS1 rocker + Contactor CL25



Fuseless starter - GPS2 + Contactor CL03-CL04



Dimensions

A

B

C

D

E

F

G

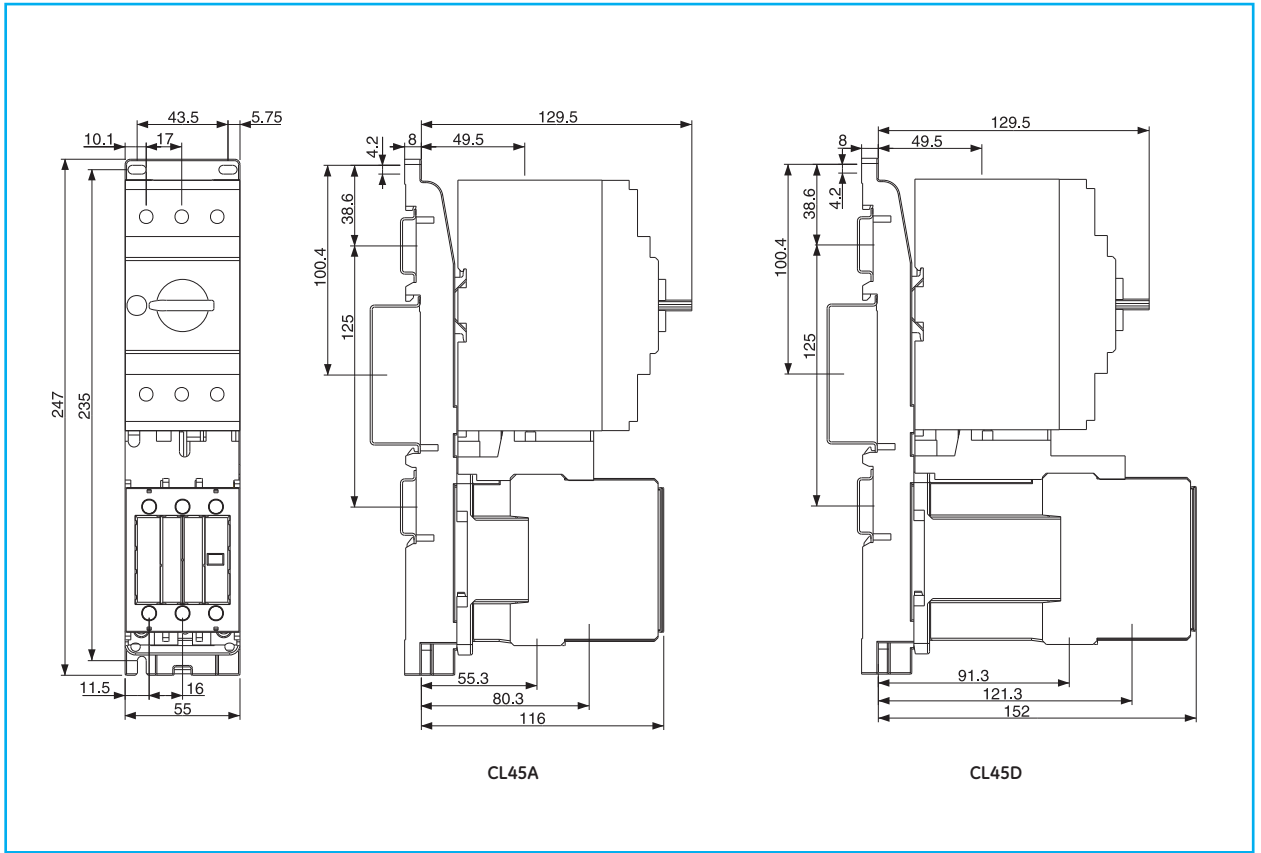
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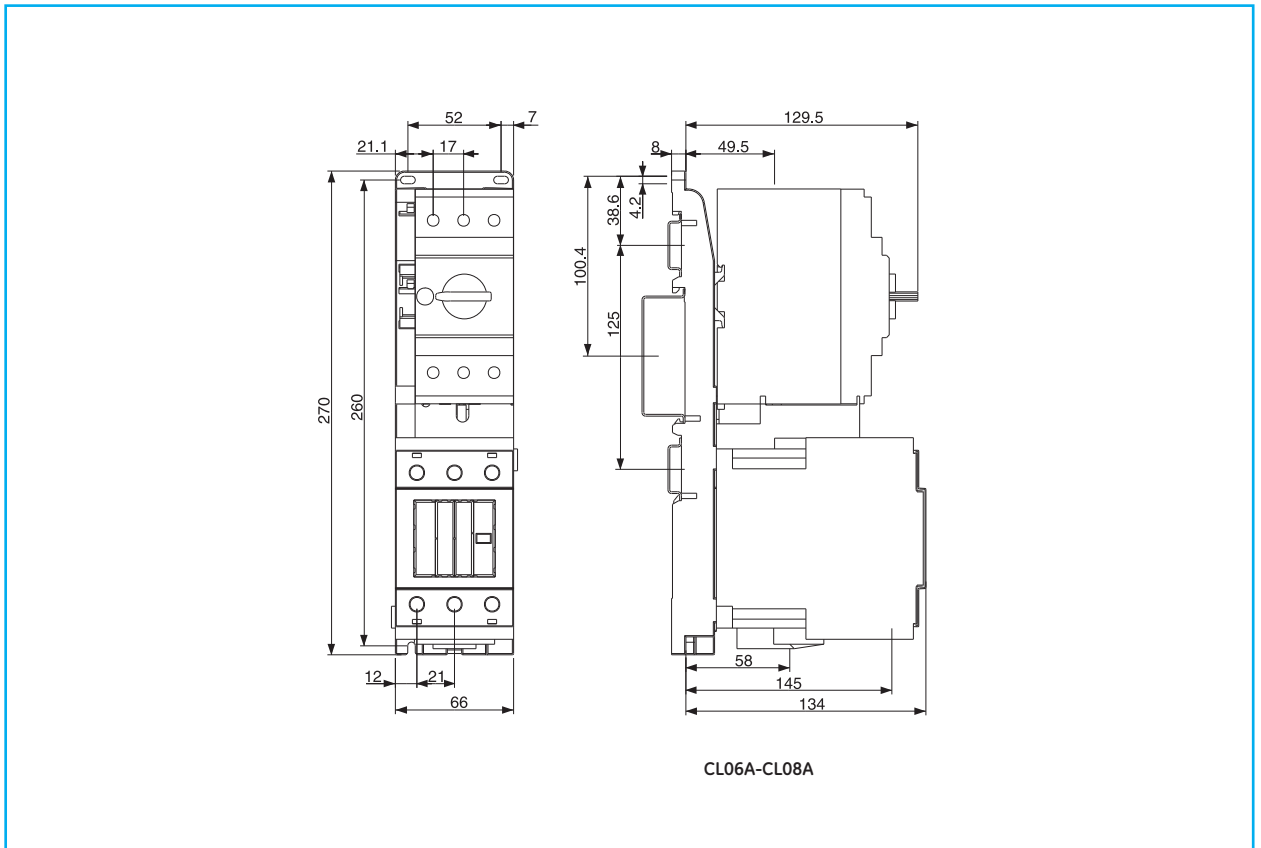
X

Dimensional drawings

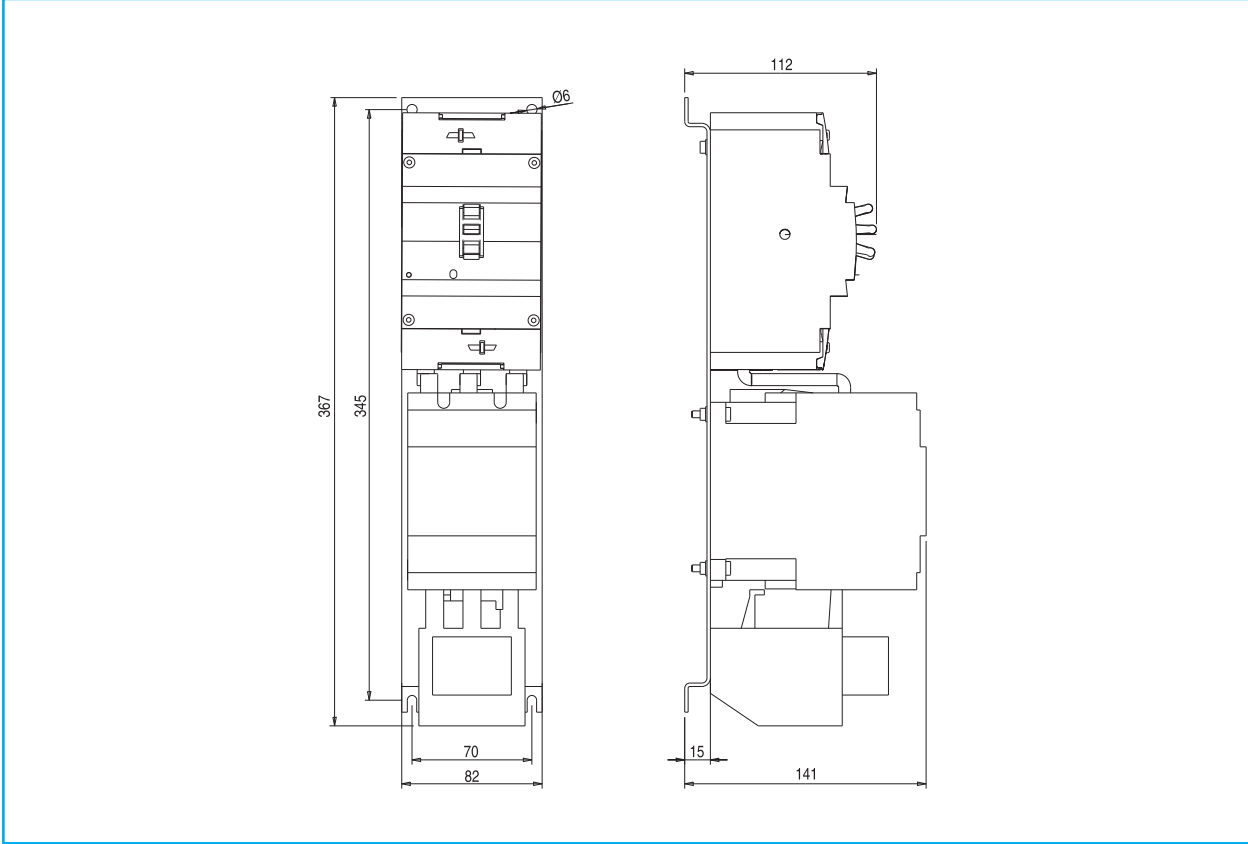
Fuseless starter - GPS2 + Contactor CL45



Fuseless starter - GPS2 + Contactor CL06-CL08



Fuseless starter - Record Plus + Contactor CL09 + Thermal overload relay RT2



Dimensions

| |
|----------|
| A |
| B |
| C |
| D |
| E |
| F |
| G |
| H |
| I |
| X |



Order codes ● page D.19
 Wiring diagrams ● page D.24
 Dimensions ● page D.32

Direct-on-line starters

Series M 6 to 12A (AC-3)

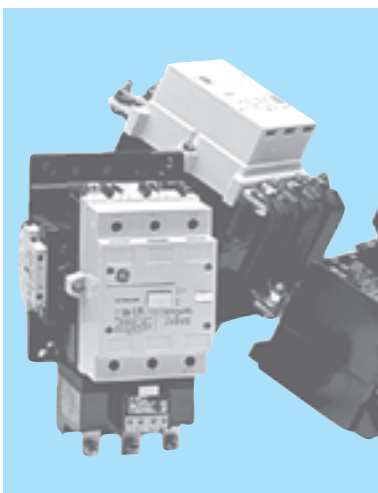
- Power circuit: up to 690V AC
- Control circuit: up to 600V AC
- Polycarbonate enclosure (IP40 - IP65)
 - Shock resistance
 - Total insulation \square
 - 4 knock-out input holes PG13.5
 - Cable entry in the base
- Terminals protected against accidental contact
- 16 setting ranges from 0.11 up to 14A
- Start contact block



Order codes ● page D.19
 Wiring diagrams ● page D.25
 Dimensions ● page D.32

Series CL 9 to 40A (AC-3)

- Power circuit: up to 690V AC
- Control circuit: up to 690V AC
- IP00 version
- Polycarbonate enclosure (IP40 - IP65)
 - Shock resistance
 - Total insulation \square
 - 4 knock-out input holes
- Empty enclosures version
- Start contact block



Order codes ● page D.19
 Wiring diagrams ● page D.26
 Dimensions ● page D.33




Series CK 150 to 825A (AC-3)

- Power circuit: up to 1000V AC
- Control circuit: up to 690V AC
- Protection degree IP00
- Terminals protected against accidental contact: IP20
 - KG75 to KG12: Coil and auxiliary terminals with built-in protection
Main terminals protector on request
 - KG13: Coil and auxiliary terminals with built-in protection

Series M - Direct-on-line starters

| | | Push-buttons | Protection degree | | Cat. no. | Ref. no | Pack |
|---------------------|--|--------------------|-------------------|------------|------------|---------|------|
| Empty boxes | | Start/Stop + Reset | IP40 | | MG0004PATO | 209780 | 1 |
| | | | IP65 | | MG0006PATO | 209781 | 1 |
| | Reset only | IP40 | | MG0004RATO | 137567 | 1 | |
| | | IP65 | | MG0006RATO | 116402 | 1 | |
| | Start/Emergency stop | IP40 | | MG0004QATO | 137566 | 1 | |
| | | IP65 | | MG0006QATO | 116074 | 1 | |
| Start contact block | Laterally mounted to the contactor, allowing the electrical operation the box push-button which incises on it. | | | | MAGL110AT | 100608 | 1 |

Series CL - Direct-on-line starters

| | For use with | Push-buttons | Protection degree | | Cat. no. | Ref. no | Pack |
|--|---|----------------------|-------------------|------------|------------|---------|------|
|  Empty boxes | CL00, CL01, CL02 | Start/Stop + Reset | IP40 | | LG0004P1B0 | 209344 | 1 |
| | | | IP65 | | LG0006P1B0 | 200004 | 1 |
| | | Without push-buttons | IP40 | | LG0004S1B0 | 209347 | 1 |
| | | | IP65 | | LG0006S1B0 | 116011 | 1 |
| | | Only Reset | IP40 | | LG0004R1B0 | 116651 | 1 |
| | | | IP65 | | LG0006R1B0 | 116652 | 1 |
| | CL25 | Start/Stop + Reset | IP40 | | LG2504P1B0 | 100885 | 1 |
| | | | IP65 | | LG2506P1B0 | 101095 | 1 |
| | Only Reset | IP40 | | LG2504R1B0 | 116226 | 1 | |
| | | IP65 | | LG2506R1B0 | 133611 | 1 | |
| | CL04 | Start/Stop + Reset | IP40 | | LG0404P1B0 | 116653 | 1 |
| | | | IP65 | | LG0406P1B0 | 116656 | 1 |
| Only Reset | IP40 | | LG0404R1B0 | 133264 | 1 | | |
| | IP65 | | LG0406R1B0 | 133265 | 1 | | |
| CL25, CL04 | Without push-buttons | IP40 | | LG0404S1B0 | 116996 | 1 | |
| | | IP65 | | LG0406S1B0 | 116997 | 1 | |
| Neutral terminal | | | | | BNL | 104797 | 10 |
|  Conversion to permanent control | Pressure-fixed between push-buttons in direct-on-line enclosures for mechanical interlocking into permanent control. | | | | EPL | 104798 | 10 |
|  Start contact block | Pressure-fixed onto the front of direct-on-line starters allowing electrical operation using the start push-button on the enclosure | | | | BMLF | 104800 | 10 |

Series CK - Direct-on-line starters. IP00

| | | | Cat. no. | Ref. no. | Pack |
|-----------------|------------------------------|------------------|----------|----------|------|
| Connection sets | Busbar set for power circuit | CK85, CK09, CK95 | KVP85G | 104770 | 1 |
| | | CK10, CK11 | KVP10G | 104771 | 1 |
| | | CK12 | KVP12G | 104767 | 1 |
| Plate | Metallic plate | CK85, CK09, CK95 | PVP85G | 241747 | 1 |
| | | CK10, CK11 | PVP10G | 241748 | 1 |
| | | CK12 | PCP12G | 241749 | 1 |

Direct-on-line starters

A

B

C

D

E

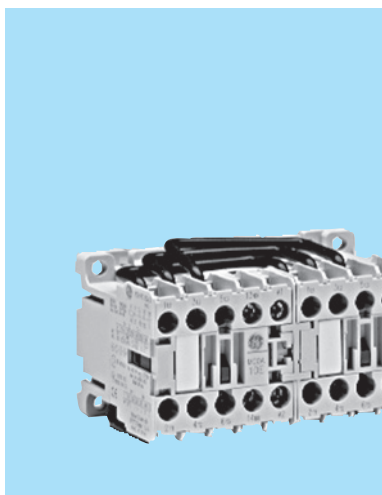
F

G

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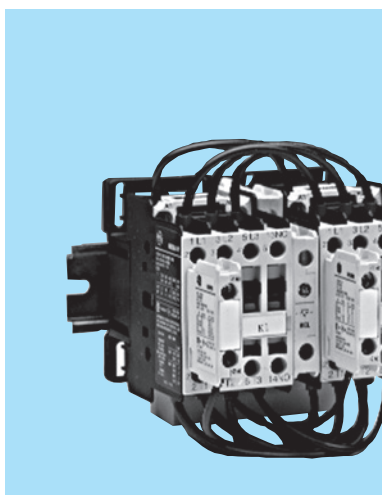


Order codes ● page D.21
 Wiring diagrams ● page D.28
 Dimensions ● page D.34

Reversing starters

Series M 6 to 12A (AC-3)

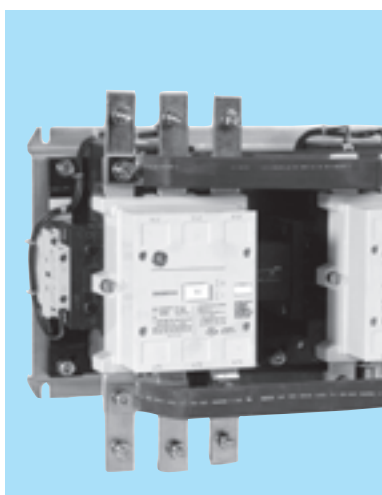
- Power circuit: up to 690V AC
- Control circuit: up to 600V AC
up to 250V DC
- Assembled versions on request.
- Screw and push-on terminals protected against accidental contact.
- Protection degree IP20 in accordance with EN 60529.
- Facility to mount instant and timed auxiliary contact blocks and voltage suppressor blocks.



Order codes ● page D.21
 Wiring diagrams ● page D.28
 Dimensions ● page D.34

Series CL 9 to 105A (AC-3)

- Power circuit: up to 690V AC
- Control circuit: up to 690V AC
- Protection degree IP00




Order codes ● page D.21
 Wiring diagrams ● page D.29
 Dimensions ● page D.35

Series CK 150 to 825A (AC-3)

- Power circuit: up to 1000V AC
- Control circuit: up to 690V AC
- Protection degree IP00

Series M and CL - Reversing starters

| Wiring kits for reversing starters | Description | For use with contactor | ac/dc | Cat. no. | Ref. no. | Pack. |
|---|---|---------------------------------------|---------------------|----------|----------|--------|
| |  | Suitable to be used with link modules | MC0.., MC1.., MC2.. | ac/dc | WKMIU | 101421 |
| CL00.., CL01.., CL02.. | | | ac/dc | WKLI02P | 101422 | 1 |
| Upper and lower connections without overload relays | | CL25.. | ac/dc | WKLI25P | 101423 | 1 |
| | | CL03.., CL04.. | ac/dc | WKLI04P | 101424 | 1 |
| | | CL45.. | ac/dc | WKLI45P | 101425 | 1 |
| | | CL06A.., CL07A.. | ac | WKLI07P | 101426 | 1 |
| Plate | Metallic plate | CL06, CL07, CL08 | | WKI0910 | 241751 | 1 |
| | | CL08, CL09, CL10 | | WKI0608 | 241752 | 1 |

Series CK - Reversing starters. IP00

| Connection sets | Description | For use with contactor | Cat. no. | Ref. no. | Pack. |
|---|------------------------------|------------------------|------------|----------|--------|
| | Busbar set for power circuit | | CK75, CK08 | KVP75U | 113627 |
| CK85, CK09, CK95 | | | KVP85U | 113628 | 1 |
| CK10, CK11 | | | KVP10U | 133374 | 1 |
| For assembly with thermal overload relay. | | CK12 | KVP12U | 113630 | 1 |
| | | CK75, CK08 | KVP75I | 133370 | 1 |
| | | CK85, CK09, CK95 | KVP85I | 113631 | 1 |
| Plate | Metallic plate | CK10, CK11 | KVP10I | 133371 | 1 |
| | | CK12 | KVP12I | 113633 | 1 |
| | | CK75, CK08 | KVB75I | 104690 | 1 |
| | CK85, CK95 | KVB95I | 104691 | 1 | |
| | CK10, CK11 | KVB10I | 104692 | 1 | |
| | CK12 | KVB12I | 104693 | 1 | |

Reversing starters

A

B

C

D

E

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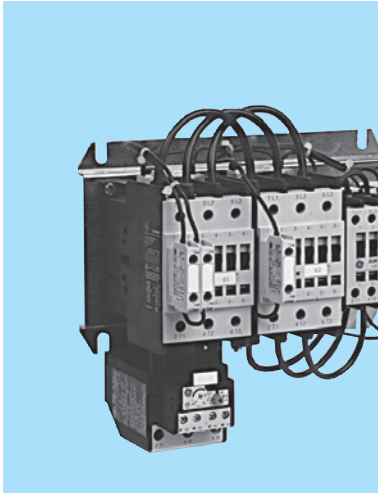
G

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Series CL, CK

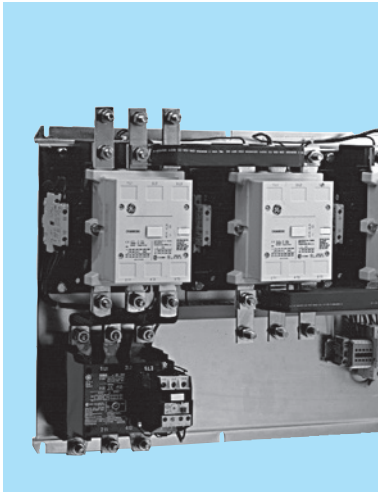


Order codes ● page D.23
 Wiring diagrams ● page D.30
 Dimensions ● page D.37

Star-delta starters

Series CL

- Power circuit: up to 690V AC
- Control circuit: up to 690V AC
- Protection degree IP00
- Use delay setting by electronic relay NMET
- Terminals protected against accidental contact



Order codes ● page D.23
 Wiring diagrams ● page D.30
 Dimensions ● page D.37

Series CK

- Power circuit: up to 1000V AC
- Control circuit: up to 690V AC
- Protection degree IP00
- Protection against accidental contacts: IP20
 - KE75: Built-in protection
 - KE08 - KE12: Coil and auxiliary terminals with built-in protection
Main terminals protector on request
 - KE13: Coil and auxiliary terminals with built-in protection

Series CL - Star-delta starters

| | | Line-delta contactor | | Cat. no. | Ref. no. | Pack |
|--------------------------------------|----------------|-------------------------|--|---------------|----------|------|
| Busbar sets for power circuit | | CL00 | | WKLE00 | 103238 | 1 |
| | | CL01, CL02 | | WKLE02 | 103241 | 1 |
| | | CL25 | | WKLE25 | 103243 | 1 |
| Plate | Metallic plate | CL06, CL07, CL08 | | WLS0 | 103247 | 1 |
| | | CL09, CL10 | | WLS01 | 241750 | 1 |

Series CK - Star-delta starters. IP00

| | | Line-delta contactor | Star contactor | Cat. no. | Ref. no. | Pack |
|--------------------------------------|----------------|-------------------------|-------------------|---------------|----------|------|
| Busbar sets for power circuit | | CK75, CK08 | CK75, CK08 | KVP75E | 133378 | 1 |
| | | CK85, CK09, CK95 | CK75, CK08 | KVP08E | 116212 | 1 |
| | | CK95 | CK85, CK09, CK95 | KVP85E | 133379 | 1 |
| | | CK10, CK11 | CK85, CK09, CK95 | KVP95E | 113637 | 1 |
| | | CK10, CK11 | CK10, CK11 | KVP10E | 133380 | 1 |
| | | CK12 | CK10, CK11 | KVP12E | 116235 | 1 |
| Plate | Metallic plate | CK75, CK08 | | KVB75E | 104694 | 1 |
| | | CK85, CK95 | | KVB95E | 104695 | 1 |
| | | CK10, CK11 | | KVB10E | 104597 | 1 |
| | | CK12 | | KVB12E | 104587 | 1 |

Star-delta starters

- A
- B
- C
- D
- E
- F
- G
- H
- I
- X

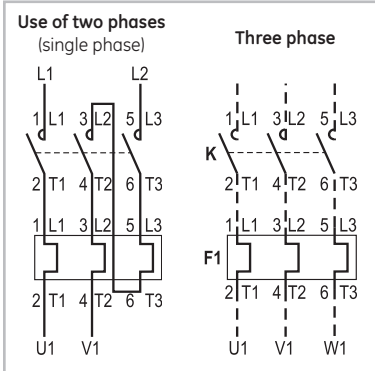


Series M, CL

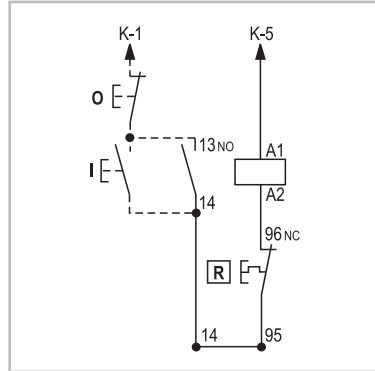
Wiring diagrams

Series M. Direct-on-line starter with reset

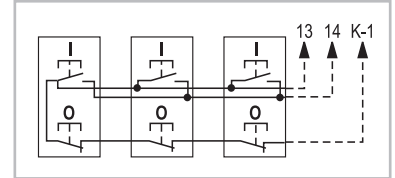
Power circuit



Control circuit

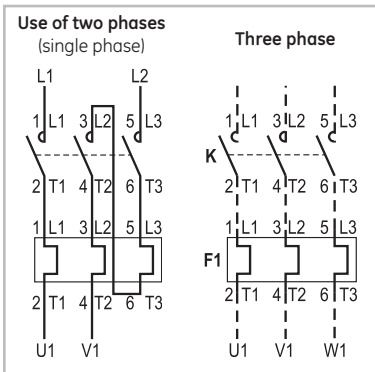


Control by two or more push-buttons

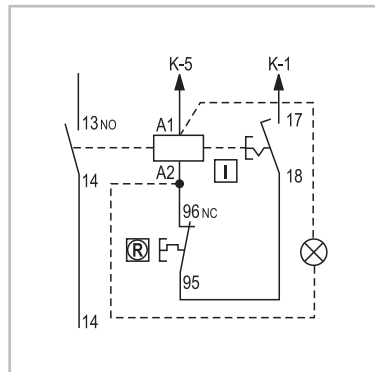


Series M. Direct-on-line starter with start/emergency stop push-button

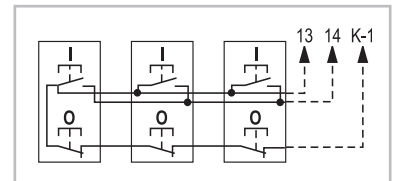
Power circuit



Control circuit



Control by two or more push-buttons



Motorstarters

A

B

C

D

E

F

G

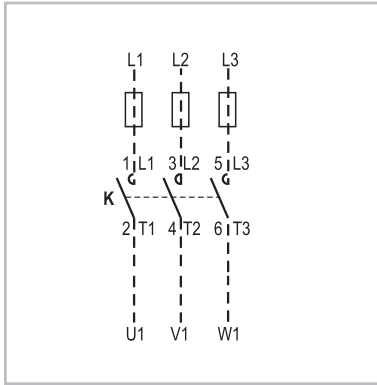
H

I

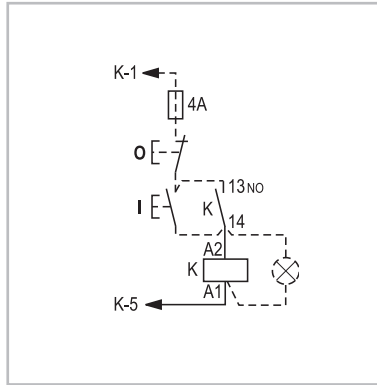
X

Series CL. Direct-on-line starter

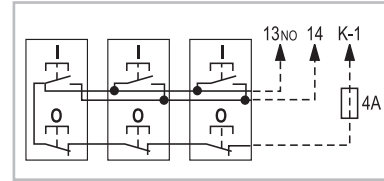
Power circuit



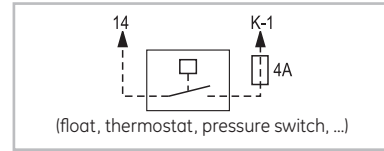
Control circuit



Control by two or more push-buttons

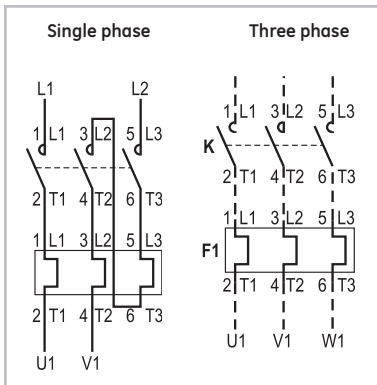


Control by permanent contact

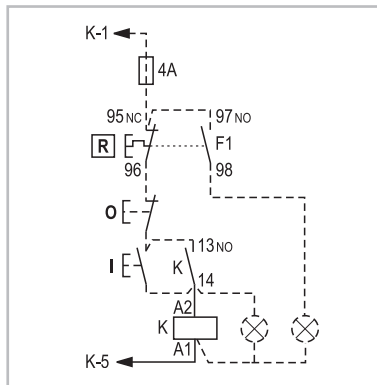


Series CL. Direct-on-line starter with reset push-button

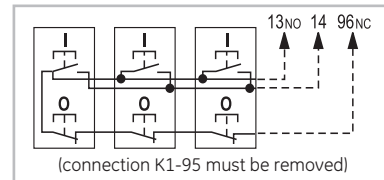
Power circuit



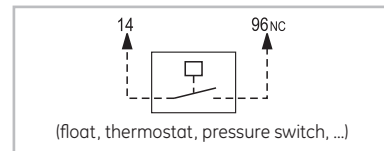
Control circuit



Control by two or more push-buttons

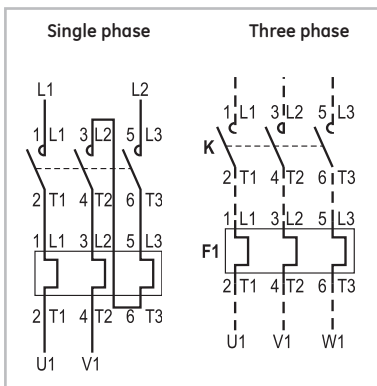


Control by permanent contact

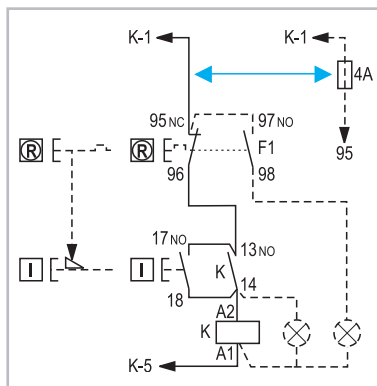


Series CL. Direct-on-line starter with start/stop/reset push-button

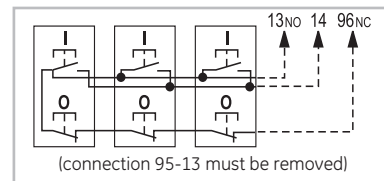
Power circuit



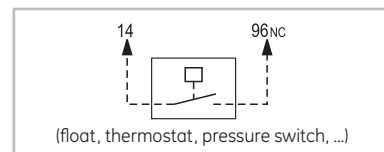
Control circuit



Control by two or more push-buttons



Control by permanent contact

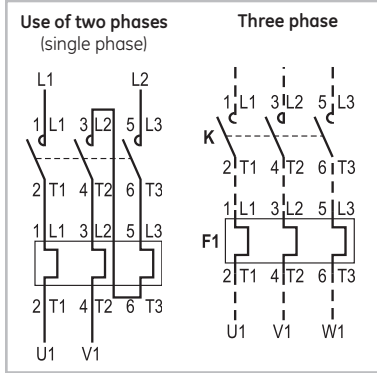


Series CK

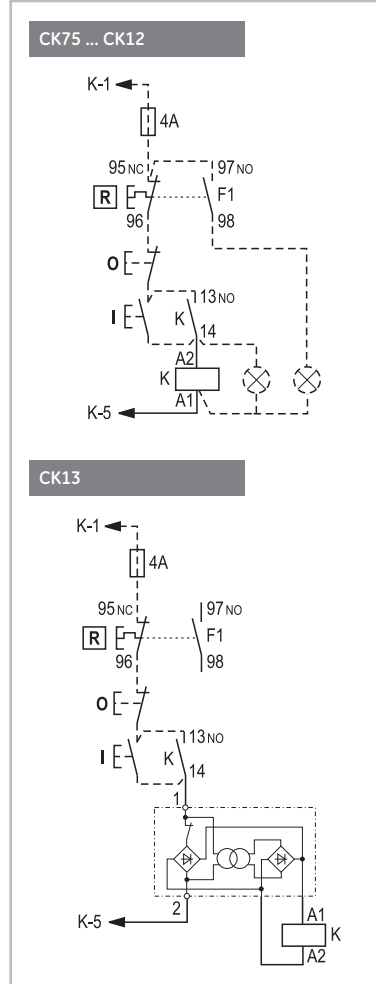
Wiring diagrams

Series CK. Direct-on-line starter

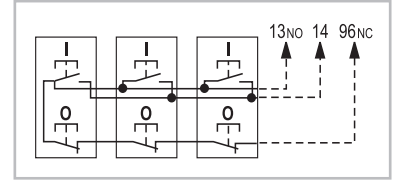
Power circuit



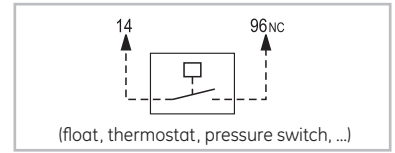
Control circuit



Control by two or more push-buttons



Control by permanent contact



Motorstarters

A

B

C

D

E

F

G

H

I

X

Notes

Grid area for notes.

Direct-on-line starters

- A
- B
- C
- D
- E
- F
- G
- H
- I
- X

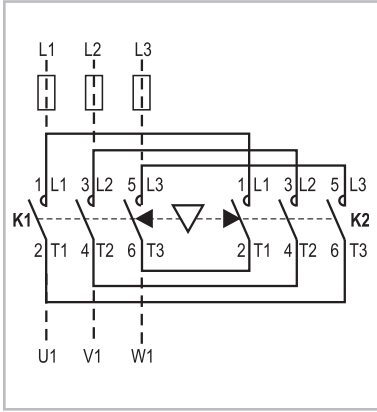


Series M, CL, CK

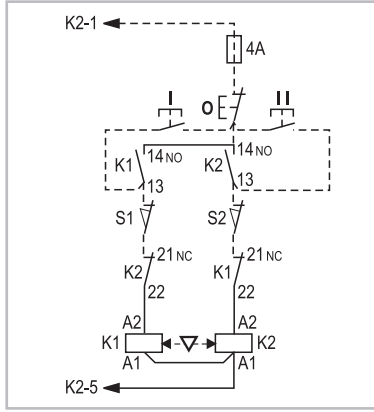
Wiring diagrams

Series M. Reversing starter without thermal overload relay

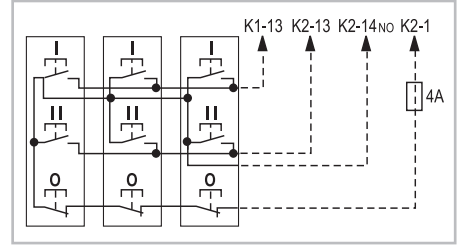
Power circuit



Control circuit

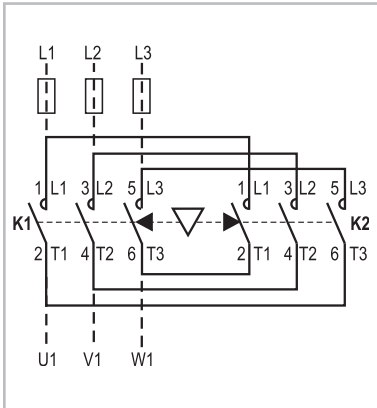


Control by two or more push-buttons

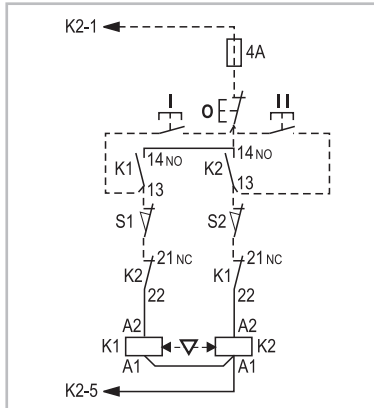


Series CL. Reversing starter without thermal overload relay

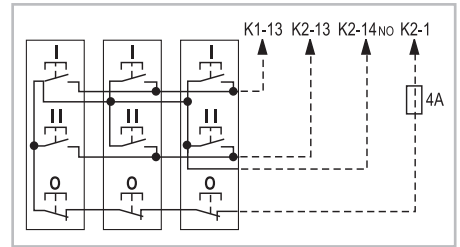
Power circuit



Control circuit

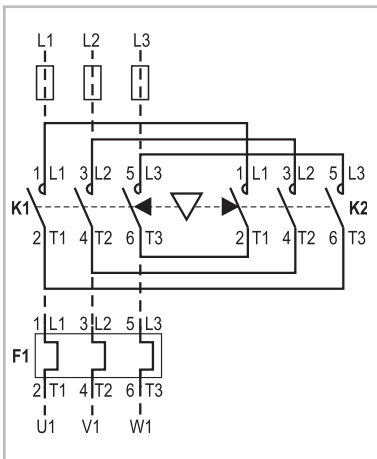


Control by two or more push-buttons

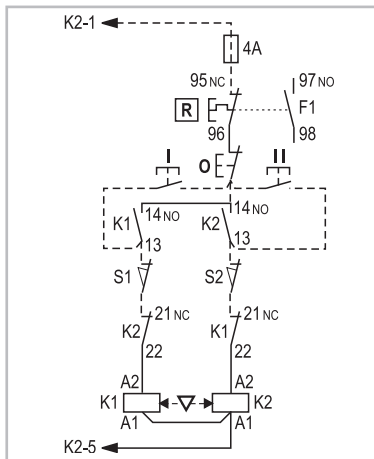


Series CL. Reversing starter with thermal overload relay

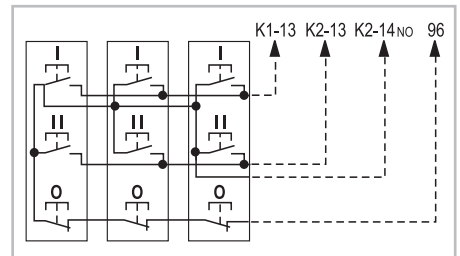
Power circuit



Control circuit



Control by two or more push-buttons



Motorstarters

A

B

C

D

E

F

G

H

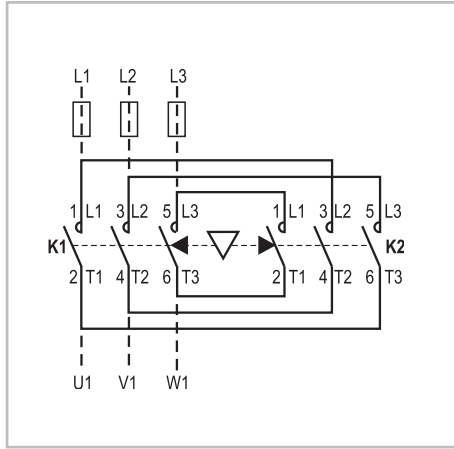
I

X

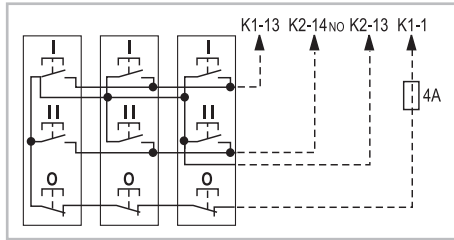


Series CK. Reversing starter without thermal overload relay

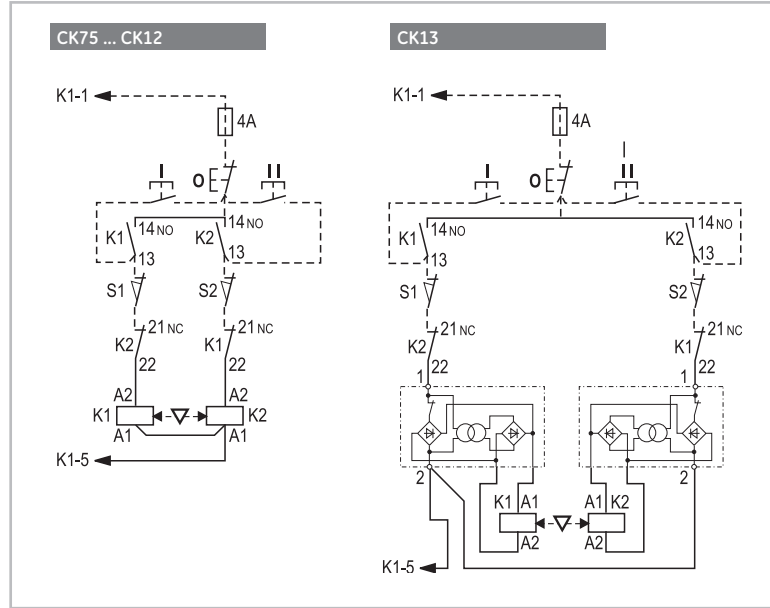
Power circuit



Control by two or more push-buttons

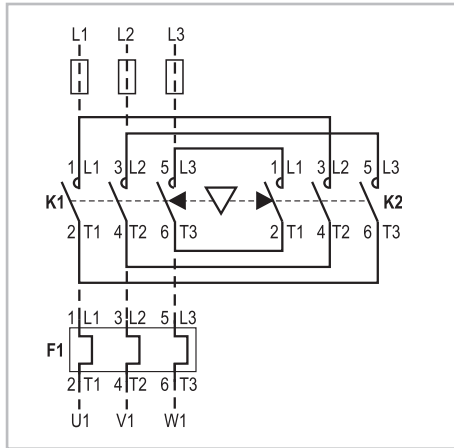


Control circuit

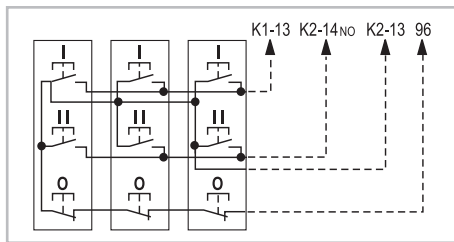


Series CK. Direct-on-line starters with thermal overload relay

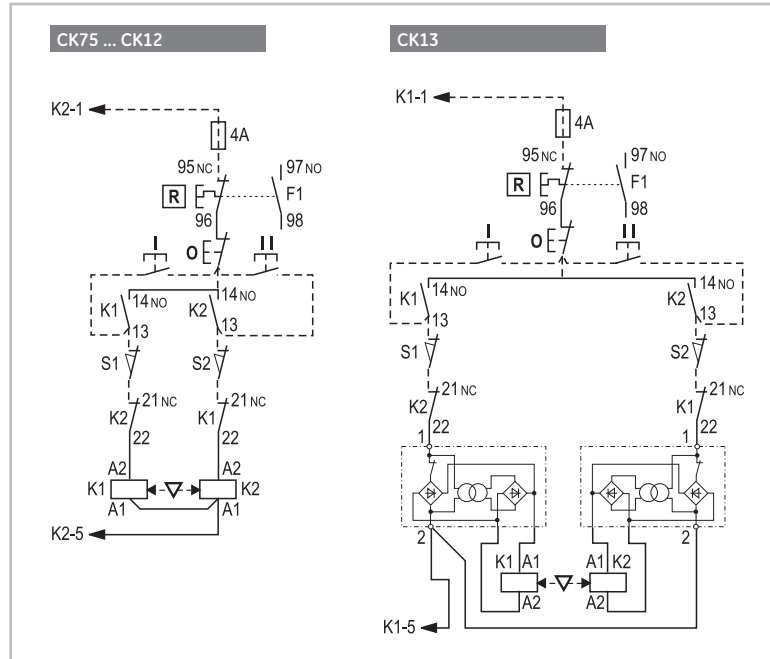
Power circuit



Control by two or more push-buttons



Control circuit



Reversing starters

A

B

C

D

E

F

G

H

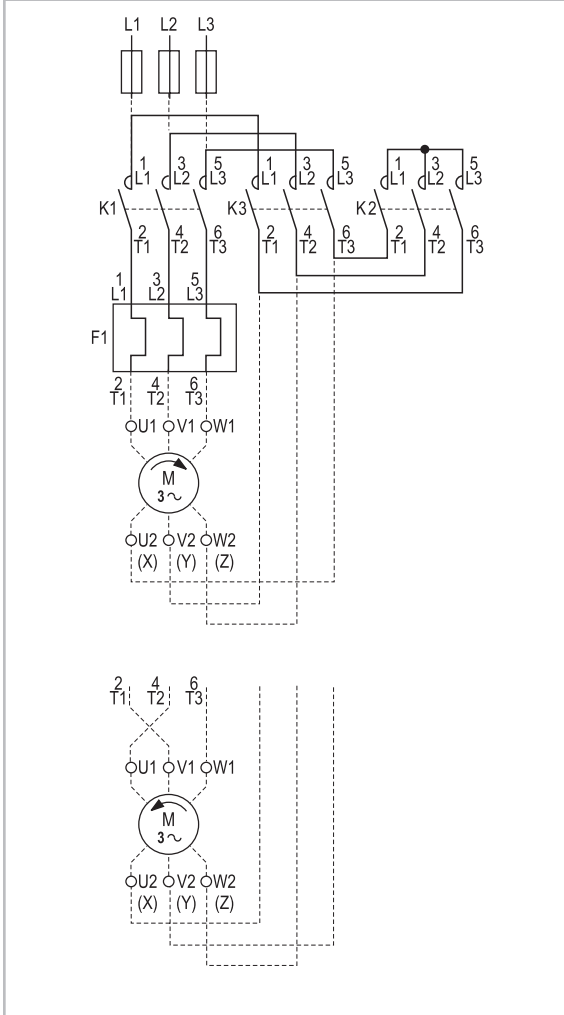
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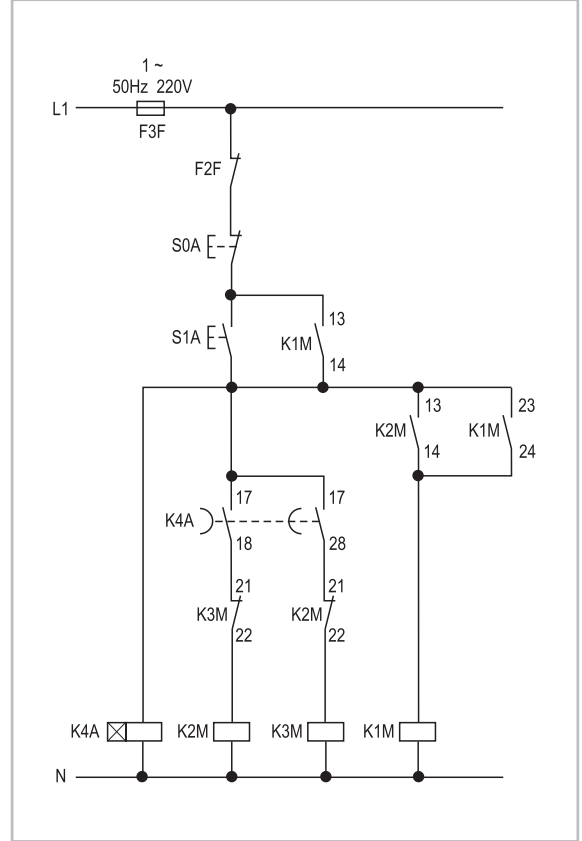
Wiring diagrams

Series CL and CK. Star-delta starters

Power circuit



Control circuit



Motorstarters

A

B

C

D

E

F

G

H

I

X

Notes

Grid area for notes.

Star-delta starters

A

B

C

D

E

F

G

H

I

X



Series M, CL, CK

Motorstarters

A

B

C

D

E

F

G

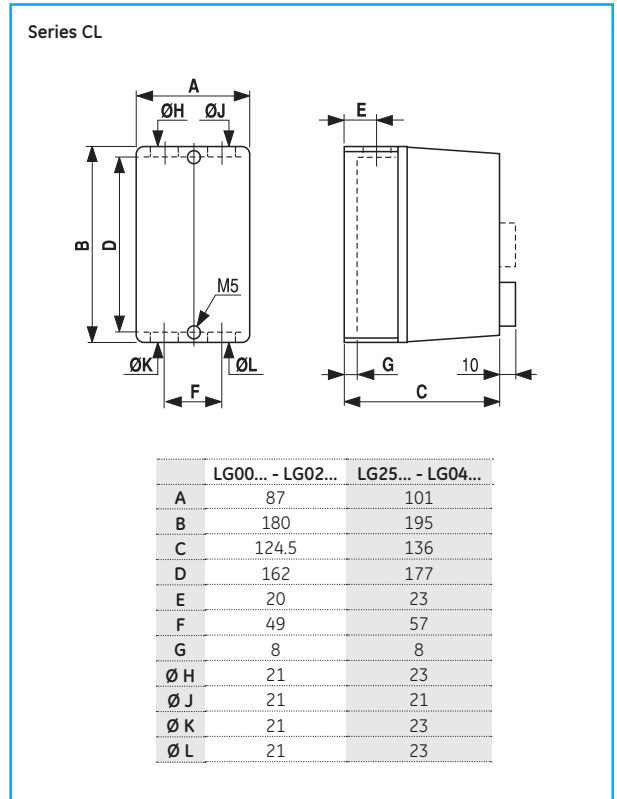
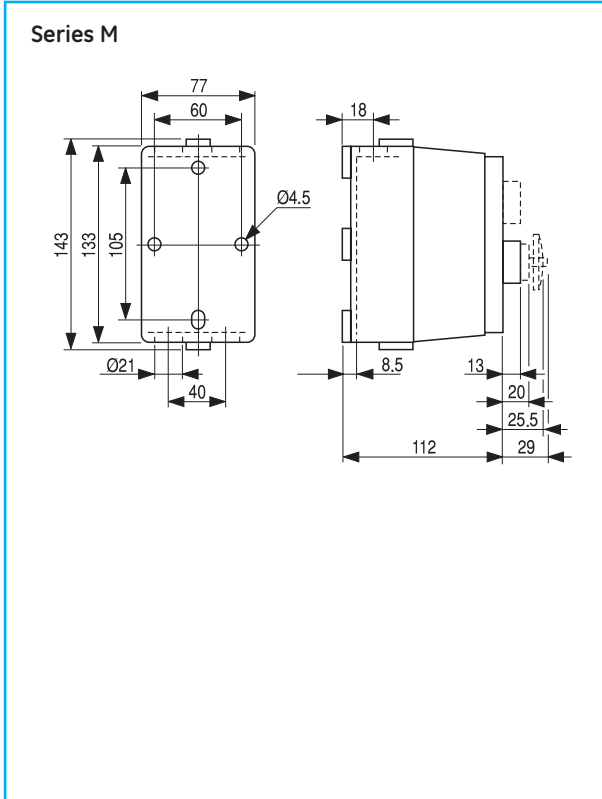
H

I

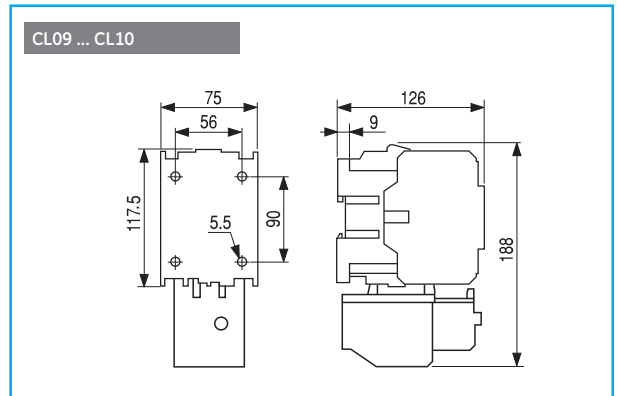
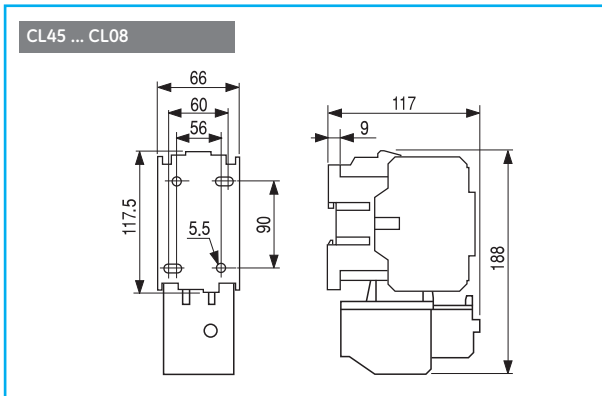
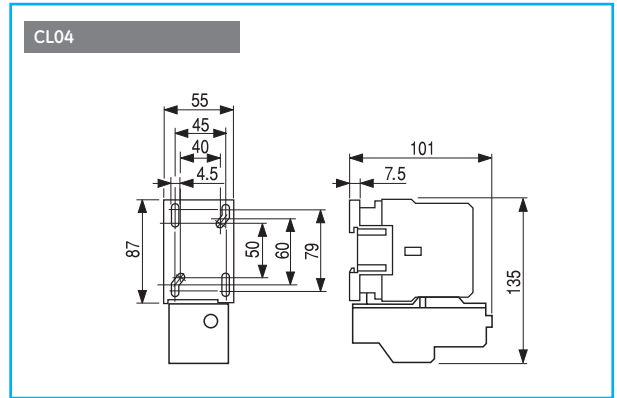
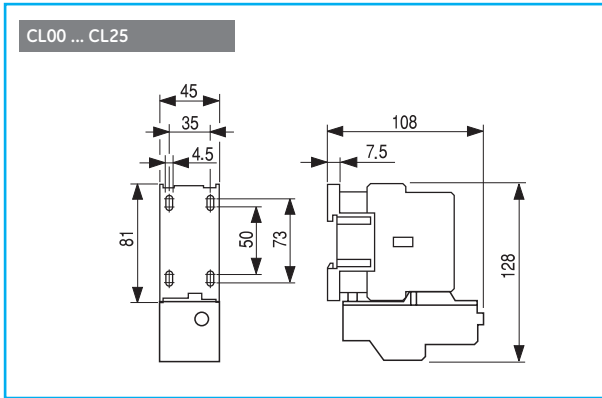
X

Dimensional drawings

Direct-on-line starters. IP40 / IP65

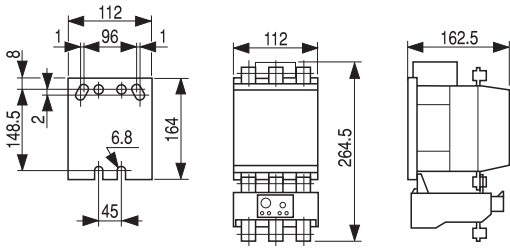


Series CL - Direct-on-line starters

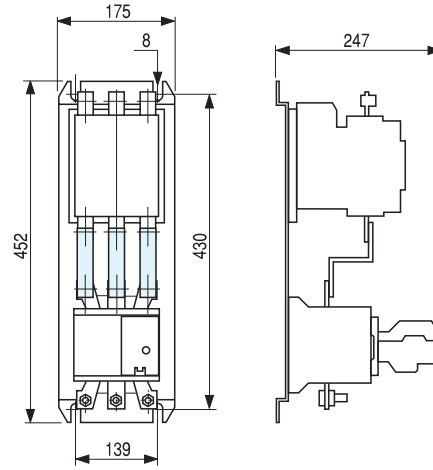


Series CK - Direct-on-line starters

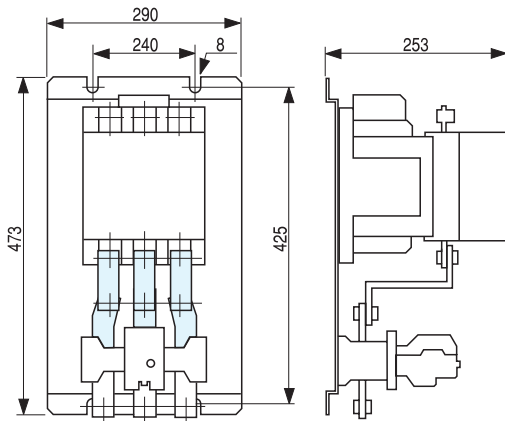
CK75 ... CK08



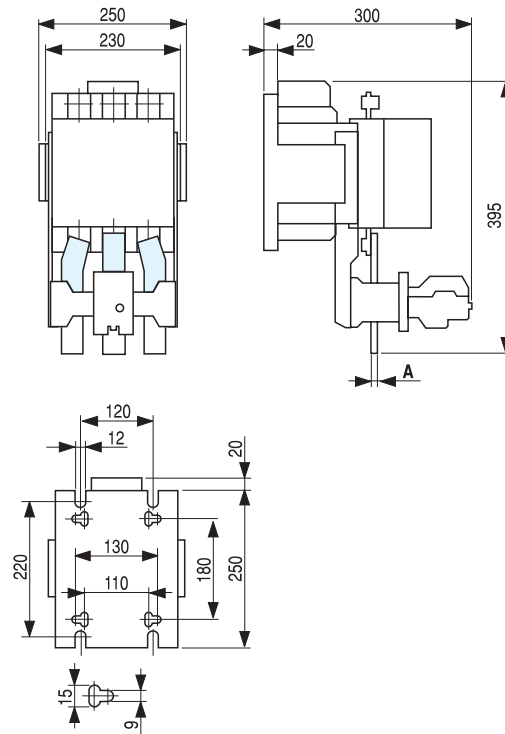
CK85 ... CK95



CK10 ... CK11



CK12



Direct-on-line starters

A

B

C

D

E

F

G

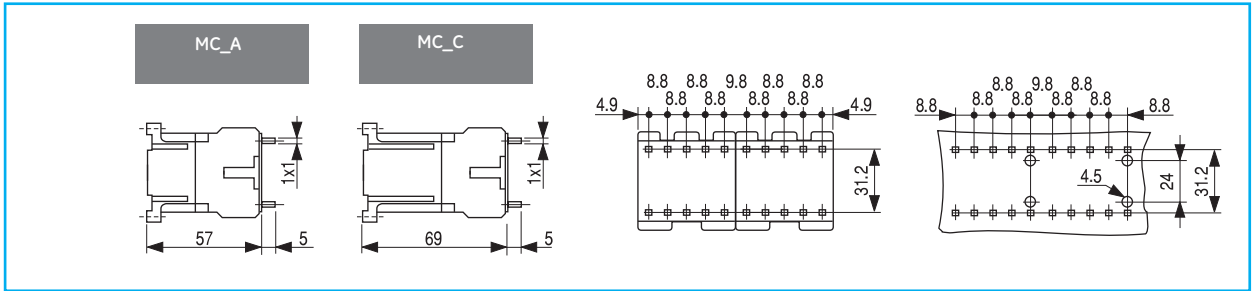
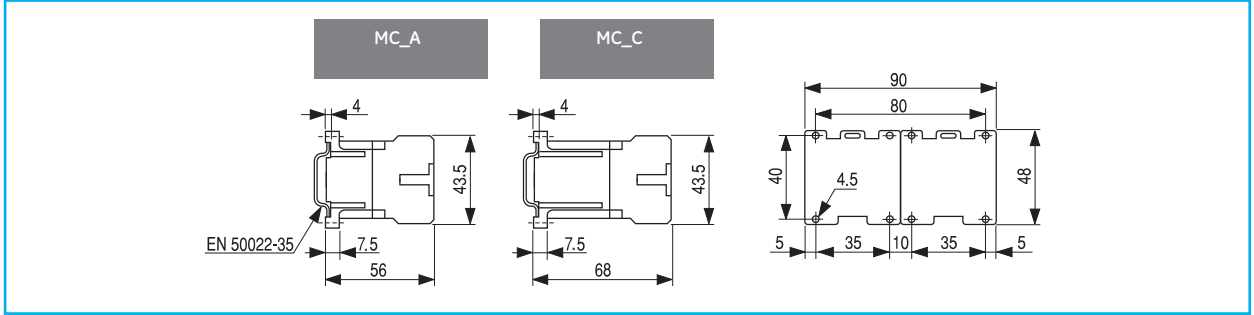
H

I

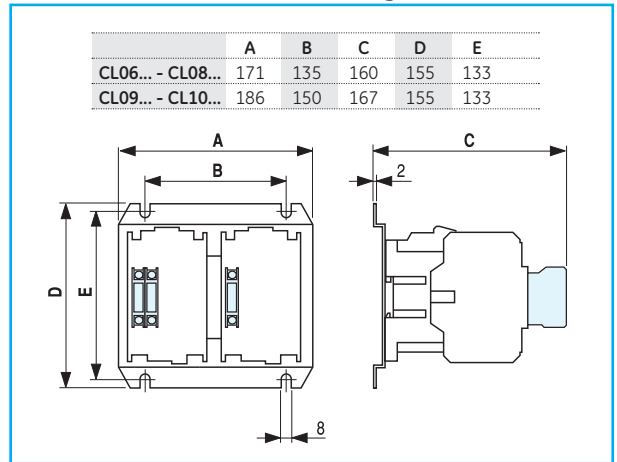
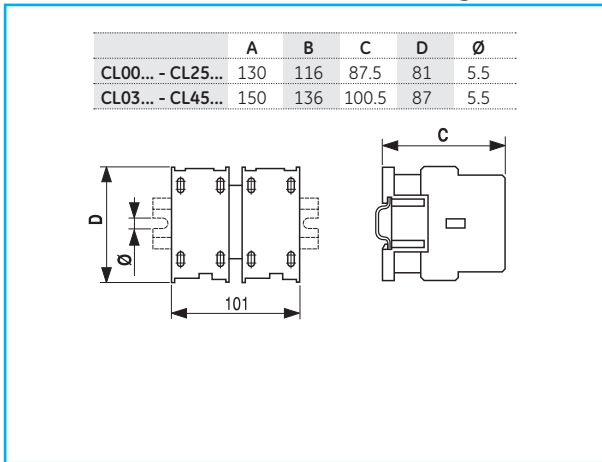
X

Dimensional drawings

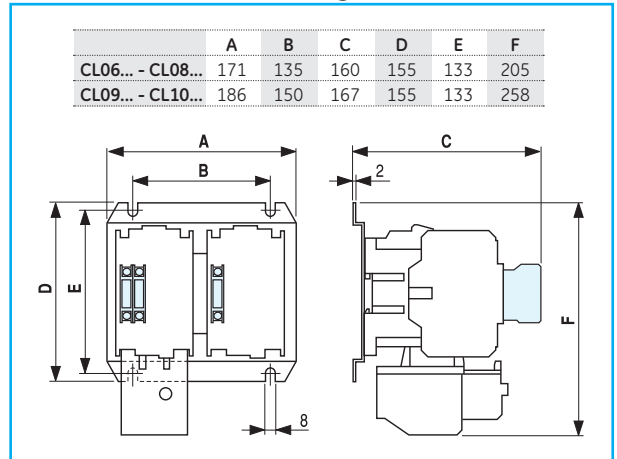
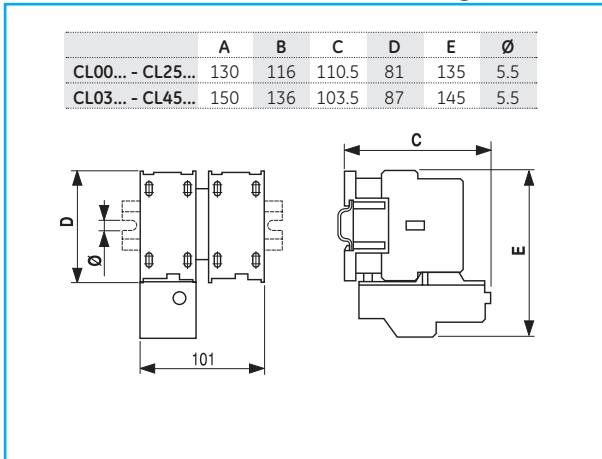
Series M. Direct-on-line reversing starters



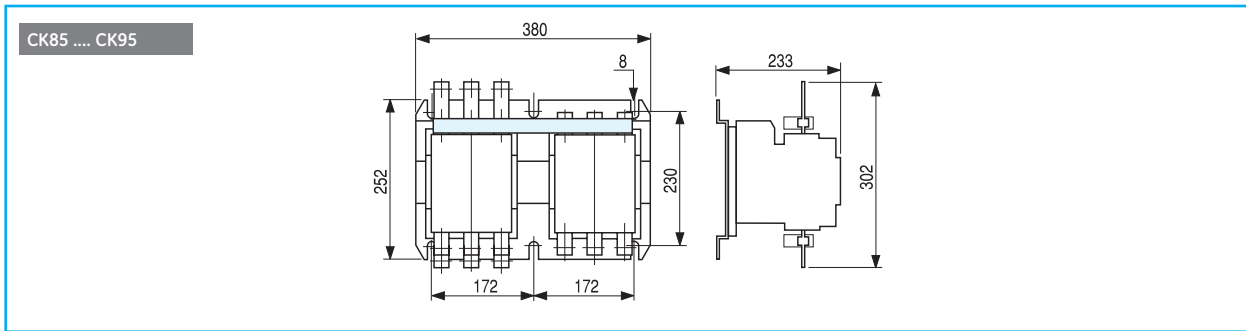
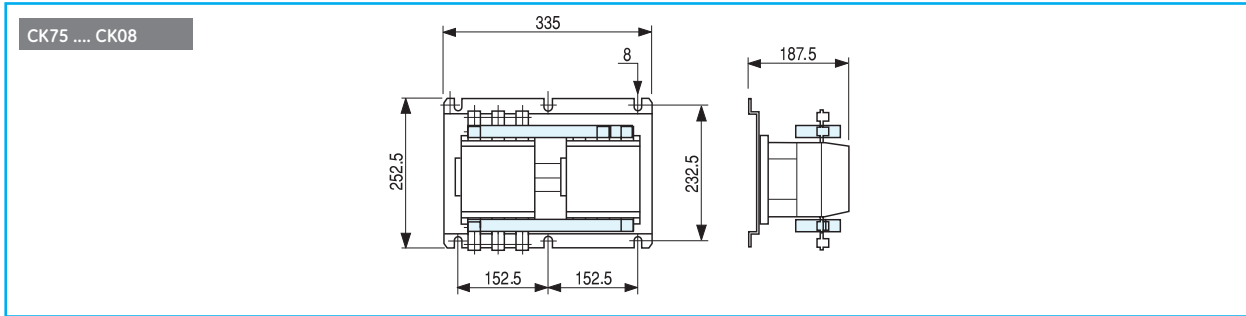
Series CL. Direct-on-line reversing starters without thermal overload relay



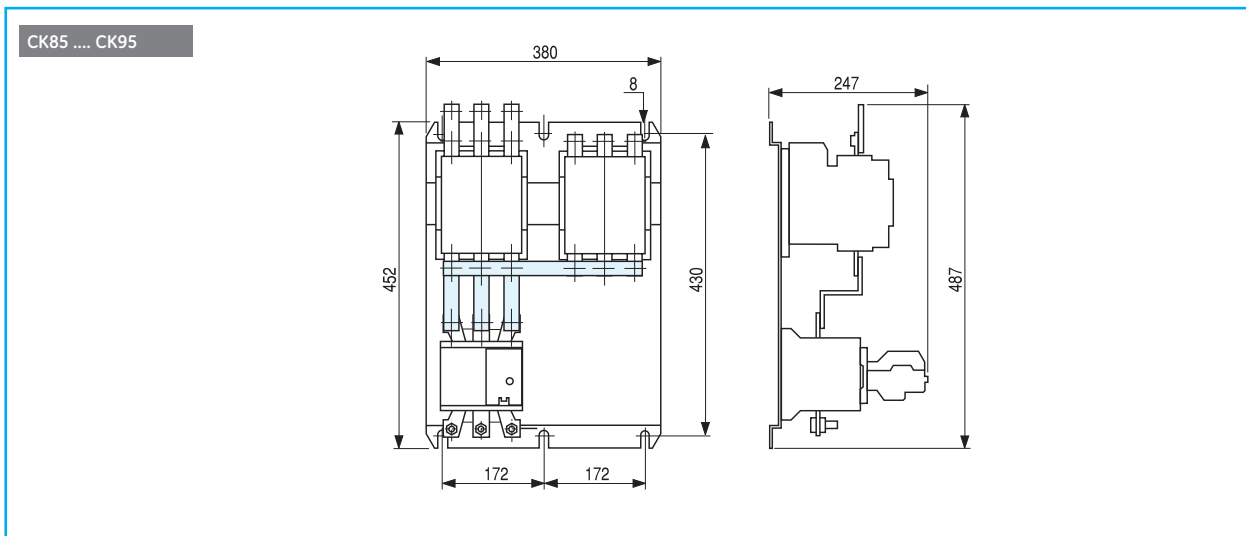
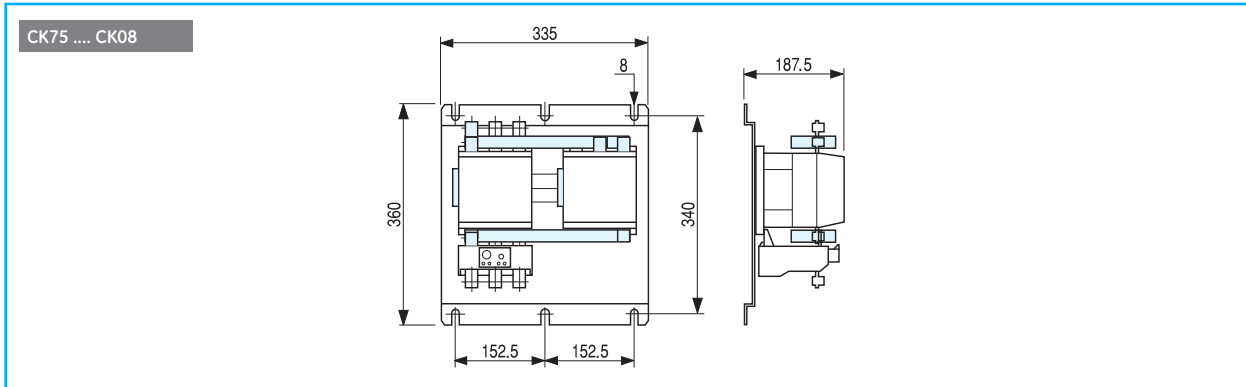
Series CL. Direct-on-line reversing starters with thermal overload relay



Series CK. Direct-on-line reversing starters without thermal overload relay



Series CK. Direct-on-line reversing starters with thermal overload relay



A

B

C

D

E

F

G

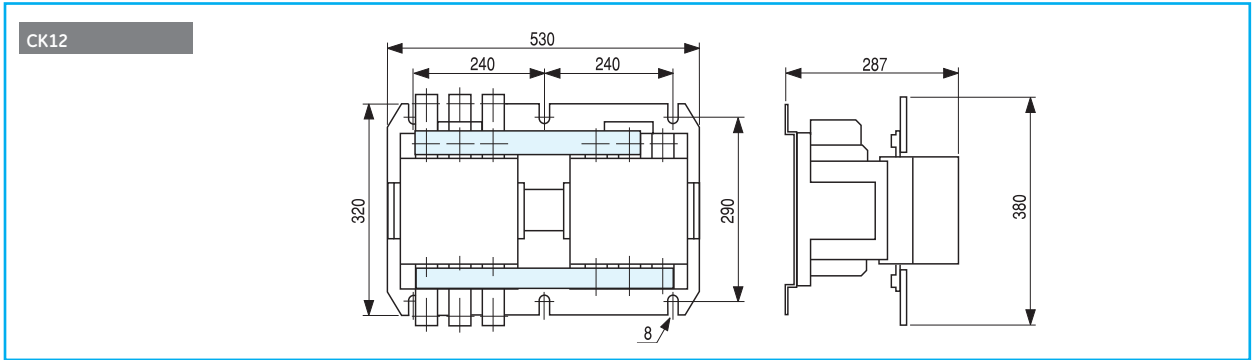
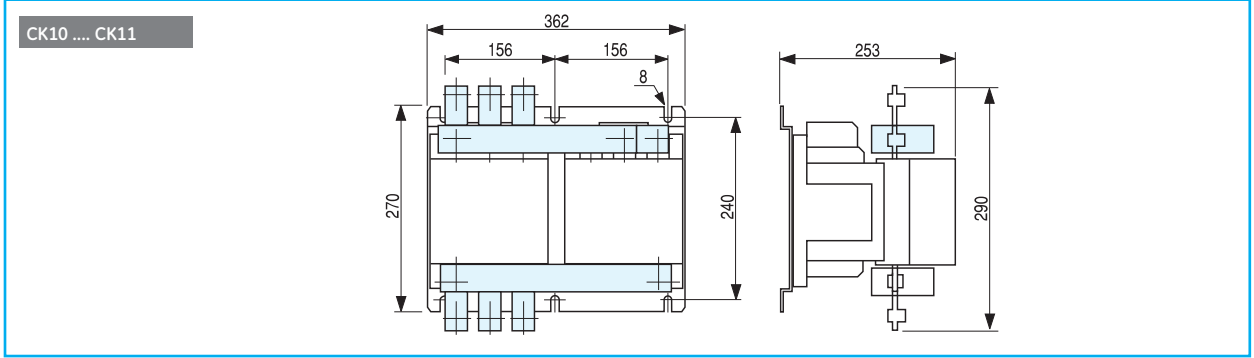
H

I

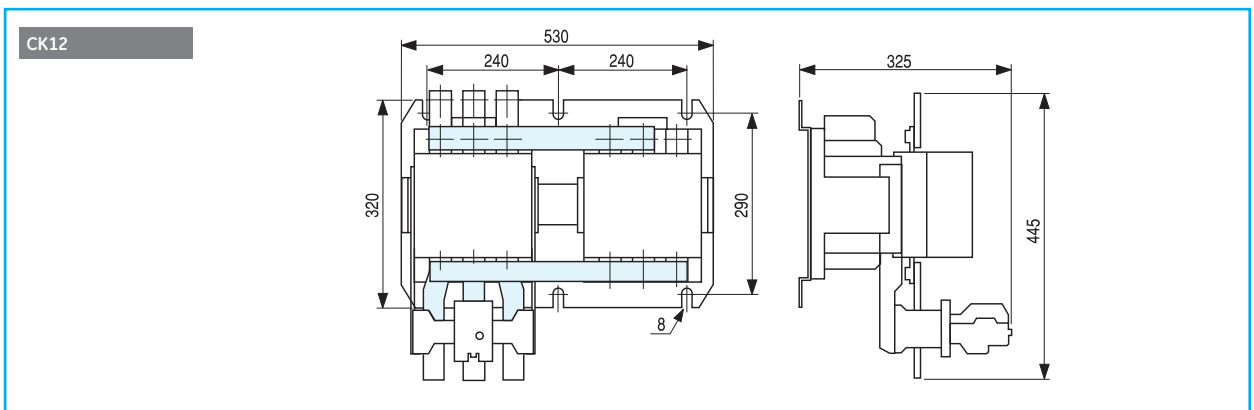
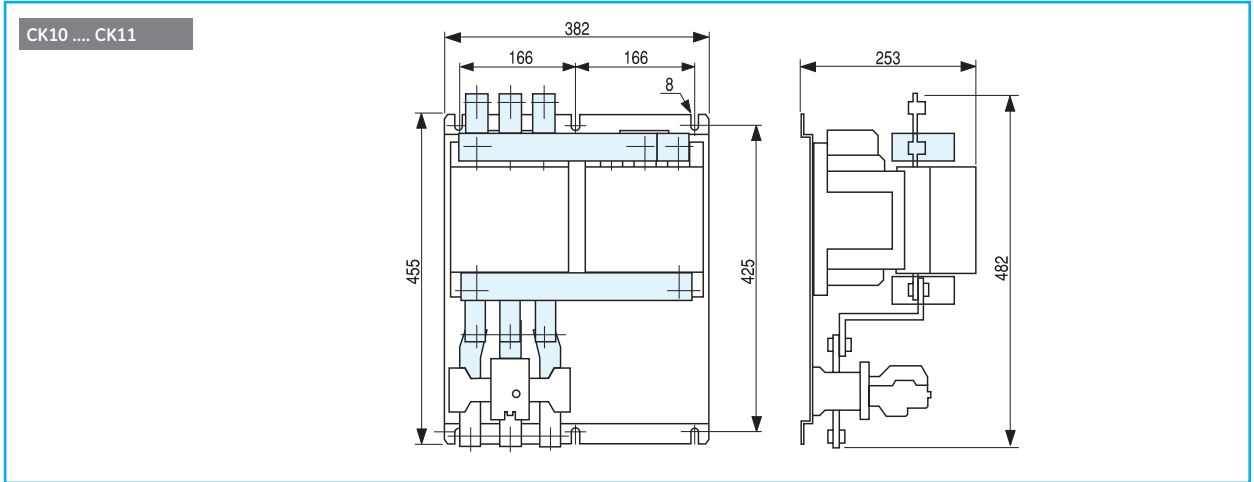
X

Dimensional drawings

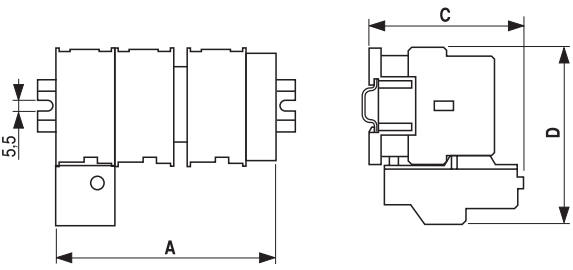
Series CK - Direct-on-line reversing starters without thermal overload relay



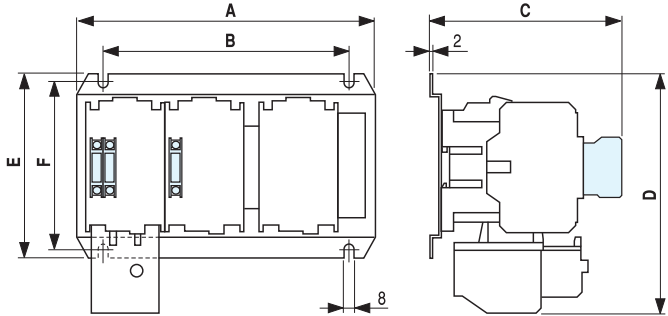
Series CK - Direct-on-line reversing starters with thermal overload relay



Series CL - Star-delta starters



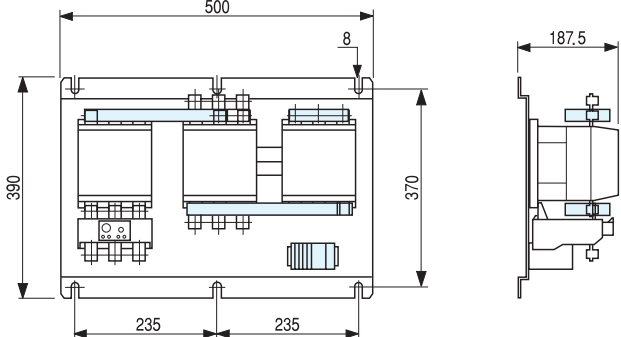
| | A | B | C | D |
|-------------------|-----|-----|-------|-----|
| CL00... - CL25... | 190 | 180 | 110.5 | 135 |
| CL03... - CL04... | 220 | 210 | 103.5 | 145 |



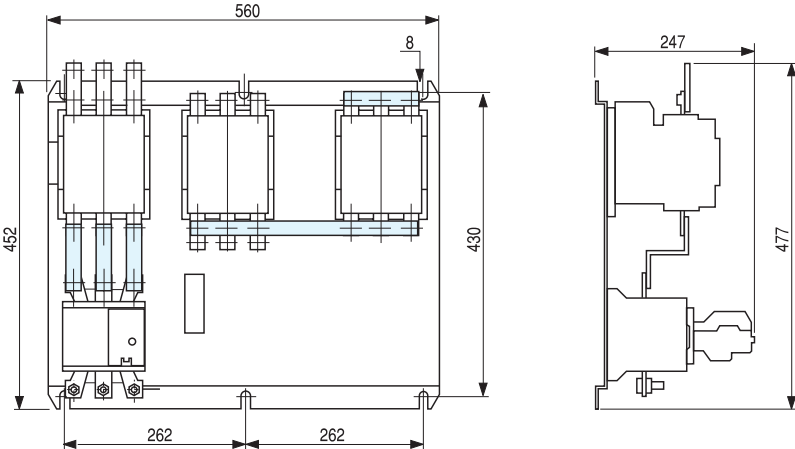
| | A | B | C | D | E | F |
|-------------------|-----|-----|-----|-----|-----|-----|
| CL06... - CL08... | 253 | 217 | 129 | 205 | 155 | 133 |
| CL09... | 263 | 247 | 138 | 247 | 155 | 133 |
| CL10... | 283 | 247 | 151 | 247 | 155 | 133 |

Series CK - Star-delta starters

CK75 ... CK08



CK85 ... CK95



A

B

C

D

E

F

G

H

I

X

Series M, CL, CK

Dimensional drawings

Series CK - Star-delta starters

Motorstarters

A

B

C

D

E

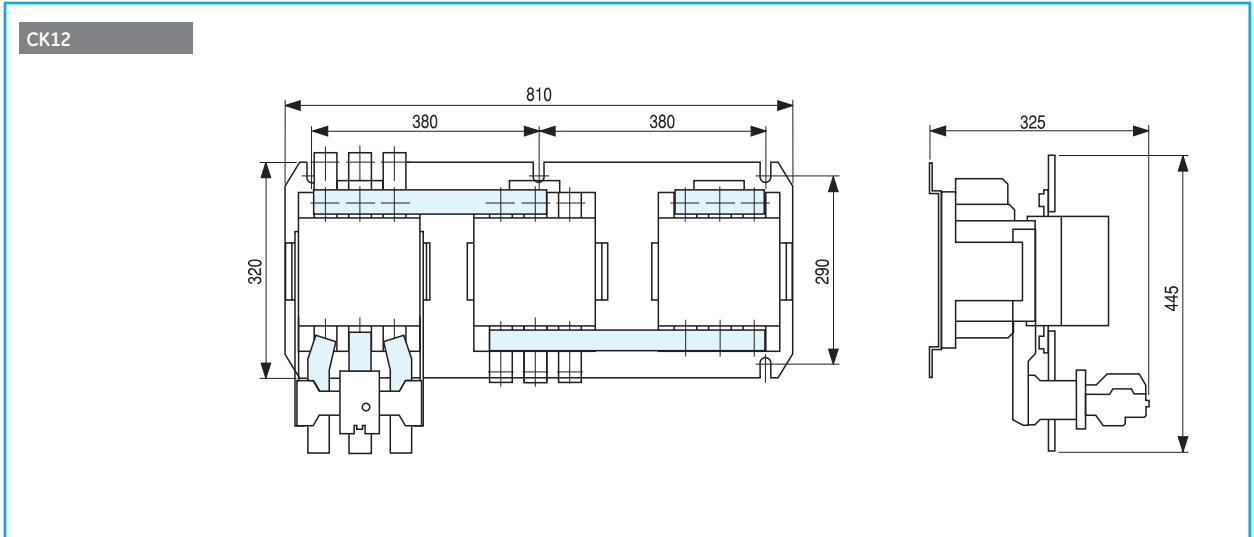
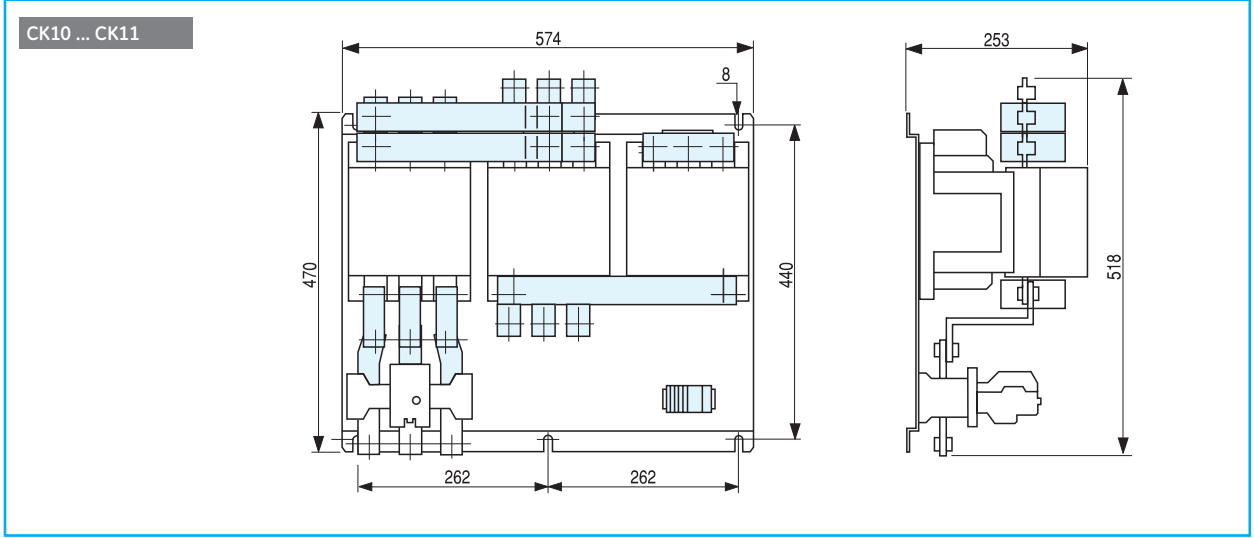
F

G

H

I

X



Utilisation categories according to IEC 60947-4-1

Standard utilisation categories AC

| Category | Typical applications |
|----------|---|
| AC-1 | Non-inductive or slightly loads. Resistance furnaces |
| AC-2 | Slip-ring motors: starting, plugging |
| AC-3 | Squirrel-cage motors (1): starting, switching off motors during running. |
| AC-4 | Squirrel-cage motors: starting, plugging, inching. |
| AC-5 a | Discharge lamps |
| AC-5 b | Incandescent lamps |
| AC-6 a | Transformers |
| AC-6 b | Cos φ capacitors |
| AC-7 a | Slightly inductive loads for domestic applications |
| AC-7 b | Motors in domestic applications |
| AC-8 a | Drive motors for cooling compressors (2) with manual reset and thermal overload relay |
| AC-8 b | Drive motors for cooling compressors (2) with manual reset and automatic reset |

Standard utilisation categories DC

| Category | Typical applications |
|----------|---|
| DC-1 | Non-inductive or slightly inductive loads. Resistance furnaces |
| DC-3 | Shunt motors: starting, plugging, inching |
| DC-5 | Series motors: starting, plugging, inching |
| DC-6 | Incandescent lamps |

- (1) Category AC-3 can be used for accidental not continuous short period service, while mounting and testing machines. The number of operations shall not be greater than 5 per minute or 10 per 10 minutes.
- (2) The drive motor of a hermetic cooling compressor is an assembly of a motor and compressor in the same housing, without any axle; the motor is working in the cooling liquid.
- (3) Making conditions in alternating current are expressed by effective value. Moreover the asymmetrical current high value, referred to $\cos \varphi$, can assume a higher value.
- (4) Tolerance for $\cos \varphi = \pm 0.05$
- (5) Tolerance for $L/R = \pm 15\%$

Making and breaking capacity

IEC 60947-4-1

Values given for closing and opening by intermittent use

| Cat. | Rated current | Closing (3) | | | Opening | | |
|------|----------------|-------------|-------|-------------------|---------|-------|-------------------|
| | | Ic/Ie | Ur/Ue | cos φ (4) | Ic/Ie | Ur/Ue | cos φ (4) |
| AC-1 | All values | 1.5 | 1.05 | 0.80 | 1.5 | 1.05 | 0.80 |
| AC-2 | All values | 4 | 1.05 | 0.65 | 4 | 1.05 | 0.65 |
| AC-3 | Ie \leq 100A | 10 | 1.05 | 0.45 | 8 | 1.05 | 0.45 |
| | Ie > 100A | 10 | 1.05 | 0.35 | 8 | 1.05 | 0.35 |
| AC-4 | Ie \leq 100A | 12 | 1.05 | 0.45 | 10 | 1.05 | 0.45 |
| | Ie > 100A | 12 | 1.05 | 0.35 | 10 | 1.05 | 0.35 |

| Cat. | Rated current | Closing | | | Opening | | |
|------|---------------|---------|-------|-------------|---------|-------|-------------|
| | | Ic/Ie | Ur/Ue | L/R(5) (ms) | Ic/Ie | Ur/Ue | L/R(5) (ms) |
| DC-1 | All values | 1.5 | 1.05 | 1 | 1.5 | 1.05 | 1 |
| DC-3 | All values | 4 | 1.05 | 2.5 | 4 | 1.05 | 2.5 |
| DC-5 | All values | 4 | 1.05 | 15 | 4 | 1.05 | 15 |

Electrical endurance

IEC 60947-4-1

Values given for closing and opening intermittent use

| Cat. | Rated current | Closing (3) | | | Opening | | |
|------|---------------|-------------|-------|-------------------|---------|-------|-------------------|
| | | Ic/Ie | Ur/Ue | cos φ (4) | Ic/Ie | Ur/Ue | cos φ (4) |
| AC-1 | All values | 1 | 1 | 0.95 | 1 | 1 | 0.95 |
| AC-2 | All values | 2.5 | 1 | 0.65 | 2.5 | 1 | 0.65 |
| AC-3 | Ie \leq 17A | 6 | 1 | 0.65 | 1 | 0.17 | 0.65 |
| | Ie > 17A | 6 | 1 | 0.35 | 1 | 0.17 | 0.35 |
| AC-4 | Ie \leq 17A | 6 | 1 | 0.65 | 6 | 1 | 0.65 |
| | Ie > 17A | 6 | 1 | 0.35 | 6 | 1 | 0.35 |

| Cat. | Rated current | Closing | | | Opening | | |
|------|---------------|---------|------------|--------|---------|------------|--------|
| | | Ic/Ie | Ur/Ue (ms) | L/R(5) | Ic/Ie | Ur/Ue (ms) | L/R(5) |
| DC-1 | All values | 1 | 1 | 1 | 1 | 1 | 1 |
| DC-3 | All values | 2.5 | 1 | 2 | 2.5 | 1 | 2 |
| DC-5 | All values | 2.5 | 1 | 7.5 | 2.5 | 1 | 7.5 |

| | |
|-----------|---------------------------|
| Ue | Rated operational voltage |
| Ie | Rated operational current |
| Ur | Feed-back voltage |
| Ic | Current made or broken |

Applications

A

B

C

D

E

F

G

H

I

X



Utilisation category AC-1

Three pole contactors

| Type | | MC0 | MC1 | MC2 | CL00 | CL01 | CL02 | CL25 | CL03 | CL04 | CL45 | CL06 | CL07 | CL08 | CL09 | CL10 |
|--|--------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Max. operat. current at ambient temp. of | 40°C (A) | 20 | 20 | 20 | 25 | 25 | 32 | 45 | 45 | 60 | 60 | 90 | 110 | 110 | 140 | 140 |
| | 55°C (A) | 20 | 20 | 20 | 25 | 25 | 32 | 45 | 45 | 60 | 60 | 90 | 110 | 110 | 140 | 140 |
| (for all voltages) | 70°C (A) | 16 | 16 | 16 | 20 | 20 | 25 | 32 | 32 | 48 | 48 | 72 | 88 | 88 | 110 | 110 |
| Max. operat. power | 230/220V (kW) | 7.5 | 7.5 | 7.5 | 9.5 | 9.5 | 12 | 17 | 17 | 22.5 | 22.5 | 30 | 42 | 42 | 53 | 53 |
| Three-phase resistors | 400/380V (kW) | 13 | 13 | 13 | 16.5 | 16.5 | 22 | 29 | 29 | 39.5 | 39.5 | 55 | 72.5 | 72.5 | 92 | 92 |
| | 440/415V (kW) | 15 | 15 | 13 | 18 | 18 | 23 | 32 | 32 | 43 | 43 | 57 | 79 | 79 | 100 | 100 |
| | 500V (kW) | 17 | 17 | 17 | 21.5 | 21.5 | 27.5 | 39 | 39 | 52 | 52 | 69 | 95 | 95 | 121 | 121 |
| | 690/660V (kW) | 22.5 | 22.5 | 22.5 | 28.5 | 28.5 | 38 | 51 | 51 | 68.5 | 68.5 | 95 | 125 | 125 | 160 | 160 |
| Cable size | (mm ²) | 2.5 | 2.5 | 2.5 | 4 | 4 | 6 | 10 | 10 | 16 | 16 | 35 | 35 | 35 | 50 | 50 |
| Percentage of the max. operational current at | 120 ops./h (%) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | 300 ops./h (%) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | 600 ops./h (%) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | 1200 ops./h (%) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 80 | 80 |
| | 3000 ops./h (%) | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 40 | 40 |

| Type | | CK75C | CK08C | CK85B | CK09B | CK95B | CK10C | CK11C | CK12B | CK13B | | | | | | |
|--|--------------------|-------|-------|-------|-------|-----------|-----------|-----------|------------|------------|--|--|--|--|--|--|
| Max. operat. current at ambient temp. of | 40°C (A) | 250 | 250 | 315 | 315 | 450 | 600 | 700 | 1000 | 1250 | | | | | | |
| | 55°C (A) | 200 | 200 | 252 | 252 | 382 | 510 | 546 | 736 | 1125 | | | | | | |
| (for all voltages) | 70°C (A) | 155 | 155 | 195 | 195 | 300 | 402 | 468 | 680 | 1060 | | | | | | |
| Max. operat. power | 230/220V (kW) | 90 | 90 | 114 | 114 | 170 | 191 | 234 | 289 | 450 | | | | | | |
| Three-phase resistors | 400/380V (kW) | 155 | 155 | 196 | 196 | 310 | 329 | 406 | 500 | 780 | | | | | | |
| | 440/415V (kW) | 180 | 180 | 227 | 227 | 343 | 329 | 470 | 578 | 904 | | | | | | |
| | 500V (kW) | 200 | 200 | 259 | 259 | 389 | 415 | 533 | 657 | 1027 | | | | | | |
| | 690/660V (kW) | 270 | 270 | 341 | 341 | 537 | 572 | 705 | 867 | 1354 | | | | | | |
| | 1000V (kW) | 400 | 400 | 517 | 517 | 780 | 866 | 1060 | 1314 | 2054 | | | | | | |
| Cable size | (mm ²) | 120 | 120 | 185 | 185 | 2x (30X5) | 2x (30X8) | 2x (30X8) | 2x (30X10) | 2x (30X10) | | | | | | |
| Percentage of the max. operational current at | 120 ops./h (%) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | | | | | | |
| | 300 ops./h (%) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 90 | | | | | | |
| | 600 ops./h (%) | 100 | 100 | 100 | 100 | 100 | 80 | 80 | 80 | 70 | | | | | | |
| | 1200 ops./h (%) | 80 | 80 | 80 | 80 | 80 | - | - | - | - | | | | | | |
| | 3000 ops./h (%) | 40 | 40 | 40 | 40 | - | - | - | - | - | | | | | | |

Four pole contactors

| Type | | MC0 | MC1 | MC2 | CL01 | CL02 | CL03 | CL04 | CL05 | CL07 | CL08(1) | CL09(2) |
|--|--------------------|------|------|------|------|------|------|------|------|------|---------|---------|
| Max. operat. current at ambient temp. of | 40°C (A) | 20 | 20 | 20 | 25 | 32 | 45 | 60 | 90 | 110 | 110 | 140 |
| | 55°C (A) | 20 | 20 | 20 | 25 | 32 | 45 | 60 | 90 | 110 | 110 | 140 |
| (for all voltages) | 70°C (A) | 16 | 16 | 16 | 20 | 25 | 32 | 48 | 72 | 88 | 88 | 110 |
| Max. operat. power | 230/220V (kW) | 7.5 | 7.5 | 7.5 | 9.5 | 12 | 17 | 22.5 | 30 | 42 | 42 | 53 |
| Three-phase resistors | 400/380V (kW) | 13 | 13 | 13 | 16.5 | 22 | 29 | 39.5 | 55 | 72.5 | 72.5 | 92 |
| | 440/415V (kW) | 15 | 15 | 15 | 18 | 23 | 32 | 43 | 57 | 79 | 79 | 100 |
| | 500V (kW) | 17 | 17 | 17 | 21.5 | 27.5 | 39 | 52 | 69 | 95 | 95 | 121 |
| | 690/660V (kW) | 22.5 | 22.5 | 22.5 | 28.5 | 38 | 51 | 68.5 | 95 | 125 | 25 | 160 |
| Cable size | (mm ²) | 2.5 | 2.5 | 2.5 | 4 | 6 | 10 | 16 | 35 | 35 | 35 | 50 |
| Percentage of the max. operational current at | 120 ops./h (%) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | 300 ops./h (%) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | 600 ops./h (%) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | 1200 ops./h (%) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 80 |
| | 3000 ops./h (%) | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 40 |

| Type | | CK07B | CK08B | CK09B | CK95B | CK10C | CK11C | CK12B | CK13B | | | |
|--|--------------------|-------|-------|-----------|-----------|-----------|-----------|------------|------------|--|--|--|
| Max. operat. current at ambient temp. of | 40°C (A) | 200 | 325 | 400 | 500 | 600 | 700 | 1000 | 1250 | | | |
| | 55°C (A) | 170 | 260 | 320 | 425 | 510 | 546 | 736 | 1125 | | | |
| (for all voltages) | 70°C (A) | 140 | 201 | 272 | 335 | 402 | 468 | 680 | 1060 | | | |
| Max. operat. power | 230/220V (kW) | 76 | 123 | 152 | 191 | 228 | 266 | 381 | 476 | | | |
| Three-phase resistors | 400/380V (kW) | 131 | 214 | 263 | 329 | 395 | 460 | 658 | 822 | | | |
| | 440/415V (kW) | 143 | 233 | 287 | 359 | 431 | 503 | 719 | 898 | | | |
| | 500V (kW) | 173 | 281 | 346 | 415 | 519 | 606 | 866 | 1082 | | | |
| | 690/660V (kW) | 228 | 371 | 457 | 572 | 686 | 800 | 1143 | 1428 | | | |
| | 1000V (kW) | - | 562 | 692 | 866 | 1039 | 1212 | 1732 | 2165 | | | |
| Cable size | (mm ²) | 95 | 185 | 2x (25X5) | 2x (30X5) | 2x (30X8) | 2x (30X8) | 2x (30X10) | 2x (40X10) | | | |
| Percentage of the max. operational current at | 120 ops./h (%) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | | | |
| | 300 ops./h (%) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 90 | | | |
| | 600 ops./h (%) | 100 | 100 | 100 | 100 | 80 | 80 | 80 | 70 | | | |
| | 1200 ops./h (%) | 80 | 80 | 80 | 80 | - | - | - | - | | | |
| | 3000 ops./h (%) | 40 | 40 | 40 | 40 | - | - | - | - | | | |

Increase in maximum operational current through connection poles in parallel:
 - 2 poles in parallel: Ie x 1.8
 - 3 poles in parallel: Ie x 2.4
 - 4 poles in parallel: Ie x 3.2

(1) Only types (2NO + 2NC)
 (2) Only types (4NO)

Motorstarters

A

B

C

D

E

F

G

H

I

X



Utilisation category AC-3

Three pole contactors

| Types | | MC0 | MC1 | MC2 | CL00 | CL01 | CL02 | CL25 | CL03 | CL04 | CL45 | CL06 | CL07 | CL08 | CL09 | CL10 |
|---|-----------------|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|------|------|
| Operational current Ie for Ue ≤ 400V | (A) | 6 | 9 | 12 | 9 | 12 | 18 | 25 | 25 | 32 | 40 | 50 | 65 | 80 | 95 | 105 |
| Max. operat. power 230/220V | (kW) | 1.5 | 3 | 3 | 2.2 | 3 | 4 | 7.5 | 7.5 | 9 | 11 | 15 | 18.5 | 22 | 25 | 30 |
| | (HP) | 2 | 4 | 4 | 3 | 4 | 5.5 | 10 | 10 | 12 | 15 | 20 | 25 | 30 | 34 | 40 |
| Three-phase motors 50/60Hz | 400/380V (kW) | 2.2 | 4 | 5.5 | 4 | 5.5 | 7.5 | 12 | 12 | 16 | 18.5 | 22 | 30 | 37 | 45 | 55 |
| | (HP) | 3 | 5.5 | 7.3 | 5.5 | 7.5 | 10 | 16 | 16 | 22 | 25 | 30 | 40 | 50 | 60 | 75 |
| 440/415V | (kW) | 2.2 | 4 | 5.5 | 4 | 5.5 | 7.5 | 12 | 12 | 16 | 22 | 25 | 37 | 45 | 50 | 55 |
| | (HP) | 3 | 5.5 | 7.3 | 5.5 | 7.5 | 10 | 16 | 16 | 22 | 30 | 34 | 50 | 60 | 68 | 75 |
| 500V | (kW) | 3 | 4 | 5.5 | 5.5 | 7.5 | 10 | 15 | 15 | 18.5 | 25 | 30 | 40 | 45 | 55 | 65 |
| | (HP) | 4 | 5.5 | 7.3 | 7.5 | 10 | 13.5 | 20 | 20 | 25 | 34 | 40 | 55 | 60 | 75 | 88 |
| 690/660V | (kW) | 3 | 4 | 5.5 | 5.5 | 7.5 | 10 | 15 | 15 | 18.5 | 30 | 35 | 45 | 45 | 55 | 65 |
| | (HP) | 4 | 5.5 | 7.3 | 7.5 | 10 | 13.5 | 20 | 20 | 25 | 40 | 48 | 60 | 60 | 75 | 88 |
| Percentage of the max. operational current at | 120 ops./h (%) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | 300 ops./h (%) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | 600 ops./h (%) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | 1200 ops./h (%) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 75 | 75 |
| | 3000 ops./h (%) | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 25 |

| Type | | CK75C | CK08C | CK85B | CK09B | CK95B | CK10C | CK11C | CK12B | CK13B |
|--|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Operational current Ie for Ue ≤ 400V | (A) | 150 | 185 | 205 | 250 | 309 | 420 | 550 | 700 | 825 |
| Max. operat. power 230/220V | (kW) | 45 | 55 | 65 | 75 | 90 | 125 | 160 | 220 | 250 |
| | (HP) | 60 | 75 | 88 | 100 | 125 | 170 | 220 | 300 | 340 |
| Three-phase motors 50/60Hz | 400/380V (kW) | 75 | 90 | 110 | 132 | 160 | 220 | 280 | 375 | 450 |
| | (HP) | 100 | 125 | 150 | 180 | 220 | 300 | 380 | 510 | 610 |
| 440/415V | (kW) | 80 | 100 | 125 | 132 | 185 | 230 | 315 | 400 | 450 |
| | (HP) | 108 | 135 | 170 | 180 | 250 | 312 | 425 | 540 | 610 |
| 500V | (kW) | 100 | 110 | 132 | 160 | 200 | 300 | 400 | 480 | 500 |
| | (HP) | 135 | 150 | 180 | 220 | 270 | 405 | 540 | 650 | 680 |
| 690/660V | (kW) | 100 | 132 | 155 | 200 | 250 | 375 | 450 | 500 | 550 |
| | (HP) | 135 | 180 | 205 | 270 | 335 | 510 | 610 | 680 | 750 |
| 1000V | (kW) | 65 | 100 | 110 | 150 | 200 | 300 | 375 | 450 | 500 |
| | (HP) | 88 | 135 | 150 | 205 | 270 | 405 | 510 | 610 | 680 |
| Percentage of the max. operational current | 120 ops./h (%) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | 300 ops./h (%) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 80 |
| | 600 ops./h (%) | 100 | 100 | 100 | 100 | 100 | 75 | 75 | 75 | 65 |
| | 1200 ops./h (%) | 75 | 75 | 75 | 75 | 75 | - | - | - | - |
| | 3000 ops./h (%) | 25 | 25 | 25 | 25 | - | - | - | - | - |

Utilisation category AC-4

Three pole contactors

| Type | | MC0 | MC1 | MC2 | CL00 | CL01 | CL02 | CL25 | CL03 | CL04 | CL45 | CL06 | CL07 | CL08 | CL09 | CL10 |
|---|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|------|------|------|------|
| Operational current Ue ≤ 690V | (A) | 2.75 | 3.5 | 3.5 | 5 | 7 | 8 | 12 | 12 | 16 | 18.5 | 23 | 30 | 37 | 44 | 50 |
| Operational power 230/220V (200.000 operations) | (kW) | 0.55 | 0.75 | 0.75 | 1.1 | 1.5 | 1.8 | 3 | 3 | 3.7 | 4 | 5.5 | 7.5 | 10 | 11 | 13 |
| | (HP) | 0.73 | 1 | 1 | 1.5 | 2 | 2.4 | 4 | 4 | 5 | 5.3 | 7.3 | 9.7 | 13 | 14.6 | 17.3 |
| 400/380V | (kW) | 1.1 | 1.5 | 1.5 | 2.2 | 3 | 3.7 | 5.5 | 5.5 | 7.5 | 9 | 11 | 15 | 18.5 | 22 | 25 |
| | (HP) | 1.5 | 2 | 2 | 3 | 4 | 5 | 7.3 | 7.3 | 9.7 | 12 | 14.6 | 20 | 24.6 | 29.2 | 33 |
| 500V | (kW) | 1.5 | 2.2 | 2.2 | 3 | 4 | 5.5 | 7.5 | 7.5 | 10 | 11 | 15 | 18.5 | 22 | 25 | 30 |
| | (HP) | 2 | 3 | 3 | 4 | 5.3 | 7.3 | 9.7 | 9.7 | 13 | 14.6 | 20 | 24.6 | 29.2 | 33 | 40 |
| 690/660V | (kW) | 2.2 | 3 | 3 | 4 | 5.5 | 7.5 | 10 | 10 | 11 | 15 | 18.5 | 22 | 25 | 30 | 37 |
| | (HP) | 3 | 4 | 4 | 5.3 | 7.3 | 9.7 | 13 | 13 | 14.6 | 20 | 24.6 | 29.2 | 33 | 40 | 49 |
| Max. operational current ≤ 400V (35.000 operations) | (A) | 6 | 9 | 9 | 9 | 12 | 18 | 25 | 25 | 32 | 40 | 50 | 65 | 80 | 95 | 105 |
| Max. operational power 400/380V | (kW) | 2.2 | 4 | 4 | 4 | 5.5 | 7.5 | 11 | 12 | 16 | 18.5 | 22 | 30 | 37 | 45 | 55 |
| Type | | CK75C | CK08C | CK85B | CK09B | CK95B | CK10C | CK11C | CK12B | CK13B | | | | | | |
| Operational current Ue ≤ 400V | (A) | 65 | 75 | 90 | 110 | 125 | 150 | 165 | 250 | 350 | | | | | | |
| Operational power 230/220V | (kW) | 18.5 | 22 | 25 | 33 | 37 | 45 | 50 | 80 | 110 | | | | | | |
| | (HP) | 24.6 | 29.2 | 33 | 44 | 49 | 60 | 66.5 | 106 | 146 | | | | | | |
| Three-phase motors 50/60Hz (200.000 operations) | 400/380V (kW) | 33 | 40 | 45 | 55 | 63 | 80 | 90 | 132 | 165 | | | | | | |
| | (HP) | 44 | 53 | 60 | 73 | 83.8 | 106 | 119 | 175 | 219 | | | | | | |
| 500V | (kW) | 45 | 50 | 63 | 75 | 90 | 100 | 110 | 225 | 250 | | | | | | |
| | (HP) | 60 | 66.5 | 83.8 | 100 | 119 | 133 | 146 | 300 | 332 | | | | | | |
| 690/660V | (kW) | 55 | 63 | 80 | 100 | 110 | 132 | 150 | 250 | 315 | | | | | | |
| | (HP) | 73 | 83.8 | 106 | 133 | 146 | 175 | 200 | 332 | 419 | | | | | | |
| Max. operational current ≤ 400V (35.000 operations) | (A) | 150 | 185 | 205 | 250 | 309 | 420 | 550 | 700 | 825 | | | | | | |
| Max. operational power 400/380V | (kW) | 75 | 90 | 110 | 132 | 160 | 220 | 280 | 375 | 450 | | | | | | |

Applications

A

B

C

D

E

F

G

H

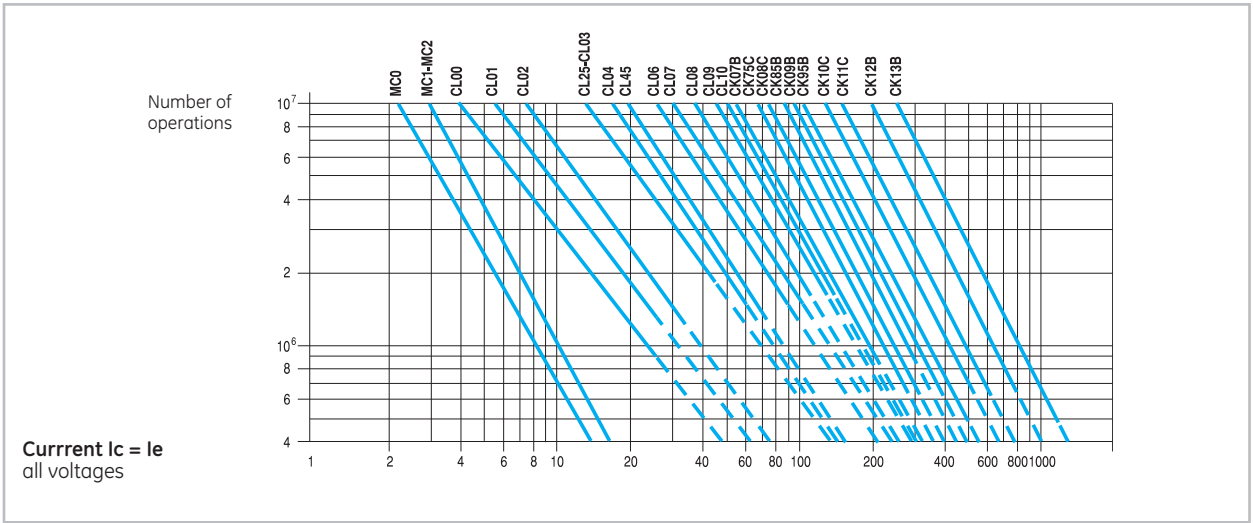
I

X

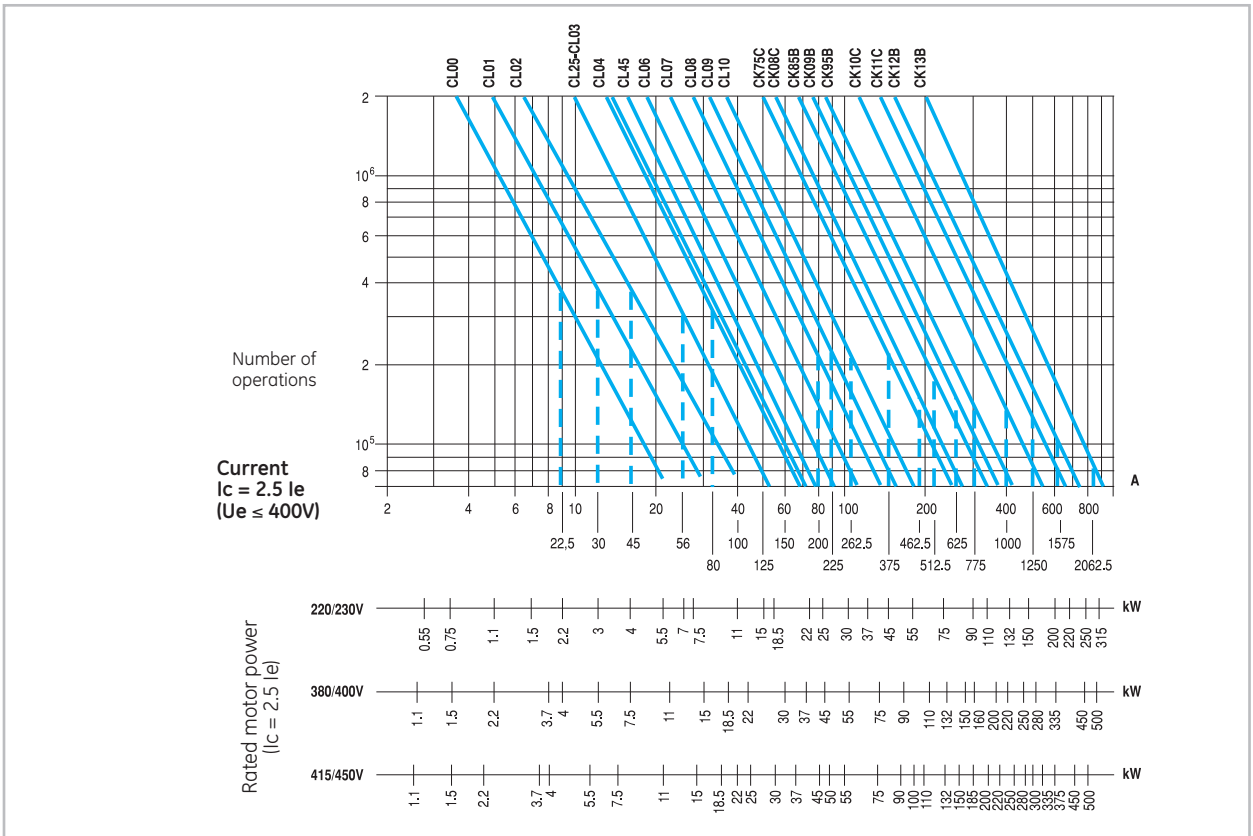


Electrical endurance

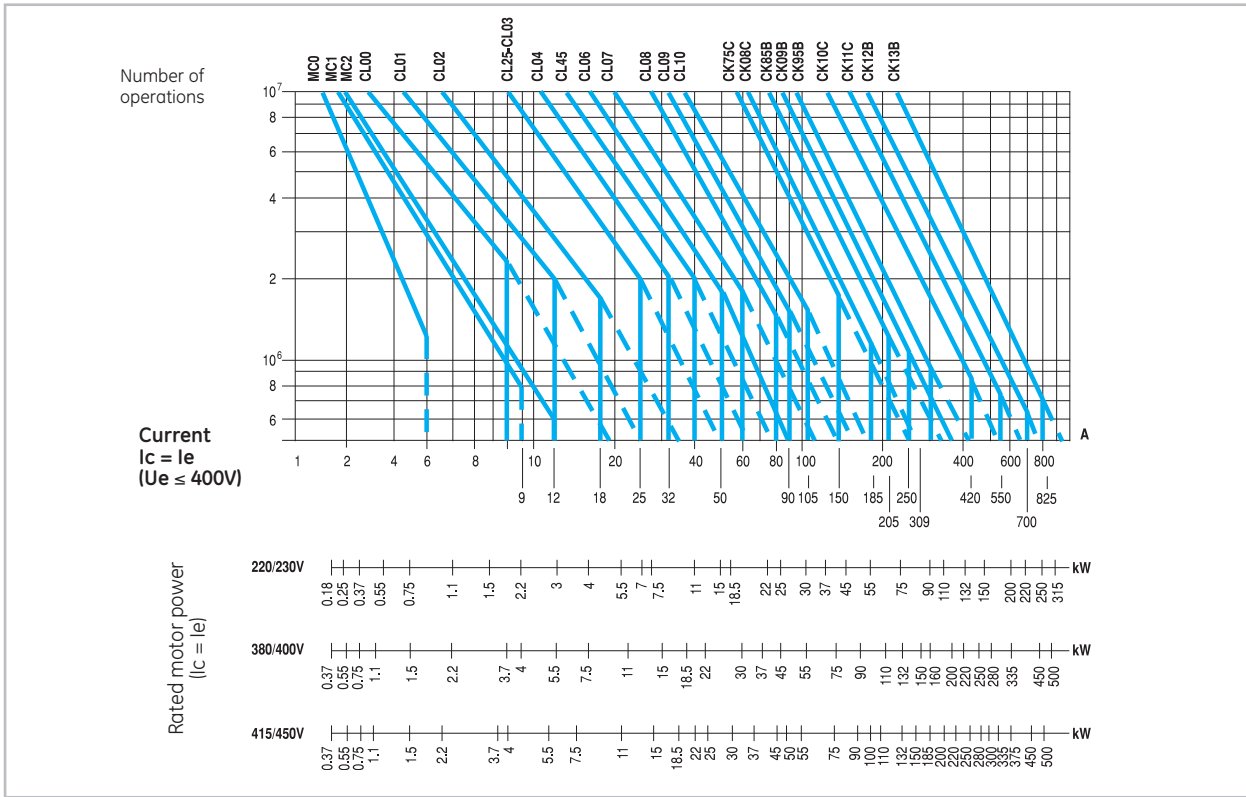
Category AC1



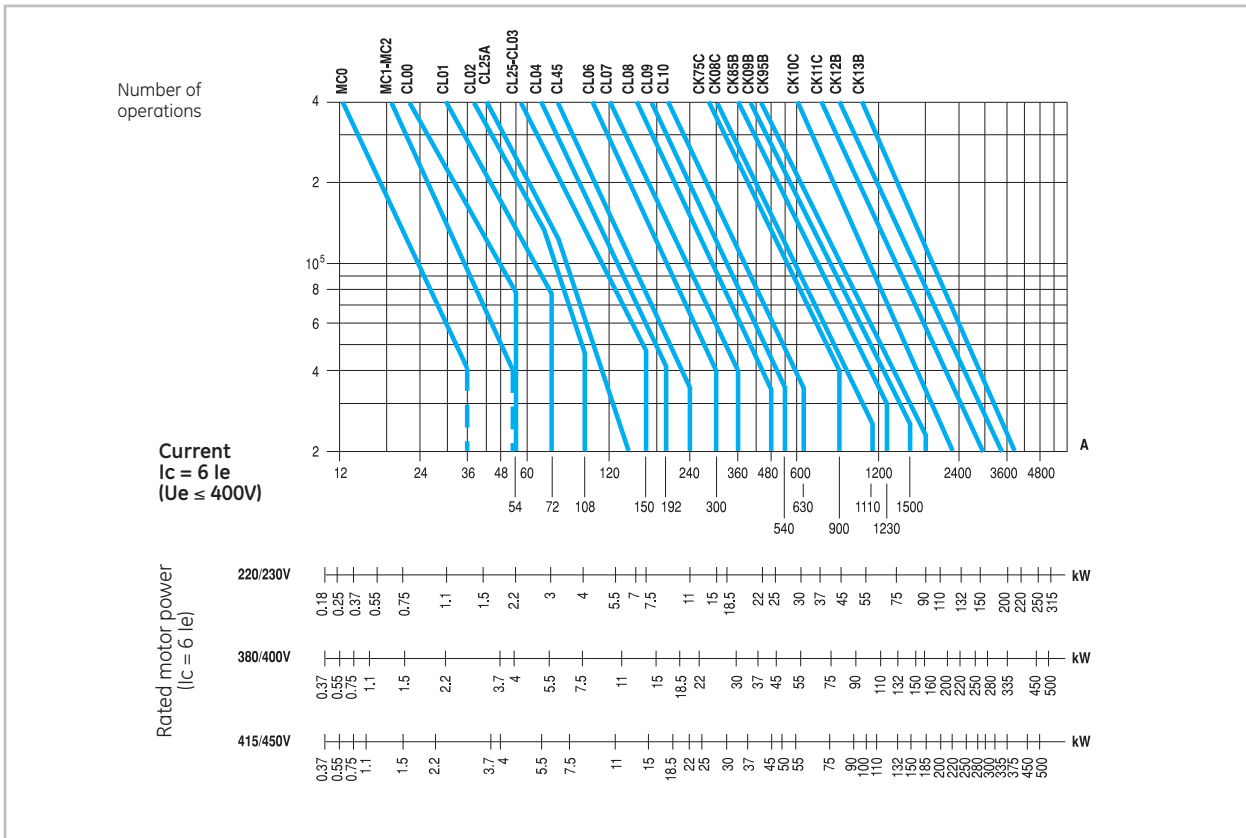
Category AC2



Category AC3



Category AC4



Applications

- A
- B
- C
- D
- E
- F
- G
- H
- I
- X



Electrical endurance

Mixed category AC2 / AC'2

Graph to determine the coefficient which when multiplied by the contactor electrical endurance in category AC'2, will give the electrical endurance in mixed category AC2/AC'2.

Example:

- % of operations in AC2:
35% (or 65% as AC'2)
- Breaking current $I_c = 2.54 I_e$
- Contactor considered: CK08BA
Resultant coefficient from the graph: 0.35
Electrical endurance in AC'2 for contactor CK085A, to drive a motor of 45kW at 380V:
 $I_e = 85A; 5.5 \times 10^6$ operations.

Resultant electrical endurance for mixed service considered:

$$0.35 \times 5.5 \times 10^6 = 1.92 \times 10^6 \text{ operations.}$$

Mixed category AC4 / AC3

Electrical endurance for mixed category (AC3/AC4) is calculated with the following formula:

| |
|---|
| $\text{Electrical endurance (AC3/AC4)} = \frac{\text{Electrical endurance (AC3)}}{1 + \frac{\% \text{ ops. AC4}}{100} \times \left(\frac{\text{Electr. endur. (AC3)}}{\text{Electr. endur. (AC4)}} - 1 \right)}$ |
|---|

Notes

Grid area for notes.

Applications

- A
- B
- C
- D
- E
- F
- G
- H
- I
- X



Series M, CL, CK

Series M and CL. Max. operational current I_e (A) - DC utilisation categories

Category DC1. L/R ≤ 1ms

| Ue | Poles in serie | MC0 | MC1 | MC2 | CL00 | CL01 | CL02 | CL25 | CL03 | CL04 | CL45 | CL05 | CL06 | CL07 | CL08 | CL09 | CL10 |
|------|----------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 24V | 1 | 6 | 9 | 9 | 18 | 18 | 18 | 25 | 25 | 32 | 40 | 50 | 50 | 65 | 65 | 80 | 80 |
| | 2 | 8 | 12 | 12 | 25 | 25 | 32 | 45 | 45 | 60 | 60 | 90 | 90 | 110 | 110 | 140 | 140 |
| | 3 | 15 | 20 | 20 | 25 | 25 | 32 | 45 | 45 | 60 | 60 | 90 | 90 | 110 | 110 | 140 | 140 |
| | 4 | 15 | 20 | 20 | - | 25 | 32 | - | 45 | 60 | - | 90 | - | 110 | - | 140 | - |
| 48V | 1 | 5 | 7.5 | 7.5 | 15 | 15 | 15 | 20 | 20 | 25 | 35 | 45 | 45 | 55 | 55 | 70 | 70 |
| | 2 | 8 | 12 | 12 | 25 | 25 | 32 | 45 | 45 | 60 | 60 | 90 | 90 | 110 | 110 | 140 | 140 |
| | 3 | 12 | 16 | 16 | 25 | 25 | 32 | 45 | 45 | 60 | 60 | 90 | 90 | 110 | 110 | 140 | 140 |
| | 4 | 15 | 20 | 20 | - | 25 | 32 | - | 45 | 60 | - | 90 | - | 110 | - | 140 | - |
| 60V | 1 | 4 | 6 | 6 | 12 | 12 | 12 | 18 | 18 | 18 | 32 | 40 | 40 | 50 | 50 | 65 | 65 |
| | 2 | 6 | 9 | 9 | 25 | 25 | 32 | 45 | 45 | 60 | 60 | 90 | 90 | 110 | 110 | 140 | 140 |
| | 3 | 12 | 16 | 16 | 25 | 25 | 32 | 45 | 45 | 60 | 60 | 90 | 90 | 110 | 110 | 140 | 140 |
| | 4 | 15 | 20 | 20 | - | 25 | 32 | - | 45 | 60 | - | 90 | - | 110 | - | 140 | - |
| 125V | 1 | 1.6 | 2.5 | 2.5 | 6 | 6 | 6 | 8 | 8 | 8 | 16 | 16 | 16 | 16 | 16 | 16 | 16 |
| | 2 | 4 | 6 | 6 | 18 | 18 | 18 | 25 | 25 | 45 | 45 | 80 | 80 | 90 | 90 | 110 | 110 |
| | 3 | 5 | 10 | 10 | 25 | 25 | 25 | 32 | 45 | 60 | 60 | 90 | 90 | 110 | 110 | 140 | 140 |
| | 4 | 5 | 10 | 10 | - | 25 | 32 | - | 45 | 60 | - | 90 | - | 110 | - | 140 | - |
| 220V | 1 | 0.2 | 0.36 | 0.36 | 0.8 | 0.8 | 0.8 | 0.8 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 |
| | 2 | 1.7 | 2.6 | 2.6 | 7.5 | 7.5 | 7.5 | 7.5 | 8 | 8 | 8 | 20 | 20 | 20 | 20 | 20 | 20 |
| | 3 | 4 | 8 | 8 | 25 | 25 | 25 | 32 | 45 | 50 | 50 | 90 | 90 | 110 | 110 | 140 | 140 |
| | 4 | 4 | 8 | 8 | - | 25 | 32 | - | 45 | 60 | - | 90 | - | 110 | - | 140 | - |
| 440V | 1 | 0.09 | 0.13 | 0.13 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| | 2 | 0.26 | 0.4 | 0.4 | 0.8 | 0.8 | 0.8 | 0.8 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 |
| | 3 | 0.5 | 1 | 1 | 8 | 8 | 8 | 10 | 10 | 10 | 10 | 15 | 15 | 15 | 15 | 15 | 15 |
| | 4 | 0.5 | 1 | 1 | - | 15 | 15 | - | 20 | 25 | - | 80 | - | 90 | - | 110 | - |
| 600V | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 2 | - | - | - | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 1 | 1 | 1 | 1 | 1 | 1 |
| | 3 | - | - | - | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 |
| | 4 | - | - | - | - | 8 | 10 | - | 12 | 12 | - | 50 | - | 65 | - | 75 | - |

Motorstarters

Category DC3. L/R ≤ 2.5ms

| Ue | Poles in serie | MC0 | MC1 | MC2 | CL00 | CL01 | CL02 | CL25 | CL03 | CL04 | CL45 | CL05 | CL06 | CL07 | CL08 | CL09 | CL10 |
|------|----------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 24V | 1 | - | - | - | 12 | 12 | 12 | 18 | 18 | 25 | 32 | 40 | 40 | 50 | 50 | 65 | 65 |
| | 2 | 4 | 9 | 9 | 18 | 18 | 18 | 25 | 25 | 40 | 40 | 65 | 65 | 80 | 80 | 105 | 105 |
| | 3 | 8 | 12 | 12 | 18 | 18 | 18 | 25 | 25 | 40 | 40 | 65 | 65 | 80 | 80 | 105 | 105 |
| | 4 | - | - | - | - | 18 | 18 | - | 25 | 40 | - | 65 | - | 80 | - | 105 | - |
| 48V | 1 | - | - | - | 9 | 9 | 9 | 12 | 12 | 18 | 20 | 30 | 30 | 35 | 35 | 45 | 45 |
| | 2 | 3 | 6 | 6 | 18 | 18 | 18 | 25 | 25 | 40 | 40 | 65 | 65 | 80 | 80 | 105 | 105 |
| | 3 | 6 | 9 | 9 | 18 | 18 | 18 | 25 | 25 | 40 | 40 | 65 | 65 | 80 | 80 | 105 | 105 |
| | 4 | - | - | - | - | 18 | 18 | - | 25 | 40 | - | 65 | - | 80 | - | 105 | - |
| 60V | 1 | - | - | - | 7.5 | 7.5 | 7.5 | 10 | 10 | 15 | 15 | 25 | 25 | 30 | 30 | 35 | 35 |
| | 2 | 3 | 6 | 6 | 18 | 18 | 18 | 25 | 25 | 40 | 40 | 65 | 65 | 80 | 80 | 105 | 105 |
| | 3 | 6 | 9 | 9 | 18 | 18 | 18 | 25 | 25 | 40 | 40 | 65 | 65 | 80 | 80 | 105 | 105 |
| | 4 | - | - | - | - | 18 | 18 | - | 25 | 40 | - | 65 | - | 80 | - | 105 | - |
| 125V | 1 | - | - | - | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| | 2 | 0.85 | 4.5 | 4.5 | 10 | 10 | 12 | 18 | 18 | 25 | 32 | 50 | 50 | 60 | 60 | 80 | 80 |
| | 3 | 1.7 | 6 | 6 | 15 | 15 | 18 | 25 | 25 | 32 | 40 | 35 | 35 | 80 | 80 | 105 | 105 |
| | 4 | - | - | - | - | 15 | 18 | - | 25 | 32 | - | 35 | - | 80 | - | 105 | - |
| 220V | 1 | - | - | - | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| | 2 | 0.35 | 1.2 | 1.2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 7 | 7 | 7 | 7 | 7 | 7 |
| | 3 | 0.7 | 2.5 | 2.5 | 12 | 12 | 12 | 18 | 18 | 25 | 32 | 50 | 50 | 65 | 65 | 95 | 95 |
| | 4 | - | - | - | - | 15 | 18 | - | 32 | 32 | - | 65 | - | 80 | - | 105 | - |
| 440V | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 2 | 0.05 | 0.15 | 0.15 | 0.3 | 0.3 | 0.3 | 0.3 | 0.5 | 0.5 | 0.5 | 1 | 1 | 1 | 1 | 1 | 1 |
| | 3 | 0.13 | 0.3 | 0.3 | 1.5 | 1.5 | 1.5 | 1.5 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| | 4 | - | - | - | - | 6 | 6 | - | 6 | 6 | - | 50 | - | 65 | - | 75 | - |
| 600V | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 3 | - | - | - | 0.8 | 0.8 | 0.8 | 0.8 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| | 4 | - | - | - | - | 2.5 | 2.5 | - | 2.5 | 2.5 | - | 25 | - | 30 | - | 35 | - |

Category DC5. L/R ≤ 15ms

| Ue | Poles in serie | MC0 | MC1 | MC2 | CL00 | CL01 | CL02 | CL25 | CL03 | CL04 | CL45 | CL05 | CL06 | CL07 | CL08 | CL09 | CL10 |
|------|----------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 24V | 1 | - | - | - | 12 | 12 | 12 | 18 | 18 | 25 | 32 | 40 | 40 | 50 | 50 | 65 | 65 |
| | 2 | 3 | 4.5 | 4.5 | 18 | 18 | 18 | 25 | 25 | 40 | 40 | 65 | 65 | 80 | 80 | 105 | 105 |
| | 3 | 6 | 9 | 9 | 18 | 18 | 18 | 25 | 25 | 40 | 40 | 65 | 65 | 80 | 80 | 105 | 105 |
| | 4 | - | - | - | - | 18 | 18 | - | 25 | 40 | - | 65 | - | 80 | - | 105 | - |
| 48V | 1 | - | - | - | 9 | 9 | 9 | 12 | 12 | 18 | 20 | 30 | 30 | 35 | 35 | 45 | 45 |
| | 2 | 2.5 | 4 | 4 | 18 | 18 | 18 | 25 | 25 | 40 | 40 | 65 | 65 | 80 | 80 | 105 | 105 |
| | 3 | 6.5 | 8 | 8 | 18 | 18 | 18 | 25 | 25 | 40 | 40 | 65 | 65 | 80 | 80 | 105 | 105 |
| | 4 | - | - | - | - | 18 | 18 | - | 25 | 40 | - | 65 | - | 80 | - | 105 | - |
| 60V | 1 | - | - | - | 7.5 | 7.5 | 7.5 | 10 | 10 | 15 | 15 | 25 | 25 | 30 | 30 | 35 | 35 |
| | 2 | 2 | 3 | 3 | 18 | 18 | 18 | 25 | 25 | 40 | 40 | 65 | 65 | 80 | 80 | 105 | 105 |
| | 3 | 5 | 7 | 7 | 18 | 18 | 18 | 25 | 25 | 40 | 40 | 65 | 65 | 80 | 80 | 105 | 105 |
| | 4 | - | - | - | - | 18 | 18 | - | 25 | 40 | - | 65 | - | 80 | - | 105 | - |
| 125V | 1 | - | - | - | 0.8 | 0.8 | 0.8 | 0.8 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 |
| | 2 | 0.65 | 1.5 | 1.5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 50 | 50 | 60 | 60 | 85 | 85 |
| | 3 | 1.3 | 2 | 2 | 15 | 15 | 15 | 20 | 20 | 25 | 32 | 60 | 60 | 70 | 70 | 95 | 95 |
| | 4 | - | - | - | - | 15 | 18 | - | 25 | 32 | - | 65 | - | 80 | - | 105 | - |
| 220V | 1 | - | - | - | - | - | - | - | - | - | - | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| | 2 | 0.16 | 0.26 | 0.26 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 3 | 3 | 3 | 3 | 4 | 4 |
| | 3 | 0.5 | 0.8 | 0.8 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 7 | 7 | 7 | 7 | 7 | 7 |
| | 4 | - | - | - | - | 10 | 10 | - | 15 | 15 | - | 65 | - | 75 | - | 95 | - |
| 440V | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 3 | 0.4 | 0.1 | 1.1 | 0.5 | 0.5 | 0.5 | 0.5 | 0.7 | 0.7 | 0.7 | 1 | 1 | 1 | 1 | 1 | 1 |
| | 4 | - | - | - | - | 2 | 2 | - | 4 | 4 | - | 40 | - | 50 | - | 60 | - |
| 600V | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 4 | - | - | - | - | 0.75 | 0.75 | - | 2.5 | 2.5 | - | 20 | - | 25 | - | 30 | - |



Max. operational current I_e (A) - DC utilisation categories (continued)

Category DC1. $L/R \leq 1ms$

| Ue | Poles in serie | CK07 | CK75 | CK08 | CK85 | CK09 | CK95 | CK10 | CK11 | CK12 | CK13 |
|------|----------------|------|------|------|------|------|------|------|------|------|------|
| 24V | 1 | 150 | 200 | 200 | 250 | 250 | 350 | 500 | 600 | 800 | 1000 |
| | 2 | 200 | 250 | 250 | 315 | 315 | 450 | 600 | 700 | 1000 | 1250 |
| | 3 | 200 | 250 | 250 | 315 | 315 | 450 | 600 | 700 | 1000 | 1250 |
| | 4 | 200 | - | 250 | - | 315 | 450 | 600 | 700 | 1000 | 1250 |
| 48V | 1 | 125 | 170 | 170 | 200 | 200 | 295 | 425 | 500 | 600 | 850 |
| | 2 | 140 | 175 | 175 | 220 | 220 | 315 | 425 | 480 | 700 | 850 |
| | 3 | 200 | 250 | 250 | 315 | 315 | 500 | 600 | 700 | 1000 | 1250 |
| | 4 | 200 | - | 250 | - | 315 | 500 | 600 | 700 | 1000 | 1250 |
| 60V | 1 | 100 | 140 | 140 | 175 | 175 | 245 | 350 | 420 | 560 | 700 |
| | 2 | 140 | 175 | 175 | 220 | 220 | 315 | 425 | 480 | 700 | 850 |
| | 3 | 200 | 250 | 250 | 315 | 315 | 500 | 600 | 700 | 1000 | 1250 |
| | 4 | 200 | - | 250 | - | 315 | 500 | 600 | 700 | 1000 | 1250 |
| 125V | 1 | 20 | 25 | 25 | 30 | 30 | 50 | 60 | 70 | 100 | 125 |
| | 2 | 110 | 200 | 200 | 250 | 250 | 300 | 400 | 500 | 600 | 1000 |
| | 3 | 200 | 250 | 250 | 315 | 315 | 500 | 600 | 700 | 1000 | 1250 |
| | 4 | 200 | - | 250 | - | 315 | 500 | 600 | 700 | 1000 | 1250 |
| 220V | 1 | - | - | - | - | - | - | - | - | - | - |
| | 2 | 65 | 110 | 110 | 150 | 150 | 200 | 250 | 250 | 300 | 400 |
| | 3 | 200 | 250 | 250 | 315 | 315 | 500 | 600 | 700 | 1000 | 1250 |
| | 4 | 200 | - | 250 | - | 315 | 500 | 600 | 700 | 1000 | 1250 |
| 440V | 1 | - | - | - | - | - | - | - | - | - | - |
| | 2 | - | - | - | - | - | - | - | - | - | - |
| | 3 | 60 | 120 | 120 | 150 | 150 | 180 | 240 | 300 | 400 | 480 |
| | 4 | 110 | - | 200 | - | 250 | 315 | 400 | 500 | 700 | 800 |
| 600V | 1 | - | - | - | - | - | - | - | - | - | - |
| | 2 | - | - | - | - | - | - | - | - | - | - |
| | 3 | 32 | 65 | 65 | 80 | 80 | 95 | 130 | 160 | 215 | 250 |
| | 4 | 85 | - | 100 | - | 130 | 170 | 215 | 265 | 375 | 430 |

Category DC3. $L/R \leq 2.5ms$

| Ue | Poles in serie | CK07 | CK75 | CK08 | CK85 | CK09 | CK95 | CK10 | CK11 | CK12 | CK13 |
|------|----------------|------|------|------|------|------|------|------|------|------|------|
| 24V | 1 | 105 | 150 | 185 | 205 | 250 | 309 | 420 | 550 | 700 | 825 |
| | 2 | 105 | 150 | 185 | 205 | 250 | 309 | 420 | 550 | 700 | 825 |
| | 3 | 105 | 150 | 185 | 205 | 250 | 309 | 420 | 550 | 700 | 825 |
| | 4 | 105 | - | 185 | - | 250 | 309 | 420 | 550 | 700 | 825 |
| 48V | 1 | 70 | 105 | 130 | 140 | 175 | 215 | 290 | 385 | 490 | 575 |
| | 2 | 105 | 150 | 185 | 205 | 250 | 309 | 420 | 550 | 700 | 825 |
| | 3 | 105 | 150 | 185 | 205 | 250 | 309 | 420 | 550 | 700 | 825 |
| | 4 | 105 | - | 185 | - | 250 | 309 | 420 | 550 | 700 | 825 |
| 60V | 1 | 55 | 85 | 105 | 110 | 140 | 175 | 230 | 300 | 390 | 460 |
| | 2 | 105 | 150 | 185 | 205 | 250 | 309 | 420 | 550 | 700 | 825 |
| | 3 | 105 | 150 | 185 | 205 | 250 | 309 | 420 | 550 | 700 | 825 |
| | 4 | 105 | - | 185 | - | 250 | 309 | 420 | 550 | 700 | 825 |
| 125V | 1 | 20 | 25 | 25 | 30 | 30 | 50 | 60 | 70 | 100 | 125 |
| | 2 | 105 | 150 | 185 | 205 | 250 | 309 | 420 | 550 | 700 | 825 |
| | 3 | 105 | 150 | 185 | 205 | 250 | 309 | 420 | 550 | 700 | 825 |
| | 4 | 105 | - | 185 | - | 250 | 309 | 420 | 550 | 700 | 825 |
| 220V | 1 | - | - | - | - | - | - | - | - | - | - |
| | 2 | 10 | 60 | 70 | 80 | 85 | 95 | 140 | 185 | 225 | 400 |
| | 3 | 105 | 150 | 185 | 205 | 250 | 309 | 420 | 550 | 700 | 825 |
| | 4 | 105 | - | 185 | - | 250 | 309 | 420 | 550 | 700 | 825 |
| 440V | 1 | - | - | - | - | - | - | - | - | - | - |
| | 2 | - | - | - | - | - | - | - | - | - | - |
| | 3 | 8 | 50 | 55 | 65 | 70 | 80 | 120 | 150 | 180 | 320 |
| | 4 | 80 | - | 105 | - | 185 | 205 | 250 | 300 | 400 | 700 |
| 600V | 1 | - | - | - | - | - | - | - | - | - | - |
| | 2 | - | - | - | - | - | - | - | - | - | - |
| | 3 | 4 | 25 | 25 | 30 | 35 | 40 | 60 | 75 | 90 | 165 |
| | 4 | 40 | - | 50 | - | 90 | 100 | 125 | 150 | 200 | 350 |

Category DC5. $L/R \leq 15ms$

| Ue | Poles in serie | CK07 | CK75 | CK08 | CK85 | CK09 | CK95 | CK10 | CK11 | CK12 | CK13 |
|------|----------------|------|------|------|------|------|------|------|------|------|------|
| 24V | 1 | 105 | 150 | 185 | 205 | 250 | 309 | 420 | 550 | 700 | 825 |
| | 2 | 105 | 150 | 185 | 205 | 250 | 309 | 420 | 550 | 700 | 825 |
| | 3 | 105 | 150 | 185 | 205 | 250 | 309 | 420 | 550 | 700 | 825 |
| | 4 | 105 | - | 185 | - | 250 | 309 | 420 | 550 | 700 | 825 |
| 48V | 1 | 60 | 90 | 110 | 120 | 150 | 185 | 250 | 330 | 420 | 495 |
| | 2 | 105 | 150 | 185 | 205 | 250 | 309 | 420 | 550 | 700 | 825 |
| | 3 | 105 | 150 | 185 | 205 | 250 | 309 | 420 | 550 | 700 | 825 |
| | 4 | 105 | - | 185 | - | 250 | 309 | 420 | 550 | 700 | 825 |
| 60V | 1 | 55 | 85 | 105 | 110 | 140 | 175 | 230 | 300 | 390 | 460 |
| | 2 | 105 | 150 | 185 | 205 | 250 | 309 | 420 | 550 | 700 | 825 |
| | 3 | 105 | 150 | 185 | 205 | 250 | 309 | 420 | 550 | 700 | 825 |
| | 4 | 105 | - | 185 | - | 250 | 309 | 420 | 550 | 700 | 825 |
| 125V | 1 | 15 | 20 | 20 | 25 | 25 | 40 | 50 | 60 | 80 | 100 |
| | 2 | 80 | 95 | 105 | 150 | 185 | 205 | 250 | 300 | 400 | 700 |
| | 3 | 105 | 150 | 185 | 205 | 250 | 309 | 420 | 550 | 700 | 825 |
| | 4 | 105 | - | 185 | - | 250 | 309 | 420 | 550 | 700 | 825 |
| 220V | 1 | - | - | - | - | - | - | - | - | - | - |
| | 2 | 8 | 50 | 55 | 65 | 70 | 80 | 120 | 150 | 180 | 320 |
| | 3 | 80 | 95 | 105 | 150 | 185 | 205 | 250 | 300 | 400 | 700 |
| | 4 | 105 | - | 185 | - | 250 | 309 | 420 | 550 | 700 | 825 |
| 440V | 1 | - | - | - | - | - | - | - | - | - | - |
| | 2 | - | - | - | - | - | - | - | - | - | - |
| | 3 | 5 | 40 | 40 | 50 | 50 | 60 | 90 | 100 | 100 | 200 |
| | 4 | 65 | - | 95 | - | 150 | 185 | 205 | 250 | 300 | 400 |
| 600V | 1 | - | - | - | - | - | - | - | - | - | - |
| | 2 | - | - | - | - | - | - | - | - | - | - |
| | 3 | 40 | 45 | 50 | 75 | 90 | 100 | 125 | 150 | 200 | 350 |
| | 4 | 35 | - | 45 | - | 75 | 90 | 100 | 125 | 150 | 200 |

Applications

A

B

C

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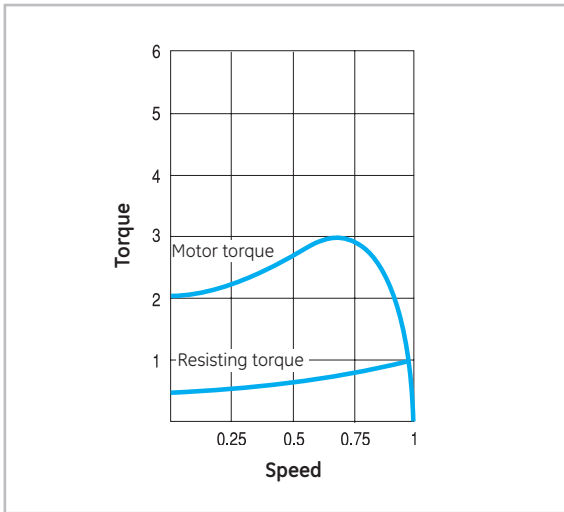
Series M, CL, CK

Direct-on-line starters

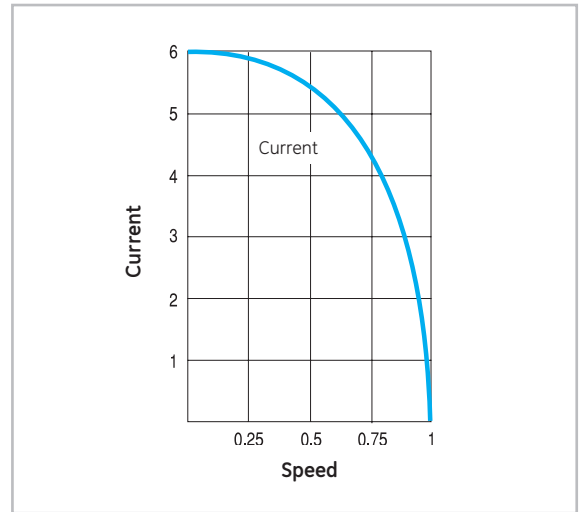
- Motors connected directly on-line with a contactor and a thermal overload relay.
- Simple installation with high starting torque and current.
- For use with motors of medium power that do not need a progressive star

| | | |
|------|--------------------------------------|---------------|
| AC-3 | Switching off motors during running | $I_c = I_e$ |
| AC-4 | Switching off motors during starting | $I_c = 6 I_e$ |

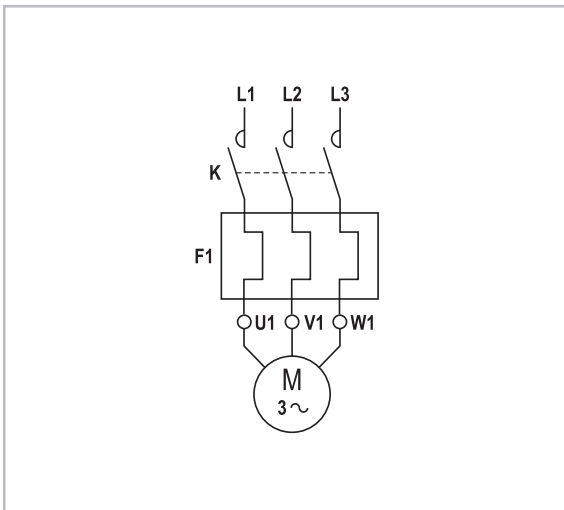
Torque-speed curve



Current-speed curve



Diagram



Motorstarters

A

B

C

D

E

F

G

H

I

X

Selection table

| Motor | | | | | | | | | | Contactor | Thermal relay | Fuse | | | |
|----------|------|----------|------|----------|------|------|------|----------|------|-----------|---------------|-------|-------|-------|----|
| 230/200V | | 400/380V | | 440/415V | | 500V | | 690/660V | | | | 1000V | aM | gG-gL | |
| kW | A | kW | A | kW | A | kW | A | kW | A | kW | A | A | A | | |
| - | - | - | - | - | - | - | - | 0.06 | 0.13 | - | - | MC0 | MT03A | 0.5 | 1 |
| - | - | 0.06 | 0.23 | 0.06 | 0.21 | 0.06 | 0.17 | 0.09 | 0.2 | - | - | MC0 | MT03B | 0.5 | 1 |
| - | - | - | - | - | - | - | - | 0.12 | 0.25 | - | - | | MT03B | 0.5 | 1 |
| 0.06 | 0.39 | 0.09 | 0.34 | 0.09 | 0.31 | 0.09 | 0.26 | 0.18 | 0.35 | - | - | | MT03C | 1 | 2 |
| - | - | - | - | 0.12 | 0.4 | 0.12 | 0.33 | - | - | - | - | | MT03C | 1 | 2 |
| 0.09 | 0.58 | 0.12 | 0.44 | - | - | 0.18 | 0.46 | 0.25 | 0.46 | - | - | | MT03D | 1 | 2 |
| - | - | 0.18 | 0.61 | 0.18 | 0.56 | 0.25 | 0.6 | - | - | - | - | | MT03D | 1 | 2 |
| - | - | - | - | - | - | - | - | 0.37 | 0.7 | - | - | | MT03E | 2 | 4 |
| 0.12 | 0.76 | 0.25 | 0.78 | 0.25 | 0.7 | 0.37 | 0.9 | 0.55 | 0.9 | - | - | | MT03E | 2 | 4 |
| 0.18 | 1.05 | 0.37 | 1.13 | 0.37 | 1.1 | 0.55 | 1.2 | 0.75 | 1.1 | - | - | | MT03F | 2 | 4 |
| 0.25 | 1.4 | - | - | - | - | - | - | - | - | - | - | | MT03G | 2 | 4 |
| - | - | 0.55 | 1.6 | 0.55 | 1.5 | 0.75 | 1.5 | 1.1 | 1.5 | - | - | | MT03H | 4 | 6 |
| 0.37 | 2 | 0.75 | 2 | 0.75 | 2 | 1.1 | 2 | 1.5 | 2 | - | - | | MT03I | 4 | 6 |
| - | - | 1.1 | 2.6 | 1.1 | 2.5 | 1.5 | 2.6 | - | - | - | - | | MT03J | 4 | 6 |
| 0.56 | 2.75 | - | - | - | - | - | - | 2.2 | 2.9 | - | - | | MT03J | 4 | 6 |
| 0.75 | 3.5 | 1.5 | 3.5 | 1.5 | 3.4 | 2.2 | 3.8 | 3 | 3.5 | - | - | | MT03K | 6 | 10 |
| 1.1 | 5 | 2.2 | 5 | 2.2 | 4.5 | 3 | 5 | - | - | - | - | MT03L | 10 | 16 | |
| 1.5 | 7 | - | - | - | - | - | - | - | - | - | - | MT03M | 10 | 16 | |
| - | - | - | - | - | - | - | - | 3.7 | 4.6 | - | - | MC1 | MT03L | 10 | 16 |
| - | - | - | - | - | - | - | - | 4 | 5 | - | - | | MT03L | 10 | 16 |
| - | - | 3 | 7 | 3 | 6.5 | 3.7 | 6 | - | - | - | - | | MT03M | 10 | 16 |
| - | - | - | - | 3.7 | 7.3 | 4 | 6.5 | - | - | - | - | | MT03M | 10 | 16 |
| - | - | 3.7 | 8 | 4 | 8 | - | - | - | - | - | - | | MT03N | 12 | 20 |
| 2.2 | 9 | 4 | 9 | - | - | - | - | - | - | - | - | MT03N | 12 | 20 | |
| - | - | - | - | - | - | - | - | 5.5 | 6.7 | - | - | MC2 | MT03M | 12 | 20 |
| - | - | - | - | - | - | 5.5 | 9 | - | - | - | - | | MT03N | 16 | 20 |
| 3 | 12 | 5.5 | 12 | 5.5 | 11 | - | - | - | - | - | - | | MT03P | 16 | 20 |
| - | - | 0.06 | 0.23 | 0.06 | 0.21 | 0.06 | 0.17 | 0.09 | 0.2 | - | - | CL00 | RT1B | 2 | 4 |
| - | - | - | - | - | - | 0.09 | 0.26 | 0.12 | 0.25 | - | - | | RT1C | 2 | 4 |
| 0.06 | 0.39 | 0.09 | 0.34 | 0.09 | 0.31 | 0.12 | 0.33 | 0.18 | 0.35 | - | - | | RT1C | 2 | 4 |
| 0.09 | 0.58 | 0.12 | 0.44 | 0.12 | 0.4 | 0.18 | 0.46 | 0.25 | 0.46 | - | - | | RT1D | 2 | 4 |
| - | - | 0.18 | 0.61 | 0.18 | 0.56 | 0.25 | 0.6 | - | - | - | - | | RT1D | 2 | 4 |
| - | - | - | - | - | - | - | - | 0.37 | 0.7 | - | - | | RT1F | 2 | 4 |
| 0.12 | 0.76 | 0.25 | 0.78 | 0.25 | 0.7 | 0.37 | 0.9 | 0.55 | 0.9 | - | - | | RT1F | 2 | 4 |
| 0.18 | 1.05 | 0.37 | 1.13 | 0.37 | 1.1 | 0.55 | 1.2 | 0.75 | 1.1 | - | - | | RT1G | 2 | 4 |
| 0.25 | 1.4 | 0.55 | 1.6 | 0.55 | 1.5 | 0.75 | 1.5 | 1.1 | 1.5 | - | - | | RT1H | 2 | 6 |
| 0.37 | 2 | 0.75 | 2 | 0.75 | 2 | 1.1 | 2 | 1.5 | 2 | - | - | | RT1J | 4 | 6 |
| 0.55 | 2.75 | 1.1 | 2.6 | 1.1 | 2.5 | 1.5 | 2.6 | 2.2 | 2.9 | - | - | | RT1K | 4 | 6 |
| 0.75 | 3.5 | 1.5 | 3.5 | 1.5 | 3.4 | 2.2 | 3.8 | - | - | - | - | | RT1K | 6 | 10 |
| - | - | - | - | - | - | - | - | 3.7 | 4.6 | - | - | | RT1L | 6 | 16 |
| 1.1 | 5 | 2.2 | 5 | 2.2 | 4.5 | - | - | - | - | - | - | | RT1L | 6 | 16 |
| 1.5 | 7 | - | - | 3.7 | 7.3 | 3.7 | 6 | 5.5 | 7 | - | - | | RT1M | 10 | 20 |
| - | - | 3.7 | 8 | - | - | - | - | - | - | - | - | RT1M | 12 | 25 | |
| 2.2 | 9 | 4 | 9 | 4 | 9 | 5.5 | 9 | - | - | - | - | RT1N | 16 | 25 | |
| - | - | - | - | - | - | - | - | 7.5 | 9 | - | - | CL01 | RT1N | 16 | 25 |
| 3 | 12 | 5.5 | 12 | 5.5 | 11 | 7.5 | 12 | - | - | - | - | | RT1P | 16 | 35 |
| 3.7 | 14 | - | - | 7.5 | 14 | - | - | - | - | - | - | CL02 | RT1P | 20 | 40 |
| 4 | 16 | 7.5 | 16 | - | - | 10 | 15.5 | - | - | - | - | | RT1S | 20 | 40 |
| - | - | - | - | - | - | - | - | 11 | 13 | - | - | CL25 | RT1P | 20 | 40 |
| - | - | - | - | - | - | 11 | 17 | 13 | 16 | - | - | | RT1S | 20 | 40 |
| 5.5 | 21 | - | - | 11 | 21 | 13 | 20 | - | - | - | - | | RT1T | 32 | 50 |
| - | - | 11 | 22.5 | - | - | 15 | 23 | - | - | - | - | RT1U | 32 | 50 | |

Direct-on-line starters

- A
- B
- C
- D
- E
- F
- G
- H
- I
- X



Direct-on-line starters

Selection table (continued)

Motorstarters

A

B

C

D

E

F

G

H

I

X

| Motor | | | | | | | | | | Contactor | Thermal relay | Fuse | | | |
|----------|-----|----------|-----|----------|-----|------|------|----------|-----|-----------|---------------|-------|----------|-----|-------|
| 230/200V | | 400/380V | | 440/415V | | 500V | | 690/660V | | | | 1000V | | aM | gG-gL |
| kW | A | kW | A | kW | A | kW | A | kW | A | kW | A | A | A | | |
| - | - | - | - | - | - | - | - | 17 | 20 | - | - | CL04 | RT1T | 32 | 50 |
| 7.5 | 27 | 15 | 30 | 15 | 28 | 17.5 | 26.5 | - | - | - | - | | RT1V | 40 | 63 |
| - | - | - | - | - | - | - | - | 18.5 | 23 | - | - | | RT1U | 32 | 50 |
| - | - | - | - | - | - | - | - | 22 | 25 | - | - | CL45 | RT1V | 40 | 63 |
| - | - | - | - | - | - | 18.5 | 28.5 | - | - | - | - | | RT1V | 40 | 63 |
| - | - | 18.5 | 37 | 18.5 | 35 | 22 | 33 | - | - | - | - | | RT1W | 50 | 80 |
| - | - | - | - | - | - | 25 | 37.5 | 30 | 35 | - | - | | RT1W | 50 | 80 |
| 11 | 40 | - | - | 22 | 40 | - | - | - | - | - | - | | RT2E (1) | 50 | 80 |
| - | - | - | - | - | - | - | - | 33 | 38 | - | - | CL06 | RT2E | 50 | 80 |
| - | - | 22 | 44 | 25 | 45 | - | - | - | - | - | - | | RT2G | 63 | 80 |
| 15 | 50 | - | - | - | - | - | - | - | - | - | - | | RT2G | 63 | 80 |
| - | - | - | - | - | - | - | - | 37 | 41 | - | - | CL07 | RT2E | 63 | 80 |
| - | - | - | - | - | - | 30 | 45 | 40 | 43 | - | - | | RT2G | 63 | 80 |
| - | - | 30 | 60 | 30 | 55 | 37 | 55 | - | - | - | - | | RT2H | 80 | 125 |
| 18.5 | 65 | - | - | 37 | 66 | - | - | - | - | - | - | | RT2J | 80 | 125 |
| - | - | - | - | - | - | - | - | 45 | 49 | - | - | CL08 | RT2G | 80 | 125 |
| - | - | 37 | 72 | - | - | 45 | 65 | - | - | - | - | | RT2J | 100 | 125 |
| 22 | 75 | - | - | - | - | - | - | - | - | - | - | | RT2J | 100 | 125 |
| - | - | - | - | 45 | 80 | - | - | - | - | - | - | | RT2L | 100 | 160 |
| - | - | - | - | - | - | - | - | 55 | 60 | - | - | CL09 | RT2H | 80 | 125 |
| - | - | - | - | - | - | 50 | 73 | - | - | - | - | | RT2J | 100 | 125 |
| 25 | 84 | 45 | 85 | 50 | 88 | 55 | 80 | - | - | - | - | | RT2L | 100 | 160 |
| 30 | 105 | 55 | 105 | 55 | 100 | - | - | - | - | - | - | CL10 | RT2M | 125 | 200 |
| - | - | - | - | - | - | - | - | - | - | 55 | 40 | CK75 | RT4J | 63 | 80 |
| - | - | - | - | - | - | - | - | 75 | 80 | - | - | | RT3C | 125 | 160 |
| - | - | - | - | - | - | - | - | 90 | 97 | - | - | | RT3D | 125 | 160 |
| - | - | - | - | - | - | 75 | 105 | - | - | - | - | | RT3D | 160 | 200 |
| 37 | 126 | - | - | - | - | - | - | - | - | - | - | | RT3E | 160 | 200 |
| - | - | 75 | 138 | 75 | 135 | 90 | 129 | - | - | - | - | | RT3E | 200 | 224 |
| 45 | 150 | - | - | - | - | - | - | - | - | - | - | | RT3F | 200 | 224 |
| - | - | - | - | - | - | - | - | - | - | 75 | 54 | CK08 | RT4 K | 80 | 125 |
| - | - | - | - | - | - | - | - | - | - | 90 | 64 | | RT3B | 100 | 160 |
| - | - | - | - | - | - | - | - | 110 | 118 | - | - | | RT3E | 160 | 200 |
| - | - | - | - | - | - | - | - | 132 | 141 | - | - | | RT3F | 200 | 250 |
| - | - | 90 | 170 | 90 | 165 | 110 | 156 | - | - | - | - | | RT3F | 200 | 250 |
| 55 | 182 | - | - | 100 | 182 | - | - | - | - | - | - | | RT3F | 200 | 250 |
| - | - | - | - | - | - | - | - | - | - | 110 | 78 | CK85 | RT4L (1) | 100 | 160 |
| - | - | - | - | - | - | - | - | 150 | 166 | - | - | | RT4N (1) | 250 | 315 |
| - | - | - | - | 110 | 200 | 132 | 188 | - | - | - | - | | RT4P (1) | 250 | 315 |
| - | - | 110 | 211 | - | - | - | - | - | - | - | - | | RT4P (1) | 250 | 315 |
| - | - | - | - | - | - | - | - | - | - | 132 | 94 | CK09 | RT4M (1) | 125 | 160 |
| - | - | - | - | - | - | - | - | - | - | 150 | 105 | | RT4M (1) | 160 | 200 |
| - | - | - | - | - | - | - | - | 160 | 170 | - | - | | RT4N (1) | 200 | 250 |
| - | - | - | - | - | - | - | - | 185 | 193 | - | - | | RT4P (1) | 250 | 315 |
| - | - | - | - | - | - | - | - | - | - | 160 | 113 | CK95 | RT4M (1) | 160 | 200 |
| - | - | - | - | - | - | - | - | - | - | 185 | 130 | | RT4N (1) | 160 | 200 |
| - | - | - | - | - | - | - | - | - | - | 200 | 141 | | RT4N (1) | 200 | 250 |
| - | - | - | - | - | - | - | - | - | - | 220 | 155 | CK10 | RT5A (1) | 200 | 250 |
| - | - | - | - | - | - | - | - | - | - | 250 | 175 | | RT5A (1) | 250 | 315 |
| - | - | - | - | - | - | - | - | 220 | 230 | - | - | CK95 | RT4P (1) | 315 | 400 |
| - | - | - | - | 150 | 269 | 185 | 261 | 250 | 262 | - | - | | RT4R (1) | 355 | 400 |
| - | - | 150 | 283 | 160 | 285 | - | - | - | - | - | - | | RT4R (1) | 400 | 425 |
| 90 | 309 | 160 | 309 | - | - | 200 | 281 | - | - | - | - | | RT4R (1) | 400 | 425 |

(1) Separate mounting: type RT2XP.



Selection table (continued)

| Motor | | | | | | | | | | Contactor | Thermal relay | Fuse | | | |
|----------|-----|----------|-----|----------|-----|------|-----|----------|-----|-----------|---------------|-------|------|------|-------|
| 230/200V | | 400/380V | | 440/415V | | 500V | | 690/660V | | | | 1000V | | aM | gG-gL |
| kW | A | kW | A | kW | A | kW | A | kW | A | kW | A | A | A | | |
| - | - | - | - | - | - | 220 | 310 | 280 | 292 | - | - | CK10 | RT5C | 400 | 425 |
| - | - | - | - | 185 | 325 | - | - | 300 | 307 | - | - | CK10 | RT5C | 425 | 500 |
| - | - | - | - | - | - | - | - | 315 | 322 | - | - | CK10 | RT5C | 425 | 500 |
| 110 | 356 | 185 | 355 | 200 | 350 | 250 | 348 | 335 | 344 | - | - | CK10 | RT5D | 425 | 500 |
| - | - | 220 | 370 | 220 | 385 | - | - | 355 | 366 | - | - | CK10 | RT5D | 500 | 500 |
| - | - | - | - | - | - | 280 | 385 | 375 | 390 | - | - | CK10 | RT5D | 500 | 500 |
| - | - | 220 | 408 | - | - | 300 | 409 | - | - | - | - | CK10 | RT5D | 500 | 500 |
| - | - | - | - | - | - | - | - | - | - | 280 | 197 | CK11 | RT5B | 250 | 315 |
| - | - | - | - | - | - | - | - | - | - | 300 | 211 | CK11 | RT5B | 315 | 355 |
| - | - | - | - | - | - | - | - | - | - | 315 | 221 | CK11 | RT5B | 315 | 355 |
| - | - | - | - | - | - | - | - | - | - | 335 | 234 | CK11 | RT5B | 315 | 355 |
| - | - | - | - | - | - | - | - | - | - | 355 | 245 | CK11 | RT5B | 315 | 355 |
| - | - | - | - | - | - | - | - | 400 | 412 | - | - | CK11 | RT5D | 500 | 500 |
| 132 | 425 | - | - | 250 | 437 | 315 | 426 | - | - | - | - | CK11 | RT5D | 630 | 630 |
| - | - | - | - | - | - | 335 | 456 | 425 | 442 | - | - | CK11 | RT5D | 630 | 630 |
| - | - | 250 | 475 | 280 | 480 | 355 | 485 | 450 | 462 | - | - | CK11 | RT5E | 630 | 630 |
| 150 | 500 | - | - | 300 | 508 | 375 | 513 | - | - | - | - | CK11 | RT5E | 630 | 630 |
| 160 | 520 | 280 | 530 | 315 | 530 | 400 | 543 | - | - | - | - | CK11 | RT5E | 630 | 630 |
| - | - | - | - | - | - | - | - | - | - | 375 | 256 | CK12 | RT5B | 315 | 355 |
| - | - | - | - | - | - | - | - | - | - | 400 | 273 | CK12 | RT5C | 400 | 425 |
| - | - | - | - | - | - | - | - | - | - | 425 | 290 | CK12 | RT5C | 400 | 425 |
| - | - | - | - | - | - | - | - | - | - | 450 | 307 | CK12 | RT5C | 400 | 425 |
| - | - | - | - | - | - | - | - | 475 | 488 | - | - | CK12 | RT5E | 630 | 630 |
| - | - | - | - | - | - | - | - | 500 | 514 | - | - | CK12 | RT5E | 630 | 630 |
| - | - | 300 | 563 | 335 | 565 | - | - | - | - | - | - | CK12 | RT5E | 630 | 630 |
| 185 | 609 | 315 | 580 | 355 | 600 | - | - | - | - | - | - | CK12 | RT5E | 630 | 630 |
| 200 | 630 | 335 | 630 | 375 | 630 | 450 | 613 | - | - | - | - | CK12 | RT5E | 800 | 800 |
| 220 | 710 | 355 | 650 | - | - | 475 | 647 | - | - | - | - | CK12 | RT5E | 800 | 800 |
| - | - | 375 | 680 | 400 | 673 | - | - | - | - | - | - | CK12 | RT5E | 800 | 800 |
| - | - | - | - | - | - | - | - | - | - | 475 | 324 | CK13 | RT5C | 500 | 630 |
| - | - | - | - | - | - | - | - | - | - | 500 | 341 | CK13 | RT5C | 500 | 630 |
| - | - | 400 | 720 | 425 | 714 | 500 | 680 | - | - | - | - | CK13 | RT6A | 1000 | 1000 |
| - | - | 425 | 763 | 450 | 756 | - | - | - | - | - | - | CK13 | RT6A | 1000 | 1000 |
| 250 | 823 | 450 | 800 | - | - | - | - | - | - | - | - | CK13 | RT6A | 1000 | 1000 |

Direct-on-line starters

A

B

C

D

E

F

G

H

I

X



Star-delta starters

For AC squirrel cage motors

In order to use this type of starting, the following conditions must be met:

The ends of the three stator windings should terminate in a terminal box (6 terminals, see diagram).

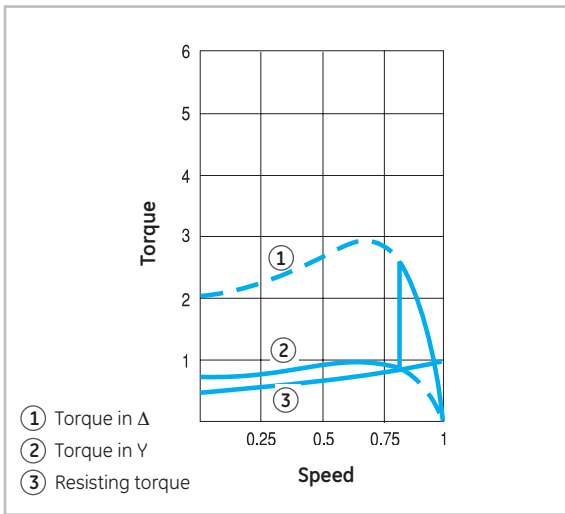
The line voltage should be the same as the motor delta connection voltage.

This starting system is suitable for machines where the resisting torque during starting is less than 1/3 of the motor torque (see torque speed curves).

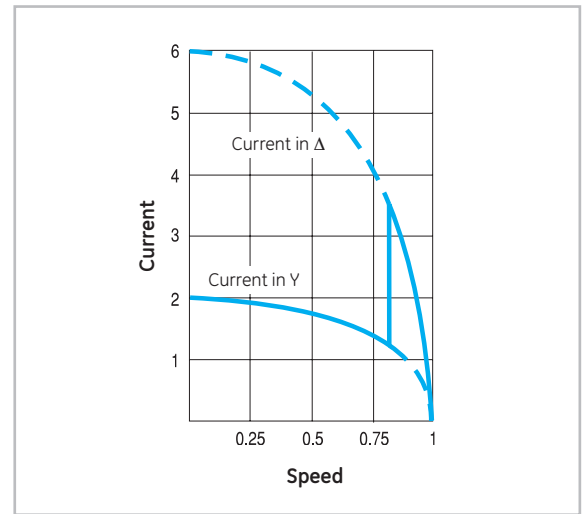
The target of this type of starting is to reduce the current during starting to 1/3, there by reducing the linedrop (see current speed curves).

Reduce the motor torque to 1/3 to smooth out mechanical stress on the machine and on the load (see torque speed curves).

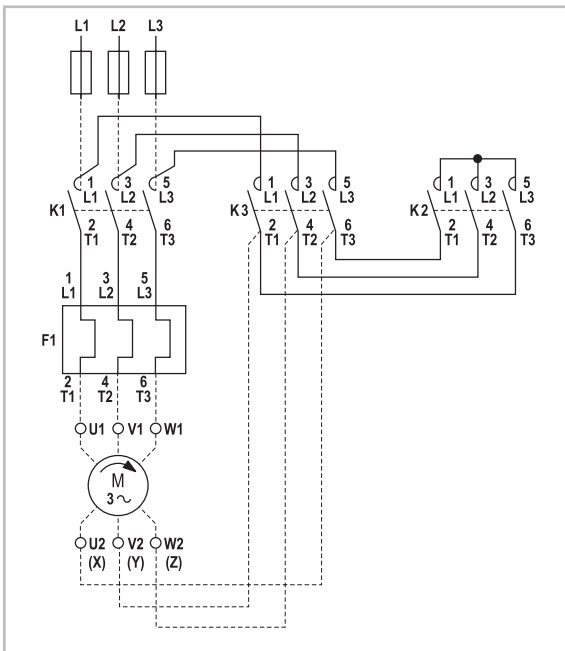
Torque-speed curve



Current-speed curve



Diagram



Selection table

| Motor | | | | | | | | | | | | Contactors | | Thermal | Fuse | |
|----------|-----|----------|------|----------|-----|------|------|----------|-----|-------|----|------------|-------|---------|------|-------|
| 230/200V | | 400/380V | | 440/415V | | 500V | | 690/660V | | 1000V | | Line and | Star | relay | aM | gG-gL |
| kW | A | kW | A | kW | A | kW | A | kW | A | kW | A | Delta | | | A | A |
| 2.2 | 9 | 4 | 9 | - | - | 5.5 | 9 | 7.5 | 9 | - | - | CL00 | CL00 | RT1L | 16 | 25 |
| 3 | 12 | 5.5 | 12 | 5.5 | 11 | 7.5 | 12 | - | - | - | - | CL00 | CL00 | RT1M | 16 | 35 |
| 3.7 | 14 | - | - | - | - | - | - | - | - | - | - | CL00 | CL00 | RT1N | 20 | 40 |
| 4 | 16 | 7.5 | 16 | 7.5 | 14 | - | - | - | - | - | - | CL01 | CL00 | RT1N | 20 | 40 |
| - | - | - | - | - | - | - | - | 11 | 13 | - | - | CL01 | CL00 | RT1M | 20 | 40 |
| - | - | - | - | - | - | 11 | 17 | - | - | - | - | CL01 | CL00 | RT1N | 20 | 40 |
| 5.5 | 21 | 11 | 22.5 | 11 | 21 | - | - | - | - | - | - | CL02 | CL01 | RT1P | 32 | 50 |
| - | - | - | - | - | - | - | - | 15 | 18 | - | - | CL02 | CL01 | RT1P | 32 | 50 |
| - | - | - | - | - | - | 15 | 23 | - | - | - | - | CL02 | CL01 | RT1P | 32 | 50 |
| - | - | - | - | - | - | - | - | 18.5 | 23 | - | - | CL25 | CL02 | RT1P | 32 | 50 |
| 7.5 | 27 | 15 | 30 | 15 | 28 | - | - | - | - | - | - | CL25 | CL02 | RT1S | 40 | 63 |
| - | - | - | - | - | - | 18.5 | 28.5 | 22 | 26 | - | - | CL25 | CL02 | RT1S | 40 | 63 |
| - | - | - | - | 18.5 | 35 | 22 | 33 | - | - | - | - | CL25 | CL02 | RT1T | 50 | 80 |
| 11 | 40 | 18.5 | 37 | - | - | - | - | - | - | - | - | CL25 | CL25 | RT1U | 50 | 63 |
| - | - | - | - | - | - | - | - | 30 | 35 | - | - | CL03 | CL25 | RT1T | 50 | 63 |
| - | - | 22 | 44 | 22 | 40 | 30 | 45 | - | - | - | - | CL03 | CL25 | RT1U | 63 | 80 |
| 15 | 50 | 25 | 50 | - | - | - | - | - | - | - | - | CL04 | CL03 | RT1V | 63 | 80 |
| - | - | - | - | - | - | - | - | 37 | 41 | - | - | CL45 | CL03 | RT1U | 50 | 80 |
| - | - | 30 | 60 | 30 | 55 | - | - | - | - | - | - | CL45 | CL03 | RT1W | 63 | 80 |
| 18.5 | 65 | - | - | - | - | - | - | - | - | - | - | CL45 | CL03 | RT1W | 80 | 125 |
| - | - | - | - | - | - | 37 | 55 | 45 | 49 | - | - | CL45 | CL03 | RT1V | 63 | 80 |
| 22 | 75 | - | - | - | - | - | - | - | - | - | - | CL06 | CL04 | RT2G | 100 | 160 |
| - | - | 33 | 65 | 37 | 66 | - | - | - | - | - | - | CL06 | CL04 | RT1W | 80 | 100 |
| - | - | - | - | - | - | 45 | 65 | 55 | 60 | - | - | CL06 | CL04 | RT2E | 100 | 160 |
| - | - | 37 | 72 | - | - | - | - | - | - | - | - | CL06 | CL04 | RT2E | 100 | 160 |
| - | - | 45 | 85 | 45 | 80 | 55 | 80 | - | - | - | - | CL06 | CL04 | RT2G | 100 | 160 |
| - | - | - | - | - | - | - | - | 75 | 80 | - | - | CL07 | CL06 | RT2G | 100 | 160 |
| 30 | 105 | 55 | 105 | 55 | 100 | - | - | - | - | - | - | CL07 | CL06 | RT2H | 125 | 160 |
| - | - | - | - | - | - | 75 | 105 | - | - | - | - | CL08 | CL06 | RT2H | 125 | 160 |
| 37 | 126 | - | - | - | - | - | - | - | - | - | - | CL08 | CL06 | RT2J | 160 | 200 |
| - | - | - | - | 75 | 135 | - | - | - | - | - | - | CL08 | CL06 | RT2J | 160 | 200 |
| - | - | - | - | - | - | - | - | 90 | 97 | - | - | CL09 | CL06 | RT2H | 125 | 160 |
| 40 | 138 | - | - | - | - | - | - | - | - | - | - | CL09 | CL07 | RT2L | 160 | 250 |
| - | - | - | - | - | - | 90 | 129 | - | - | - | - | CL09 | CL07 | RT2J | 160 | 250 |
| - | - | 75 | 138 | - | - | - | - | - | - | - | - | CL09 | CL07 | RT2L | 160 | 250 |
| - | - | - | - | - | - | - | - | 110 | 118 | - | - | CL10 | CL07 | RT2J | 160 | 250 |
| 45 | 150 | - | - | - | - | - | - | - | - | - | - | CL10 | CL07 | RT2L | 160 | 250 |
| - | - | - | - | - | - | 110 | 156 | - | - | - | - | CL10 | CL08 | RT2L | 200 | 250 |
| - | - | 90 | 170 | 90 | 165 | - | - | - | - | - | - | CL10 | CL08 | RT2M | 200 | 250 |
| - | - | - | - | - | - | - | - | 132 | 141 | - | - | CK75C | CL08 | RT3C | 160 | 200 |
| 55 | 182 | - | - | - | - | 132 | 188 | - | - | - | - | CK75C | CL08 | RT3D | 200 | 250 |
| - | - | - | - | 110 | 200 | - | - | - | - | - | - | CK75C | CL08 | RT3D | 250 | 315 |
| - | - | - | - | - | - | - | - | 150 | 166 | - | - | CK75C | CL09 | RT3D | 200 | 250 |
| - | - | - | - | - | - | - | - | 160 | 170 | - | - | CK75C | CL10 | RT3D | 200 | 250 |
| - | - | 110 | 211 | - | - | 150 | 218 | - | - | - | - | CK75C | CL10 | RT3E | 250 | 315 |
| - | - | - | - | 132 | 240 | 160 | 228 | - | - | - | - | CK75C | CL10 | RT3E | 250 | 315 |
| 75 | 239 | - | - | - | - | - | - | - | - | - | - | CK75C | CL10 | RT3E | 250 | 315 |
| - | - | - | - | - | - | - | - | - | - | 90 | 64 | CK75C | CK75C | RT4LJ | 80 | 125 |
| - | - | - | - | - | - | - | - | - | - | 110 | 78 | CK75C | CK75C | RT4LJ | 108 | 160 |
| - | - | 132 | 245 | - | - | - | - | - | - | - | - | CK75C | CL10 | RT3F | 315 | 355 |
| - | - | - | - | - | - | - | - | 185 | 193 | - | - | CK75C | CK75C | RT3E | 250 | 315 |
| - | - | 150 | 288 | 150 | 269 | 185 | 261 | - | - | - | - | CK08C | CK75C | RT3F | 315 | 355 |
| - | - | - | - | 160 | 285 | - | - | - | - | - | - | CK08C | CK75C | RT3F | 315 | 355 |
| - | - | - | - | - | - | - | - | 200 | 207 | - | - | CK08C | CK75C | RT3E | 250 | 315 |
| - | - | - | - | - | - | - | - | 220 | 230 | - | - | CK08C | CK75C | RT3E | 250 | 315 |
| 90 | 309 | - | - | - | - | - | - | - | - | - | - | CK08C | CK75C | RT3F | 315 | 355 |

For electrical endurance see page C.34-44, but first divide the rated power and current values shown in the table by 1.73. The thermal overload relay should be set at 0.58 In of the motor.

Star-delta starters

A

B

C

D

E

F

G

H

I

X



Star-delta starters

Selection table (continued)

| Motor | | | | | | | | | | Contactors | | Thermal | Fuse | | | |
|----------|-----|----------|-----|----------|-----|------|-----|----------|-----|------------|-----|----------|-------|-------|------|-------|
| 230/200V | | 400/380V | | 440/415V | | 500V | | 690/660V | | 1000V | | Line and | Star | relay | aM | gG-gL |
| kW | A | kW | A | kW | A | kW | A | kW | A | kW | A | Delta | | | A | A |
| - | - | - | - | - | - | - | - | - | - | 132 | 94 | CK08C | CK75C | RT4LK | 125 | 160 |
| - | - | - | - | - | - | - | - | - | - | 150 | 105 | CK08C | CK75C | RT3B | 125 | 160 |
| - | - | - | - | - | - | - | - | - | - | 160 | 113 | CK08C | CK75C | RT3B | 125 | 160 |
| - | - | - | - | - | - | - | - | - | - | 185 | 130 | CK85B | CK75C | RT4LL | 160 | 200 |
| - | - | 160 | 309 | - | - | 200 | 281 | 250 | 262 | - | - | CK85B | CK75C | RT4N | 355 | 400 |
| - | - | - | - | - | - | 220 | 310 | - | - | - | - | CK85B | CK75C | RT4N | 355 | 400 |
| - | - | - | - | 185 | 325 | - | - | - | - | - | - | CK85B | CK75C | RT4P | 400 | 425 |
| 110 | 356 | 185 | 355 | 200 | 350 | - | - | - | - | - | - | CK85B | CK75C | RT4P | 400 | 425 |
| - | - | - | - | - | - | - | - | 280 | 262 | - | - | CK09B | CK75C | RT4N | 315 | 355 |
| 132 | 425 | 200 | 370 | 220 | 385 | 250 | 348 | - | - | - | - | CK09B | CK75C | RT4P | 500 | 500 |
| - | - | 220 | 408 | - | - | 280 | 385 | - | - | - | - | CK09B | CK08C | RT4P | 500 | 500 |
| - | - | - | - | - | - | - | - | - | - | 200 | 141 | CK09B | CK08C | RT4LL | 200 | 250 |
| - | - | - | - | - | - | - | - | - | - | 220 | 155 | CK09B | CK08C | RT4LM | 200 | 250 |
| - | - | - | - | - | - | - | - | - | - | 250 | 175 | CK09B | CK08C | RT4LM | 200 | 250 |
| - | - | - | - | - | - | - | - | 300 | 307 | - | - | CK09B | CK08C | RT4N | 355 | 400 |
| - | - | - | - | - | - | - | - | 315 | 322 | - | - | CK09B | CK08C | RT4N | 355 | 400 |
| - | - | - | - | - | - | - | - | 335 | 349 | - | - | CK09B | CK08C | RT4P | 500 | 500 |
| - | - | - | - | - | - | - | - | - | - | 280 | 197 | CK95B | CK09B | RT4LM | 250 | 315 |
| - | - | - | - | 250 | 437 | - | - | - | - | - | - | CK95B | CK08C | RT4P | 500 | 500 |
| - | - | - | - | - | - | - | - | 355 | 366 | - | - | CK95B | CK85B | RT4P | 425 | 500 |
| - | - | - | - | - | - | 300 | 409 | 375 | 390 | - | - | CK95B | CK85B | RT4P | 500 | 500 |
| - | - | - | - | - | - | 315 | 426 | - | - | - | - | CK95B | CK85B | RT4P | 500 | 500 |
| 150 | 500 | 250 | 475 | 280 | 480 | - | - | - | - | - | - | CK95B | CK85B | RT4R | 630 | 630 |
| - | - | - | - | - | - | - | - | - | - | 300 | 211 | CK95B | CK85B | RT4LM | 250 | 315 |
| - | - | - | - | - | - | - | - | - | - | 315 | 221 | CK95B | CK85B | RT4LM | 250 | 315 |
| - | - | - | - | - | - | - | - | 400 | 412 | - | - | CK95B | CK85B | RT4R | 500 | 500 |
| - | - | - | - | - | - | - | - | 425 | 442 | - | - | CK95B | CK85B | RT4R | 500 | 500 |
| - | - | - | - | 300 | 508 | 335 | 456 | 450 | 462 | - | - | CK10C | CK85B | RT5C | 630 | 630 |
| 160 | 520 | - | - | - | - | 355 | 485 | - | - | - | - | CK10C | CK85B | RT4C | 630 | 630 |
| - | - | - | - | - | - | 375 | 513 | - | - | - | - | CK10C | CK85B | RT5C | 630 | 630 |
| - | - | 280 | 530 | 315 | 530 | - | - | - | - | - | - | CK10C | CK85B | RT5C | 630 | 630 |
| - | - | 300 | 563 | 355 | 561 | - | - | - | - | - | - | CK10C | CK85B | RT5C | 630 | 630 |
| - | - | 315 | 580 | - | - | - | - | - | - | - | - | CK10C | CK85B | RT5C | 630 | 630 |
| 185 | 609 | - | - | 355 | 600 | - | - | - | - | - | - | CK10C | CK85B | RT5C | 800 | 800 |
| - | - | - | - | - | - | - | - | - | - | 335 | 234 | CK10C | CK09B | RT5A | 315 | 355 |
| - | - | - | - | - | - | - | - | - | - | 355 | 245 | CK10C | CK09B | RT5A | 315 | 355 |
| - | - | - | - | - | - | - | - | - | - | 375 | 256 | CK10C | CK09B | RT5A | 315 | 355 |
| - | - | - | - | - | - | - | - | - | - | 400 | 273 | CK10C | CK09B | RT5A | 355 | 400 |
| - | - | - | - | - | - | - | - | - | - | 425 | 290 | CK10C | CK09B | RT5A | 355 | 400 |
| - | - | - | - | - | - | - | - | - | - | 450 | 307 | CK10C | CK09B | RT5A | 355 | 400 |
| - | - | - | - | - | - | - | - | 475 | 488 | - | - | CK10C | CK09B | RT5C | 630 | 630 |
| - | - | - | - | - | - | - | - | 500 | 514 | - | - | CK10C | CK09B | RT5C | 630 | 630 |
| - | - | - | - | - | - | 400 | 543 | 530 | 545 | - | - | CK10C | CK09B | RT5C | 630 | 630 |
| - | - | - | - | 375 | 587 | 425 | 580 | 560 | 575 | - | - | CK10C | CK09B | RT5C | 630 | 630 |
| 200 | 630 | 335 | 630 | 375 | 630 | 450 | 613 | - | - | - | - | CK10C | CK09B | RT5D | 800 | 800 |
| - | - | 355 | 650 | - | - | - | - | - | - | - | - | CK10C | CK09B | RT5D | 800 | 800 |
| - | - | - | - | - | - | - | - | 600 | 616 | - | - | CK10C | CK95B | RT5D | 800 | 800 |
| - | - | - | - | 400 | 622 | 475 | 647 | 630 | 646 | - | - | CK10C | CK95B | RT5D | 800 | 800 |
| - | - | - | - | - | - | - | - | - | - | 475 | 324 | CK10C | CK95B | RT5B | 355 | 400 |
| - | - | - | - | - | - | - | - | - | - | 500 | 341 | CK10C | CK95B | RT5B | 400 | 425 |
| - | - | - | - | - | - | - | - | - | - | 600 | 407 | CK10C | CK95B | RT5B | 500 | 500 |
| - | - | - | - | 400 | 673 | 425 | 659 | - | - | - | - | CK10C | CK10C | RT5D | 800 | 800 |
| - | - | 375 | 680 | - | - | 500 | 680 | 670 | 688 | - | - | CK11C | CK10C | RT5D | 800 | 800 |
| 220 | 710 | 400 | 720 | 425 | 714 | 530 | 725 | 710 | 729 | - | - | CK11C | CK10C | RT5D | 800 | 800 |
| - | - | - | - | 450 | 756 | 560 | 762 | 750 | 770 | - | - | CK11C | CK10C | RT5E | 1000 | 1000 |
| - | - | 425 | 763 | 475 | 798 | - | - | - | - | - | - | CK11C | CK10C | RT5E | 1000 | 1000 |
| - | - | - | - | - | - | 600 | 817 | - | - | - | - | CK11C | CK10C | RT5E | 1000 | 1000 |

For electrical endurance see page C.34-44, but first divide the rated power and current values shown in the table by 1.73. The thermal overload relay should be set at 0.58 In of the motor.

Motorstarters

A

B

C

D

E

F

G

H

I

X



Selection table (continued)

| Motor | | | | | | | | | | Contactors | | Thermal | Fuse | | | |
|----------|------|----------|------|----------|------|------|------|----------|-----|------------|-----|----------------|-------|-------|-------|-------|
| 230/200V | | 400/380V | | 440/415V | | 500V | | 690/660V | | 1000V | | Line and Delta | Star | relay | aM | gG-gL |
| kW | A | kW | A | kW | A | kW | A | kW | A | kW | A | | | | A | A |
| 250 | 823 | - | - | - | - | - | - | - | - | - | - | CK11C | CK10C | RT5E | 1000 | 1000 |
| - | - | - | - | - | - | - | - | - | - | 630 | 428 | CK11C | CK10C | RT5B | 500 | 630 |
| - | - | - | - | - | - | - | - | - | - | 670 | 455 | CK11C | CK10C | RT5C | 500 | 630 |
| - | - | 450 | 800 | - | - | - | - | - | - | - | - | CK11C | CK10C | RT5E | 1000 | 1000 |
| - | - | 475 | 846 | 500 | 840 | - | - | - | - | - | - | CK11C | CK10C | RT5E | 1000 | 1000 |
| - | - | - | - | - | - | - | - | 800 | 821 | - | - | CK11C | CK10C | RT5E | 1000 | 1000 |
| - | - | 500 | 892 | 530 | 890 | 630 | 857 | 850 | 873 | - | - | CK11C | CK10C | RT5E | 1000 | 1000 |
| 280 | 910 | 530 | 943 | 560 | 941 | 670 | 912 | - | - | - | - | CK11C | CK10C | RT5E | 2x630 | 2x630 |
| 300 | 975 | - | - | - | - | 710 | 965 | - | - | - | - | CK12C | CK10C | RT5E | 2x630 | 2x630 |
| 315 | 1023 | 560 | 996 | 600 | 1010 | 750 | 1020 | - | - | - | - | CK12C | CK10C | RT5E | 2x630 | 2x630 |
| 335 | 1083 | - | - | 630 | 1058 | - | - | - | - | - | - | CK12C | CK10C | RT5E | 2x630 | 2x630 |
| - | - | - | - | - | - | - | - | - | - | 750 | 510 | CK12C | CK11C | RT5C | 630 | 630 |
| - | - | - | - | - | - | - | - | 900 | 924 | - | - | CK13B | CK11C | RT6A | 2x630 | 2x630 |
| - | - | - | - | - | - | 800 | 1088 | 950 | 975 | - | - | CK13B | CK11C | RT6A | 2x630 | 2x630 |
| - | - | 600 | 1074 | - | - | - | - | - | - | - | - | CK12B | CK11C | RT5E | 2x630 | 2x630 |
| 355 | 1142 | - | - | 710 | 1097 | - | - | - | - | - | - | CK12B | CK11C | RT5E | 2x630 | 2x630 |
| - | - | - | - | - | - | - | - | - | - | 800 | 543 | CK13B | CK11C | RT5C | 630 | 800 |
| - | - | 630 | 1128 | 670 | 1125 | - | - | - | - | - | - | CK12B | CK11C | RT5E | 2x630 | 2x630 |
| 375 | 1206 | 670 | 1200 | 710 | 1190 | 850 | 1156 | - | - | - | - | CK13B | CK11C | RT6A | 2x800 | 2x800 |
| 400 | 1286 | 710 | 1270 | 750 | 1255 | - | - | - | - | - | - | CK13B | CK11C | RT6A | 2x800 | 2x800 |
| 425 | 1364 | - | - | - | - | - | - | - | - | - | - | CK13B | CK12C | RT6A | 2x800 | 2x800 |
| - | - | 750 | 1342 | - | - | - | - | - | - | - | - | CK13B | CK12C | RT6A | 2x800 | 2x800 |

For electrical endurance see page C.34-44, but first divide the rated power and current values shown in the table by 1.73. The thermal overload relay should be set at 0.58 In of the motor.

Star-delta starters

- A
- B
- C
- D
- E
- F
- G
- H
- I
- X



Autotransformer starters

For AC squirrel cage motors

This type of starting is used for machines where the resisting torque during starting is less than the motor torque (see torque speed curves):

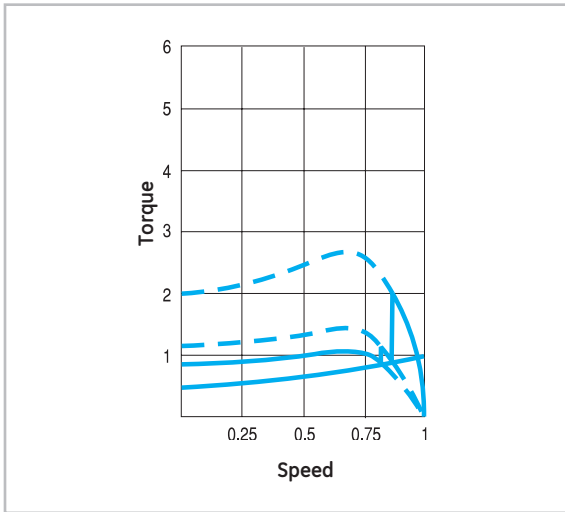
- Reduce current during starting to the required value (this will depend on the autotransformer voltage ratio selected).
- Reduce motor torque to smooth out mechanical stress on the machine and on the load (see torque speed curves). Reduction of the motor will depend on the autotransformer voltage ratio.

The two requirements for star-delta starting do not apply here. That is to say both end of the three windings do not have to be accessible and the line voltage does not have to be the same as the delta connection voltage.

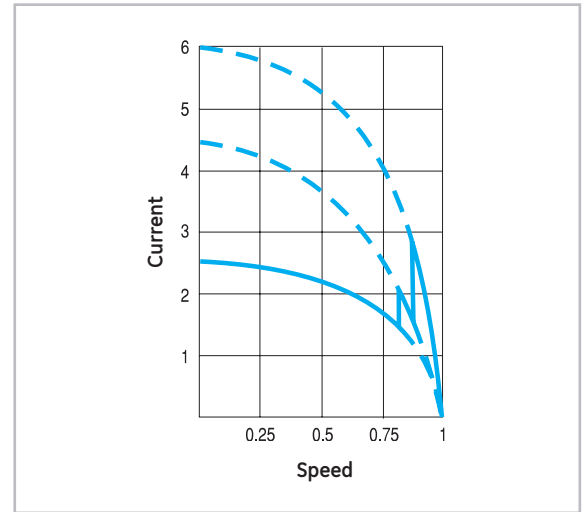
This system also has the following advantages over star-delta starting:

- required current and starting torque can be selected.
- starting can be effected at various points.
- motor voltage continuity during network switching.

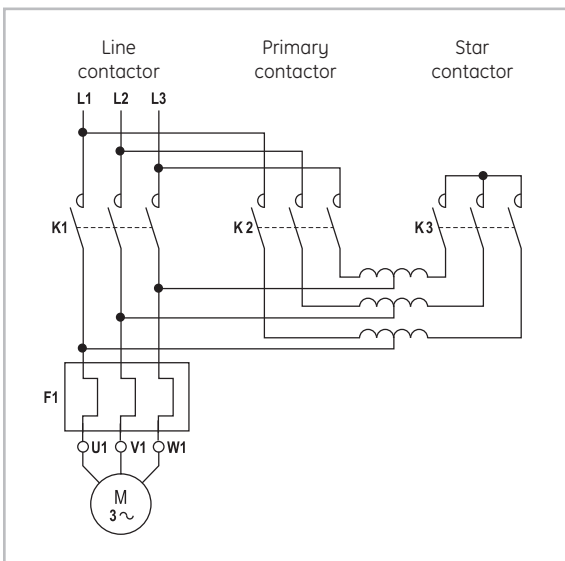
Torque-speed curve



Current-speed curve



Diagram



Selection table

| Motor | | | | | | | | | | | Contactors | | Thermal | Fuse | | |
|----------|-----|----------|------|----------|-----|------|------|----------|-----|-------|------------|-------|---------------------|-------|------|-------|
| 230/200V | | 400/380V | | 440/415V | | 500V | | 690/660V | | 1000V | | Line | Pr. trafo + Star | relay | aM | gG-gL |
| kW | A | kW | A | kW | A | kW | A | kW | A | kW | A | | | | A | A |
| 2.2 | 9 | 4 | 9 | 4 | 8 | 5.5 | 9 | - | - | - | - | CL00 | CL00 | RT1N | 16 | 25 |
| - | - | - | - | - | - | - | - | 7.5 | 9 | - | - | CL01 | CL00 | RT1N | 16 | 25 |
| 3 | 12 | 5.5 | 12 | 5.5 | 11 | 7.5 | 12 | - | - | - | - | CL01 | CL00 | RT1P | 16 | 35 |
| 3.7 | 14 | - | - | 7.5 | 14 | - | - | - | - | - | - | CL02 | CL00 | RT1P | 20 | 40 |
| - | - | 7.5 | 16 | - | - | 10 | 15.5 | - | - | - | - | CL02 | CL00 | RT1S | 20 | 40 |
| - | - | - | - | - | - | - | - | 11 | 13 | - | - | CL25 | CL01 | RT1P | 20 | 40 |
| - | - | - | - | - | - | 11 | 17 | - | - | - | - | CL25 | CL01 | RT1S | 20 | 40 |
| 5.5 | 21 | 11 | 22.5 | 11 | 21 | 13 | 20 | - | - | - | - | CL25 | CL01 | RT1T | 32 | 50 |
| - | - | - | - | - | - | - | - | 15 | 18 | - | - | CL03 | CL01 | RT1T | 32 | 50 |
| - | - | - | - | - | - | 15 | 23 | - | - | - | - | CL04 | CL01 | RT1U | 32 | 50 |
| 7.5 | 27 | 15 | 30 | 15 | 28 | - | - | - | - | - | - | CL04 | CL02 | RT1V | 40 | 63 |
| - | - | - | - | - | - | - | - | 18.5 | 23 | - | - | CL45 | CL02 | RT1U | 32 | 50 |
| - | - | - | - | - | - | 18.5 | 22.5 | 22 | 25 | - | - | CL45 | CL02 | RT1U | 40 | 63 |
| - | - | - | - | 18.5 | 35 | 22 | 33 | - | - | - | - | CL45 | CL02 | RT1W | 50 | 80 |
| 11 | 40 | 18.5 | 37 | 22 | 40 | - | - | - | - | - | - | CL06 | CL03 | RT2E | 50 | 80 |
| - | - | - | - | - | - | - | - | 30 | 35 | - | - | CL06 | CL03 | RT2E | 50 | 80 |
| - | - | 22 | 44 | - | - | - | - | - | - | - | - | CL06 | CL03 | RT2G | 63 | 80 |
| 15 | 50 | - | - | - | - | - | - | - | - | - | - | CL06 | CL03 | RT2G | 63 | 80 |
| - | - | - | - | - | - | 30 | 45 | - | - | - | - | CL07 | CL03 | RT2G | 63 | 80 |
| - | - | - | - | - | - | - | - | 37 | 41 | - | - | CL07 | CL04 | RT2E | 63 | 80 |
| - | - | 30 | 60 | 30 | 55 | 37 | 55 | - | - | - | - | CL07 | CL04 | RT2H | 80 | 125 |
| 18.5 | 65 | - | - | 37 | 66 | - | - | - | - | - | - | CL07 | CL04 | RT2J | 80 | 125 |
| - | - | - | - | - | - | - | - | 45 | 49 | - | - | CL08 | CL04 | RT2G | 80 | 125 |
| - | - | - | - | - | - | - | - | 55 | 60 | - | - | CL08 | CL04 | RT2H | 80 | 125 |
| - | - | - | - | - | - | 45 | 65 | - | - | - | - | CL08 | CL06 | RT2J | 80 | 125 |
| 22 | 75 | 37 | 72 | - | - | - | - | - | - | - | - | CL08 | CL06 | RT2J | 80 | 125 |
| - | - | - | - | 45 | 80 | 55 | 80 | - | - | - | - | CL08 | CL06 | RT2L | 100 | 160 |
| 25 | 84 | 45 | 85 | 50 | 88 | - | - | - | - | - | - | CL09 | CL06 | RT2L | 100 | 160 |
| - | - | - | - | - | - | - | - | 75 | 80 | - | - | CL09 | CL06 | RT2L | 125 | 160 |
| 30 | 105 | 55 | 105 | 55 | 100 | 75 | 105 | - | - | - | - | CL10 | CL06 | RT2M | 160 | 200 |
| - | - | - | - | - | - | - | - | 90 | 97 | - | - | CL10 | CL07 | RT2M | 125 | 200 |
| 37 | 126 | 75 | 138 | 75 | 135 | 90 | 129 | - | - | - | - | CK75C | CL07 | RT3E | 200 | 224 |
| - | - | - | - | - | - | - | - | 110 | 118 | - | - | CK08C | CL08 | RT3E | 160 | 200 |
| - | - | - | - | - | - | - | - | 132 | 141 | - | - | CK08C | CL08 | RT3F | 200 | 250 |
| 45 | 150 | 90 | 170 | 90 | 165 | 110 | 156 | - | - | - | - | CK08C | CL08 | RT3F | 200 | 250 |
| 55 | 182 | - | - | - | - | - | - | - | - | - | - | CK08C | CL08 | RT3F | 200 | 250 |
| - | - | - | - | - | - | - | - | - | 90 | 64 | - | CK08C | CL08 | RT3B | 100 | 160 |
| - | - | - | - | - | - | - | - | 150 | 166 | - | - | CK85B | CL09A | RT4N | 250 | 315 |
| - | - | 110 | 211 | 110 | 200 | 132 | 188 | - | - | - | - | CK85B | CL09A | RT4P | 250 | 315 |
| - | - | - | - | - | - | - | - | - | 110 | 78 | - | CK85B | CK75C | RT4N | 100 | 160 |
| - | - | - | - | - | - | - | - | 160 | 170 | - | - | CK09B | CK75C | RT4N | 200 | 250 |
| - | - | - | - | - | - | 150 | 218 | 185 | 193 | - | - | CK09B | CK75C | RT4P | 250 | 315 |
| 75 | 239 | 132 | 245 | 132 | 240 | 160 | 228 | 200 | 207 | - | - | CK09B | CK75C | RT4R | 315 | 355 |
| - | - | - | - | - | - | - | - | - | - | 150 | 105 | CK09B | CK75C | RT4M | 160 | 200 |
| - | - | - | - | - | - | - | - | - | - | 160 | 113 | CK95B | CK08C | RT4M | 160 | 200 |
| - | - | - | - | - | - | - | - | - | - | 220 | 155 | CK10C | CK08C | RT5A | 200 | 250 |
| - | - | - | - | - | - | - | - | - | - | 250 | 175 | CK10C | CK85B | RT5A | 250 | 315 |
| - | - | - | - | - | - | - | - | 220 | 230 | - | - | CK95B | CK08C | RT4P | 315 | 355 |
| 90 | 309 | 160 | 309 | - | - | 220 | 310 | - | - | - | - | CK10C | CK08C | RT5C | 400 | 425 |
| - | - | - | - | 185 | 325 | - | - | 300 | 307 | - | - | CK10C | CK08C | RT5C | 425 | 500 |
| 110 | 356 | 220 | 408 | 220 | 385 | 280 | 285 | 335 | 344 | - | - | CK10C | CK85B | RT5D | 425 | 500 |
| 132 | 425 | - | - | 250 | 437 | - | - | - | - | - | - | CK11C | CK85B | RT5D | 630 | 630 |
| - | - | - | - | - | - | - | - | - | - | 280 | 197 | CK10C | CK09B | RT5B | 250 | 315 |
| - | - | - | - | - | - | - | - | - | - | 335 | 234 | CK11C | CK09B | RT5B | 315 | 355 |
| - | - | - | - | - | - | - | - | - | - | 355 | 245 | CK11C | CK09B | RT5B | 315 | 355 |
| - | - | - | - | - | - | 300 | 409 | 400 | 412 | - | - | CK11C | CK09B | RT5D | 500 | 500 |
| - | - | - | - | - | - | 315 | 426 | - | - | - | - | CK11C | CK09B | RT5D | 630 | 630 |
| 150 | 500 | 250 | 475 | 280 | 480 | 335 | 456 | - | - | - | - | CK11C | CK09B | RT5E | 630 | 630 |
| - | - | - | - | - | - | - | - | - | - | 375 | 256 | CK12B | CK95B | RT5B | 315 | 355 |
| - | - | - | - | 300 | 508 | 375 | 513 | 450 | 462 | - | - | CK12B | CK95B | RT5E | 630 | 630 |
| 160 | 520 | 315 | 580 | 335 | 565 | - | - | - | - | - | - | CK12B | CK95B | RT5E | 630 | 630 |
| - | - | - | - | - | - | - | - | - | - | 450 | 307 | CK12B | CK10C | RT5C | 400 | 425 |
| - | - | - | - | - | - | - | - | 475 | 488 | - | - | CK12B | CK10C | RT5D | 630 | 630 |
| 200 | 630 | 335 | 630 | 375 | 630 | 450 | 613 | - | - | - | - | CK12B | CK10C | RT5E | 800 | 800 |
| - | - | - | - | - | - | - | - | - | - | 500 | 341 | CK13B | CK10C | RT5C | 500 | 630 |
| - | - | - | - | - | - | - | - | 500 | 514 | - | - | CK13B | CK10C | RT6A | 800 | 800 |
| 220 | 710 | 425 | 762 | 450 | 756 | 500 | 800 | - | - | - | - | CK13B | CK10C | RT6A | 1000 | 1000 |
| 250 | 823 | 450 | 800 | - | - | - | - | - | - | - | - | CK13B | CK10C | RT6A | 1000 | 1000 |

Autotransformer starters
A
B
C
D
E
F
G
H
I
X


Contactors for rotor starters

For AC slip-ring motors

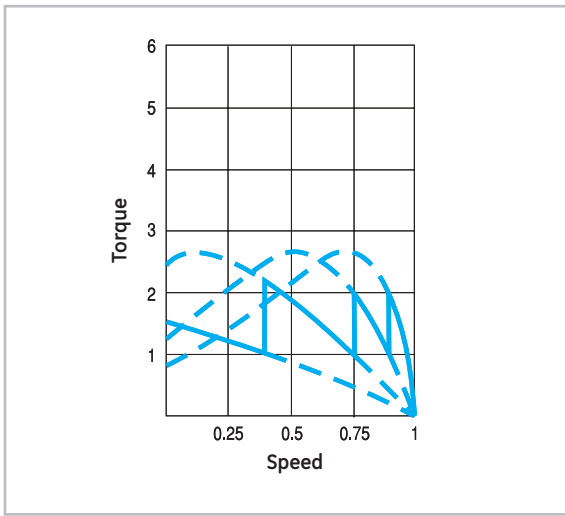
This type of starter is used in machines with resisting torque of any value where it is required to:

- Start with reduced peak currents without consequent motor torque reduction, as is the case with high resisting torques and when starting with reduced peak currents is required.
- Control speed for different load or resisting torque values, with reduced peak currents: lifting and transport gear, flow volume control, etc.

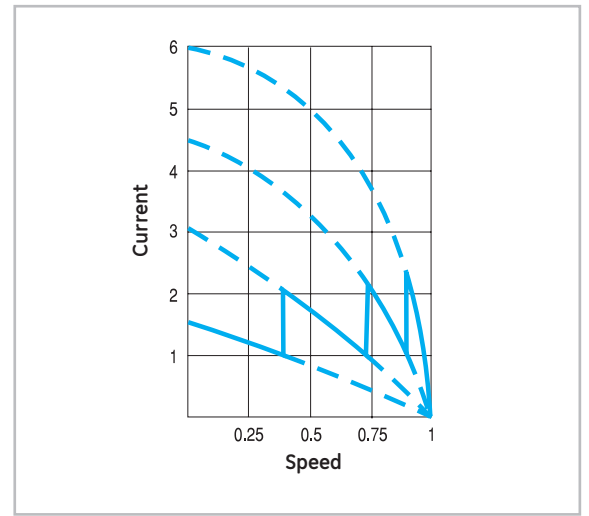
Whatever the application, a distinction should be made between the two electrical circuits which are used in this type of starters:

- Stator circuit, present in two categories and having a different breaking current in each:
 Category AC'2: switching-off motors during running, $I_c = I_e$
 Category AC 2: switching-off motors during starting, $I_c = 2.5 I_e$
- Rotor circuit, with similar characteristics to those in category AC1.

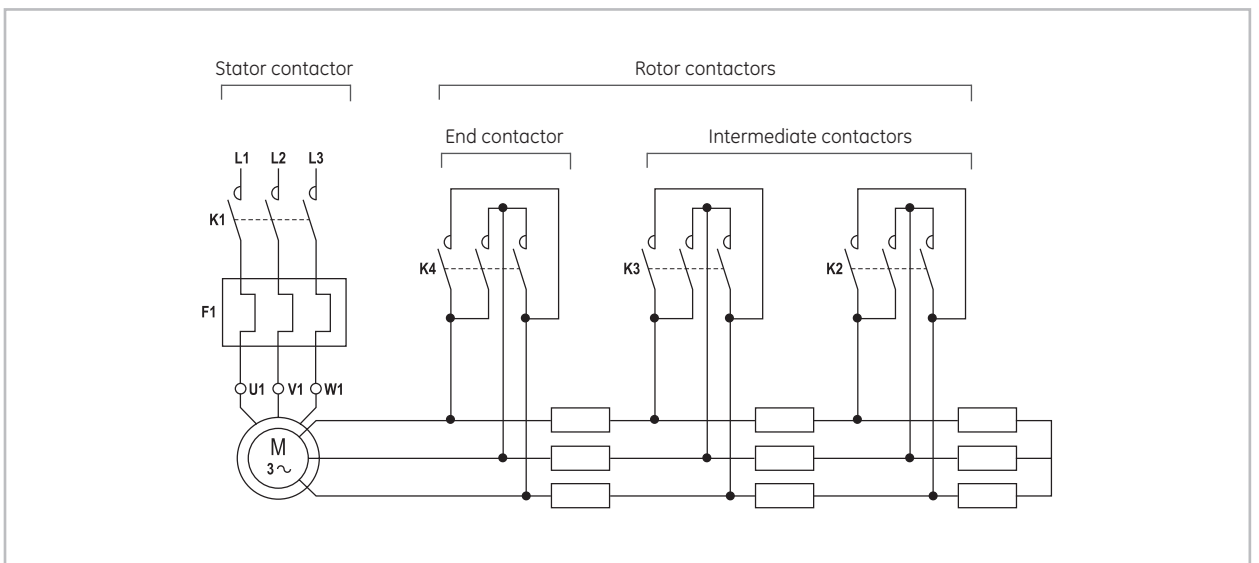
Torque-speed curve



Current-speed curve



Diagram



Stator circuit

| Motor power | | | | | | Con- tactor | Thermal relay | Fuse | |
|--------------------|--------------------|--------------------|------------|--------------------|-------------|----------------|------------------|---------|------------|
| 230V 220V kW | 400V 380V kW | 440V 415V kW | 500V kW | 690V 660V kW | 1000V kW | | | aM A | gG-gL A |
| - | - | 11 | 13 | - | - | | | CL25 | RT1T |
| 5.5 | 11 | - | - | - | - | CL25 | RT1U | 32 | 50 |
| - | - | - | - | 15 | - | CL03 | RT1T | 25 | 40 |
| - | - | - | - | 17 | - | CL04 | RT1T | 32 | 50 |
| - | - | - | 15 | - | - | CL04 | RT1U | 32 | 50 |
| 7.5 | 15 | 15 | 17 | - | - | CL04 | RT1V | 40 | 63 |
| - | - | - | - | 18.5 | - | CL45 | RT1U | 32 | 50 |
| - | - | 18.5 | 22 | 33 | - | CL45 | RT1W | 50 | 80 |
| 11 | 18.5 | 22 | - | - | - | CL06 | RT2E | 50 | 80 |
| - | 22 | 25 | 25 | 33 | - | CL06 | RT2G | 63 | 80 |
| 15 | - | - | - | - | - | CL06 | RT2G | 63 | 80 |
| - | - | - | 30 | 40 | - | CL07 | RT2G | 63 | 80 |
| - | 30 | 30 | 37 | - | - | CL07 | RT2H | 80 | 125 |
| 18.5 | - | 37 | - | - | - | CL07 | RT2J | 80 | 125 |
| - | - | - | - | 45 | - | CL08 | RT2G | 63 | 80 |
| - | - | - | - | 55 | - | CL09 | RT2H | 80 | 125 |
| - | - | - | 45 | - | - | CL08 | RT2J | 80 | 125 |
| 22 | 37 | 45 | - | - | - | CL08 | RT2J | 100 | 160 |
| - | - | - | 55 | 75 | - | CL10 | RT2J | 100 | 160 |
| 25 | 45 | 50 | 63 | - | - | CL10 | RT2L | 125 | 160 |
| - | - | - | - | 90 | - | CK75C | RT3D | 125 | 160 |
| 30 | 55 | 55 | 75 | - | - | CK75C | RT3D | 160 | 200 |
| 37 | 75 | 75 | 90 | - | - | CK75C | RT3E | 200 | 250 |
| - | - | - | - | - | 90 | CK08C | RT3B | 100 | 125 |
| - | - | - | - | 110 | - | CK08C | RT3E | 160 | 200 |
| - | - | - | - | 132 | - | CK08C | RT3F | 200 | 250 |
| 45 | 90 | 90 | 110 | - | - | CK08C | RT3F | 200 | 250 |
| 55 | - | 100 | - | - | - | CK08C | RT4N | 250 | 315 |
| - | - | 110 | 132 | - | - | CK85B | RT4P | 250 | 315 |
| - | - | - | - | - | 150 | CK09B | RT4M | 125 | 160 |
| - | - | - | - | 160 | - | CK09B | RT4N | 200 | 250 |
| - | - | - | - | 200 | - | CK09B | RT4P | 250 | 315 |
| 75 | 132 | 132 | 160 | - | - | CK09B | RT4P | 315 | 355 |
| - | - | - | - | - | 185 | CK95B | RT4N | 160 | 200 |
| - | - | - | - | - | 250 | CK10C | RT4N | 200 | 250 |
| - | - | - | - | 220 | - | CK10C | RT4P | 315 | 355 |
| 90 | 160 | 160 | 220 | 300 | - | CK10C | RT5C | 355 | 400 |
| - | - | 185 | - | 315 | - | CK10C | RT5C | 400 | 425 |
| 110 | 200 | 220 | 250 | 335 | - | CK10C | RT5C | 500 | 630 |
| - | - | - | - | - | 280 | CK10C | RT5B | 250 | 315 |
| - | - | - | - | - | 335 | CK11C | RT5B | 315 | 355 |
| - | - | - | - | - | 355 | CK11C | RT5B | 315 | 355 |
| - | 220 | - | 300 | 400 | - | CK11C | RT5D | 500 | 600 |
| 132 | - | 250 | 315 | - | - | CK11C | RT5D | 630 | 630 |
| 150 | 250 | 250 | 335 | - | - | CK11C | RT5E | 630 | 630 |
| - | - | - | - | - | 375 | CK12B | RT5B | 355 | 400 |
| - | - | - | - | - | 450 | CK12B | RT5C | 400 | 425 |
| - | - | 300 | 375 | 475 | - | CK12B | RT5E | 630 | 800 |
| 220 | 335 | 375 | - | - | - | CK12B | RT5E | 800 | 800 |
| - | - | - | - | - | 500 | CK13B | RT5C | 400 | 500 |
| - | - | - | - | 500 | - | CK13B | RT6A | 630 | 800 |
| 220 | 425 | - | 450 | - | - | CK13B | RT6A | 1000 | 1000 |
| 250 | 450 | 450 | 500 | - | - | CK13B | RT6A | 1000 | 1000 |

Rotor circuit

| Rotor | | Contactor | |
|-------------|--------------|--------------|-------|
| Current (1) | Max. voltage | Intermediate | End |
| A | V | | |
| 28 | 1000 | CL00 | CL00 |
| 37 | 1000 | CL00 | CL01 |
| 42 | 1000 | CL00 | CL01 |
| 48 | 1000 | CL01 | CL02 |
| 55 | 1000 | CL02 | CL25 |
| 60 | 1000 | CL02 | CL03 |
| 75 | 1000 | CL25 | CL04 |
| 90 | 1000 | CL25 | CL45 |
| 98 | 1000 | CL03 | CL45 |
| 112 | 1000 | CL04 | CL06 |
| 120 | 1000 | CL45 | CL06 |
| 135 | 1000 | CL45 | CL06 |
| 147 | 1000 | CL06 | CL06 |
| 165 | 1000 | CL06 | CL07 |
| 180 | 1000 | CL06 | CL07 |
| 187 | 1000 | CL07 | CL08 |
| 202 | 1000 | CL07 | CL09 |
| 240 | 1000 | CL08 | CL10 |
| 247 | 1000 | CL08 | CK75C |
| 280 | 1000 | CL09 | CK75C |
| 315 | 1000 | CL09 | CK08C |
| 360 | 1000 | CL10 | CK85C |
| 390 | 1500 | CK75C | CK09B |
| 472 | 1500 | CK08C | CK95B |
| 525 | 1500 | CK85B | CK95B |
| 585 | 1500 | CK09B | CK10C |
| 660 | 1500 | CK95B | CK10C |
| 825 | 1500 | CK10C | CK11C |
| 945 | 1500 | CK10C | CK12B |
| 1087 | 1500 | CK11C | CK12B |
| 1188 | 1500 | CK11C | CK12B |
| 1485 | 1500 | CK12B | CK13B |
| 1956 | 1500 | CK13B | - |

(1) The currents shown relate to the delta connection of the contactors poles. If the poles are star-connected, divide the values given in the column by 1.5.

Electrical endurance

- Stator circuit (see graph AC-2)
- Rotor circuit (see graph AC-1)

Contactors for rotor starters

A

B

C

D

E

F

G

H

I

X



Contactors for rotor speed drives

Motorstarters

A

B

C

D

E

F

G

H

I

X

Stator circuit

| | Motor power (1) | | | | | | | Contactor |
|---------------------|--------------------|--------------------|------------|------------|------------|------------|-------------|-----------|
| | 230V 220V kW | 400V 380V kW | 415V kW | 440V kW | 500V kW | 690V kW | 1000V kW | |
| Jogging 10% AC-2 | 2.4 | 4.5 | 5 | 5.5 | 5.5 | 6.3 | - | CL00 |
| | 3.7 | 6.5 | 7.5 | 7.5 | 8 | 9 | - | CL01 |
| | 5 | 8 | 10 | 10 | 10 | 11 | - | CL02 |
| | 7 | 13 | 15 | 15 | 15 | 15 | - | CL25 |
| | 9 | 16.5 | 19 | 19 | 19 | 19 | - | CL04 |
| | 10.5 | 19.5 | 24 | 24 | 24 | 27 | - | CL45 |
| | 13.5 | 23 | 27 | 27 | 27 | 30 | - | CL06 |
| | 18.5 | 28 | 32 | 32 | 32 | 35 | - | CL07 |
| | 21 | 34 | 40 | 40 | 40 | 45 | - | CL08 |
| | 22.5 | 39 | 47 | 47 | 47 | 50 | - | CL09 |
| 27.5 | 49 | 55 | 55 | 55 | 60 | - | CL10 | |
| 38 | 65 | 70 | 70 | 75 | 75 | - | CK75C | |
| 40 | 75 | 85 | 85 | 85 | 95 | 80 | CK08C | |
| 50 | 85 | 90 | 90 | 100 | 100 | 95 | CK85B | |
| 55 | 96 | 110 | 110 | 110 | 120 | 110 | CK09B | |
| 70 | 110 | 115 | 115 | 125 | 125 | 120 | CK95B | |
| 85 | 147 | 175 | 175 | 175 | 195 | 165 | CK10C | |
| 105 | 181 | 220 | 220 | 220 | 233 | 220 | CK11C | |
| 124 | 215 | 235 | 235 | 257 | 270 | 250 | CK12B | |
| 140 | 250 | 260 | 260 | 300 | 280 | 276 | CK13B | |
| Jogging 20% AC-2 | 2.1 | 3.7 | 4.4 | 4.4 | 4.4 | 5 | - | CL00 |
| | 2.6 | 4.5 | 6.1 | 6.1 | 6.1 | 7 | - | CL01 |
| | 3.6 | 6.5 | 8.2 | 8.2 | 8.2 | 9 | - | CL02 |
| | 6.3 | 11 | 12.7 | 12.7 | 12.7 | 11 | - | CL25 |
| | 8 | 13.8 | 15.9 | 15.9 | 15.9 | 17 | - | CL04 |
| | 9.2 | 16 | 18.5 | 18.5 | 18.5 | 20 | - | CL45 |
| | 10.5 | 18.5 | 22 | 22 | 22 | 25 | - | CL06 |
| | 13 | 23 | 27 | 27 | 27 | 31 | - | CL07 |
| | 17.3 | 30 | 34.6 | 34.6 | 34.6 | 43 | - | CL08 |
| | 19.6 | 34 | 39 | 39 | 39 | 47 | - | CL09 |
| | 22 | 38 | 46 | 46 | 46 | 55 | - | CL10 |
| | 32 | 60 | 65 | 65 | 65 | 70 | 65 | CK75C |
| | 36 | 75 | 75 | 75 | 75 | 90 | 75 | CK08C |
| | 42 | 78 | 85 | 85 | 85 | 100 | 85 | CK85B |
| | 47.8 | 82.5 | 90 | 96 | 96 | 115 | 100 | CK09B |
| | 60 | 96 | 110 | 110 | 110 | 135 | 125 | CK95B |
| 77 | 132 | 140 | 150 | 150 | 190 | 160 | CK10C | |
| 89 | 153 | 178 | 178 | 185 | 220 | 185 | CK11C | |
| 110 | 190 | 218 | 218 | 220 | 258 | 220 | CK12B | |
| 132 | 228 | 230 | 230 | 258 | 240 | 230 | CK13B | |

Rotor circuit

| | Rotor current (2) | Rotor voltage without counter-current | Rotor voltage with counter-current | Contactor |
|--|-------------------|---------------------------------------|------------------------------------|-----------|
| | 22 | 690 | 500 | CL00 |
| | 30 | 690 | 500 | CL01 |
| | 39 | 690 | 500 | CL02 |
| | 60 | 690 | 500 | CL25 |
| | 72 | 690 | 500 | CL04 |
| | 87 | 750 | 600 | CL45 |
| | 105 | 750 | 600 | CL06 |
| | 127 | 750 | 600 | CL07 |
| | 147 | 750 | 600 | CL08 |
| | 177 | 750 | 600 | CL09 |
| | 195 | 750 | 600 | CL10 |
| | 220 | 1000 | 750 | CK75C |
| | 240 | 1000 | 750 | CK08C |
| | 280 | 1000 | 750 | CK85B |
| | 315 | 1000 | 750 | CK09B |
| | 360 | 1000 | 750 | CK95B |
| | 405 | 1000 | 750 | CK10C |
| | 525 | 1000 | 750 | CK11C |
| | 780 | 1000 | 750 | CK12B |
| | 885 | 1000 | 750 | CK13B |
| | 18 | 690 | 500 | CL00 |
| | 25 | 690 | 500 | CL01 |
| | 37 | 690 | 500 | CL02 |
| | 48 | 690 | 500 | CL25 |
| | 60 | 690 | 500 | CL04 |
| | 72 | 750 | 600 | CL45 |
| | 85 | 750 | 600 | CL06 |
| | 106 | 750 | 600 | CL07 |
| | 123 | 750 | 600 | CL08 |
| | 147 | 750 | 600 | CL09 |
| | 165 | 750 | 600 | CL10 |
| | 190 | 1000 | 750 | CK75C |
| | 210 | 1000 | 750 | CK08C |
| | 240 | 1000 | 750 | CK85B |
| | 273 | 1000 | 750 | CK09B |
| | 305 | 1000 | 750 | CK95B |
| | 348 | 1000 | 750 | CK10C |
| | 453 | 1000 | 750 | CK11C |
| | 570 | 1000 | 750 | CK12B |
| | 750 | 1000 | 750 | CK13B |

Electrical endurance 10⁶ x 1.3 operations

continued on D.61

- (1) Power values shown are not standard as they refer to intermittent service.
- (2) The current shown relates to the delta connection of the contactor poles.
If the poles are star-connected, divide the values given in the column by 1.5.



Stator circuit (continued)

| Motor power (1) | | | | | | | Contactor |
|--------------------|--------------------|------------|------------|------------|------------|-------------|-----------|
| 230V 220V kW | 400V 380V kW | 415V kW | 440V kW | 500V kW | 690V kW | 1000V kW | |
| 1.4 | 2.8 | 3.4 | 3.4 | 3.4 | 4 | - | CL00 |
| 2.2 | 3.8 | 4.5 | 4.5 | 4.5 | 5.5 | - | CL01 |
| 3 | 5.5 | 7.5 | 7.5 | 7.5 | 7.5 | - | CL02 |
| 4.9 | 9 | 10 | 10 | 10 | 11 | - | CL25 |
| 6.7 | 12.8 | 14.8 | 14.8 | 14.8 | 13 | - | CL04 |
| 7 | 13 | 15 | 15 | 15 | 17 | - | CL45 |
| 9 | 15 | 18 | 18 | 18 | 20 | - | CL06 |
| 10.5 | 18.5 | 22 | 22 | 22 | 25 | - | CL07 |
| 13.5 | 24 | 28 | 28 | 28 | 33 | - | CL08 |
| 18.5 | 29 | 33 | 33 | 33 | 40 | - | CL09 |
| 19.6 | 34 | 39 | 39 | 39 | 45 | - | CL10 |
| 25 | 45 | 47 | 47 | 47 | 55 | 60 | CK75C |
| 30 | 55 | 63 | 63 | 63 | 77 | 63 | CK08C |
| 35 | 78 | 80 | 80 | 80 | 90 | 75 | CK85B |
| 40 | 75 | 85 | 85 | 85 | 100 | 80 | CK09B |
| 46 | 83 | 100 | 100 | 100 | 135 | 117 | CK95B |
| 63 | 110 | 132 | 132 | 132 | 150 | 132 | CK10C |
| 79 | 136 | 157 | 157 | 160 | 190 | 160 | CK11C |
| 91 | 157 | 165 | 176 | 188 | 220 | 185 | CK12B |
| 115 | 200 | 200 | 200 | 220 | 205 | 202 | CK13B |

Jogging
35% AC-2

Rotor circuit (continued)

| Rotor current (2) | Rotor voltage without counter-current | Rotor voltage with counter-current | Contactor |
|-------------------|---------------------------------------|------------------------------------|-----------|
| 14 | 660 | 500 | CL00 |
| 20 | 660 | 500 | CL01 |
| 26 | 660 | 500 | CL02 |
| 42 | 660 | 500 | CL25 |
| 50 | 660 | 500 | CL04 |
| 57 | 750 | 600 | CL45 |
| 70 | 750 | 600 | CL06 |
| 85 | 750 | 600 | CL07 |
| 100 | 750 | 600 | CL08 |
| 120 | 750 | 600 | CL09 |
| 138 | 750 | 600 | CL10 |
| 155 | 1000 | 750 | CK75C |
| 172 | 1000 | 750 | CK08C |
| 200 | 1000 | 750 | CK85B |
| 225 | 1000 | 750 | CK09B |
| 250 | 1000 | 750 | CK95B |
| 285 | 1000 | 750 | CK10C |
| 385 | 1000 | 750 | CK11C |
| 495 | 1000 | 750 | CK12B |
| 637 | 1000 | 750 | CK13B |

Electrical endurance 10⁶ x 1.3 operations

- (1) Power values shown are not standard as they refer to intermittent service.
- (2) The current shown relates to the delta connection of the contactor poles.
If the poles are star-connected, divide the values given in the column by 1.5.

Contactors for connection of power transformers

In this application it is essential to ascertain the no-load inrush current of the transformer I_{μ} , (magnetisation current) which in the majority of cases determines the size of the contactor.

Two cases are illustrated in the table:

- No-loop inrush current up to 20 times the rated transformer current
- No-loop inrush current up to 40 times the rated transformer current.

The contactor should not cut out the short-circuit current; if the protective devices used are fuses, this condition will be intrinsically complied with.

In the case however of devices with tripping contacts the general line circuit breaker will be driven rather than the contactor coil.

Selection table

| $\frac{I_{\mu}}{I_e} = 20$ | | $\frac{I_{\mu}}{I_e} = 40$ | | Contactor |
|----------------------------|---------------------|----------------------------|---------------------|-----------|
| 230V 240V kVA | 380V 400V kVA | 230V 240V kVA | 380V 400V kVA | |
| 2 | 3.5 | 1 | 1.75 | CL00A |
| 2.75 | 5 | 1.37 | 2.5 | CL01A |
| 4 | 7 | 2 | 3.5 | CL02A |
| 5.75 | 10 | 2.85 | 5 | CL25A |
| 5.75 | 10 | 2.85 | 5 | CL03A |
| 7.25 | 12.5 | 3.65 | 6.25 | CL04A |
| 9 | 15.5 | 4.50 | 7.75 | CL45A |
| 10 | 17 | 5 | 8.5 | CL05A |
| 12 | 21 | 6 | 10.5 | CL06A |
| 15 | 25 | 7.5 | 12.5 | CL07A |
| 20 | 35 | 10 | 16 | CL08A |
| 25 | 40 | 12.5 | 20 | CL09A |
| 30 | 50 | 15 | 25 | CL10A |
| 35 | 55 | 17 | 27 | CK75C |
| 40 | 60 | 20 | 30 | CK08C |
| 45 | 75 | 22 | 35 | CK85B |
| 50 | 85 | 25 | 42.5 | CK09B |
| 80 | 150 | 40 | 75 | CK10C |
| 100 | 170 | 50 | 85 | CK11C |
| 127 | 215 | 64 | 107 | CK12B |
| 160 | 280 | 80 | 140 | CK13B |

Motorstarters

A

B

C

D

E

F

G

H

I

X



Contactors for capacitors (category AC6b)

The most usual application of capacitors is for centralised automatic power factor ($\cos \varphi$) correction. A characteristic of capacitors is the high overcurrent which appears as they are connected.

Such overcurrents are due to:

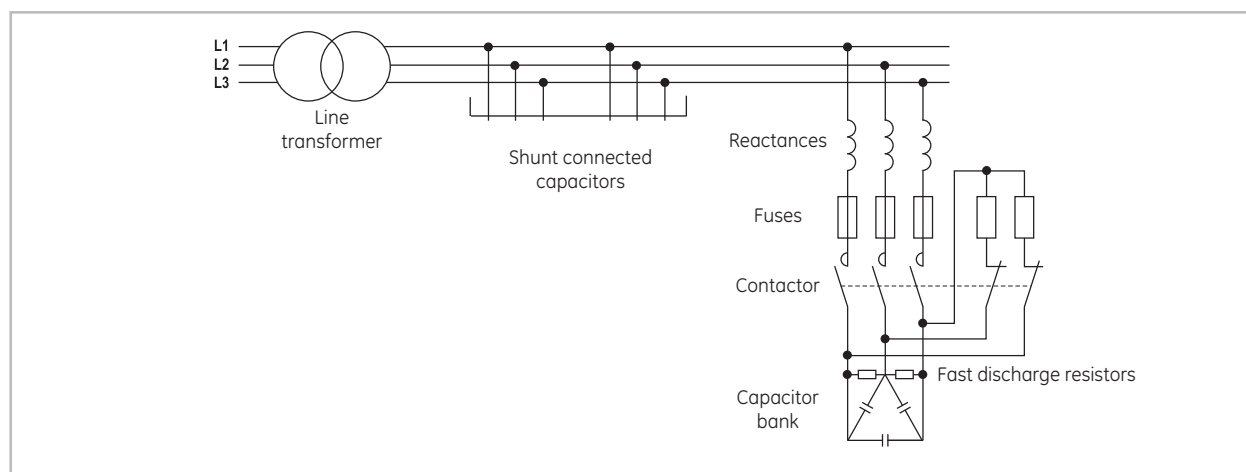
- Harmonic currents produced by saturated transformers, rectifiers, etc.
- Transient currents, the frequency and amplitude of which depend on the network inductance and the capacitor size.
- Additional transient currents arising where a capacitor is connected when others have already been connected, and caused by discharging of the latter.

GE Power Controls contactors are fitted with specially treated hardened alloy contacts which are highly resistant to welding and are therefore capable of withstanding high current peaks on connection.

The operation conditions taken as a basis for usage are:

- Near presence of other previously connected capacitors with a total power of up to eight times that of the capacitor to be connected.
- Shock coils reactances with a minimum inductance of $4\mu\text{H}$. These can be obtained by making 4 or 6 turns of 15cm windings on the conductor of each phase.
- Fast discharge resistor for reconnection within 60 seconds.

Diagram



Selection table

| Contactor | | $\theta \leq 55^\circ\text{C}$ | | | | | $\theta \leq 70^\circ\text{C}$ | | | | | Fuse gl - gG | I max. (peak) |
|-----------|------|--------------------------------|--------------|--------------|--------------|----------------------|--------------------------------|--------------|--------------|--------------|----------------------|-----------------|------------------|
| Type | Ith | 220V 230V 240V kvar | 400V kvar | 415V kvar | 500V kvar | 690V 660V kvar | 220V 230V 240V kvar | 400V kvar | 415V kvar | 500V kvar | 690V 660V kvar | | |
| CL00A | 25 | 3 | 5 | 5.5 | 6.5 | 5.7 | 2.4 | 4 | 4.5 | 5.2 | 4.5 | 10 | 1000 |
| CL01A | 25 | 4.5 | 9.5 | 10.5 | 12.5 | 11 | 3.6 | 6 | 6.5 | 10 | 7 | 16 | 1000 |
| CL02A | 32 | 6.5 | 11 | 12 | 14.5 | 12.5 | 5.2 | 8.5 | 9 | 11.5 | 10 | 25 | 1000 |
| CL25A | 45 | 7.5 | 12.5 | 14 | 16 | 15 | 6.5 | 10 | 11 | 13 | 12 | 25 | 1000 |
| CL03A | 45 | 9 | 15 | 16.5 | 20 | 17.5 | 7.2 | 12 | 13 | 16 | 14 | 35 | 2500 |
| CL04A | 60 | 12.5 | 21 | 23 | 27.5 | 24 | 10 | 17 | 18 | 22 | 19.5 | 40 | 2500 |
| CL45A | 60 | 16.5 | 25 | 27 | 32 | 30 | 13 | 20 | 22 | 25 | 22 | 50 | 2500 |
| CL06A | 90 | 22 | 40 | 43 | 52 | 50 | 17 | 30 | 33 | 41 | 35 | 80 | 3500 |
| CL07A | 110 | 25 | 45 | 48 | 58 | 65 | 19 | 35 | 37 | 46 | 40 | 125 | 3500 |
| CL08A | 110 | 30 | 50 | 54 | 65 | 70 | 22 | 40 | 43 | 52 | 50 | 125 | 3500 |
| CL09A | 140 | 40 | 65 | 70 | 85 | 95 | 35 | 58 | 62 | 75 | 85 | 160 | 3500 |
| CL10A | 140 | 45 | 70 | 80 | 90 | 105 | 40 | 60 | 64 | 65 | 75 | 160 | 3500 |
| CK75C | 250 | 60 | 110 | 118 | 145 | 150 | 48 | 88 | 94 | 116 | 120 | 250 | 5000 |
| CK08C | 250 | 70 | 125 | 135 | 162 | 170 | 56 | 100 | 107 | 130 | 136 | 250 | 5000 |
| CK85B | 315 | 80 | 150 | 160 | 195 | 200 | 64 | 120 | 130 | 156 | 160 | 315 | 5000 |
| CK09B | 315 | 95 | 165 | 177 | 215 | 230 | 85 | 148 | 160 | 192 | 205 | 315 | 5000 |
| CK95B | 450 | 105 | 190 | 205 | 250 | 288 | 95 | 175 | 188 | 230 | 265 | 450 | 5500 |
| CK10C | 600 | 135 | 260 | 280 | 340 | 370 | 120 | 235 | 252 | 375 | 330 | 630 | 10000 |
| CK11C | 700 | 190 | 325 | 350 | 425 | 450 | 152 | 260 | 280 | 340 | 360 | 800 | 10000 |
| CK12B | 1000 | 250 | 400 | 430 | 520 | 600 | 200 | 320 | 344 | 416 | 480 | 1000 | 12000 |
| CK13B | 1250 | 315 | 525 | 565 | 685 | 650 | 252 | 420 | 452 | 548 | 520 | 1250 | 15000 |

Electrical endurance: 100.000 operations

| |
|---|
| A |
| B |
| C |
| D |
| E |
| F |
| G |
| H |
| I |
| X |

Contactors for control lighting circuits

The characteristics of the most usual lighting systems are as follows:

Incandescent lamps

The connection current in very high -of the order of 15 times- rated current. Although this is a very short duration, it is only taken into account in order for the contactor connection current not to be exceeded. The power factor is always maintained at 1.

Fluorescent lamps

The connection current is slightly higher than rated current. The power factor is about 0.5. To improve up to 0.9, compensating capacitors can be used. In such cases, the connection power of the capacitor must be taken into account, the effect of which is appreciably greater on the smaller contactors.

High pressure mercury vapour lamps

The connection current varies, depending on type, between

1.6 and 2 times the rated current and will hold for between 3 and 5 minutes.

The power factor is of the order of 0.6 and this can be improved up to approximately unit value by means of compensating capacitors. In such cases, the connection power of the capacitor must be taken into account, the effect of which is appreciably greater on the smaller contactors.

High pressure sodium vapour lamps

The connection current values varies, depending on type, between 1.3 and 1.6 times the rated current and will hold between 3 and 5 minutes.

The power factor is of the order of 0.45 and this can be improved up to apporximately unit value by means of compensating capacitors. In such cases, the connection power of the capacitor must be taken into account, the effect of which is appreciably greater on the smaller contactors.

Selection table

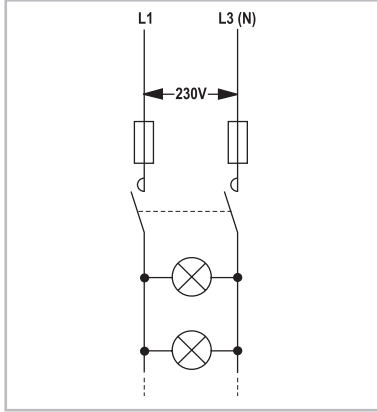
| Types | W | A | µF | Maximum number of lamps per phase at 230V | | | | | | | | | |
|---|------|-------|-----|---|-----|-----|-----|----|------|------|------|------|--|
| | | | | MCR | MC0 | MC1 | MC2 | RL | CL00 | CL01 | CL02 | CL25 | |
| Incandescent | 60 | 0.27 | | 27 | 37 | 59 | 59 | 59 | 62 | 62 | 70 | 77 | |
| | 100 | 0.45 | | 16 | 22 | 35 | 35 | 35 | 40 | 40 | 50 | 60 | |
| | 200 | 0.91 | | 8 | 11 | 17 | 17 | 17 | 20 | 20 | 25 | 30 | |
| | 300 | 1.36 | | 5 | 7 | 11 | 11 | 11 | 13 | 13 | 17 | 20 | |
| | 500 | 2.27 | | 3 | 4 | 7 | 7 | 7 | 8 | 8 | 10 | 12 | |
| | 1000 | 4.5 | | 1 | 2 | 3 | 3 | 3 | 4 | 4 | 5 | 6 | |
| 2000 | 9.1 | | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | |
| Fluorescent Single arrangement Without compensation | 15 | 0.23 | | 51 | 61 | 79 | 79 | 79 | 88 | 98 | 126 | 155 | |
| | 20 | 0.37 | | 32 | 38 | 49 | 49 | 49 | 57 | 61 | 78 | 110 | |
| | 40 | 0.44 | | 28 | 33 | 41 | 41 | 41 | 48 | 51 | 66 | 93 | |
| | 65 | 0.7 | | 18 | 21 | 26 | 26 | 26 | 30 | 32 | 41 | 58 | |
| 100 | 1.5 | | 8 | 10 | 12 | 12 | 12 | 14 | 16 | 19 | 27 | | |
| Fluorescent Single arrangement With compensation | 15 | 0.23 | 3.5 | 26 | 32 | 49 | 49 | 49 | 61 | 77 | 94 | 111 | |
| | 20 | 0.25 | 4.5 | 20 | 25 | 38 | 38 | 38 | 48 | 61 | 74 | 87 | |
| | 40 | 0.3 | 4.5 | 20 | 25 | 38 | 38 | 38 | 48 | 61 | 74 | 87 | |
| | 65 | 0.45 | 7 | 13 | 14 | 25 | 25 | 25 | 31 | 39 | 47 | 56 | |
| 100 | 0.7 | 18 | 5 | 6 | 9 | 9 | 9 | 11 | 14 | 17 | 21 | | |
| High pressure mercury vapour Without compensation | 250 | 2.13 | | 5 | 5 | 5 | 6 | 6 | 6 | 8 | 10 | 12 | |
| | 400 | 3.25 | | 3 | 3 | 4 | 4 | 4 | 4 | 5 | 6 | 8 | |
| | 700 | 5.4 | | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 5 | |
| 1000 | 7.5 | | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | | |
| High pressure mercury vapour With compensation | 250 | 1.3 | 20 | 9 | 9 | 9 | 9 | 11 | 11 | 14 | 18 | 22 | |
| | 400 | 2.1 | 25 | 7 | 7 | 7 | 7 | 7 | 7 | 9 | 11 | 14 | |
| | 700 | 3.6 | 40 | 5 | 5 | 5 | 5 | 4 | 4 | 5 | 6 | 8 | |
| 1000 | 5.3 | 60 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 5 | | |
| High pressure sodium vapour Without compensation | 250 | 3 | | 3 | 3 | 4 | 4 | 4 | 4 | 5 | 7 | 9 | |
| | 400 | 4.4 | | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 5 | 6 | |
| | 1000 | 10.3 | | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | |
| High pressure sodium vapour With compensation | 250 | 1.45 | 40 | 5 | 5 | 5 | 5 | 10 | 10 | 12 | 16 | 20 | |
| | 400 | 2.5 | 45 | 4 | 4 | 4 | 4 | 6 | 6 | 7 | 9 | 11 | |
| | 1000 | 5.5 | 100 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 4 | 5 | |
| Metal iodide Without compensation | 250 | 2.17 | - | 3 | 3 | 4 | 4 | 4 | 4 | 5 | 7 | 9 | |
| | 400 | 3.48 | - | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 6 | |
| | 700 | 6.09 | - | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | |
| | 1000 | 8.7 | - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | |
| | 2000 | 17.39 | - | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | |
| Metal iodide With compensation | 250 | 1.4 | 32 | 0 | 6 | 6 | 7 | 7 | 7 | 9 | 11 | 16 | |
| | 400 | 2.0 | 45 | 0 | 4 | 5 | 5 | 5 | 5 | 6 | 8 | 11 | |
| | 700 | 3.6 | 65 | 0 | 2 | 3 | 3 | 3 | 3 | 3 | 4 | 6 | |
| | 1000 | 5.3 | 85 | 0 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | |
| 2000 | 10.6 | 100 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 2 | |



Diagrams

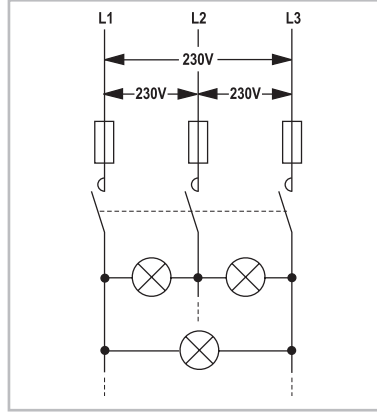
Single-phase circuit

The total number of lamps will be as shown in the table.



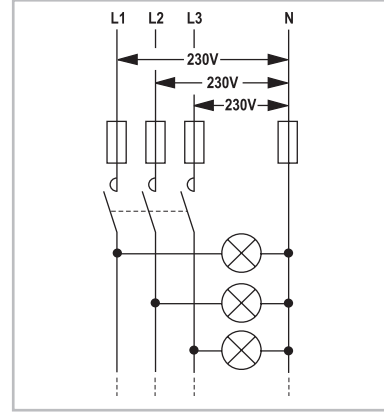
3-phase circuit, lamps delta-connected

The total number of lamps will be as shown in the table, multiplied by 1.73 and distributed in three equal quantities.



3-phase circuit, lamps star-connected

The total number of lamps will be as shown in the table, multiplied by 3 and distributed in three equal quantities.



Maximum number of lamps per phase at 230V

| CL03 | CL04 | CL45 | CL06 | CL07 | CL08 | CL09 | CL10 | CK75C | CK08C | CK09 | CK95 | CK10 | CK11 | CK12 | CK13 |
|------|------|------|------|------|------|------|------|-------|-------|------|------|------|------|------|------|
| 77 | 85 | 122 | 156 | 191 | 222 | 264 | 284 | 333 | 410 | 555 | 820 | 1320 | 1550 | 1860 | 1860 |
| 60 | 66 | 73 | 95 | 116 | 133 | 160 | 170 | 200 | 246 | 333 | 490 | 790 | 930 | 1120 | 1120 |
| 30 | 33 | 36 | 47 | 58 | 66 | 79 | 84 | 99 | 122 | 165 | 240 | 390 | 460 | 550 | 550 |
| 20 | 22 | 24 | 31 | 38 | 44 | 53 | 56 | 66 | 81 | 110 | 165 | 260 | 300 | 370 | 370 |
| 12 | 12 | 14 | 19 | 23 | 26 | 31 | 33 | 39 | 48 | 66 | 95 | 155 | 185 | 220 | 220 |
| 6 | 6 | 7 | 9 | 11 | 13 | 16 | 17 | 20 | 24 | 33 | 50 | 80 | 90 | 110 | 110 |
| 3 | 3 | 3 | 4 | 5 | 7 | 8 | 8 | 10 | 12 | 16 | 25 | 40 | 45 | 55 | 55 |
| 177 | 224 | 237 | 355 | 390 | 434 | 496 | 553 | 790 | 988 | 1245 | 1770 | 2340 | 2740 | 3910 | 4890 |
| 125 | 139 | 147 | 221 | 243 | 270 | 309 | 344 | 490 | 614 | 774 | 1090 | 1460 | 1700 | 2430 | 3040 |
| 105 | 118 | 124 | 186 | 204 | 227 | 260 | 289 | 413 | 516 | 650 | 920 | 1220 | 1430 | 2045 | 2550 |
| 66 | 74 | 78 | 116 | 127 | 142 | 163 | 181 | 259 | 324 | 409 | 570 | 770 | 900 | 1280 | 1600 |
| 30 | 34 | 36 | 54 | 59 | 66 | 76 | 85 | 121 | 151 | 190 | 270 | 360 | 420 | 600 | 750 |
| 119 | 134 | 149 | 191 | 232 | 273 | 312 | 347 | 496 | 621 | 786 | 900 | 1240 | 1450 | 1740 | 1740 |
| 92 | 103 | 115 | 148 | 180 | 212 | 243 | 270 | 385 | 482 | 610 | 700 | 960 | 1120 | 1350 | 1350 |
| 92 | 103 | 115 | 148 | 180 | 212 | 243 | 270 | 385 | 482 | 610 | 700 | 960 | 1120 | 1350 | 1350 |
| 59 | 66 | 74 | 95 | 115 | 136 | 155 | 173 | 248 | 310 | 393 | 440 | 610 | 720 | 860 | 860 |
| 23 | 23 | 29 | 37 | 45 | 53 | 60 | 67 | 96 | 120 | 152 | 170 | 240 | 280 | 330 | 330 |
| 14 | 15 | 18 | 27 | 30 | 33 | 36 | 42 | 60 | 75 | 95 | 136 | 181 | 211 | 302 | 377 |
| 9 | 10 | 12 | 18 | 20 | 22 | 24 | 28 | 40 | 49 | 62 | 89 | 119 | 138 | 198 | 247 |
| 5 | 6 | 7 | 11 | 12 | 13 | 14 | 17 | 24 | 30 | 38 | 54 | 71 | 83 | 119 | 149 |
| 4 | 4 | 5 | 8 | 9 | 9 | 10 | 12 | 17 | 21 | 27 | 39 | 51 | 60 | 86 | 107 |
| 31 | 27 | 33 | 49 | 55 | 60 | 66 | 77 | 109 | 156 | 156 | 171 | 311 | 311 | 374 | 467 |
| 25 | 17 | 20 | 31 | 34 | 37 | 41 | 48 | 87 | 125 | 125 | 137 | 249 | 249 | 299 | 374 |
| 16 | 10 | 12 | 18 | 20 | 22 | 24 | 28 | 54 | 78 | 78 | 86 | 156 | 156 | 187 | 234 |
| 10 | 7 | 8 | 12 | 13 | 15 | 16 | 19 | 36 | 52 | 52 | 57 | 104 | 104 | 125 | 156 |
| 10 | 11 | 13 | 19 | 21 | 24 | 26 | 30 | 43 | 54 | 68 | 96 | 129 | 150 | 214 | 268 |
| 7 | 7 | 9 | 13 | 15 | 16 | 18 | 20 | 29 | 37 | 46 | 66 | 88 | 102 | 146 | 183 |
| 3 | 3 | 4 | 6 | 6 | 7 | 7 | 9 | 12 | 16 | 20 | 28 | 37 | 44 | 62 | 78 |
| 16 | 25 | 30 | 44 | 49 | 54 | 59 | 69 | 57 | 81 | 81 | 90 | 163 | 163 | 195 | 244 |
| 14 | 14 | 17 | 26 | 29 | 31 | 34 | 40 | 51 | 72 | 72 | 80 | 145 | 145 | 174 | 217 |
| 7 | 6 | 8 | 12 | 13 | 14 | 16 | 18 | 23 | 33 | 33 | 36 | 65 | 65 | 78 | 98 |
| 12 | 12 | 12 | 19 | 21 | 23 | 25 | 29 | 41 | 52 | 65 | 93 | 124 | 145 | 207 | 259 |
| 8 | 8 | 8 | 12 | 13 | 14 | 16 | 18 | 26 | 32 | 41 | 58 | 78 | 91 | 129 | 162 |
| 4 | 4 | 4 | 7 | 7 | 8 | 9 | 10 | 15 | 18 | 23 | 33 | 44 | 52 | 74 | 92 |
| 3 | 3 | 3 | 5 | 5 | 6 | 6 | 7 | 10 | 13 | 16 | 23 | 31 | 36 | 52 | 65 |
| 2 | 2 | 2 | 2 | 3 | 3 | 3 | 4 | 5 | 6 | 8 | 12 | 16 | 18 | 26 | 32 |
| 21 | 21 | 21 | 32 | 36 | 39 | 43 | 50 | 68 | 97 | 97 | 107 | 195 | 195 | 234 | 292 |
| 15 | 15 | 15 | 23 | 25 | 28 | 30 | 35 | 48 | 69 | 69 | 76 | 138 | 138 | 166 | 208 |
| 8 | 8 | 8 | 13 | 14 | 15 | 17 | 19 | 34 | 48 | 48 | 53 | 96 | 96 | 115 | 144 |
| 6 | 6 | 6 | 8 | 9 | 10 | 11 | 13 | 26 | 37 | 37 | 40 | 73 | 73 | 88 | 110 |
| 3 | 3 | 3 | 4 | 5 | 5 | 6 | 7 | 22 | 31 | 31 | 34 | 62 | 62 | 75 | 93 |

A

B

C

D

E

F

G

H

I

X



Small soft starter with integral by-pass

ASTAT S is compact, easy to operate soft starter, designed for use with standard 3-phase squirrel cage motors. It provides an advanced method of reducing current during motor starting and stopping. ASTAT S will start supplying a reduced voltage to the motor, increasing up to the rated voltage, so avoiding, high currents and generating soft starting and stopping.

The motor has to be able to start in a reduced voltage.

- Solid soft starter for standard 3ph AC motors up to 30kW at 400V AC
- Voltage ratings up to 600V
- Two phase control with integral by-pass
- Compact, small case
- DIN rail mounting. Optional from 31A
- Start and soft stop features

Marking



The cUL, is achieved for all range of ASTAT S, except for 58A models, items QA02P058S, QA12P058S, QA22P058S, QA32P058S.

Technical data

Ratings

| | |
|-----------------|--|
| Voltage ratings | 3ph AC systems 220/230V (+10%, -15%) for units QA02P___S 380/415V (+10%, -15%) for units QA12P___S 480/500V (+10%, -15%) for units QA22P___S 575/600V (+10%, -15%) for units QA32P___S |
| Frequency range | 50/60Hz (±5%) |
| Load | 3ph, AC standard motors |

Control specifications

| | |
|-----------------|------------|
| Ramp up | 0,5 - 10 s |
| Ramp down | 0,5 - 10 s |
| Initial voltage | 0 - 80% Un |
| Starting torque | 0 - 64% Tn |

I/O control

| | |
|---------|--|
| Inputs | one input for Start/Stop |
| Outputs | one output for «End of Ramp» signal for ratings 31, 44, 58A |

Ambient conditions

| | |
|-----------------------|---|
| Operating temperature | 0 to 40°C. Up to 60°C derating by 1,2% per °C |
| Storage temperature | -20 to 70°C |
| Relative humidity | up to 80%, without condensation |
| Max. altitude | up to 1000m. Above this derate by 5% each 100m |
| Protection degree | IP20 |

- Order codes ● page D.67
- Diagrams ● page D.68
- Performances ● page D.69
- Dimensions ● page D.70



Small soft starter with integral by-pass



| Input voltage V / CA | Current rating (2) A | Maximum current A | Maximum motor power (1) | | | | Cat. No. | Ref. no. | Pack |
|-------------------------|--|----------------------|-------------------------|---------------------|---------------------|---------------------|-----------|----------|------|
| | | | 220/230V kW / Hp | 380/415V kW / Hp | 480/500V kW / Hp | 575/600V kW / Hp | | | |
| 220 | 8 | 28 | 1.5 / 2 | - | - | - | QA02P008S | 120881 | 1 |
| | 17 | 60 | 4 / 5.5 | - | - | - | QA02P017S | 120882 | 1 |
| | 22 | 77 | 5.5 / 7.5 | - | - | - | QA02P022S | 120883 | 1 |
| | 31 | 110 | 7.5 / 10 | - | - | - | QA02P031S | 120884 | 1 |
| | 44 | 150 | 11 / 15 | - | - | - | QA02P044S | 120885 | 1 |
| | 58 | 200 | 15 / 20 | - | - | - | QA02P058S | 120886 | 1 |
| 400 | 8 | 28 | - | 4 / 5.5 | - | - | QA12P008S | 120892 | 1 |
| | 17 | 60 | - | 7.5 / 10 | - | - | QA12P017S | 120893 | 1 |
| | 22 | 77 | - | 11 / 15 | - | - | QA12P022S | 120894 | 1 |
| | 31 | 110 | - | 15 / 20 | - | - | QA12P031S | 120895 | 1 |
| | 44 | 150 | - | 22 / 30 | - | - | QA12P044S | 120896 | 1 |
| | 58 | 200 | - | 30 / 40 | - | - | QA12P058S | 120897 | 1 |
| 500 | 8 | 28 | - | - | 5.5 / 7.5 | - | QA22P008S | 120898 | 1 |
| | 17 | 60 | - | - | 11 / 15 | - | QA22P017S | 120899 | 1 |
| | 22 | 77 | - | - | 15 / 20 | - | QA22P022S | 120900 | 1 |
| | 31 | 110 | - | - | 22 / 30 | - | QA22P031S | 120901 | 1 |
| | 44 | 150 | - | - | 30 / 40 | - | QA22P044S | 120902 | 1 |
| | 58 | 200 | - | - | 45 / 60 | - | QA22P058S | 120903 | 1 |
| 600 | 8 | 28 | - | - | - | 7.5 / 10 | QA32P008S | 120904 | 1 |
| | 17 | 60 | - | - | - | 15 / 20 | QA32P017S | 120905 | 1 |
| | 22 | 77 | - | - | - | 22 / 30 | QA32P022S | 120906 | 1 |
| | 31 | 110 | - | - | - | 30 / 40 | QA32P031S | 120907 | 1 |
| | 44 | 150 | - | - | - | 37 / 50 | QA32P044S | 120908 | 1 |
| | 58 | 200 | - | - | - | 55 / 75 | QA32P058S | 120909 | 1 |
| Accessory | DIN rail mounting kit for types 31A, 44A and 58A | | | | | | QAOPTDIN | 120910 | 1 |

- (1) Ratings for standard 4-poles AC motors
 (2) See Operations/hour in table below
 Cycles/hour includes both soft start and soft stop

Times between rampings Start/Stop

| | Starting current | Ramp 1 sec. | Ramp 2 sec. | Ramp 5 sec. | Ramp 10 sec. |
|-----------|------------------|-------------|-------------|-------------|--------------|
| QA_2P008S | 8 | 7 | 15 | 35 | 70 |
| | 16 | 16 | 33 | 77 | 155 |
| | 24 | 26 | 51 | 125 | 250 |
| | 28 (*) | 32 | 62 | 155 | - |
| QA_2P017S | 17 | 7 | 15 | 35 | 70 |
| | 34 | 16 | 33 | 77 | 155 |
| | 51 | 26 | 51 | 125 | 250 |
| | 60 (*) | 32 | 62 | 155 | - |
| QA_2P022S | 22 | 7 | 15 | 35 | 70 |
| | 44 | 16 | 33 | 77 | 155 |
| | 66 | 26 | 51 | 125 | 250 |
| | 77 (*) | 32 | 62 | 155 | - |
| QA_2P031S | 31 | 4 | 8 | 20 | 40 |
| | 62 | 8 | 15 | 38 | 76 |
| | 93 | 12 | 24 | 62 | 124 |
| | 110 (*) | 15 | 31 | 80 | - |
| QA_2P044S | 44 | 4 | 8 | 20 | 40 |
| | 88 | 8 | 15 | 38 | 76 |
| | 132 | 12 | 24 | 62 | 124 |
| | 155 (*) | 15 | 31 | 80 | - |
| QA_2P058S | 58 | 4 | 8 | 20 | 40 |
| | 116 | 8 | 15 | 38 | 76 |
| | 174 | 12 | 24 | 62 | 124 |
| | 200 (*) | 15 | 31 | 80 | - |

(*) Maximum starting current at all

Small soft starters

A

B

C

D

E

F

G

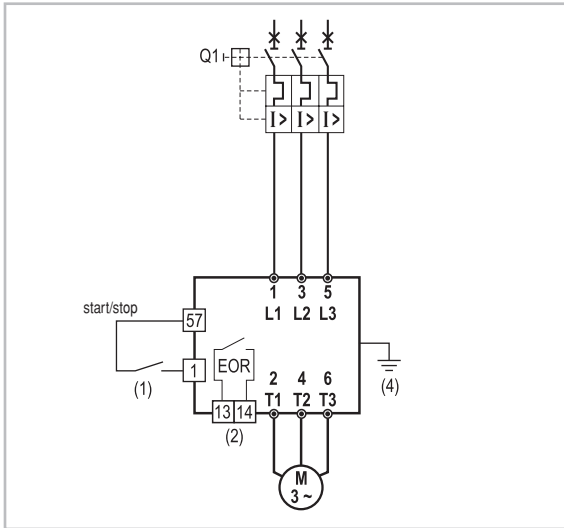
H

I

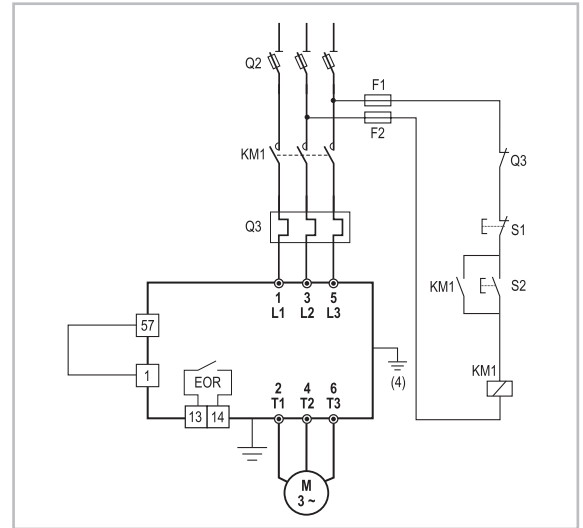
X

Diagrams

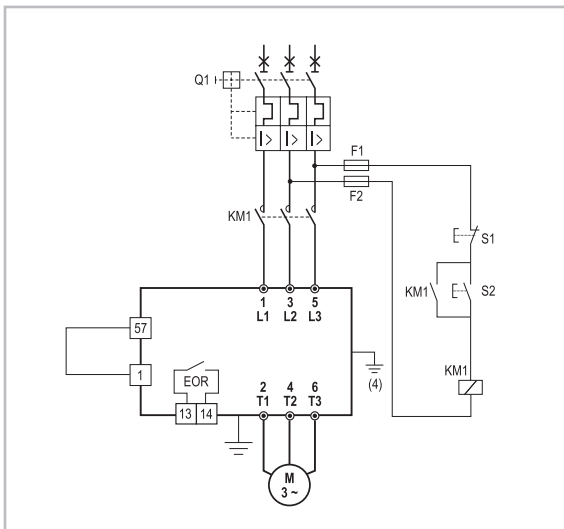
Control by permanent command (soft start and stop)



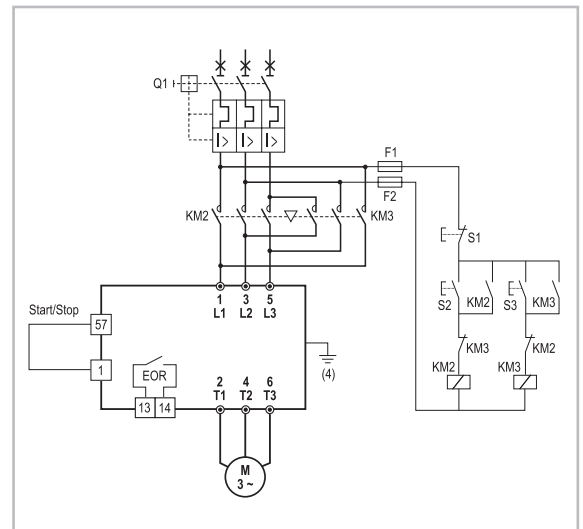
Control by push-buttons, line contactor and thermal overload relay (soft start)



Control by push-buttons and line contactor (soft start)



Forward/reverse control by push-buttons (3)



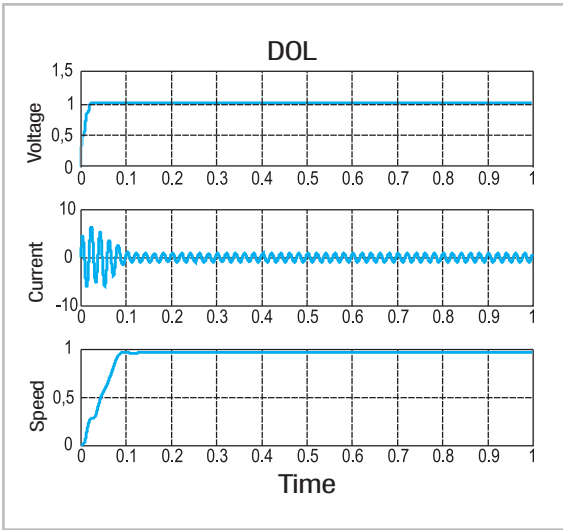
| Motor power 380/415V | | ASTAT S | Q1 | Q2 | KM1 | Q3 | F1-F2 | S1-S2-S3 |
|-------------------------|-----|----------|----------|----------|-----------|---------------------------|-------|----------|
| kW | Hp | | | Am fuses | Contactor | Thermal overload relay | | |
| 4 | 5.5 | QA12P008 | GPS1B*AK | 10 | CL25A | RT A 1N | - | P9-P3 |
| 7.5 | 10 | QA12P017 | GPS1B*AN | 25 | CL25A | RT A 1S | - | P9-P3 |
| 11 | 15 | QA12P022 | GPS1B*AP | 32 | CL25A | RT A 1T | - | P9-P3 |
| 15 | 20 | QA12P031 | GPS1B*AR | 40 | CL04A | RT A 1V | - | P9-P3 |
| 22 | 30 | QA12P044 | GPS2B*AT | 63 | CL06A | RT A 2F | - | P9-P3 |
| 30 | 40 | QA12P058 | GPS2B*AU | 80 | CL07A | RT A 2H | - | P9-P3 |

Coordination type 1

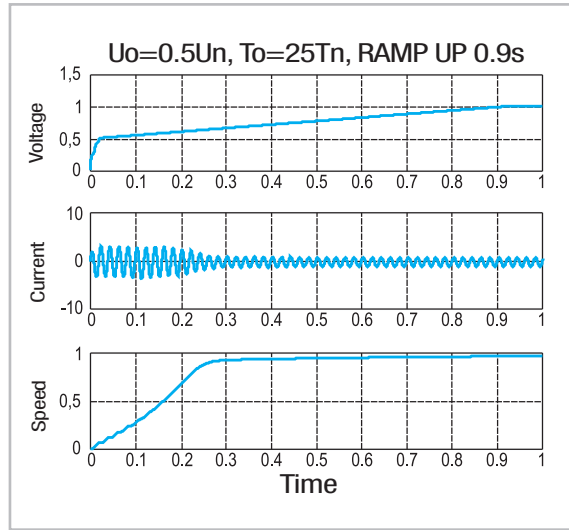
- (1) Use dry contact only.
- (2) End of Ramp output relay (only types 31A, 44A and 58A).
- (3) Forward/Reverse operation must be done when motor is not rotating.
- (4) Ground terminal only for types 31A, 44A and 58A.

Performances

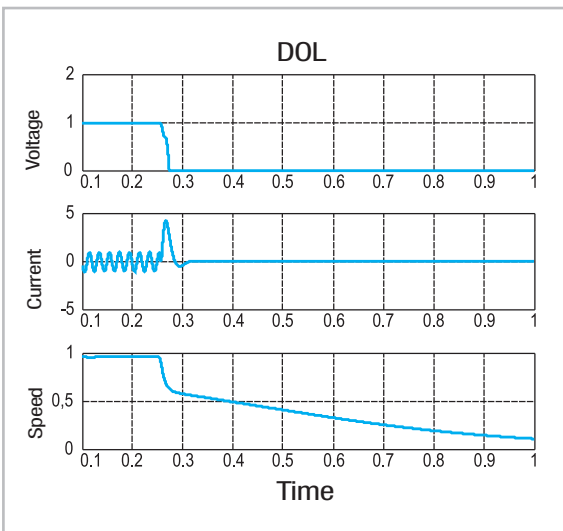
Direct-on-line start



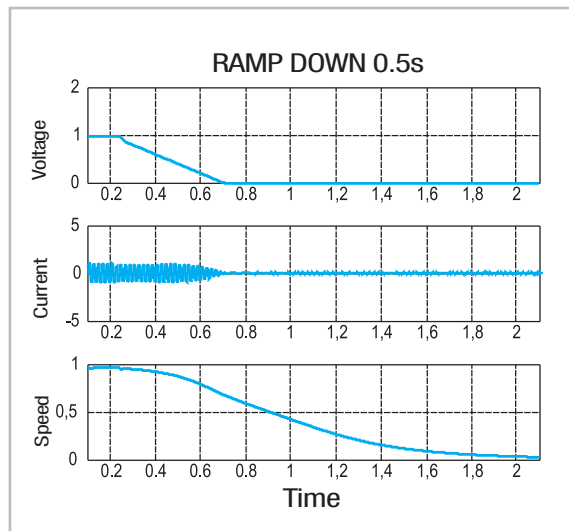
ASTAT S soft start



Direct-on-line stop



ASTAT S soft stop



Small soft starters

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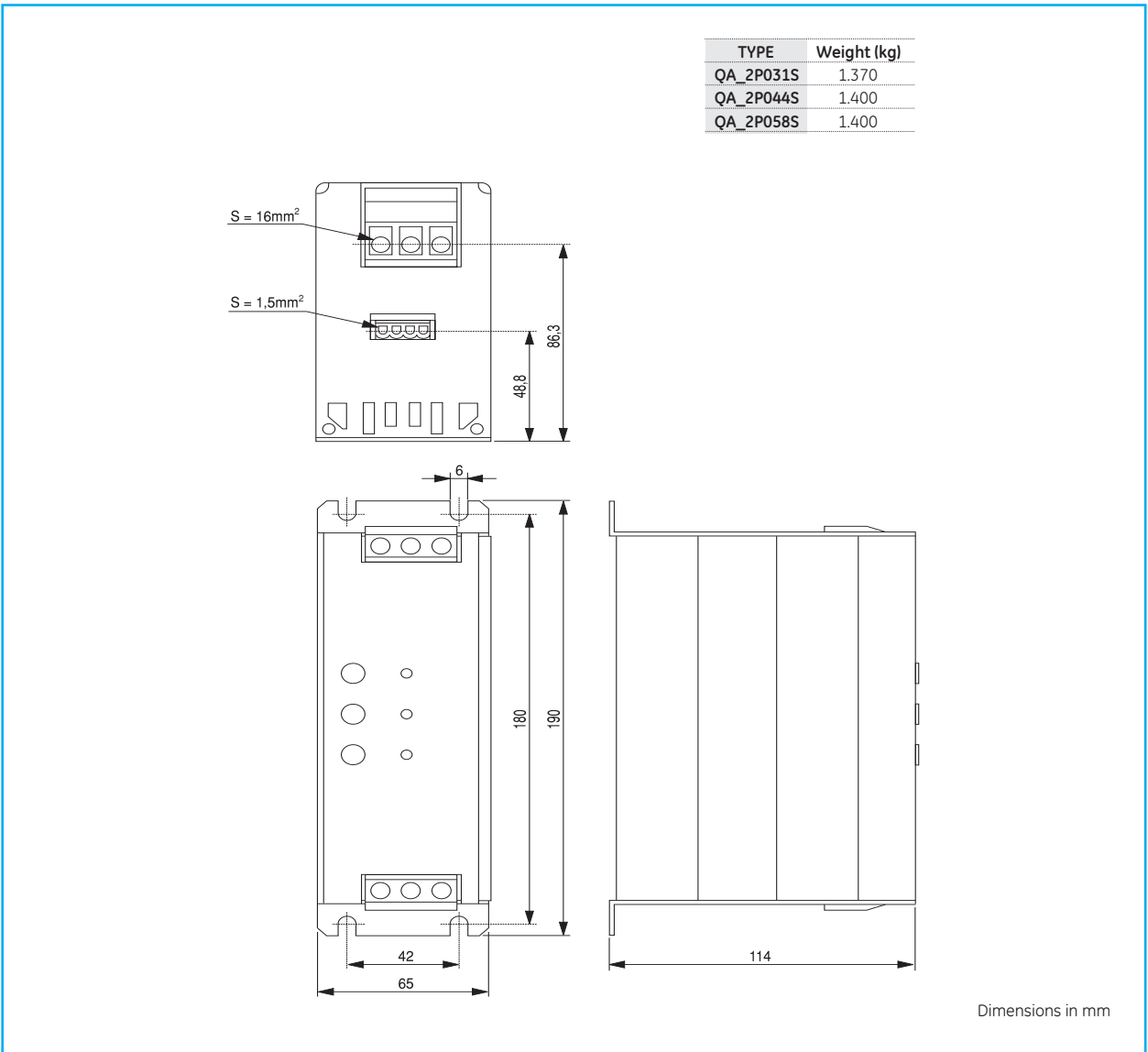
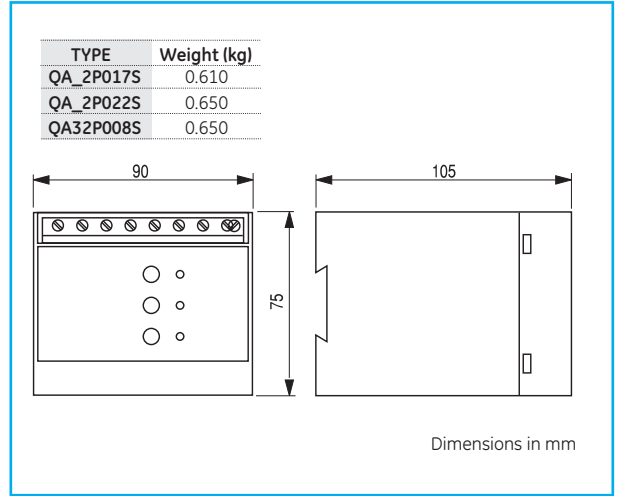
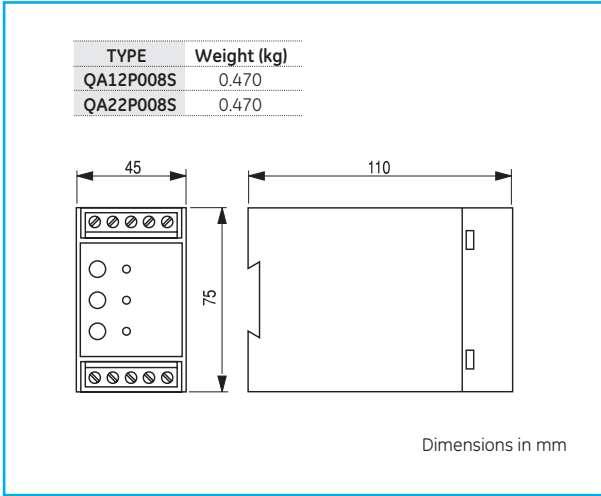
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Dimensional drawings

Small soft starter with integral by-pass



ASTAT XT

Digital soft starters for 3ph standard induction motors

GE's new ASTAT XT solid state soft starter features microprocessor control digital technology. Setup and adjustment is performed through a six-button keypad and parameters or messages are displayed out through a friendly LCD multilanguage interface with two rows, sixteen alphanumeric characters each. The design includes isolated I/O and high level of protection in their circuits to minimize the disturbance effects while working in the hardest industrial environment.

ASTAT XT Soft Starter offers reliable performance and smooth acceleration for a variety of standard AC motors up to 1400A and up to 690V, reducing mechanical shock to the driving system, resulting in extended component and motor life.

ASTAT XT offers many traditional features such a motor overload function, adjustable ramps, current limit, kick start, but also other high end features like Inside-Delta operation, Torque Control, Pump control and a reliable motor and unit set of protections.

Key Features

- Ratings up to 1400Amps and up to 690VAC
- Friendly multilanguage interface with two rows, sixteen characters each
- Built-in with three extra power terminals for external bypass
- In-Line or Inside-Delta operation modes
- Torque control and pump control advanced features
- Motor protection according IEC 10, 20 and NEMA 10, 20, 30, even if ASTAT XT is in By-pass
- Built in communications RS485 port, and ModBus protocol as standard
- ProfibusDP and DeviceNet optional interfaces for communications



Approvals / Marking



For units up to 820A. "U" type



Control panel



A

B

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IEC ratings. Recommended motor and type unit ratings

Digital Soft Starters

A

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X

| | Mains voltage | Light Duty | NORMAL DUTY (IEC Class 10) | | | | HEAVY DUTY (IEC Class 20) | | | | Cat. No. | Ref. No. | |
|------------|---------------|------------|----------------------------|---------------|-----------|-----------|---------------------------|---------------|-----------|-----------|--------------|--------------|-----------|
| | | | Max Current Rating | Rated Current | 400V-230V | 480V-415V | 500V-690V | Rated Current | 400V-230V | 480V-415V | | | 500V-690V |
| | | | A | A | kW | kW | kW | A | kW | kW | | | kW |
| 230-500VAC | 8 | 8 | 1.5 | 3 | 4 | - | 8 | 1.5 | 3 | 4 | - | QT10008U21MS | 169075 |
| | 17 | 17 | 4 | 7.5 | 7.5 | - | 12 | 3 | 5.5 | 5.5 | - | QT10017U21MS | 169076 |
| | 34 | 31 | 7.5 | 15 | 18.5 | - | 31 | 7.5 | 15 | 18.5 | - | QT10031U21MS | 169077 |
| | 54 | 44 | 11 | 22 | 30 | - | 44 | 11 | 22 | 30 | - | QT10044U21MS | 169078 |
| | 65 | 58 | 15 | 30 | 37 | - | 55 | 15 | 30 | 37 | - | QT10058U21MS | 169079 |
| | 72 | 72 | 22 | 37 | 45 | - | 66 | 18.5 | 37 | 45 | - | QT10072U21MS | 169080 |
| | 104 | 85 | 22 | 45 | 55 | - | 80 | 22 | 45 | 55 | - | QT10085U21MS | 169081 |
| | 130 | 105 | 30 | 55 | 55 | - | 99 | 30 | 55 | 55 | - | QT10105U21MS | 169082 |
| | 156 | 145 | 45 | 75 | 90 | - | 130 | 37 | 55 | 90 | - | QT10145U21MS | 169083 |
| | 170 | 170 | 55 | 90 | 110 | - | 134 | 37 | 75 | 90 | - | QT10170U21MS | 169084 |
| | 248 | 210 | 55 | 110 | 132 | - | 203 | 55 | 110 | 132 | - | QT10210N21MS | 169091 |
| | 361 | 310 | 90 | 160 | 200 | - | 310 | 75 | 160 | 200 | - | QT10310N21MS | 169092 |
| | 390 | 390 | 110 | 200 | 250 | - | 344 | 110 | 160 | 250 | - | QT10390N21MS | 169093 |
| | 480 | 460 | 132 | 250 | 315 | - | 432 | 132 | 250 | 315 | - | QT10460N21MS | 169094 |
| | 480 | 460 | 132 | 250 | 315 | - | 432 | 132 | 250 | 315 | - | QT10460U21MS | 169088 |
| | 610 | 580 | 160 | 315 | 400 | - | 488 | 160 | 250 | 355 | - | QT10580N21MS | 169095 |
| | 610 | 580 | 160 | 315 | 400 | - | 552 | 160 | 315 | 400 | - | QT10580U21MS | 169089 |
| 820 | 650 | 200 | 355 | 400 | - | 552 | 160 | 315 | 400 | - | QT10650N21MS | 169096 | |
| 820 | 820 | 250 | 400 | 560 | - | 690 | 200 | 400 | 500 | - | QT10820U21MS | 169090 | |
| 1180 | 950 | 315 | 560 | 630 | - | 950 | 315 | 560 | 630 | - | QT10950N21MS | 169097 | |
| 1375 | 1100 | 355 | 630 | 800 | - | 1076 | 355 | 630 | 800 | - | QT11100N21MS | 169098 | |
| 1750 | 1400 | 400 | 800 | 1000 | - | 1400 | 400 | 800 | 1000 | - | QT11400N21MS | 169099 | |
| 690VAC | 8 | 8 | - | - | - | 5.5 | 8 | - | - | - | 5.5 | QT30008N21MS | 169119 |
| | 17 | 17 | - | - | - | 15 | 12 | - | - | - | 7.5 | QT30017N21MS | 169120 |
| | 34 | 31 | - | - | - | 22 | 31 | - | - | - | 22 | QT30031N21MS | 169121 |
| | 54 | 44 | - | - | - | 37 | 44 | - | - | - | 37 | QT30044N21MS | 169122 |
| | 65 | 58 | - | - | - | 55 | 55 | - | - | - | 45 | QT30058N21MS | 169123 |
| | 72 | 72 | - | - | - | 55 | 66 | - | - | - | 55 | QT30072N21MS | 169124 |
| | 104 | 85 | - | - | - | 75 | 80 | - | - | - | 75 | QT30085N21MS | 169125 |
| | 130 | 105 | - | - | - | 90 | 99 | - | - | - | 90 | QT30105N21MS | 169126 |
| | 156 | 145 | - | - | - | 132 | 130 | - | - | - | 90 | QT30145N21MS | 169127 |
| | 170 | 170 | - | - | - | 160 | 134 | - | - | - | 132 | QT30170N21MS | 169128 |
| | 248 | 210 | - | - | - | 200 | 203 | - | - | - | 200 | QT30210N21MS | 169129 |
| 361 | 310 | - | - | - | 250 | 310 | - | - | - | 250 | QT30310N21MS | 169130 | |
| 390 | 390 | - | - | - | 355 | 344 | - | - | - | 315 | QT30390N21MS | 169131 | |
| 480 | 460 | - | - | - | 400 | 432 | - | - | - | 400 | QT30460N21MS | 169132 | |
| 610 | 580 | - | - | - | 560 | 488 | - | - | - | 400 | QT30580N21MS | 169133 | |
| 820 | 650 | - | - | - | 630 | 552 | - | - | - | 560 | QT30650N21MS | 169134 | |
| 1180 | 950 | - | - | - | 900 | 950 | - | - | - | 900 | QT30950N21MS | 169135 | |
| 1375 | 1100 | - | - | - | 1000 | 1076 | - | - | - | 1000 | QT31100N21MS | 169136 | |
| 1750 | 1400 | - | - | - | - | 1400 | - | - | - | - | QT31400N21MS | 169137 | |

Remark

Motor kW ratings given in above table are for IEC, standard AC four poles motors. Always check that motor rated current is less than the specified rated current of the starter, for the specific application (Normal Duty or Heavy Duty)



QT10008U21MS
ASTAT XT 8A-72A



QT10105U21MS
ASTAT XT 105A-170A



QT10210N21MS
ASTAT XT 210A-390A



QT10460N21MS
ASTAT XT 460A-650A



NEMA ratings. Recommended unit type and motor ratings

| | LIGHT DUTY Nema 10 | | | | NORMAL DUTY Nema 20 | | | | HEAVY DUTY Nema 30 | | | | Cat. No. | Ref. No. |
|-----------------------------|-----------------------|------|----------------|------|------------------------|------|----------------|------|-----------------------|------|----------------|--------------|--------------|----------|
| | Current Rating | | Current Rating | | Current Rating | | Current Rating | | Current Rating | | Current Rating | | | |
| | 230V | 460V | 575V | 230V | 460V | 575V | 230V | 460V | 575V | 230V | 460V | 575V | | |
| Mains voltage 230-500VAC | A | HP | HP | HP | A | HP | HP | HP | A | HP | HP | HP | | |
| | 8 | 2 | 5 | - | 8 | 2 | 5 | - | 8 | 2 | 5 | - | QT10008U21MS | 169075 |
| | 17 | 5 | 10 | - | 17 | 5 | 10 | - | 12 | 3 | 7.5 | - | QT10017U21MS | 169076 |
| | 34 | 10 | 25 | - | 31 | 10 | 20 | - | 31 | 10 | 20 | - | QT10031U21MS | 169077 |
| | 54 | 20 | 40 | - | 44 | 15 | 30 | - | 44 | 15 | 30 | - | QT10044U21MS | 169078 |
| | 65 | 20 | 50 | - | 58 | 20 | 40 | - | 55 | 20 | 40 | - | QT10058U21MS | 169079 |
| | 72 | 25 | 50 | - | 72 | 25 | 50 | - | 66 | 20 | 50 | - | QT10072U21MS | 169080 |
| | 104 | 40 | 75 | - | 85 | 30 | 60 | - | 80 | 30 | 60 | - | QT10085U21MS | 169081 |
| | 130 | 50 | 100 | - | 105 | 40 | 75 | - | 99 | 40 | 75 | - | QT10105U21MS | 169082 |
| | 156 | 60 | 125 | - | 145 | 50 | 100 | - | 130 | 50 | 100 | - | QT10145U21MS | 169083 |
| | 170 | 60 | 125 | - | 170 | 60 | 125 | - | 134 | 50 | 100 | - | QT10170U21MS | 169084 |
| | 262 | 100 | 200 | - | 210 | 75 | 150 | - | 203 | 75 | 150 | - | QT10210U21MS | 169085 |
| | 387 | 150 | 300 | - | 310 | 100 | 250 | - | 310 | 100 | 250 | - | QT10310U21MS | 169086 |
| | 414 | 150 | 350 | - | 390 | 150 | 300 | - | 361 | 150 | 300 | - | QT10390U21MS | 169087 |
| | 480 | 200 | 400 | - | 460 | 150 | 350 | - | 432 | 150 | 350 | - | QT10460U21MS | 169088 |
| | 610 | 250 | 500 | - | 580 | 200 | 400 | - | 552 | 200 | 400 | - | QT10580U21MS | 169089 |
| 820 | - | - | - | 820 | 250 | 500 | - | 690 | 250 | 500 | - | QT10820U21MS | 169090 | |
| Mains voltage 460-600VAC | 8 | - | 5 | 5 | 8 | - | 5 | 5 | 8 | - | 5 | 5 | QT20008U21MS | 169100 |
| | 17 | - | 10 | 15 | 17 | - | 10 | 15 | 12 | - | 7.5 | 10 | QT20017U21MS | 169101 |
| | 34 | - | 25 | 30 | 31 | - | 20 | 25 | 31 | - | 20 | 25 | QT20031U21MS | 169102 |
| | 54 | - | 40 | 50 | 44 | - | 30 | 40 | 44 | - | 30 | 40 | QT20044U21MS | 169103 |
| | 65 | - | 50 | 60 | 58 | - | 40 | 50 | 55 | - | 40 | 50 | QT20058U21MS | 169104 |
| | 72 | - | 50 | 60 | 72 | - | 50 | 60 | 66 | - | 50 | 60 | QT20072U21MS | 169105 |
| | 104 | - | 75 | 100 | 85 | - | 60 | 75 | 80 | - | 60 | 75 | QT20085U21MS | 169106 |
| | 130 | - | 100 | 125 | 105 | - | 75 | 100 | 99 | - | 75 | 100 | QT20105U21MS | 169107 |
| | 156 | - | 125 | 150 | 145 | - | 100 | 150 | 130 | - | 100 | 125 | QT20145U21MS | 169108 |
| | 170 | - | 125 | 150 | 170 | - | 125 | 150 | 134 | - | 100 | 125 | QT20170U21MS | 169109 |
| | 262 | - | 200 | 250 | 210 | - | 150 | 200 | 203 | - | 150 | 200 | QT20210U21MS | 169110 |
| | 387 | - | 300 | 400 | 310 | - | 250 | 300 | 310 | - | 250 | 300 | QT20310U21MS | 169111 |
| | 414 | - | 350 | 400 | 390 | - | 300 | 400 | 361 | - | 300 | 300 | QT20390U21MS | 169112 |
| | 480 | - | 400 | 500 | 460 | - | 350 | 400 | 432 | - | 350 | 400 | QT20460U21MS | 169113 |
| | 610 | - | 500 | - | 580 | - | 400 | 400 | 552 | - | 400 | 500 | QT20580U21MS | 169114 |
| | 820 | - | - | - | 820 | - | 500 | 500 | 690 | - | 500 | - | QT20820U21MS | 169115 |

Remark

Motor HP ratings given in above table are for NEMA, standard AC four poles motors. Always check that motor rated current is less than the specified rated current of the starter, for the specific application (Light duty, Normal duty or Heavy duty)

Order codes

A

B

C

D

E

F

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H

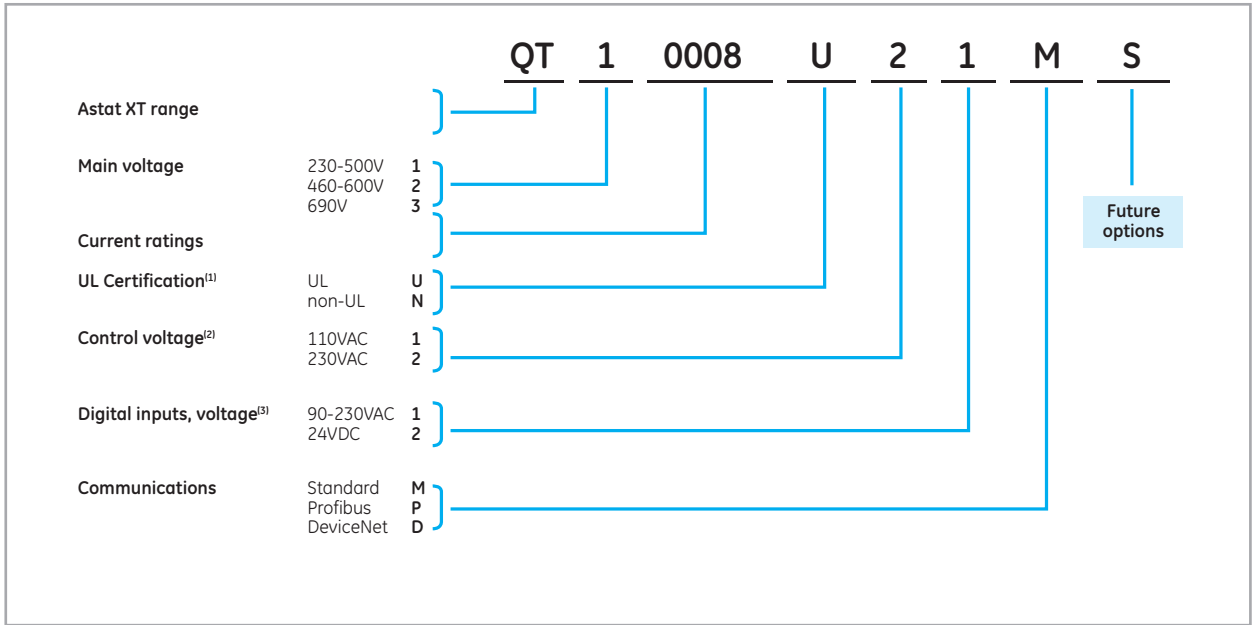
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Unit configuration

Digital Soft Starters



- (1) - ASTAT XT up to 600V, and up to 170A (Cat Numbers up to QT10170_ or up to QT20170) are always cUL certified. Option "N" not available
 - Units QT2, from QT20008_, up to QT20820_ are always cUL certified. Option "N" not available.
 - Units QT1, or QT2 from QTx0950_ up to QTx1400 are not UL certified. Option "U" not available.
 - Units QT3_, rated to 690V, are not UL certified. Option "U" not available
- (2) ASTAT XT standard Control Voltage configuration is option 2, Voltage 230VAC, +10%, -15%
- (3) ASTAT XT standard configuration for Inputs is option 1, Voltage 90-230VAC, +10%, -15%

A

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Technical Data

Ratings

| | | |
|------------------------|---------------------------|--|
| Main voltage | 3Ph AC supply | 230 to 500VAC +10%, -15% for QT1xxx units 460 to 600VAC +10%, -15% for QT2xxx units 690VAC +10%, -15% for QT3xxx units |
| Starter current rating | for 3Ph AC motors | From 8A up to 1400A. |
| Motor current rating | 3 phases induction motors | Motor rated current from 50% to 100% of starter current |
| Control voltage | 1ph AC supply | 230VAC, +10, -15%, 50/60Hz, or 110VAC, +10, -15%, 50/60Hz (optional) |
| Frequency range | 50/60Hz systems | Wide from 45Hz to 65Hz. Auto-tracking frequency range |

Control specifications

| | | |
|------------------------|---|--|
| Control system | Digital control with microcontroller. Starting ramp, with progressive increase in voltage and current limitation | |
| Operation mode | In-Line (three wires) or Inside-Delta (six wires) of the motor | |
| Run operation | Soft Start and Soft stop by multiple choices, including torque control both at start or Stop phases | |
| Operator interface | By LCD display, keypad and Indication LEDs Display: LCD with two rows, 16 characters each Type: Multilanguage, dip-switch selectable for English, Italian, Spanish and German Keys: Six keys, Mode, reset, Set, Select and Up / Down LEDs: ON, Start, Run, Soft Stop, Stop, Save / Slow Speed, Dual Set / Reverse and Fault | |
| Initial voltage | 10-50% Un. Up to 80% with expanded settings function | |
| Starting current | 100-400% In. Can be extended up to 500%, by using extended settings | |
| Acceleration ramp time | 1-30 sec. Can be extended up to 90sec, by using extended settings | |
| Deceleration ramp time | 1-30 sec. Can be extended up to 90sec, by using extended settings | |
| Current limitation | 100-400% of motor rated current. Can be extended up to 500% by using extended settings | |
| Bypass | By external contactor while motor is full protected by ASTAT XT. | |
| Monitoring | Motor Current, Line Voltage, motor thermistor resistance, Test & Maintenance and Statistics | |

Environmental conditions

| | | |
|-----------------------|---|--|
| Operating temperature | -10 up to 50°C, with current derating by 2.5% per °C, from 40°C | |
| Storage temperature | -20°C up to 70°C | |
| Maximum altitude | Up to 1000 mts. Ask your dealer for installation at higher altitude | |
| Humidity | 95% at 50°C or 98% at 45°C | |
| Protection degree | IP20 for units up to 72A, IP00 for units from 85A up to 1400A | |
| Pollution degree | Class 3 | |

Standards

| | | |
|------------------|---|--|
| Global standards | CE for the full range. UL, cUL for specified units up to 820A | |
| EMC emissions | EN 61000-6-4 CISPR 11 Class A | |
| Immunity | EN 61000-6-2 ESD 8KV air, IEC 801-2; Electric RF field 10 V/m, 20-1000Mhz, IEC 801-3 Fast transients 2KV, IEC 801-4 | |
| Safety | EN 600947-1 Related to safety requirements. UL508C | |



Functions

Available standard functions

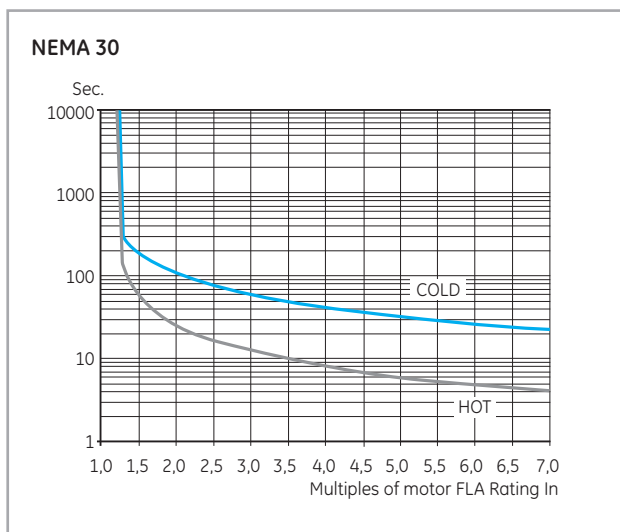
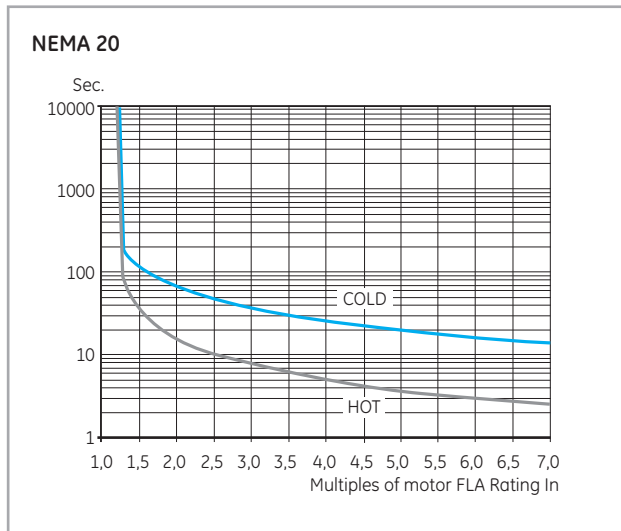
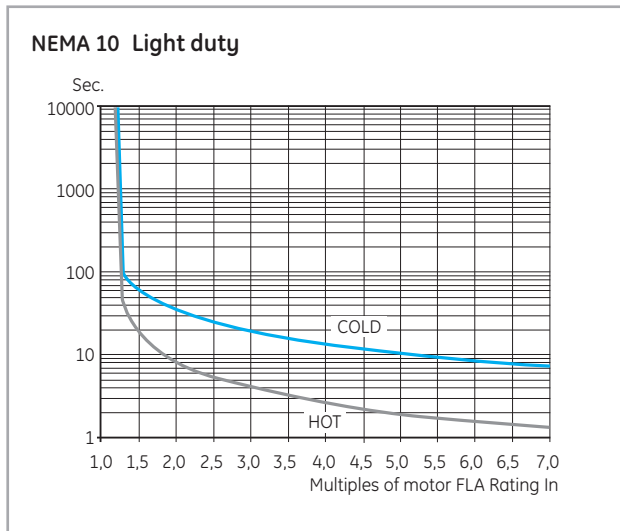
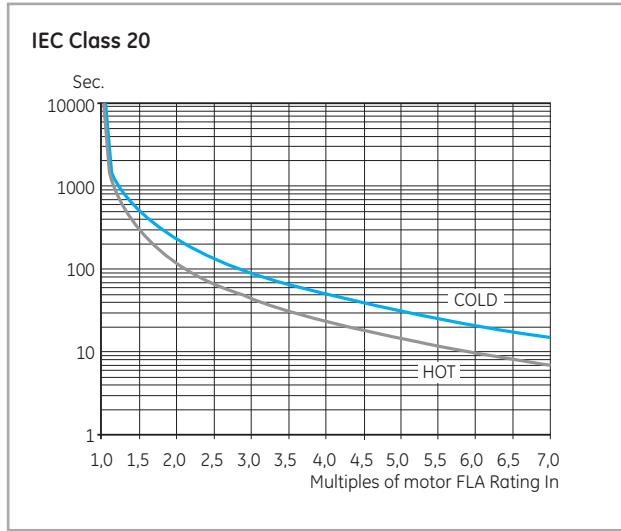
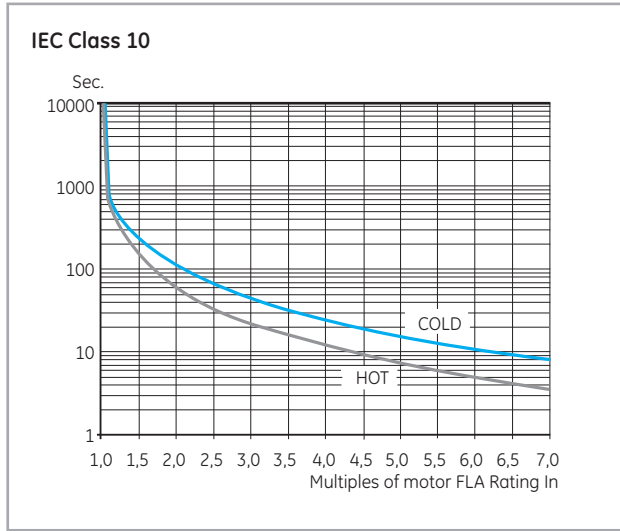
| | |
|---------------------------------|---|
| Soft start and soft stop | ASTAT XT is provided with a soft start and soft stop features, including five independent acceleration and deceleration curve models. The factory default curve is used for general purpose, other three are used for pump control and the last one for torque control. |
| Pump control | Specific function for pump control, that avoids overpressure in the system at the end of acceleration phase and suppresses the hammering at stopping phase. |
| Torque control | Provides a smooth time controlled torque ramp acceleration and deceleration, with linear deceleration of the torque resulting in a close to linear speed deceleration, thus eliminating stall conditions |
| In line / Inside delta | ASTAT XT allows either traditional Line operation or Inside Delta operation. When the ASTAT XT is installed to operate Inside Delta, the individual phases of the starter are connected in series with the individual motor windings (six wiring connections like the Start-Delta starters), thus reducing the current x1.73, and allowing the use of a much smaller starter (x1.5 less than motor rated current). |
| Bypass | ASTAT XT allows bypass operation using an external contactor, controlled ON/OFF by starter function EOR (End Of Ramp). The starter is provided with three dedicated power terminals to facilitate wirings to the bypass contactor. ASTAT XT protections to motor are enabled, even in bypass. |
| Kick start | This function allows to start high friction loads that require high starting torque for a short period of time. When this function is enabled, a pulse of 80% Un during an adjustable time from 0 to 1sec is given to the motor. After this pulse the output voltage is ramping down to Starting Voltage setting, before ramping up again to full voltage. |
| End of ramp | Detects end of acceleration and outputs a signal by a dry relay contact. This signal can be delayed by an adjustable timer from 0-120 sec. |
| Lock-Out | Allows to control the number of startings into a period of time, then protecting both motor and ASTAT. |
| Dual settings | By this function, ASTAT XT is able to control a secondary motor Dual setting of Starting Voltage, Starting Current, Current Limit, Ramp Up, Ramp Down and Motor current parameters can be selected by using one of the programmable ASTAT XT's inputs |
| Energy saving | Activated when the motor has a light load for extended periods of time, then reducing the output voltage level and decreasing the reactive current and motor copper/iron losses. This function can be enabled or disabled by dedicated parameters in ASTAT XT. |
| Slow speed | Function that allows the motor to run at 1/6 constant rated speed, for a short period of time of maximum 30sec. This function supports forward and reverse operation. |
| Auto reset | This function allows the ASTAT XT automatic recover after a fault caused by Undervoltage, Undercurrent or Phase lost. Auto-Reset can be programmed up to maximum 10 attempts. |
| Cooling fan control | Allows three methods of control for the ASTAT's built-in cooling fans. - Continuous Operation - Controlled by an external input - Automatically OFF controlled, after five minutes ASTAT XT is stopped |
| Generator supply | This is a specific function useful when the Starter is powered from a diesel generator rather than from commercial power supply. The function is enabled by an internal Dip Switch, and helps to minimize the negative effects caused by the generator's voltage fluctuations during starting. |
| Keypad lock | This function is enabled by means of starter's internal dipswitch, then locking the keypad. This is useful to prevent undesired parameter modifications. |
| Built-in communications | ASTAT XT includes a ModBus RTU communications protocol. Communications are carried out through a half duplex RS485 port, with maximum baudrate of 9600, supporting up to 247 stations. |
| Statistic data | ASTAT XT records useful data for maintenance and start up - Last 10 trip events - Statistical data like number of starts, number of trip events and elapsed RUN time. - Last trip data information of Motor current, Starting current and acceleration time. |

Motor and starter protection

| | |
|-------------------------|---|
| Overload | Trips the ASTAT-XT when current exceeds the Overload Trip level according IEC Class 10, 20 or NEMA 10, 20, 30 |
| Motor thermistor | Trips when motor thermistor resistance decreases below trip level set ASTAT XT allows both PTC or NTC sensors, with adjustable trip level |
| Too many starts | Trips if the number of starts, during Duty Cycle Time exceeds the preset number |
| Long start time | Trips if output voltage does not reach rated voltage at the preset Max. Start time |
| O/C JAM fault | Trips under the following conditions: - Instantaneously when current exceeds 8.5 x ASTAT-XT Current - During starting when current exceeds 8.5 x Motor Current - During running when current exceeds 200-850% of Motor Current O/C JAM has a programmable tripping delay of 0-5 seconds |
| Undercurrent | Trips when line current drops below the preset level for the preset time. |
| Undervoltage | Trips when line voltage drops below the preset level for the preset time. |
| Overvoltage | Trips when line voltage increases above a preset level for a preset time |
| Phase loss | Trips if 1 or 2 phases are lost |
| Frequency loss | Trips if frequency is not in the range of 40-66.6Hz |
| Phase sequence | Trips if line phase sequence is wrong |
| Slow speed time | Trips when operating at slow speed for extended periods |
| Wrong connection | Trips the ASTAT-XT when one or more motor phases is not properly connected to ASTAT-XT's load terminals or if there is an internal disconnection in the motor winding |
| Shorted SCR | Trips and prevents starting if any SCR is short-circuited or when motor windings are shorted |
| Over temperature | Heat-sink over-temperature. Trips the ASTAT-XT when the heat-sink temperature rises above 85°C |
| External fault | Trips the ASTAT-XT when a N.O. contact between terminals 19-21 closes for over two seconds |
| Wrong parameters | Parameters not transferred from RAM to EEPROM or vice versa |
| OC or wrong CON | Trips when the ASTAT-XT is connected Inside Delta and Wrong connection or overcurrent is detected |

Overload protections - Thermal characteristics

The ASTAT XT allows motor protection according IEC Class 10 or Class 20 and NEMA 10, 20 or 30, user free selectable by ASTAT internal dedicated parameter.

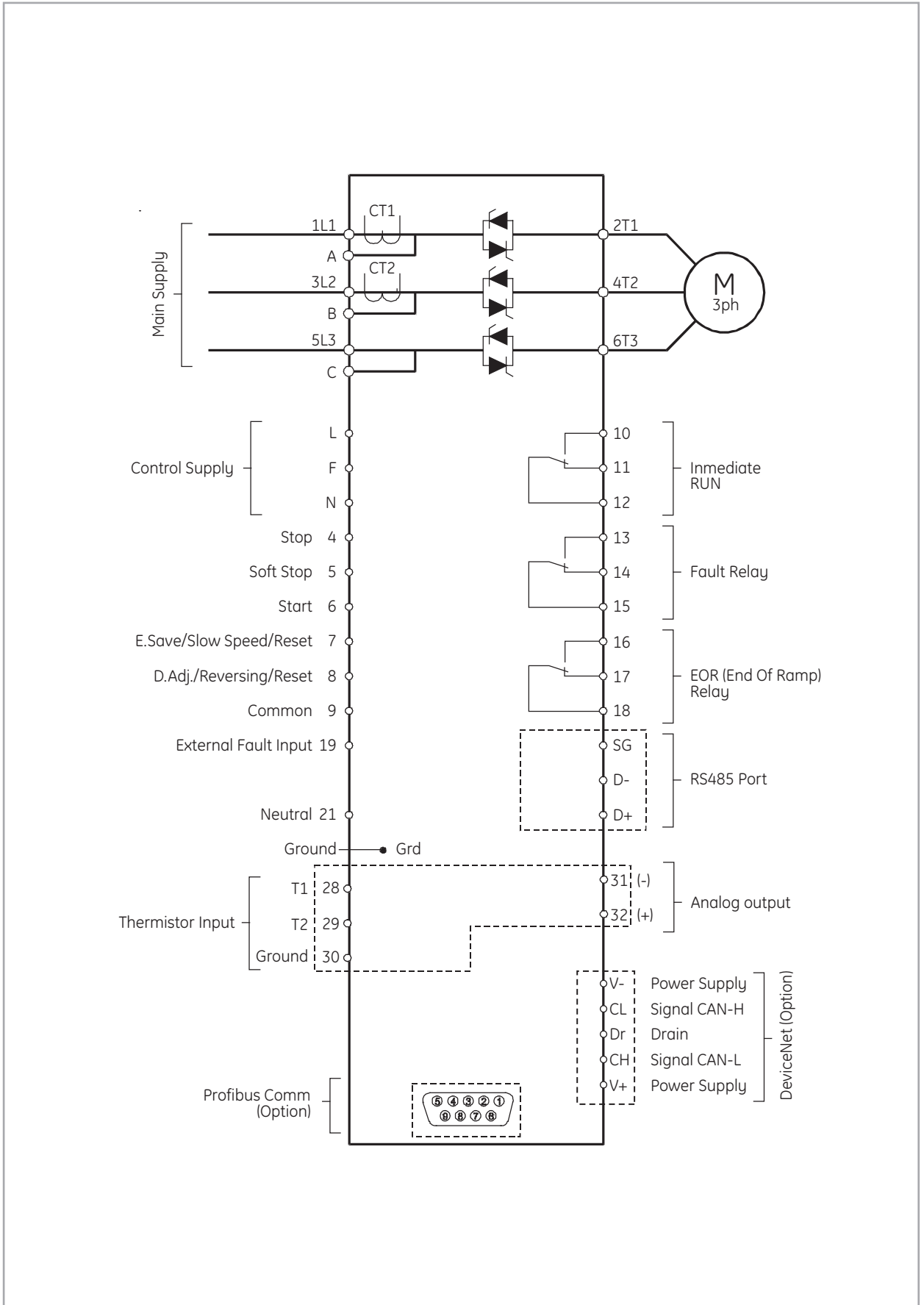


Maximum number starting /hour

| Starting current I/In ⁽¹⁾ | Ramp time | | |
|--------------------------------------|-----------|-----|-----|
| | 10s | 20s | 30s |
| 2 | 24 | 12 | 8 |
| 3 | 16 | 8 | 5 |
| 4 | 12 | 6 | 4 |

(1) In= rated current of ASTAT XT in the specified class IEC/Nema

I/O Wiring, Basic scheme



I/O terminal board specifications

Power I/O terminals

| Terminals | Function | Description |
|---------------|-----------------|---|
| 1L1, 3L2, 5L3 | Mains Input | 3ph Input voltage according Astat XT Main Voltage Option rating (Option 1, QT1_) 230-500VAC, +10%/-15% 50/60Hz (Option 2, QT2_) 460-600VAC, +10%/-15% 50/60Hz (Option 3, QT3_) 690VAC, +10%/-15% 50/60Hz |
| 2T1, 4T2, 6T3 | Output to motor | Power Output terminals to 3ph AC motor |
| A, B, C | By-pass | Bypass terminals for external by-pass contactor |
| G | Ground | ASTAT XT, ground connection |

Control power supply

| | | |
|------|----------------|---|
| L, N | Control Supply | a110VAC or 220VAC, according ASTAT XT Control Voltage rating |
| F | Fan control | Cooling fan external control, together with jumper J1 Control Voltage & Fan consumption VA: QTx0008 to QTx0031: No fan. Total consumption: 150VA QTx0044 to QTx0072: Fan 35 VA. Total consumption 185VA QTx0085 to QTx0170: Fan 60 VA. Total consumption 210VA QTx0210 to QTx0390: Fans 105VA. Total consumption 255VA QTx0390 to QTx 1400A : Fans 150VA.Total consumption 300VA |

Digital inputs

| | | |
|---|---------------------|---|
| 4 | Stop | Dedicated input to Stop |
| 5 | Soft Stop | Dedicated input to Soft Stop |
| 6 | Start | Dedicated input to Start |
| 7 | Programmable Inputs | Programmable to functions Energy Saving, Slow Speed and Reset |
| 8 | Programmable Inputs | Programmable to functions Dual Set, Reverse and Reset |
| 9 | Common | Common terminal for digital inputs from 4, 5, 6, 7 and 8 |
| | | Operating Voltage of digital inputs from 4 to 9 Digital Input hardware is operated according either of below ordered voltage ratings (Option 1, standard) From 90 to 230VAC +10%, 50/60Hz (Option 2, Optional) 24VDC +10%/ -15% |

Other inputs

| | | |
|--------|------------------|--|
| 19, 21 | External fault | Requires a free voltage relay contact, to detect external fault |
| 21 | Neutral | This terminal may be connected to Mains Neutral when available |
| 28, 29 | Motor thermistor | PTC or NTC programmable input for motor thermistor protection The input can be enabled or disabled, and programmed at desired trip level resistance |

Digital outputs

| | | |
|------------|-------|--|
| 10, 11, 12 | RUN | Run Relay with NO & NC dry contact. Programmable ON delay |
| 13, 14, 15 | FAULT | Fault to ON or Fault to OFF programmable function |
| 16, 17, 18 | EOR | End Of Ramp relay. Programmable ON delay |
| | | Relay Outputs Ratings Max rating: 8A, 250VAC, 2000VA max |

Analogue output

| | | |
|--------|----------------|---|
| 31, 32 | Current output | Range 0 to 2xIn. Programmable 0-10VDC, 0-20mA or 4-20mA |
| 30 | Ground | Ground terminal for Analog Output |

Communications

| | | |
|--------------------|---------------------|--|
| D+, D-, SG | RS485 terminals | RS485 Communication port, half duplex for ModBus protocol Baudrate 1200, 2400, 4800, 9600 BPS |
| D-9 connector | Profibus port | Optional Profibus Communications port |
| V+, CL, Dr, CH, V- | DeviceNet terminals | Optional Devicenet Communications port |

I/O terminal board specifications

A

B

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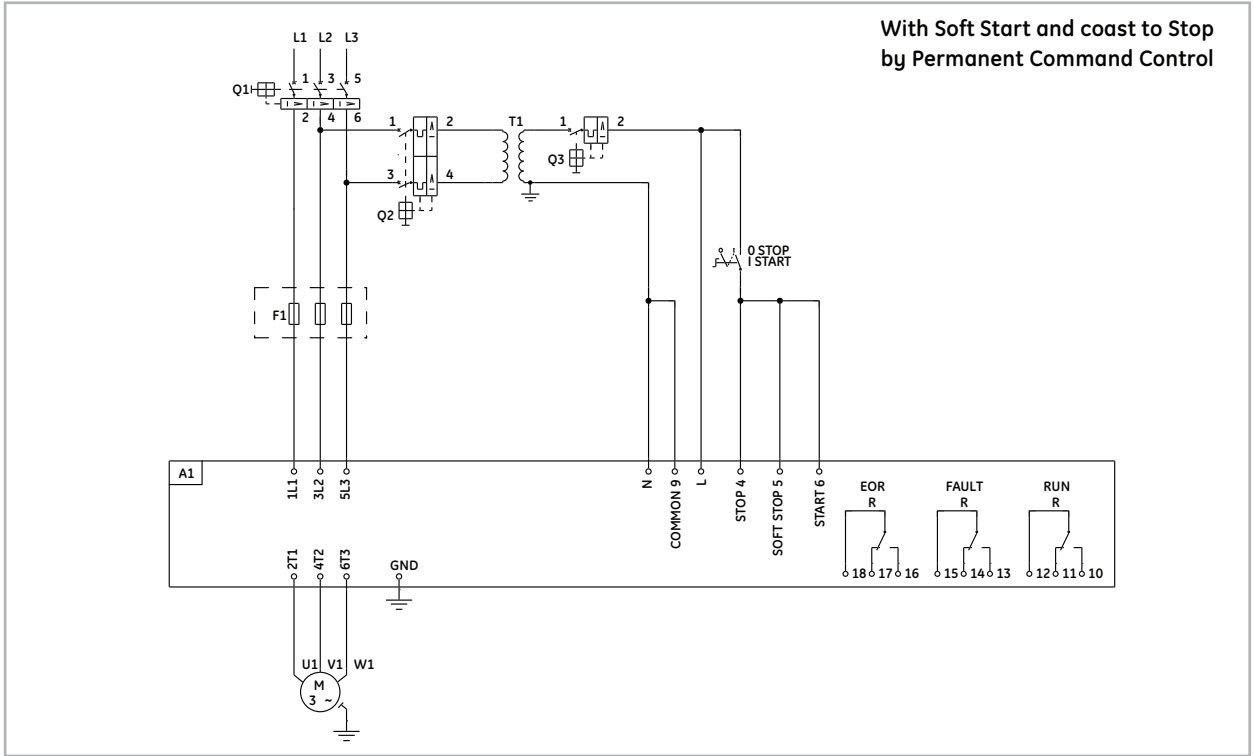
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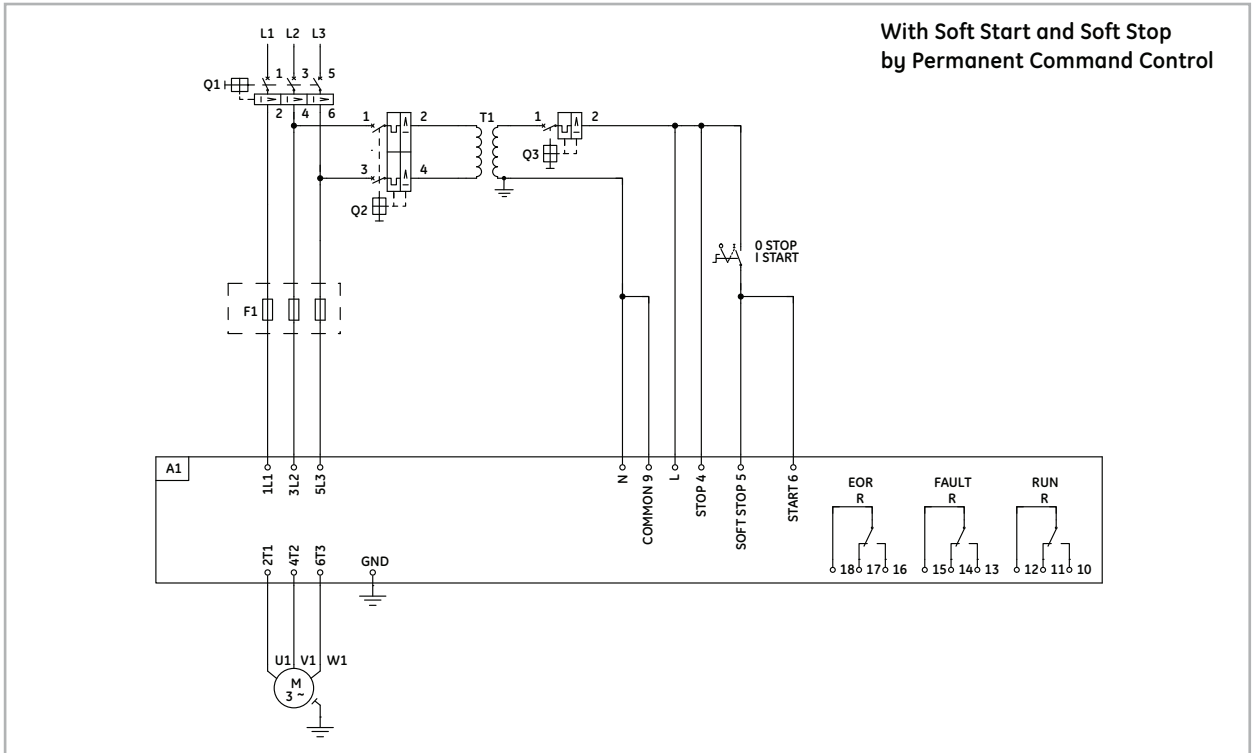
X

Application wiring diagrams

Basic diagram without line contactor⁽¹⁾



Basic diagram without line contactor⁽¹⁾



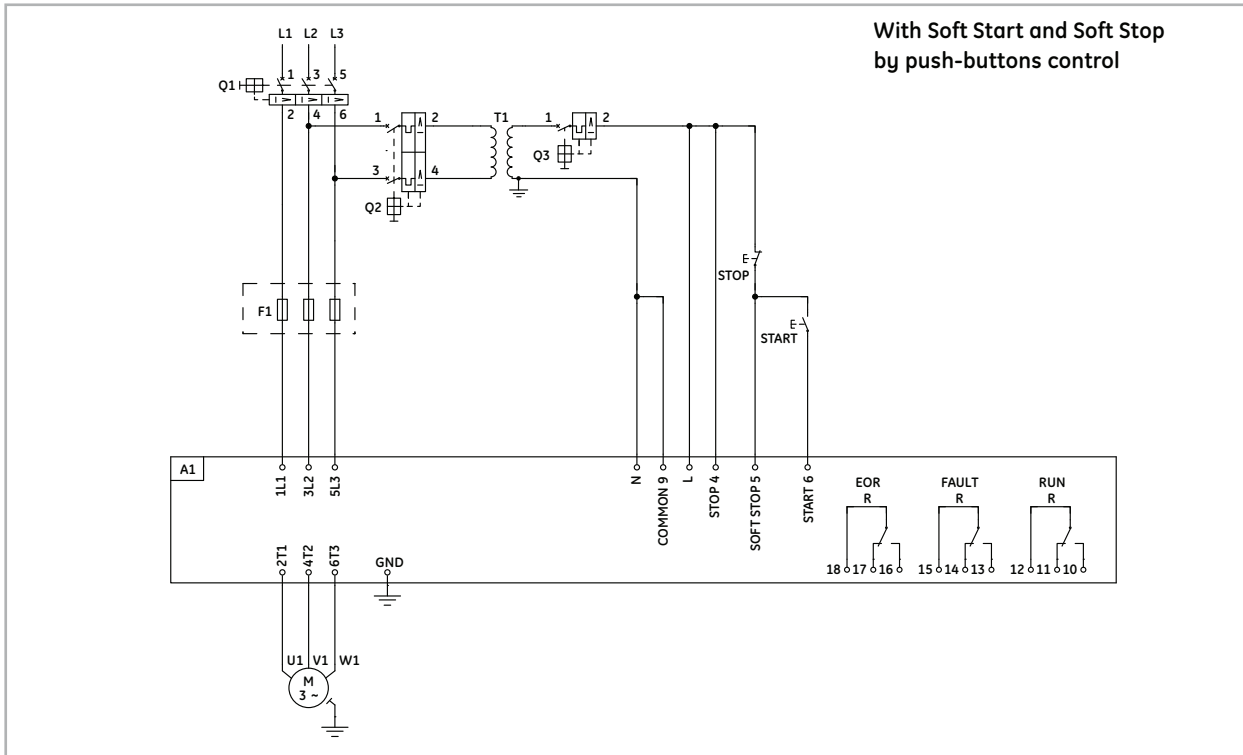
(1) Schemes are given for information purposes. Add additional emergency safety stop, if it is required for your application.

Remarks

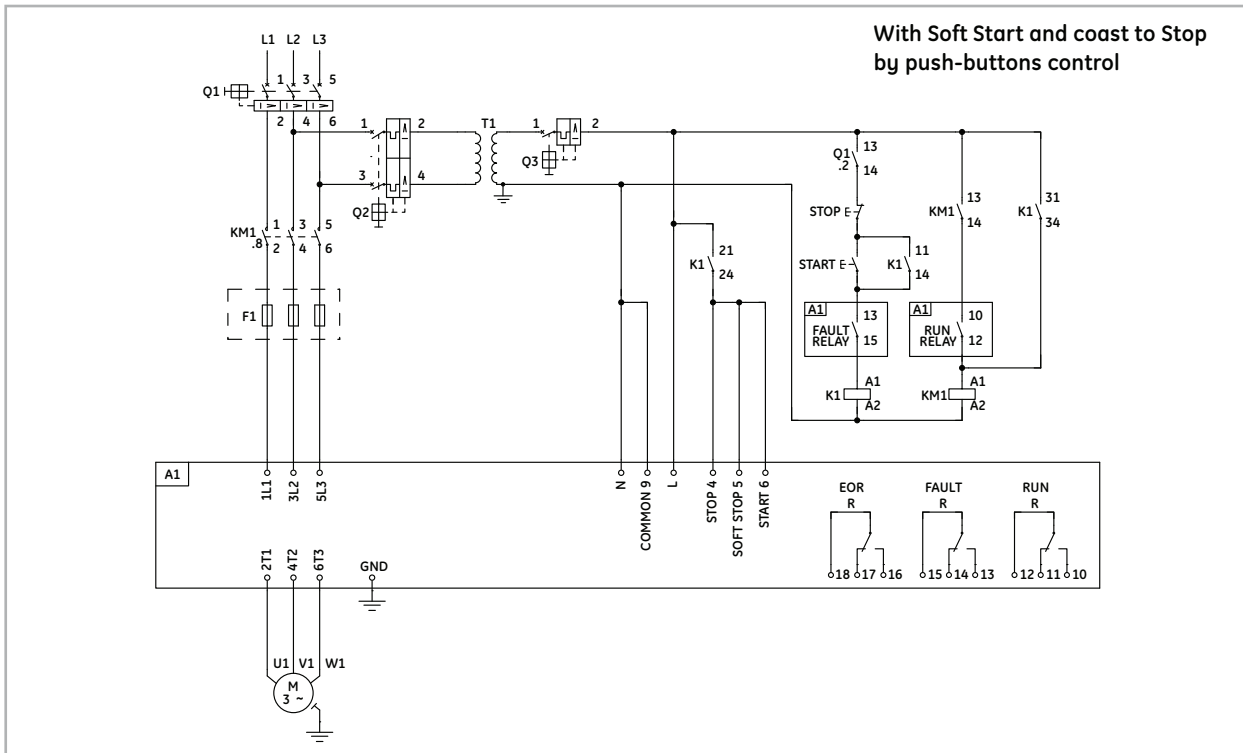
1. Check coordination tables for proper selection of Breaker and Line contactor.
2. Control Voltage and Control Input voltage are from same source in above example. Please check manuals if you have different sources for Control Voltage and Control input Voltage.
3. Semiconductor Fuses "F" are only required for Type 2 coordination. Please check coordination tables
4. In spite of ASTAT XT can operate without line contactor, the use of a line contactor will increase the operation safety. Anyway provide a way to switch off the Breaker in case of an emergency.

Application wiring diagrams

Basic diagram without line contactor⁽¹⁾



Basic diagram with line contactor⁽¹⁾



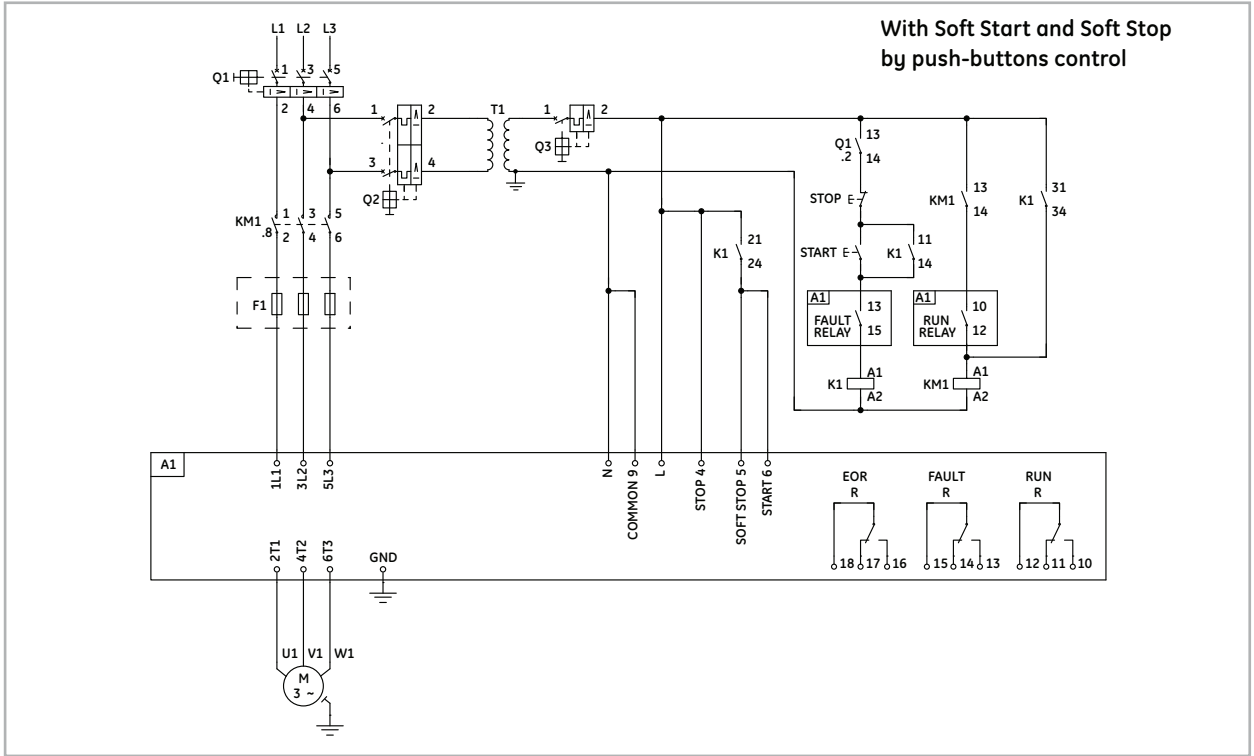
(1) Schemes are given for information purposes. Add additional emergency safety stop, if it is required for your application.

Remarks

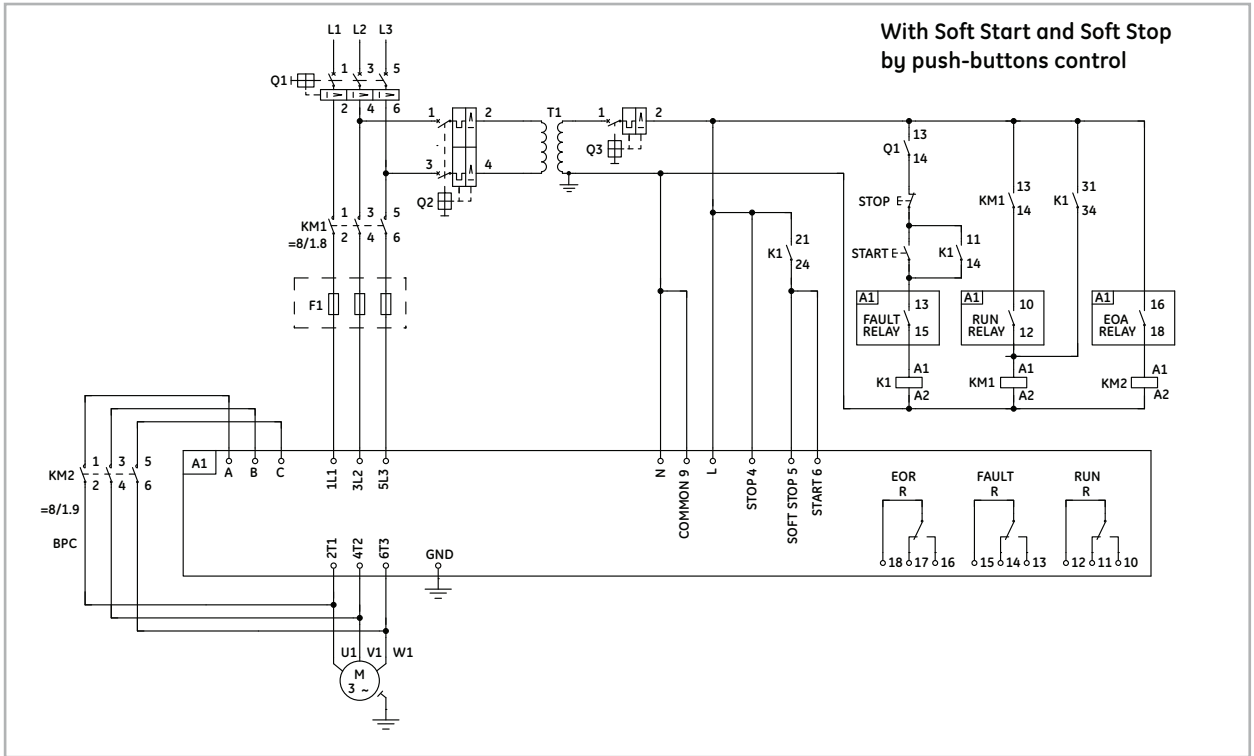
1. Check coordination tables for proper selection of Breaker and Line contactor.
2. Control Voltage and Control Input voltage are from same source in above example. Please check manuals if you have different sources for Control Voltage and Control input Voltage.
3. Semiconductor Fuses "F" are only required for Type 2 coordination. Please check coordination tables
4. In spite of ASTAT XT can operate without line contactor, the use of a line contactor will increase the operation safety. Anyway provide a way to switch off the Breaker in case of an emergency.

Application wiring diagrams

Basic diagram with line contactor⁽¹⁾



Basic diagram with line and bypass contactors⁽¹⁾



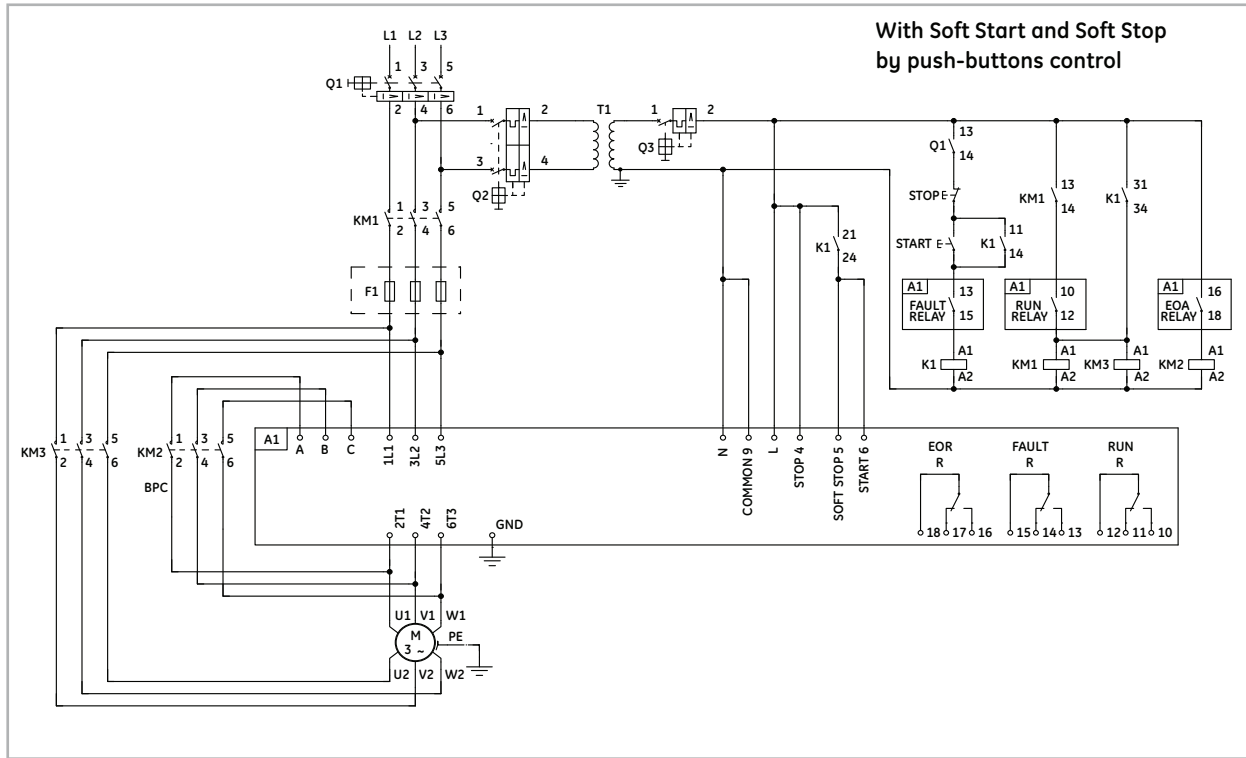
(1) Above schemes are given for information purposes. Add additional emergency safety stop, if it is required for your application.

Remarks

1. Check coordination tables for proper selection of Breaker and Line contactor.
2. Control Voltage and Control Input voltage are from same source in above example. Please check manuals if you have different sources for Control Voltage and Control input Voltage.
3. Semiconductor Fuses "F" are only required for Type 2 coordination. Please check coordination tables

Application wiring diagrams

Basic diagram in "Inside Delta" configuration with line and bypass contactors⁽¹⁾



(1) Above schemes are given for information purposes. Add additional emergency safety stop, if it is required for your application.

Remarks

1. Check coordination tables for proper selection of Breaker and Line contactor.
2. Control Voltage and Control Input voltage are from same source in above example. Please check manuals if you have different sources for Control Voltage and Control input Voltage.
3. Semiconductor Fuses "F" are only required for Type 2 coordination. Please check coordination tables
4. Wrong connection of the motor, or the ASTAT-XT when it is Inside-delta connected may seriously damage the motor or the ASTAT-XT. Please check additional details given in the ASTAT XT's instruction manual.

Coordination Type 1

Combination with aM fuses - 415V

Digital Soft Starters

| Main Voltage Up to 415VAC | ASTAT-XT type | | aM fuses | | Contactor Type | Short-circuit current | |
|------------------------------|---------------|----------|----------|------------|-------------------|--------------------------|----|
| | Rating (A) | Cat. No. | | Rating (A) | CL/CK series | Iq (kA) | |
| | 8 | - | QT10008 | - | 16 | CL00 | 80 |
| | 17 | - | QT10017 | - | 20 | CL02 | 80 |
| | 31 | - | QT10031 | - | 35 | CL04 | 80 |
| | 44 | - | QT10044 | - | 50 | CL06 | 80 |
| | 58 | - | QT10058 | - | 80 | CL07 | 80 |
| | 72 | - | QT10072 | - | 100 | CL08 | 80 |
| | 85 | - | QT10085 | - | 125 | CL09 | 80 |
| | 105 | - | QT10105 | - | 160 | CL10 | 80 |
| | 145 | - | QT10145 | - | 200 | CK75C | 80 |
| | 170 | - | QT10170 | - | 200 | CK08C | 80 |
| | 210 | - | QT10210 | - | 250 | CK09B | 80 |
| | 310 | - | QT10310 | - | 400 | CK95B | 80 |
| | 390 | - | QT10390 | - | 500 | CK10C | 80 |
| | 460 | - | QT10460 | - | 630 | CK11C | 80 |
| | 580 | - | QT10580 | - | 800 | CK12B | 80 |
| | 650 | - | QT10650 | - | 1000 | CK13B | 80 |
| | 950 | - | QT10950 | - | 2x630 | - | 80 |
| | 1100 | - | QT11100 | - | 2x800 | - | 80 |
| | 1400 | - | QT11400 | - | 2x800 | - | 80 |

Combination with Record Plus MCCB'S - 415V

| Main Voltage Up to 415VAC | ASTAT-XT type | | Circuit Breaker | | Contactor Type | Short-circuit current | |
|------------------------------|---------------|----------|-----------------|------------|-------------------|--------------------------|----|
| | Rating (A) | Cat. No. | Record Plus | Rating (A) | CL/CK series | Iq (kA) | |
| | 8 | - | QT10008 | FD63 | 16 | CL45 | 65 |
| | 17 | - | QT10017 | FD63 | 40 | CL06 | 65 |
| | 31 | - | QT10031 | FD63 | 50 | CL06 | 65 |
| | 44 | - | QT10044 | FD160 | 63 | CL06 | 65 |
| | 58 | - | QT10058 | FD160 | 80 | CL07 | 65 |
| | 72 | - | QT10072 | FD160 | 80 | CL08 | 65 |
| | 85 | - | QT10085 | FE160 | 125 | CL10 | 65 |
| | 105 | - | QT10105 | FE160 | 160 | CL10 | 65 |
| | 145 | - | QT10145 | FE160 | 160 | CK85B | 65 |
| | 170 | - | QT10170 | FE250 | 160 | CK08 | 65 |
| | 210 | - | QT10210 | FE250 | 160 | CK85 | 65 |
| | 310 | - | QT10310 | FG400 | 400 | CK10C | 65 |
| | 390 | - | QT10390 | FG400 | 400 | CK12B | 65 |
| | 460 | - | QT10460 | FG630 | 630 | CK12B | 65 |
| | 580 | - | QT10580 | FG630 | 630 | CK13B | 65 |
| | 650 | - | QT10650 | FK1250 | 1000 | CK13B | 50 |
| | 950 | - | QT10950 | FK1250 | 1000 | - | 50 |
| | 1100 | - | QT11100 | FK1250 | 1250 | - | 50 |
| | 1400 | - | QT11400 | FK1600 | 1600 | - | 50 |

Combination with aM fuses - 500V

| Main Voltage 500 VAC | ASTAT-XT type | | aM fuses | | Contactor Type | Short-circuit current | |
|-------------------------|---------------|----------|----------|------------|-------------------|--------------------------|----|
| | Rating (A) | Cat. No. | | Rating (A) | CL/CK series | Iq (kA) | |
| | 8 | QT10008 | QT20008 | - | 16 | CL00 | 80 |
| | 17 | QT10017 | QT20017 | - | 20 | CL02 | 80 |
| | 31 | QT10031 | QT20031 | - | 35 | CL04 | 80 |
| | 44 | QT10044 | QT20044 | - | 50 | CL06 | 80 |
| | 58 | QT10058 | QT20058 | - | 80 | CL07 | 80 |
| | 72 | QT10072 | QT20072 | - | 100 | CL08 | 80 |
| | 85 | QT10085 | QT20085 | - | 125 | CL09 | 80 |
| | 105 | QT10105 | QT20105 | - | 160 | CL10 | 80 |
| | 145 | QT10145 | QT20145 | - | 200 | CK75C | 80 |
| | 170 | QT10170 | QT20170 | - | 200 | CK08C | 80 |
| | 210 | QT10210 | QT20210 | - | 250 | CK09B | 80 |
| | 310 | QT10310 | QT20310 | - | 400 | CK95B | 80 |
| | 390 | QT10390 | QT20390 | - | 500 | CK10C | 80 |
| | 460 | QT10460 | QT20460 | - | 630 | CK11C | 80 |
| | 580 | QT10580 | QT20580 | - | 800 | CK12B | 80 |
| | 650/820 | QT10650 | QT20820 | - | 1000 | CK13B | 80 |
| | 950 | QT10950 | QT20950 | - | 2x630 | - | 80 |
| | 1100 | QT11100 | QT21100 | - | 2x800 | - | 80 |
| | 1400 | QT11400 | QT21400 | - | 2x800 | - | 80 |



Coordination Type 2

Combination with semiconductor fuses - 415V

| Rating (A) | ASTAT-XT type | | Semiconductor fuses ⁽¹⁾ | Contactor Type | Short-circuit current | |
|------------------------------|---------------|----------|------------------------------------|----------------|-----------------------|----|
| | | Cat. No. | Bussmann type | CL/CK series | Iq (kA) | |
| Main Voltage Up to 415VAC | 8 | - | QT10008 | 170M3808D | CL25 | 80 |
| | 17 | - | QT10017 | 170M3810D | CL25 | 80 |
| | 31 | - | QT10031 | 170M3813D | CL04 | 80 |
| | 44 | - | QT10044 | 170M3814D | CL45 | 80 |
| | 58 | - | QT10058 | 170M3814D | CL07 | 80 |
| | 72 | - | QT10072 | 170M3815D | CL08 | 80 |
| | 85 | - | QT10085 | 170M3816D | CL09 | 80 |
| | 105 | - | QT10105 | 170M3817D | CL10 | 80 |
| | 145 | - | QT10145 | 170M3817D | CK75C | 80 |
| | 170 | - | QT10170 | 170M3819D | CK08C | 80 |
| | 210 | - | QT10210 | 170M4864D | CK09B | 80 |
| | 310 | - | QT10310 | 170M4864D | CK95B | 80 |
| | 390 | - | QT10390 | 170M5814D | CK10C | 80 |
| | 460 | - | QT10460 | 170M5820D | CK11C | 80 |
| | 580 | - | QT10580 | 170M5816D | CK12B | 50 |
| | 650 | - | QT10650 | 2x170M5814D | CK13B | 80 |
| | 950 | - | QT10950 | 2x170M5816D | - | 80 |
| 1100 | - | QT11100 | 2x170M6892D | - | 80 | |
| 1400 | - | QT11400 | 2x170M8555D | - | 80 | |

Combination with semiconductor fuses - 500V

| Rating (A) | ASTAT-XT type | | Semiconductor fuses ⁽¹⁾ | Contactor Type | Short-circuit current | |
|-------------------------|---------------|----------|------------------------------------|----------------|-----------------------|----|
| | | Cat. No. | Bussmann type | CL/CK series | Iq (kA) | |
| Main Voltage 500 VAC | 8 | QT10008 | QT20008 | 170M3808D | CL25 | 80 |
| | 17 | QT10017 | QT20017 | 170M3810D | CL25 | 80 |
| | 31 | QT10031 | QT20031 | 170M3813D | CL04 | 80 |
| | 44 | QT10044 | QT20044 | 170M3814D | CL06 | 80 |
| | 58 | QT10058 | QT20058 | 170M3814D | CL07 | 80 |
| | 72 | QT10072 | QT20072 | 170M3815D | CL08 | 80 |
| | 85 | QT10085 | QT20085 | 170M3816D | CL09 | 80 |
| | 105 | QT10105 | QT20105 | 170M3817D | CL10 | 80 |
| | 145 | QT10145 | QT20145 | 170M3817D | CK75C | 80 |
| | 170 | QT10170 | QT20170 | 170M3819D | CK08C | 80 |
| | 210 | QT10210 | QT20210 | 170M4864D | CK09B | 80 |
| | 310 | QT10310 | QT20310 | 170M4864D | CK10C | 80 |
| | 390 | QT10390 | QT20390 | 170M5814D | CK10C | 80 |
| | 460 | QT10460 | QT20460 | 170M5820D | CK11C | 80 |
| | 580 | QT10580 | QT20580 | 170M5816D | CK12B | 50 |
| | 650/820 | QT10650 | QT20820 | 2x170M5814D | CK13B | 80 |
| | 950 | QT10950 | QT20950 | 2x170M5816D | - | 80 |
| 1100 | QT11100 | QT21100 | 2x170M6892D | - | 80 | |
| 1400 | QT11400 | QT21400 | 2x170M8555D | - | 80 | |

Combination with semiconductor fuses - 690V

| Rating (A) | ASTAT-XT type | | Semiconductor fuses ⁽¹⁾ | Contactor Type | Short-circuit current | |
|-------------------------|---------------|----------|------------------------------------|----------------|-----------------------|----|
| | | Cat. No. | Bussmann type | CL/CK series | Iq (kA) | |
| Main Voltage 690 VAC | 8 | - | QT30008 | 170M3808D | CL25 | 50 |
| | 17 | - | QT30017 | 170M3810D | CL25 | 50 |
| | 31 | - | QT30031 | 170M3813D | CL06 | 50 |
| | 44 | - | QT30044 | 170M3814D | CL06 | 50 |
| | 58 | - | QT30058 | 170M3814D | CL07 | 50 |
| | 72 | - | QT30072 | 170M3815D | CL08 | 50 |
| | 85 | - | QT30085 | 170M3816D | CK75C | 50 |
| | 105 | - | QT30105 | 170M3817D | CK75C | 50 |
| | 145 | - | QT30145 | 170M3817D | CK08B | 50 |
| | 170 | - | QT30170 | 170M3819D | CK08B | 50 |
| | 210 | - | QT30210 | 170M4864D | CK08B | 50 |
| | 310 | - | QT30310 | 170M4864D | CK10C | 50 |
| | 390 | - | QT30390 | 170M5814D | CK10C | 50 |
| | 460 | - | QT30460 | 170M5820D | CK12B | 50 |
| | 580 | - | QT30580 | 170M5816D | CK12B | 30 |
| | 650 | - | QT30650 | 2x170M5814D | - | 50 |
| | 950 | - | QT30950 | 2x170M5816D | - | 50 |
| 1100 | - | QT31100 | 2x170M6892D | - | 50 | |
| 1400 | - | QT31400 | 2x170M8555D | - | 50 | |

(1) Semiconductor Fuses must be always used for Type 2 coordination

A

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Dimensions and weights

Cat. No.: QTx0008U_, QTx0017U_, QTx0031U_, QTx0044U_, QTx0058U_, QTx0072U_

| Cat. No | Dimensions | | Power terminal size (mm²) | | | Weight Kg |
|----------|------------|-------|---------------------------|---------|---------------|-----------|
| | D1 | D2 | 1L1, 3L2, 5L3 | A, B, C | 2T1, 4T2, 6T3 | |
| QTx0008U | 160 | 182.5 | 16 | 16 | 16 | 4.2 |
| QTx0017U | 160 | 182.5 | 16 | 16 | 16 | 4.2 |
| QTx0031U | 160 | 182.5 | 16 | 16 | 16 | 5.3 |
| QTx0044U | 207 | 229.5 | 16 | 16 | 35 | 6.7 |
| QTx0058U | 207 | 229.5 | 16 | 16 | 35 | 6.7 |
| QTx0072U | 207 | 229.5 | 35 | 35 | 35 | 6.7 |

UL Certified units

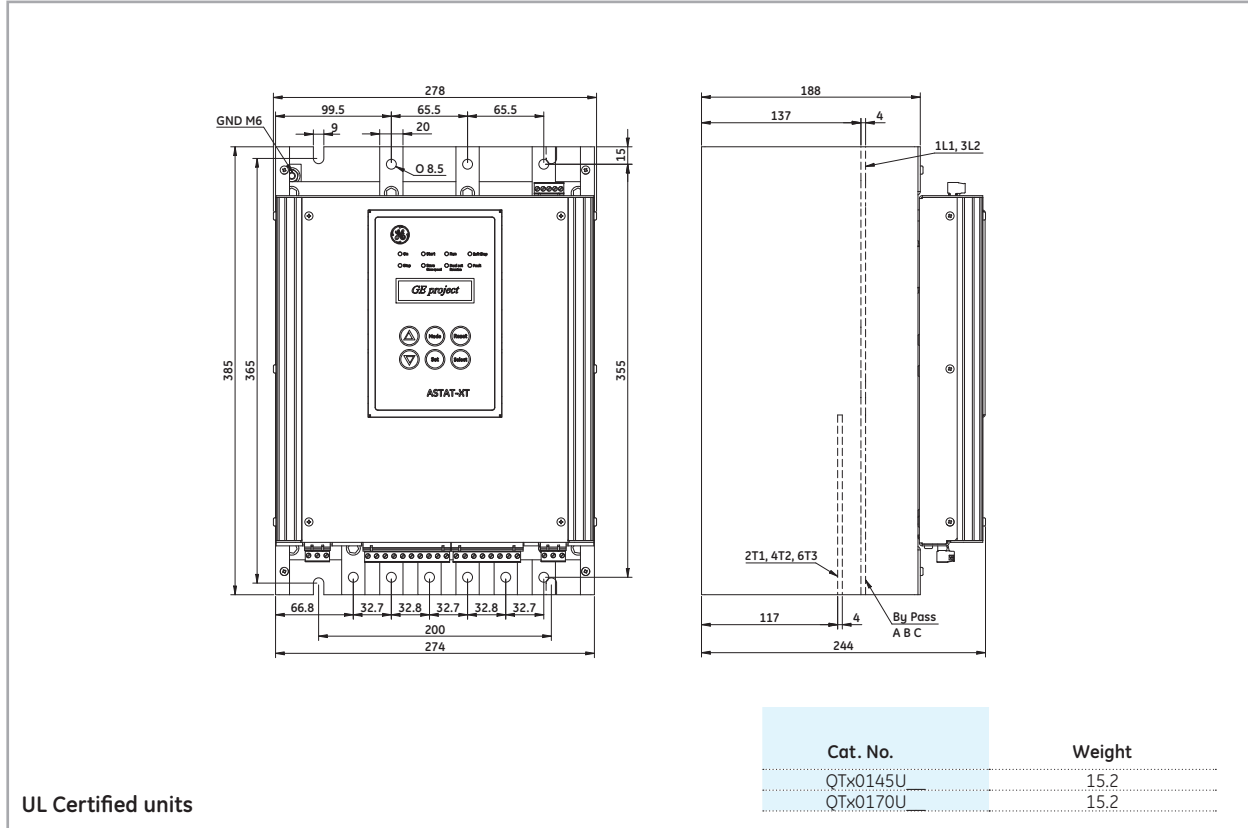
Cat. No.: QTx0085U_, QTx0105U_

| Cat. No. | Weight |
|-----------|--------|
| QTx0085U_ | 15.2 |
| QTx0105U_ | 15.2 |

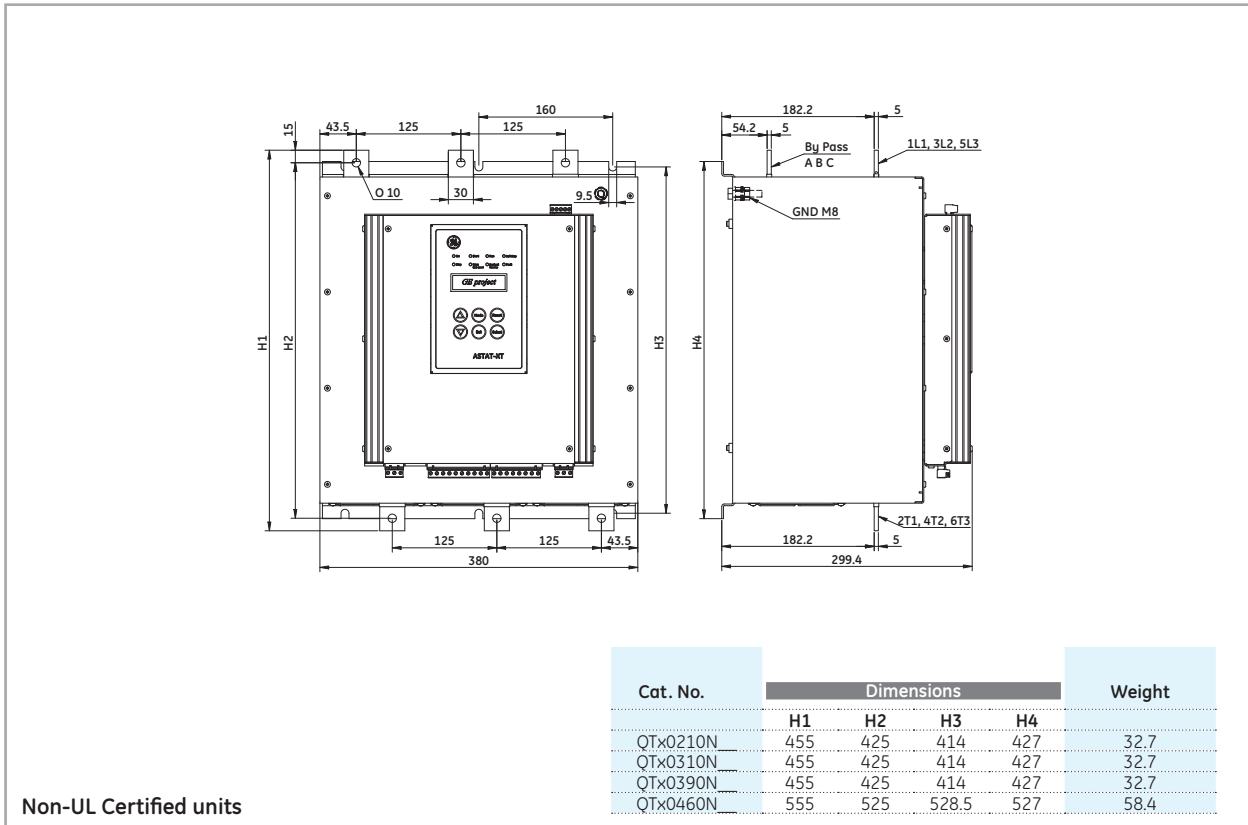
UL Certified units

Dimensions and weights

Cat. No.: QTx0145U_, QTx0170U_



Cat. No.: QTx0210N_, QTx0315N_, QTx0390N_, QTx0460N_



Dimensions

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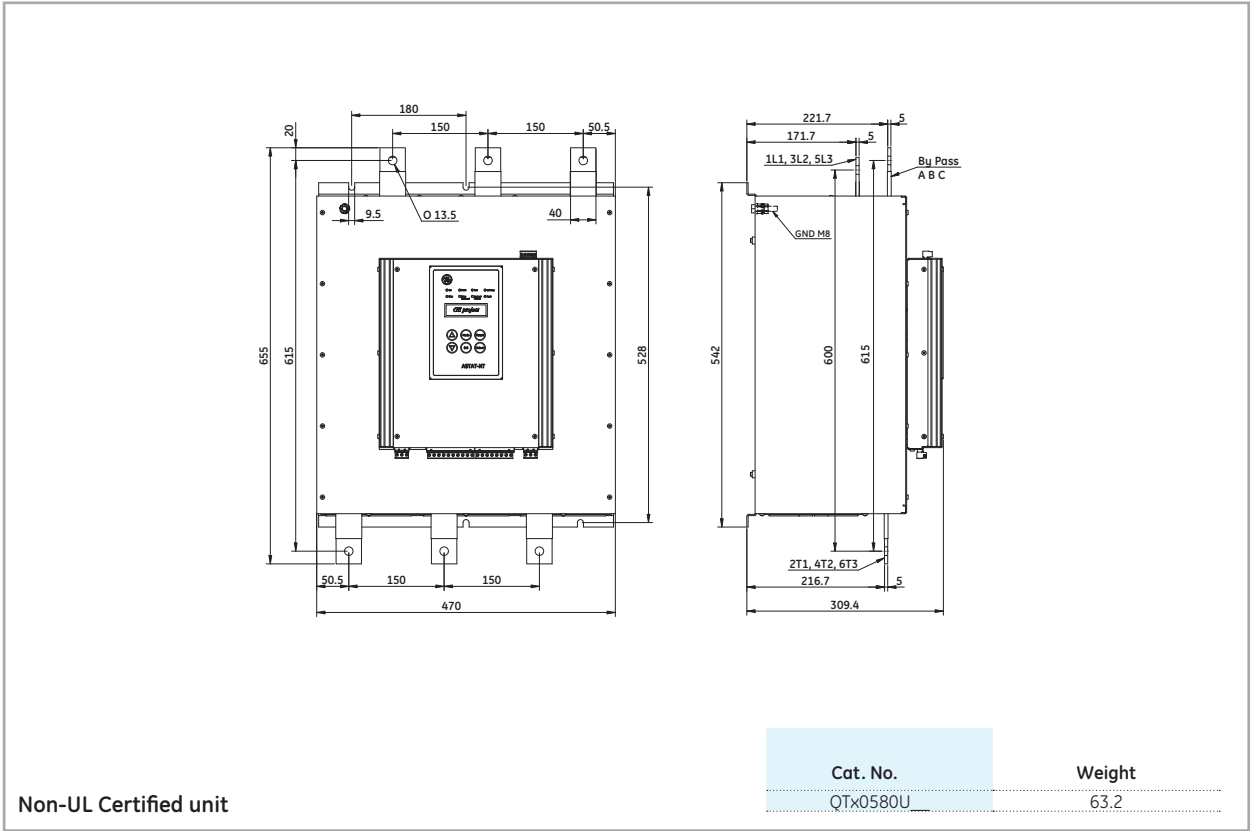
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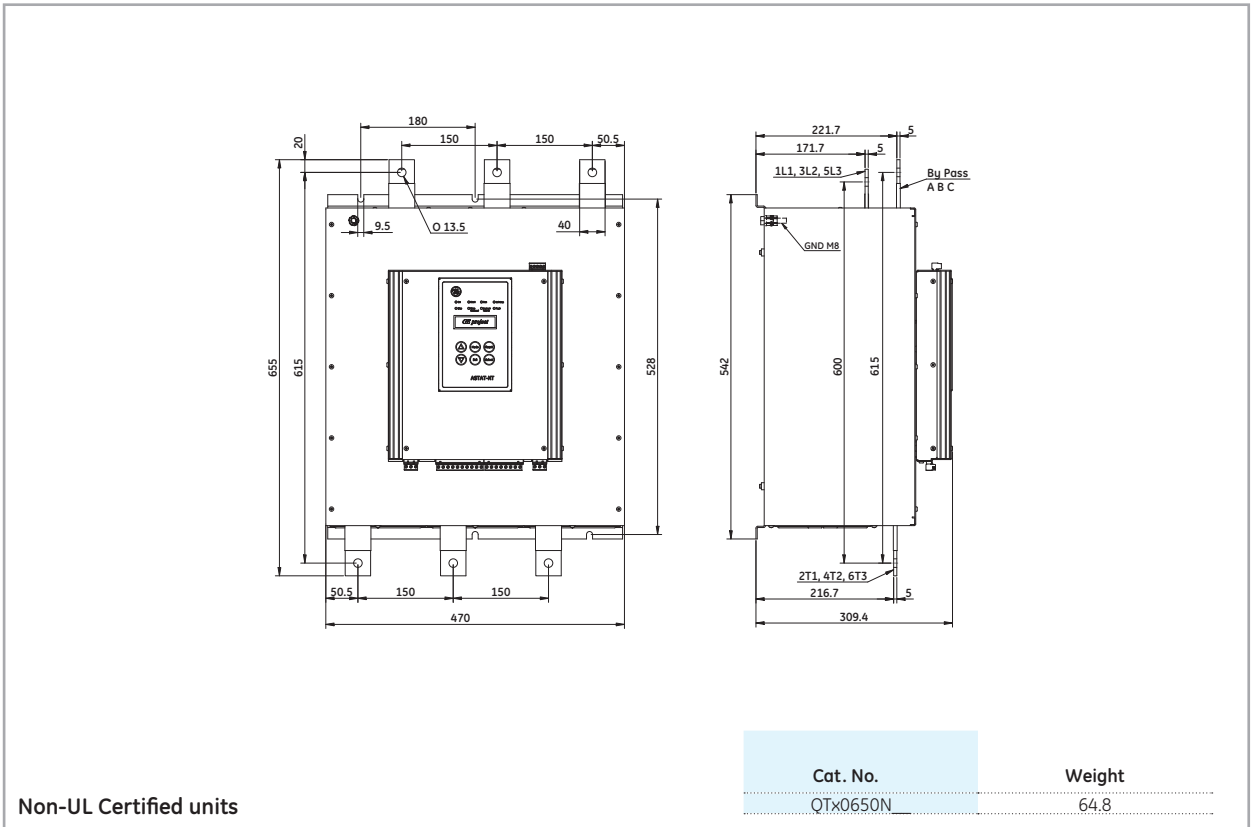
X

Dimensions and weights

Cat. No.: QTx0580N_

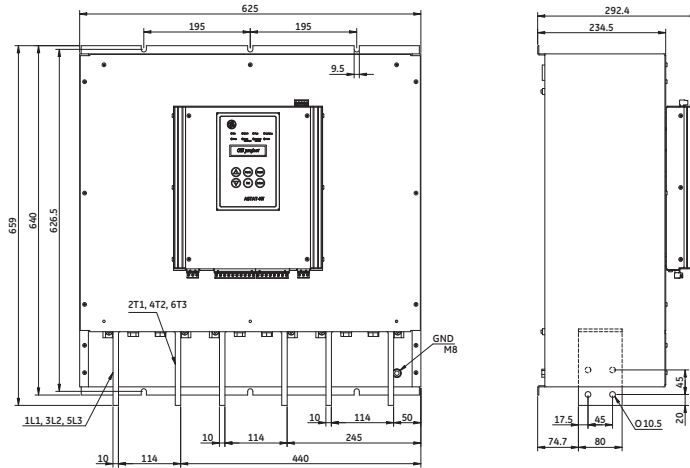


Cat. No.: QTx0650N_



Dimensions and weights

Cat. No.: QTx0950N_



Remarks

1. This unit must be operated with a bypass contactor
 2. Add space for current transformers (supplied separately from the main unit) and bus bars for preparation for bypass
- Approximate current transformers dimensions: W=240mm, H=130mm, D=90mm

Non-UL Certified unit

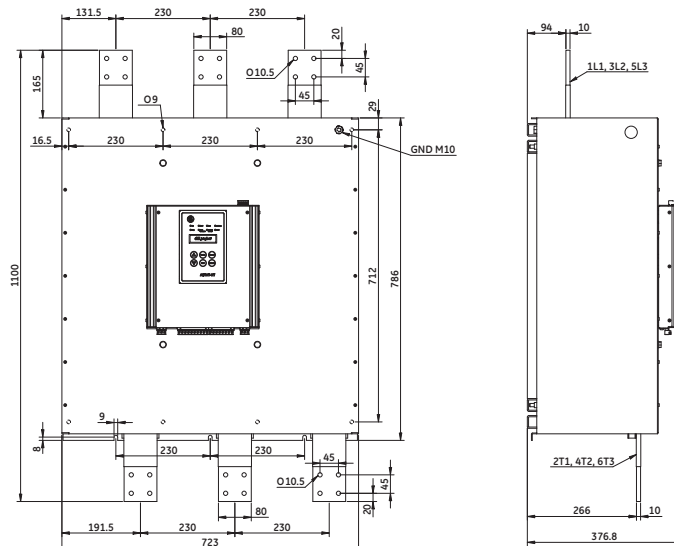
Cat. No.

QTx0950N

Weight

86.7

Cat. No.: QTx1100N_ , QTx1400N



Remarks

1. Units must be operated with a bypass contactor
2. Add space for current transformers (Supplied separately from main unit) and bus bars for preparation for bypass

Approximate current transformers dimensions:

W=240mm, H=130mm, D=90mm. (for 1100A unit, Cat Numbers QTx1100N_

W=270mm, H=155mm, D=90mm. (for 1400A unit, Cat Numbers QTx1400N_

Non-UL Certified unit

Cat. No.

QTx1100N

Weight

169.8

QTx1400N

175.5

Dimensions

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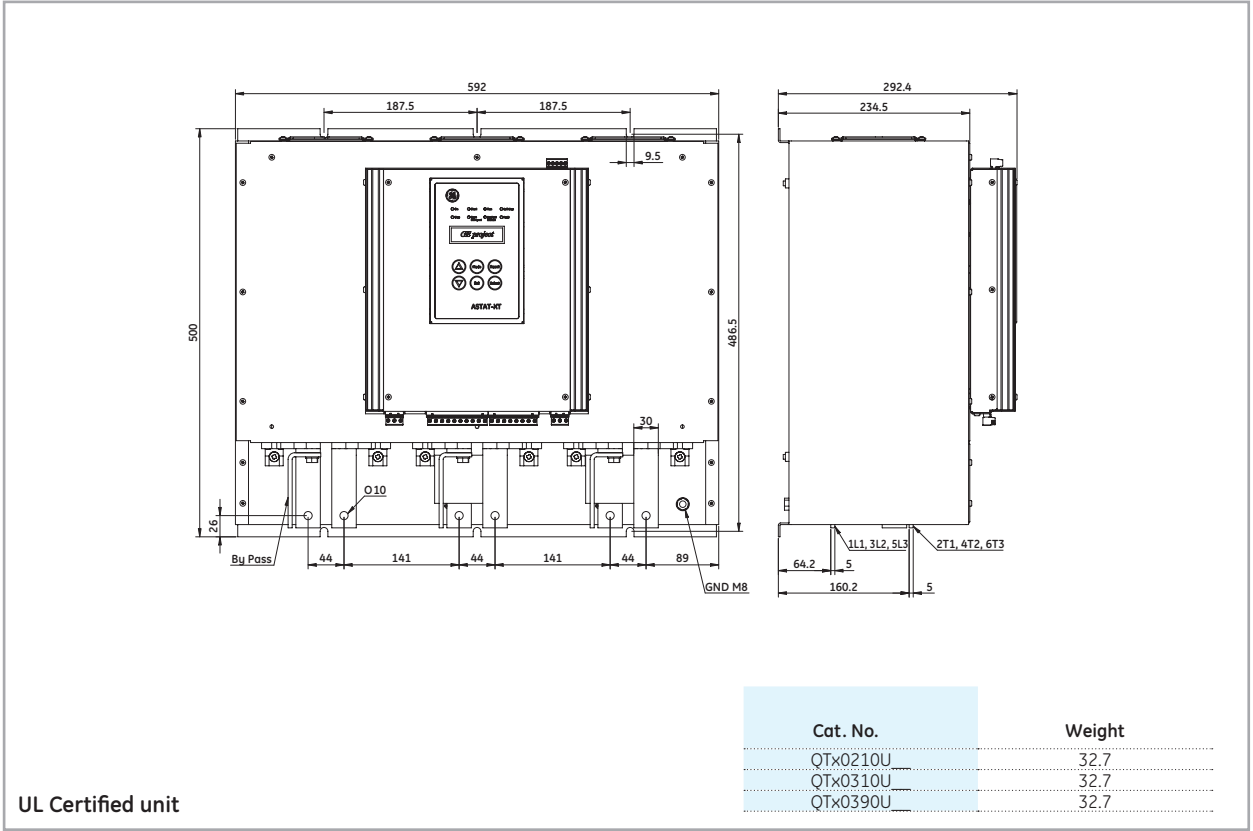
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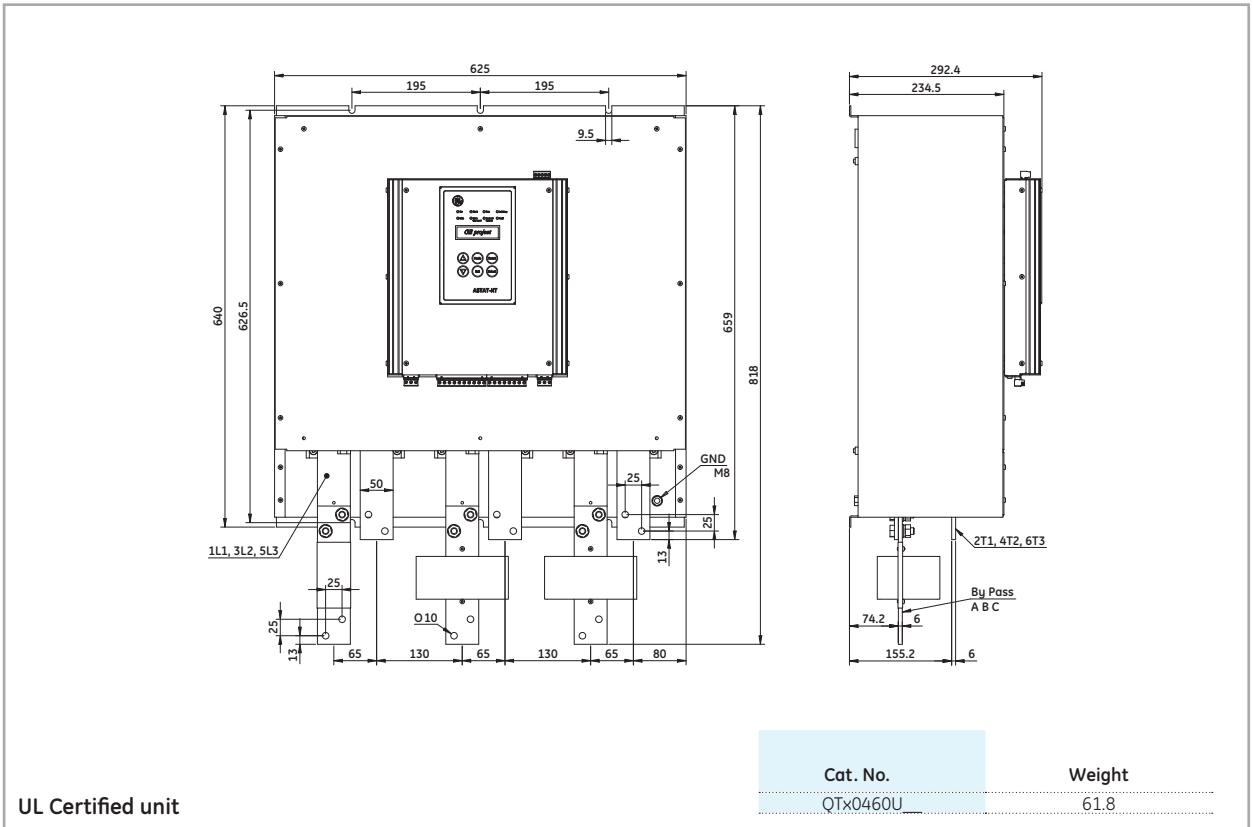
X

Dimensions and weights

Cat. No.: QTx0210U_, QTx0315U_, QTx0390U_

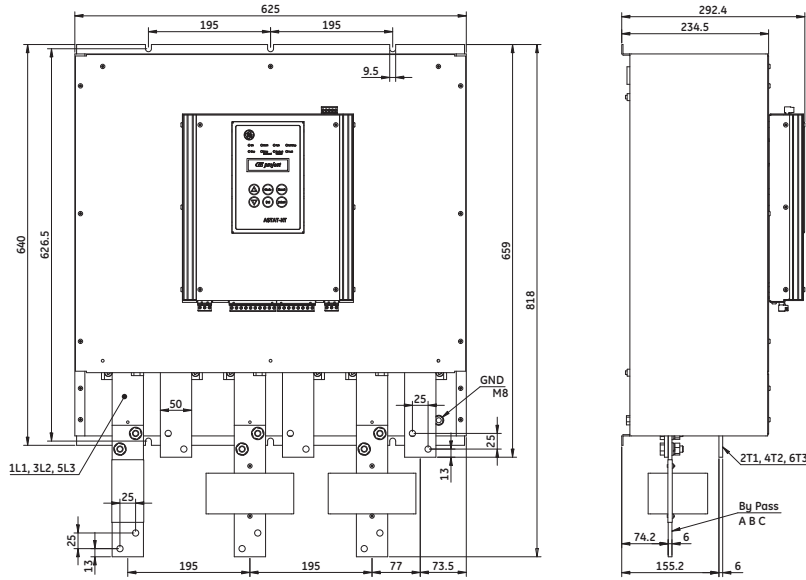


Cat. No.: QTx0460U_



Dimensions and weights

Cat. No.: QTx0580U_, QTx0820U_



UL Certified unit

| Cat. No. | Weight |
|----------|--------|
| QTx0580U | 69,5 |
| QTx0820U | 69,5 |

Dimensions

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Everything is

Series P9

E.2 Control and signalling units Ø 22 mm

Series 077

E.42 Control and signalling units Ø 30 mm

Series NLT

E.60 Light towers

E.66 **Foot switches**

E.68 **Safety foot switches**

E.69 **Signalling devices**

Plug-in relays and Auxiliary contactors

Motor protection devices

Contactors and Thermal overload relays

Motorstarters

Control and signalling units

Electronic relays

Limit switches

Speed drive units

Main switches

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- E.4 **Range overview**
- E.6 **Technical data**
- E.8 **Order codes - Panel mounting devices**
- E.8 Complete devices
- E.11 Standard push-buttons
- E.11 Mushroom head push-buttons
- E.11 Push buttons with key
- E.12 Selector switches with knob
- E.13 Selector switches with lever
- E.14 Selector switches with key
- E.16 Illuminated push-buttons
- E.16 Illuminated selector switches
- E.17 Selector push-buttons
- E.17 Toggle switches - Joysticks
- E.18 Emergency lever
- E.18 Reset push buttons
- E.18 Potentiometer operators
- E.18 Buzzers - Pilot lights
- E.19 Double function push-buttons
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- E.21 Power supplies
- E.22 Electrical diagrams

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- E.23 **Order codes - Base mounting devices**
- E.23 Contact blocks and power supplies

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- E.24 **Order codes - Push-button stations in thermoplastic**
- E.26 **Order codes - Equipped boxes**
- E.28 **Order codes - Push-button stations in aluminium**

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- E.30 **Order codes - Common accessories**

I

- E.36 **Overall dimensions**
- E.36 Panel mounting
- E.41 Enclosures for push-button stations

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Main features

Shape, material and colours



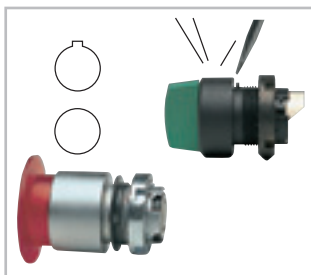
The P9 line offers three types of operators:

- **round in satin chrome**
- **round in engineering thermoplastic**
- **square in engineering thermoplastic**

Modern ergonomic P9 actuators are available in a wide variety of colours and styles, and are the result of superior industrial design experience.

Series P9 satisfies any sophisticated industrial applications.

Fitting and positioning



All the P9 operators are fitted with seal to ensure IP66 degree of protection.

A locating tab on the operator allows the correct positioning on panels with holes drilled according to CENELEC EN 50007 standards (with notch). The tab also ensures panel stability and prevents unwanted rotations.

The tab can be removed with a screwdriver for applications in holes without notch.

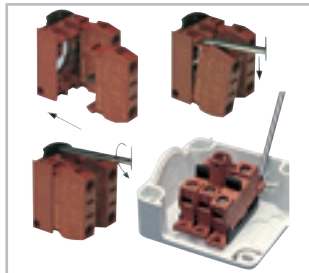
Rear locking and back mounting procedure



P9 operators are back mounted to the panel by a patented locking ring. The units can be assembled using a standard screwdriver.

As an option, an assembly wrench is available.

Fast mounting



All the P9 rear panel devices are snap-on.

Mounting between panel and operator is accomplished by means of a patented snap-on flange which ensures a fast fitting.

For base mounting, the fitting is done directly on the adaptor inside the enclosures base.

Each single block can be mounted or removed individually.

In panel mounting, it is also possible to install or remove the snap-on mounting flange with the contact block group;

Blocks and/or flange can be disassembled by a standard screwdriver, to simplify operations.

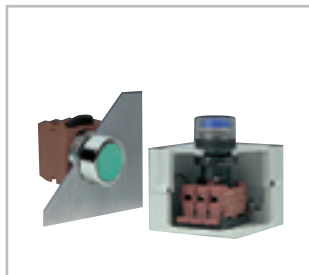
Safety and reliability



The P9 contact blocks are designed to ensure maximum reliability in every condition and to monitor control circuits at low energy levels (12V-5mA) minimum, thanks to advanced solution such as:

- four contact points
- high efficiency self-cleaning operation
- silver contacts properly shaped
- high contact pressure

Mounting system



The P9 line offers a wide variety of operators, contact blocks and power supplies for panel mounting.

Furthermore a range of contact blocks and power supplies are available for base mounting.

The base mounting option is simple thanks to plastic enclosures fitted with a standard mounting adaptor, which allows a snap-on and secure fastening.

A

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Series P9

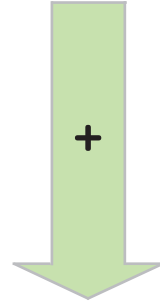
Control and signalling units Ø 22 mm

Panel mounting devices



Control units

| | | | | | |
|---|---|--|---|--|---|
| Standard push-b.  E.11 | Mushroom push-button  E.11 | Emergency push-button  E.11 | Key push-button  E.11 | Knob selector sw.  E.12 | Lever selector sw.  E.13 |
| Key selector sw.  E.14 | Selector push-b.  E.17 | Toggle switch  E.17 | Joystick  E.17 | Emergency lever  E.18 | Double push-b.  E.19 |



| |
|---|
| Contact blocks  E.20 |
|---|

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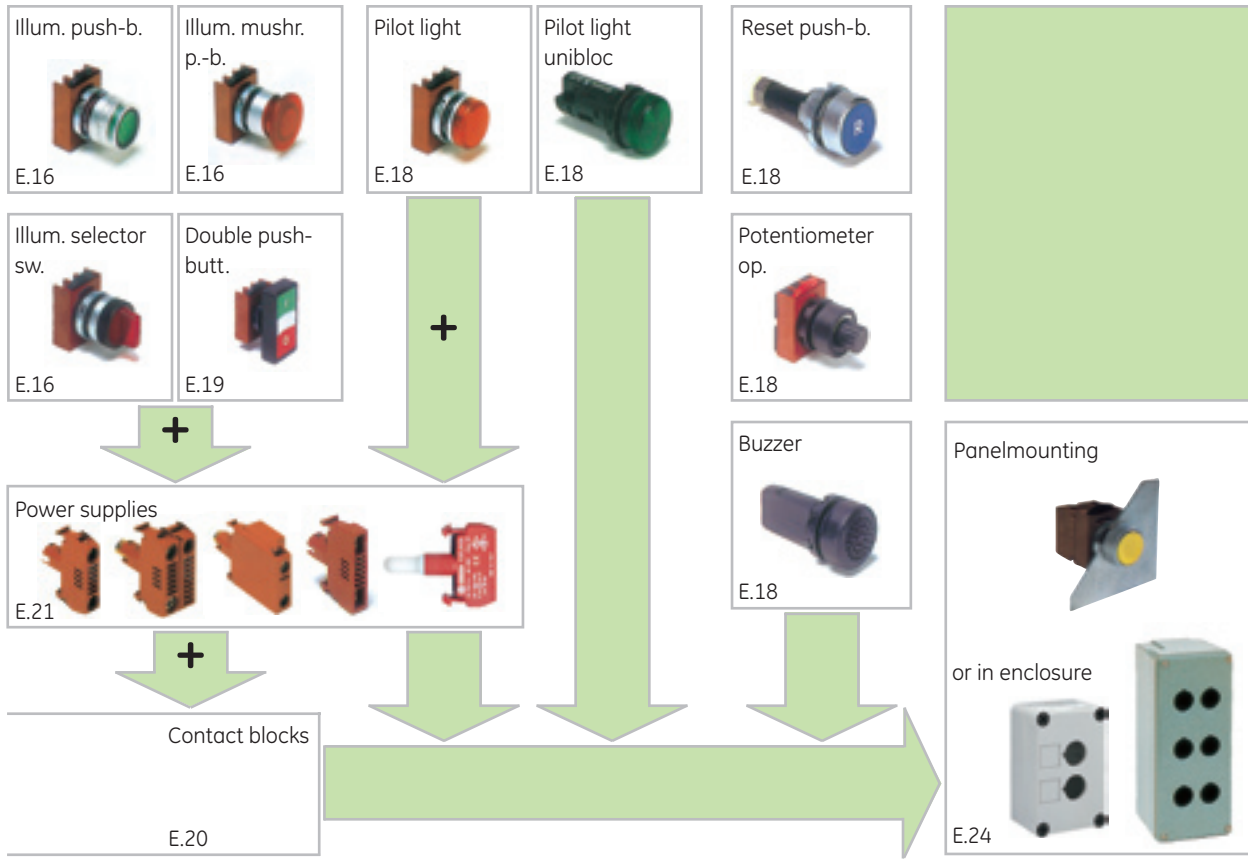
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Illuminated control units Signalling units




Others units



Range overview

- A
- B
- C
- D
- E
- F
- G
- H
- I
- X

Accessories

| General | Push-buttons | Mushroom push-buttons | Selector switches | Illuminated push-buttons | Illuminated mushroom push-buttons | Illuminated selector switches | Pilot lights |
|-----------------------|-------------------------------------|---|-------------------|-------------------------------------|---|-------------------------------|-------------------|
| Nameplates E.34 | Caps E.30 | Name plates E.35 | Knobs E.32 | Diffusers E.31 | Lenses E.32 | Lenses E.32 | Diffusers E.31 |
| Plugs E.33 | Rubber caps E.32 | Mushr. heads E.32 | Lever E.32 | Lenses E.32 | Collar E.33 | Padlock E.33 | Lenses E.32 |
| Flanges E.33 | Double rubber caps E.19 | Collar Ø 40 E.33 | | Padlock E.33 | | | |
| Ring wrench E.33 | Padlock E.33 | | | Push-on/ push-off device E.33 | | | |
| Neutral plate E.35 | Push-on/ push-off device E.33 | | | Bulbs BA9S E.34 |  | | |
| | Keys E.34 |  | | Bulb extractor E.33 |  | | |

Technical data

Compliance with standards

IEC 947.5.1 - VDE 0660 - NFC 63140
IEC/EN 60947.5.1 - UTE - BSI - NEMA
CENELEC EN 50007

Approvals

cUL U.S. - RINA - CE - GOST R - Lloyd's Register of Shipping - Bureau Veritas - Germanischer Lloyd

Climatic protections

The standard versions are suitable for use in the following climates:

| | |
|----------------------|------------------------|
| Temperate climate | cat. 23/50 (DIN 50014) |
| Wet climate | cat. 23/83 (DIN 50015) |
| Hot wet climate | cat. 40/92 (DIN 50015) |
| Variable wet climate | FW24 (DIN 50016) |

Temperature ranges

| | |
|-----------|-------------------|
| Operation | -25 °C to + 70 °C |
| Storage | -40 °C to + 70 °C |

Protection degree of the operators

IP66 according to CENELEC EN 60529 when they are mounted into enclosures with the same or a higher degree of protection.

Suitable for using into enclosures type NEMA 1-3-3R-3S-4-4X-12-13 according to UL 508.

Protection degree of the terminals

IP2x according to CENELEC EN 60529.

Shock resistance (acc. to MIL 202 B method 202 A)

1/2 sinusoid 11 ms:

No damage or disassembling at 100 g for all devices, except for the illuminated operators with transformer 38 g.

Vibration resistance (according to IEC 68-2-6)

16 g with frequency range from 40 to 500 Hz and maximum shifting 0.75 mm (peak-to-peak).

Rated insulation voltage

690V according to EN 60947.1

Impulse withstand voltage

4 kV according to EN 60947.1

Insulation class

Groep C according VDE 0110

Electrical shocks protection (acc. IEC 536)

| | |
|-------------------|---------------------------------|
| Metal operators | Class I |
| Plastic operators | Class II (double insulation) |

Short-circuit protection

With fuses 16A gG according to IEC 269.1 and 269.3.

Performances of the contacts

- Slow acting
- Self-cleaning sliding
- NC forced breaking
- Double movable bridge
- Four switching points
- Double break

Electrical resistance of the contact

≤ 25 m Ω according to IEC 255, cat. 3

Identification of the terminals

According CENELEC EN 50013

Electrical performances

Rated thermal current I_{th} = 10 A

Performances according IEC 947.5.1

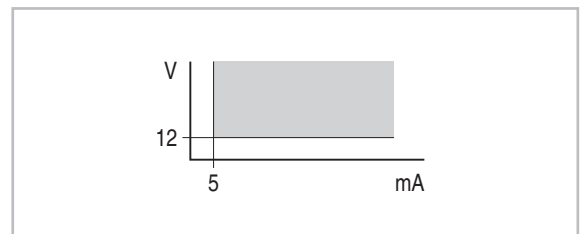
| Categorie AC 15 | | 24 | 48 | 60 | 110 | 220 | 380 | 500 | 600 |
|-----------------|--------------------|----|----|----|-----|-----|-----|-----|-----|
| Voltage | U _e (V) | | | | | | | | |
| Current | I _e (A) | 10 | 10 | 10 | 6 | 3 | 2 | 1.5 | 1.2 |

| Categorie DC 13 | | 24 | 48 | 60 | 110 | 220 | 300 |
|-----------------|--------------------|-----|-----|----|------|------|-----|
| Voltage | U _e (V) | | | | | | |
| Current | I _e (A) | 2.5 | 1.4 | 1 | 0.55 | 0.27 | 0.2 |

Performances according to CSA and UL

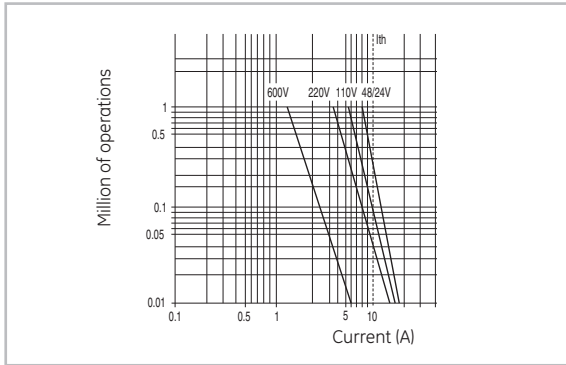
| | |
|------------------|--------|
| AC Heavy Duty | (A600) |
| DC Standard Duty | (Q300) |

Operating range

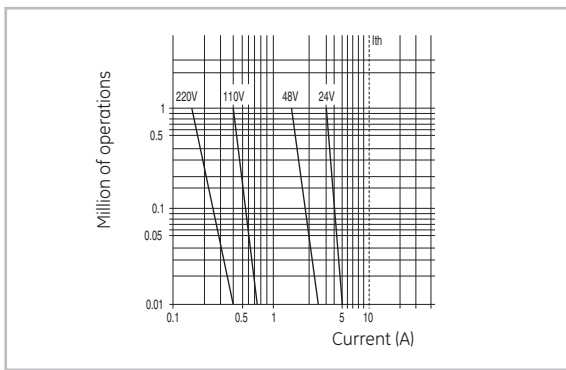


Electrical endurance

Alternative current 50/60 Hz cat. AC 15



Direct current cat. DC 13



Mechanical endurance

| | |
|---|--------------|
| Locking emergency | |
| Mushroom head push-buttons 3 positions | 0.3 Mil./op. |
| Illuminated mushroom head push-buttons 3 pos. | |
| Joysticks | |
| Key push-buttons | |
| Toggle switches | 0.5 Mil./op. |
| Illuminated selector switches | |
| Push-on push-off device | |
| Standard selector switches | |
| Key selector switches | |
| Illuminated push-buttons | 1 Mil./op |
| Selector push-buttons | |
| Emergency lever | |
| Standard push-buttons | 3 Mil./op. |
| Mushroom head push-buttons | |

Rear panel modularity

The P9 series is composed with 10 mm or a multiple of 10 mm modular units, fitted side by side on a proper mounting flange. The standard operators are supplied with a three position flange with a capacity of 3 units of 10 mm or 1 of 10 mm and 1 of 20 mm or 1 of 30 mm.

When the three position flange is not enough to satisfy the applications needs, the five position flange is required to add two more units of 10 mm mounted side by side.

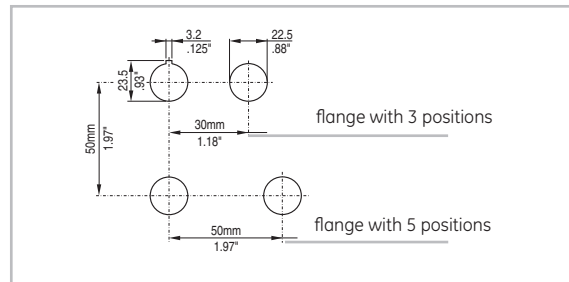
Using the five position flange take into account the bigger with (50 mm instead of 30 mm).

Number of electrical contacts

| | Flange | |
|--|-------------------------|-------------------------|
| | standard 3 positions | optional 5 positions |
| Standard push-buttons | | |
| Mushroom head push-buttons | max 6 | max 8 |
| Emergency lever | | |
| Standard selectors | max 4 | max 8 |
| Key selector switches | | |
| Joysticks | | |
| Key push-buttons | max 4 | - |
| Selector push-buttons | | |
| Toggle switches | | |
| Mushroom head with lock | max 4 | - |
| Mushroom head push-buttons 3 pos. | max 2 | |
| Illuminated push-buttons | | |
| Illuminated mushroom head push-buttons | max 4 | max 4 |
| Illuminated selector switches | | |
| Illuminated mush. push-buttons with lock | max 2 | max 2 |
| Illuminated mush. push-buttons 3 pos. | | |

Mounting

Fitted for panels 1 to 6 mm. thick with holes drilled according to CENELEC EN 50007 standards.



Technical data

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Series P9

Control and signalling units Ø 22 mm

Complete devices

| Description | Contact-block | Power supply | Cap colour | Cat. no. | | Ref. no. | | |
|---|---|--------------|---|----------|-------------------|----------|-------------------|--------|
| | | | | Metal | Plastic | | | |
| Momentary push-buttons (head + contact block)  | Standard flush | 1 NO |  13 14 | Black | P9MPN53007 | 153007 | P9XPN52007 | 152007 |
| | | | | Green | P9MPN53006 | 153006 | P9XPN52002 | 152002 |
| Mushroom/Emergency push-buttons (head + contact block)  | Standard raised | 1 NC |  21 22 | Red | P9MPN53061 | 153061 | P9XPN52061 | 152061 |
| | Mushroom head momentary | 1 NC |  21 22 | Red Ø 40 | P9MEM53111 | 153111 | P9XEM52111 | 152111 |
| Mushroom/Emergency push-buttons (head + contact block)  | Mush.with latch pull to release | 1 NC |  21 22 | Red Ø 40 | P9MET53121 | 153121 | P9XET52121 | 152121 |
| | Mush.with latch turn to release | | | | P9MER53161 | 153161 | P9XER52161 | 152161 |
| | Mush.with latch key to release (key 3095) | | | | P9MEC53130 | 153130 | P9XEC52130 | 152130 |
| Knob selector switch (knob head + contact block)  | 2 fixed positions | 1 NO |  13 14 | Black | P9MSM53293 | 153293 | P9XSM52293 | 152293 |
| | 3 fixed positions | 2 NO |  13 23 14 24 | Black | P9MSM53391 | 153391 | P9XSM52391 | 152321 |
| Knob selector switch (knob head + contact block)  | 2 fixed positions | 1 NO |  13 14 | Key 3095 | P9MSC53435 | 153435 | P9XSC52435 | 152435 |
| | 3 fixed positions | 2 NO |  13 23 14 24 | Key 3095 | P9MSC53497 | 153497 | P9XSC52497 | 152497 |

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









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Complete devices

| | Description | Contact-block | Power supply | Cap colour | Cat. no. | | Ref. no. | |
|---|--|---------------|---|-----------------------|--|----------------------------|--|----------------------------|
| | | | | | Metal | Plastic | | |
| Illuminated push-buttons (Head + Standard full voltage power supply+ contact blocks)  | Momentary flush (bulb not included) | 1NO |  | Green | P9MPL53502 | 153501 | P9XPL52502 | 152502 |
| | | 1 NC |  | Red | P9MPL53511 | 153511 | P9XPL52511 | 152511 |
| | | 1NO + 1NC |  | Green Red White | P9MPL53514 P9MPL53515 P9MPL53513 | 153514 153515 153513 | P9XPL52514 P9XPL52515 P9XPL52513 | 152514 152515 152513 |
| | | | | | | | | |
| Pilot lights  | Standard diffused lens- Full voltage Power supply | |  | Green Red | P9MLD53610 P9MLD53611 | 153610 153611 | P9XLD52610 P9XLD52611 | 152610 152611 |
| | | |  | | | | | |
| | Standard diffused lens- Integrated LED 24VAC/DC | |  | Green Red | P9MLD53620 P9MLD53621 | 153623 153621 | P9XLD52620 P9XLD52621 | 152620 152621 |
| | | | | | | | | |
| Double functions push-buttons (Head + contact block & power supply when indicated)  | Flush both caps | 1 NO + 1NC |  | Green-red | | | P9DPL54700 | 154700 |
| | Flush both caps - Full voltage power supply | 1 NO + 1NC |  | Green-red | | | P9DPL54720 | 154720 |
| | Flush both caps with ISO I/O Full voltage power supply | 1 NO + 1NC |  | Green-red | | | P9DPL54701 | 154701 |
| | Flush both caps with ISO I/O | 1 NO + 1NC |  | Green-red | | | P9DPL54721 | 154721 |

Panel mounting

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Series P9

Control and signalling units Ø 22 mm

Notes

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A large grid of dots for taking notes, spanning the width of the page and most of its height.



Push-buttons

| Standard / Momentary | | Description | Cat. no. | Ref. no. see bottom | Cat. no. | Ref. no. see bottom | Cat. no. | Ref. no. see bottom |
|---|---|--|------------------|------------------------|--------------------|------------------------|-------------------|------------------------|
| | | | Metal | | Plastic | | Plastic | |
| | | | ○ | | ● | | ■ | |
|  | | With flush cap | P9MPN●G | | P9XPN●G | | P9SPN●G | |
| | | With raised cap | P9MPN●S | | P9XPN●S | | P9SPN●S | |
| | | Recessed | P9MPN●E | | | | | |
| Mushroom head / Momentary | | Mushroom head Ø 28 mm | P9MEM3●N | | P9XEM3●N* | | | |
|  | | Mushroom head Ø 40 mm | P9MEM4●N | | P9XEM4●N* | | | |
| | | Mushroom head Ø 60 mm | P9MEM6●N | | | | P9SEM3RN | 186031 |
| | | Mushroom head ∇ 30 mm | | | | | | |
| | | | | | * Color N or R | | | |
| Mushroom head / Emergency with latch | | | | | | | | |
| Standard | Push-pull to release | Mushroom head Ø40 mm | P9MET4●N1 | | P9XET4●N1 | | P9SET4R | 186061 |
|  | Push-twist to release | Red mushroom head Ø28 mm | P9MER3RN | 184070 | P9XER3RN | 185070 | | |
| | | Red mushroom head Ø40 mm | P9MER4RN | 184071 | P9XER4RN | 185071 | | |
| | Push-key to release | Red mushroom head Ø40 mm | P9MEC4RN▲ | | P9XEC4RN▲ | | | |
| Positive break in accordance with EN 418 | Push-twist to release | Red mushroom head Ø40 mm | | | P9XER4RAN | 185077 | P9SER4RA | 186072 |
|  | Push-twist to release | Red mushroom head Ø40 mm with status indication | | | P9XER4RAW | 185078 | | |
| | Push-key to release | Red mushroom head Ø40 mm with key code 3095 | | | P9XEC4RA95N | 185079 | P9SEC4RA95 | 186073 |
| Mushroom head / 3 positions | | | | | | | | |
|  | | Ø40 mm 1-0 fixed. 2 transient | P9MET4●N2 | | | | | |
| | | Ø40 mm 0 fixed. 1-2 transient | P9MET4●N3 | | | | | |
| With keylock ⁽¹⁾ | | | | | | | | |
| Key withdrawable in position I & II |  | normal | P9MPCN1K▲ | | | | | |
|  | | depressed | P9MPCN2K▲ | | | | | |
| | | normal & depressed | P9MPCN3K▲ | | | | | |
| Key withdrawable position III | Lockable position  | normal | P9MPCN1E▲ | | | | | |
|  | | depressed | P9MPCN2E▲ | | | | | |
| | | normal & depressed | P9MPCN3E▲ | | | | | |

(1) Keys on E.14

The catalogue numbers in **bold** are available from stock.

| Colours | | black | red | green | yellow | brown | blue | white | grey | without cap |
|----------------|---|----------|----------|----------|----------|----------|----------|----------|----------|-------------|
| Caps | ● | N | R | V | G | M | L | B | H | 0 |
| Mushroom heads | ● | N | R | V | G | - | L | - | - | - |

Remark: To complete the catalogue number, substitute the symbol ● by a letter for the choice of the colour and the symbol ▲ by a number for the type of the key.































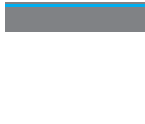


For reference numbers, see chapter X, pg. X.8



Series P9

Control and signalling units Ø 22 mm

Selector switches with knob

| 2 positions | | Function (1) | Cat. no. | Ref. no. see bottom | Cat. no. | Ref. no. see bottom | Cat. no. | Ref. no. see bottom | | | |
|---|--|--|-----------------|------------------------|-----------------|------------------------|-----------------|------------------------|--|---|---|
| | | | | | | | | | Metal | Plastic | Plastic |
| | | | | | | | | |  |  |  |
|  | Fixed |  D | P9MSMD0● | | P9XSMD0N | 185110 | P9SSMD0N | 186110 | | | |
| | |  I | P9MSMI0● | | P9XSMI0N | 185120 | P9SSMI0N | 186120 | | | |
| | With spring return |  H | P9MSMH0● | | | | | | | | |
| | |  D | P9MSMD5● | | P9XSMD5N | 185150 | P9SSMD5N | 186140 | | | |
| | |  I | P9MSMI5● | | | | P9SSMI5N | 186150 | | | |
| | |  H | P9MSMH1● | | | | | | | | |
| 3 positions | | | | | | | | | | | |
|  | Fixed |  E | P9MSME0● | | | | P9SSME0N | 186170 | | | |
| | |  L | P9MSML0● | | | | | | | | |
| | |  U | P9MSMU0● | | P9XSMU0N | 185190 | P9SSMU0N | 186190 | | | |
| | |  Z, B | P9MSMZ0● | | P9XSMZ0N | 185200 | P9SSMZ0N | 186200 | | | |
| | With spring return |  E | P9MSME1● | | | | P9SSME1N | 186210 | | | |
| | |  L | P9MSML1● | | | | | | | | |
| | |  U | P9MSMU1● | | | | P9SSMU1N | 186230 | | | |
| | |  Z, B | P9MSMZ1● | | P9XSMZ1N | 185240 | P9SSMZ1N | 186240 | | | |
| | |  E | P9MSME5● | | | | | | | | |
| | |  L | P9MSML5● | | | | | | | | |
| | |  U | P9MSMU5● | | | | | | | | |
| | |  Z, B | P9MSMZ5● | | P9XSMZ5N | 185280 | P9SSMZ5N | 186280 | | | |
| |  E | P9MSME3● | | | | | | | | | |
| |  L | P9MSML3● | | | | | | | | | |
| |  U | P9MSMU3● | | | | | | | | | |
| |  Z, B | P9MSMZ3● | | P9XSMZ3N | 185320 | P9SSMZ3N | 186320 | | | | |
| 4 positions | | | | | | | | | | | |
|  | Fixed |  X | P9MSMX0● | | P9XSMX0N | 185330 | P9SSMX0N | 186330 | | | |
| | With spring return |  X | P9MSMX5● | | | | | | | | |
| 5 positions | | | | | | | | | | | |
|  | Fixed |  X | P9MSMY0● | | | | | | | | |
| | |  W | P9MSMW0● | | | | | | | | |

(1) Electrical diagrams, see E.22





























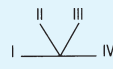
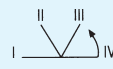
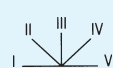

The catalogue numbers **in bold** are available from stock.

| | | | | | | |
|---------------------|-------|-----|-------|--------|------|---|
| Colours round shape | black | red | green | yellow | blue | |
| Knobs | ● | N | R | V | G | L |

For reference numbers, see chapter X, pg. X.8



Selector switches with lever

| 2 positions | | Function (1) | Cat. no. | Ref. no. see bottom | Cat. no. | Ref. no. see bottom |
|--|---|---|-----------------|------------------------|------------------------|-------------------------|
| | | | Metal | | Plastic | |
|   | Fixed |  | D | P9MSVD0● | | P9XSVD0N 185370 |
| | |  | I | P9MSVI0● | | P9XaSVI0N 185371 |
| | |  | H | P9MSVH0● | | |
| | With spring return |  | D | P9MSVD5● | | P9XSVD5N 185373 |
| | |  | I | P9MSVI5● | | |
| | |  | H | P9MSVH1● | | |
| 3 positions | | | | | | |
|   | Fixed |  | E | P9MSVE0● | | |
| | |  | L | P9MSVL0● | | |
| | |  | U | P9MSVU0● | | |
| | |  | Z, B | P9MSVZ0● | | P9XSVZ0N 185379 |
| | With spring return |  | E | P9MSVE1● | | |
| | |  | L | P9MSVL1● | | |
| | |  | U | P9MSVU1● | | |
| | |  | Z, B | P9MSVZ1● | | |
| | With spring return |  | E | P9MSVE5● | | |
| | |  | L | P9MSVL5● | | |
| | |  | U | P9MSVU5● | | |
| | |  | Z, B | P9MSVZ5● | | |
| With spring return |  | E | P9MSVE3● | | | |
| |  | L | P9MSVL3● | | | |
| |  | U | P9MSVU3● | | | |
| |  | Z, B | P9MSVZ3● | | P9XSVZ3N 185391 | |
| 4 positions | | | | | | |
|   | Fixed |  | X | P9MSVX0● | | P9XS VX0N 185392 |
| | With spring return |  | X | P9MSVX5● | | |
| 5 positions | | | | | | |
| Fixed |  | X | P9MSVY0● | | | |
| |  | W | P9MSVW0● | | | |

(1) Electrical diagrams, see E.22

The catalogue numbers in **bold** are available from stock.

| | | | | | | |
|---------|---|-------|-----|-------|--------|------|
| Colours | ● | black | red | green | yellow | blue |
| Levers | ● | N | R | V | G | L |










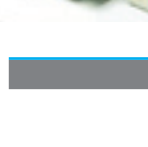








For reference numbers, see chapter X, pg. X.8



Panel mounting


- A
- B
- C
- D
- E**
- F
- G
- H
- I
- X

Selector switches with key

| 2 positions | | Function (1) | Key removal | Cat. no. | Ref. no. see bottom | Cat. no. | Ref. no. see bottom | Cat. no. | Ref. no. see bottom | | | | | | | | |
|---|---|--------------|------------------|------------------|------------------------|-------------------|------------------------|-------------------|------------------------|--|---|---|--|--|--|--|--|
| Fixed | With spring return | | | | | | | | | Metal | Plastic | Plastic (1) | | | | | |
| | | | | | | | | | |  |  |  | | | | | |
|  |  | D | I | P9MSCD0A▲ | | P9XSCD0A95 | 185400 | P9SSCD0A95 | 186400 | | | | | | | | |
| | | | II | P9MSCD0E▲ | | P9XSCD0E95 | 185401 | | | | | | | | | | |
| | | | I-II | P9MSCD0K▲ | | P9XSCD0K95 | 185402 | | | | | | | | | | |
|  |  | I | 0 | P9MSCI0C▲ | | | | | | | | | | | | | |
| | | | I | P9MSCI0E▲ | | | | | | | | | | | | | |
| | | | 0-I | P9MSCI0N▲ | | | | | | | | | | | | | |
|  |  | H | I | P9MSCH0A▲ | | | | | | | | | | | | | |
| | | | 0 | P9MSCH0C▲ | | | | | | | | | | | | | |
| | | | I-0 | P9MSCH0H▲ | | | | | | | | | | | | | |
|  |  | D | I | P9MSCD5A▲ | | P9XSCD5A95 | 185409 | P9SSCD5A95 | 186409 | | | | | | | | |
| | | | I | P9MSCI5C▲ | | P9XSCI5C95 | 185410 | P9SSCI5C95 | 186410 | | | | | | | | |
| | | | H | P9MSCH1C▲ | | | | | | | | | | | | | |
| 3 positions | | Function (1) | Key removal | Cat. no. | Ref. no. see bottom | Cat. no. | Ref. no. see bottom | Cat. no. | Ref. no. see bottom | | | | | | | | |
| Fixed |  | | | | | | | | | E | I | P9MSCE0A▲ | | | | | |
| | | | | | | | | | | | 0 | P9MSCE0C▲ | | | | | |
| | | | II | P9MSCE0E▲ | | | | | | | | | | | | | |
|  |  | L | I | P9MSCL0A▲ | | | | | | | | | | | | | |
| | | | 0 | P9MSCL0C▲ | | | | | | | | | | | | | |
| | | | II | P9MSCL0E▲ | | | | | | | | | | | | | |
|  |  | U | I | P9MSCU0A▲ | | | | | | | | | | | | | |
| | | | 0 | P9MSCU0C▲ | | | | | | | | | | | | | |
| | | | II | P9MSCU0E▲ | | | | | | | | | | | | | |
|  |  | Z, B | I | P9MSCZ0A▲ | | P9XSCZ0A95 | 185433 | | | | | | | | | | |
| | | | 0 | P9MSCZ0C▲ | | P9XSCZ0C95 | 185434 | | | | | | | | | | |
| | | | II | P9MSCZ0E▲ | | P9XSCZ0E95 | 185435 | | | | | | | | | | |
| | | I-0 | P9MSCZ0H▲ | | | | | | | | | | | | | | |
| | | I-II | P9MSCZ0K▲ | | | | | | | | | | | | | | |
| | | 0-II | P9MSCZ0N▲ | | | | | | | | | | | | | | |
| | | I-0-II | P9MSCZ0T▲ | | P9XSCZ0T95 | 185439 | P9SSCZ0T95 | 186439 | | | | | | | | | |

(1) Electrical diagrams, see E.22 The catalogue numbers in bold are available from stock.

Keys for round metal shape








| | | | | | | | | | | | |
|---|---------------------------------------|--------|-------|-----|------|--------|----|----|----|----|------------|
|  | Standard version number | ▲ | 95 | | | | | | | | |
| | Standard version with specific number | ▲ | 01 | 02 | 03 | 04 | 05 | 10 | 16 | 19 | 55 (Ronis) |
| | FIAT version number | ▲ | 33 | 34 | 37 | 38 | 40 | | | | |
| Colour | | yellow | black | red | blue | orange | | | | | |

(1) Key for square shape and round plastic shape, only standard version 95

For reference numbers, see chapter X, pg. X.8



Selector switches with key

| | 3 positions | Function (1) | Key removal | Cat. no. | | Ref. no. | | Cat. no. | | Ref. no. | |
|---|--------------------|---|-------------------|------------------|-------------------|------------------|-------------------|------------|--|------------|--|
| | | | | see bottom | | see bottom | | see bottom | | see bottom | |
| | | | | Metal | Plastic | Plastic (1) | | | | | |
|  | With spring return |  | E | 0 | P9MSCE1C▲ | | | | | | |
| | | | | II | P9MSCE1E▲ | | | | | | |
| | | | | 0-II | P9MSCE1N▲ | | | | | | |
| | | | | L | 0 | P9MSCL1C▲ | | | | | |
| | | | | | II | P9MSCL1E▲ | | | | | |
| | | | | | 0-II | P9MSCL1N▲ | | | | | |
| | | U | 0 | P9MSCU1C▲ | | | | | | | |
| | | | II | P9MSCU1E▲ | | | | | | | |
| | | | 0-II | P9MSCU1N▲ | | | | | | | |
| | | Z; B | 0 | P9MSCZ1C▲ | | | | | | | |
| | | | II | P9MSCZ1E▲ | | | | | | | |
| | | | 0-II | P9MSCZ1N▲ | | | | | | | |
| | |  | E | I | P9MSCE5A▲ | | | | | | |
| | | | | 0 | P9MSCE5C▲ | | | | | | |
| | | | | I-0 | P9MSCE5H▲ | | | | | | |
| L | I | | | P9MSCL5A▲ | | | | | | | |
| | 0 | | | P9MSCL5C▲ | | | | | | | |
| | I-0 | | | P9MSCL5H▲ | | | | | | | |
| U | I | | | P9MSCU5A▲ | | | | | | | |
| | 0 | | | P9MSCU5C▲ | | | | | | | |
| | I-0 | | | P9MSCU5H▲ | | | | | | | |
| Z, B | I | P9MSCZ5A▲ | P9XSCZ5A95 | 185461 | P9SSCZ5A95 | 186461 | | | | | |
| | 0 | P9MSCZ5C▲ | P9XSCZ5C95 | 185462 | | | | | | | |
| | I-0 | P9MSCZ5H▲ | P9XSCZ5H95 | 185463 | | | | | | | |
|  | E | 0 | P9MSCE3C▲ | | | | | | | | |
| | | L | 0 | P9MSCL3C▲ | | | | | | | |
| | | U | 0 | P9MSCU3C▲ | | | | | | | |
| | | Z, B | 0 | P9MSCZ3C▲ | P9XSCZ3C95 | 185467 | P9SSCZ3C95 | 186467 | | | |
|  | Fixed |  | X | I | P9MSCX0A▲ | | | | | | |
| | | | | II | P9MSCX0B▲ | | | | | | |
| | | | | III | P9MSCX0D▲ | | | | | | |
| | | | | IV | P9MSCX0E▲ | | | | | | |
| | | | | I-II | P9MSCX0F▲ | | | | | | |
| | | | | I-III | P9MSCX0J▲ | | | | | | |
| | | | | I-IV | P9MSCX0K▲ | | | | | | |
| | | | | II-III | P9MSCX0L▲ | | | | | | |
| | | | | II-IV | P9MSCX0M▲ | | | | | | |
| | | | | III-IV | P9MSCX0P▲ | | | | | | |
| | | | | I-II-III | P9MSCX0R▲ | | | | | | |
| | | | | I-II-IV | P9MSCX0S▲ | | | | | | |
| | I-III-IV | P9MSCX0U▲ | | | | | | | | | |
| | II-III-IV | P9MSCX0V▲ | | | | | | | | | |
| | I-II-III-IV | P9MSCX0Z▲ | | | | | | | | | |
| | With spring return |  | X | I | P9MSCX5A▲ | | | | | | |
| | | | | | P9MSCX5B▲ | | | | | | |
| | | | | | P9MSCX5D▲ | | | | | | |
| | | | | | I-II | P9MSCX5F▲ | | | | | |
| | | | | | I-III | P9MSCX5J▲ | | | | | |
| | | | | | II-III | P9MSCX5L▲ | | | | | |
| | | | | | I-II-III | P9MSCX5R▲ | | | | | |

(1) Electrical diagrams, see E.22

The catalogue numbers in **bold** are available from stock.

Keys for round metal shape

| | | | | | | | | | | |
|---------------------------------------|---|--------|-------|-----|------|--------|----|----|----|------------|
| Standard version number | ▲ | 95 | | | | | | | | |
| Standard version with specific number | ▲ | 01 | 02 | 03 | 04 | 05 | 10 | 16 | 19 | 55 (Ronis) |
| FIAT version number | ▲ | 33 | 34 | 37 | 38 | 40 | | | | |
| Colour | | yellow | black | red | blue | orange | | | | |

(1) Key for square shape and round plastic shape, only standard version 95

For reference numbers, see chapter X, pg. X.8

Panel mounting

- A
- B
- C
- D
- E
- F
- G
- H
- I
- X



A

B

C

D

E

F

G

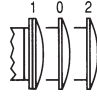
H

I

X

Illuminated push-buttons

| | | Cat. no. | | Ref. no. | | Cat. no. | | Ref. no. | |
|------------------------------------|-------------------------------|------------------------|-------------------------|----------------|--------|------------|--|------------|--|
| | | see bottom | | see bottom | | see bottom | | see bottom | |
| | | Metal | Plastic | Plastic | | | | | |
| Standard / Momentary | | | | | | | | | |
| | With diffused lens: | | | | | | | | |
| | Flush | P9MPLGD | P9XPLGD | P9SPLGD | | | | | |
| | Raised | P9MPLSD | P9XPLSD | P9SPLSD | | | | | |
| | Recessed | P9MPL ^L ED | | | | | | | |
| Mushroom head / Momentary | | | | | | | | | |
| | Mushroom head Ø40 mm | P9MEM4L | P9XEM4L* | | | | | | |
| | Mushroom head \square 30 mm | | | P9SEM3RL | 186551 | | | | |
| Mushroom head / With latch | | | | | | | | | |
| | Push-pull to release | | | | | | | | |
| | Mushroom head Ø40 mm | P9MET4 ^L L1 | P9XET4 ^L L1* | P9SET4RL1 | 186561 | | | | |
| | | | * Color R, V or G | | | | | | |
| Mushroom head / 3 positions | | | | | | | | | |
| | With mushroom Ø40 mm | | | | | | | | |
| | 1-0 fixed, 2 transient | P9MET4L2 | P9XET4RL2 | 185571 | | | | | |
| | 0 transient, 1-2 fixed | P9MET4L3 | | | | | | | |



Illuminated selector switches with knob

| | 2 positions | Function (1) | | | | | | | |
|--|-------------|--------------|------|-----------------|-----------------|-----------------|-----------------|--|--|
| | Fixed | | D | P9MSLD0L | P9XSLD0L | P9SSLD0L | | | |
| | 3 positions | Fixed | | Z, B | P9MSLZ0L | P9XSLZ0L | P9SSLZ0L | | |
| | | | Z, B | P9MSLZ1L | | | | | |
| | | | Z, B | P9MSLZ5L | | | | | |
| | | | Z, B | P9MSLZ3L | | | | | |
| | | | Z, B | P9MSLZ3L | | | | | |

Illuminated selector switches with lever

| | 2 positions | Function (1) | | | | | | | |
|--|-------------|--------------|------|-----------------|-----------------|--|--|--|--|
| | Fixed | | D | P9MSAD0L | | | | | |
| | 3 positions | Fixed | | Z, B | P9MSAZ0L | | | | |
| | | | Z, B | P9MSAZ1L | | | | | |
| | | | Z, B | P9MSAZ5L | | | | | |
| | | | Z, B | P9MSAZ3L | | | | | |
| | | | Z, B | P9MSAZ3L | | | | | |

(1) Electrical diagrams, see E.22








The catalogue numbers **in bold** are available from stock.

| | | | | | | | | |
|---------------|---|-----|-------|--------|--------|------|-------|-------|
| Colours | ● | red | green | yellow | orange | blue | white | clear |
| Lens | ● | R | V | G | A | L | B | I |
| Mushroomheads | ● | R | V | G | A | L | B | I |
| Knob/lever | ● | R | V | G | A | L | B | I |





For reference numbers, see chapter X, pg. X.8








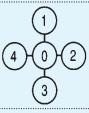

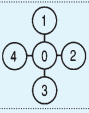
Selector push-buttons (black coloured)

| | Function (1) | Cat. no. | Ref. no. | Cat. no. | | Ref. no. | |
|---|--------------|---|----------|---|---|---|---------|
| | | | | Metal | Plastic | Plastic | Plastic |
| | | | |  |  |  | |
| 2 positions | | | | | | | |
|  | Fixed |  | 201 | P9MPS21G | 184690 | | |
| | | | 231 | P9MPS22G | 184691 | | |
| | | | 235 | P9MPS23G | 184692 | | |
| 3 positions | | | | | | | |
|  | Fixed |  | 301 | P9MPS34G | 184693 | | |
| | | | 323 | P9MPS35G | 184694 | | |

Toggle switches (black coloured)

| | | | | | | | | | |
|---|----------------|---|---|--------------|--------|--------------|--------|--------------|--------|
| 2 positions | | | | | | | | | |
|  | Fixed position |  | D | P9MCD | 184695 | P9XCD | 185695 | P9SCD | 186695 |
| | | | | | | | | | |
| 3 positions | | | | | | | | | |
|  | Fixed position |  | B | P9MCB | 184696 | | | | |
| | | | B | P9MCC | 184697 | | | | |

Joysticks (black coloured)

| | | | | | | | | |
|---|-------------------|---|---------------------------------|----------------|--------|----------------|--------|--|
| 2 positions + central zero position ⁽¹⁾ | | | | | | | | |
|  | Without interlock |  | fixed positions | P9MMN2F | 184700 | P9XMN2F | 185700 | |
| | | | transient positions | P9MMN2T | 184701 | P9XMN2T | 185701 | |
| | | | 1 transient - 3 fixed positions | P9MMN2A | 184702 | | | |
| | | | 1 fixed - 3 transient positions | P9MMN2B | 184703 | | | |
|  | With interlock |  | fixed positions | P9MMB2F | 184710 | P9XMB2F | 185710 | |
| | | | transient positions | P9MMB2T | 184711 | P9XMB2T | 185711 | |
| | | | 1 transient - 3 fixed positions | P9MMB2A | 184712 | P9XMB2A | 185712 | |
| | | | 1 fixed - 1 transient positions | P9MMB2B | 184713 | P9XMB2B | 185713 | |
| 4 positions + central zero position ⁽¹⁾ | | | | | | | | |
|  | Without interlock |  | fixed positions | P9MMN4F | 184720 | P9XMN4F | 185720 | |
| | | | transient positions | P9MMN4T | 184721 | P9XMN4T | 185721 | |
|  | With interlock |  | fixed positions | P9MMB4F | 184740 | P9XMB4F | 185740 | |
| | | | transient positions | P9MMB4T | 184741 | P9XMB4T | 185741 | |

(1) Electrical diagrams, see E.22

The catalogue numbers in **bold** are available from stock.

Panel mounting

A

B

C

D

E

F

G

H

I

X

Series P9

Control and signalling units Ø 22 mm

A

B

C

D

E

F





G

H

I

X


Emergency lever

| | Cat. no. | Ref. no. | Cat. no. | Ref. no. | Cat. no. | Ref. no. |
|---|----------|----------|--|---|---|----------|
| | Metal | | Plastic | | Plastic | |
|  | | |  |  |  | |
| Red lever | P9MWR | 184770 | | | | |


Reset push-button

| | | | | | | |
|---|---------------------------------|-------|--------|-------|--------|--|
|  | White symbol on blue background | P9MRG | 184771 | P9XRG | 185771 | |
|---|---------------------------------|-------|--------|-------|--------|--|


Potentiometer operator (potentiometer not included)

| | | | | | | | |
|---|------------|------|--------|------|--------|------|--------|
|  | Black knob | P9MZ | 184772 | P9XZ | 185772 | P9SZ | 186772 |
|---|------------|------|--------|------|--------|------|--------|

Buzzer

| | | | | | | | |
|---|--|--|--|-------|--------|-------|--------|
|  | Black coloured Bitonal sound Full voltage AC/DC Frequency: 2kHz Sound intensity: 80dB at 1 m Consumption: 3 to 9 mA 24 V 110-240 V | | | | | | |
| | | | | P9XBD | 185773 | P9SBD | 186773 |
| | | | | P9XBM | 185774 | P9SBM | 186774 |

Pilot lights

| | | | | | | | |
|---|---------------------------------------|---------------|------------|-----------------|------------|---------------|------------|
|  | Standard | | | | | | |
| | Diffused lens (for filament bulb) | P9ML●D | see bottom | P9XL●D | see bottom | P9SL●D | see bottom |
| | Refracted lens (for neon bulb) | P9ML●R | see bottom | | | | |
| | Glass lens | P9ML●V | see bottom | | | | |
| | Unibloc (complete pilot light) | | | | | | |
| | Full voltage AC/DC | | | | | | |
| | BA9S max 382 V - 2 W not included | | | | | | |
| | Diffused lens | | | P9XU●DDQ | see bottom | | |
| | Refracted lens | | | | | | |
| | With resistor 220 V | | | | | | |
| | BA9S 110 V - 2 W included | | | | | | |
| | Diffused lens | | | P9XU●DRN | see bottom | | |
| | Refracted lens | | | | | | |





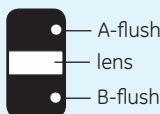
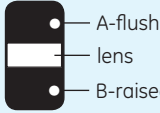

The catalogue numbers **in bold** are available from stock.

| | | | | | | | | |
|---------|---|----------|----------|----------|----------|----------|----------|----------|
| Colours | | red | green | yellow | orange | blue | white | clear |
| Lens | ● | R | V | G | A | L | B | I |

For reference numbers, see chapter X, pg. X.8



Double function push-buttons ⁽¹⁾

| | Colours (2) | Cat. no. | Ref. no. | Cat. no. | Ref. no. | |
|--|---|---|---|---------------------------|-------------------|--------|
| | | Plastic caps without symbols | | Plastic caps with symbols | | |
| | |  |  | | | |
| IP40 protection (acc. to IEC 529) | | | | | | |
|   | <p>With white lens assembled for indicator light. Black insert for not illuminated function included in the packaging.</p>  <ul style="list-style-type: none"> A-flush lens B-flush  <ul style="list-style-type: none"> A-flush lens B-raised | A - Black B - Red | P9DPLNRG00 | 186880 | P9DPLNRG01 | 186890 |
| | | A - Green B - Red | P9DPLVRG00 | 186881 | P9DPLVRG01 | 186891 |
| | | A - Black B - Red | P9DPLNRS00 | 186882 | P9DPLNRS01 | 186892 |
| | | A - Green B - Red | P9DPLVRS00 | 186883 | P9DPLVRS01 | 186893 |
| Clear cap (silicon rubber) | | | | | | |
|  | IP66 protection (acc. to IEC 529) | A - flush B - flush | 080CPDT | 173208 | 080CPDT | 173208 |
| | | A - flush B - raised | P9ADCST | 187796 | P9ADCST | 187796 |

(1) With white lens assembled.
Black insert for not illuminated function included in the packaging.
(2) Integral caps, colours not replacable.

Panel mounting

A

B

C

D

E

F

G

H

I

X

Series P9

Control and signalling units Ø 22 mm

A

B

C

D

E

F

G

H

I

X

Contact blocks

| | | Cat. no. | Ref. no. |
|--|-----------------------------|--|-----------------------|
| Logic Reed A new range of LOGIC REED contact blocks with faston terminals for use with power lower than 12V - 5mA. | Contact type | NC | P9B01FH 187014 |
| | | NO | P9B10FH 187015 |
| | Rated voltage | AC2 to 120V max. DC2 to 30V max. | |
| | Rated current | AC/DC - 0.001 to 0.15A max. | |
| | Rated power | AC - 8VA max. DC - 4.5W max. | |
| | Minimum centerline distance | 30x32 mm. | |
| | Mounting on operators | through specific bayonet flange adaptor. | P9ACFSM 187846 |
| | Full voltage power supply | | P9PDHF 187056 |































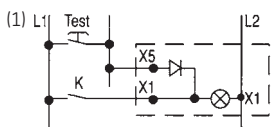
| | With screw | Contact type | Cat. no. | Ref. no. |
|--|---|------------------|----------------|----------|
| | min. 1 of 22 AWG (0.32 mm ²) max. 2 of 12 AWG (3.3 mm ²) | | | |
| | | NC+NO | P9B11VN | 187000 |
| | | NC+NC | P9B02VN | 187008 |
| | | NO+NO | P9B20VN | 187009 |
| | | NC | P9B01VN | 187001 |
| | | NO | P9B10VN | 187002 |
| | | NC late opening | P9B01VR | 187003 |
| | | NO early closing | P9B10VA | 187004 |
| | Faston 1 x (6.35 x 0.8 mm) 2 x (2.8 x 0.8 mm) | | | |
| | | NC | P9B01FN | 187012 |
| | | NO | P9B10FN | 187013 |
| | Terminal adapter printed circuit board adapter | | P9ACA6 | 188804 |

The catalogue numbers in **bold** are available from stock.



Power supplies

| With screw | Position on flange 2 3 1 | Contact type | Cat. no. | Ref. no. | |
|--|---|---|--|--|------------|
|  <p>min. 1 of 22 AWG (0.32 mm²) max. 2 of 12 AWG (3.3 mm²)</p>  |   | Full voltage ≅ IEC: BA9S max 380V-2W not included UL-CSA: BA9S max 250V-2W not included | P9PDNV0 | 187020 | |
| | | Logic Reed fullvoltage for low power | P9PDHF | 187056 | |
| |  |  | Long life 110/120V ≅ BA9S 130V-2W included | P9PRLVJ | 187021 |
| |  |  | Resistor + Diode 220/240 V ~ BA9S 130V-2W included | P9PRDVN | 187022 |
| |  |  | Resistor 110/120V ≅ BA9S 60V-1.2W included | P9PRNVJ | 187023 |
| |  |  | 220/240V ≅ BA9S 130V-2W included | P9PRNVN | 187024 |
| |  |  | Resistor ENEL version BA9S 48V-2W included 110V ≅ | P9PREVJ | 187025 |
| | | | 125/127V ≅ | P9PREVL | 187026 |
| |  |  | UL-CSA: BA9S max 250V-2W not included Test full voltage (1) ≅ IEC: BA9S max 380V-2W not included | P9PDTV0 | 187027 |
| |  |  | Test resistor (1) 220/240 V ≅ BA9S 130V-2W included | P9PRTVN | 187028 |
| |  |  | Transformer 50/60 Hz BA9S 6V-1.5W included | P9PTNV♦ | see bottom |
| |  |  | Multifunction (2) full voltage 24V ≅ BA9S 24V-2W included | P9PDMVD | 187040 |
| | | Multifunction (2) full voltage 110V ≅ BA9S 130V-2W included | P9PDMVJ | 187041 | |
|  |  | Multifunction (2) Transformer 50/60 Hz BA9S 6V-0.6W included | P9PTMV♦ | see bottom | |
|  <p>Faston</p> <p>1 x (6.35 x 0.8 mm) 2 x (2.8 x 0.8 mm)</p> |  | Full voltage IEC: BA9S max 380V-2W not included UL-CSA: BA9S max 250V-2W not included | P9PDNFO | 187055 | |
| |  <p>Integrated LED</p> |  | Standard light 24V AC/DC 120V AC 230V AC | P9PLNVD♦ see bottom P9PLNVJ♦ see bottom P9PLNVN♦ see bottom | |
| | | Flashing light 24V AC/DC 120V AC 230V AC | P9PLFVD♦ see bottom P9PLFVJ♦ see bottom P9PLFVN♦ see bottom | | |



- (2) Y1 Y2 Do not connect for flashing light
 Y1 Y2 Link to external contact in order to have steady or flashing light
 L C C closed = Steady light
 L C C open = Flashing light

| | | | | | | |
|-------------|----------|----------|----------|----------|----------|----------|
| LED colour♦ | orange | white | yellow | blue | red | green |
| | A | B | G | L | R | V |

The catalogue numbers in **bold** are available from stock.

| | | | | | |
|---------|---------|---------|-----|---------|---------|
| Voltage | 110-120 | 220-250 | 380 | 415-440 | 480-500 |
| ♦ | J | N | U | W | Y |
| : | J | N | U | - | - |

For reference numbers, see chapter X, pg. X.8



Panel mounting

A

B

C

D

E

F

G

H

I

X

A

B

C

D

E

F

G

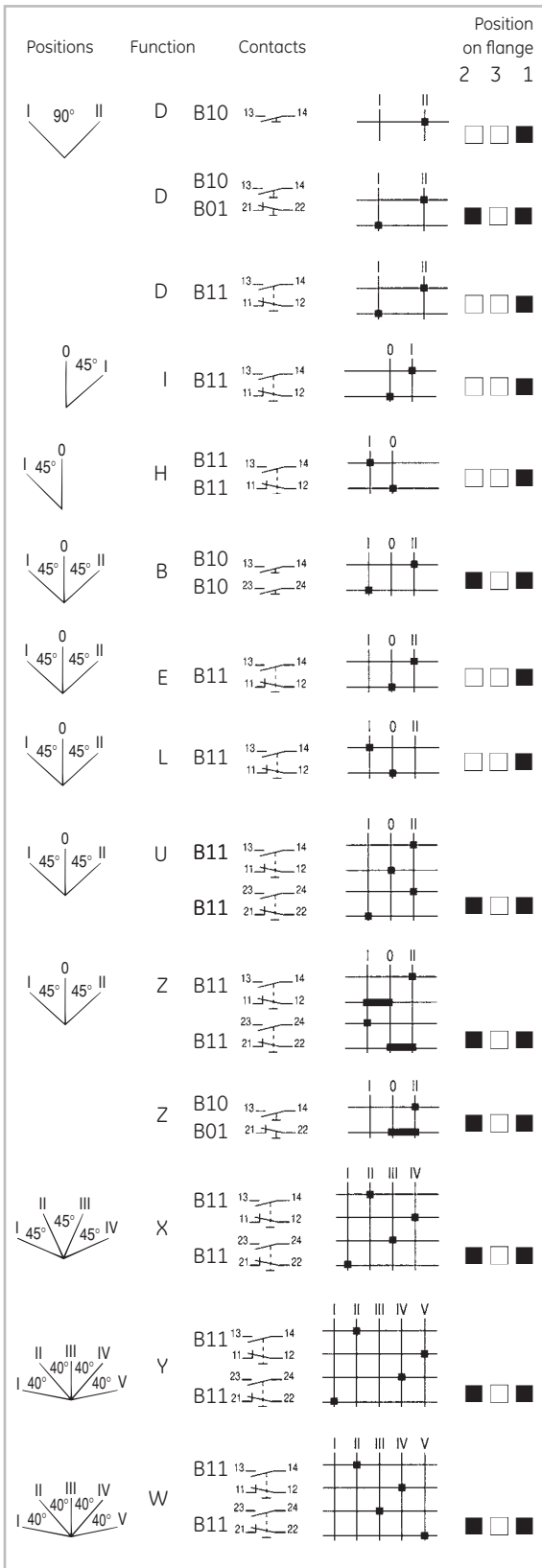
H

I

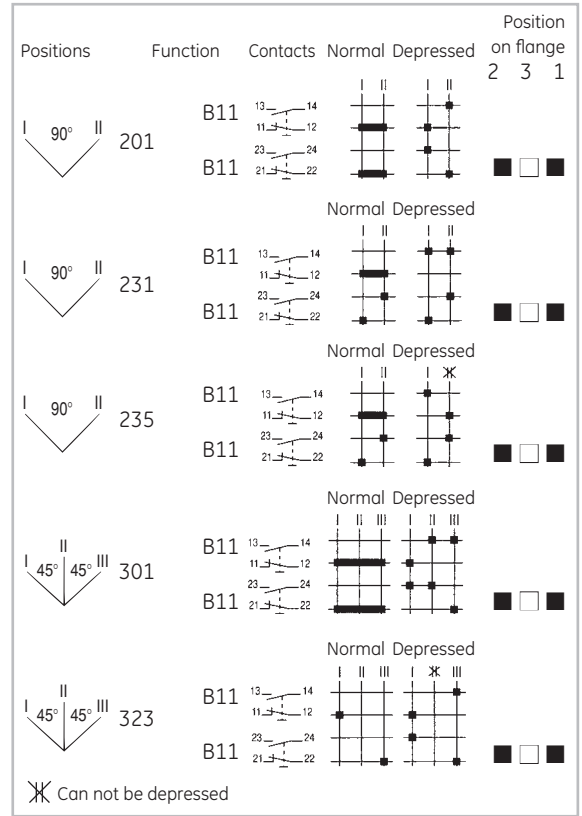
X

Diagrams

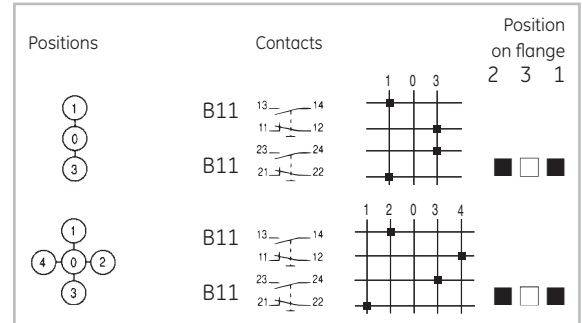
Selector switches



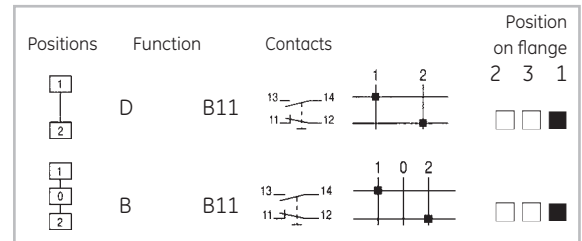
Selector push-buttons



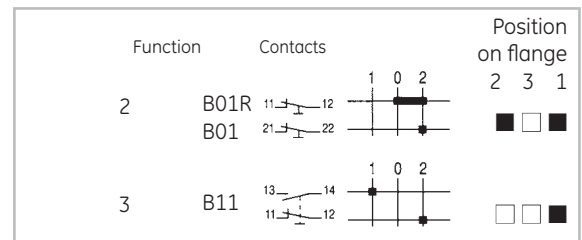
Joysticks




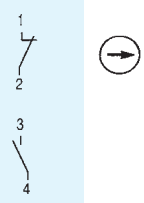


Toggle switches




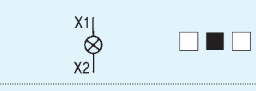



Mushroom head push-buttons 3 pos.



Contact blocks

| With screw |  min. 1 of 22 AWG (0.32 mm ²) max. 2 of 12 AWG (3.3 mm ²) |  | Contact type | Cat. no. | Ref. no. |
|------------|--|---|--------------|---|---|
| | | | NC |  |  |
| | | | NO | P9B10BN | 187018 |

Power supplies

| With screw | Position on flange 2 3 1 | Bulb power supply | Cat. no. | Ref. no. |
|--|--|---|---|------------|
|  min. 1 of 22 AWG (0.32 mm ²) max. 2 of 12 AWG (3.3 mm ²) |  | Full voltage ≅ IEC: BA9S max 380V-2W not included UL-CSA: BA9S max 250V-2W not included |  P9PDNB0 | 187070 |
|  |  | Standard light | P9PLNBD • | see bottom |
| | | 24V AC/DC | P9PLNBJ • | see bottom |
| | | 120V AC | P9PLNBN • | see bottom |
| | | 230V AC | | |

The catalogue numbers **in bold** are available from stock.

| | | | | | | |
|-------------|--------|-------|--------|------|-----|-------|
| LED colour• | orange | white | yellow | blue | red | green |
| | A | B | G | L | R | V |

Base mounting

A

B

C

D

E

F

G

H

I

X

For reference numbers, see chapter X, pg. X.8


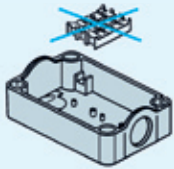


Push-button stations in thermoplastic (Light grey coloured RAL 7035)

For panel and base mounting



- IP66 according to IEC529, EN 60529
- Engineered thermoplastic covers, bases and screws
- Self extinguishing Class V0, according to UL 94
- Rust resistant (4X according to UL 508)
- Total insulation with all thermoplastic operators
- Contact blocks and power supplies for both base and front mounting

| Empty versions | Number of holes | Cat. no. | Ref. no. |
|---|------------------|----------------|----------|
| Cover with holes Knockouts conduit entry | 1 (yellow cover) | P9EPEG1 | 189000 |
| | 1 | P9EPE01 | 189001 |
| | 2 | P9EPE02 | 189002 |
| | 3 | P9EPE03 | 189003 |
| | 4 | P9EPE04 | 189004 |
| | 6 | P9EPE06 | 189005 |

For panel mounting



| Accessories | Description | Symbols | Cat. no. | Ref. no. |
|---|---------------------------|---------|---------------|---------------|
| Write-on plates Bilaminated, self adhesive, 20 x 20 mm Black background engravable for white texts | Without text | | P9AELN | 189030 |
| | Text in English (1) START | | P9AELN202 | 189031 |
| | STOP | | P9AELN201 | 189032 |
| | FORWARD | | P9AELN214 | 189033 |
| | REVERSE | | P9AELN215 | 189034 |
| | CLOSE | | P9AELN205 | 189035 |
| | OPEN | | P9AELN206 | 189036 |
| | UP | | P9AELN204 | 189037 |
| | DOWN | | P9AELN203 | 189038 |
| | LEFT | | P9AELN222 | 189152 |
| | RIGHT | | P9AELN224 | 189154 |
| | | → | P9AELN006 | 189041 |
| | | I | P9AELN028 | 189042 |
| | | 0 | P9AELN029 | 189043 |

Earth terminal clamp

P9AEMT 189029

| Equipped versions | Operators | Colour | Diagram | Name-plate | Cat. no. | Ref. no. |
|-------------------|---|--------|---------|------------|--------------------|----------|
| One unit | Flush push-button | green | | I | P9EPA01Y02 | 189010 |
| | Flush push-button | white | | I | P9EPA01Y03 | 189011 |
| | Emergency push-button with latch according to EN418 (yellow cover) | red | | 0 | P9EPAG1Y0N | 189007 |
| | Emergency push-button with latch & status indicator according to EN418 (yellow cover) | red | | 0 | P9EPAG1Y01W | 189008 |
| | Emergency push-button with latch according to EN418 - key to release (yellow cover) | red | | 0 | P9EPAG1Y06N | 189009 |














(1) Other languages on request

The catalogue numbers **in bold** are available from stock.



Push-button stations in thermoplastic (continued)

| Equipped versions | | Operators | Colour | Diagram | Name-plate | Cat. no. | Ref. no. |
|---|--------------------|--|--------|--|------------|-------------------|----------|
|  | Two units | Flush push-buttons | green |  | I | P9EPA02Y01 | 189016 |
| | | | red |  | 0 | | |
|  | Three units | Full voltage pilot light max 380V-2W not included | BA9S |  | blank | P9EPA03Y01 | 189018 |
| | | Flush push-buttons | green |  | I | | |
| | | Flush push-buttons | red |  | 0 | | |
| | | Flush push-buttons | black |  | ↑ | | |
| Flush push-buttons | red |  | 0 | | | | |
| Flush push-buttons | black |  | ↓ | | | | |

The catalogue numbers **in bold** are available from stock.

Push-button stations

A

B

C

D

E

F

G

H

I

X

Series P9

Control and signalling units Ø 22 mm

A

B

C

D

E

F

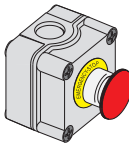
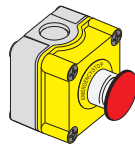
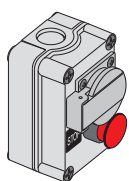
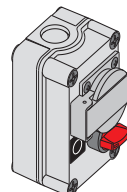
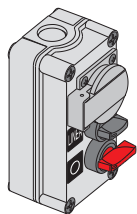
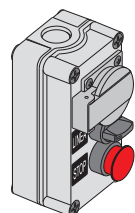
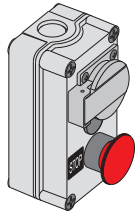
G

H

I

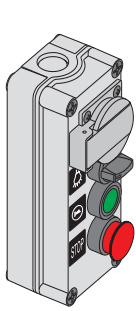
X

Equipped boxes

| | | Specially enclosures to use for shaft lifts (other versions, please contact us) | | | | | | | |
|---|---|---|----------------------|-------------------|----------|------|-------------------|--------|---|
| | | Composition | Individual operators | Cat. no. | Ref. no. | Pack | | | |
|  | One operator | Thermoplastic box. 1 element | P9EPE01 | P9EPC01X00 | 215432 | 1 | | | |
| | | Emergency push button mushroom head Ø40, push-pull to release | P9XET4RN1 | | | | | | |
| | 1NC contact block | P9B01VN | | | | | | | |
| | 1NO contact block | P9B10VN | | | | | | | |
| | Nameplate with inscription "EMERGENCY-STOP" | 080XTGR02 | | | | | | | |
| | PG16 packing gland | | | | | | | | |
|  | | Thermoplastic box. Yellow cover. 1 element | P9EPEG1 | P9EPC01X01 | 215433 | 1 | | | |
| | | Emergency push-button mushroom head Ø40, push-twist to release | P9XER4RN | | | | | | |
| | 1NC contact block | P9B01VN | | | | | | | |
| | Nameplate with inscription "EMERGENCY-STOP" | 080XTGR02 | | | | | | | |
|  | Two operators | Thermoplastic box. 2 elements | P9EPE02 | | | | P9EPL02X01 | 189136 | 1 |
| | | Emergency push-button mushroom head Ø28, push-twist to release | P9XER3RN | | | | | | |
| | | 1NC contact block | P9B01VN | | | | | | |
| | | Nameplate with inscription "STOP" | P9AELN201 | | | | | | |
| | 16A Schuko socket-outlet with cover | | | | | | | | |
|  | | Thermoplastic box. 2 elements | P9EPE02 | P9EPL02X02 | 189137 | 1 | | | |
| | | Selector switch, 2 positions, with red knob | P9XSMD0R | | | | | | |
| | | 1NC contact block | P9B01VN | | | | | | |
| | | Nameplate with inscription "O-I" | P9AELN039 | | | | | | |
| | 16A Schuko socket-outlet with cover | | | | | | | | |
|  | Three operators | Thermoplastic box. 3 elements | P9EPE03 | | | | P9EPL03X01 | 189138 | 1 |
| | | Selector switch, 2 positions, with black knob | P9XSMD0N | | | | | | |
| | | 1NC contact block | P9B01VN | | | | | | |
| | | 1NO contact block | P9B10VN | | | | | | |
| | | Nameplate with inscription "LINEA" | P9AELN523 | | | | | | |
| | | Selector switch, 2 positions, with red lever | P9XSVD0R | | | | | | |
| 1NO contact block | P9B10VN | | | | | | | | |
| | Nameplate with inscription "O-I" | P9AELN039 | | | | | | | |
| | 16A Schuko socket-outlet with cover | | | | | | | | |
|  | | Thermoplastic box. 3 elements | P9EPE03 | P9EPL03X02 | 189139 | 1 | | | |
| | | Selector switch, 2 positions, with black knob | P9XSMD0N | | | | | | |
| | | 1NC contact block | P9B01VN | | | | | | |
| | | 1NO contact block | P9B10VN | | | | | | |
| | | Nameplate with inscription "LINEA" | P9AELN523 | | | | | | |
| | | Emergency push-button mushroom head Ø28, push-twist to release | P9XER3RN | | | | | | |
| 1NC contact block | P9B01VN | | | | | | | | |
| | Nameplate with inscription "STOP" | P9AELN201 | | | | | | | |
| | 16A Schuko socket-outlet with cover | | | | | | | | |
|  | | Thermoplastic box. 3 elements | P9EPE03 | P9EPL03X03 | 189140 | 1 | | | |
| | | Emergency push-button mushroom head Ø40, push-twist to release | P9XER4RN | | | | | | |
| | | 1NC contact block | P9B01VN | | | | | | |
| | | Nameplate with inscription "STOP" | P9AELN201 | | | | | | |
| | | Round plug | P9ARHPR | | | | | | |
| | | 16A Schuko socket-outlet with cover | | | | | | | |



Equipped boxes (continued)





Four operators

| Specially enclosures to use for shaft lifts (other versions, please contact us) | | | | |
|--|----------------------|-------------------|----------|------|
| Composition | Individual operators | Cat. no. | Ref. no. | Pack |
| Thermoplastic box, 4 elements | P9EPE04 | P9EPL04X01 | 189141 | 1 |
| Selector switch, 2 positions, with black knob | P9XSM00N | | | |
| 1NC contact block | P9B01VN | | | |
| 1NO contact block | P9B10VN | | | |
| Nameplate with "Light" symbol | P9AELN100 | | | |
| Standard/momentary push button with flush cap, green | P9XPNVG | | | |
| 1NO contact block | P9B10VN | | | |
| Nameplate with "Bell" symbol | P9AELN099 | | | |
| Emergency push-button mushroom head Ø28, push-twist to release | P9XER3RN | | | |
| 1NC contact block | P9B01VN | | | |
| Nameplate with inscription "STOP" | P9AELN201 | | | |
| 16A Schuko socket-outlet with cover | | | | |

Push-button stations

- A
- B
- C
- D
- E
- F
- G
- H
- I
- X

Push-button stations in aluminium (Grey coloured RAL 7012)

| For panel mounting | Protection | Number of holes | Type | Cat. no. | Ref. no. | | |
|--|--|--|--|----------------|----------|------------|--------|
|  <p>Cover with holes with conduit entry</p> | IP66 (according to IEC 529, EN 60529) | 1 | 1 | 080SP1 | 170801 | | |
| | | 1 | 1M (1) | 080SP1M | 170831 | | |
| | | 2 | 2 | 080SP2 | 170802 | | |
| | | 2 | 2M (1) | 080SP2M | 170832 | | |
| | | 3 | 3 | 080SP3 | 170803 | | |
| | | 4 | 4 | 080SP4 | 170804 | | |
| | | 4 | 4M (1) | 080SP4M | 170834 | | |
| | | 6 | 6 | 080SP6 | 170806 | | |
| | | 8 | 8 | 080SP8 | 170807 | | |
| | | 12 | 12 | 080SP12 | 170808 | | |
| | | 18 | 18 | 080SP18 | 170809 | | |
| | | 24 | 24 | 080SP24 | 170810 | | |
| | | 35 | 35 | 080SP35 | 170811 | | |
| | | <p>Cover with holes without conduit entry</p> | IP66 (according to IEC 529, EN 60529) | 1 | 1 | 080SP1SFE | 170836 |
| | | | | 1 | 1M (1) | 080SP1MSFE | 170839 |
| 2 | 2 | | | 080SP2SFE | 170842 | | |
| 2 | 2M (1) | | | 080SP2MSFE | 170845 | | |
| 3 | 3 | | | 080SP3SFE | 170848 | | |
| 4 | 4 | | | 080SP4SFE | 170850 | | |
| 4 | 4M (1) | | | 080SP4MSFE | 170851 | | |
| 6 | 6 | | | 080SP6SFE | 170852 | | |
| 8 | 8 | | | 080SP8SFE | 170854 | | |
| 12 | 12 | | | 080SP12SFE | 170857 | | |
| 18 | 18 | | | 080SP18SFE | 170860 | | |
| 24 | 24 | | | 080SP24SFE | 170862 | | |
| 35 | 35 | | | 080SP35SFE | 170864 | | |
|  <p>Cover without holes with conduit entry</p> | IP66 (according to IEC 529, EN 60529) | | | 1 | 1 | 080SP1SFC | 170835 |
| | | | | 1 | 1M (1) | 080SP1MSFC | 170838 |
| | | 2 | 2 | 080SP2SFC | 170841 | | |
| | | 2 | 2M (1) | 080SP2MSFC | 170844 | | |
| | | 3 | 3 | 080SP3SFC | 170847 | | |
| | | 4 | 4 | 080SP2SFC | 170841 | | |
| | | 4 | 4M (1) | 080SP2MSFC | 170844 | | |
| | | 6 | 6 | 080SP3SFC | 170847 | | |
| | | 8 | 8 | 080SP8SFC | 170853 | | |
| | | 12 | 12 | 080SP12SFC | 170856 | | |
| | | 18 | 18 | 080SP18SFC | 170859 | | |
| | | 24 | 24 | 080SP18SFC | 170859 | | |
| | | 35 | 35 | 080SP35SFC | 170863 | | |
| | | <p>Cover without holes without conduit entry</p> | IP66 (according to IEC 529, EN 60529) | 1 | 1 | 080SP1SF | 170837 |
| | | | | 1 | 1M (1) | 080SP1MSF | 170840 |
| 2 | 2 | | | 080SP2SF | 170843 | | |
| 2 | 2M (1) | | | 080SP2MSF | 170846 | | |
| 3 | 3 | | | 080SP3SF | 170849 | | |
| 4 | 4 | | | 080SP2SF | 170843 | | |
| 4 | 4M (1) | | | 080SP2MSF | 170846 | | |
| 6 | 6 | | | 080SP3SF | 170849 | | |
| 8 | 8 | | | 080SP8SF | 170855 | | |
| 12 | 12 | | | 080SP12SF | 170858 | | |
| 18 | 18 | | | 080SP18SF | 170861 | | |
| 24 | 24 | | | 080SP18SF | 170861 | | |
| 35 | 35 | | | 080SP35SF | 170865 | | |

(1) With deep socle

Accessories

| Description | Cat. no. | Ref. no. |
|---|----------------|----------|
| Kit of two hinges for types 18, 24, 35 with holes | 080KCSP | 170883 |

Overall dimensions, see E.41

The catalogue numbers **in bold** are available from stock.

Notes

















Push-button stations

- A
- B
- C
- D
- E
- F
- G
- H
- I
- X



Caps for standard push-buttons


















| Colour | Cat. no. | Ref. no. | Cat. no. | Ref. no. | Cat. no. | Ref. no. | Cat. no. | Ref. no. | |
|---|---|--------------------|---|--------------------|---|--------------------|---|--------------------|--------|
| | Flush and recessed | | Raised | | Flush | | Raised | | |
| Neutral |  | |  | |  | |  | | |
| | P9ARBG ● | 18710 ■ | P9ARBS ● | 18720 ■ | P9ASBG ● | 18750 ■ | P9ASBS ● | 18760 ■ | |
| With symbols ⁽¹⁾ | | | | | | | | | |
| Stop  | Black | P9ARBGN 029 | 187150 | P9ARBSN 029 | 187250 | P9ASBGN 029 | 187550 | P9ASBSN 029 | 187650 |
| | Red | P9ARBGR 029 | 187110 | P9ARBSR 029 | 187210 | P9ASBGR 029 | 187510 | P9ASBSR 029 | 187610 |
| Start  | Black | P9ARBGN 028 | 187111 | P9ARBSN 028 | 187211 | P9ASBGN 028 | 187511 | P9ASBSN 028 | 187611 |
| | Green | P9ARBGV 028 | 187112 | P9ARBSV 028 | 187212 | P9ASBGV 028 | 187512 | P9ASBSV 028 | 187612 |
| | White | P9ARBGB 028 | 187151 | P9ARBSB 028 | 187251 | P9ASBGB 028 | 187551 | P9ASBSB 028 | 187651 |
| Continuous rectilinear motion  | Black | P9ARBGN 006 | 187117 | P9ARBSN 006 | 187217 | P9ASBGN 006 | 187517 | P9ASBSN 006 | 187617 |
| | Green | P9ARBGV 006 | 187118 | P9ARBSV 006 | 187218 | P9ASBGV 006 | 187518 | P9ASBSV 006 | 187618 |
| | White | P9ARBGB 006 | 187152 | P9ARBSB 006 | 187252 | P9ASBGB 006 | 187552 | P9ASBSB 006 | 187652 |
| Increase  | Black | P9ARBGN 017 | 187125 | | | | | | |
| Decrease  | Black | P9ARBGN 018 | 187127 | | | | | | |
| Reset  | Blue | P9ARBGL 037 | 187143 | | | P9ASBGL 037 | 187543 | P9ASBSL 037 | 187643 |
| Stop/Reset  | Red | P9ARBGR 036 | 187144 | | | | | | |
| Test  | Black | P9ARBGN 030 | 187145 | P9ARBSN 030 | 187245 | P9ASBGN 030 | 187545 | P9ASBSN 030 | 187645 |
| | Green | P9ARBGV 030 | 187146 | P9ARBSV 030 | 187246 | P9ASBGV 030 | 187546 | P9ASBSV 030 | 187646 |
| Stop  | Red | P9ARBGR 201 | 187147 | P9ARBSR 201 | 187247 | P9ASBGR 201 | 187547 | P9ASBSR 201 | 187647 |
| Start  | Black | P9ARBGN 202 | 187148 | P9ARBSN 202 | 187248 | P9ASBGN 202 | 187548 | P9ASBSN 202 | 187648 |
| | Green | P9ARBGV 202 | 187149 | P9ARBSV 202 | 187249 | P9ASBGV 202 | 187549 | P9ASBSV 202 | 187649 |
| | White | P9ARBGB 202 | 188909 | P9ARBSB 202 | 188978 | P9ASBGB 202 | 189859 | P9ASBSB 202 | 189928 |

(1) Other symbols on request

The catalogue numbers **in bold** are available from stock.

| | | | | | | | | | |
|---------|---|----------|----------|----------|----------|----------|----------|----------|----------|
| Colours | | black | red | green | yellow | brown | blue | white | grey |
| Caps | ● | N | R | V | G | M | L | B | H |

Diffusers/insert for illuminated units

| | | Cat. no. | Ref. no. | Cat. no. | Ref. no. | Cat. no. | Ref. no. |
|-------------------------------|---|---|----------|---|----------|---|----------|
| | | For pilot lights | | For illuminated push buttons | | For pilot lights and illuminated push buttons | |
| | |  | |  | |  | |
| Neutral | | P9ARDLS | 187300 | P9ARDPL | 187350 | 080QDF | 173220 |
| With symbols ⁽¹⁾ | on white background | | | | | | |
| Stop |  | P9ARDLS029 | 187301 | P9ARDPL029 | 187351 | 080QDF029 | 187701 |
| Start |  | P9ARDLS028 | 187302 | P9ARDPL028 | 187352 | 080QDF028 | 187702 |
| Continuous rectilinear motion |  | P9ARDLS006 | 187305 | P9ARDPL006 | 187355 | 080QDF006 | 187705 |
| Increase |  | P9ARDLS017 | 187309 | P9ARDPL017 | 187359 | 080QDF017 | 187709 |
| Decrease |  | P9ARDLS018 | 187310 | P9ARDPL018 | 187360 | 080QDF018 | 187710 |
| Auto cycle |  | P9ARDLS026 | 187311 | P9ARDPL026 | 187361 | 080QDF026 | 187711 |
| Manual |  | P9ARDLS027 | 187312 | P9ARDPL027 | 187362 | 080QDF027 | 185788 |
| Locking |  | P9ARDLS031 | 187313 | P9ARDPL031 | 187363 | 080QDF031 | 187713 |
| Releasing |  | P9ARDLS032 | 187314 | P9ARDPL032 | 187364 | 080QDF032 | 187714 |
| Coolant |  | P9ARDLS001 | 187315 | P9ARDPL001 | 187365 | 080QDF001 | 187715 |
| Light |  | P9ARDLS002 | 187316 | P9ARDPL002 | 187366 | 080QDF002 | 187716 |
| Test |  | P9ARDLS030 | 187318 | P9ARDPL030 | 187368 | 080QDF030 | 185789 |
| Stop |  | P9ARDLS201 | 187319 | P9ARDPL201 | 187369 | 080QDF201 | 187719 |
| Start |  | P9ARDLS202 | 187320 | P9ARDPL202 | 187370 | 080QDF202 | 187720 |

(1) Other symbols on request

The catalogue numbers in **bold** are available from stock.

Common accessories

A

B

C

D

E

F

G

H

I

X

Series P9

Control and signalling units Ø 22 mm

A

B

C

D

E

F



G

H



I

X



Mushroom heads

| Description | Cat. no. | Ref. no. see bottom | Cat. no. | Ref. no. see bottom | | |
|---------------------|----------|------------------------|----------|------------------------|---|---|
| | | | | | Plastic | |
| | | | | |  |  |
| Momentary operators | Ø 28 mm | P9ARB3● | | | | |
| | Ø 40 mm | P9ARB4● | | | | |
| | Ø 60 mm | P9ARB6● | | | | |
| | ∩ 30 mm | | P9ASB3● | | | |
| Push-pull operators | Ø 40 mm | P9ACB4● | P9ACB4● | | | |



Knobs and levers

| Description | Cat. no. | Ref. no. see bottom | Cat. no. | Ref. no. see bottom | | |
|-----------------------------|----------|------------------------|----------|------------------------|---|---|
| | | | | | Plastic | |
| | | | | |  |  |
| Knob for selector switches | P9ACMN● | | P9ACMN● | | | |
| Lever for selector switches | P9ARMV● | | | | | |


Lenses

| Description | Cat. no. | Ref. no. see bottom | Cat. no. | Ref. no. see bottom | | |
|-----------------------------------|-------------------|------------------------|----------|------------------------|---|---|
| | | | | | Plastic | |
| | | | | |  |  |
| Pilot lights | diffused version | P9ARGLD● | P9ASGLD● | | | |
| | refracted version | P9ARGLR● | | | | |
| | glass version | P9ARGLV● | | | | |
| Illuminated push-buttons | diffused version | P9ARGPD● | P9ASGPD● | | | |
| Illuminated mushroom head push-b. | momentary Ø 40 mm | P9ARGP4● | | | | |
| | ∩ 30 mm | | | | | |
| | push-pull Ø 40 mm | P9ACGP4● | | | | |
| Illuminated selector switches | knob | P9ACGSL● | P9ACGSL● | | | |
| | lever | P9ARGSA● | | | | |

Rubber protective caps (IP66)

| Description | Cat. no. | Ref. no. see bottom | Cat. no. | Ref. no. see bottom | | |
|-----------------------------|----------------------------|------------------------|----------|------------------------|---|---|
| | | | | | Plastic | |
| | | | | |  |  |
| Standard flush push-buttons | coloured (nitrilic rubber) | 080CP● | P9ASC● | | | |
| | clear (silicon rubber) | 080CPT | P9ASC● | 170198 | | |
| Raised push buttons | clear (silicon rubber) | P9ARCST | P9ASCST | 187490 | | |

Spare boots for joysticks

| | | | | | |
|---|--|-----|----------|--------|--|
|  (a) | Standard rubber boot for joystick | (a) | P9ARSCMN | 188043 | |
| | Standard rubber boot for joystick with interlock | (a) | P9ARSCMB | 188044 | |
| | Silicone boot for joystick | (b) | P9ARSGMN | 187495 | |
| | Silicone boot for joystick with interlock | (b) | P9ARSGMB | 187496 | |

The catalogue numbers in **bold** are available from stock.

| Colours | | black | red | green | yellow | orange | blue | white | clear |
|-----------------|---|-------|-----|-------|--------|--------|------|-------|-------|
| Mushroom heads | ● | N | R | V | G | - | L | - | - |
| Knobs/lever | ● | N | R | V | G | - | L | - | - |
| Lenses | ● | - | R | V | G | A | L | B | I |
| Protective caps | ● | N | R | V | G | - | - | - | - |

For reference numbers, see chapter X, pg. X.8



Common accessories




| Plugs | Description | Cat. no. | Ref. no. | Cat. no. | Ref. no. |
|---|--|----------------|----------|----------------|----------|
| | | Plastic | | Plastic | |
|  | Round | P9ARHPR | 187491 | | |
| | Square 30 x 30 mm | | | P9ASHP3 | 187792 |
| | Rectangular 30 x 50 mm | | | P9ASHP5 | 187793 |
| Protections | | | | | |
|  | Collar for mushroom head push-buttons Ø40 mm. | P9ARRE4 | 187492 | | |
| | Protection cover padlockable for standard push-buttons, illuminated push-buttons, selector switches, illuminated selector switches with knob. | P9ACRCL | 187840 | P9ACRCL | 187840 |
| Flanges | | | | | |
|  | With three positions Centre distances 30 x 50 mm | P9ACFS3 | 187841 | P9ACFS3 | 187841 |
| | With five positions Centre distances 50 x 50 mm | P9ACFS5 | 187842 | P9ACFS5 | 187842 |
| | With two positions For Logic Reed contact blocks | P9ACFSM | 187846 | P9ACFSM | 187846 |
| Adapter screw plug-in terminal | | | | | |
| | Only for Logic Reed contact blocks and power supplies | P9ACAFV | 187847 | P9ACAFV | 187847 |
| Adapter | | | | | |
|  | Gives round control and signalling units a square appearance. Made in black thermoplastic. Can be used with nameplate for square operators P9ASTBS (see P.30). Excluded for mushroom flush buttons with positive break and types with 3 positions. | P9ARSN1 | 188805 | | |
| Push-on/push off | | | | | |
|  | Device for standard push-buttons and illuminated push-buttons. To be added only to single pole contact blocks. The NO-contacts must be early closing types. | P9ACDPP | 187843 | P9ACDPP | 187843 |
| Extended srew | | | | | |
|  | For reset push-buttons (setting min. 80, max. 170 mm) | P9ACVLR | 187844 | P9ACVLR | 187844 |
| Central contact driving plug | | | | | |
| | For standard momentary push-buttons and momentary mushroom head push-buttons. | | | P9ASHAC | 187794 |
| Tools | | | | | |
|  | Locking ring wrench | P9ACWAF | 187845 | P9ACWAF | 187845 |
| | Bulb extractor | 080ESL | 170212 | 080ESL | 170212 |
| | Extractor for caps and lenses | | | P9ASEBG | 187795 |

The catalogue numbers **in bold** are available from stock.

Common accessories




- A
- B
- C
- D
- E
- F
- G
- H
- I
- X

Spare keys

| Description | | Cat. no. | Ref. no. |
|-------------------------|---------------|---|---|
| | | Plastic | |
| | |  |  |
| | |  | |
| Standard version | Code | | |
| | 3095 | 077C3095 | 173095 |
| | 9901 | 077C9901 | 173901 |
| | 9902 | 077C9902 | 173902 |
| | 9903 | 077C9903 | 173903 |
| | 9904 | 077C9904 | 173904 |
| | 9905 | 077C9905 | 173905 |
| | 9910 | 077C9910 | 173910 |
| | 9916 | 077C9916 | 173916 |
| | 9919 | 077C9919 | 173919 |
| | 3353 | 077C3353 | 173353 |
| | (Ronis) 455 | 077CR455 | 173455 |
| FIAT version | Colour | Code | |
| | yellow | 73033 | 077CF73033 |
| | black | 73034 | 077CF73034 |
| | red | 73037 | 077CF73037 |
| | blue | 73038 | 077CF73038 |
| | orange | 73040 | 077CF73040 |






Bulbs BA9s

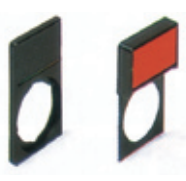
| Description | | Cat. no. | Ref. no. |
|----------------------|-----------------------|---|---|
| | | Plastic | |
| | |  |  |
| | |  | |
| Filament type | Vn | Vn | |
| | 6 | 0.6 | BA9S606 187850 |
| | 6 | 1.5 | BA9S615 187851 |
| | 12 | 2.0 | BA9S122 187852 |
| | 24 | 2.0 | BA9S242 187853 |
| | 30 | 2.1 | BA9S30 187854 |
| | 48 | 2.0 | BA9S48 187855 |
| | 60 | 1.2 | BA9S6012 187856 |
| | 130 | 2.0 | BA9S130 187857 |
| Neon type | | | |
| | 110 | 0.11 | BA9SN110 187860 |
| | 220 | 0.33 | BA9SN220 187861 |
| Mono LED | VN AC/DC ± 10% | | |
| | | 6 | BA9S6L● see bottom |
| | | 12 | BA9S12L● see bottom |
| | | 24 | BA9S24L● see bottom |
| | | 48 | BA9S48L● see bottom |
| | | 110 | BA9S110L● see bottom |
| | | (AC) 230 | BA9S230L● see bottom |



| Colours | red | green | yellow | blue | white |
|---------|-----|-------|--------|------|-------|
| ● | R | V | G | L | B |

Insert holders

| Description | | Cat. no. | Ref. no. | Cat. no. | Ref. no. |
|---|----------------------------------|---|---|---|----------|
| | | Plastic | | Plastic | |
| | |  |  |  | |
| Supplied with neutral insert engravable on both sides or transparent. | | | | | |
| Standard 30 x 50 mm | Background black/red, white text | P9ARTBS | 188000 | P9ASTBS | 188010 |
| | Background white, black text | P9ARTWS | 188005 | P9ASTWS | 188011 |
| | Transparent | P9ARTTS | 188012 | P9ASTTS | 188014 |
| Extended 45 x 50 mm | Background black/red, white text | P9ARTBM | 188001 | | |
| | Background white, black text | P9ARTWM | 188008 | | |
| | Transparent | P9ARTTM | 188019 | | |





The catalogue numbers **in bold** are available from stock.

For reference numbers, see chapter X, pg. X.8


Rectangular inserts

| For insert holders 30 x 50 mm | | Neutral | | | | | |
|-------------------------------|------------------|----------------------------------|-------------------|----------|------------------|-----------------|--------------------------|
| | | Description | Cat. no. | Ref. no. | Description | Cat. no. | Ref. no. |
| | | black/red background | P9ACPBS | 188015 | | | |
| | | white background | P9ACPWS | 188017 | | | |
| | | transparent | P9ACPTS | 188018 | | | |
| | | English (1) | | | French (1) | | |
| START | black background | START | P9ACPBS202 | 188202 | black background | MARCHE | P9ACPBS308 188308 |
| | | STOP | P9ACPBS201 | 188201 | | ARRET | P9ACPBS301 188301 |
| | | REVERSE | P9ACPBS215 | 188215 | | AVANT | P9ACPBS303 188303 |
| | | CLOSE | P9ACPBS205 | 188205 | | ARRIERE | P9ACPBS302 188302 |
| | | OPEN | P9ACPBS206 | 188206 | | FERMER | P9ACPBS309 188309 |
| | | UP | P9ACPBS204 | 188204 | | OUVRIR | P9ACPBS316 188316 |
| | | DOWN | P9ACPBS203 | 188203 | | MONTEE | P9ACPBS317 188317 |
| | | LEFT | P9ACPBS222 | 188222 | | DESCENTE | P9ACPBS304 188304 |
| | | RIGHT | P9ACPBS224 | 188224 | | GAUCHE | P9ACPBS306 188306 |
| | | FAST | P9ACPBS208 | 188208 | | DROITE | P9ACPBS305 188305 |
| | | SLOW | P9ACPBS207 | 188207 | | VITE | P9ACPBS324 188324 |
| | | OPEN-CLOSE | P9ACPBS234 | 188234 | | LENT | P9ACPBS307 188307 |
| | | HAND-AUTO | P9ACPBS243 | 188243 | | OUVERT-FERME | P9ACPBS335 188335 |
| | | STOP-START | P9ACPBS232 | 188232 | | MAIN-AUTO | P9ACPBS336 188336 |
| MARCHE | | FORWARD-REVERSE | P9ACPBS231 | 188231 | | ARRET-MARCHE | P9ACPBS328 188328 |
| | | OFF-ON | P9ACPBS233 | 188233 | | AVANT-ARRIERE | P9ACPBS332 188332 |
| | | AUTO-OFF-HAND | P9ACPBS258 | 188258 | | HORS-EN | P9ACPBS331 188331 |
| | | FORWARD-0-REVERSE | P9ACPBS239 | 188239 | | AUTO-0-MAIN | P9ACPBS334 188334 |
| | | 0-1 | P9ACPBS039 | 188030 | | AVANT-0-ARRIERE | P9ACPBS333 188333 |
| | | | | | | 0-1 | P9ACPBS039 188030 |
| | | | | | | | |
| For insert holders 45 x 50 mm | | Neutral | | | | | |
| | | black/red background, white text | P9ARPBM | 188002 | | | |
| | | white background, black text | P9ARPWM | 188028 | | | |
| | | transparent | P9ARPTM | 188019 | | | |

Round plates for emergency

| | | Diameter 59 mm | | | Diameter 78 mm | | |
|---|--------------------|--------------------|------------------|----------|--------------------|------------------|----------|
| | | Description | Cat. no. | Ref. no. | Description | Cat. no. | Ref. no. |
| Without text | yellow background | | 080XTGR | 179514 | black background | 080XTG8 | 179515 |
| | With text | yellow background | | | black background | | |
|  59 mm  78 mm | EMERGENZA | EMERGENZA | 080XTGR01 | 179525 | EMERGENZA | 080XTG801 | 179535 |
| | EMERGENCY STOP | EMERGENCY STOP | 080XTGR02 | 179526 | EMERGENCY STOP | 080XTG802 | 179536 |
| | ARRET D'URGENCE | ARRET D'URGENCE | 080XTGR03 | 179510 | ARRET D'URGENCE | 080XTG803 | 179511 |
| | NOT - AUS | NOT - AUS | 080XTGR04 | 179527 | NOT - AUS | 080XTG804 | 179537 |
| | NOODSTOP | NOODSTOP | 080XTGR05 | 179528 | NOODSTOP | 080XTG805 | 179538 |
| | PARO EMERGENCIA | PARO EMERGENCIA | 080XTGR06 | 179529 | PARO EMERGENCIA | 080XTG806 | 179539 |
| | NOTSTOP | NOTSTOP | 080XTGR07 | 179530 | EMERGENZA GENERALE | 080XTG807 | 179540 |
| | PARAGEM EMERGENCIA | PARAGEM EMERGENCIA | 080XTGR08 | 179531 | PARAGEM EMERGENCIA | 080XTG808 | 179541 |

Neutral plate

| | | Description | Cat. no. | Ref. no. | | |
|---|----------------|---|----------|----------|--|--|
|  | Snap-on system | For identification of contact blocks and power supplies | P9ACPIU | 188016 | | |
| | | | | | | |

(1) Other languages on request. The catalogue numbers in **bold** are available from stock.

Push-button stations

A

B

C

D

E

F

G

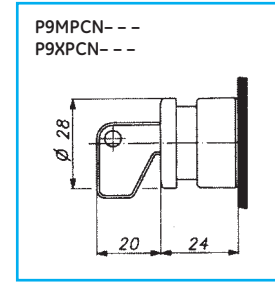
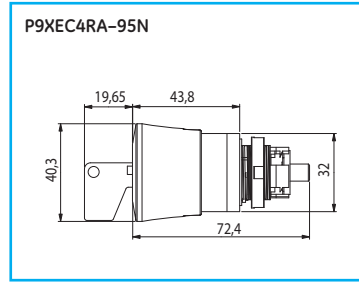
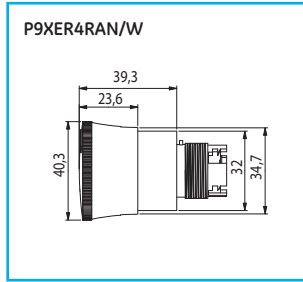
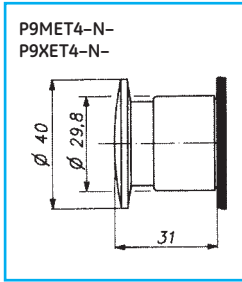
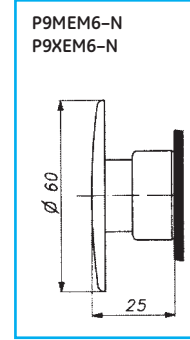
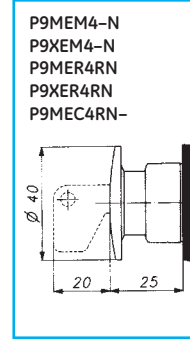
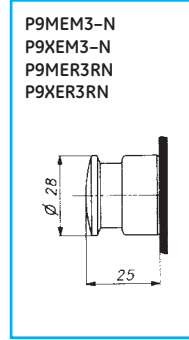
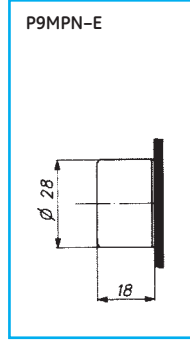
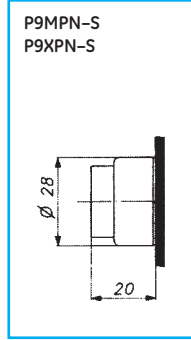
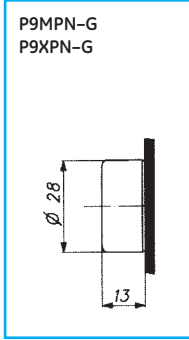
H

I

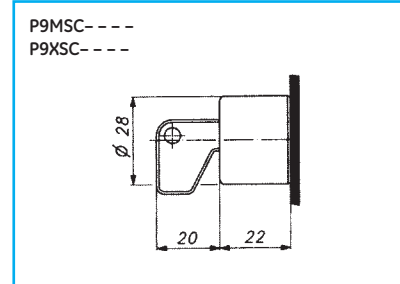
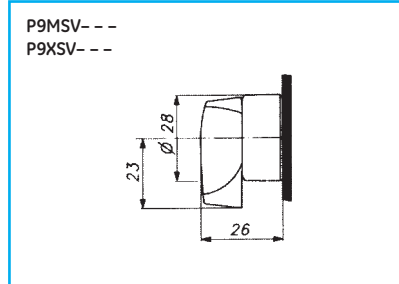
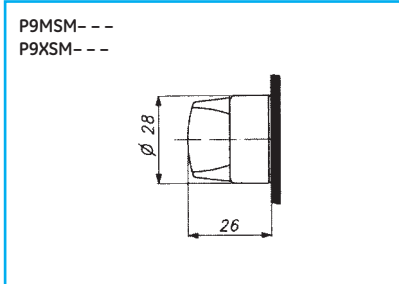
X

Dimensional drawings

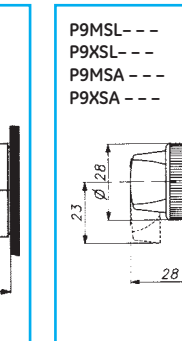
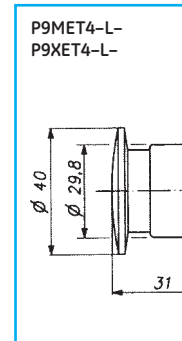
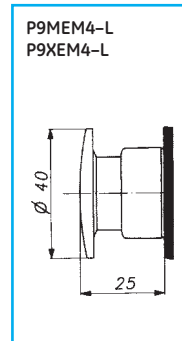
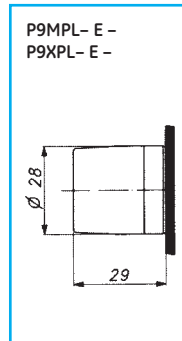
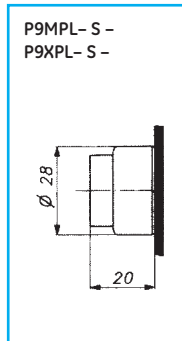
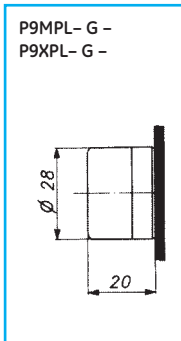
Round operators - Push-buttons



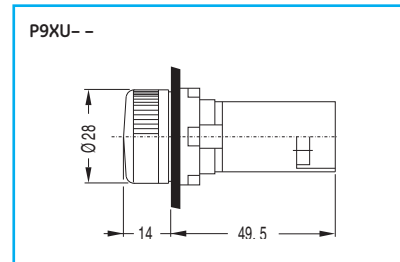
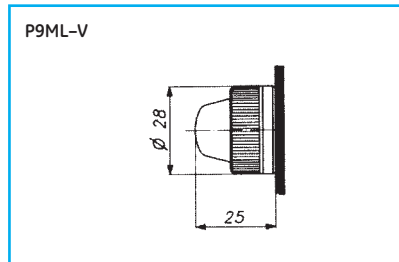
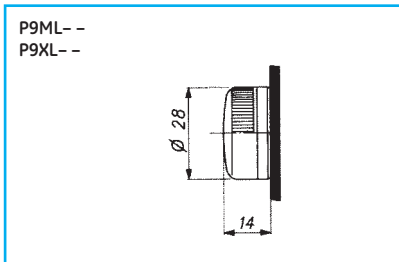
Round operators - Selector switches



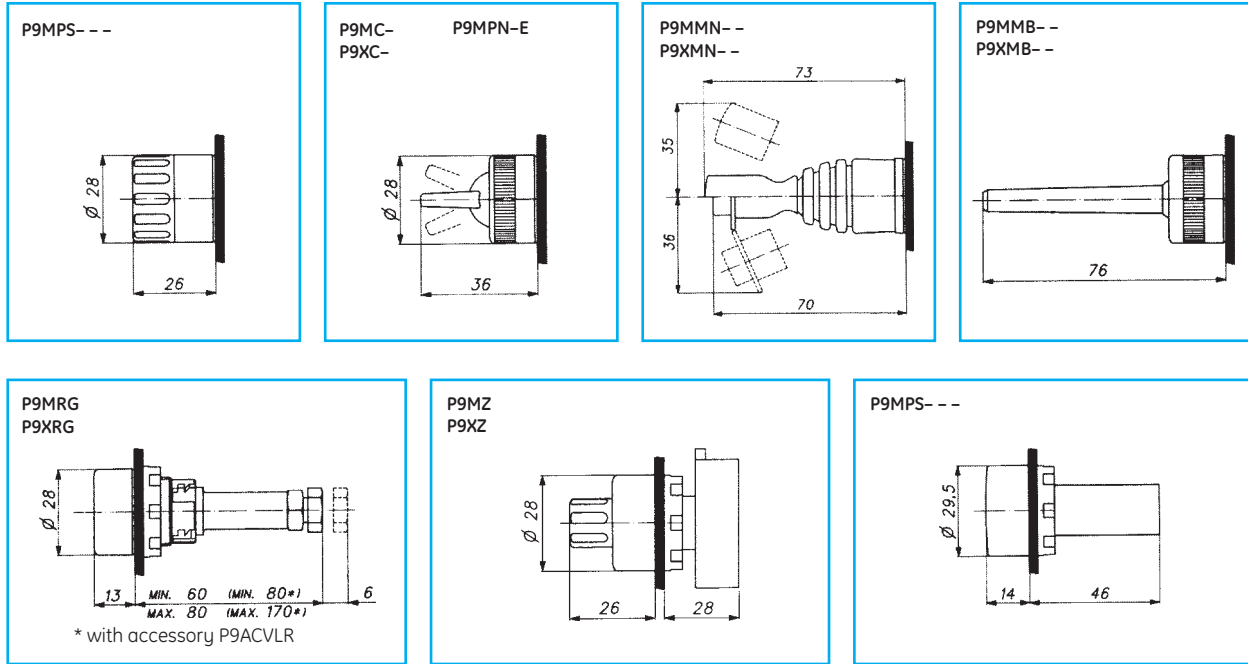
Round operators - Illuminated push-buttons and selector switches



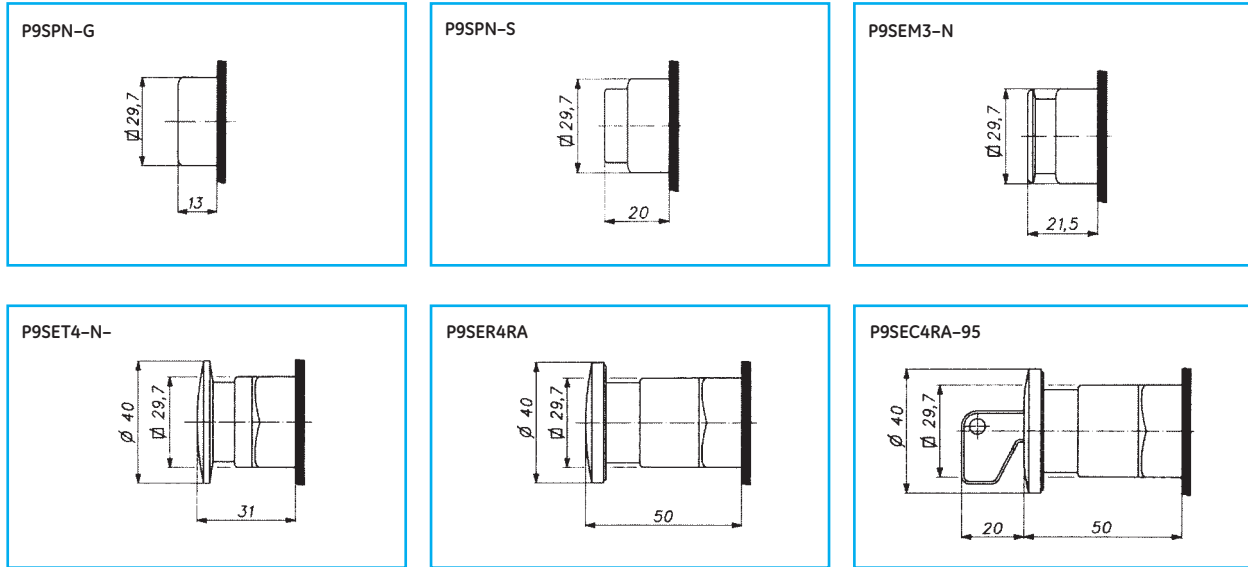
Round operators - Pilot lights



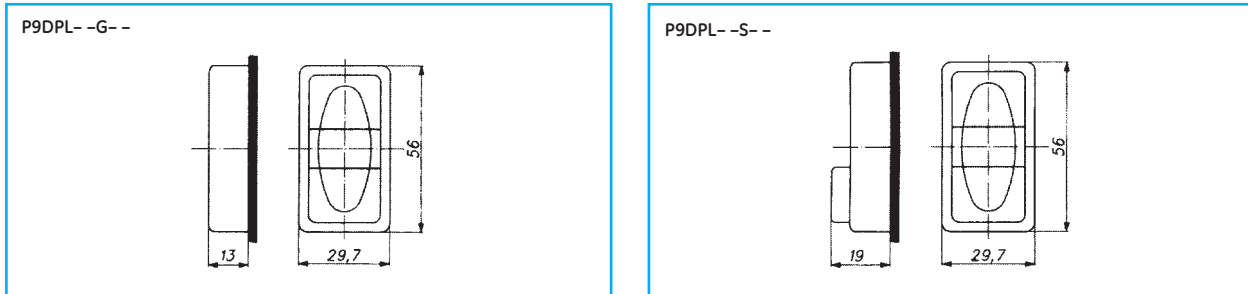
Round operators - Other devices



Square operators - Push-buttons



Square operators - Double function push-buttons



Panel mounting

A

B

C

D

E

F

G

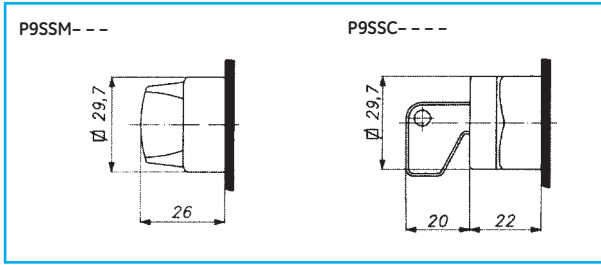
H

I

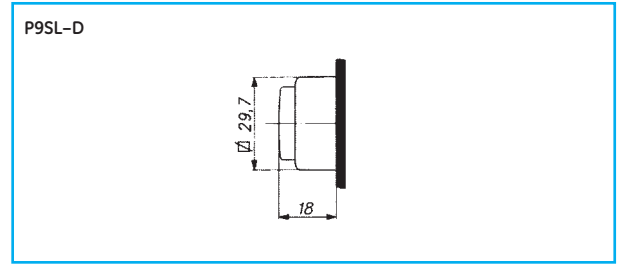
X

Dimensional drawings

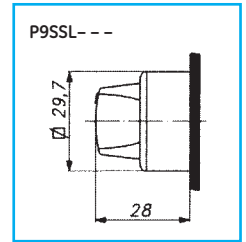
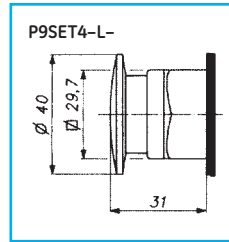
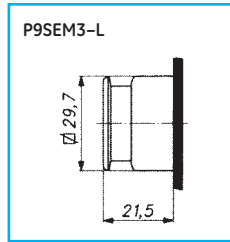
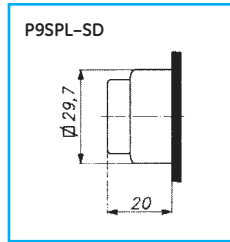
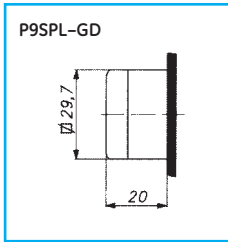
Square operators - Selector switches



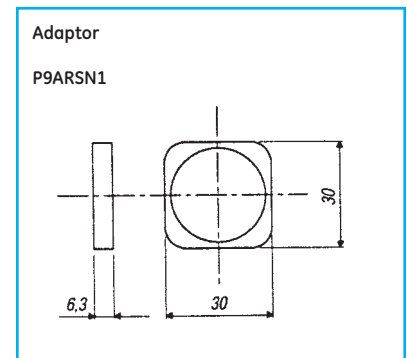
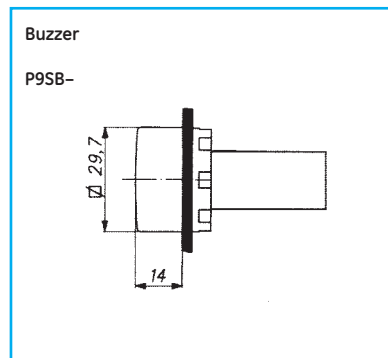
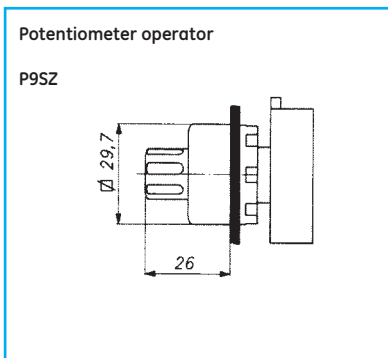
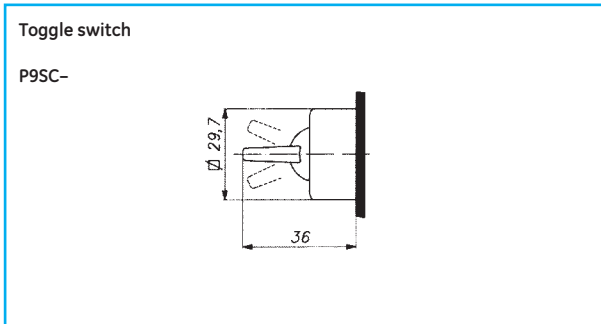
Square operators - Pilot lights



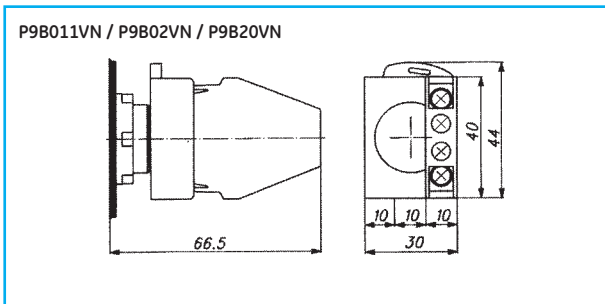
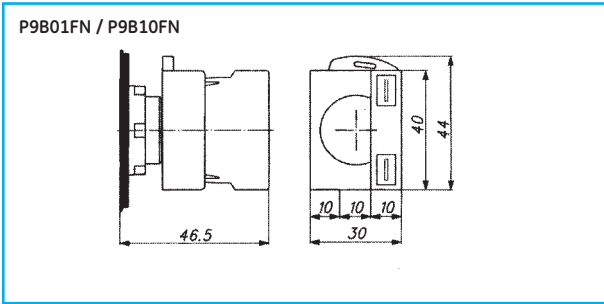
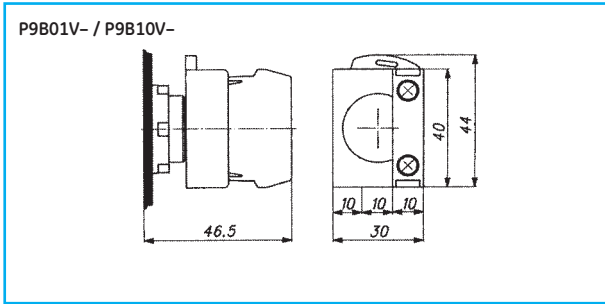
Square operators - Illuminated push-buttons and selector switches



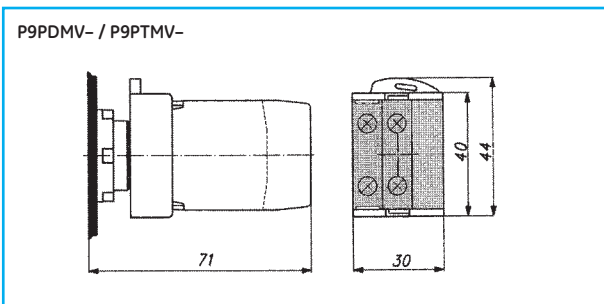
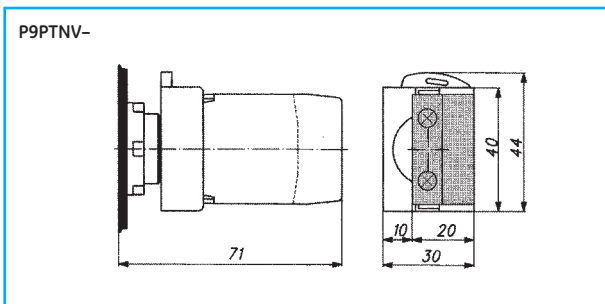
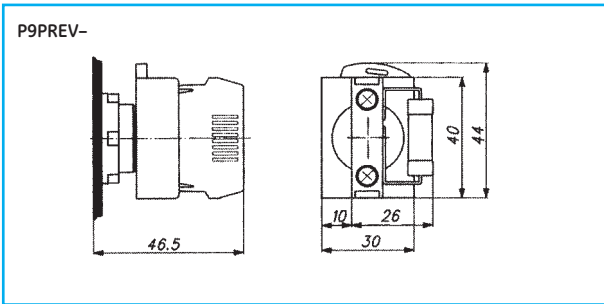
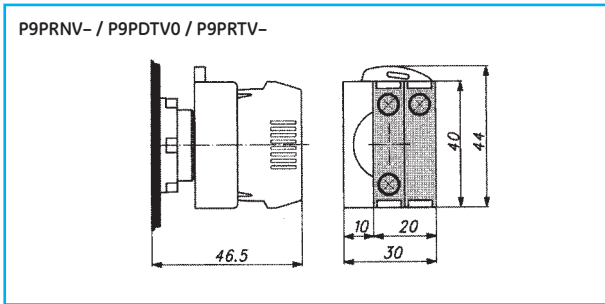
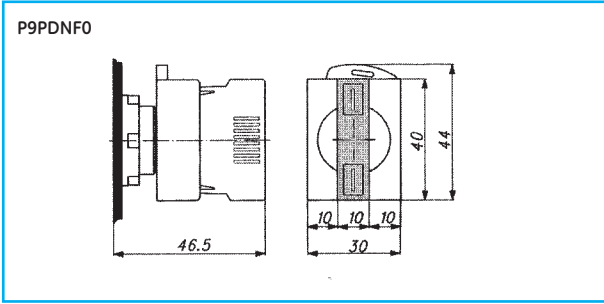
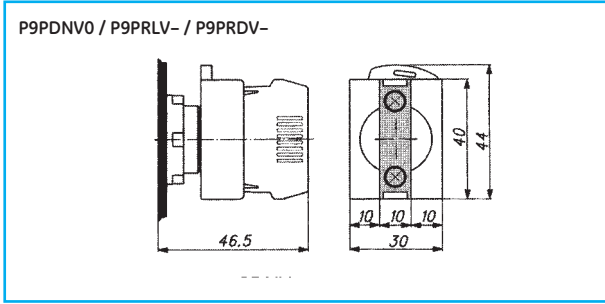
Square operators - Other devices



Contact blocks



Power supplies



Panel mounting

- A
- B
- C
- D
- E
- F
- G
- H
- I
- X

Series P9

Control and signalling units Ø 22 mm

A

B

C

D

E

F

G

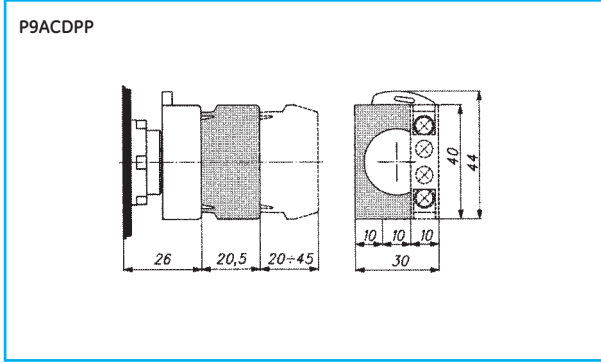
H

I

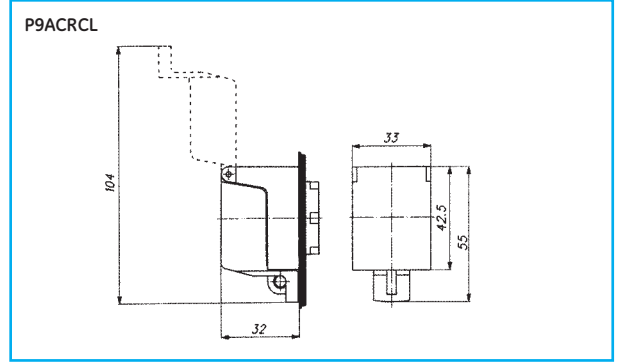
X

Dimensional drawings

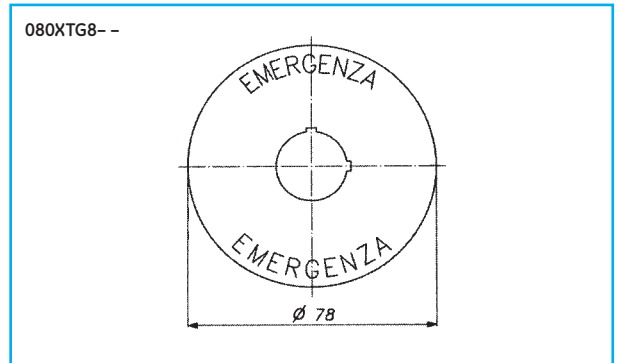
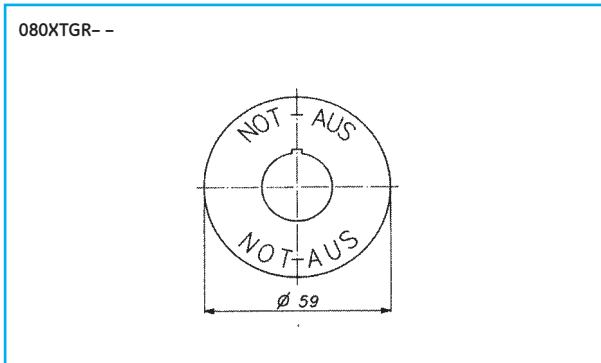
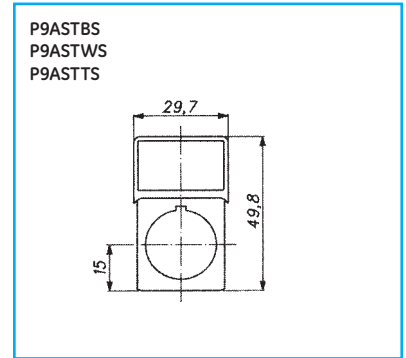
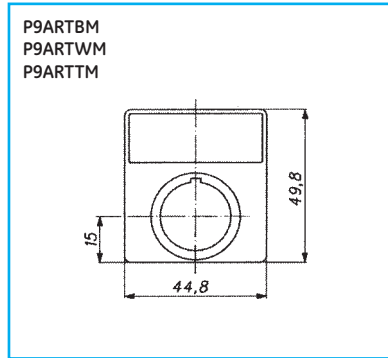
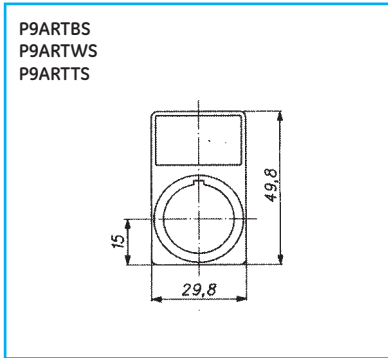
Push-on / push-off devices



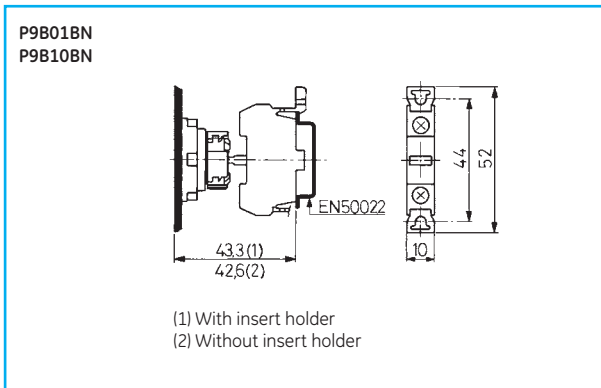
Protection cover



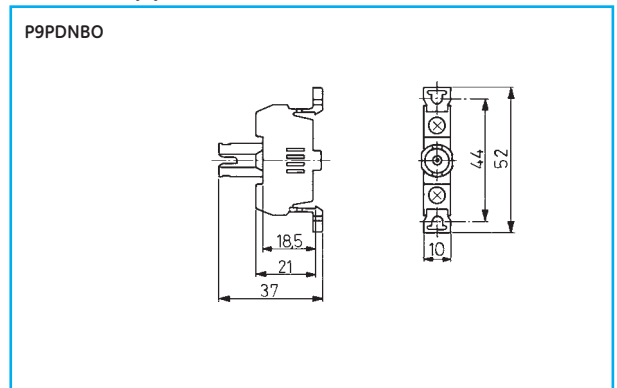
Insert holders and plates



Contact blocks

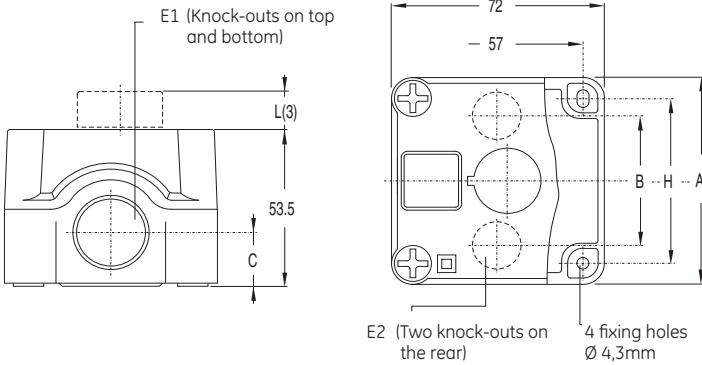


Power supplies



Overall dimensions

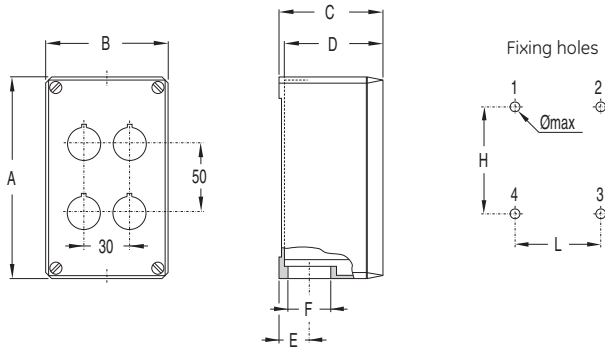
Enclosures for push-button stations in thermoplastic



| Holes | A | B | C | E1 | E2 | H |
|-------|-----|-----|------|-------------------|------|-----|
| 1 | 72 | 46 | 16.5 | 23 ⁽¹⁾ | 15.5 | 57 |
| 2 | 110 | 78 | 16.5 | 23 ⁽¹⁾ | 21.5 | 95 |
| 3 | 140 | 108 | 16.5 | 23 ⁽¹⁾ | 21.5 | 125 |
| 4 | 175 | 143 | 16.5 | 23 ⁽¹⁾ | 21.5 | 160 |
| 6 | 235 | 200 | 19.5 | 29 ⁽²⁾ | 23 | 220 |

(1) Suitable for cable gland, with locknut, PG16 or 1/2" NPT
 (2) Suitable for cable gland, with locknut, PG21 or 3/4" NPT
 (3) Flush push-button: 13
 Pilot light: 14
 Emergency push-button: 50
 Key selector switch: 22
 For customized versions see operator dimensions.

Enclosures for push-button stations in aluminium



| Type | Holes Ø 22 | | Dimensions | | | | | | Fixing templates | |
|------|------------|-----------|------------|--------|--------|--------|--------|-------|------------------|-----------------------|
| | vertic. | horizont. | A (mm) | B (mm) | C (mm) | D (mm) | E (mm) | F | HxLxØmax (mm) | position of the holes |
| 1 | 1 | - | 87 | 87 | 75 | 72 | 21.5 | PG 21 | 74x55x4 | 1-3 |
| 1M | 1 | - | 87 | 87 | 100 | 97 | 21.5 | PG 21 | 68x55x4 | 1-3 |
| 2 | 2 | - | 145 | 87 | 75 | 72 | 21.5 | PG 21 | 132x55x4 | 1-3 |
| 2M | 2 | - | 145 | 87 | 100 | 97 | 21.5 | PG 21 | 126x55x4 | 1-3 |
| 3 | 3 | - | 195 | 87 | 100 | 97 | 21.5 | PG 21 | 176x55x4 | 1-3 |
| 4 | 2 | 2 | 145 | 87 | 75 | 72 | 21.5 | PG 21 | 132x55x4 | 1-3 |
| 4M | 2 | 2 | 145 | 87 | 100 | 97 | 21.5 | PG 21 | 126x55x4 | 1-3 |
| 6 | 3 | 2 | 195 | 87 | 100 | 97 | 21.5 | PG 21 | 176x55x4 | 1-3 |
| 8 | 2 | 4 | 152 | 152 | 101.5 | 98.5 | 27 | PG 29 | 136x119x6 | 1-3 |
| 12 | 3 | 4 | 205 | 230 | 101.5 | 98.5 | 27 | PG 29 | 172x214x6 | 1-2-3-4 |
| 18 | 3 | 6 | 257 | 300 | 101.5 | 98.5 | 35 | PG 36 | 221x282x6 | 1-2-3-4 |
| 24 | 4 | 6 | 257 | 300 | 101.5 | 98.5 | 35 | PG 36 | 221x282x6 | 1-2-3-4 |
| 35 | 5 | 7 | 350 | 350 | 123 | 106.5 | 41 | PG 36 | 180x180x10 | 1-2-3-4 |

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Technical data

Compliance with standards

IEC 947.5.1 - VDE 0660 - NFC 63140
 CEI EN 60947.5.1 - UTE - BSI - NEMA
 CENELEC EN 50007

Approvals

UL (U.S.A.) - CSA (Canada) - RINA - CE

Climatic protections

The standard versions are suitable for use in the following climates:

| | |
|----------------------|------------------------|
| Temperate climate | cat. 23/50 (DIN 50014) |
| Wet climate | cat. 23/83 (DIN 50015) |
| Hot wet climate | cat. 40/92 (DIN 50015) |
| Variable wet climate | FW24 (DIN 50016) |

Temperature ranges

| | |
|-----------|-------------------|
| Operation | -25 °C to + 70 °C |
| Storage | -40 °C to + 70 °C |

Protection degree of the operators

IP65 according to IEC 529 when they are mounted into enclosures with the same or a higher degree of protection. IP66 with appropriate protective caps.

Protection degree of the terminals

IP2x according to IEC 529.
 Fully integrated on signalling units, illuminated push-buttons and illuminated selector switches. With accessory on contact blocks for control units.

Rated insulation voltage

690V according to EN 60947.1

Impulse withstand voltage

4 kV according to EN 60947.1

Insulation class

Group C according to VDE 0110

Electric shocks protection

Class I according to IEC 536

Short-circuit protection

With fuses type gl of 10A according to IEC 947.5.1

Connection terminals

Connection terminals
 Screw type with retractable clamp.
 Clamping capacity of rigid and/or flexible conductors:
 - minimum 22 AWG (0.32 mm²)
 - maximum 12 AWG (3.3 mm²)

Performances of the contacts

- Slow acting
- Self-cleaning
- NC forced breaking
- Double break

Electrical performances

Rated thermal current I_{th} = 10 A

Performances according IEC 947.5.1

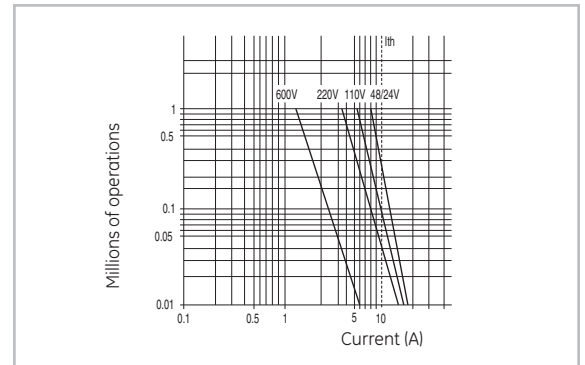
| Categorie AC 15 (A600) | | | | | | | | | |
|---|--------|-----|-----|----|------|------|-----|------|-----|
| Voltage | Ue (V) | 24 | 48 | 60 | 110 | 220 | 380 | 500 | 600 |
| Current | Ie (A) | 10 | 10 | 10 | 6 | 3 | 2 | 1.5 | 1.2 |
| Categorie DC 13 (P600) | | | | | | | | | |
| Voltage | Ue (V) | 24 | 48 | 60 | 110 | 220 | 300 | 500 | 600 |
| Current | Ie (A) | 5 | 2.7 | 2 | 1.1 | 0.55 | 0.3 | 0.22 | 0.2 |
| Categorie DC 13 (Q300) for illuminated push-buttons and illuminated selector switch | | | | | | | | | |
| Voltage | Ue (V) | 24 | 48 | 60 | 110 | 220 | 300 | | |
| Current | Ie (A) | 2.5 | 1.1 | 1 | 0.55 | 0.27 | 0.2 | | |

Performances according to CSA and UL

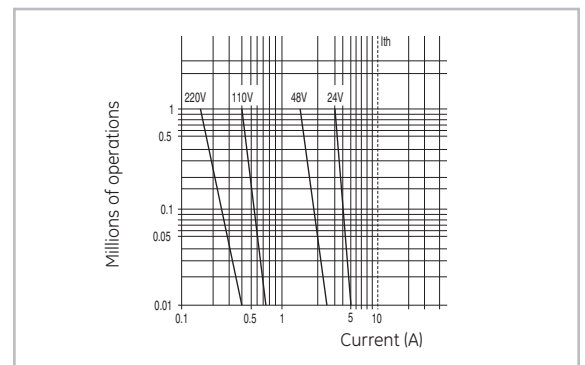
| | |
|-------------------------|--|
| AC Heavy Duty (A600) | |
| DC Standard Duty (Q300) | for illuminated push-buttons and illuminated selector switch |

Electrical endurance

Alternative current 50/60 Hz cat. AC 15



Direct current cat. DC 13



Mechanical endurance

| | |
|-------------------------------|---------------------------|
| Joysticks | 0.5 x 10 ⁶ op. |
| Key push-buttons | |
| Locking emergency | 1 x 10 ⁶ op. |
| Knob selector switches | |
| Lever selector switches | |
| Key selector switches | |
| Illuminated selector switches | |
| Selector push-buttons | |
| Timed push-buttons | |
| Illuminated push-buttons | 3 x 10 ⁶ op. |
| Momentary std push-buttons | |
| Momentary mush. push-buttons | |

Number of contact blocks

| | |
|---------------------------------|---|
| Momentary standard push-buttons | 4 double pole |
| Momentary mush. push-buttons | (8 single pole) |
| Key push-buttons | 4 double pole |
| Locking emergency | (4 single pole) |
| Selector switches | 6 double pole |
| (4 pos. types excl) | (6 single pole) |
| 4 pos. selector switches | 2 double pole |
| Selector push-buttons | 6 double pole |
| | (6 single pole) |
| Joysticks 2 and | 4 double pole |
| 4 positions | (4 single pole) |
| Illuminated push-buttons | For different contacts |
| Illuminated selector switches | configuration, contact our sales office |

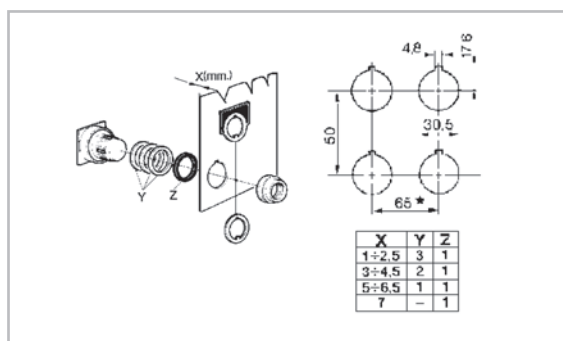
Fitting of units

The units of Series 077 are designed for fitting onto panels with a thickness between 1 and 7 mm., with holes of 30.5 mm. diameter, according to rules established by EN 60947.5.1.

A special metal ring supplied with each unit or one of the name plates included among the fittings, enables the unit to be exactly positioned.

All equipment is supplied with a set of spacing rings to adjust variations in the thickness of the panel thus ensuring a uniform front protrusion.

For a correct fitting, it needs to observe the diagram below and tables indications.



A

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Push-buttons

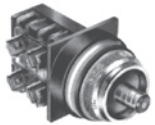




| Standard/Momentary | Description | Contacts | Cat. no. | Ref. no. |
|---|--|-------------------------|-----------------|---------------|
|  | | NC+NO | 077P11 | 180019 |
| | | NC | 077P01 | 180039 |
| | | NO | 077P10 | 180029 |
| Standard/Time delayed ⁽¹⁾ | Contacts delayed at the release of the push button. Accuracy ± 5% Setting range: 0,1 - 30 sec. 10 - 180 sec. | NC+NO | 077P11T30 | 180120 |
|  | | NC+NO | 077P11T180 | 180121 |
| | | | | |
| To complete by | | | | |
|  | Fixing kits With 4 coloured caps: black, red, green, yellow | Ring type with guard | 077GGBCN | 180020 |
| | | without guard | 077GSBCN | 180010 |
| | With 4 coloured caps: brown, orange, blue, white | Ring type with guard | 077GGBCS | 180050 |
| | | without guard | 077GSBCS | 180040 |
|  | With 1 clear and 4 marking etched on both sides  | Ring type with guard | 077GGBCF | 180137 |
| | | without guard | 077GSBCF | 180136 |
| | | | | |

(1) Not approved by RINA and Lloyd's Register

The catalogue numbers **in bold** are available from stock.

For reference numbers, see chapter X, pg. X.10

Push-buttons

| Mushroom head/Momentary | | Description | Contacts | Cat. no. | Ref. no. |
|--|---|--|--------------------------------------|-----------------|---------------|
|  | | | NC+NO | 077E11 | 180049 |
| | | | NC | 077E01 | 180069 |
| | | | NO | 077E10 | 180059 |
| Mushroom head/ Emergency with latch | | Push-twist to release | NC+NO | 077RE11 | 180079 |
|  | | | NC | 077RE01 | 180099 |
| | | | NO | 077RE10 | 180089 |
| | With keylock ⁽¹⁾ | | Key withdrawable in positions I & II | | |
|  |  Locking (type G unlock) | Lockable in position: normal & depressed | NC+NO | 077PC11C | 180100 |
| | | depressed without pre-setting ⁽²⁾ | NC+NO | 077PC11G | 180104 |
| | | | | | |
| To complete by | | Description | Diameter | Cat. no. | Ref. no. |
|  | Mushroom head caps | | | | |
| | For momentary push-button | Ø 35 mm | 077E● | see bottom | |
| | | Ø 60 mm | 077EE● | see bottom | |
| | For push-twist to release push-button | Red Ø 35 mm | 077RER | 180090 | |
| | | Red Ø 60 mm | 077ECR | 181602 | |
| For keylock push-button | | | | | |

The catalogue numbers in **bold** are available from stock.

| Colours | black | red | yellow |
|---------|----------|----------|----------|
| ● | N | R | G |

- (1) Supplied with two standard keys 3095.
- (2) Combined with mushroom head 077ECR makes an emergency with latch push-key to release.

For reference numbers, see chapter X, pg. X.10



- A
- B
- C
- D
- E**
- F
- G
- H
- I
- X

Series 077

Control and signalling units

A

B

C

D

E

F









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




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Selector switches with knob

| 2 positions | | | Function (1) | Contacts | Cat. no. | Ref. no. see bottom |
|---|---|---|--------------------|---------------------------------------|------------------|------------------------|
|  | Fixed |  | D | NC+NO | 077SDN11 | 180170 |
| | |  | H | NC+NO | 077SHN11 | 180180 |
| 3 positions | | | | | | |
|  | Fixed |  | B | NC+NO | 077SBN11 | 180230 |
| | | | U | 2NC+2NO | 077SUN22 | 180440 |
| | | | Z | 2NC+2NO | 077SZN22 | 180480 |
| | With spring return |  | B | NC+NO | 077SBN11SC | 180240 |
| | |  | B | NC+NO | 077SBN11DC | 180250 |
| |  | B | NC+NO 2NC + 2NO | 077SBN11RC 077SN22RC | 180260 180510 | |

Selector switches with lever









| 2 positions | | | Function (1) | Contacts | Cat. no. | Ref. no. |
|---|--------------------|---|--------------|----------|-------------------|----------|
|  | Fixed |  | D | NC+NO | 077SLD11 | 180601 |
| | | | | | | |
| 3 positions | | | | | | |
|  | Fixed |  | B | NC+NO | 077SLB11 | 180607 |
| | | | Z | 2NC+2NO | 077SLZ22 | 180623 |
| | With spring return |  | Z | 2NC+2NO | 077SLZ22DC | 180625 |
| | |  | Z | 2NC+2NO | 077SLZ22RC | 180626 |
| | | | | | | |
| 4 positions | | | | | | |
|  | Fixed |  | X | 2NC+2NO | 077SLX22 | 180606 |

The catalogue numbers in **bold** are available from stock.

(1) Electrical diagrams, see E.55



Selector switches with key ⁽¹⁾

| 2 positions | | Function (2) | Contacts | Key removal | Cat. no. | Ref. no. |
|--|--------------------|---|----------|-------------------------|----------------------------|--|
|  | Fixed |  | D | NC+NO NC+NO NC+NO | I II I-II | 077SCD1101 180630 077SCD1105 180631 077SCD1109 180632 |
| | With spring return |  | I | NC+NO | 0 | 077SCI11DC03 180640 |
| | |  | H | NC+NO | 0 | 077SCH11SC03 180636 |
| 3 positions | | | | | | |
|  | Fixed |  | B | NC+NO | I-0-II | 077SCB1120 180843 |
| | With spring return |  | B | NC+NO | I-0 | 077SCB11DC07 180852 |
| | | | Z | 2NC+2NO | I | 077SCZ22DC01 180906 |
|  | | B | NC+NO | 0 | 077SCB11RC03 180853 | |

The catalogue numbers in **bold** are available from stock.

- (1) Supplied with two standard keys 3095.
- (2) Electrical diagrams, see E.55

Control and signalling units Ø 30 mm

A

B

C

D

E

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For reference numbers, see chapter X, pg. X.10



Series 077

Control and signalling units

A

B

C

D

E

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



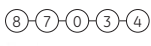
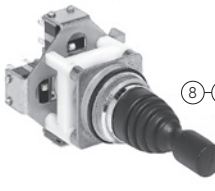
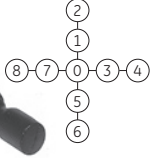
G

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X







Joysticks

| 2 positions + central zero position | | Function ⁽¹⁾ | Contacts | Cat. no. | Ref. no. | Cat. no. | Ref. no. |
|--|----------------------------------|-------------------------|----------|---------------------|----------------|----------------------|----------|
| | | | | Without interlock | With interlock | | |
|   | Fixed position | N | 2NC+2NO | 077MTS2422 | 180910 | 077MTS2422B | 181000 |
| | | R | 2NC+2NO | 077MTS2422R | 180912 | 077MTS2422RB | 181002 |
| | Transient position | N | 2NC+2NO | 077MT24S22 | 180911 | 077MT24S22B | 181001 |
| | | R | 2NC+2NO | 077MT24S22R | 180913 | 077MT24S22RB | 181003 |
| <hr/> | | | | | | | |
| 4 positions + central zero position | | | | | | | |
|   | Fixed positions | N | 2NC+2NO | 077MTS123422 | 180914 | 077MTS123422B | 181004 |
| | Transient positions | | 2NC+2NO | 077MT1234S22 | 180915 | 077MT1234S22B | 181005 |
| <hr/> | | | | | | | |
| 2+2 positions + central zero position | | | | | | | |
|   | Fixed positions | X | 4NC+4NO | 077M2S2SX44 | 180918 | 077M2S2SX44B | 181008 |
| | Transient positions | | 4NC+4NO | 077M2T2TX44 | 180919 | 077M2T2TX44B | 181009 |
| | 4,8 transient -3,7 fixed | | 4NC+4NO | 077M2S2TX44 | 180921 | | |
| | Transient positions | Y | 4NC+4NO | 077M2T2TY44 | 180923 | | |
| <hr/> | | | | | | | |
| 4+4 positions + central zero position | | | | | | | |
|   | Transient positions | X | 8NC+8NO | 077M4T4TX88 | 180927 | | |
| | 2,4,6,8 transient -1,3,5,7 fixed | | 8NC+8NO | 077M4S4TX88 | 180929 | 077M4S4TX88B | 181019 |
| | Transient positions | Y | 8NC+8NO | 077M4T4TY88 | 180931 | 077M4T4TY88B | 181021 |

The catalogue numbers **in bold** are available from stock.

(1) Electrical diagrams, see E.55

Illuminated push-buttons

| Momentary | Description | Contacts | Cat. no. | Ref. no. |
|--|--|----------------------|---|----------------------------|
|  | Full voltage ~ / === BA9s max 380V - 2 W not included | NC+NO NO+NO NO | 077PLM11D0 077PLM20D0 077PLM10D0 | 181040 181041 181043 |
| | With transformer 50/60Hz BA9s6V-1.5W included | NC+NO | 077PLM11T♦ | |
| To complete by: | | | | |
| Lenses | | | | |
|   | Standard | | 077GPL ● | see bottom |
| | Mushroom head Ø 35 mm (to use with the fixing ring 077GG03) | | 077GELR | 180971 |
| Locking rings | | | | |
|    | Without guard | | 077GG03 | 180980 |
| | With metal guard | | 077GGM | 180981 |
| | With transparent guard | | 077GGT | 180982 |

The catalogue numbers **in bold** are available from stock.

| Suffix | 110-120V | 220-250V |
|--------|----------|----------|
| ♦ | J | N |

| Colours | red | green | yellow | orange | blue | white | clear |
|-----------------|----------|----------|----------|----------|-----------|----------|----------|
| Standard lenses | R | V | G | A | BL | B | I |











Control and signalling units Ø 30 mm

- A
- B
- C
- D
- E**
- F
- G
- H
- I
- X

For reference numbers, see chapter X, pg. X.10



Illuminated selector switches

| 2 positions | | Function (1) | Contacts | Cat. no. | Ref. no. |
|---|---------------------------|---|----------|----------------|--|
|  | Fixed |  Full voltage ~ /  BA9s max. 380V-2W not included | D | NC+NO | 077ISD11D0 181060 |
| 3 positions | | Function (1) | Contacts | Cat. no. | Ref. no. |
|  | Fixed |  Full voltage ~ /  BA9s max. 380V-2W not included | B | NC+NO | 077ISB11D0 181170 |
|  | With spring return |  Full voltage ~ /  BA9s max. 380V-2W not included | B Z | NC+NO NC+NO | 077ISB11D0RC 181174 077ISZ11D0RC 181176 |
| To complete by: | | | | | |
|  | Lenses | | | | |
| | Knob | | | 077MIS● | see bottom |

(1) Electrical diagrams, see E.55







The catalogue numbers **in bold** are available from stock.

| Suffix | 110-120V | 220-250V |
|--------|----------|----------|
| ◆ | J | N |

| Colours | red | green | yellow |
|---------|----------|----------|----------|
| ● | R | V | G |

For reference numbers, see chapter X, pg. X.10

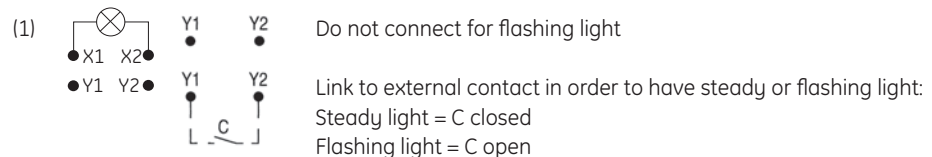
Pilot lights

| | Description | Cat. no. | Ref. no. |
|---|--|------------------------------------|------------------|
|  | Full voltage ~ / === BA9s max. 380V-2W not included | 077LDNV0 | 181300 |
| | With resistor ~ / === 110-120V, BA9s60V-1.2W included 220-240V, BA9s130V-2W included | 077LRNVJ 077LRNVN | 181301 181302 |
|  | With transformer 50/60Hz BA9s6v-1.5w included | 077LTNV♦ | |
| | Multifunction (1) full voltage 24V ~ / === BA9s24V-2W included | 077LDMVD | 181305 |
|  | Multifunction (1) with transformer 50/60 Hz BA9s6V-0.6W included | 077LTMV♦ | |
| To complete by: | | | |
| | Lenses | | |
|  | plastic version | 077GL● | see bottom |
| | Full voltage ~ / === For bulb E14 base max 660V(1)-6W not included | 077DLE14 | 181260 |
|  | | | |
| To complete by: | | | |
| | Lenses | | |
|  | For pilot lights 077DLE14 plastic version | 099GW1● | see bottom |

The catalogue numbers **in bold** are available from stock.

| Suffix | 110-120V | 220-250V |
|--------|----------|----------|
| ♦ | J | N |

| Colours | red | green | yellow | orange | blue | white | clear |
|---------|----------|----------|----------|----------|-----------|----------|----------|
| ● | R | V | G | A | BL | B | I |



For reference numbers, see chapter X, pg. X.10

A

B

C

D

E

F























G

H

I

X

Accessories

| | Description | Cat. no. | Ref. no. |
|---|--|-----------------|---------------------------|
|  | Push-on/push-off device For momentary standard push-buttons Converts momentary push-button to push-on/push-off. This device can only be used with 077-01 (NC) and/or 077-10A (NO early make) contact blocks. | 077DPP | 181550 |
|  | Push-pull to release device For momentary mushroom push-buttons Converts momentary mushroom push-button to push to latch/pull to release. | 077DAE | 181554 |
|  | Handles Knob for selector switches | 077M● | see bottom |
|  | Protection Guard-ring for mushroom head push-button dia 35 mm. | 077GE35 | 181620 |
|  | Plug For unused mounting hole. | 077TPF | 181601 |
|  | Potentiometer operator Suitable for potentiometers with shaft 50 mm long and 6 mm diameter. Potentiometer not included. | 077OPZ | 181570 |
|  | Rubber protective caps For standard push-buttons - coloured - clear For illuminated standard push-buttons - clear For knob selector switches - black colour with clear knob | 077CP● | see bottom |
|  | | 077CPT | 181588 |
|  | | 077CPLT | 181600 |
|  | | 077CST | 181603 |
|  | Spare keys Standard version | Code 3095 | 077C3095 173095 |
|  | Bulbs BA9s Filament type Vn Wn 6 0.6 6 1.5 12 2 24 2 30 2.1 48 2 60 1.2 130 2 Neon type 110 0.11 220 0.33 Mono LED Vn AC/DC ± 10% 6 12 24 48 110 (DC) 230 | BA9S606 | 187850 |
|  | | BA9S615 | 187851 |
|  | | BA9S122 | 187852 |
|  | | BA9S242 | 187853 |
|  | | BA9S30 | 187854 |
|  | | BA9S48 | 187855 |
|  | | BA9S6012 | 187856 |
|  | | BA9S130 | 187857 |
|  | | BA9SN110 | 187860 |
|  | | BA9SN220 | 187861 |
|  | | BA9S6L● | see bottom |
| | | BA9S12L● | see bottom |
| | | BA9S24L● | see bottom |
| | | BA9S48L● | see bottom |
| | | BA9S110L● | see bottom |
| | BA9S230L● | see bottom | |






The catalogue numbers **in bold** are available from stock.

| Colours ● | black | red | green | yellow | blue | white |
|-----------------|----------|----------|----------|--------|------|-------|
| Knobs | N | R | V | G | BL | - |
| Protective caps | N | R | V | G | - | - |
| Mono LED | - | R | V | G | BL | B |

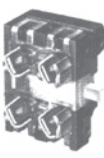
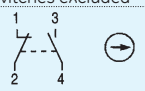




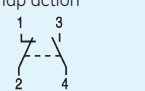


For reference numbers, see chapter X, pg. X.10



Nameplates

| | Description | Cat. no. | Ref. no. |
|---|--|-----------------|----------|
|  For push-button and pilot lights | Without text (black background) | 077TNA | 181650 |
| | With text in English (black background)  STOP | 077TNA40 | 181840 |
|  For 2 position selector switch and selector push-button | Without text (black background) | 077TNA2 | 181660 |
| | With text (black background) ON - OFF | 077TNA230 | 181930 |
|  For 3 position selector switch and selector push-button | Without text (black background) | 077TNA3 | 181670 |
| | With text (black background) | 077TNA301 | 181951 |
| | MANUAL CYCLE-O-AUTOMATIC | 077TNA312 | 181962 |
| | OPEN - OFF - CLOSE UP - OFF - DOWN | 077TNA313 | 181963 |
|  Diameter 62 mm for emergency push-buttons | Without text (yellow background) | 077TGR | 181720 |
| | With text (yellow background): EMERGENCY STOP | 077TGRO2 | 181722 |

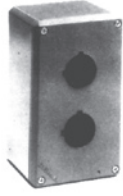

Contact blocks

| 2 positions | Contacts | Cat. no. | Ref. no. | |
|--|--|---|----------------|--------|
|  Standard | For all the applications Illuminated push-buttons and illuminated selector switches excluded | | | |
| |  | NC+NO | 077-11 | 180001 |
| |  | NC | 077-01 | 180003 |
| |  | NO | 077-10 | 180002 |
| |  | NC late opening | 077-01R | 180008 |
| |  | NO early closing | 077-10A | 180007 |
| | Accessories for contact blocks 077-... IP2X protection | for use with NO 077PTB10 181608 for use with NC 077PTB01 181609 for use with NO+NC 077PTB11 181615 | | |
| | For 2 + 2 and 4 + 4 positions joysticks Snap action | | 099SPDTDB | 180009 |
| |  | NC+NO | P9B11VN | 187000 |
| |  | NC | P9B01VN | 187001 |
|  | NO | P9B10VN | 187002 | |

The catalogue numbers in **bold** are available from stock.

- A
- B
- C
- D
- E**
- F
- G
- H
- I
- X


















Enclosures for push-button stations in aluminium alloy (Grey RAL 7012)

| | | | Cat. no. | Ref. no. |
|---|--|-------------------|----------------|----------|
|  <p>Cover with holes with conduit entry</p> | No. of holes | Type | | |
| | 1 | 1 | 077SP1 | 180521 |
| | 1 | 1M | 077SP1M | 180522 |
| | 2 | 2 | 077SP2 | 180523 |
| | 2 | 2M | 077SP2M | 180524 |
| | 3 | 3 | 077SP3 | 180525 |
| | 4 | 4V | 077SP4V | 180526 |
| | 4 | 4 | 077SP4 | 180527 |
| | 6 | 6 | 077SP6 | 180528 |
| | 9 | 9 | 077SP9 | 180529 |
| | 12 | 12 | 077SP12 | 180530 |
| | 16 | 16 | 077SP16 | 180531 |
| | 20 | 20 | 077SP20 | 180532 |
| | 25 | 25 | 077SP25 | 180533 |
| | 30 | 30 | 077SP30 | 180534 |
| | 36 | 36 | 077SP36 | 180535 |
| | <p>Cover with holes without conduit entry</p> | No. of holes | Type | |
| 1 | | 1 | 077SP1SFE | 180536 |
| 1 | | 1M | 077SP1MSFE | 180537 |
| 2 | | 2 | 077SP2SFE | 180538 |
| 2 | | 2M | 077SP2MSFE | 180539 |
| 3 | | 3 | 077SP3SFE | 180540 |
| 4 | | 4V | 077SP4VSFE | 180541 |
| 4 | | 4 | 077SP4SFE | 180542 |
| 6 | | 6 | 077SP6SFE | 180543 |
| 9 | | 9 | 077SP9SFE | 180544 |
| 12 | | 12 | 077SP12SFE | 180545 |
| 16 | | 16 | 077SP16SFE | 180546 |
| 20 | | 20 | 077SP20SFE | 180547 |
| 25 | | 25 | 077SP25SFE | 180548 |
| 30 | | 30 | 077SP30SFE | 180549 |
| 36 | | 36 | 077SP36SFE | 180550 |
|  <p>Cover without holes with conduit entry</p> | | Type | | |
| | 1 | 080SP1SFC | 170835 | |
| | 1M | 080SP1MSFC | 170838 | |
| | 2 | 080SP2SFC | 170841 | |
| | 2M | 080SP2MSFC | 170844 | |
| | 3 | 080SP3SFC | 170847 | |
| | 4V | 077SP4VSFC | 180551 | |
| | 4 | 080SP8SFC | 170853 | |
| | 6 | 080SP12SFC | 170856 | |
| | 9 | 080SP12SFC | 170856 | |
| | 12 | 080SP18SFC | 170859 | |
| | 16 | 080SP18SFC | 170859 | |
| | 20 | 080SP35SFC | 170863 | |
| | 25 | 080SP35SFC | 170863 | |
| | 30 | 077SP36SFC | 180552 | |
| | 36 | 077SP36SFC | 180552 | |
| | <p>Cover without holes without conduit entry</p> | Type | | |
| 1 | | 080SP1SF | 170837 | |
| 1M | | 080SP1MSF | 170840 | |
| 2 | | 080SP2SF | 170843 | |
| 2M | | 080SP2MSF | 170846 | |
| 3 | | 080SP3SF | 170849 | |
| 4V | | 077SP4VSF | 180553 | |
| 4 | | 080SP8SF | 170855 | |
| 6 | | 080SP12SF | 170858 | |
| 9 | | 080SP12SF | 170858 | |
| 12 | | 080SP18SF | 170861 | |
| 16 | | 080SP18SF | 170861 | |
| 20 | | 080SP35SF | 170865 | |
| 25 | | 080SP35SF | 170865 | |
| 30 | | 077SP36SF | 180554 | |
| 36 | | 077SP36SF | 180554 | |
| Accessories Kit of two hinges for types from 12 to 36 holes. | | | 080KCSP | 170883 |










The catalogue numbers **in bold** are available from stock.

Diagrams















Selector switches

| | Function | Contacts | Diagram |
|---|-------------|---|---|
|  | D 077 11... |  |  |
|  | I 077 11... |  |  |
|  | H 077 11... |  |  |
|  | B 077 11... |  |  |
|  | Z 077 11... |  |  |
| | 077 11... |  |  |









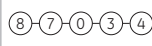











































Illuminated selector switches

| Full voltage type | Function | Contacts | Diagram |
|---|--------------------------|---|---|
|  | D 077 10... 077 01... |  |  |
|  | B 077 10... 077 01... |  |  |
|  | Z 077 10... 077 01... |  |  |

Joysticks

| Positions | Function | Contacts | Diagram |
|---|-------------|---|---|
|  | N 077 11... |  |  |
| | 077 11... |  |  |
| | R 077 11... |  |  |
| | 077 11... |  |  |
|  | N 077 11... |  |  |
| | 077 11... |  |  |

Joysticks

| Positions | Function | Contacts | Diagram |
|---|-------------|--|---|
| | X 077 11... |  |  |
| | 077 11... |  |  |
| | 077 11... |  |  |
| | 077 11... |  |  |
|  | Y 077 11... |  |  |
| | 077 11... |  |  |
| | 077 11... |  |  |
| | 077 11... |  |  |
| | X 077 11... |  |  |
| | 077 11... |  |  |
| | 077 11... |  |  |
| | 077 11... |  |  |
| | 077 11... |  |  |
| | 077 11... |  |  |
| | 077 11... |  |  |
| | 077 11... |  |  |
|  | Y 077 11... |  |  |
| | 077 11... |  |  |
| | 077 11... |  |  |
| | 077 11... |  |  |
| | 077 11... |  |  |
| | 077 11... |  |  |
| | 077 11... |  |  |
| | 077 11... |  |  |
| | 077 11... |  |  |

■ = closed contact

| |
|---|
| A |
| B |
| C |
| D |
| E |
| F |
| G |
| H |
| I |
| X |

Series 077

Control and signalling units

A

B

C

D

E

F

G

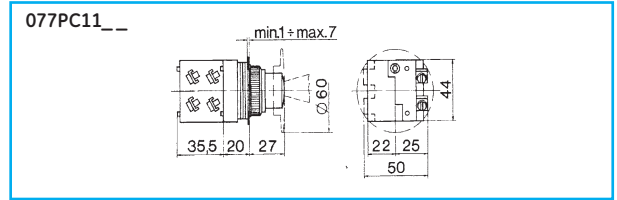
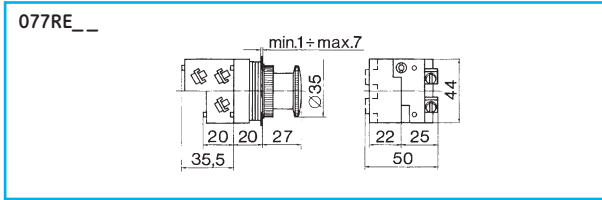
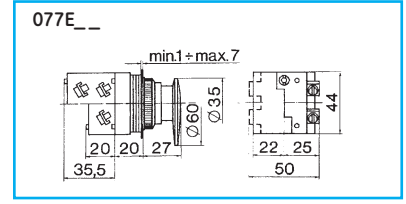
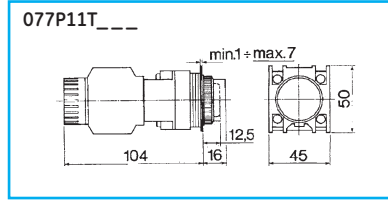
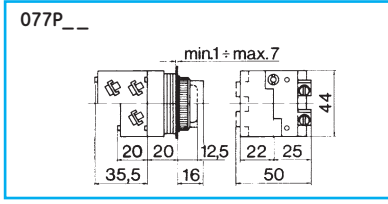
H

I

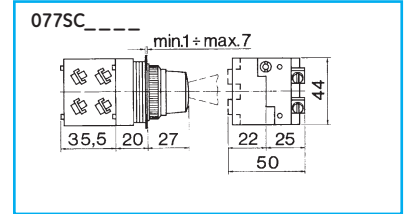
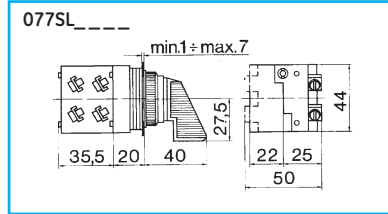
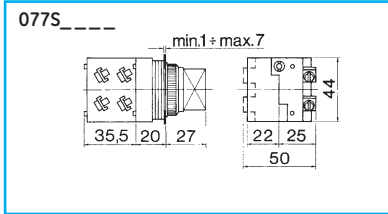
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Dimensional drawings

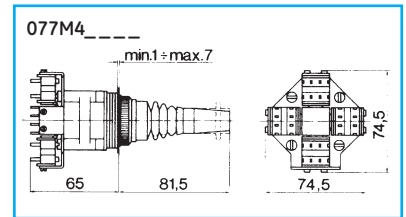
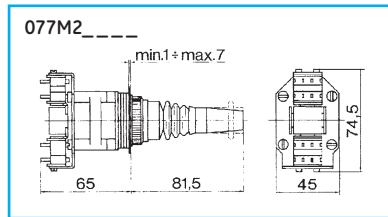
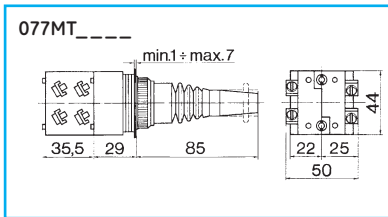
Push-buttons



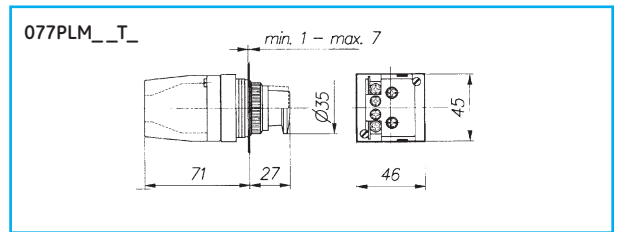
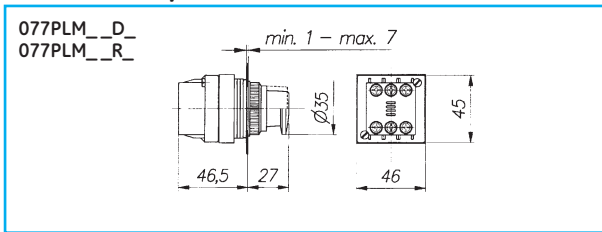
Selector switches



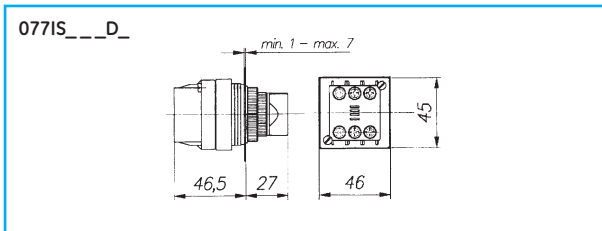
Joysticks



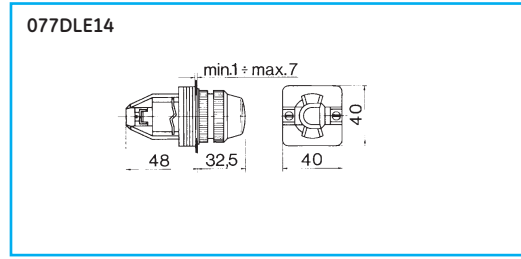
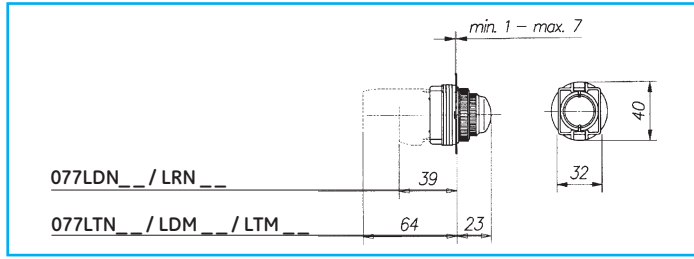
Illuminated push-buttons



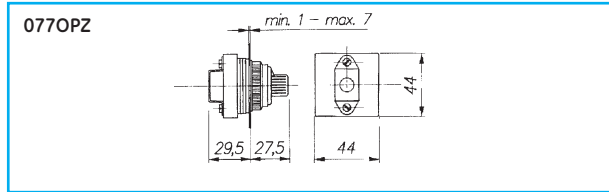
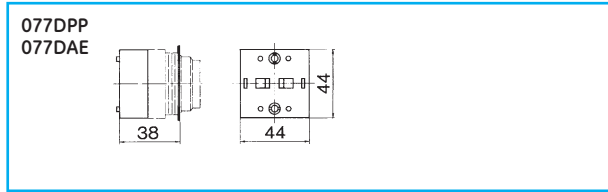
Illuminated selector switches



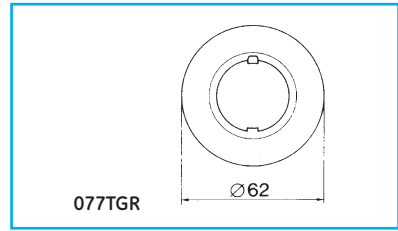
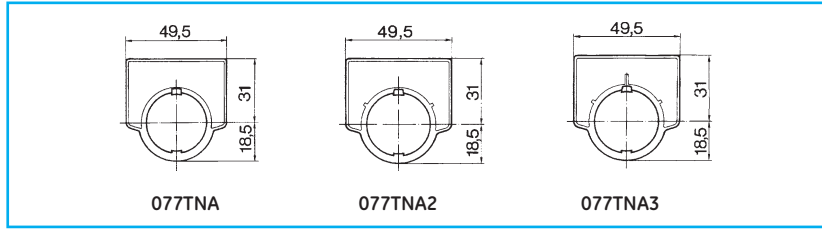
Pilot lights



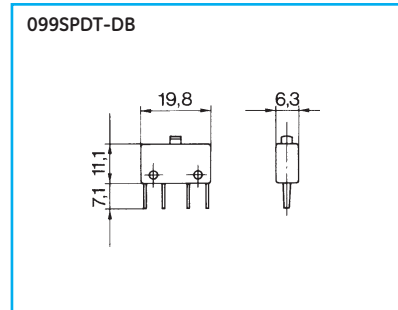
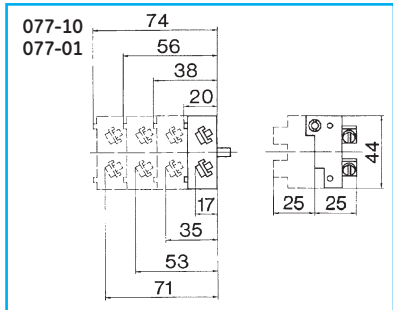
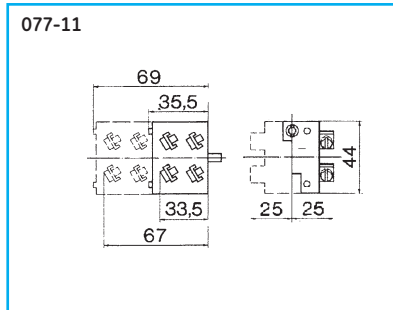
Kits



Nameplates



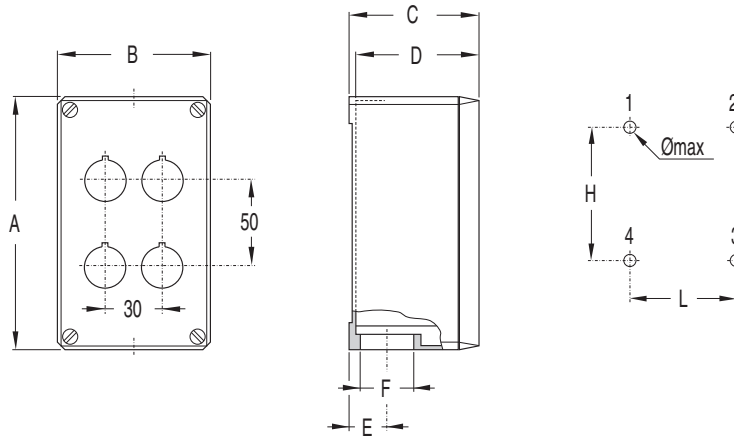
Contact blocks



| |
|----------|
| A |
| B |
| C |
| D |
| E |
| F |
| G |
| H |
| I |
| X |

Dimensional drawings

Aluminium enclosures



| Type | Number of holes $\varnothing 30$ | | Dimensions | | | | | | Fixing templates | |
|------|----------------------------------|-----------|------------|--------|--------|--------|--------|-------|-------------------------------|-----------------------|
| | Vertic. | Horizont. | A (mm) | B (mm) | C (mm) | D (mm) | E (mm) | F | HxLx \varnothing_{max} (mm) | position of the holes |
| 1 | - | - | 87 | 87 | 75 | 72 | 21.5 | PG 21 | 74x55x4 | 1 - 3 |
| 1M | - | - | 87 | 87 | 100 | 97 | 21.5 | PG 21 | 68x55x4 | 1 - 3 |
| 2 | 2 | - | 145 | 87 | 75 | 72 | 21.5 | PG 21 | 132x55x4 | 1 - 3 |
| 2M | 2 | - | 145 | 87 | 100 | 97 | 21.5 | PG 21 | 126x55x4 | 1 - 3 |
| 3 | 3 | - | 195 | 87 | 100 | 97 | 21.5 | PG 21 | 176x55x4 | 1 - 3 |
| 4V | 4 | - | 257 | 92 | 86.5 | 83.5 | 23 | PG 21 | 224x76x6 | 1 - 3 |
| 4 | 2 | 2 | 152 | 152 | 101.5 | 98.5 | 27 | PG 29 | 136x119x6 | 1 - 3 |
| 6 | 2 | 3 | 205 | 230 | 101.5 | 98.5 | 27 | PG 29 | 172x214x6 | 1-2-3-4 |
| 9 | 3 | 3 | 205 | 230 | 101.5 | 98.5 | 27 | PG 29 | 172x214x6 | 1-2-3-4 |
| 12 | 3 | 4 | 257 | 300 | 101.5 | 98.5 | 35 | PG 36 | 221x282x6 | 1-2-3-4 |
| 16 | 4 | 4 | 257 | 300 | 101.5 | 98.5 | 35 | PG 36 | 221x282x6 | 1-2-3-4 |
| 20 | 5 | 4 | 350 | 350 | 123.5 | 106.5 | 41 | PG 36 | 180x180x10 | 1-2-3-4 |
| 25 | 5 | 5 | 350 | 350 | 123.5 | 106.5 | 41 | PG 36 | 180x180x10 | 1-2-3-4 |
| 30 | 6 | 5 | 410 | 410 | 144.5 | 127.5 | 53 | PG 48 | 180x180x10 | 1-2-3-4 |
| 36 | 6 | 6 | 410 | 410 | 144.5 | 127.5 | 53 | PG 48 | 180x180x10 | 1-2-3-4 |

Control and signalling units

A

B

C

D

E

F

G

H

I

X



Notes

Large grid area for notes.

Control and signalling units Ø 30 mm

- A
- B
- C
- D
- E
- F
- G
- H
- I
- X






Light towers

- Outstanding modular concept.
One terminal unit can be combined with **up to seven modular signal units**.
- Steady light units, flashing light units, strobe light units, LED light units.
- The buzzer elements emit a clearly audible dual-tone signal for maximum safety.
- A bayonet mounting, through a simple manual operation, allows a quick and simultaneous method of joining the signal units together and the electrical connection of them.
- Compact dimension Ø70mm.
- IP65 for use in extreme conditions.
- Captive screw cable connectors, located with terminal unit are **easy** to reach and guarantee a quick and neat electrical connection.
- The special design makes maintenance quick, easy and carried out in complete safety and without tools.
- The high quality of materials used to manufacture the lenses ensures the light output is at the **highest luminous** intensity, combined with a sturdy construction and a good resistance to aging.

Marking



Meaning of optical signals

| | Colour | Meaning | Operating state |
|---|----------------|--|--|
|  | Red | Extreme danger Hazardous conditions | Immediate action necessary |
|  | Yellow / Amber | Beware Warning conditions imminent | Abnormal state Monitor or action as necessary |
|  | Green | Normal conditions | No actions required |
|  | Blue | Conditions requiring defined action | Discontinuity Intervention mandatory |
|  | White / Clear | No particular meaning | Other state Can be used as required |

Meaning of audible signals (EN 981, IEC 73)


| | Signal tone | Meaning | Operating state |
|--|-----------------------------|---------|----------------------------|
| | Intermittent modulated tone | Danger | Immediate action necessary |
| | Linear tone | Safety | No actions required |

Light units

NLT1... **Steady light unit**

- With socket BA15D for filament bulbs (7W max.) and LEDs
- Supply voltage: 240V AC/DC
- Current consumption (with 5W lamps):


| 24V | 115V | 240V |
|-------|------|------|
| 210mA | 43mA | 22mA |



NLT2... **Flashing light unit**

- With socket BA15D for filament bulbs (7W max.) and LEDs
- Supply voltage: 24V AC/DC, 115V AC, 240V AC
- Current consumption (with 5W lamps):

| 24V DC | 24V AC | 115V AC | 240V AC |
|--------|--------|---------|---------|
| 130mA | 145mA | 25mA | 15mA |




NLT3... **Strobe light unit**

- Lamp type: 4 Joule xenon lamp
- Supply voltage: 24V AC/DC, 115V AC, 240V AC
- Current consumption:

| 24V DC | 24V AC | 115V AC | 240V AC |
|--------|--------|---------|---------|
| 75mA | 135mA | 20mA | 15mA |

- Flash frequency: 1,4Hz (84 flashes per min.) according with EN 60073



Audio units

NLT73BD **Pulsating tone**

- **Protection degree IP54**
- Tone: pulsating
- Audio frequency: 2900Hz
- Pulsating tone frequency: 0,5Hz according to EN 457
- Sound level at 1 m.: 90 dB (A)
- Supply voltage: 24V AC/DC
- Current consumption: 20mA




NLT75AJ - NLT75AN **Pulsating or constant tone**

- **Protection degree IP54**
- Tone: pulsating or constant
- Audio frequency: 2600Hz according to EN 457
- Pulsating tone frequency: 1Hz according to EN 457
- Sound level at 1 m.: pulsating tone: 95 dB (A) constant tone: 93 dB (A)
- Supply voltage: 115VAC (NLT75AJ) / 240VAC (NLT75AN)
- Current consumption:

| 115VAC | 240VAC |
|--------|--------|
| 40mA | 30mA |

Pulsating or constant tone, adjustable by removing or inserting bridge JP1 in the printed circuit.



NLT75BD **Modulated tone**


- **Protection degree IP54**
- Audio frequency: 2500 - 2800Hz according to EN 457
- Sound level at 1 m.: max. 90 dB (A)
- Supply voltage: 24V AC/DC
- Current consumption: 40mA

16 sounds can be selected by means of the dip switch



NLT77BD **Pulsating tone**

- **Protection degree IP65**
- Audio frequency: 1200 - 2600Hz according to EN 457
- Sound level at 1 m.: max. 84 dB (A)
- Supply voltage: 24V AC/DC
- Current consumption: 40mA




NLT77AJ - NLT77AN **Pulsating or constant tone**

- **Protection degree IP65**
- Tone: pulsating or constant
- Audio frequency: 2600Hz according to EN 457
- Pulsating tone frequency: 1Hz according to EN 457
- Sound level at 1 m.: pulsating tone: 78 dB (A) constant tone: 75 dB (A)
- Supply voltage: 115VAC (NLT77AJ) / 240VAC (NLT77AN)
- Current consumption:

| 115VAC | 240VAC |
|--------|--------|
| 40mA | 30mA |

Pulsating or constant tone, adjustable by removing or inserting bridge JP1 in the printed circuit.



Light towers

A

B

C

D

E

F

G

H

I

X

Light units

Control and signalling units

A

B

C

D

E

F

G

H




I

X

| | Supply voltage | Red | | Amber | | Yellow | | Green | | Blue | | Clear | |
|--|----------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|---------------|
| | | Cat. no. | Ref. no. | Cat. no. | Ref. no. | Cat. no. | Ref. no. | Cat. no. | Ref. no. | Cat. no. | Ref. no. | Cat. no. | Ref. no. Pack |
| Steady light units (bulb not included)  | 12...240V | NLT1R | 222230 | NLT1A | 222231 | NLT1G | 222232 | NLT1V | 222233 | NLT1L | 222234 | NLT1I | 222235 1 |
| Flashing light units (bulb BA15D filament) (bulb included)  | 24V AC/DC | NLT2BDR | 222236 | NLT2BDA | 222237 | NLT2BDG | 222238 | NLT2BDV | 222239 | NLT2BDL | 222240 | NLT2BDI | 222241 1 |
| | 115V AC | NLT2AJR | 222242 | NLT2AJA | 222243 | NLT2AJG | 222244 | NLT2AJV | 222245 | NLT2AJL | 222246 | NLT2AJI | 222247 1 |
| | 240V AC | NLT2ANR | 222248 | NLT2ANA | 222249 | NLT2ANG | 222250 | NLT2ANV | 222251 | NLT2ANL | 222252 | NLT2ANI | 222253 1 |
| Flashing light units (bulb LED) (bulb included)  | 24V AC/DC | NLT2BDLR | 222289 | NLT2BDLA | 222290 | NLT2BDLG | 222291 | NLT2BDLV | 222292 | NLT2BDLL | 222293 | NLT2BDLI | 222294 1 |
| | 115V AC | NLT2AJLR | 222295 | NLT2AJLA | 222296 | NLT2AJLG | 222297 | NLT2AJLV | 222298 | NLT2AJLL | 222299 | NLT2AJLI | 242464 1 |
| | 240V AC | NLT2ANLR | 222301 | NLT2ANLA | 222302 | NLT2ANLG | 222303 | NLT2ANLV | 222304 | NLT2ANLL | 222305 | NLT2ANLI | 222306 1 |
| Strobe light units (bulb included)  | 24V AC/DC | NLT3BDR | 222254 | NLT3BDA | 222255 | NLT3BDG | 222256 | NLT3BDV | 222257 | NLT3BDL | 222258 | NLT3BDI | 222259 1 |
| | 115V AC | NLT3AJR | 222260 | NLT3AJA | 222261 | NLT3AJG | 222262 | NLT3AJV | 222263 | NLT3AJL | 222264 | NLT3AJI | 222265 1 |
| | 240V AC | NLT3ANR | 222266 | NLT3ANA | 222267 | NLT3ANG | 222268 | NLT3ANV | 222269 | NLT3ANL | 222270 | NLT3ANI | 222271 1 |




Audio units


| | Protection degree | Supply voltage | Cat. no. | Ref. no. | Pack |
|--|-------------------|----------------|----------|----------|------|
|  Pulsating tone | IP54 | 24V AC/DC | NLT73BD | 222278 | 1 |
| | IP65 | 24V AC/DC | NLT77BD | 222279 | 1 |
|  Pulsating or constant tone Adjustable by removing or inserting bridge JP1 in the printed circuit | IP54 | 115V AC | NLT75AJ | 222287 | 1 |
| | | 240V AC | NLT75AN | 222288 | 1 |
| | IP65 | 115V AC | NLT77AJ | 222280 | 1 |
| | | 240V AC | NLT77AN | 222281 | 1 |
|  Modulated tone 16 sounds can be selected by means of dip switch | IP54 | 24V AC/DC | NLT75BD | 222286 | 1 |

The audio units can only be mounted as final top unit (top cover included)


Bulbs

| | Supply voltage | Red | | Amber | | Yellow | | Green | | Blue | | White | | Pack | | | |
|--|----------------|------------|----------|------------|----------|------------|----------|------------|----------|------------|----------|------------|-----------|----------|-----------|--------|---|
| | | Cat. no. | Ref. no. | Cat. no. | Ref. no. | Cat. no. | Ref. no. | Cat. no. | Ref. no. | Cat. no. | Ref. no. | Cat. no. | Ref. no. | | | | |
|  LED - BA15D | 24V AC/DC | BA15D24LR | 222330 | BA15D24LA | 222331 | BA15D24LG | 222332 | BA15D24LV | 222333 | BA15D24LL | 222334 | BA15D24LB | 222335 | 1 | | | |
| | 115V AC | BA15D115LR | 222336 | BA15D115LA | 222337 | BA15D115LG | 222338 | BA15D115LV | 222339 | BA15D115LL | 222340 | BA15D115LB | 222341 | 1 | | | |
| | 240V AC | BA15D230LR | 222342 | BA15D230LA | 222343 | BA15D230LG | 222344 | BA15D230LV | 222345 | BA15D230LL | 222346 | BA15D230LB | 222347 | 1 | | | |
| Incandescent BA15D | Supply voltage | | | | | | | | | | | | | Clear | | | |
| | | | | | | | | | | | | | | Cat. no. | Ref. no. | Pack | |
| | | 12V | | | | | | | | | | | | | BA15D125 | 222348 | 5 |
| | | 24V | | | | | | | | | | | | | BA15D245 | 222349 | 5 |
| | | 30V | | | | | | | | | | | | | BA15D305 | 222350 | 5 |
| | | 115V | | | | | | | | | | | | | BA15D1155 | 222351 | 5 |
| 240V | | | | | | | | | | | | | BA15D2305 | 222352 | 5 | | |

Terminal

| | Cat. no. | Ref. no. | Pack |
|---|----------|----------|------|
|  Terminal unit with top cover | NLT9TC | 222282 | 1 |

Base with tube

| | Cat. no. | Ref. no. | Pack |
|---|----------|----------|------|
|  Base + tube height 100mm | NLT5BT | 222284 | 1 |
| Base + tube height 100mm, 90° fixing | NLT90BT | 222307 | 1 |
| Tube height extension 100mm | NLT5ET | 222285 | 1 |

A

B

C

D

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X

Series NLT

Control and signalling units

A

B

C

D

E

F

G

H

I

X

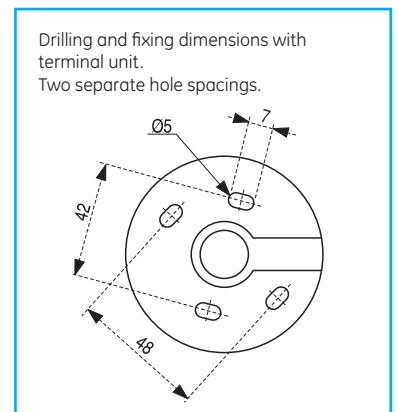
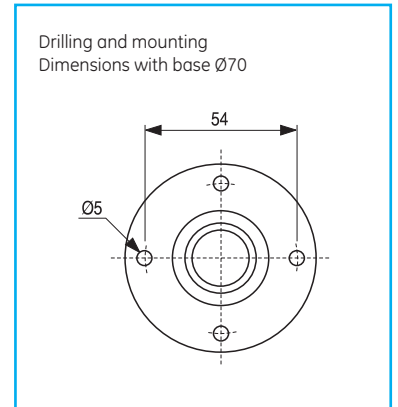
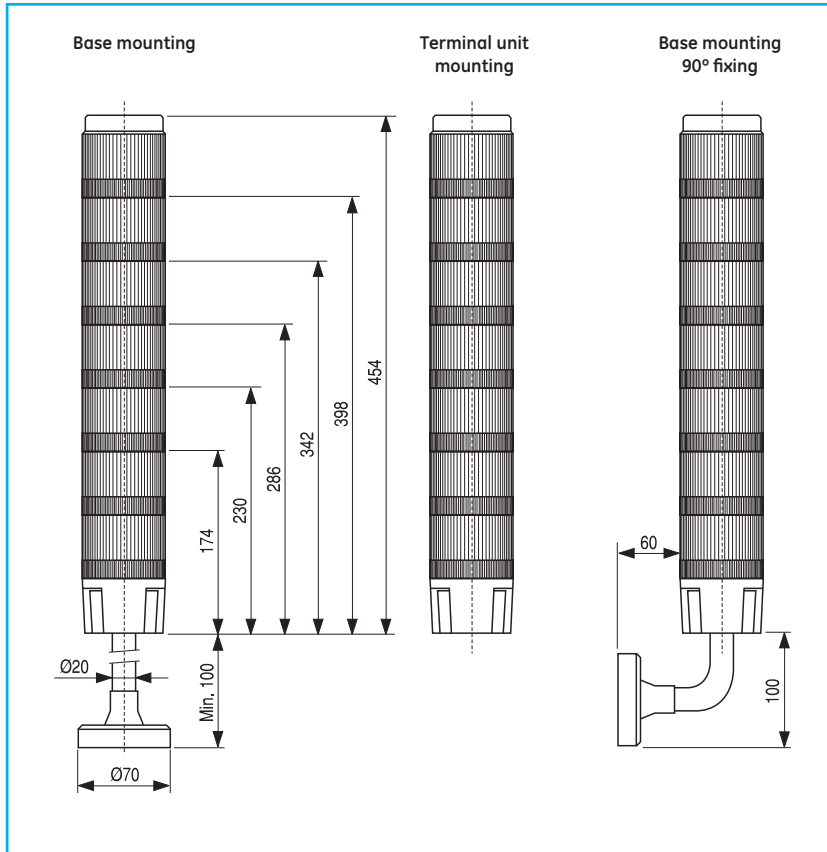
Technical data

| | |
|--|---|
| Conformity to standards | EEC regulation 89/336 electromagnetic compatibility EEC regulation 73/23 low voltage, including amendment EEC 93/68 All NLT range are made and tested in full compliance with: EN 60947-5-14 (VDE 0470, IEC 60947) CE, cUL US |
| Materials | Polycarbonate Visual and audio signal units, terminal unit, top cover, base and extension tubes |
| Rated insulated voltage | 250V max. |
| Operating temperature | -20°C ... +60°C (except version with bulb 12V = 40°C) |
| Protection degree (according to EN 60529) | IP65 (IP54 for audio units types NLT73xx and NLT75xx) (indicators must be correctly assembled with top cover, gasket or PG conduit fitting) |
| Colours (according to EN 60073) | Amber, Blue, Yellow, Clear, Red and Green |
| Lamp type | Steady/flashing units: Bayonet type BA15D socket: filament (7W max.) or LED Strobe units: Xenon lamps |
| Nr. of combined units | Up to 7 modular units |
| Connection | Captive screw cable connectors (max. cable size 1.5mm ²) inside terminal sleeve «C» is common to all signal units. |
| Connection identification code | They are numbered 1/7 from base to top |

Mechanical characteristics

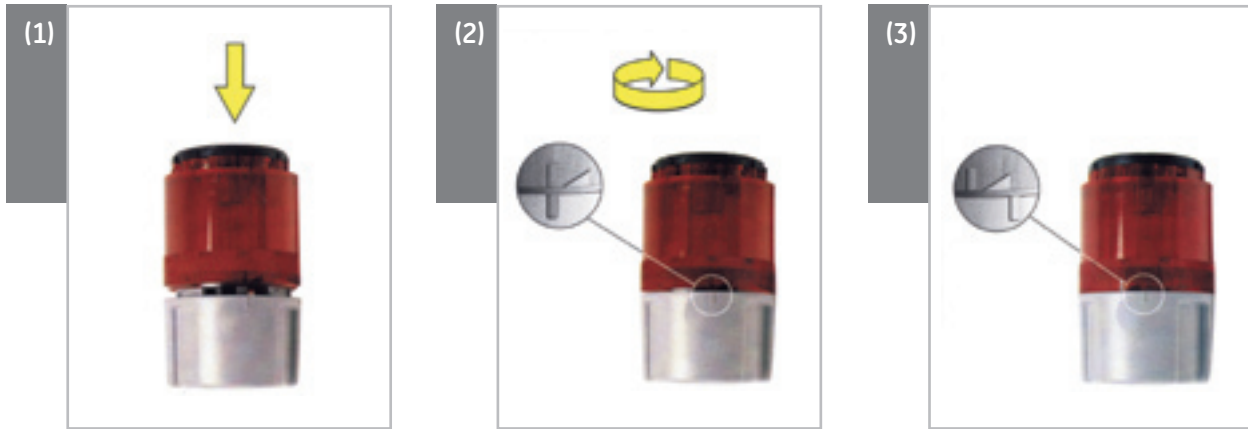
| | |
|--------------------------|--|
| Mounting of the units | |
| Average torque | 2.4Nm |
| Unfastening of the units | |
| Average torque | 2.3Nm |
| Vibration resistance | 2g min. (10-150Hz) according to IEC 68-2-6 |
| Mounting | Direct through terminal unit or with base and tube |

Dimensions



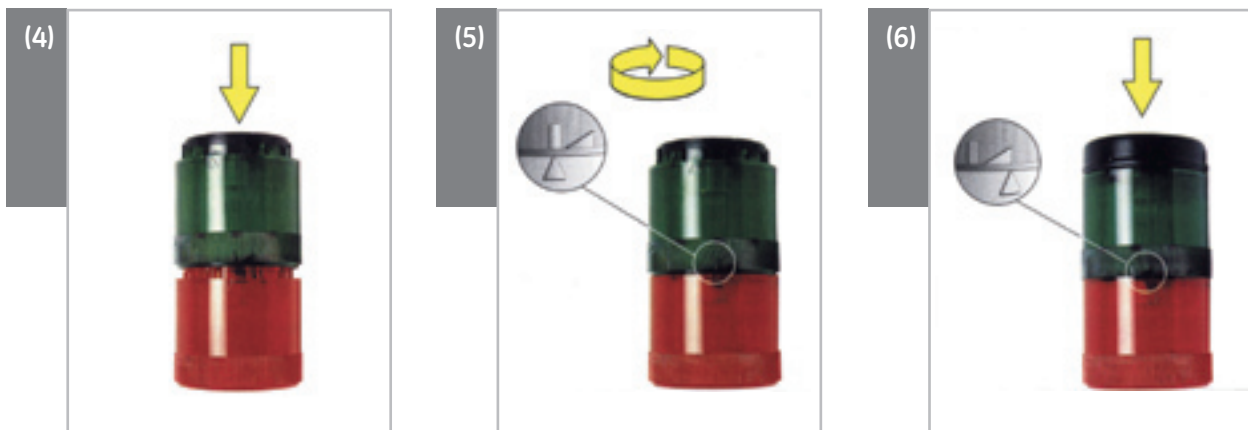
Modular system

Place signal beacon unit onto terminal unit **(1)** align guide marks and twist clockwise till they are locked **(2) + (3)**

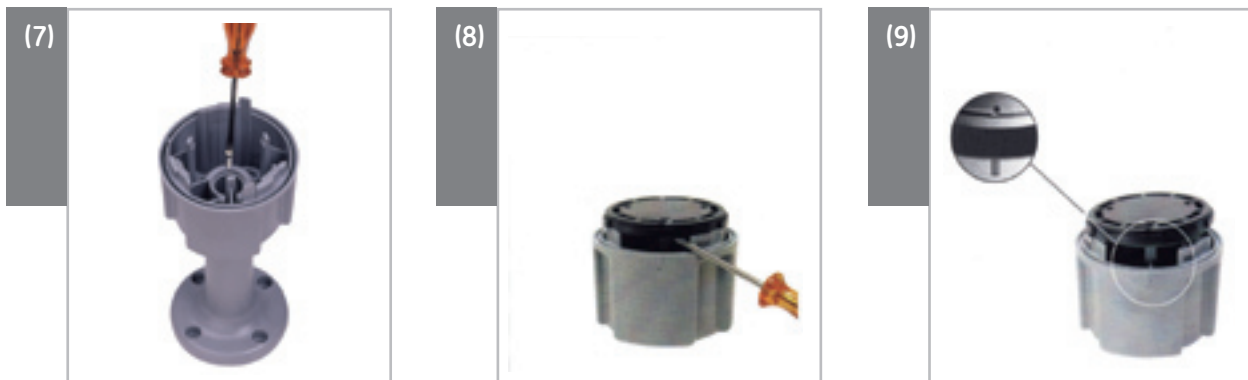


Follow the same steps to add more signal units **(4) + (5) + (6)**

The audible element can be mounted as final top unit, as it is complete with a top cover.



To fix extension tube (base always included), insert it into opening on the underside of the terminal unit and tighten screw on the side **(7)**. To reach the screw cable clamp terminals, remove black disc first, prising with a small screwdriver **(8)**. Connect to terminals (coloured units are numbered from base to top). To place terminal back into position, align the guiding marks **(9)** and press inwards.



Light towers

A

B

C

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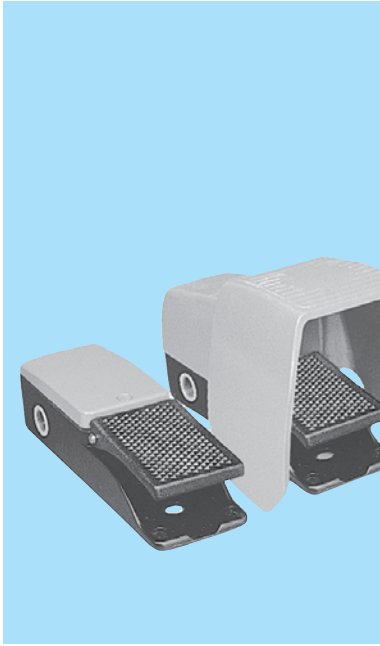
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Foot switches

General

Foot switches, for intensive services suitable for controlling and monitoring of low voltage AC and DC electrical circuits.

Climatic protections

The standard versions are suitable for use in the following climates:

- Temperate climate cat. 23/50 (DIN 50014)
- Wet climate cat. 23/83 (DIN 50015)
- Hot wet climate cat. 40/92 (DIN 50015)
- Variable wet climate cat. FW 24 (DIN 50016)

Standards

IEC 947-5-1, CEI EN 60947.5.1
VDE 0660

Approvals


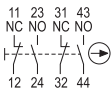

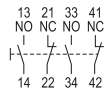

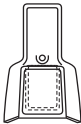
CSA, UL

Specifications

| | | | | | | | | |
|--|---|------------------------|----|-----|-----|-----|-----|--|
| Temperature ranges | Operation | from -30°C up to +80°C | | | | | | |
| | Storage | from -30°C up to +80°C | | | | | | |
| Degree of protection (according to IEC 529) | IP 65 | | | | | | | |
| Vibration resistance | 20g (10 up to 55Hz) | | | | | | | |
| Mechanical endurance | 2 × 10 ⁷ for all the types | | | | | | | |
| Electrical | | | | | | | | |
| Rated insulation voltage according to EN 60947.1 | 500V | | | | | | | |
| Insulation class according to VDE 0110 | Group C | | | | | | | |
| Electric shock protection according to IEC 536 | Class I | | | | | | | |
| Short-circuit prot. according to IEC 269.1 and 269.3 | 10A gL fuses | | | | | | | |
| Electrical performances of the contact blocks | | | | | | | | |
| Rated thermal current (I _{th}) | 10A | | | | | | | |
| Performances according to EN 60947.5.1 | | | | | | | | |
| Slow motion contacts Category AC 15 | Voltage | Ue (V) | 24 | 48 | 110 | 220 | 380 | |
| | Current | Ie (A) | 6 | 6 | 6 | 6 | 4 | |
| Snap action contacts Category AC 15 | Voltage | Ue (V) | 24 | 48 | 110 | 220 | 380 | |
| | Current | Ie (A) | 6 | 6 | 6 | 5 | 4 | |
| Category DC 13 | Voltage | Ue (V) | 24 | 48 | 110 | 220 | | |
| | Current | Ie (A) | 1 | 0,8 | 0,7 | 0,3 | | |
| Connection | Same polarity for both slow motion and snap action contacts | | | | | | | |
| Cables entries | IPA1, IPA2, IPB1, IPB2 | 1 × M20 | | | | | | |
| | IPA1-P | 2 × M20 | | | | | | |

Order codes ● pg. E.67
Dimensional drawings ● pg. E.73

Foot switches - Contact combinations (per pedal)

| | | Slow break | | | | Snap action | | | | | | |
|---|--|---|---|--|---|-------------|-------------------|----------|-------------------|-------------------|--------|---|
| | |  |  |  |  | | | | | | | |
| | | Function (1) | Cat. no | Ref. no. | Cat. no | Ref. no. | Cat. no | Ref. no. | Cat. no | Ref. no. | Pack | |
|  | ONE pedal Without guard | N | IPA1-N211B | 132170 | | | IPA1-N411B | 132198 | IPA1-N422B | 132213 | 1 | |
| | | P(2) | IPA1-P211B | 132171 | | | - | - | - | - | 1 | |
| | | D | - | | | | | | | IPA1-D422B | 132214 | 1 |
|  | ONE pedal With guard | N | IPB1-N211B | 132172 | IPB1-N222B | 132186 | IPB1-N411B | 132201 | IPB1-N422B | 132215 | 1 | |
| | | P(2) | IPB1-P211B | 132173 | - | - | - | - | - | - | 1 | |
| | | D | - | | | | | | | IPB1-D422B | 132216 | 1 |
| | | R | - | | | | IPB1-R411B | 132203 | - | - | 1 | |
| | ONE pedal With guard Heavy duty | N | IPA2-N211B | 132182 | | | | | | | 1 | |
| Spare microswitches | | | N211B | 116113 | N222B | 116664 | N411B | 116663 | N422B | 116665 | 1 | |

- (1) **Function N**
Normal operation. When the pedal is pressed the contacts change position. When released they return to their position.
- Function P**
Press-on press-off operation. The position of the contacts changes each time the pedal is pressed.
- Function D**
Two-stage operation. Used with two contacts blocks. When the pedal is pressed to the first point, the contacts of the first block switch; when pressed as far as the second point the contacts of the second block switch and the first block stays in the same position.
- Function R**
Normal operation with potentiometer. When the pedal is pressed, the contacts change position at the same time as the potentiometer is operated. When released, the contacts and potentiometer return to their initial position.

 Positive opening.

(2) Version with function P do not correspond to the concept of positive opening.

Foot switches

A

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Approvals



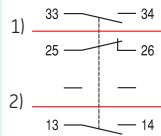
Features

Enclosed in metal with aluminium protection cover, safety latch function "OFF-ON-OFF" with manual reset.

Technical data

Switching diagram

- 1) Trigger point
- 2) Latched position

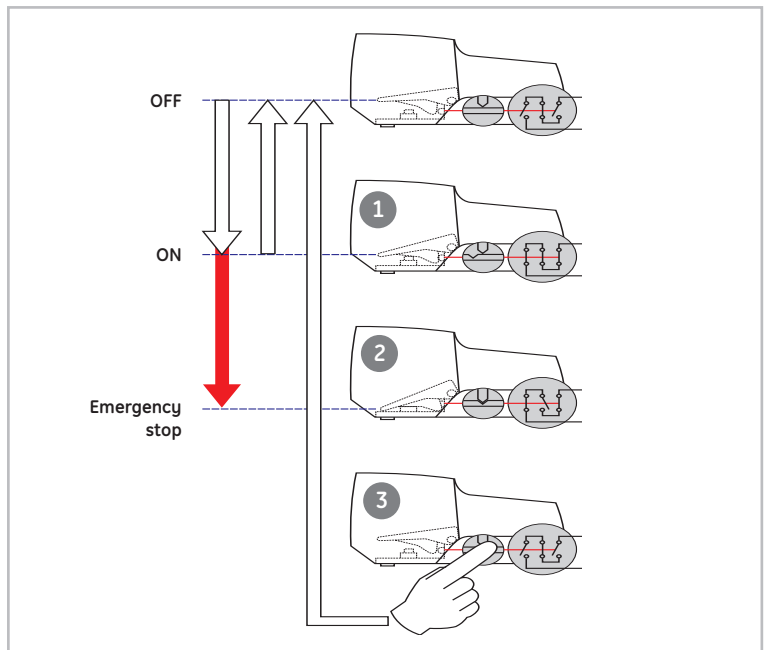


| | |
|--------------------------------------|------------------|
| Rated insulation voltage U_i | max. 400VAC |
| Thermal continuous current I_{the} | max. 10A |
| Switching frequency | max. 50/min. |
| Mechanical operational life | 10×10^6 |
| number of switching cycles | |
| Ambient temperature | -30°C to +80°C |
| Cable conduits | (3x) M20x1.5 |
| Protection degree | IP65 |
| Actuating force (approx.) | 10N |
| Trigger point | 200N |
| Weight | 1.5 kg |

Safety foot switches

Operation

- 1) **Pedal operation up to the trigger point**
 The operating contact is closed, the operating process is started
- 2) **Operation past the trigger point in emergency cases**
 The operating contact is opened and latched and the process is stopped. Also if the device is unused, the latch remains in the off-position in this phase. Uncontrolled restart is prevented
- 3) **Reset function**
 Only after the danger has passed can the contacts be manually unlatched (push-button on the side). The operating process can now be restarted by pushing the pedal up to the triggering point.



Order codes

| | Cat. no. | Ref. no. | Pack |
|--|----------|----------|------|
| - According to standards: EN 60947-1 / IEC 60947-5-1 | IPSF1 | 223000 | 1 |
| - Slow-action contact | | | |
| - Snap-action contact | | | |
| - Trigger point | | | |
| - Latch function | | | |
| - Making current according to EN/IEC 60947-5-1 AC15/240V/3A | | | |

Dimensions ● pg. E.73



A

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Signalling devices

General

Series 105 signalling units are used to indicate the electric equipment power supply conditions.

For this purpose the devices shall be wired after the main disconnecting switch and clearly in view when the cabinet's doors are opened.

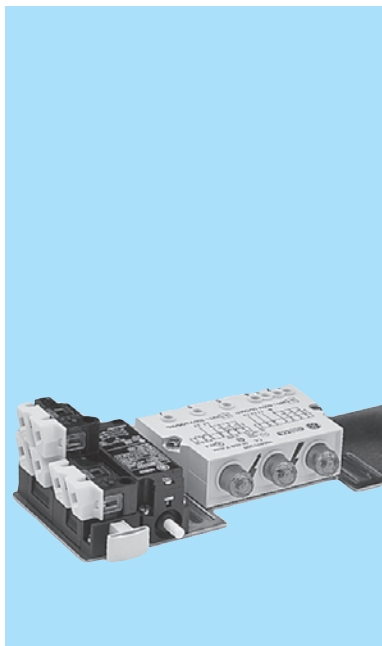
Series 105 DTL devices can be used on three-phase lines with or without the neutral wire or single-phase power lines, indicating the hazardous condition due to the applied voltage.

Three luminous red lamps are used. The flashing devices are normally used in combination with limit switches contacts NC type 114FCT03 that provides insertion when the cabinet door are open only.

Climatic protection

The standard versions are suitable for use in the following climates:

- Temperate climate cat. 23/50 (DIN 50014)
- Wet climate cat. 23/83 (DIN 50015)
- Hot wet climate cat. 40/92 (DIN 50015)
- Variable wet climate cat. FW 24 (DIN 50016)



Standards

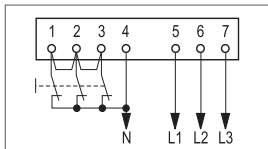
CEI, IEC, VDE, BSI and UTE

Approvals

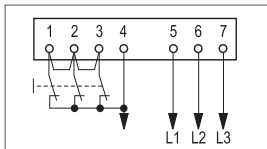
UL, CSA, CE

Suggested connections

Indicates the presence of 3, 2 or 1 phase only by means of the relative lamp.

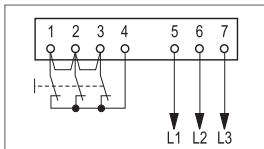


3-phase line with insulated neutral



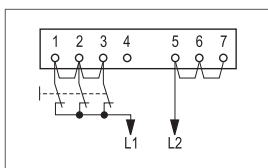
3-phase line with grounded neutral

Indicates the presence of 3 or 2 phases by means of the relative lamp. One phase only is not indicated (all lamps OFF)

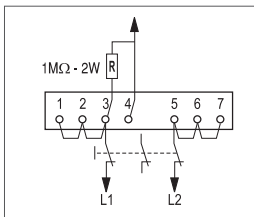


3-phase line without neutral

Indicates both phases with 3 lamps ON at same time. One phase only is not indicated (all lamps OFF)



Single-phase line (general diagram)



Single phase-line (alternative diagram)

1. Phase to phase connection on a 3 phase line with grounded neutral. Indicates the presence of 2-phases or 1 only with the 3 lamps ON at the same time.
2. Phase to neutral connection on a 3 phase line with grounded neutral or phase to phase by a matching transformer with one phase grounded. Indicates the presence of the ungrounded phase with the 3 lamps ON at the same time. No indication occur if the ungrounded phase is missing (all lamps OFF).

Specifications

| | | |
|---|-----------|---|
| Temperature ranges | Operation | from -25°C up to +70°C |
| | Storage | from -40°C up to +70°C |
| Degree of protection (according to IEC 529) | | IP 20 |
| Electrical | | |
| Rated insulation voltage according to EN 60947.1 | | 690V |
| Impulse withstand voltage according to EN 60947.1 | | 4kV |
| Electrical input | | 2mA max. |
| Connections | | Terminal strip with numbered terminals, accessible from outside |
| | | protected against accidental contacts according to DIN 57106 and IP 20 according to IEC 529 |
| Clamping capacity | | Maximum one flexible conductor 12 AWG (3.3mm ²) |

Order codes ● pg. E.70
Dimensional drawings ● pg. E.72



Flashing devices



| Supply voltage | | Cat. no | Ref. no. | Pack |
|-----------------------|------------------------|-----------|----------|------|
| Three-phase (50-60Hz) | Single-phase (50/60Hz) | | | |
| 220V | 110-127V | 105DTL220 | 132230 | 1 |
| 380-600V | 220-350V | 105DTL500 | 132231 | 1 |
| 690V | | 105DTL690 | 132232 | 1 |

3 pole limit switch for device control



| Protection degree | Cables entry | Operation force | Contacts | Cat. no | Ref. no. | Pack |
|-------------------|--------------|-----------------|----------|-----------|----------|------|
| IP40 | PG11 | 8.5 N min. | 3NC | 114FCT03 | 130320 | 25 |
| IP65 | PG11 | 8.5 N min. | 3NC | 114FCT03T | 130321 | 25 |

Paralell bridge for 3 poles limit switches



| Cat. no | Ref. no. | Pack |
|---------|----------|------|
| 105 PT | 132234 | 50x5 |

Single door protection unit



The unit includes the following components:

- one flashing device 105DTL220 or 105DTL500.
- one 3-pole limit switch 114FCT03 for connection of the flashing device
- one electrical interlock device and panel light 105GIL or 105GIL10.
- one mounting plate 105PM on which are fitted on the above devices.

If two doors have to be protected (as double enclosure closing on the middle) the mounting plate shall be fitted also one limit switch 114FCT03 and one device 105GIL or 105GIL10.

Approvals:

UL (USA) - CSA (Canada)

| Supply voltage | | | Cat. no | Ref. no. | Pack |
|-----------------------|------------------------|-------------------|-------------|----------|------|
| Three-phase (50-60Hz) | Single-phase (50/60Hz) | Tripping coil | | | |
| 220V | 110-127V | Shunt trip | 105GP1P220 | 132250 | 1 |
| 220V | 110-127V | Undervoltage trip | 105GP1P220M | 132251 | 1 |
| 380-600V | 220-350V | Shunt trip | 105GP1P500 | 132252 | 1 |
| 380-600V | 220-350V | Undervoltage trip | 105GP1P500M | 132253 | 1 |

Electrical interlock device and cubicle lighting ⁽¹⁾

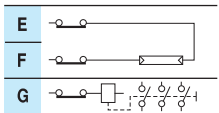
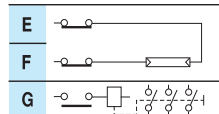


The switch can be directly driven by the enclosure door.
 If several doors are employed, one switch per door shall be used.
 When properly connected, the following functions are provided:

- Position 1 (pushed) door closed: light OFF, tripping coil of main switch unpowered (normal equipment operation)
- Position 2. (free) door opening: light ON, tripping coil of main switch powered (equipment shall cut-out automatically).
- Position 3 (pulled) door open: light ON, tripping coil of main switch unpowered (adjustment on the equipment of dry checks). When door is closed again, the switch revert automatically from position 2 or 3 to position 1.

Terminals have IP2X protection degree according to IEC/EN 60529

Approvals: UL (U.S.A.) - CSA (Canada)

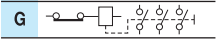
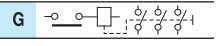
| Tripping coil | | Cat. no | Ref. no. | Pack | | | | | | | | | | | | | | | | |
|-------------------|---|-------------------|----------|------|---|----------|---|---|---|----------|---|---|---|----------|---|---|---|---|--|--|
| Shunt trip | | 105 GIL | 132240 | 1 | | | | | | | | | | | | | | | | |
| | <table border="1"> <thead> <tr> <th></th> <th>1</th> <th>2</th> <th>3</th> </tr> </thead> <tbody> <tr> <td>E</td> <td>○</td> <td>○</td> <td>○</td> </tr> <tr> <td>F</td> <td>○</td> <td>○</td> <td>○</td> </tr> <tr> <td>G</td> <td>○</td> <td>○</td> <td>○</td> </tr> </tbody> </table> | | 1 | 2 | 3 | E | ○ | ○ | ○ | F | ○ | ○ | ○ | G | ○ | ○ | ○ |  | | |
| | 1 | 2 | 3 | | | | | | | | | | | | | | | | | |
| E | ○ | ○ | ○ | | | | | | | | | | | | | | | | | |
| F | ○ | ○ | ○ | | | | | | | | | | | | | | | | | |
| G | ○ | ○ | ○ | | | | | | | | | | | | | | | | | |
| Undervoltage trip | | 105 GIL 10 | 132241 | 1 | | | | | | | | | | | | | | | | |
| | <table border="1"> <thead> <tr> <th></th> <th>1</th> <th>2</th> <th>3</th> </tr> </thead> <tbody> <tr> <td>E</td> <td>○</td> <td>○</td> <td>○</td> </tr> <tr> <td>F</td> <td>○</td> <td>○</td> <td>○</td> </tr> <tr> <td>G</td> <td>○</td> <td>○</td> <td>○</td> </tr> </tbody> </table> | | 1 | 2 | 3 | E | ○ | ○ | ○ | F | ○ | ○ | ○ | G | ○ | ○ | ○ |  | | |
| | 1 | 2 | 3 | | | | | | | | | | | | | | | | | |
| E | ○ | ○ | ○ | | | | | | | | | | | | | | | | | |
| F | ○ | ○ | ○ | | | | | | | | | | | | | | | | | |
| G | ○ | ○ | ○ | | | | | | | | | | | | | | | | | |

Electrical interlock device ⁽¹⁾



The switch is directly driven by the enclosure door.
 If several doors are employed, one switch per door is needed.
 When properly connected, the same functions of devices above shall be provided but without enclosure control light.

Terminals have IP2X protection degree according to IEC 529

| Tripping coil | | Cat. no | Ref. no. | Pack | | | | | | | | |
|-------------------|---|------------------|----------|------|---|----------|---|---|---|--|--|--|
| Shunt trip | | 105 CI | 132242 | 1 | | | | | | | | |
| | <table border="1"> <thead> <tr> <th></th> <th>1</th> <th>2</th> <th>3</th> </tr> </thead> <tbody> <tr> <td>G</td> <td>○</td> <td>○</td> <td>○</td> </tr> </tbody> </table> | | 1 | 2 | 3 | G | ○ | ○ | ○ |  | | |
| | 1 | 2 | 3 | | | | | | | | | |
| G | ○ | ○ | ○ | | | | | | | | | |
| Undervoltage trip | | 105 CI 10 | 132243 | 1 | | | | | | | | |
| | <table border="1"> <thead> <tr> <th></th> <th>1</th> <th>2</th> <th>3</th> </tr> </thead> <tbody> <tr> <td>G</td> <td>○</td> <td>○</td> <td>○</td> </tr> </tbody> </table> | | 1 | 2 | 3 | G | ○ | ○ | ○ |  | | |
| | 1 | 2 | 3 | | | | | | | | | |
| G | ○ | ○ | ○ | | | | | | | | | |

Mounting plate



| | Cat. no | Ref. no. | Pack |
|--|---------------|----------|------|
| | 105 PM | 132244 | 1 |

(1) For electrical performance and features of contact blocks please see E.42

A

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Series 105

Control and signalling units

A

B

C

D

E

F

G

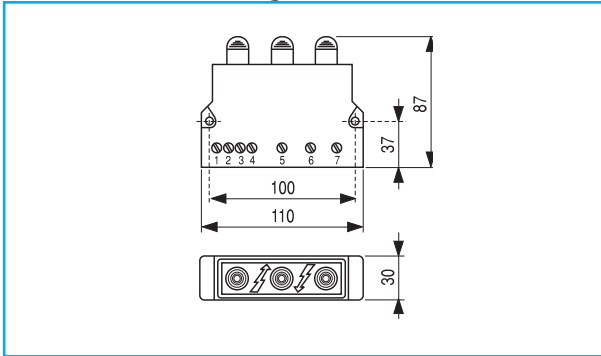
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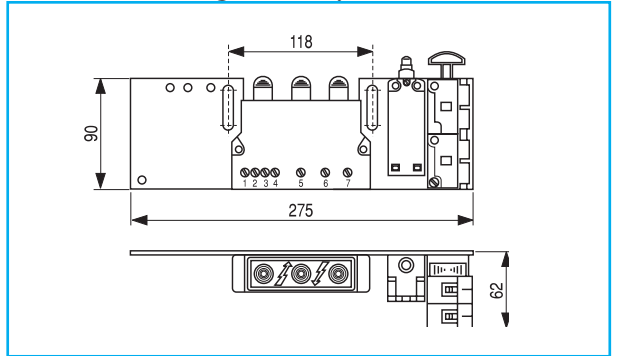
X

Dimensional drawings

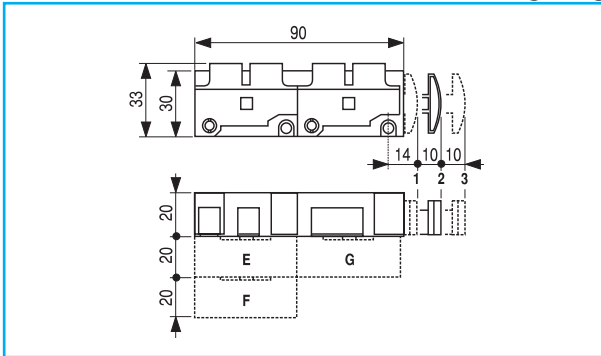
Series 105 - Flashing devices



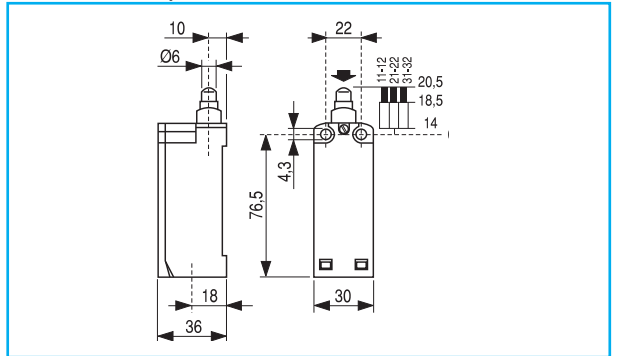
Series 105 - Single door protection unit



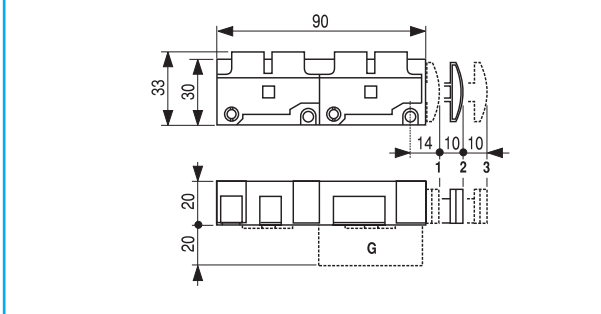
Series 105 - Electrical interlock and cubicle lighting



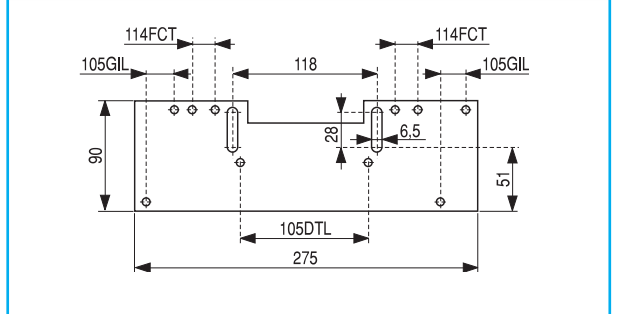
Series 105 - 3 pole limit switch for device control



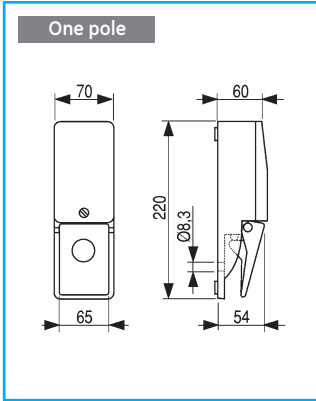
Series 105 - Electrical interlock device



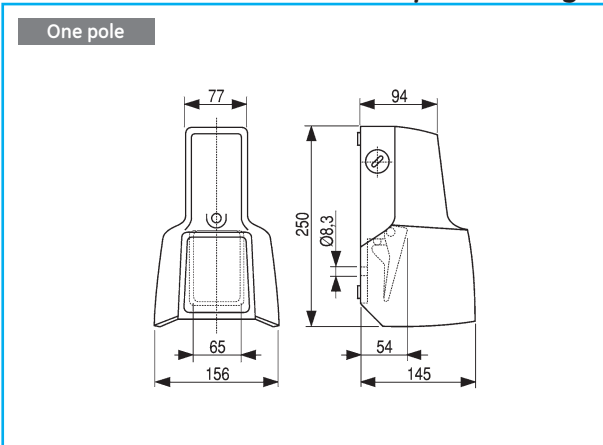
Series 105 - Mounting plate



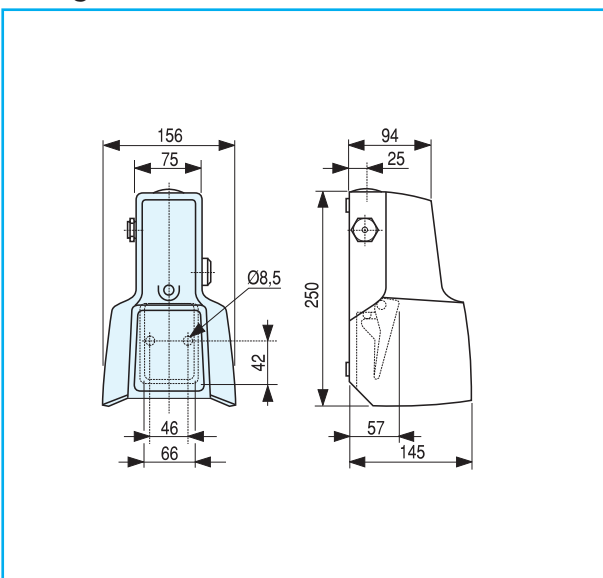
Series IP - Foot switches without protective guard



Series IP - Foot switches with protective guard



Safety foot switches



Foot switches

| |
|---|
| A |
| B |
| C |
| D |
| E |
| F |
| G |
| H |
| I |
| X |

Everything is

Order codes

F.3 Series NMV
Multivoltage electronic timers. 22.5mm module

F.4 Series D
Single voltage electronic timers. 45mm module

F.4 Liquid level detectors relay

F.4 Earth leakage relays

F.5 Protection relays

F.6 Detection relays

F.6 Control and protection relays

Technical data

F.7 Series NMV

F.11 Series D

Dimensions

F.20 Series NMV and D

Plug-in relays and Auxiliary contactors

Motor protection devices

Contactors and Thermal overload relays

Motorstarters

Control and signalling units

Electronic relays

Limit switches

Speed drive units

Main switches

Numerical index

A

B

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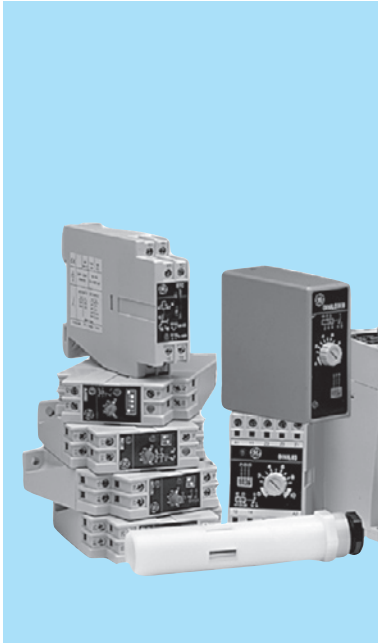
X

under control



Series NMV, D

Electronic relays



Series NMV Multivoltage
22.5mm module

Series D Single voltage
45mm module






Standards

| | | |
|----------|------------------|------------------|
| VDE 0106 | CSA C 22.2 Nr.14 | UNE 20-119 |
| VDE 0110 | UL 94 | IEC/EN 60947-5-1 |
| EN 50002 | UL 508 | IEC/EN 61812-1 |
| EN 50042 | IEC 255.5 | CE |
| | | CUL |

Range overview

| | 22.5mm module | | 45mm module | |
|--|----------------------------|-------|----------------------------|-----|
| | Series NMV Multivoltage | | Series D Single voltage | |
| Delay | | Pg. | Pg. | Pg. |
| Delayed ON | NMTCV | F.3 | | |
| OFF delay | NMRDV | F.3 | | |
| | | NMMFV | F.5 | |
| Star-delta starter | NMETV | F.3 | | |
| Multifunction | NMMFV | F.3 | | |
| Impulse | | | NMMFV | F.5 |
| Delayed ON | | | NMMFV | F.5 |
| ON delay with auxiliary contact | NMMFV | F.3 | | |
| OFF delay with auxiliary contact | NMMFV | F.3 | | |
| ON + OFF with auxiliary contact | NMMFV | F.3 | | |
| Intermittence | | | | |
| Symmetric intermittence | | | | |
| Asymmetric intermittence | NMIVV | F.3 | | |
| Control | | | | |
| Motor re-start control relay | | | RCRT6 | F.4 |
| Detectors | | | | |
| Liquid level detector relay | | | DINIL | F.4 |
| Voltage detector relay | | | RDT | F.6 |
| Current detector relay with delay | | | RDIT | F.6 |
| Relay | | | | |
| Differential earth leakage | | | RDHT/A | F.4 |
| Thermistor relay | | | RS01N | F.6 |
| Frequency control relay | | | RCF | F.6 |
| Protection (three-phase lines) | | | | |
| Integral protection relay for 3-Phase lines | | | RDF1 | F.5 |
| Phase sequence | | | RSF | F.5 |
| Phase sequence and phase failure | | | RSFF | F.5 |
| Maximum and minimum voltage | | | RTMM | F.5 |
| Protection (single-phase lines) | | | | |
| Maximum and minimum voltage | | | RMM | F.5 |

Multivoltage electronic timers - 22.5mm module

| | Supply voltage | Time range | Available contacts | Cat. no. | Ref. no. | Pack | |
|--|---|-------------------|---|----------------------------------|----------|------|--|
|  Delayed ON relay | Direct | 0.06 sec - 100 h. | 2 changeover | NMTCV 2 | 124901 | 1 | |
| | 24-240V AC/DC | | | | | | |
| Technical data: see F.7 | | | | | | | |
|  Star-delta starter relay | Direct | 1 - 10 sec. | 1 changeover | NMETV | 124908 | 1 | |
| | 24-240V AC/DC | 6 - 60 sec. | | | | | |
| | With transformer ⁽²⁾ | 1 - 10 sec. | 1 changeover | NMETV t AU ⁽¹⁾ | 124911 | 1 | |
| | | 6 - 60 sec. | | | | | |
| Technical data: see F.8 | | | | | | | |
|  Delayed OFF timer | Direct | 0.5 - 6 sec. | 2 changeover | NMRDV 2-6 | 124915 | 1 | |
| | 24-240V AC/DC | 5 - 60 sec. | 2 changeover | NMRDV 2-60 | 124916 | 1 | |
| | 24-240V AC/DC | 50 - 600 sec. | 2 changeover | NMRDV 2-600 | 124917 | 1 | |
| | Technical data: see F.8 | | | | | | |
|  Asymmetric intermittence, started by connection or pause (choice) | Direct | 0.06 sec - 100 h | 1 changeover | NMIVV | 124929 | 1 | |
| | 24-240V AC/DC | | | | | | |
| Technical data: see F.9 | | | | | | | |
|  Multifunction | <ul style="list-style-type: none"> - Delayed ON timer - Delayed ON through contact timer - Delayed OFF through contact timer - Delayed ON and OFF through contact timer | | <ul style="list-style-type: none"> - Impulse ON timer - Impulse ON through contact timer - Impulse OFF through contact timer - Impulse ON and OFF through contact timer | | | | |
| | Module 22,5mm | | | | | | |
| | Direct | 0.6 sec - 100 h | 1 changeover | NMMFV | 124930 | 1 | |
| 24-240V AC/DC Technical data: see F.10 | | | | | | | |

(1) AU = coil 380V 50/60 Hz
(2) Transformer inside the timer housing

Electronic relays of 22.5 mm

A

B

C

D

E

F

G

H

I

X

Dimensions ● pg. F.21



Single voltage electronic timers - 45mm module

| Motor re-start control relay (plug in) | Supply voltage | Voltage (V) | Available contacts | Time range | Cat. no. | Ref. no. | Pack |
|--|----------------|-----------------------|--------------------|----------------------|--|--|------------------|
| | | Direct ⁽¹⁾ | | RCRT 1 changeover | 0.2 - 6 sec. (memory time) 0.2 - 60 sec. (delayed time) | RCRT 6 - 60AN ⁽²⁾ RCRT 6 - 60AJ ⁽³⁾ | 123624 123623 |
| Technical data: see F.11 | | | | | | | |

Liquid level detector relay

| | Supply voltage | Contacts | No. of circuits | Cat. no. | Ref. no. | Pack |
|----------------------|--|----------|--|----------|-------------------------|------------------|
| | | | DINIL ...E 1 changeover 11 pins socket for DINIL-02E, -03E. for panel fixing. Front terminals | 2 | DINIL 02E ENU PRCZ11 | 123656 220647 |
| Technical data: F.12 | | | | | | |
| Probes | Without cable. Waterproof and protected with a thermoplastic housing. Stainless steel probe. | | | SON-3 | 123700 | 1 |
| | | | | | | |

Earth leakage relays - 45 mm module

| Differential earth leakage relay with hand reset (with test) | Supply voltage | Contacts | Sensiv. (A) | Ø (mm) | Differential transformers | | | Earth leakage relays | | |
|---|-----------------------------|---|-------------|--------|---------------------------|----------|------|------------------------------|----------|------|
| | | | | | Cat. no. | Ref. no. | Pack | Cat. no. | Ref. no. | Pack |
| | | RDHT 1-... With test 1 changeover | 0.2 - 1.2 | 35 | WKAT 35-1,2A/2V | 204165 | 1 | RDHT 1-1,2AEN ⁽⁴⁾ | 123744 | 1 |
| | | | | 70 | WKAT 70-1,2A/2V | 204166 | 1 | | | |
| | | | 1 - 10 | 35 | WKAT 35-10A/2V | 204169 | 1 | RDHT 1-10AEN ⁽⁴⁾ | 123754 | 1 |
| | | | | 70 | WKAT 70-10A/2V | 204170 | 1 | | | |
| Technical data: see F.13 | | | | | | | | | | |
| Differential earth leakage relay with automatic reset (with test) | Direct and with transformer | RDHA 1-... With test 1 changeover | 0.2 - 1.2 | 35 | WKAT 35-1,2A/2V | 204165 | 1 | RDHA 1-1,2AEU ⁽⁵⁾ | 123965 | 1 |
| | | | | 70 | WKAT 70-1,2A/2V | 204166 | 1 | | | |
| | | | 1 - 10 | 35 | WKAT 35-10A/2V | 204169 | 1 | RDHA 1-10AEN ⁽⁴⁾ | 123964 | 1 |
| | | | | 70 | WKAT 70-10A/2V | 204170 | 1 | | | |
| Technical data: see F.13 | | | | | | | | | | |







(1) Possibility of fitting a remote potentiometer.
(2) AN = 220V 50/60Hz
(3) AJ = 110-125V 50/60Hz

(4) EN = coil 220/230V 50/60Hz
(5) EU = coil 380/400V 50/60Hz

Dimensions ● pg. F.21



Protection relays

| | Supply voltage contact | Contacts | Operating range | | Unbalance | Mains frequency | Cat. no. | Ref. no. | Pack |
|---|-----------------------------|----------------------------|-----------------|---------|-----------|-----------------|----------------------------------|----------|------|
| | | | Umin. | Umax. | | | | | |
| Integral protection relay for three-phase lines  | With transformer | RDF1 1-... 1 changeover | 5 - 20% | 5 - 15% | 2.5 - 10% | 50 Hz | RDF1-50AU ⁽¹⁾ | 123985 | 1 |
| | Technical data: see F.14 | | | | | | | | |
| Unbalance and phase failure protection relay for three-phase lines  | Direct and with transformer | RPDF 2-... 2 changeover | - | - | 2.5 - 10% | 50 Hz | RPDF2-50AU ⁽¹⁾ | 124025 | 1 |
| | Technical data: see F.15 | | | | | | | | |
| Phase sequence and phase failure protection relay for three-phase lines  | With transformer | RSFF 1-... 1 changeover | - | - | - | 50 Hz | RSFF1-50AU ⁽¹⁾ | 124622 | 1 |
| | Technical data: see F.16 | | | | | | | | |
| Phase sequence protection relay for three-phase lines  | With transformer | RSF 1-... 1 changeover | - | - | - | 50 Hz | RSF1-50ANU ⁽²⁾ | 124051 | 1 |
| | Technical data: see F.16 | | | | | | | | |
| Maximum and minimum voltage protection relay for three-phase lines  | With transformer | RTMM 2-... 2 changeover | 5 - 20% | 5 - 15% | - | | RTMM 2 AU | 124085 | 1 |
| | | | | | | | RTMM EN ⁽³⁾ | 124084 | 1 |
| | Technical data: see F.17 | | | | | | | | |
| Maximum and minimum voltage protection relay for a single-phase lines  | With transformer | RMM 2-... 2 changeover | 5 - 20% | 5 - 15% | - | | RMM 2 EN ⁽³⁾ | 124104 | 1 |
| | Technical data: see F.17 | | | | | | | | |

(1) AU = coil 380V 50Hz
 (2) ANU = coil 220-230V 380-400V 50/60Hz
 (3) EN = coil 220/230V 50/60Hz

Dimensions ● pg. F.21

Electronic relays of 45 mm

A

B

C

D

E

F

G

H



I

X



Series D

Electronic relays

Detection relays

| | Supply voltage | Contacts | Operating range | Voltage drop | Input impedance | Max. input voltage | Cat. no. | Ref. no. | Pack |
|---|-----------------------------|----------------------------|------------------------|--------------|-----------------|--------------------|---|------------------|--------|
| Voltage detector relay  | Direct and with transformer | RDT 2-... 2 changeover | 40 - 400V | - | 800 kΩ | 600V | RDT2400VEN ⁽¹⁾ | 124184 | 1 |
| | | | | | | | | | |
| Current detector with delay (0.5 - 15 sec.)  | Direct and with transformer | RDIT 2-... 2 changeover | 0.5 - 5A 20 - 200mV | 0.25V | 0.05Ω 1 kΩ | 10A 15V | RDIT2-5AEN ⁽¹⁾ RDIT2-02VEN ⁽¹⁾ | 124754 124354 | 1 1 |
| | | | | | | | | | |

Control and protection relays

| | Supply voltage | Contacts | Thermal probe ⁽⁵⁾ When cold - When hot | | | Cat. no. | Ref. no. | Pack | | | | | | |
|---|--|---------------------------|--|--------|------------------|--|------------------|----------|--------------------------|---------|-----------|-------------------------|--------|---|
| Thermistor relay  | Direct and with transformer ⁽⁴⁾ | RS01N 1 changeover | 1.5 kΩ - | 2.5 kΩ | | RS01NEN ⁽¹⁾ RS01NAJ ⁽²⁾ | 212759 124373 | 1 1 | | | | | | |
| | | | | | | | | | Technical data: see F.19 | | | | | |
| Frequency control relay  | With transformer ⁽⁴⁾ | RCF 1-... 1 changeover | | | Jumper terminals | Setting range | Cat. no. | Ref. no. | Pack | | | | | |
| | | | | | | | | | | Without | 5 - 15Hz | RCF-1 AJ ⁽²⁾ | 124433 | 1 |
| | | | | | | | | | | Y1 - Y2 | 15 - 45Hz | RCF-1 EN ⁽¹⁾ | 124434 | 1 |
| Technical data: see F.20 | | | | | | | | | | | | | | |
| Y1 - Y3 45 - 135Hz RCF-1 AU ⁽³⁾ 124435 1 | | | | | | | | | | | | | | |

- (1) EN = coil 220/230V 50/60Hz
- (2) AJ = coil 110V 50/60Hz
- (3) AU = coil 380/400V 50/60Hz
- (4) Transformer inside the timer housing
- (5) Thermal probe resistance not included

Dimensions ● pg. F.21



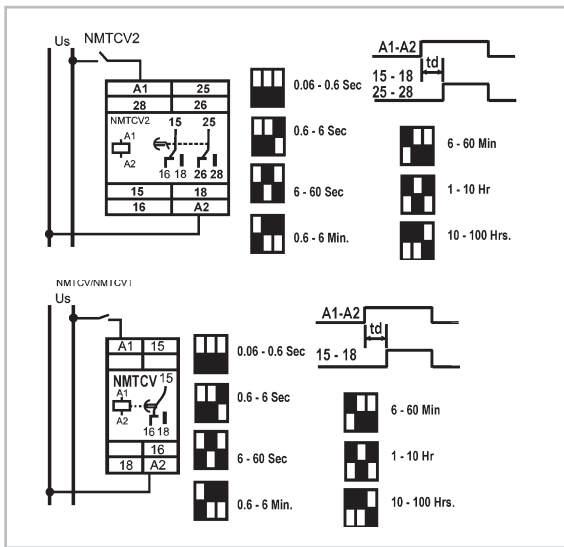
NMTCV2 Delayed ON timer

Function

Electronic relay whose output contact connects with a certain adjustable delay from the moment voltage is applied to supply terminals **A1-A2**.

It has seven timing ranges : see drawing. ↗

Range selection is made by dipperswitches located on the front of the relay. Times are set by front potentiometer controlling an Application Specific Integrated Circuit (ASIC) specially designed for this group of relays. This allows for excellent precision and repeatability features.



↗ 0.06 - 0.6s, 0.6 - 6s, 6 - 60s, 0.6 - 6 min, 6 - 60 min, 1 - 10h, 10 - 100h

Technical characteristics

| | | NMTCV2 |
|---|--------|----------------|
| Nr. of changeover contacts | | 2 |
| Output contacts: | | |
| Rated insulation voltage U_i | AC (V) | 250 |
| | DC (V) | 250 |
| Thermal current I_{th} | (A) | 6 |
| Utilisation AC-15 | | |
| Rated voltage U_e | (V) | 120/230 |
| Rated current I_e | (A) | 2.5/1.3 |
| Utilisation DC-13 | | |
| Rated voltage U_e | (V) | 110/230 |
| Rated current I_e | (A) | 0.2/0.1 |
| Supply voltages (U_n) | | |
| AC/DC (direct) | (V) | 24-240 |
| AC(with transformer) | (V) | - |
| Frequency | (Hz) | 50/60 |
| Supply voltage tolerance | (%) | +10 / -20 |
| Consumption | (mA) | 60 (24V) |
| | (mA) | 15 (240V) |
| | (VA) | - |
| Input circuit test voltage (between input, output and group circuits) | (kV) | 4 |
| Switch ON response time | | 0.06s - 100 h. |
| Switch OFF response time | (ms) | 150 |
| Reset time between 2 cycles ⁽¹⁾ | (ms) | 100 |
| Repeat accuracy with 0.85 - 1.1 U_n | (%) | 1 |

Electronic relays of 22.5 mm

A

B

C

D

E

F

G

H

I

X

Ambient conditions

| | |
|-------------------------|----------------------------|
| Storage temperature | -40°C to +80°C |
| Operating temperature | -25°C to +60°C |
| Relative humidity | 95% (without condensation) |
| Max. operating altitude | 2.000 m |
| Degree of protection | IP40; terminals IP20 |
| Operating positions | Any position |

Conformity to standards

| | |
|------------------|------------------|
| VDE 0106 | CSA C 22.2 No 14 |
| VDE 0110 | IEC/EN 60255-5 |
| EN 50002 | UL 94 |
| EN 50042 | UL 508 |
| IEC/EN 60947-5-1 | UNE 20-119 |
| CE | |

(1) Reset time: Time that must go by from the relay ends an operation until it is able to initiate the next one without error.

Remark

The relay has a green LED that lights when the relay is energised (flashing during the timing) and a red LED that lights when output contact is made.

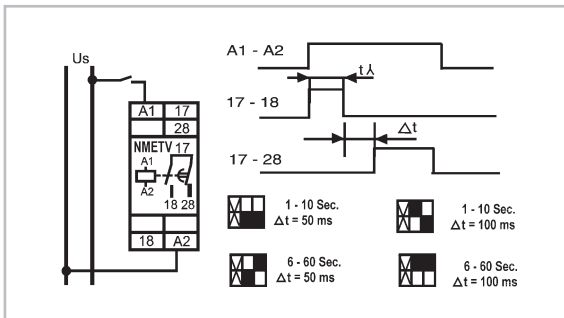


NMETV... Star-delta starter timer

Function

Electronic relay timed in steps whose purpose is to control star-delta starting. When supply voltage is applied to the **A1-A2** terminals, the star contact (17-18) closes for an adjustable time between up to 100 h (selectable) When this time is up, it opens, there is a pause and then the delta contact connects (17-18). The standard pause time is about 100ms.

Times are set by front potentiometer controlling an ASIC specially designed for this group of relays. This allows for excellent precision and repeatability features.



Technical characteristics

| | NMETV | NMETV t |
|--|--------|--------------|
| Nr. of changeover contacts | 2 | |
| Output contacts: | | |
| Rated insulation voltage U_i | AC (V) | 250 |
| | DC (V) | 250 |
| Thermal current I_{th} | (A) | 6 |
| Utilisation AC-15 | | |
| Rated voltage U_e | (V) | 125/230 |
| Rated current I_e | (A) | 2.5/1.3 |
| Utilisation DC-13 | | |
| Rated voltage U_e | (V) | 110/230 |
| Rated current I_e | (A) | 0.2/0.1 |
| Supply voltages (U_n) | | |
| AC/DC (direct) | (V) | 24-240 |
| AC(with transformer) | (V) | - |
| | | 200-240 |
| | | 380-440 |
| Frequency | (Hz) | 50/60 |
| Supply voltage tolerance | (%) | +10 / -20 |
| Consumption | (mA) | 50 (at 24V) |
| | (mA) | 12 (at 240V) |
| | (VA) | - |
| | | 3.5 |
| Test voltage | (kV) | 4 |
| (between input, output and ground) | | |
| Switch ON response time | (ms) | 100 |
| Reset time between 2 cycles ⁽¹⁾ | (ms) | 100 |
| Repeat accuracy with 0.85 - 1.1 Un(%) | | 2 |

Ambient conditions

| | |
|-------------------------|----------------------------|
| Storage temperature | -40°C to +80°C |
| Operating temperature | -25°C to +60°C |
| Relative humidity | 95% (without condensation) |
| Max. operating altitude | 2.000 m |
| Degree of protection | IP40; terminals IP20 |
| Operating positions | Any position |

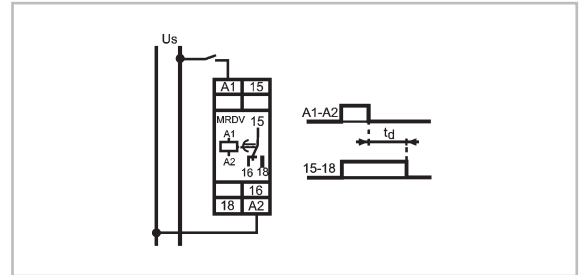
Conformity to standards

| | |
|--------------------------|--------------------|
| VDE 0106 | CSA C 22.2 No 14 |
| VDE 0110 | IEC/EN 60255-5 |
| EN 50001 (NMETV) | UL 94 |
| EN 50002 | UL 508 |
| EN 50042 (NMRDV) | UNE 20-119 (NMRDV) |
| IEC/EN 60947-5-1 (NMRDV) | CE |

NMRDV... Delayed OFF timer

Function

Electronic relay whose output contact instantly connects when supply voltage is applied to terminals **A1-A2**. It disconnects with an adjustable delay as from the moment the relay loses supply voltage. There are several types depending on the range of timers.



Technical characteristics

| | NMRDV2 | |
|--|--------|--------------------|
| Nr. of changeover contacts | 2 | |
| Output contacts: | | |
| Rated insulation voltage U_i | AC (V) | 250 |
| | DC (V) | 250 |
| Thermal current I_{th} | (A) | 6 |
| Utilisation AC-15 | | |
| Rated voltage U_e | (V) | 125/230 |
| Rated current I_e | (A) | 2.5/1.3 |
| Utilisation DC-13 | | |
| Rated voltage U_e | (V) | 110/230 |
| Rated current I_e | (A) | 0.2/0.1 |
| Supply voltages (U_n) | | |
| AC/DC (direct) | (V) | 24-240 |
| AC(with transformer) | (V) | - |
| | | 200-240 |
| | | 380-440 |
| Frequency | (Hz) | 50/60 |
| Supply voltage tolerance | (%) | +10 / -20 |
| Consumption | (mA) | 1,5 (at 24V) |
| | (mA) | 5 (at 240V) |
| | (VA) | - |
| | | 4 |
| Test voltage | | |
| | (kV) | 4 |
| (between input, output and ground) | | |
| Switch ON response time | (ms) | 250 ⁽²⁾ |
| Switch OFF response time | | 0.5 - 600 |
| Reset time between 2 cycles ⁽¹⁾ | (ms) | 250 |
| Repeat accuracy with 0.85 - 1.1 Un(%) | | 5 |

- (1) Reset time: Time that must go by from the relay ends an operation until it is able to initiate the next one without error.
- (2) For 24V c.c. = 300ms

Remark

NMETV relays have a green LED that lights up when the relays is energised (flashing during the timing) and a red LED that lights up when the star contact 17-18 is closed.

NMIVV Asymmetric intermittence, started by connection or pause (choice)

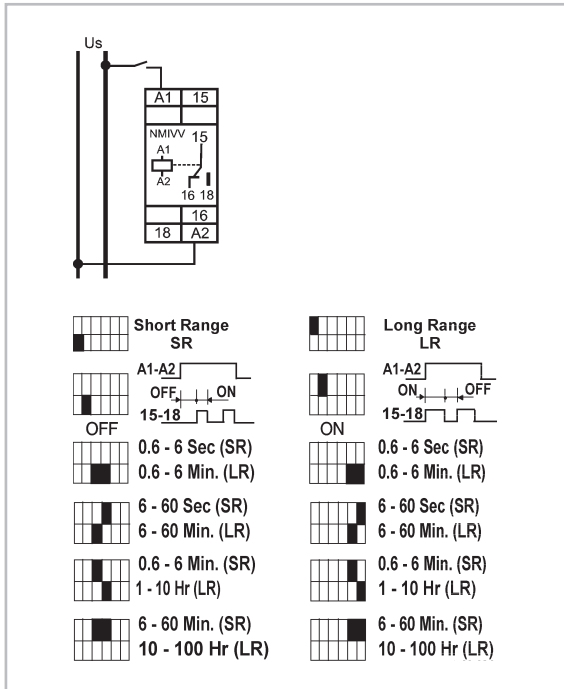
Function

Electronic relay whose output contact connects and disconnects intermittently. Connection and pause times may be separately. The intermittency cycle begins a connection or disconnection selected by a dip-switches and start the instant connection is made from supply voltage to the **A1-A2** terminals. A new step is begun if voltage supply is interrupted during operation.

It has seven timing ranges ;

NMIVV : 0,6 sec - 100 h

Range selection is made by dip-switches located on the front of the relay. Times are set by front potentiometer an ASIC specially designed for this group of relays. This allows for excellent precision and repeatability features.



Technical characteristics

| | | NMIVV |
|--|--------|----------------|
| Nr. of changeover contacts | | 1 |
| Output contacts: | | |
| Rated insulation voltage Ui | AC (V) | 250 |
| | DC (V) | 50 |
| Thermal current Ith | (A) | 6 |
| Utilisation AC-15 | | |
| Rated voltage Ue | (V) | 125/230 |
| Rated current Ie | (A) | 2,5/1,3 |
| Utilisation DC-13 | | |
| Rated voltage Ue | (V) | 110/230 |
| Rated current Ie | (A) | 0,2/0,1 |
| Supply voltages (Un) | | |
| AC/DC (direct) | (V) | 24-240 |
| Frequency | (Hz) | 50/60 |
| Supply voltage tolerance | (%) | +10 / -20 |
| Consumption | (mA) | 60 (at 24V) |
| | (mA) | 15 (at 240V) |
| | (VA) | - |
| Test voltage (between input, output and ground circuits) | (kV) | 2 |
| Switch ON response time | (ms) | 150 |
| Intermittent switch ON times ⁽²⁾ | | 0,6 s - 100 h. |
| Reset time between 2 cycles ⁽¹⁾ | (ms) | 150 |
| Repeat accuracy with 0.85 - 1.1 Un(%) | | 1 |

Electronic relays of 22.5 mm

A

B

C

D

E

F

G

H

I

X

Ambient conditions

| | |
|-------------------------|----------------------------|
| Storage temperature | -40°C to +80°C |
| Operating temperature | -25°C to +60°C |
| Relative humidity | 95% (without condensation) |
| Max. operating altitude | 2.000 m |
| Degree of protection | IP40; terminals IP20 |
| Operating positions | Any position |

Conformity to standards

| | |
|------------------|------------------|
| VDE 0106 | CSA C 22.2 No 14 |
| VDE 0110 | IEC/EN 60255-5 |
| EN 50002 | UL 94 |
| EN 50005 | UL 508 |
| EN 50042 | UNE 20-119 |
| IEC/EN 60947-5-1 | CE |

- Reset time: Time that must go by from the relay ends an operation until it is able to initiate the next one without error.
- Connection and pause times be set within different ranges.

Remark

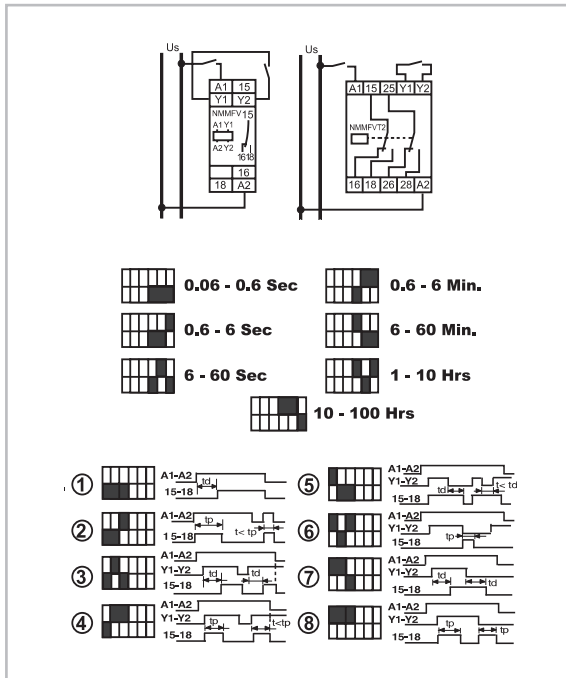
These relays has a green LED that lights up when the relays is energised (flashing during the timing) and a red LED that lights up when output contact is made.



NMMFV Multifunction relay

Function

The functions of this multifunction and multirange electronic relay are selected by 3 dip-switches located on the front of the relay. It has eight functions: delayed ON timer, delayed ON through contact timer, delayed OFF through contact timer, delayed ON and OFF through contact timer, impulse ON timer, impulse ON through contact timer, impulse OFF through contact timer, impulse ON and OFF through contact timer. If the relay loses current during timing, it disconnects and is ready for a new cycle. It has seven timing ranges: see drawing. Range selection is made by dip-switches located on front of the relay. Times are set by front potentiometer controlling an ASIC specially designed for this group of relays. This allows for excellent precision and repeatability features.



Technical characteristics

| | | NMMFV |
|---|--------|------------------|
| Nr. of changeover contacts | | 1 |
| Output contacts: | | |
| Rated insulation voltage Ui | AC (V) | 250 |
| | DC (V) | 250 |
| Thermal current Ith | (A) | 6 |
| Utilisation AC-15 | | |
| Rated voltage Ue | (V) | 110/230 |
| Rated current Ie | (A) | 2.5/1.3 |
| Utilisation DC-13 | | |
| Rated voltage Ue | (V) | 110/230 |
| Rated current Ie | (A) | 0.2/0.1 |
| Supply voltages (Un) | | |
| AC/DC (direct) | (V) | 24-240 |
| Frequency | (Hz) | 50/60 |
| Supply voltage tolerance | (%) | +10 / -20 |
| Consumption | (mA) | 60 (at 24V) |
| | (mA) | 15 (at 240V) |
| | (VA) | - |
| Test voltage (between input, output and ground circuit) | (kV) | 2 |
| Switch ON response time | | 0.065 s - 100 h. |
| Switch OFF response time | | 0.065 s - 100 h. |
| Reset time between 2 cycles ⁽¹⁾ | (ms) | 150 |
| Repeat accuracy with 0.85 - 1.1 Un(%) | | 1 |
| Voltage open Y1-Y2 (control contact terminals) | (V DC) | 5 |
| Current through control contact | | |
| Initial | (mA) | 15 |
| Permanent | (mA) | 1 |

Ambient conditions

| | |
|-------------------------|----------------------------|
| Storage temperature | -40°C to +80°C |
| Operating temperature | -25°C to +60°C |
| Relative humidity | 95% (without condensation) |
| Max. operating altitude | 2,000 m |
| Degree of protection | IP40; terminals IP20 |
| Operating positions | Any position |

Conformity to standards

| | |
|------------------|------------------|
| VDE 0106 | CSA C 22.2 No 14 |
| VDE 0110 | IEC/EN 60255-5 |
| EN 50002 | UL 94 |
| EN 50042 | UL 508 |
| IEC/EN 60947-5-1 | UNE 20-119 |
| CE | |

(1) Reset time: Time that must go by from the relay ends an operation until it is able to initiate the next one without error.

Remark

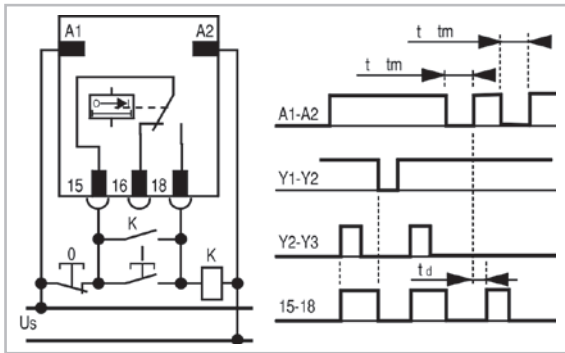
The relays have a green LED that lights up when the relays is energised (flashing during the timing) and a red LED that lights up when output contact is made.

RCRT... Motor re-start control relay (plug-in)

Function

RCRT...

The relay is used for instantaneous or delayed motor startup after a short-time power failure (max. 6 sec). The start occurs immediately if power supply is disrupted for less than 0.2 sec. If the power failure lasts longer, the relay activates its memory for a time that can be set to 0.2 to 6 sec, after which no automatic restart is possible. If power supply is restored while the memory period is elapsing, the relay commands a motor restart with a delay time from power supply restoration that can be set to 0.2 to 60 sec. A system stop cancels the memory function after 50 ms, and therefore the stop signal should be on for at least this time. The relay is non-sensitive to any control voltage fluctuation or disruption during or after the motor stop.



Technical characteristics

| | | RCRT 6-60 |
|---|--------|-------------------|
| Nr. of changeover contacts | | 1 |
| Output contacts: | | |
| Rated insulation voltage U_i | AC (V) | 400 |
| | DC (V) | 250 |
| Thermal current I_{th} | (A) | 6 |
| Utilisation AC-15 | | |
| Rated voltage U_e | (V) | 120/240 |
| Rated current I_e | (A) | 2.5/1.3 |
| Utilisation DC-13 | | |
| Rated voltage U_e | (V) | 110/220 |
| Rated current I_e | (A) | 0.2/0.1 |
| Supply voltages (U_n) | | |
| AC | (V) | 110, 220-230, 125 |
| Frequency | (Hz) | 50/60 |
| Permissible supply voltage variation (%) | | +10 / -15 |
| Repeat accuracy with 0.85 - 1.1 U_n (%) | | 2 |
| Consumption | (VA) | 3 |
| Input circuit test voltage | (kV) | 4 |
| (between input, output circuit and earth) | | |
| Switch ON response time | (ms) | 100 |
| Power failure detection level | | 0.8 U_s |
| Reset time (stop) | (ms) | 50 - 75 |
| Memory reset time | (ms) | 100 |
| Max. restart delay time | (s) | 0.2 - 60 |
| Max. memory time | (s) | 0.2 - 6 |

Electronic relays of 45 mm

A

B

C

D

E

F

G

H

I

X

Ambient conditions

| | |
|-------------------------|----------------------------|
| Storage temperature | -10°C to +85°C |
| Operating temperature | -5°C to +50°C |
| Relative humidity | 95% (without condensation) |
| Max. operating altitude | 2.000 m |
| Degree of protection | IP40; terminals IP20 |
| Operating positions | Any position |

Conformity to standards

| | |
|-----------|------------------|
| VDE 0106 | IEC/EN 60947-5-1 |
| EN 50001 | UNE 20-119 |
| EN 50005 | CE |
| EN 50011 | |
| DIN 46199 | |

Remark

The relay has one LED that lights up when the contact is made.

DINIL 02E Liquid level detector relay for simultaneous control of well and tank

Functions

Plug-in devices for control of level of conductive liquids which can perform the following functions:

Filling control: The contact between **1** and **3** closes when the tank to be checked drops below a minimum, fixed by the position of probe **6**, which starts up the pumping system. When the maximum filling level is reached, fixed by the position of probe **7**, the contact between **1** and **3**, opens and the pumping system stops. For the filling control the two well probes must be connected externally to the common one (condition of full well).

Draining control: The contact **1-3** closes if the level liquid goes above a maximum, fixed by the position of probe **9**, which starts up the drain pumping system. When the level drops below a minimum, fixed by the position of probe **8** the contact **1-3** opens and stop the pumping system, which prevents the pumpo from losing its prime.

Simultaneous filling and draining control: The system starts up whenever the tank requires liquid and the well has sufficient level to supply it, and it stops when the liquid reaches its maximum level in the tank or, as the case may be, the well reaches its minimum level.

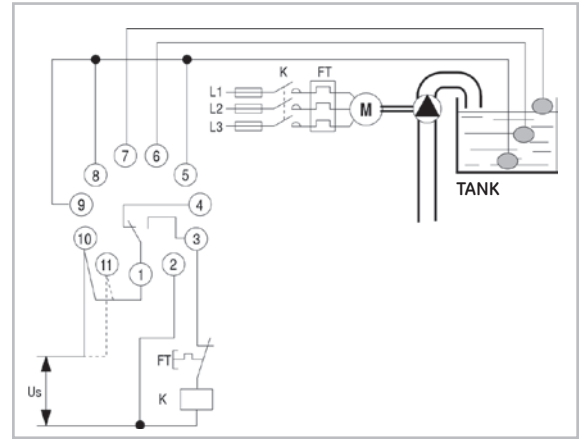
Remark: In all the above applications, the contact between **1-3** is used as a permanent contact for starting and stopping the pump starter, whether this is DOL, star-delta or any other type of starter.

Control voltage: **Two voltages:**
terminals 2-10 (220 VAC)
terminals 2-11 (380 VAC)

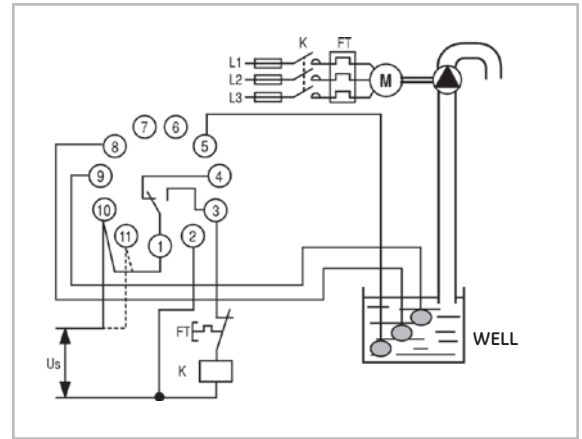
Technical characteristics

| | | DINIL-02E |
|--|----------|--------------------------------|
| Nr. of changeover contacts | | 1 |
| Output contacts: | | |
| Rated insulation voltage U_i | AC (V) | 400 |
| | DC (V) | 250 |
| Thermal current I_{th} | (A) | 6 |
| Utilisation AC-15 | | |
| Rated voltage U_e | (V) | 120/240 |
| Rated current I_e | (A) | 2.5/1.3 |
| Utilisation DC-13 | | |
| Rated voltage U_e | (V) | 110/220 |
| Rated current I_e | (A) | 0.2/0.1 |
| Supply voltages (U_n) | | |
| AC (with transformer) | (V) | 380-400/220-230 (two voltages) |
| Frequency | (Hz) | 50/60 |
| Permissible supply voltage variation(%) | | +10 / -15 |
| Repeat accuracy with 0.85-1.1 U_n (%) | | 2 |
| Consumption | (VA) | 3 |
| Input circuit test voltage (between input, output circuit and earth) | (kV) | 4 |
| Voltage between probes and common | (V ef.) | 6 - 18 |
| Max. consumption of probes | (mA ef.) | 0.18 |
| Max. resistance between probes (resistance of controlled liquid) | (kOhms) | 200 |
| Switch ON response time | (s) | 1 |
| Switch OFF response time | (s) | 1 |

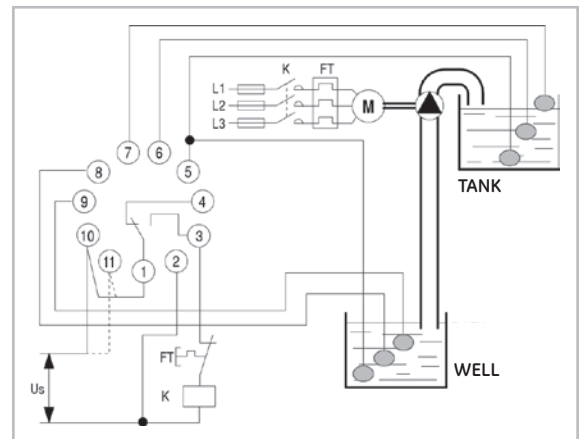
DINIL-02E - Filling control



DINIL-02E - Draining control



DINIL-02E - Simultaneous filling and draining control



Ambient conditions

| | |
|----------------------------|----------------------------|
| Storage temperature | -10°C to +85°C |
| Operating temperature | -5°C to +50°C |
| Relative humidity | 95% (without condensation) |
| Maximum operating altitude | 2.000 m |
| Degree of protection | IP40; terminals IP20 |
| Operating positions | Any |

Conformity to standards

VDE 0106 IEC/EN 60947-5-1 CE UNE 20119

Remark

The relays has one LED that lights up when the output contact is made.

RDHT..., RDHA... Earth leakage relays

RDHT... Earth leakage relay with manual reset, with test
RDHA... Earth leakage relay with automatic reset, with test

Function

RDH, RDHT and RDHA are earth leakage detectors for industrial networks with neutral connected to earth, used with WKA (without test) and WKAT (with test) differential transformers. Tripping is produced when leakage current exceeds a threshold which is adjustable by means of a front mounted potentiometer. Tripping ranges are shown in the table below.

RDH and RDHT keep memory of tripping even in the absence of voltage in **A1** and **A2** and resetting is obtained from a push-button. RDHA is self resetting in the absence of control voltage in **A1** and **A2** or when leakage disappears. RDHT and RDHA have in addition a test push-button for control from cubicle door, and therefore those relays should always be use with WKAT transformers with test winding. All types have included a timer, with external ajustement in RDHA and internal ajustement in RDH and RDHT that allows to delay the trip to achieve trip selectivity.

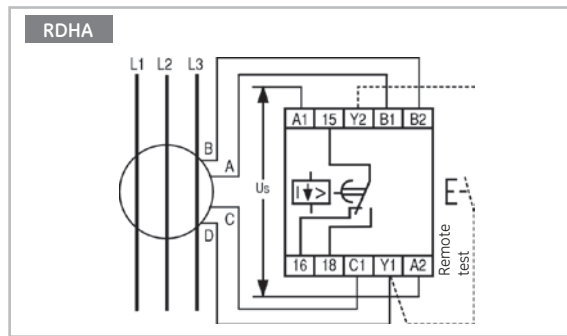
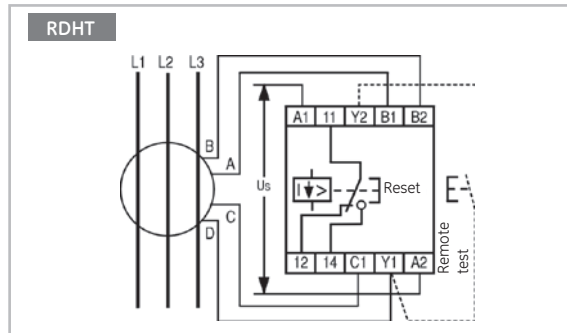
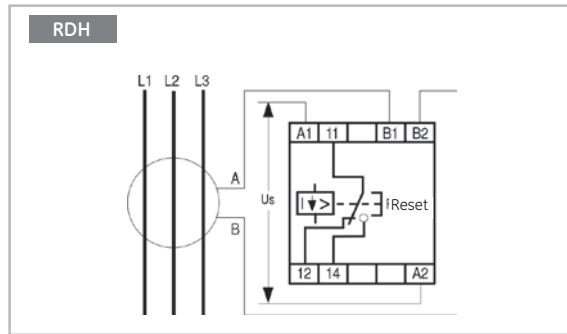
| RDHT1-... RDHA1-... | Sensitivity | Transformers | | Ø |
|------------------------|-------------|--------------|---------|----|
| ... 1,2 | 0.2 - 1.2A | WKAT-35 | 1.2A/2V | 35 |
| | | WKAT-70 | 1.2A/2V | 70 |
| ... 10 | 1 - 10A | WKAT-35 | 10A/2V | 35 |
| | | WKAT-70 | 10A/2V | 70 |

Ambient conditions

| | |
|-----------------------|----------------------------|
| Storage temperature | -10°C to +85°C |
| Operating temperature | 0°C to +50°C |
| Relative humidity | 95% (without condensation) |
| Altitude | 2.000 m |
| Degree of protection | IP40; terminals IP20 |
| Operating positions | Any |

Conformity to standards

| | |
|-----------|------------------|
| VDE 0106 | IEC/EN 60947-5-1 |
| EN 50001 | UNE 20-119 |
| EN 50005 | CE |
| EN 50011 | |
| DIN 46199 | |



Technical characteristics

| | RDHT1-... | RDHA1-... |
|---|-----------|-----------------|
| Nr. of changeover contacts | 1 | |
| Output contacts: | | |
| Rated insulation voltage Ui | AC (V) | 400 |
| | DC (V) | 250 |
| Thermal current Ith | (A) | 6 |
| Utilisation AC-15 | | |
| Rated voltage Ue | (V) | 120/240 |
| Rated current Ie | (A) | 2.5/1.3 |
| Utilisation DC-13 | | |
| Rated voltage Ue | (V) | 110/220 |
| Rated current Ie | (A) | 0.2/0.1 |
| Supply voltages (Un) | | |
| AC (with transformer) | (V) | 380-400 |
| | | 220-230 220-230 |
| DC/AC (direct) | (V) | - |
| Frequency | (Hz) | 50/60 |
| Permissible supply voltage variation (%) | +10 / -15 | |
| Repeat accuracy with 0.85-1.1 Un (%) | 2 | |
| Consumption (VA) | 3 | |
| Input circuit test voltage (kV) | 4 | |
| (between input, output circuit and earth) | | |
| Switch ON response time (s) | 150-200 | 100 |
| (can be delayed up to 5 sec) | | |

Electronic relays of 45 mm

A

B

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RDFF1... Integral protection relay for three-phase lines

Function

Protection against:

- a) Phase failure
- b) Phase sequence
- c) Phase unbalance
- d) Low line voltage
- e) High line voltage

Relay operates by phase angle detection between voltages and not by voltage levels and therefore will drive satisfactorily even with feedback from other motors.

Relays will connect only when all conditions are normal (contact 15-18 closes) and disconnects on any fault including supply, protecting network even with supply failure. It will not connect if phase sequence is incorrect, preventing motors starting in wrong direction.

Unbalance adjustment

Phase, unbalance, and therefore single phase is very dangerous for the life of a motor. The graph below shows temperature rise in a three-phase motor with a phase unbalance (NEMA MG 1-1433 and 34). The per cent unbalance is obtained as follow:

$$\% \text{ unbalance} = \frac{\text{Max. voltage deviation from average voltage}}{\text{average voltage}} \times 100$$

Tripping is adjustable between 2.5 and 10 %.

Consequently protection is provided for motors working closely adjusted to rated power, to others more generously sized, and even power lines.

In any case adjustments should be made so that on failure of one phase relay will disconnect.

Voltage adjustment

Voltage tripping is adjustable from -5 to -20 % and +5 to +15 % maximum by which it is possible to adjust to values recommended by IEC 34.1 (1969) and IEC 158 respectively. Tripping for these causes is delayed 1 second approximately.

Tripping indication

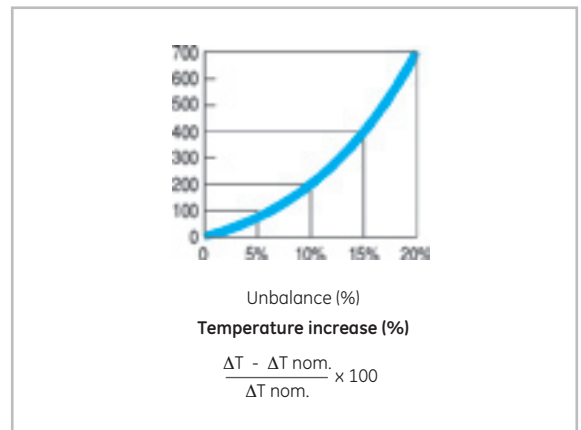
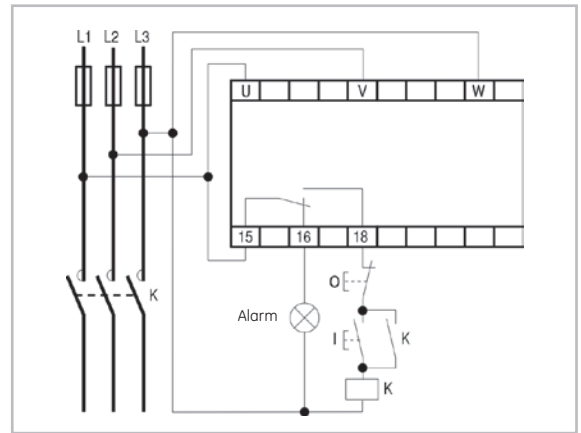
Relays incorporate LED diode tripping indication. When phase sequence is incorrect, both phase sequence and unbalance light up. When unbalance lights up only indicates unbalance or single phasing with feedback.

Ambient conditions

| | |
|-----------------------|----------------------------|
| Storage temperature | -10°C to +85°C |
| Operating temperature | -5°C to +50°C |
| Relative humidity | 95% (without condensation) |
| Altitude | 2.000 m |
| Degree of protection | IP40; terminals IP20 |
| Operating positions | Any |

Conformity to standards

| | | |
|----------|------------|------------------|
| VDE 0106 | EN 50011 | IEC/EN 60947-5-1 |
| EN 50001 | DIN 46199 | CE |
| EN 50005 | UNE 20-119 | |



Technical characteristics

| | | RDFF1-5 |
|--|--------|-----------|
| Nr. of changeover contacts | | 1 |
| Output contacts: | | |
| Rated insulation voltage Ui | AC (V) | 400 |
| | DC (V) | 250 |
| Thermal current Ith | (A) | 6 |
| Utilisation AC-15 | | |
| Rated voltage Ue | (V) | 120/240 |
| Rated current Ie | (A) | 2.5/1.3 |
| Utilisation DC-13 | | |
| Rated voltage Ue | (V) | 110/220 |
| Rated current Ie | (A) | 0,2/0,1 |
| Supply voltages (Un) | | |
| AC (with transformer) | (V) | 380 |
| Frequency | (Hz) | 50 |
| Permissible supply voltage variation (%) | | +15 / -20 |
| Repeat accuracy with 0.85 - 1.1 Un | (%) | 2 |
| Consumption | (VA) | 3 |
| Input circuit test voltage (between input, output circuit and earth) | (kV) | 4 |
| Unbalance tripping (adjustable) | (%) | 2.5 to 10 |
| Low voltage tripping (adjustable) | (%) | 5 to 20 |
| Overvoltage tripping (adjustable) | (%) | 5 to 15 |
| Switch ON response time | (ms) | 200 |
| Reset hysteresis | (%) | 5 approx. |

RPDF... Unbalance and phase failure protection relay for three-phase lines

Function

The RPDF-electronic relay is intended for the protection of lines or electronic motors against unbalance between phases or failure of one or more phases. Detection of unbalance or phase failure is done by measuring phase change and not by voltage levels. This guarantees correct working even when there are return paths due to motors running which are connected to the mains networks to be protected. The relay is made when all conditions are normal (contact 11-14 closed); the contacts open in the event of a failure. In this way, any failure, including that of the relay supply, will cause disconnection and so avoid the supply being left unprotected.

Setting unbalance

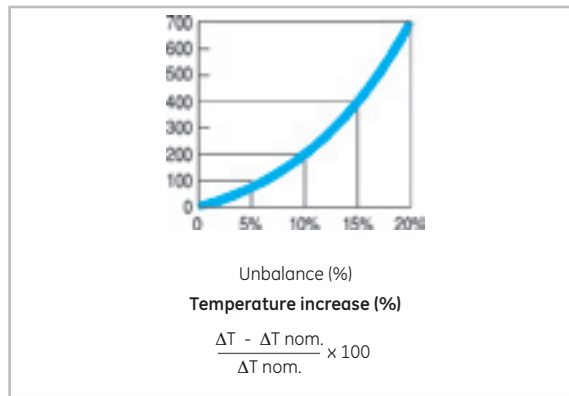
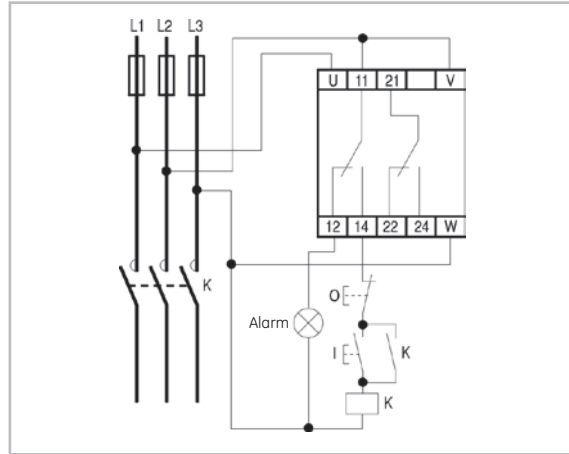
The unbalance in phases and, consequently, the failure of one of these, is a limiting factor in the life of an electric motor. The graph below shows the percentage temperature increase in a three-phase motor as a function of the degree of unbalance (see standards NEMA MG 1-1433 and 34). The per cent unbalance is calculated as follows :

$$\% \text{ unbalance} = \frac{\text{Max. voltage deviation from average voltage}}{\text{average voltage}} \times 100$$

The trip is adjustable between about 2.5% and 10%. Consequently protection is provided for motors working closely adjusted to rated power, to others more generously sized, and even power lines. In any case, the adjustment must be such that the loss of a phase produces the opening of the relay.

Ambient conditions

| | |
|-----------------------|----------------------------|
| Storage temperature | -10°C to +85°C |
| Operating temperature | -5°C to +50°C |
| Relative humidity | 95% (without condensation) |
| Altitude | 2.000 m |
| Degree of protection | IP40; terminals IP20 |
| Operating positions | Any |



Technical characteristics

| | | RPDF 2-50 |
|---|--------|--------------|
| Nr. of changeover contacts | | 2 |
| Output contacts: | | |
| Rated insulation voltage U_i | AC (V) | 400 |
| | DC (V) | 250 |
| Thermal current I_{th} | (A) | 6 |
| Utilisation AC-15 | | |
| Rated voltage U_e | (V) | 120/240 |
| Rated current I_e | (A) | 2.5/1.3 |
| Utilisation DC-13 | | |
| Rated voltage U_e | (V) | 110/220 |
| Rated current I_e | (A) | 0,2/0,1 |
| Supply voltages (Un) | | |
| AC (with transformer) | (V) | 380 |
| Frequency | (Hz) | 50 |
| Permissible supply voltage variation | (%) | +10 / -20 |
| Repeat accuracy | (%) | 2 |
| Consumption | (VA) | 3 |
| Input circuit test voltage | (kV) | 4 |
| (between input, output circuit and earth) | | |
| Unbalance tripping (adjustable) | (%) | 2.5 to 10 |
| Switch ON response time | (ms) | 100 |
| Reset hysteresis | (%) | 2 |

Conformity to standards

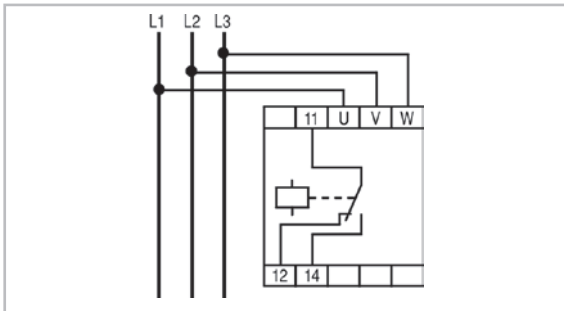
| | |
|-----------|------------------|
| VDE 0106 | IEC/EN 60947-5-1 |
| EN 50001 | UNE 20-119 |
| EN 50005 | CE |
| EN 50011 | |
| DIN 46199 | |

RSFF... Phase sequence and phase failure protection relay for three-phase lines

Function

The RSFF relay is designed to detect phase sequence errors and/or phase failures in three phase lines. Three terminals **U, V, W** are connected to each of the three phases of the mains. Controlling vectors of voltage between lines (amplitude and phase) is detected the direct sequence (phase **V** with 120° in respect of **U** and phase **W** with 240° lag in respect and phase **U**) as well as balance of voltages and angles of phases, for detecting a phase failure even with returns (motor working).

By means of an external potentiometer can be adjusted the network unbalance, level, between 2,5 % and 105 % to adapt the relays sensibility for phase failure function. This unbalance is measured according to NEMA MG1-1433 and 34, and corresponds to a fall of simple tension of phase in amplitude of 7.3 and 28%, respectively. The relay precives either increases or drops of voltage and angle, then it detect the failures even in motors working as breaking devices (loads going down in lifting devices). When relay is powered, it connects instantaneously (max. 200ms) if the power system is correct. Once the switched on relay is switch-on, it switches-off with 1 sec. delay in case of a failure, to avoid false disconnections due to transient unbalances. (Start of other motors, transformers, etc.).



Technical characteristics

| | | RSFF1-50 |
|---|--------|-----------|
| Nr. of changeover contacts | | 1 |
| Output contacts: | | |
| Rated insulation | AC (V) | 400 |
| voltage Ui | DC (V) | 250 |
| Thermal current Ith | (A) | 6 |
| Utilisation AC-15 | | |
| Rated voltage Ue | (V) | 120/240 |
| Rated current Ie | (A) | 2.5/1.3 |
| Utilisation DC-13 | | |
| Rated voltage Ue | (V) | 110/220 |
| Rated current Ie | (A) | 0.2/0.1 |
| Supply voltages (Un) | | |
| AC (with transformer) | (V) | 380-400 |
| Frequency | (Hz) | 50/60 |
| Permissible supply voltage variation (%) | | +15 / -20 |
| Repeat accuracy | (%) | 2 |
| Consumption | (VA) | 3 |
| Input circuit test voltage | (kV) | 4 |
| (between input, output circuit and earth) | | |
| Switch ON response time | (ms) | 200 |
| Switch OFF response time | (s) | 1 |

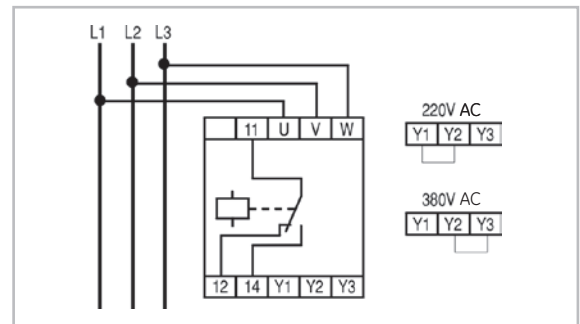
$$\% \text{ unbalance} = \frac{\text{max. voltage derivation from average voltage}}{\text{average voltage}} \times 100$$

RSF... Phase sequence relay for three-phase lines

Function

The RSF1 is designed to detect phase sequence in three phase power system. Three supplies **U, V, W**, take voltage from each of the phases of the network. When phase sequence supplying relay is direct (Phase **V** with 120° lag in respect of **U** and phase **W** with 120° lag in respect of **V**) the relays connects with supply (closes contact between **11-14**) and if no it remains OFF. For correct operation, relay must have supplying each of the three phases.

A phase failure, when there is a return current (the motor is rotating), is not detected by the relay and may lead to a relay malfunction.



Technical characteristics

| | | RSF1-50 |
|---|--------|----------------------------------|
| Nr. of changeover contacts | | 1 |
| Output contacts: | | |
| Rated insulation | AC (V) | 400 |
| voltage Ui | DC (V) | 250 |
| Thermal current Ith | (A) | 6 |
| Utilisation AC-15 | | |
| Rated voltage Ue | (V) | 120/240 |
| Rated current Ie | (A) | 2.5/1.3 |
| Utilisation DC-13 | | |
| Rated voltage Ue | (V) | 110/220 |
| Rated current Ie | (A) | 0.2/0.1 |
| Supply voltages (Un) | | |
| AC (with transformer) | (V) | 380-400 / 220-230 (two voltages) |
| Frequency | (Hz) | 50/60 |
| Permissible supply voltage variation (%) | | +10 / -15 |
| Repeat accuracy | (%) | 2 |
| Consumption | (VA) | 3 |
| Input circuit test voltage | (kV) | 4 |
| (between input, output circuit and earth) | | |
| Switch ON response time | (ms) | 500 |
| Switch OFF response time | (ms) | 200 |

Ambient conditions

| | |
|-----------------------|----------------------------|
| Storage temperature | -10°C to +85°C |
| Operating temperature | -5°C to +50°C |
| Relative humidity | 95% (without condensation) |
| Altitude | 2.000 m |
| Degree of protection | IP40; terminals IP20 |
| Operating positions | Any |

Conformity to standards

| | | | |
|----------|------------------|-----------|------------|
| VDE 0106 | IEC/EN 60947-5-1 | EN 50001 | UNE 20-119 |
| EN 50005 | EN 50011 | DIN 46199 | CE |

Remark

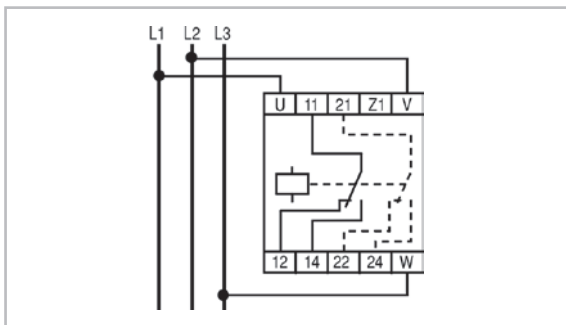
The relay has one LED that lights when the output contact is made.

RTMM2 Maximum and minimum voltage protection relay for three-phase lines

Function

The RTMM electronic relay is voltage sensitive and has one or two changeover output contacts. The relay maintains operated (contact between **11-14** or between **21-24** closed) while the voltage is within the tolerance limits and opens when these limits are surpassed in plus or minus. The relay can be used for low voltage or over-voltage detection in three-phase lines.

The trip value, for maximum and minimum voltage, are set by means of two independent potentiometer mounted on the relay front cover. The limits for the trip are adjustable between +5 and +15% for maximum voltage and between -5 and -20% for minimum voltage.



Technical characteristics

| | | RTMM2 |
|---|--------|-----------------|
| Nr. of changeover contacts | | 2 |
| Output contacts: | | |
| Rated insulation | AC (V) | 400 |
| voltage Ui | DC (V) | 250 |
| Thermal current Ith | (A) | 6 |
| Utilisation AC-15 | | |
| Rated voltage Ue | (V) | 120/240 |
| Rated current Ie | (A) | 2.5/1.3 |
| Utilisation DC-13 | | |
| Rated voltage Ue | (V) | 110/220 |
| Rated current Ie | (A) | 0.2/0.1 |
| Supply voltages (Un) | | |
| AC (with transformer) | (V) | 400,380,240,220 |
| Frequency | (Hz) | 50/60 |
| Permissible supply voltage variation (%) | | +20 / -20 |
| Repeat accuracy (%) | | 2 |
| Consumption (VA) | | 3 |
| Input circuit test voltage (kV) | | 4 |
| (between input, output circuit and earth) | | |
| Low voltage tripping (adjustable) (%) | | -5 to -20 |
| Over voltage tripping (adjustable) (%) | | +5 to +15 |
| Switch ON response time (ms) | | 100 |
| Reset hysteresis (%) | | 2 |

Ambient conditions

| | |
|-----------------------|----------------------------|
| Storage temperature | -10°C to +85°C |
| Operating temperature | -5°C to +50°C |
| Relative humidity | 95% (without condensation) |
| Altitude | 2.000 m |
| Degree of protection | IP40; terminals IP20 |
| Operating positions | Any |

Conformity to standard

| | |
|-----------|------------------|
| VDE 0106 | IEC/EN 60947-5-1 |
| EN 50001 | UNE 20-119 |
| EN 50005 | CE |
| EN 50011 | |
| DIN 46199 | |

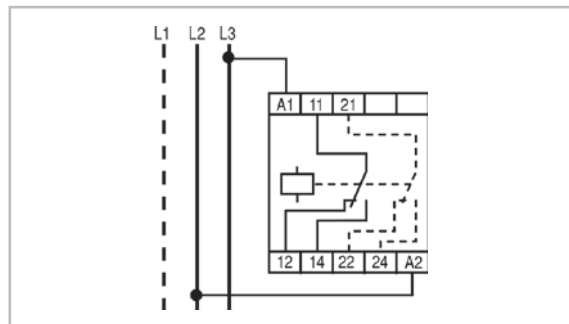
Remark

The relay has one LED that lights when the output contact is made.

RMM2 Maximum and minimum voltage relay for single-phase lines

Function

These voltage-sensitive relays with one or two changeover output contacts remain connected (contact between 11-14 or between 21-24 closed) when voltage is within tolerance limits, and opens when voltage surpasses these limits in plus or minus. Relays can be used to detect low or lower voltage in balanced single or three-phase systems, and maximum and minimum tripping values are adjustable by means of two frontal potentiometers. The limits for the trip are adjustable between 5 and 15% for maximum voltage and between 5 and 20% for minimum voltage.



Technical characteristics

| | | RMM 2 |
|---|--------|-----------|
| Nr. of changeover contacts | | 2 |
| Output contacts: | | |
| Rated insulation | AC (V) | 400 |
| voltage Ui | DC (V) | 250 |
| Thermal current Ith | (A) | 6 |
| Utilisation AC-15 | | |
| Rated voltage Ue | (V) | 120/240 |
| Rated current Ie | (A) | 2.5/1.3 |
| Utilisation DC-13 | | |
| Rated voltage Ue | (V) | 110/220 |
| Rated current Ie | (A) | 0.2/0.1 |
| Supply voltages (Un) | | |
| AC | (V) | 240,220 |
| Frequency | (Hz) | 50/60 |
| Permissible supply voltage variation (%) | | +15 / -20 |
| Repeat accuracy (%) | | 2 |
| Consumption (VA) | | 3 |
| Input circuit test voltage (kV) | | 4 |
| (between input, output circuit and earth) | | |
| Low voltage tripping (adjustable) (%) | | -5 to -20 |
| Over voltage tripping (adjustable) (%) | | +5 to +15 |
| Reset hysteresis (%) | | 5 approx. |
| Switch ON response time (ms) | | 100 |

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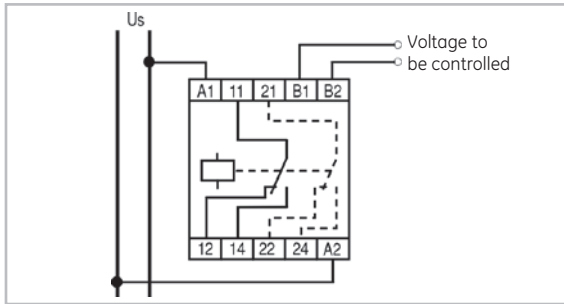
RDT2 Voltage detector relay ⁽¹⁾

Function

The output contact in this voltage detector will connect when controlled voltage between terminals B1-B2 exceeds a certain adjustable threshold by means of the front potentiometer and will disconnect with a voltage 10% below the setting value.

The relay requires voltages supply between A1-A2. Controlled voltage can be either direct (DC) or alternating (AC). The output contact function can be set to NO by means of an internal jumper (contact 11-14 is normally closed and opens when control power supply or removal is detected at A1-A2).

When the distance between the measurement point and the relay is greater than 1m, in order to avoid any noise problems, connection to the B1-B2 terminals should be made by using a shielded cable, with its screen joined to the B2 terminal and isolated at the other cable end or by using a twisted-pair cable.



Technical characteristics

| | | | RDT2-... |
|--|--------|--|-----------|
| Nr. of changeover contacts | | | 2 |
| Output contacts: | | | |
| Rated insulation voltage Ui | AC (V) | | 400 |
| | DC (V) | | 250 |
| Thermal current Ith | (A) | | 6 |
| Utilisation AC-15 | | | |
| Rated voltage Ue | (V) | | 120/240 |
| Rated current Ie | (A) | | 2.5/1.3 |
| Utilisation DC-13 | | | |
| Rated voltage Ue | (V) | | 110/220 |
| Rated current Ie | (A) | | 0.2/0.1 |
| Supply voltages (Un) | | | |
| AC | (V) | | 220-230 |
| Frequency | (Hz) | | 50/60 |
| Permissible supply voltage variation (%) | | | +10 / -15 |
| Consumption (VA) | | | 3,7 |
| Input circuit test voltage (between input, output circuit and earth) | (kV) | | 2,5 |
| Reset hysteresis (%) | | | 10 |
| Switch ON response time (ms) | | | 100 |

Ambient conditions

| | |
|-----------------------|----------------------------|
| Storage temperature | -10°C to +85°C |
| Operating temperature | -5°C to +50°C |
| Relative humidity | 95% (without condensation) |
| Altitude | 2.000 m |
| Degree of protection | IP40; terminals IP20 |
| Operating positions | Any |

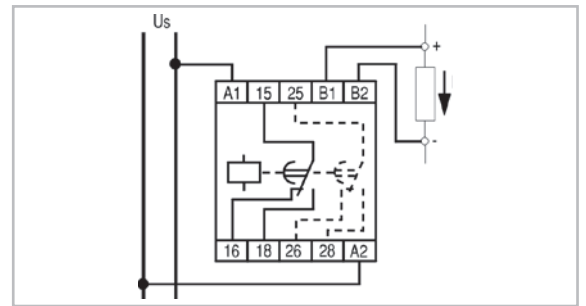
Conformity to standards

| | |
|-----------|------------------|
| VDE 0106 | IEC/EN 60947-5-1 |
| EN 50001 | UNE 20-119 |
| EN 50005 | CE |
| EN 50011 | |
| DIN 46199 | |

RDIT2 Current detector relay ⁽²⁾ with delay (0.5-15 seconds)

Function

This relay is similar to the RDI except that it will connect with a certain adjustable delay of **0.5 to 15 secs**. If current falls below threshold before timeout, relay will reset immediately to recount delay from zero. For higher currents, current transformers or shunts of suitable ratios can be used. The relay requires voltages supply between A1-A2. Controlled voltage can be either direct (DC) or alternating (AC). The output contact function can be set to NO (the **15-18** contact closes when the delay time has elapsed) or to NC (the 15-18 contact is normally closed and opens when the delay time has elapsed or when the control power supply is removed from **A1-A2**) by means of an internal jumper. The **0.2 V** version has been designed to be used with an external shunt and if the distance between the shunt and the relay is greater than 1 m, a connection to the **B1-B2** terminals should be made by using a shielded cable, with its screen joined to the **B2** terminal and isolated on the shunt side or by using a twisted-pair cable.



Technical characteristics

| | | | RDT2-... |
|--|--------|--|-----------|
| Nr. of changeover contacts | | | 2 |
| Output contacts: | | | |
| Rated insulation voltage Ui | AC (V) | | 400 |
| | DC (V) | | 250 |
| Thermal current Ith | (A) | | 6 |
| Utilisation AC-15 | | | |
| Rated voltage Ue | (V) | | 120/240 |
| Rated current Ie | (A) | | 2.5/1.3 |
| Utilisation DC-13 | | | |
| Rated voltage Ue | (V) | | 110/220 |
| Rated current Ie | (A) | | 0.2/0.1 |
| Supply voltages (Un) | | | |
| AC (with transformer) | (V) | | 220-230 |
| Frequency | (Hz) | | 50/60 |
| Permissible supply voltage variation (%) | | | +10 / -15 |
| Repeat accuracy with 0.8 - 1.1 Un (%) | | | 2 |
| Consumption (VA) | | | 3 |
| Input circuit test voltage (between input, output circuit and earth) | (kV) | | 4 |
| Switch OFF response time (s) | | | 0.5 to 15 |
| Reset time between 2 cycles ⁽³⁾ (ms) | | | 100 |

(1) Remark

The relay has a green LED which lights up when the supply is between A1 and A2, and a red LED when the contact is made (11-14).

(2) Remark

The relay has a yellow LED which lights up when the supply is between A1 and A2, and a red LED when the contact is made **15-18**.

(3) Reset time: Time that must go by from the relay ends an operation until it is able to initiate the next one without error.

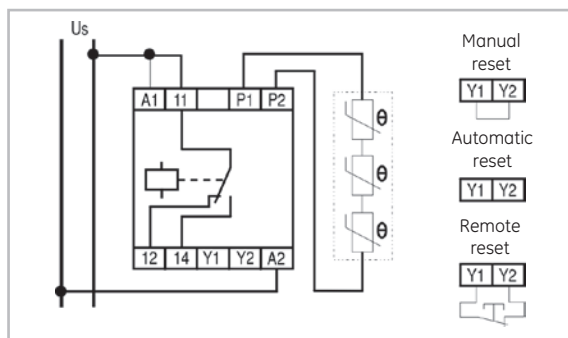
RS01N Thermistor relay

Function

This thermal probe relay is sensitive to resistance of several thermal probes (thermistors, PTC) connected to **P1** and **P2** and detect overheating in motor windings transformers, etc. where these PTC are connected.

The relays disconnects when probe resistance exceeds 2500 ohms and cannot reset until resistance is lower than 1500 ohms. Control voltage should be applied to **A1** and **A2**, the absence of this will cause relay to trip and prevent any possibility remaining without protection. In this case resetting is automatic, but if the relay trips through probe heating, resetting may be automatic, hand or remote (distance NC contact).

RS01N detect those cases of probe cables short-circuited (resistance lower than 20 Ohms) or probe cables cut (resistance higher than 2.5k Ohms). The resistance at 25 °C of the probe circuit must be within 40 to 600 ohms range.



Technical characteristics

| | | RS01N |
|---|---------|-----------------|
| Nr. of changeover contacts | | 1 |
| Output contacts: | | |
| Rated insulation voltage U_i | AC (V) | 400 |
| | DC (V) | 250 |
| Thermal current I_{th} | (A) | 6 |
| Utilisation AC-15 | | |
| Rated voltage U_e | (V) | 120/240 |
| Rated current I_e | (A) | 2.5/1.3 |
| Utilisation DC-13 | | |
| Rated voltage U_e | (V) | 110/220 |
| Rated current I_e | (A) | 0.2/0.1 |
| Supply voltages (Un) | | |
| AC (with transformer) | (V) | 220-230,125,110 |
| Frequency | (Hz) | 50/60 |
| Permissible supply voltage variation (%) | | +10 / -15 |
| Repeat accuracy with 0.85-1.1 Un (%) | | 2 |
| Consumption | (VA) | 3 |
| Input circuit test voltage | (kV) | 4 |
| (between input, output circuit and earth) | | |
| Switch OFF response time | (s) | 100 |
| Hysteresis | (kOhms) | 1 |
| Probe resistance min. (at 25°C)(Ohms) | | 40 |
| Probe resistance max. (at 25°C)(Ohms) | | 600 |
| Max. voltage in terminals P1-P2 (R=2.5kV/V) | | < 1,6 |

Ambient conditions

| | |
|-----------------------|----------------------------|
| Storage temperature | -10°C to +85°C |
| Operating temperature | -5°C to +50°C |
| Relative humidity | 95% (without condensation) |
| Altitude | 2.000 m |
| Degree of protection | IP40; terminals IP20 |
| Operating positions | Any |

Conformity to standards

| | |
|--------------------------|---------------------|
| VDE 0106 | IEC/EN 60947-5-1 |
| EN 50001 | IEC 34-11-2 (RS01N) |
| EN 50005 | UNE 20-119 |
| EN 50011 | CE |
| DIN VDE 0660-303 (RS01N) | |
| DIN 46199 (RSR) | |

Remark

The relay has one LED that lights when the output contact is made.

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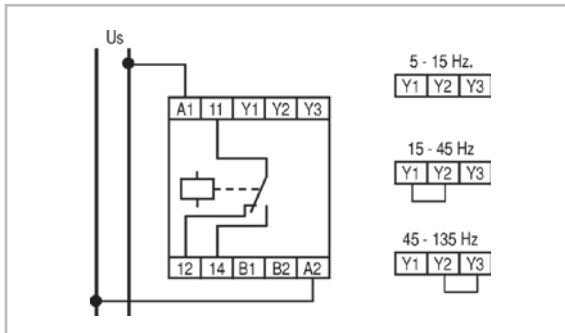
RCF 1 Frequency control relay

Function

This frequency control relay is sensitive to frequency of the signal applied to terminals **B1** and **B2** and output contact connects when frequency fails below a threshold adjustable by the front potentiometer. Supply voltage should also be applied to relay between terminals **A1** and **A2** to produce connection. Possibility of three settings ranges (by cross-connection): 5-15Hz, 15-45Hz, 45-135Hz.

Switching is independent of input signal level at **B1-B2**, within a wide range of values, and response is not changed by the input signal wave form (sinusoidal, square, triangular, etc).

Relay is suitable for suppression of rotor resistance in slipping asynchronous motors starters, speed reversal detector in motor wound motors and frequency control in generating sets.



Technical characteristics

| | | | RCF-1 |
|--|--------|--|---------------------|
| Nr. of changeover contacts | | | 1 |
| Output contacts: | | | |
| Rated insulation voltage Ui | AC (V) | | 400 |
| | DC (V) | | 250 |
| Thermal current Ith | (A) | | 6 |
| Utilisation AC-15 | | | |
| Rated voltage Ue | (V) | | 120/240 |
| Rated current Ie | (A) | | 2.5/1.3 |
| Utilisation DC-13 | | | |
| Rated voltage Ue | (V) | | 110/220 |
| Rated current Ie | (A) | | 0.2/0.1 |
| Supply voltages (Un) | | | |
| AC (with transformer) | (V) | | 380-400,220,230,110 |
| Frequency | (Hz) | | 50/60 |
| Permissible supply voltage variation(%) | | | +10 / -15 |
| Voltage between B1-B2 terminals(V c.a.) | | | 15 to 500 |
| Repeat accuracy with 0.85-1.1 Un (%) | | | 2 |
| Consumption | (VA) | | 3 |
| Input circuit test voltage (between input, output circuit and earth) | (kV) | | 4 |
| Switch ON response time | (ms) | | 100 |
| Switch OFF response time | (ms) | | 800 |
| Reset hysteresis | (Hz) | | 1.5 approx. |

Ambient conditions

| | |
|-----------------------|----------------------------|
| Storage temperature | -10°C to +85°C |
| Operating temperature | -5°C to +50°C |
| Relative humidity | 95% (without condensation) |
| Altitude | 2.000 m |
| Degree of protection | IP40; terminals IP20 |
| Operating positions | Any |

Conformity to standards

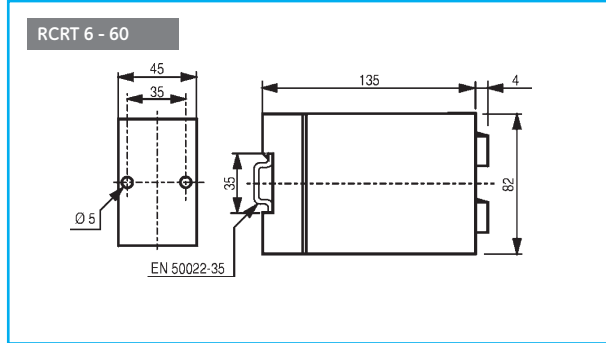
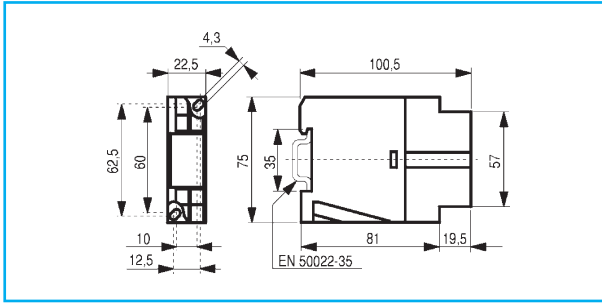
| | |
|----------------|------------------|
| VDE 0106 | EN 50042 (MRI) |
| VDE 0110 (MRI) | DIN 46199 (RCF) |
| EN 50001 (RCF) | IEC/EN 60947-5-1 |
| EN 50002 (MRI) | UNE 20-119 (RCF) |
| EN 50005 | UL 94 (MRI) |
| EN 50011 | UL 508 (MRI) |
| CE | |

Remark

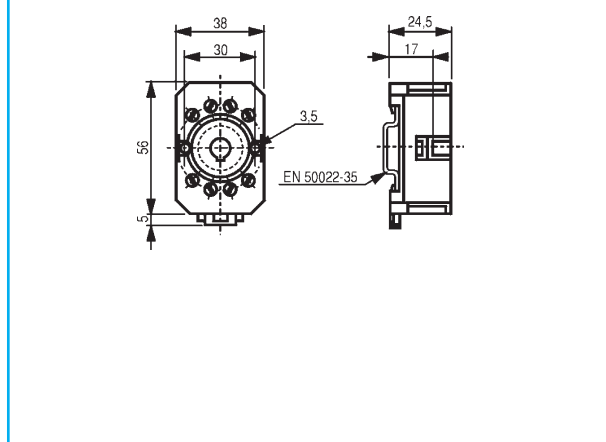
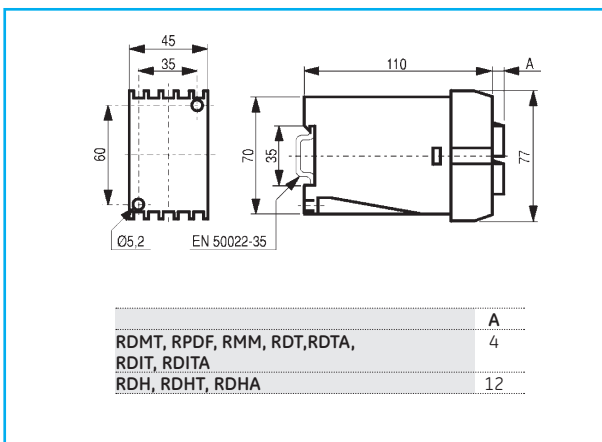
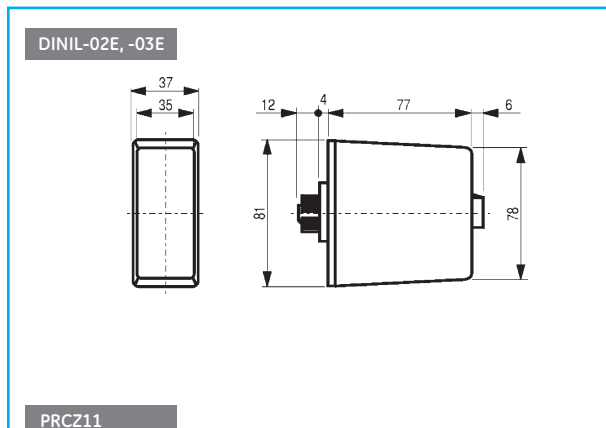
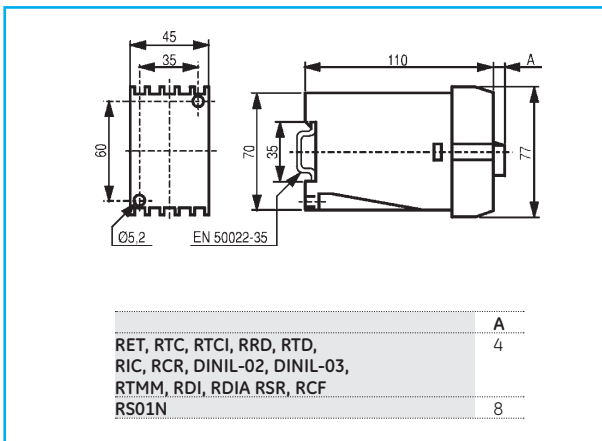
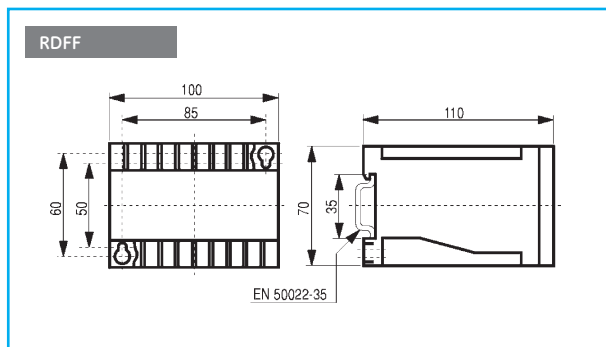
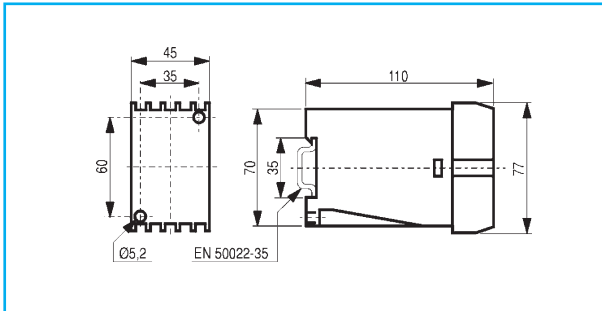
The relay has one LED that lights when the output contact is closed.

Dimensional drawings

Series NMV



Series D



Electronic relays

A

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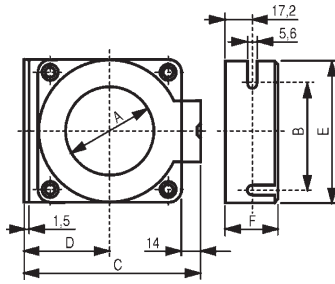
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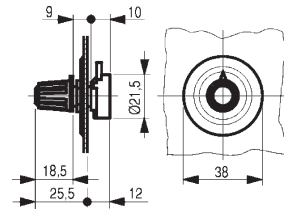
X

Differential transformers



| TYPE | A | B | C | D | E | F |
|----------|-----|-----|-----|-------|-----|------|
| WKA-35 | 35 | 75 | 99 | 42 | 92 | 33.5 |
| WKA-70 | 70 | 98 | 132 | 60.5 | 115 | 33.5 |
| WKA-105 | 105 | 141 | 175 | 82 | 158 | 33.5 |
| WKA-140 | 140 | 183 | 218 | 103.5 | 200 | 33.5 |
| WKA-210 | 210 | 270 | 309 | 150 | 290 | 43 |
| WKAT-35 | 35 | 75 | 99 | 42 | 92 | 33.5 |
| WKAT-70 | 70 | 98 | 132 | 60.5 | 115 | 33.5 |
| WKAT-105 | 105 | 141 | 175 | 82 | 158 | 33.5 |
| WKAT-140 | 140 | 183 | 218 | 103.5 | 200 | 33.5 |
| WKAT-210 | 210 | 270 | 309 | 150 | 290 | 43 |

Remote potentiometer



Series IS and IM - Metal and thermoplastic EN 50041

- G.3 Order codes
- G.10 Technical data
- G.11 Dimensions

Series IUG - Thermoplastic EN 50047

- G.5 Order codes
- G.10 Technical data
- G.13 Dimensions

Series IZ - Thermoplastic, miniature design

- G.6 Order codes
- G.10 Technical data
- G.15 Dimensions

Series 114FCT - Three pole limit switches

- G.9 Order codes
- G.15 Dimensions

Series 115 - Pressure switches

- G.18 Order codes
- G.20 Technical data
- G.21 Dimensions

Plug-in relays and Auxiliary contactors

Motor protection devices

Contactors and Thermal overload relays

Motorstarters

Control and signalling units

Electronic relays

Limit switches

Speed drive units

Main switches

Numerical index

A

B

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I

X





Metal and thermoplastic limit switches. Positive opening. Conforming to EN 50041

- Fixing center lines and operation points in accordance with EN 50041
- NC contacts with positive opening to IEC/EN 60947-5-1
- IP65 protection
- Terminal numbering according to IEC/EN 50013
- Cable entry M20 x 1.5
- Safety switches according to cat. 1 of IEC/EN 60947-5-1 (depends on actuating system)
- CSA and UL certified

Standards

IEC/EN 60947-5-1
IEC/EN 60204-1

Specifications

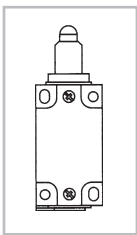
| | |
|-------------------------------------|---------------------------|
| Degree of protection | IP 65 |
| Ambient conditions | |
| Storage temperature | °C -40 to +80 |
| Operating temperature | °C -25 to +80 |
| Resistance to shocks (10 ms) | G 30 |
| Resistance to vibrations (10-55 Hz) | G 25 |
| Mechanical endurance | ops. 10 x 10 ⁶ |
| Cable entry | M20 x 1.5 |
| Fixing screws | 4 x M5 |

Approvals



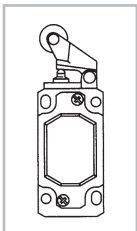
Mounted versions

Series IS...



- Double-insulated bodies, in **thermoplastic material, according to UL-94 VO**
- Clip-fixing and opening of terminal access cover, no screws.





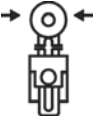




Series IM...




- Metal bodies constructed from injected **aluminium**.
- Cover fastening by screws.

Order codes ● pg. G.3
 Technical data ● pg. G.10
 Dimensions ● pg. G.11

Limit switches according to EN 50041

| | Mounting position of the head ⁽³⁾ | | | Slow break | | Snap action | | Pack |
|---|--|---------------|------------------|------------|----------|--------------|-----------|--------|
| | Heads Standard position | Head position | Form to EN 50041 | Cat. no | Ref. no. | Cat. no | Ref. no. | |
|  | Standard position | II | B | ISGA-B211 | 130000 | ISGA-B411 | 130018 | 5 |
| | | III | B | | | | IMGA-B411 | 130019 |
|  | Roller plunger | III | C | | | ISGR-B411 | 130020 | 5 |
| | | III | C | | | IMGR-B411 | 130021 | 5 |
|  | Roller level | III | (1) | | | ISGH-B411 | 130022 | 5 |
| | | III | (1) | | | IMGH-B411 | 130023 | 5 |
|  | Roller crank | III | A | | | ISGL-B411 | 130028 | 5 |
| | | III | A | | | IMGL-B411(4) | 130029 | 5 |
|  | Adjustable roller crank ⁽²⁾ | II | (1) | | | ISGT-B311 | 130030 | 5 |
| | | II | (1) | | | IMGT-B311 | 130031 | 5 |
|  | Rod lever ⁽²⁾ | II | D | | | IMGP-B311 | 130035 | 5 |
|  | Cross rod | II | (1) | | | IMGC-B411 | 130037 | 5 |
|  | Spring rod lever ⁽²⁾ | III | (1) | | | IMGQ-B311 | 130039 | 5 |
|  | Omnidirectional spring rod ⁽²⁾ | III | (1) | | | ISGM-B311 | 130040 | 5 |
| | | III | (1) | | | IMGM-B311 | 130041 | 5 |

 Positive break

- (1) Fixing center lines and operation points in accordance with EN 50041.
- (2) Heads for these limit switches have no positive opening, as they are adjustable or flexible.
- (3) Supplied in standard mounting position. Positions II and III must be set by user.
- (4) Available with metal roller lever: IMGL-B411M (130107).

Order codes

A

B

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Thermoplastic limit switches. Positive opening conforming to EN 50047

- Fixing center and operation points (IUG...) in accordance with EN 50047
- NC contacts with positive opening according to IEC/EN 60947-5-1
- IP65 protection
- Terminal numbering according to EN 50013
- Thermoplastic material according to UL-94 V0
- One bottom cable entry M20x1.5 on Series IUG...
Two side cable entries for M16x1.5 on Series IUC.
- Two fixing possibilities for series IUGA...
- Clip fixing and opening of terminals access cover, no screws.
- CSA and UL certified

Standards

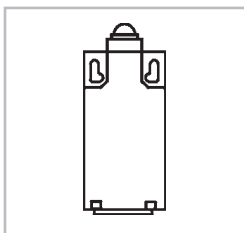
IEC/EN 60947-5-1
IEC/EN 60204-1

Approvals



Mounted versions

Series IUG...



Specifications















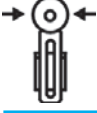







| | |
|-------------------------------------|---------------------------|
| Degree of protection | IP 65 |
| Ambient conditions | |
| Storage temperature | °C -40 to +80 |
| Operating temperature | °C -25 to +80 |
| Resistance to shocks (10 ms) | G 30 |
| Resistance to vibrations (10-55 Hz) | G 25 |
| Mechanical endurance | ops. 10 x 10 ⁶ |
| Cable entry | IUG... 1 x (M20x1.5) |
| Fixing screws | 2 of M5 |

Switch function

| Contact type | Switch function | Switch contacts | Voltage | Current |
|-----------------------|-----------------|-----------------|---------|---------|
| IUG Slow make & break | Changeover | 1NC/1NO | 250V | 10A |
| Snap action | Changeover | 1NC/1NO | 250V | 10A |

Order codes ● pg. G.5
 Technical data ● pg. G.10
 Dimensions ● pg. G.13

Limit switches according to EN 50047

| | Mounting position of the head | | | Slow break | | Snap action | | Pack |
|---|-------------------------------|---|------------------|-------------|----------|-------------|----------|------|
| | Heads Standard position | Head position | Form to EN 50047 | Cat. no. | Ref. no. | Cat. no. | Ref. no. | |
|  | II |  | B | IUGA-B211 | 130060 | IUGA-B411 | 130082 | 5 |
| | | | | IUGA-B211 S | 209140 | | | 5 |
|  | III |  | B ⁽²⁾ | | | IUGU-B411 | 130084 | 5 |
| | | | | IUGU-B211 S | 130057 | | | 5 |
|  | III |  | B ⁽²⁾ | | | IUGR-B411 | 130086 | 5 |
|  | III |  | E | IUGH-B211 | 130066 | IUGH-B411 | 130088 | 5 |
|  | III |  | B ⁽²⁾ | | | IUGI-B411 | 130090 | 5 |
|  | III |  | B ⁽²⁾ | IUGE-B211 | 130072 | IUGE-B411 | 130094 | 5 |
|  | III |  | A | IUGL-B211 | 130074 | IUGL-B411 | 130096 | 5 |
|  | II |  | B ⁽²⁾ | IUGT-B111 | 130076 | IUGT-B311 | 130098 | 5 |
|  | II |  | B ⁽²⁾ | | | IUGP-B311 | 130100 | 5 |
|  | III |  | B ⁽²⁾ | IUGQ-B111 | 130080 | IUGQ-B311 | 130102 | 5 |
|  | III |  | B ⁽²⁾ | | | IUGM-B311 | 130104 | 5 |

(1) Heads for these limit switches have no positive opening.
 (2) Fixing centre lines and operating points according to EN 50047.

 Positive break

Order codes

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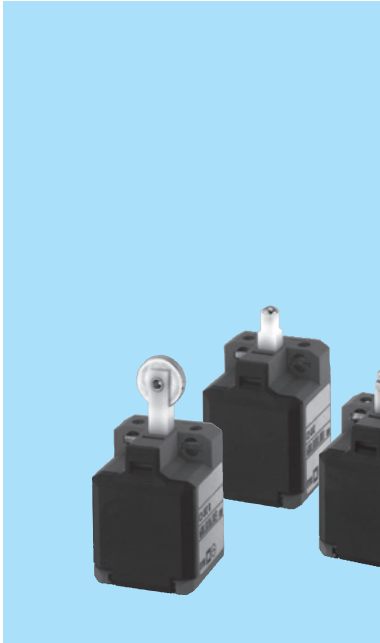
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Miniature thermoplastic limit switches

- The small sizes makes these ideal for use in reduced spaces
- With slow break, NC contacts with positive opening according to IEC/EN 60947-5-1
- 2 mm contact opening of slow-action system according to EN 81-1 for lift application
- IP30 protection
- Terminal numbering according to EN 50013
- Thermoplastic material in accordance with UL-94 V0
- Clip fixing and opening of the contact access cover, no screws
- Two fixing possibilities: 2 x M3 from the top
2 x M4 for mounting from the front

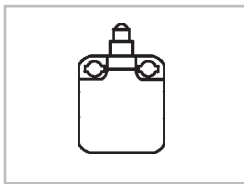
Approvals



Switch function






| Contact type | Switch function | Switch contacts | Voltage | Current |
|-------------------|-----------------|-----------------|---------|---------|
| Slow make & break | Changeover | 1NC/1NO | 250V | 10A |
| Snap action | Changeover | 1NC/1NO | 250V | 10A |

Mounted versions



Order codes ● pg. G.6
 Technical data ● pg. G.10
 Dimensions ● pg. G.15

Miniature limit switches

| | Heads | Slow break | | Snap - action | | Pack |
|---|--------------------------|--|------------------|--|----------|------|
| | | Cat. no. | Ref. no. | Cat. no. | Ref. no. | |
|  | Plunger |  11 23 NC NO 12 24 | |  13 21 NO NC 14 22 | | |
|  | Push-button (adjustable) | | IZMS-B211 130141 | IZMS-B311 | 130145 | 10 |
|  | Roller plunger | | | IZMR-B311 | 130146 | 10 |

Notes

Grid area for notes.

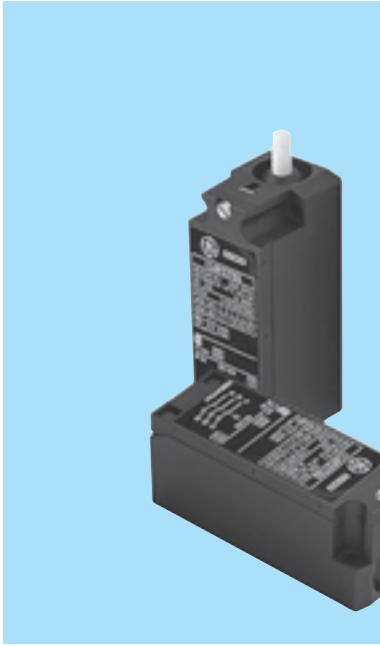
Order codes

- A
- B
- C
- D
- E
- F
- G
- H
- I
- X



Series 114FCT

Limit switches



Three pole limit switches

- Switch-box, cover and operation plunger by thermoplastic resin.
- Silver contacts.
- Lockable cover with one screw only.
- Two basic versions:
 - Without seal Protection IP40 according to IEC 529
 - With seal Protection IP65 according to IEC 529 (Types NEMA 1, 12 and 13 according to UL, ENCL. 3 according to CSA)
- Four electrical functions for both versions.
- Slow operation contacts, double-break and positive break of NC contacts.
- With screws, retractable and captive clamp type. Protection against accidental contact with live parts, degree of protection IP2x according to IEC 529.

Standards

IEC/EN 60947-5-1
VDE 0660
BSI 4794
NFC 63140

Approvals



Actuating force

| Minimum actuating force | | |
|-------------------------|--|-------|
| 114FCT03, ...03T | | 7.5N |
| 114FCT12, ...12T | | 10N |
| 114FCT21, ...21T | | 12N |
| 114FCT30, ...30T | | 13N |
| Positive opening force | | |
| 114FCT03, ...03T | | 8.5N |
| 114FCT12, ...12T | | 8.5N |
| 114FCT21, ...21T | | 8.5N |
| 114FCT30, ...30T | | - |
| Maximum force | | |
| 114FCT03, ...03T | | 12N |
| 114FCT12, ...12T | | 13.5N |
| 114FCT21, ...21T | | 15.5N |
| 114FCT30, ...30T | | 17N |


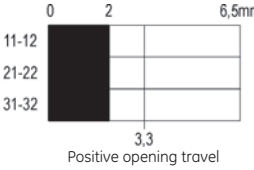

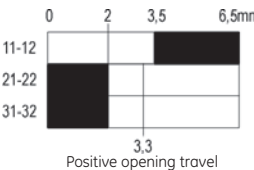
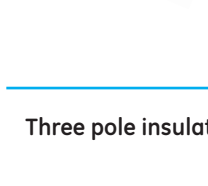
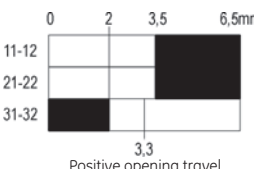

Specifications

| Mechanical performances | | | | | | | | | | | | | | | | | | | |
|---|---|----------------|----|------|------|-----|-----|-----|-----|-----|----------------|-----|-----|----|------|------|-----|-----|-----|
| Climatic protections | | | | | | | | | | | | | | | | | | | |
| Temperate climate (DIN 50014) | 23 / 50 | | | | | | | | | | | | | | | | | | |
| Wet climate (DIN 50015) | 23 / 83 | | | | | | | | | | | | | | | | | | |
| Hot wet climate (DIN 50015) | 40 / 92 | | | | | | | | | | | | | | | | | | |
| Variable wet climate (DIN 50016) | FW 24 | | | | | | | | | | | | | | | | | | |
| Temperature ranges | | | | | | | | | | | | | | | | | | | |
| Operation | -25°C to +70°C | | | | | | | | | | | | | | | | | | |
| Storage | -40°C to +70°C | | | | | | | | | | | | | | | | | | |
| Vibrations resistance | 10G | | | | | | | | | | | | | | | | | | |
| (according to IEC 68-2-6) | with frequency range from 1 to 100Hz | | | | | | | | | | | | | | | | | | |
| Mechanical endurance | 10 x 10 ⁶ operations | | | | | | | | | | | | | | | | | | |
| Operation speed | | | | | | | | | | | | | | | | | | | |
| Min. | 0.25 m/sec. | | | | | | | | | | | | | | | | | | |
| Max. | 1 m/sec. | | | | | | | | | | | | | | | | | | |
| Electrical performances | | | | | | | | | | | | | | | | | | | |
| Rated insulation voltage (Ui) EN 60947.1 | 690V | | | | | | | | | | | | | | | | | | |
| Impulse withstand voltage (Uimp) EN 60947.1 | 4kV | | | | | | | | | | | | | | | | | | |
| Insulation class according to VDE 0660 | Group C | | | | | | | | | | | | | | | | | | |
| Electrical shocks protection IEC 536 | Class II (double insulation) | | | | | | | | | | | | | | | | | | |
| Short-circuit protection according to IEC 269.1 and 269.3 | 10A | | | | | | | | | | | | | | | | | | |
| Rated thermal current: Ith | 10A | | | | | | | | | | | | | | | | | | |
| Performances according to IEC 947.5.1 | | | | | | | | | | | | | | | | | | | |
| Cat. AC15 | <table border="1"> <tr> <th>Voltage Ue (V)</th> <td>24</td> <td>48</td> <td>60</td> <td>110</td> <td>220</td> <td>380</td> <td>500</td> <td>600</td> </tr> <tr> <th>Current Ie (A)</th> <td>10</td> <td>10</td> <td>10</td> <td>6</td> <td>3</td> <td>2</td> <td>1.5</td> <td>1.2</td> </tr> </table> | Voltage Ue (V) | 24 | 48 | 60 | 110 | 220 | 380 | 500 | 600 | Current Ie (A) | 10 | 10 | 10 | 6 | 3 | 2 | 1.5 | 1.2 |
| Voltage Ue (V) | 24 | 48 | 60 | 110 | 220 | 380 | 500 | 600 | | | | | | | | | | | |
| Current Ie (A) | 10 | 10 | 10 | 6 | 3 | 2 | 1.5 | 1.2 | | | | | | | | | | | |
| Cat. DC13 | <table border="1"> <tr> <th>Voltage Ue (V)</th> <td>24</td> <td>48</td> <td>60</td> <td>110</td> <td>220</td> <td>300</td> <td></td> <td></td> </tr> <tr> <th>Current Ie (A)</th> <td>2.5</td> <td>1.4</td> <td>1</td> <td>0.55</td> <td>0.27</td> <td>0.2</td> <td></td> <td></td> </tr> </table> | Voltage Ue (V) | 24 | 48 | 60 | 110 | 220 | 300 | | | Current Ie (A) | 2.5 | 1.4 | 1 | 0.55 | 0.27 | 0.2 | | |
| Voltage Ue (V) | 24 | 48 | 60 | 110 | 220 | 300 | | | | | | | | | | | | | |
| Current Ie (A) | 2.5 | 1.4 | 1 | 0.55 | 0.27 | 0.2 | | | | | | | | | | | | | |
| Performances according to UL and CSA | | | | | | | | | | | | | | | | | | | |
| | AC / Heavy duty (A600) | | | | | | | | | | | | | | | | | | |
| | DC / Standard duty (Q300) | | | | | | | | | | | | | | | | | | |
| Terminals | | | | | | | | | | | | | | | | | | | |
| Capacity | min. 22 AWG (0.32mm ²) | | | | | | | | | | | | | | | | | | |
| Rigid and/or flexible conductors | max. 12 AWG (3.3mm ²) | | | | | | | | | | | | | | | | | | |
| Cable entry | 1 x PG11 | | | | | | | | | | | | | | | | | | |

Order codes ● pg. G.9
Dimensions ● pg. G.15



Three pole limit switches

| | Contacts | Diagrams | Protection | Cat. no. | Ref. no. | Pack. |
|---|----------------------------------|---|------------|------------------|----------|-------|
|  | 11 21 31 NC NC NC 12 22 32 |  | IP40 | 114FCT03 | 130320 | 1 |
| | | | IP65 | 114FCT03T | 130321 | 1 |
|  | 13 21 31 NO NC NC 14 22 32 |  | IP40 | 114FCT12 | 200909 | 1 |
| | | | | | | |
|  | 13 23 31 NO NO NC 14 24 32 |  | IP40 | 114FCT21 | 200910 | 1 |
| | | | | | | |
| Three pole insulated jumper | | | | 105PT | 132234 | 1 |
|  | | | | | | |

Order codes

A

B

C

D

E

F

G

H

I

X

Technical data

Limit switches

| | ISG..-B211 IMG..-B211 | ISG..-B311 IMG..-B311 ISG..-B411 IMG..-411 | IUG..-B111 IUG..-B211 | IUG..-B311 IUG..-B411 | IZM..-B211 | IZM..-B311 | |
|---|---------------------------------|---|--------------------------|--------------------------|------------|-------------|------|
| Type of break | Slow break | Snap action | Slow break | Snap action | Slow break | Snap action | |
| Number of contacts | 2 | 2 | 2 | 2 | 2 | 2 | |
| Function | 1NO-1NC | 1NO-1NC | 1NO-1NC | 1NO-1NC | 1NO-1NC | 1NO-1NC | |
| Polarity | Same | Same | Same | Same | Same | Same | |
| Rated thermal current (Ithe) (A) | 10 | 10 | 10 | 10 | 10 | 10 | |
| Auxiliary contacts | | | | | | | |
| Rated insulation voltage (Ui)V | 400 | 400 | 250 | 250 | 380 | 250 | |
| Protection against electrical shocks | Class II (ISG) CLASS I (IMG) | Class II (ISG) CLASS I (IMG) | Class II | Class II | - | - | |
| Protection against electrical shocks (fuse) (A) | 10 | 2 | 10 | 2 | 6 | 6 | |
| Rated current (DIN EN60947-5-1) | | | | | | | |
| A300 AC-15 | 12/24V (A) | - | - | - | - | - | |
| | 48/60V (A) | - | - | - | - | - | |
| | (110V) 120V (A) | 6 | 6 | 6 | 6 | 6 | |
| | 127V (A) | - | - | - | - | - | |
| | (220V) 240V (A) | 3 | 3 | 3 | 3 | 3 | |
| | 380V (A) | - | - | - | - | - | |
| | Q300 DC-13 | 24V (A) | - | - | - | - | - |
| | | 48V (A) | - | - | - | - | - |
| | | (110V) 125V (A) | 0.55 | 0.55 | - | - | 0.55 |
| | | (220V) 250V (A) | 0.27 | 0.27 | - | - | 0.27 |
| 300V (A) | | - | - | - | - | - | |
| Operating rate (ops./h) | 6000 | 6000 | 6000 | 6000 | 6000 | 6000 | |
| Switching time (ms) | - | 10 | - | 10 | - | 10 | |
| Repetition assurance (mm) | ± 0.1 | ± 0.1 | ± 0.1 | ± 0.1 | ± 0.1 | ± 0.1 | |
| Clamping capacity (mm ²) | 0.5 - 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | |
| Terminal screw | M3.5 | M3.5 | M3.5 | M3.5 | M3.5 | M3.5 | |
| Protection | IP65 | IP65 | IP65 | IP65 | IP30 | IP30 | |

Limit switches

A

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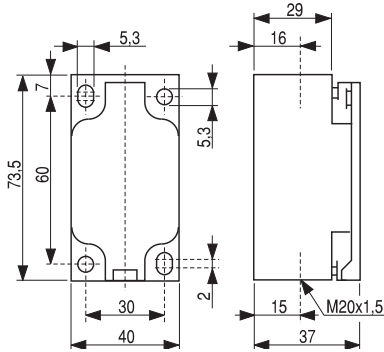
X



Dimensional drawings

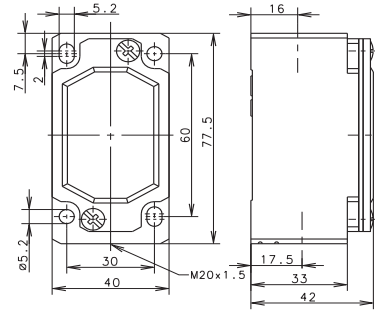
Contact block Series IS

Common for all limit switches Series IS



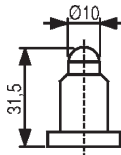
Contact block Series IM

Common for all limit switches Series IM

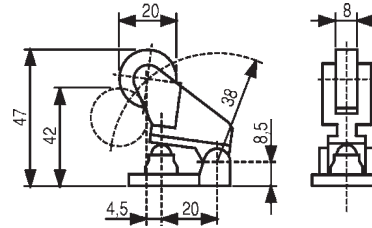


Operating heads

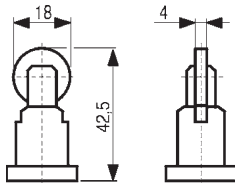
ISGA B..., IMGA B...



ISGH B..., IMGH B...



ISGR B..., IMGR B...



Dimensions

A

B

C

D

E

F

G

H

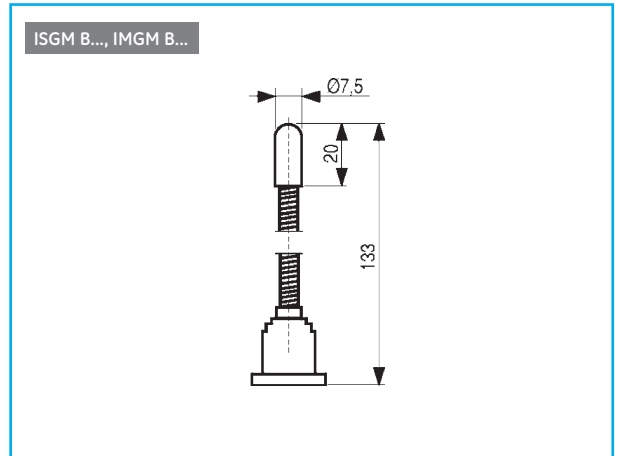
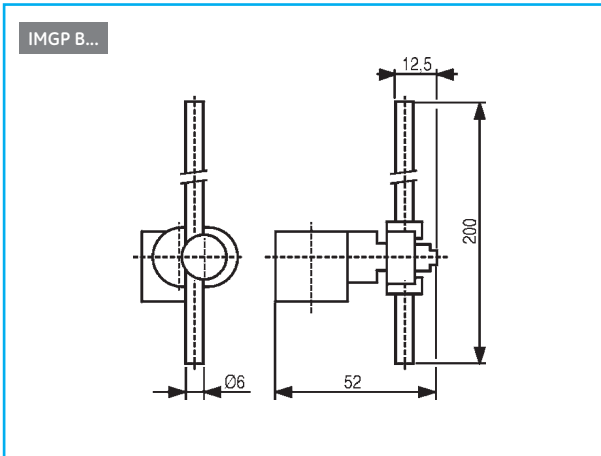
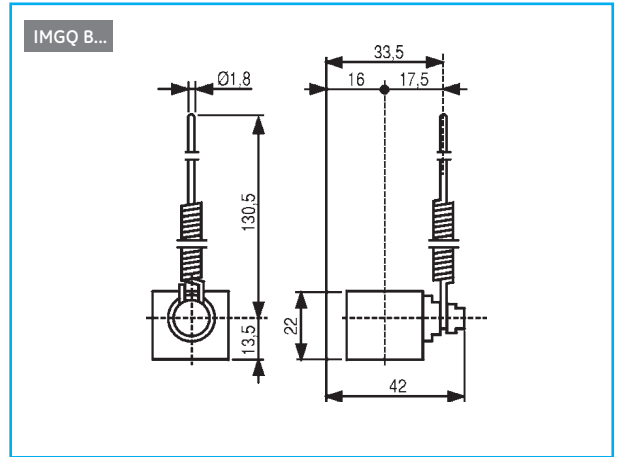
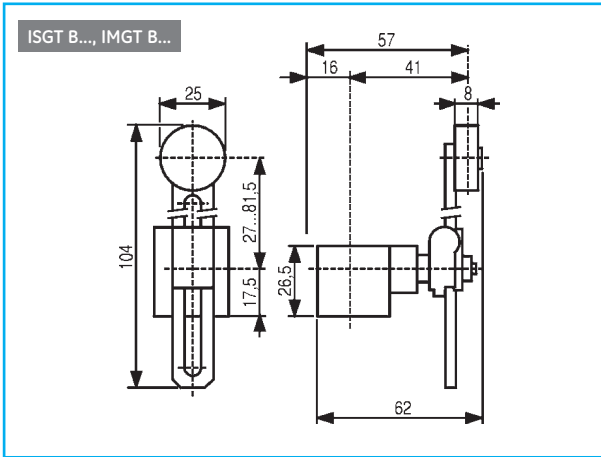
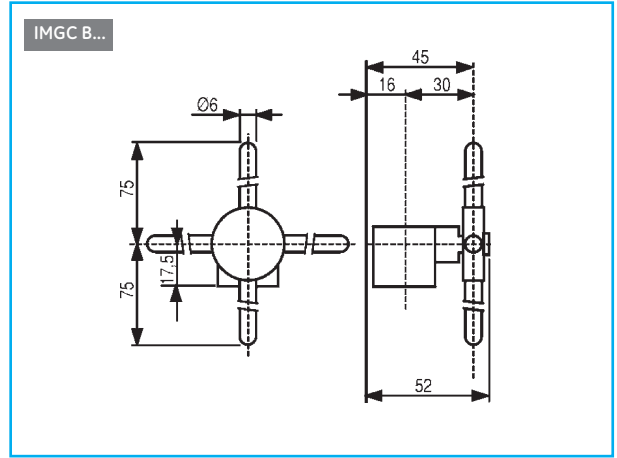
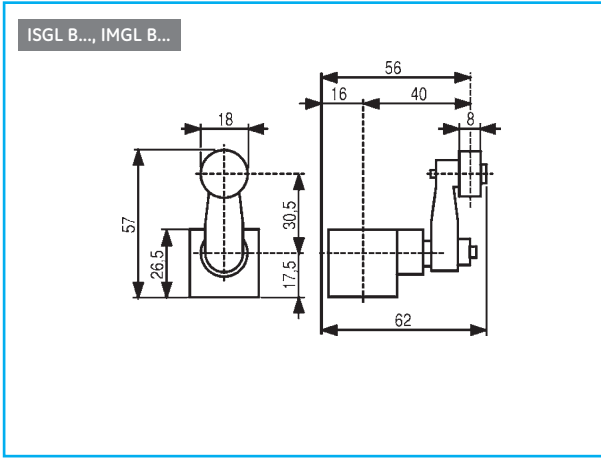
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Series IS and IM

Dimensional drawings

Operating heads (continued)



Limit switches

A

B

C

D

E

F

G

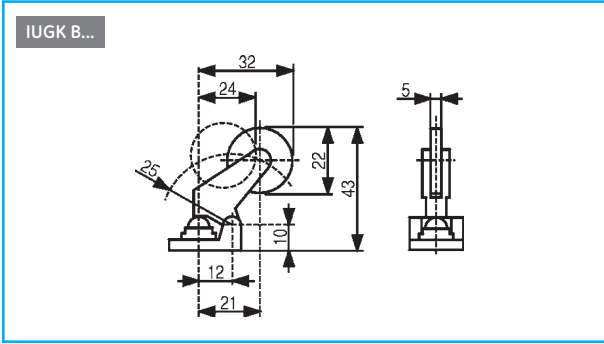
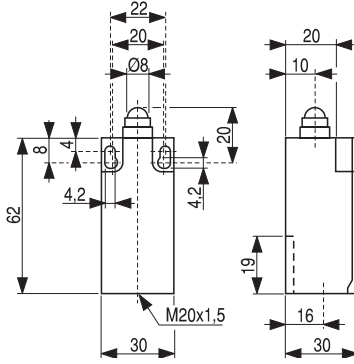
H

I

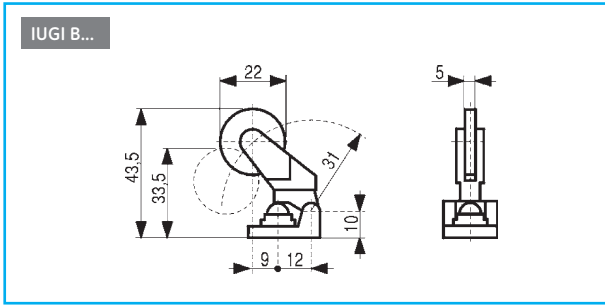
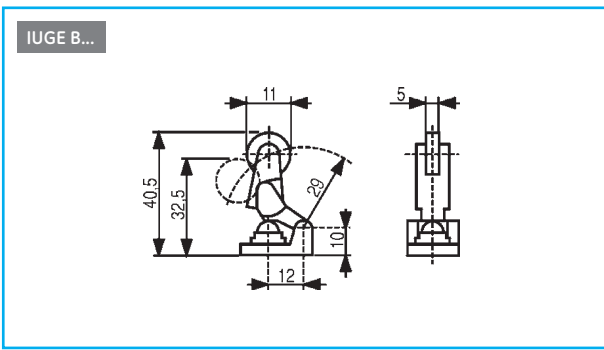
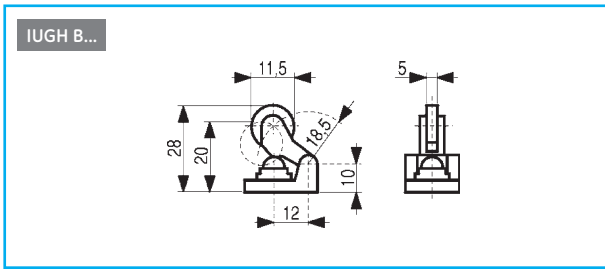
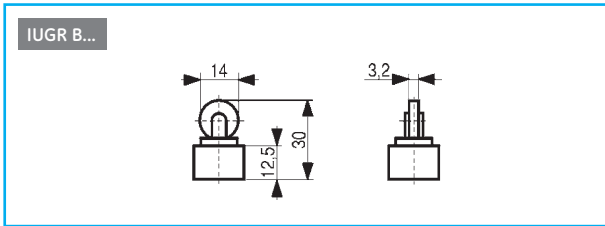
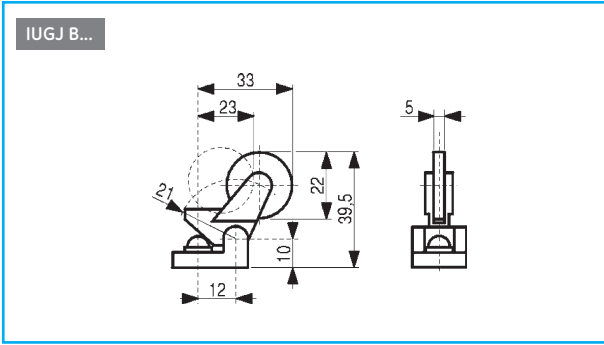
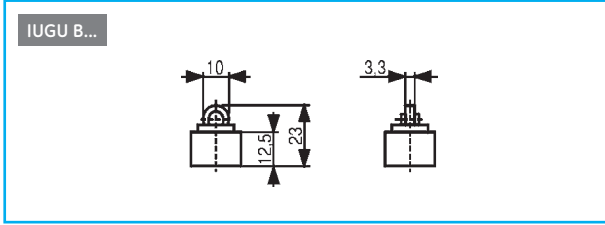
X

Contact block Series IUG

Common for all limit switches Series IUGA B...



Operating heads



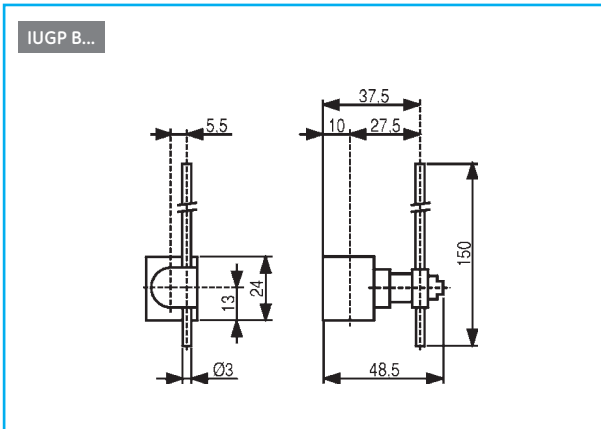
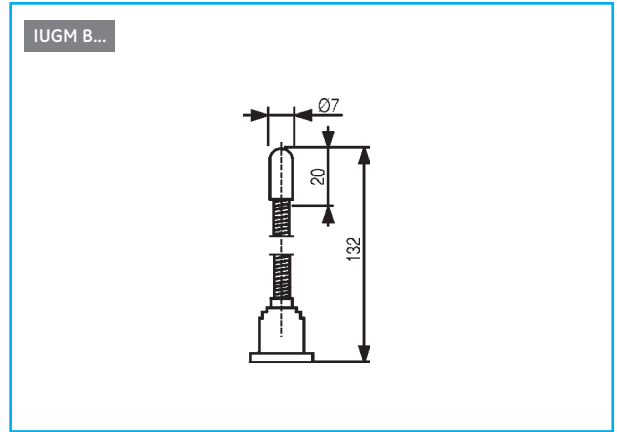
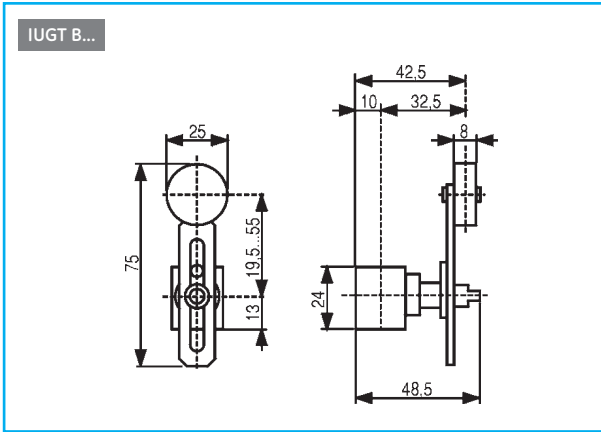
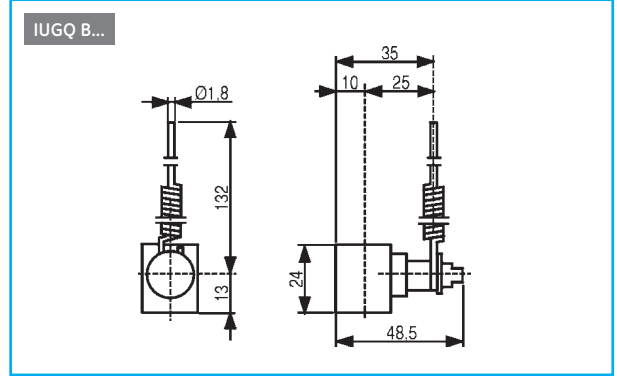
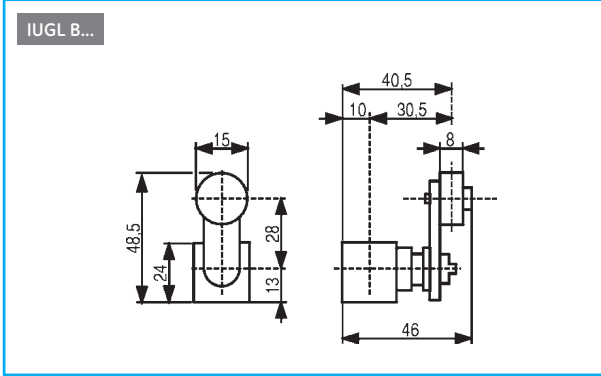
Dimensions

| |
|----------|
| A |
| B |
| C |
| D |
| E |
| F |
| G |
| H |
| I |
| X |

Series IUG

Dimensional drawings

Operating heads (continued)



Limit switches

A

B

C

D

E

F

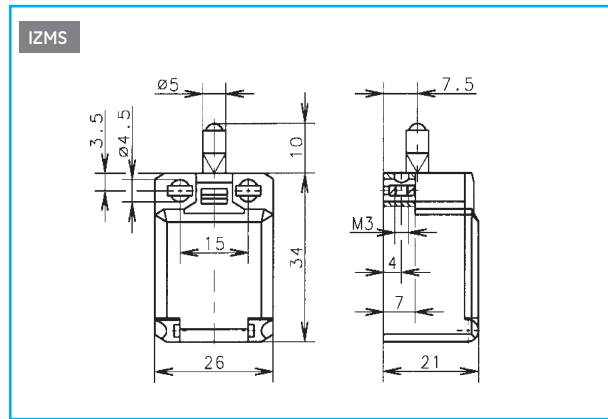
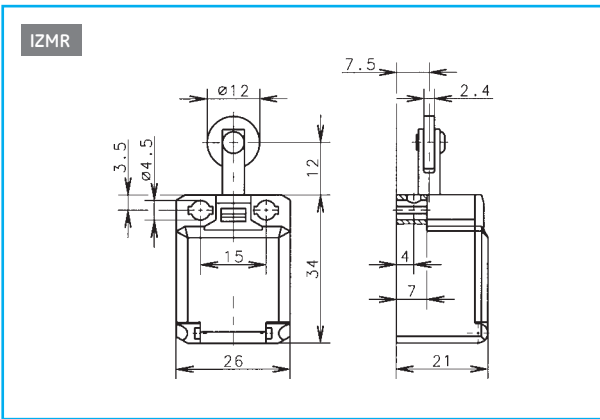
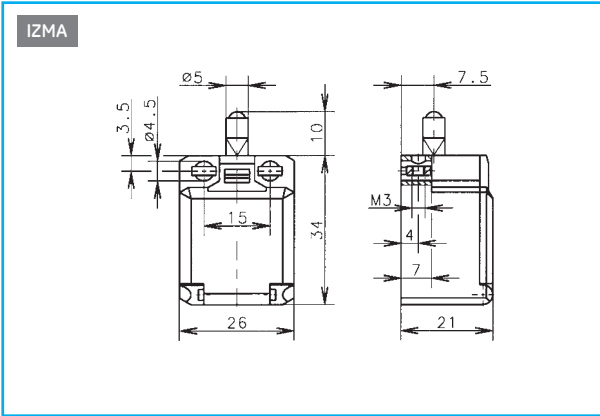
G

H

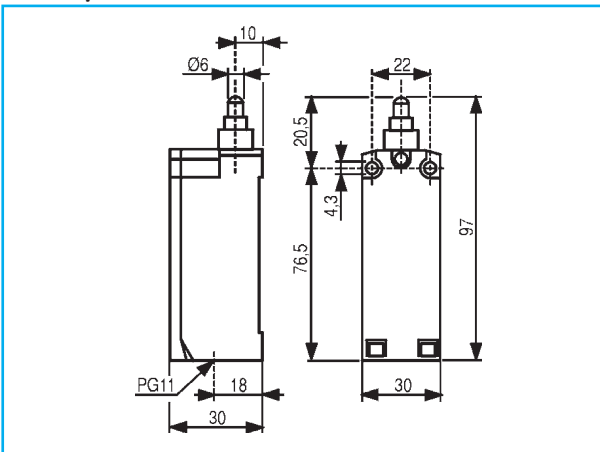
I

X

Series IZ



Three pole limit-switches Series 114FCT



Dimensions

A

B

C

D

E

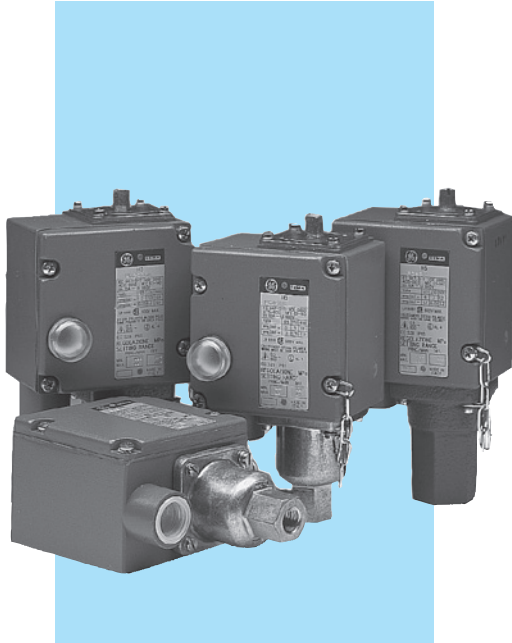
F

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Pressure switches

- Controlled fluid temperature: 120°C
- Fluids that can be controlled by bellows pressure switches: air and rare gases, freon, water (sea-water not included), fuel oils, mineral oils, hydraulic oils and other kinds of fluids that do not corrode steel, tin and other kinds of fluids that do not corrode steel, tin and copper alloys. To avoid absolutely and solvents and acids.
- Fluids that can be controlled by piston pressure switches: mineral oils and hydraulic oils that do not corrode steel and cast iron.
- Synthetic oils with base of phosphates, gas and all the other fluids have to be excluded.

Setting range choice

On the following pages are shown the values within which it is possible to make setting of our pressures switches.

For a correct interpretation, consider that:

- The main setting range defines the values within which it is possible to set the tripping of the pressure switch, when the pressure is decreasing.
- The differential setting range defines the values that, added to those ones of the main range, determine the tripping when pressure is increasing.
- The maximum admissible pressure defines the limit that the devices can stand without consequences. Indicated values have never to exceed also in the case of occasional overpressure of temporary type.

When choosing the most suitable type, consider that the device reaches its excellent efficiency when the tripping point, with decreasing pressure, is set between 25% and 75% of the main setting range.

Standards

IEC/EN 60947-5-1 BSI
CEI UTE
VDE 0660

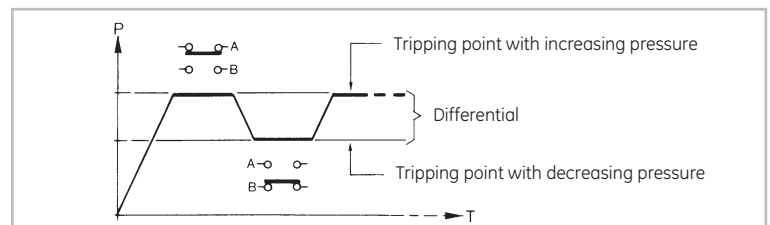
Approvals



ASE/SEV (Switzerland)

Setting

- To completely loose the external screw of the main range and the internal pawl of the differential range.
- By a manometer, to set pressure at the value on which the tripping is wanted, when pressure is decreasing. To screw the external screw of the main range until the tripping of the microswitch (A contact shall result open and B closed).
- To completely screw the pawl of the differential range, until its maximum value.
- To set pressure at the value on which the tripping is wanted, when pressure is increasing.
- To loosen the pawl of the differential range until the tripping of the microswitch (A contact shall result closed and B open).



A

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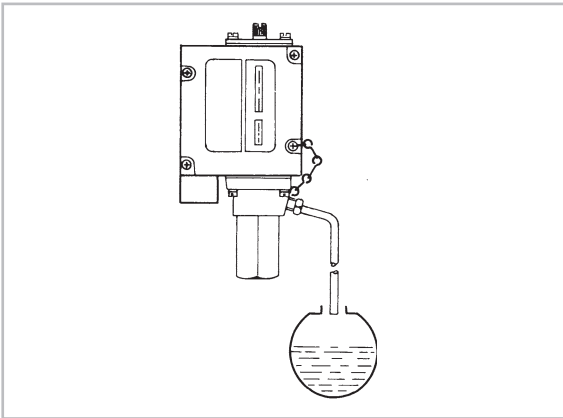


Location

Generally the location of our pressure switches can be effected as wanted.

Nevertheless, as to the piston types whitout seal ring, location have to be made in such a way as to allow the discharge, through the drainage hole, of the blow-by oil between cylinder and piston (a few drops per hour). The going-out oil can be collected by a proper drainage pipe that conveys it, free falling, into the tank of the hydraulic central, as shown in the below figure.

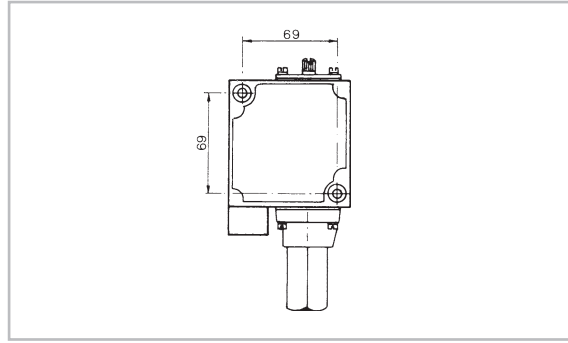
Caution



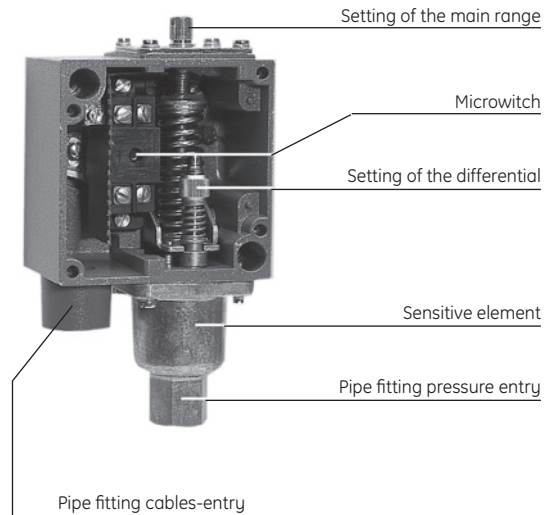
- Do not connect the drainage hole to a return pipe of the line...
- The drainage pipe must not cover a way different from that one indicated (e.g. towards the top).
- Do not plug the drainage holes.

If the above cautions are not met, inside the sensitive group there will be a counter pressure that could damage the sealing washer between actuator and frame of the pressure switch.

Fixing



To fix the pressure switch on a proper support, use the two pierceable holes \varnothing 6.8 mm. located under the cover. To absolutely avoid to fix it directly on the pipe containing the fluid to be controlled, use the threaded pipe fitting for pressure entry.



A

B

C

D

E

F



G

H

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Pressure switches - Bellows type⁽¹⁾

|  | Without lighting signalisation | | Setting range | Maximum admissible pressure | Weight (kg) | 1NO - 1NC | | 2NO - 2NC | | Pack. |
|---|---|--------------|---------------|-----------------------------|------------------|-----------|-------------------|-----------|---------|-------|
| | Main | Differential | | | | Cat. no | Ref. no | Cat. no | Ref. no | |
| | Mpa Bar | Mpa Bar | | | | | | | | |
| | 0.002 - 0.15 | 0.02 - 0.1 | 0.4 | 0.950 | 115PC002 | 132500 | 115PC2002 | 132504 | 1 | |
| | 0.02 - 1.5 | 0.2 - 1 | 4 | 0.950 | 115PC015 | 132501 | 115PC2015 | 132505 | 1 | |
| | 0.01 - 0.5 | 0.04 - 0.1 | 0.6 | 0.950 | 115PC018 | 132502 | 115PC2018 | 132515 | 1 | |
| | 0.1 - 5 | 0.4 - 1 | 6 | 0.950 | 115PC119 | 132503 | 115PC2119 | 132506 | 1 | |
| | 0.01 - 0.8 | 0.07 - 0.2 | 1.55 | | | | | | | |
| | 0.1 - 8 | 0.7 - 2 | 15.5 | | | | | | | |
| | 1 - 19 | 1.2 - 2 | 24.5 | | | | | | | |
|  | With lighting signalisation (red lens) ⁽²⁾ | | Setting range | Maximum admissible pressure | Weight (kg) | 1NO - 1NC | | 2NO - 2NC | | Pack. |
| | Main | Differential | | | | Cat. no | Ref. no | Cat. no | Ref. no | |
| | Mpa Bar | Mpa Bar | | | | | | | | |
| | 0.002 - 0.15 | 0.02 - 0.1 | 0.4 | 0.950 | 115PC002L | 132507 | 115PC2002L | 132511 | 1 | |
| | 0.02 - 1.5 | 0.2 - 1 | 4 | 0.950 | 115PC015L | 132508 | 115PC2015L | 132512 | 1 | |
| | 0.01 - 0.5 | 0.04 - 0.1 | 0.6 | 0.950 | 115PC018 | 132509 | 115PC2018 | 132513 | 1 | |
| | 0.1 - 5 | 0.4 - 1 | 6 | 0.950 | 115PC119 | 132510 | 115PC2119 | 132514 | 1 | |
| | 0.01 - 0.8 | 0.07 - 0.2 | 1.55 | | | | | | | |
| | 0.1 - 8 | 0.7 - 2 | 15.5 | | | | | | | |
| | 1 - 19 | 1.2 - 2 | 24.5 | | | | | | | |

(1) Bellows types in stainless steel on request.
 (2) Lamp is not delivered. For types see Accessories on G.19.

Limit switches

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Accessories

| Microswitch | Contacts | | Weight | | Cat. no. | | Ref. no. | | Pack. | | |
|--------------------------------------|-----------------------|--------|-------------|----------|-----------------|----------|-------------------|----------|----------------|----------|-------|
| | 1NO - 1NF | | 0.060 | | 090MI1 | | 130310 | | 25 | | |
| | 2NO - 2NF | | 0.100 | | 090MI2 | | 130311 | | 25 | | |
| Sensitive group | Basic pressure switch | Weight | Bellow type | | | | Piston type | | | | Pack. |
| | | | Standard | | Stainless steel | | Without seal ring | | With seal ring | | |
| | | | Cat. no. | Ref. no. | Cat. no. | Ref. no. | Cat. no. | Ref. no. | Cat. no. | Ref. no. | |
| | 115PC002 | 0.045 | 115807SP | 132562 | 1158065SPA | 215320 | - | - | - | - | 1 |
| | 115PC015 | 0.045 | 115803SP | 132563 | 1158067SPA | 215321 | - | - | - | - | 1 |
| | 115PC018 | 0.045 | 115805SP | 132564 | 1158067SPA | 215321 | - | - | - | - | 1 |
| | 115PC119 | 0.045 | 115804SP | 132565 | 1158067SPA | 215321 | - | - | - | - | 1 |
| | 115PD970 | 0.505 | - | - | - | - | 1158029-01GI | 132566 | 1158029-03GIT | 132568 | 1 |
| | 115PD15210 | 0.505 | - | - | - | - | 1158029-02GI | 132567 | 1158029-04GIT | 132569 | 1 |
| | 115PD38350 | | | | | | | | | | |
| Knob for setting main range pressure | | | | | Weight | | Cat. no. | | Ref. no. Pack. | | |
| | | | | | 0.014 | | 115MA | | 132570 1 | | |
| Protective cap of main range screws | | | | | Weight | | Cat. no. | | Ref. no. Pack. | | |
| | | | | | 0.078 | | 115CA | | 132571 100 | | |
| Bulb with BA96 base - filament type | | | | | Vn AC/DC | Wn | Weight | Cat. no. | Ref. no. | Pack | |
| | | | | | 6 | 1.5 | 0.002 | BA9S615 | 187851 | 5 | |
| | | | | | 12 | 2 | 0.002 | BA9S122 | 187852 | 5 | |
| | | | | | 24 | 2 | 0.002 | BA9S242 | 187853 | 5 | |
| | | | | | 30 | 2.1 | 0.002 | BA9S30 | 187854 | 5 | |
| | | | | | 48 | 2 | 0.002 | BA9S48 | 187855 | 5 | |
| | | | | | 60 | 1.2 | 0.002 | BA9S6012 | 187856 | 5 | |
| | | | | | 130 (110) | 2 | 0.002 | BA9S130 | 187857 | 5 | |
| Bulb with BA9s base - neon type | | | | | Vn AC/DC | Wn | Weight | Cat. no. | Ref. no. | Pack | |
| | | | | | 10 | 0.11 | 0.002 | BA9SN110 | 187860 | 5 | |

Pressure switches

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Technical data

General

The pressure switches Series 115 are designed for transforming a pressure variation into an electrical signal when a pre-arranged pressure value is reached.

Pressure switches are utilized in the field of the industry machines, installations and transports.

Climatic protections

| | |
|----------------------|------------------------|
| Temperature climate | cat. 23/50 (DIN 50014) |
| Wet climate | cat. 23/83 (DIN 50015) |
| Hot wet climate | cat. 40/92 (DIN 50015) |
| Variable wet climate | cat. FW24 (DIN 50016) |

Temperature ranges

| | |
|-----------|-----------------|
| Operation | -25°C to +70° C |
| Storage | -40°C to +70°C |

Insulation class

| | |
|------------|--------------|
| IP65 | IEC/EN 60529 |
| ENCL. 4, 5 | CSA |

Vibration resistance

| | |
|---|------------|
| 5g at a sinusoidal frequency ranging from to 100 Hz according to IEC 68-2-6 | IEC 68-2-6 |
|---|------------|

Mechanical endurance

Bellows type

1 million operations. It can be considerably reduced when the pressure jump reaches the maximum value foreseen for every type of device and the operations number is high. The bellows endurance can be also negatively influenced by the temperature and the kind of controlled fluid.

Rated insulation voltage

600V AC/DC

Insulation class

Group C according to VDE 0110

Short-circuit protection

10 A gL fuses according to IEC 947-5-1

Electrical performances

090MI1 (1NO + 1NC)

090MI2 (2NO + 2NC)

Rated thermal current: I_{th} = 10 A

Performances according IEC 947.5.1

| Category AC15 (A600) | | | | | | | | | |
|------------------------|---|-----|-----|----|------|------|-----|-----|-----|
| Voltage U _e | V | 24 | 48 | 60 | 110 | 220 | 380 | 500 | 600 |
| Current I _e | A | 10 | 10 | 10 | 6 | 3 | 2 | 1.5 | 1.2 |
| Category DC 13 (P600) | | | | | | | | | |
| Voltage U _e | V | 24 | 48 | 60 | 110 | 220 | 300 | | |
| Current I _e | A | 2.5 | 1.4 | 1 | 0.55 | 0.27 | 0.2 | | |

Performances according to CSA

AC/Heavy Duty (A/600)

DC/Standard Duty (Q300)

Connections at same polarity

Connection terminals

Screw type without clamping screw.

Suitable for eye, fork and hook terminals.

Cable entry

One PG 13.5 threaded cable entry.

Range

The pressure switches series 115 are available in two basic versions:

- With bellows sensitive element for pressures ranging between 0.002 Mpa (0.02 bar) minimum and 2.1 Mpa (21 bar) maximum.
- With piston sensitive element for pressures ranging between 0.95 Mpa (9.5 bar) minimum and 37.25 Mpa (372.5 bar) maximum.

Both versions can be supplied:

- Without lighting signaling
- With lighting signaling

Construction

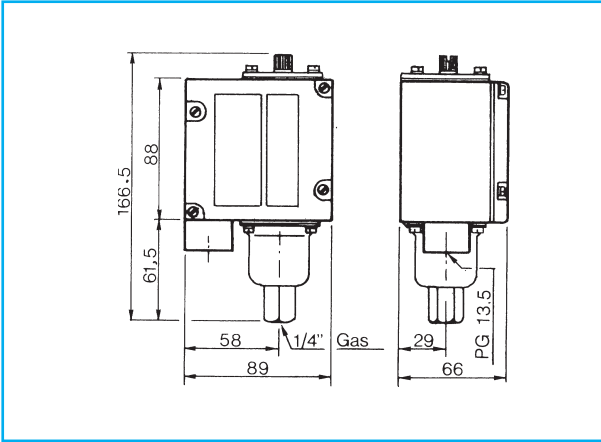
Snap-action 1NO-1NC or 2NO+2NC microswitches with double-break contacts without positive-break of the NC contact.

Bellows sensitive element, hermetic sealing, made by Tombacco (or stainless steel) material enclosed into a die-cast zamac case complete with a 1 mm. damper. Piston sensitive element, with or without seal ring, with steel piston enclosed into a cast-iron cylinder complete with 1 mm. damper.

Enclosure and cover are made of die-cast aluminium and painted with anaphoresis process grey RAL 7012..

Dimensions

Pressure switches - Bellows type



Pressure switches

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Everything is

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- H.3 Order codes
- H.5 I/O terminal board specifications
- H.5 I/O wiring
- H.6 Dimensions and weights

H.8 VAT200 - Mini AC variable speed drives

- H.9 Order codes
- H.10 Technical data
- H.12 I/O Power & control layout
- H.12 I/O Control terminal description
- H.13 External accessories
- H.14 EMC compliance
- H.15 Dimensions

Plug-in relays and Auxiliary contactors

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Contactors and Thermal overload relays

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Motorstarters

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Control and signalling units

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Main switches

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H.18 VAT300 - Advanced general purpose AC drive



- H.19 Order codes
- H.20 Optional interfaces and accessories
- H.21 Technical data
- H.23 I/O wiring basic scheme
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under control





Micro AC variable speed drives

- Single-phase or three-phase digital inverters for controlling the speed of three-phase induction AC motors from 0.2 to 2.2kW
- Built-in keypad and display
- IP20 or IP65 protection degree
- Built-in EMC filter for industrial environment (class A)
- DIN rail mountable by optional kit
- Global standards CE and cUL



Technical data

Control specifications

| | |
|------------------------------|--|
| Control system | Sinusoidal wave PWM inverter |
| Output frequency | 0 - 200Hz |
| Voltage / Frequency | Constant torque, Constant power, Torque boost Six selectable pre-set patterns |
| Overload capacity | 150%, 60 sec. |
| Carrier frequency | Selectable 4 - 16kHz |
| Frequency setting resolution | Digital 0.1Hz(0-99.9Hz), 1Hz(100-200Hz) Analogic 0.1Hz/ 60Hz |
| Acceleration/deceleration | 0.1 - 999 sec. Acceleration and deceleration set individually |
| Operating system | Two mode selection: forward run by FWD input, Reverse run by REV input Run by FWD input, forward/reverse command by REV input |
| Stopping system | Selectable either ramp down or coast to stop |
| DC braking | DC brake starting frequency 1-10Hz DC braking level 0-20%, DC braking time 0-25.5s |
| Frequency limit | Upper limit (1-200Hz), lower limit (0-200Hz) |
| Other functions | Auto re-start, Auto reset, Flying start, Jog Slow speeds |

I/O configuration

| | |
|--------------------------|--|
| Operation panel | 3 digits, 7 segment display with 5 operation keys |
| Sequence input | Four digital inputs (2 are programmable) |
| Sequence output | One programmable relay output |
| Frequency setting input | One analogue either 0-10V, 4-20mA or 0-20mA configurable |
| Source for potentiometer | 10VDC source for 2-10kΩ potentiometer |
| Analogue outputs | 0-10VDC for frequency output display |

Protection features






| | |
|---------------|--|
| Prevention | Overcurrent limitation, Overvoltage limitation, Stall prevention |
| Trip | Overload, Overvoltage, Undervoltage, Overcurrent, Powerloss, Output short-circuit, Grounding fault, Overtemperature |
| Fault history | The last three faults are recorded |

Operating environment

| | |
|-------------------|--|
| Installation | Indoor, with atmosphere free from corrosive or explosive gases, dust, steam or oil mist. |
| Protection degree | IP20 and IP65 |
| Temperature range | from -10 to 50 °C |
| Relative humidity | 0-95% without condensation |
| Vibrations | Under 1G (9.8 m/s ²) |
| Standards | cUL, CE |



1 phase and 3 phase speed drives

| Input voltage | | Input power kVA | Output current A | Max. motor power kW (1) | Cooling convection | Losses W | Protection degree | Cat. no. | Ref. no. | Pack | |
|---|---|--|--|----------------------------|--------------------|-------------|-------------------|---------------|---------------|--------------|--------|
| + 10%, -15%, 50/60 Hz (± 5%) | | | | | | | | | | | |
|  | 1ph 200V - 240V | 0.53 | 1.4 | 0.2 | natural | 21 | IP20 | U20N0K2S | 167075 | 1 | |
| | | 0.88 | 2.3 | 0.4 | forced | 38 | IP20 | U20N0K4S | 167076 | 1 | |
| | | 1.6 | 4.2 | 0.75 | forced | 60 | IP20 | U20N0K7S | 167077 | 1 | |
| |  | 1ph / 3ph 200V - 240V | 2.9 | 7.5 | 1.5 | forced | 103 | IP20 | U20N1K5S (2) | 167078 | 1 |
| | | | 4.0 | 10.5 | 2.2 | forced | 149 | IP20 | U20N2K2S (2) | 167079 | 1 |
| | | 3ph 380V - 480V | 1.6 | 2.3 | 0.75 | forced | 61 | IP20 | U20X0K7S (2) | 167080 | 1 |
| | | | 2.9 | 3.8 | 1.5 | forced | 79 | IP20 | U20X1K5S (2) | 167081 | 1 |
| | | | 4.0 | 5.2 | 2.2 | forced | 94 | IP20 | U20X2K2S (2) | 167082 | 1 |
| | |  | 1ph 200V - 240V | 0.53 | 1.4 | 0.2 | natural | 21 | IP65 | U20N0K2P (3) | 167088 |
| 0.88 | 2.3 | | | 0.4 | natural | 38 | IP65 | U20N0K4P (3) | 167089 | 1 | |
| 1.6 | 4.2 | | | 0.75 | natural | 60 | IP65 | U20N0K7P (3) | 167090 | 1 | |
|  | 1ph / 3ph 200V - 240V | | 0.53 | 1.4 | 0.2 | natural | 21 | IP65 | U20N0K2PS (4) | 167132 | 1 |
| | | | 0.88 | 2.3 | 0.4 | natural | 38 | IP65 | U20N0K4PS (4) | 167133 | 1 |
| | 3ph 380V - 480V | | 1.6 | 2.3 | 0.75 | natural | 61 | IP65 | U20X0K7P (3) | 167093 | 1 |
| | | | 2.9 | 3.8 | 1.5 | natural | 79 | IP65 | U20X1K5P (3) | 167094 | 1 |
| | | | 4.0 | 5.2 | 2.2 | natural | 94 | IP65 | U20X2K2P (3) | 167095 | 1 |
| |  | | 1ph / 3ph 200V - 240V | 2.9 | 7.5 | 1.5 | natural | 103 | IP65 | U20N1K5P (3) | 167091 |
| 4.0 | | | | 10.5 | 2.2 | natural | 149 | IP65 | U20N2K2P (3) | 167092 | 1 |
| 3ph 380V - 480V | | | 2.9 | 7.5 | 1.5 | natural | 103 | IP65 | U20N1K5PS (4) | 167135 | 1 |
| | 4.0 | | 10.5 | 2.2 | natural | 149 | IP65 | U20N2K2PS (4) | 167136 | 1 | |
| | 1.6 | | 2.3 | 0.75 | natural | 61 | IP65 | U20X0K7PS (4) | 167137 | 1 | |
| | | | 2.9 | 3.8 | 1.5 | natural | 79 | IP65 | U20X1K5PS (4) | 167138 | 1 |
| | | | 4.0 | 5.2 | 2.2 | natural | 94 | IP65 | U20X2K2PS (4) | 167139 | 1 |

Micro AC speed drives

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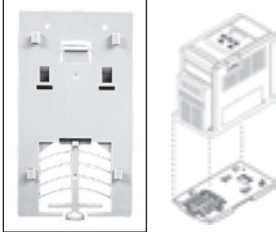
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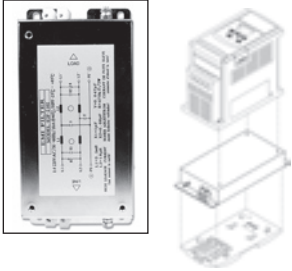
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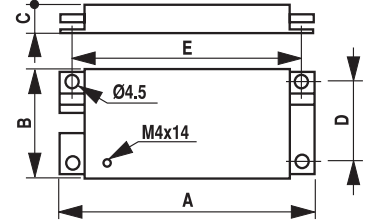
(1) Ratings for standard tree-pole induction motors with four poles.
 (2) Units including dynamic braking function. An external braking resistor is needed to perform operation.
 (3) IP65 models type U20_ _ P include only keypad in the front cover.
 (4) IP65 models type U20_ _ PS include power switch, forward/reverse switch and potentiometer in the front cover.

Options and accessories

| | Applicable to drive | Cat. no. | Ref. no. | Pack |
|--|---------------------|--|----------|------|
| DIN rail kit  | All drives | U20AR0K7 (pack of 10 pieces) | 167087 | 1 |

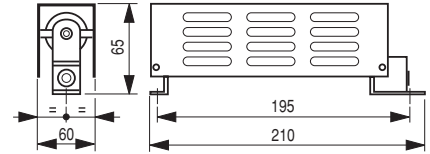
| | Applicable to drive | Cat. no. | Ref. no. | Pack |
|---|----------------------------------|------------------|----------|------|
| EMC filters  | U20N0K2S U20N0K4S U20N0K7S | U20AF0K7 | 167085 | 1 |
| | U20N1K5S U20N2K2S | U20AF2K2 | 167086 | 1 |
| | U20X0K7S U20X1K5S U20X2K2S | U20AF2K2X | 167084 | 1 |

VAT 20 includes as standard a Class A EMC filter, for industrial environment.
For residential environment, the use of external Class B EMC foot print filter is recommended.



| Cat. No. | A | B | C | D | E |
|-----------|-----|-----|----|-----|-----|
| U20AF0K7 | 156 | 76 | 25 | 60 | 145 |
| U20AF2K2 | 170 | 221 | 38 | 108 | 156 |
| U20AF2K2X | 170 | 221 | 38 | 108 | 156 |

| | Motor (kW) | Applicable to drive | Cat. no. | Ref. no. | Pack |
|---|------------|---------------------|-------------------|----------|------|
| Braking resistors 100% braking torque, 10% ED | 1.5 | U20N1K5 | TLR100P200 | 108223 | 1 |
| | 2.2 | U20N2K2 | TLR75P200 | 116300 | 1 |
| | 0.75 | U20X0K7 | TLR750P200 | 116301 | 1 |
| | 1.5 | U20X1K5 | TLR400P200 | 116302 | 1 |
| | 2.2 | U20X2K2 | TLR250P200 | 108227 | 1 |



| | Losses (W) | Applicable to drive | Cat. no. | Ref. no. | Pack |
|-----------------|--|---------------------|--------------------|----------|------|
| Reactors | Input reactors for single phase drives | | | | |
| | 2.5 | U20N0K2S | ACRP3A7H0 | 168490 | 1 |
| | 5 | U20N0K4S | ACRP8A2H5 | 168491 | 1 |
| | 7 | U20N0K7S | ACRP12A2H5 | 168492 | 1 |
| | 7.5 | U20N1K5S | ACRP18A1H3 | 168493 | 1 |
| | 8 | U20N2K2S | ACRP22A0H84 | 168494 | 1 |
| | Input reactors for three phase drives | | | | |
| | 11 | U20N1K5S | ACRP6A2H5 | 168496 | 1 |
| | 14 | U20N2K2S | ACRP9A1H3 | 168497 | 1 |
| | 8 | U20X0K7S | ACRP3A8H1 | 168509 | 1 |
| 9 | U20X1K5S | ACRP4A5H1 | 168510 | 1 | |
| 11 | U20X2K2S | ACRP6A3H4 | 168511 | 1 | |

| Cat.No. | Losses W | Fig. | A | B | C | D | E | Ø | Weight (kg) |
|-------------|----------|------|-----|-----|-----|----|-----|---|-------------|
| ACRP3A7H0 | 2.4 | 4 | 75 | 96 | 85 | 80 | 56 | 6 | 1.3 |
| ACRP8A2H5 | 5.2 | 4 | 75 | 96 | 100 | 80 | 56 | 6 | 1.8 |
| ACRP12A2H5 | 6.8 | 4 | 84 | 102 | 110 | 86 | 65 | 6 | 2.7 |
| ACRP18A1H3 | 7.3 | 4 | 96 | 112 | 106 | 96 | 77 | 6 | 3.2 |
| ACRP22A0H84 | 8 | 4 | 96 | 112 | 116 | 96 | 77 | 6 | 3.7 |
| ACRP6A2H5 | 17 | 1 | 120 | 80 | 152 | 41 | 100 | 6 | 1.5 |
| ACRP9A1H3 | 18 | 1 | 120 | 80 | 152 | 41 | 100 | 6 | 1.6 |
| ACRP3A8H1 | 17 | 1 | 120 | 80 | 152 | 41 | 100 | 6 | 1.4 |
| ACRP4A5H1 | 16 | 1 | 120 | 80 | 152 | 41 | 100 | 6 | 1.5 |
| ACRP6A3H4 | 19 | 1 | 120 | 80 | 152 | 41 | 100 | 6 | 1.7 |

Fig. 4

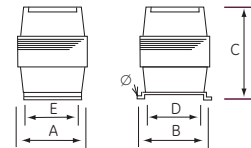
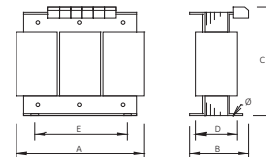


Fig. 1



Dimensions in mm



I/O terminal board specifications

Digital inputs

| Symbol | Description | Function |
|--------|-----------------------|--|
| 12V | Common digital inputs | 12V DC supply for all digital inputs |
| FWD | Forward run | Used for forward run command |
| REV | Reverse run | Used for reverse run command |
| SP1 | Multifunction input | This is a programmable digital input Either jog, slow speed, emergency stop, output shut off or reset function are allowed |
| RST | Fault reset | This is a programmable input set to reset function as default Either jog, slow speed, emergency and output shut off are allowed as well |

Digital outputs

| | | |
|---------------------------|----------------------|--|
| Trip relay 1, 2 | Multifunction output | This is a programmable output relay set to fault function as default Run status and frequency reached are allowed as well |
|---------------------------|----------------------|--|

Analogue inputs

| | | |
|-----|---------------------|--|
| MVI | Frequency setting | Programmable analogue frequency signal input 0-10V, 4-20mA or 0-20mA allowed |
| 0V | Common analogue I/O | |

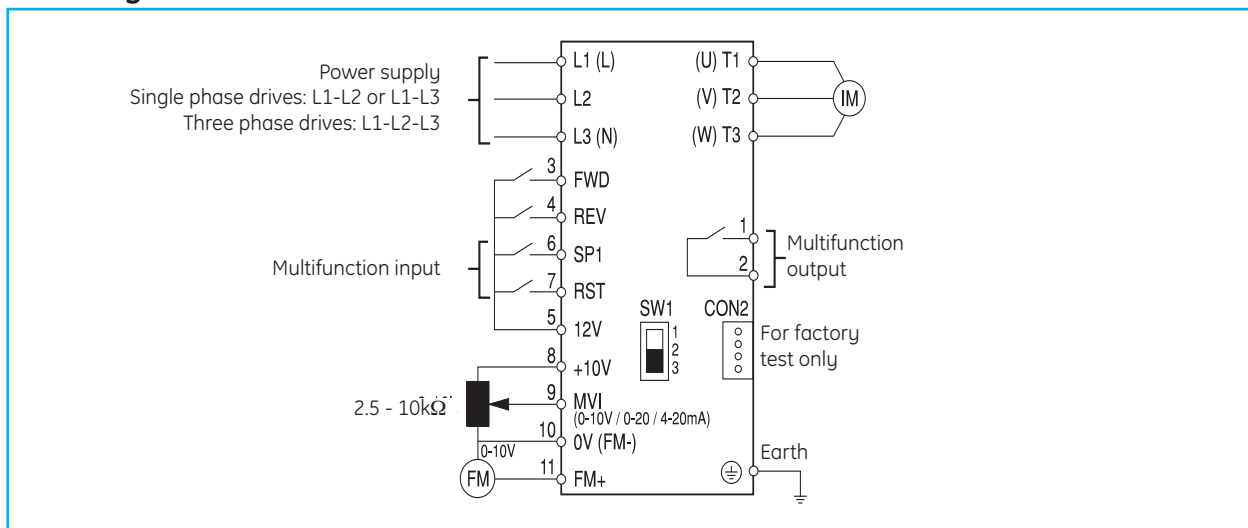
Analogue outputs

| | | |
|----|---------------------|---|
| FM | Frequency output | Analogue output 0-10V. May be used as speed meter |
| 0V | Common analogue I/O | |

Other

| | | |
|------|---------------|---|
| +10V | 10V DC source | 10V DC power supply for potentiometer 2-10K Ω (2W) |
|------|---------------|---|

I/O wiring



Micro AC speed drives

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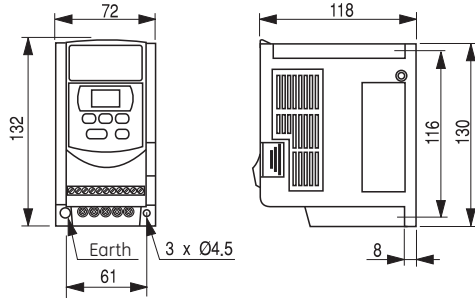
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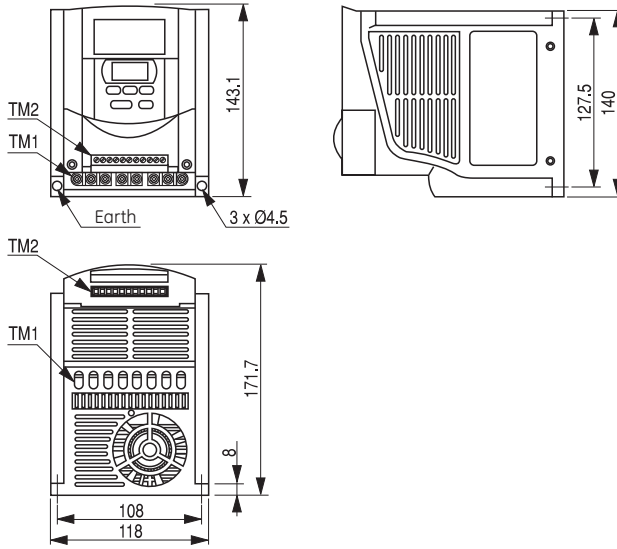
Dimensional drawings

Protection IP20



| Cat. no. | Ref. no. | Weight (kg) |
|----------|----------|-------------|
| U20N0K2S | 167075 | 0.76 |
| U20N0K4S | 167076 | 0.77 |
| U20N0K7S | 167077 | 0.8 |

Dimensions in mm



| Cat. no. | Ref. no. | Weight (kg) |
|----------|----------|-------------|
| U20N1K5S | 167078 | 1.66 |
| U20N2K2S | 167079 | 1.76 |
| U20X0K7S | 167080 | 1.60 |
| U20X1K5S | 167081 | 1.60 |
| U20X2K2S | 167082 | 1.63 |

Dimensions in mm

Speed drive units

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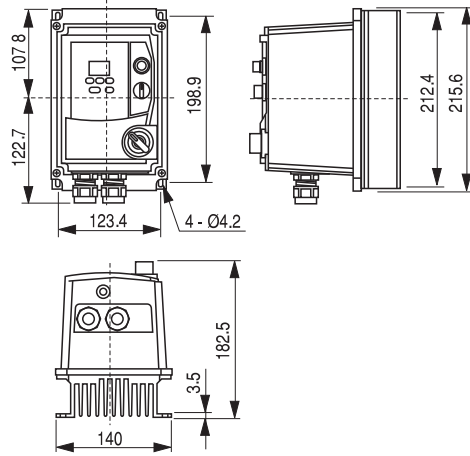
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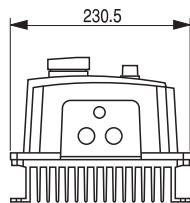
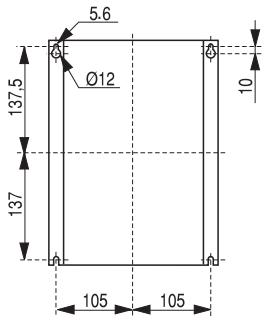
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Protection IP65



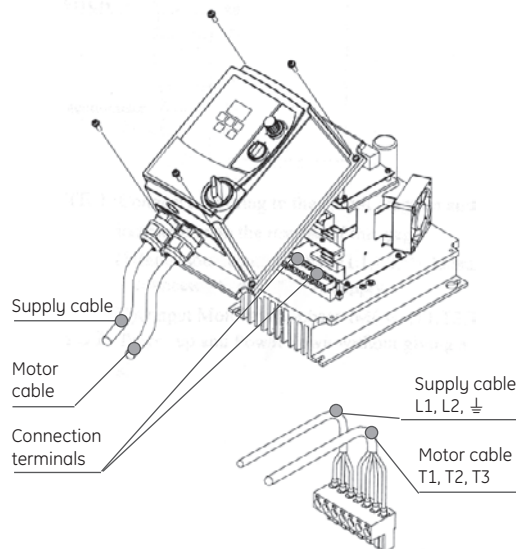
| Cat. no. | Ref. no. | Weight (kg) |
|-----------|----------|-------------|
| U20N0K2P | 167088 | 2.9 |
| U20N0K4P | 167089 | 2.9 |
| U20N0K7P | 167090 | 2.9 |
| U20N0K2PS | 167132 | 2.9 |
| U20N0K4PS | 167133 | 2.9 |
| U20N0K7PS | 167134 | 2.9 |

Dimensions in mm



| Cat. no. | Ref. no. | Weight (kg) |
|-----------|----------|-------------|
| U20N1K5P | 167091 | 4.8 |
| U20N2K2P | 167092 | 4.9 |
| U20X0K7P | 167093 | 4.9 |
| U20X1K5P | 167094 | 4.9 |
| U20X2K2P | 167095 | 4.9 |
| U20N1K5PS | 167135 | 5.2 |
| U20N2K2PS | 167136 | 5.3 |
| U20X0K7PS | 167137 | 5.2 |
| U20X1K5PS | 167138 | 5.2 |
| U20X2K2PS | 167139 | 5.2 |

Dimensions in mm





Mini AC variable speed drives

The VAT200 is a well performed, sensorless vector VSD for AC standard motors available in the following ranges:

- From 0.4 to 2.2 kW at 200V, single phase power supply
- From 0.4 to 7.5 kW at 200V, three phase power supply
- From 0.75 to 55 kW at 400V, three phase power supply

Advantages

- Compact size
- Built-in removable LED keypad
- Optional multilanguage LCD keypad
- Sensorless vector control or V/f control, selectable
- Built-in with ModBus RTU communications
- Optional Field bus communication DeviceNet, ProfibusDP
- Integrated EMC filters for U20...FS series
- Built-in with dynamic braking up to 15kW
- Performed with simple PLC and PID functions
- Easy start-up & tuning by PC or keypad
- Advanced programming and drive control by built-in PLC function
- Easy maintenance

Approvals

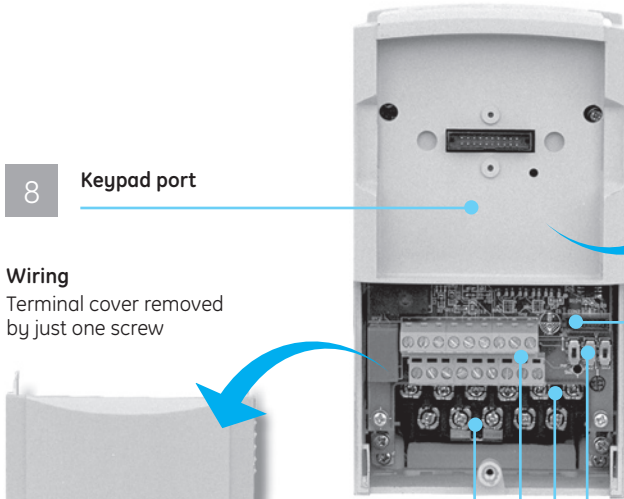


Simple and reliable

Removable keypad

- LED keypad as standard
- LCD keypad as option

1



8 Keypad port

7 Wiring
Terminal cover removed by just one screw



Serial port
For copy unit and communications

2

Configuration switches

- For analogue I/O
- For PNP/NPN digital input selection

3

I/O terminals
Supply and motor

4

I/O terminals
Control






5

I/O terminal
DC reactor

6



1 phase and 3 phase speed drives

| Input voltage + 10%, -15%, 50/60 Hz (± 5%) | | Suitable motor capacity (kW) | Rated output de current (A) | Rated capacity (KVA) | Frame | Cat. no. | Ref. no. | Pack. |
|--|--------------------|------------------------------|-----------------------------|----------------------|--------|-------------|----------|-------|
| With EMC filter | | | | | | | | |
|  Frame 1 | 1ph 200V - 240V | 0.4 | 3.1 | 1.2 | 1 | U201N00K4FS | 167400 | 1 |
| | | 0.75 | 4.5 | 1.7 | 1 | U201N00K7FS | 167401 | 1 |
| | | 1.5 | 7.5 | 2.9 | 2 | U201N01K5FS | 167402 | 1 |
| | | 2.2 | 10.5 | 4.0 | 2 | U201N02K2FS | 167403 | 1 |
| Without EMC filter | | | | | | | | |
|  Frame 2 | 1ph 200V - 240V | 0.4 | 3.1 | 1.2 | 1 | U201N00K4SS | 167411 | 1 |
| | | 0.75 | 4.5 | 1.7 | 1 | U201N00K7SS | 167412 | 1 |
| | | 1.5 | 7.5 | 2.9 | 2 | U201N01K5SS | 167413 | 1 |
| | | 2.2 | 10.5 | 4.0 | 2 | U201N02K2SS | 167414 | 1 |
| Without EMC filter | | | | | | | | |
|  Frame 3 | 3ph 200V - 240V | 0.4 | 3.1 | 1.2 | 1 | U203N00K4SS | 167415 | 1 |
| | | 0.75 | 4.5 | 1.7 | 1 | U203N00K7SS | 167416 | 1 |
| | | 1.5 | 7.5 | 2.9 | 1 | U203N01K5SS | 167417 | 1 |
| | | 2.2 | 10.5 | 4 | 2 | U203N02K2SS | 167418 | 1 |
| | | 3.7 | 17.5 | 6.7 | 2 | U203N04K0SS | 167419 | 1 |
| | | 5.5 | 26 | 9.9 | 3 | U203N05K5SS | 167420 | 1 |
| | | 7.5 | 35 | 13.3 | 3 | U203N07K5SS | 167422 | 1 |
| | | With EMC filter | | | | | | |
|  Frame 4 | 3ph 380V - 480V | 0.75 | 2.3 | 1.7 | 1 | U203X00K7FS | 167404 | 1 |
| | | 1.5 | 3.8 | 2.9 | 1 | U203X01K5FS | 167405 | 1 |
| | | 2.2 | 5.2 | 4 | 2 | U203X02K2FS | 167406 | 1 |
| | | 3.7 | 8.8 | 6.7 | 2 | U203X04K0FS | 167407 | 1 |
| | | 5.5 | 13 | 9.9 | 3 | U203X05K5FS | 167408 | 1 |
| | | 7.5 | 17.5 | 13.3 | 3 | U203X07K5FS | 167409 | 1 |
| | | 11 | 25 | 19.1 | 3 | U203X11K0FS | 167410 | 1 |
| | | Without EMC filter | | | | | | |
|  Frame 4 | 3ph 380V - 480V | 0.75 | 2.3 | 1.7 | 1 | U203X00K7SS | 167424 | 1 |
| | | 1.5 | 3.8 | 2.9 | 1 | U203X01K5SS | 167425 | 1 |
| | | 2.2 | 5.2 | 4 | 2 | U203X02K2SS | 167426 | 1 |
| | | 3.7 | 8.8 | 6.7 | 2 | U203X04K0SS | 167427 | 1 |
| | | 5.5 | 13 | 9.9 | 3 | U203X05K5SS | 167428 | 1 |
| | | 7.5 | 17.5 | 13.3 | 3 | U203X07K5SS | 167429 | 1 |
| | | 11 | 25 | 19.1 | 3 | U203X11K0SS | 167430 | 1 |
| | | 15 | 32 | 27.4 | 4 | U203X15K0SS | 167481 | 1 |
| | | 18.5 | 40 | 34 | 4 | U203X18K5SS | 167482 | 1 |
| | | 22 | 48 | 41 | 4 | U203X22K0SS | 167483 | 1 |
| | | 30 | 64 | 54 | 5 | U203X30K0SS | 167484 | 1 |
| | | 37 | 80 | 68 | 5 | U203X37K0SS | 167485 | 1 |
| 45 | 96 | 82 | 6 | U203X45K0SS | 167486 | 1 | | |
| 55 | 128 | 110 | 6 | U203X55K0SS | 167487 | 1 | | |

Mini speed drives

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Accessories

| Description | Details | Cat. no. | Ref. no. | Pack. |
|--|-------------------------------|-----------------------|------------|--------|
|  U200ARS485 / 167435 | External dynamic braking unit | U200ABU430 | 167468 | 1 |
|  U200ARS232 / 167436 | Communication interface | Profibus-DP | U200APB | 167433 |
| | | DeviceNet | U200ADN | 167434 |
| | | RS485 | U200ARS485 | 167435 |
| | | RS232 for PC to drive | U200ARS232 | 167436 |
|  U200AMP / 167437 | NEMA1 boxes | For frame 1 drives | U200AN101 | 167446 |
| | | For frame 2 drives | U200AN102 | 167447 |
| | | For frame 3 drives | U200AN103 | 167448 |
| Memory pack | Program copy | U200AMP | 167437 | 1 |
| Keypad | LED ⁽¹⁾ | U200ALEDK | 167438 | 1 |
| | LCD multilanguage | U200ALCDK | 167439 | 1 |
| | Blank cover | U200ABK | 167440 | 1 |
| Remote wire for keypad | 0.5m | U200AW05 | 167441 | 1 |
| | 1.0m | U200AW10 | 167442 | 1 |
| | 2.0m | U200AW20 | 167443 | 1 |
| | 3.0m | U200AW30 | 167444 | 1 |
| | 5.0m | U200AW50 | 167445 | 1 |

(1) All VAT200 include a LED keypad U200ALEDK as standard.

Technical data

General specifications

| | | 1ph 200-240V (with / without EMC filter) | | | | 3ph 200-240V (without EMC filter) | | | | | | |
|----------------------|-------|---|------|------|------|---|------|------|------|------|------|------|
| | | U 2 0 1 N _ _ _ _ _ S | | | | U 2 0 3 N _ _ _ _ _ S S | | | | | | |
| | | 00K4 | 00K7 | 01K5 | 02K2 | 00K4 | 00K7 | 01K5 | 02K2 | 04K0 | 05K5 | 07K5 |
| Motor ratings | (HP) | 0.5 | 1 | 2 | 3 | 0.5 | 1 | 2 | 3 | 5.5 | 7.5 | 10 |
| | (kW) | 0.4 | 0.75 | 1.5 | 2.2 | 0.4 | 0.75 | 1.5 | 2.2 | 3.7 | 5.5 | 7.5 |
| Rated output current | (A) | 3.1 | 4.5 | 7.5 | 10.5 | 3.1 | 4.5 | 7.5 | 10.5 | 17.5 | 26 | 35 |
| Rated capacity | (kVA) | 1.2 | 1.7 | 2.9 | 4 | 1.2 | 1.7 | 2.9 | 4 | 6.7 | 9.9 | 13.3 |
| Max. input voltage | | Single phase: 200-240V +10 -15%, 50/60Hz ±5% | | | | Three phase: 380-480V, +10 -15%, 50/60Hz ±5% | | | | | | |
| Max. output voltage | | Three phase: 0 - 240V | | | | Three phase: 0 - 240V | | | | | | |
| Input current | (A) | 8.5 | 12 | 19 | 27 | 4.5 | 6.5 | 11 | 15.4 | 20 | 29 | 40 |

| | | 3ph 380-480V (with / without EMC filter) | | | | | | | 3ph 380-480V (without EMC filter) | | | | | | |
|----------------------|-------|---|------|------|------|------|------|------|---|------|------|------|------|------|------|
| | | U 2 0 3 X _ _ _ _ _ S | | | | | | | U 2 0 3 X _ _ _ _ _ S S | | | | | | |
| | | 00K7 | 01K5 | 02K2 | 04K0 | 05K5 | 07K5 | 11K0 | 15K0 | 18K5 | 22K0 | 30K0 | 37K0 | 45K0 | 55K0 |
| Motor ratings | (HP) | 1 | 2 | 3 | 5.5 | 7.5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 75 |
| | (kW) | 0.75 | 1.5 | 2.2 | 3.7 | 5.5 | 7.5 | 11 | 15 | 18.5 | 22 | 30 | 37 | 45 | 55 |
| Rated output current | (A) | 2.3 | 3.8 | 5.2 | 8.8 | 13 | 17.5 | 25 | 32 | 40 | 48 | 64 | 80 | 96 | 128 |
| Rated capacity | (kVA) | 1.7 | 2.9 | 4 | 6.7 | 9.9 | 13.3 | 19.1 | 27.4 | 34 | 41 | 54 | 68 | 82 | 110 |
| Max. input voltage | | Three phase: 380-480V, +10 -15%, 50/60Hz ±5% | | | | | | | Three phase: 380-480V, +10 -15%, 50/60Hz ±5% | | | | | | |
| Max. output voltage | | Three phase: 0 - 480V | | | | | | | Three phase: 0 - 480V | | | | | | |
| Input current | (A) | 4.2 | 5.6 | 7.3 | 11.6 | 17 | 23 | 31 | 38 | 48 | 56 | 75 | 92 | 112 | 142 |

Frequency control

| | |
|--------------------------|---|
| Control mode | V / f or sensorless vector control |
| Range | 0,1 to 650,0Hz |
| Starting torque | 150% / 1Hz (sensorless vector) |
| Speed control range | 1 : 50 (sensorless vector) |
| Speed control accuracy | ±0,5% (sensorless vector) |
| Setting resolution | Digital : 0,01 Hz Analogue: 0,06Hz / 60Hz (10 bits) |
| Keypad setting | Set directly by Δ ∇ keys or by potentiometer on the keypad |
| Display function | Four digital LED (or 2x16 LCD) and status indicator; display frequency / speed / line speed / DC voltage / output voltage / current / rotation direction / inverter parameter / trouble log / program version |
| Frequency setting | 1. External potentiometer 0-5V / 0-10V / 4-20mA / 5-0V / 10-0V / 20-4mA 2. Performs up/down controls, speed control or automatic procedure control with multifunctional contacts on the terminal block (TM2) |
| Frequency limit function | Respectively setting upper/lower frequency limits and three-stage skip frequencies |

Control

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|-------------------------------|---|
| Carrier frequency | 2 to 16kHz |
| V / F pattern | 18 fixable patterns, 1 programmable pattern |
| Acc./Dec. control | Two-stage Acc./Dec. time (0,1 to 3,600 seconds) and two-stage S curve |
| Multifunctional analog output | 5 different functions |
| Multifunctional input | Assigned to 28 different functions |
| Multifunctional output | Assigned to 15 different functions |
| Digital input signal | NPN / PNP toggle |
| Other functions | Momentary power loss restart, Speed search, Overload detection, Torque detection, 8 preset speeds, Acc./Dec. switch (2 stages), S curve, 3-wire control, PID control, Torque boost, Slip compensation, Frequency upper/lower limit, Auto energy saving, Modbus slave and control link, Abnormal restart, Sequence control, Built-in simple PLC function |

Speed drive units

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Technical data (continued)

Others

| | |
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| Communication control | Control by RS232 or RS485 One to one or multilink up to 254 stations (RS485 only) Can be set Baud rate, Stop bit and Parity bit |
| Braking torque | About 100% with braking resistor (20% without braking resistor) |
| Operation temperature | -10 to +50°C |
| Storage temperature | -20 to +60°C |
| Humidity | 0 to 95% relative humidity (without condensation) |
| Vibration | 1G (9,8m/S ²) |
| EMC | Comply with requirement EN 61800-3 with optional filter |
| LVD | Comply with requirement EN 50178 |
| Enclosure | IP20 (NEMA 1 by external box attached) |
| Safety level | UL 508C |

Protective functions

| | |
|-------------------------------|---|
| Overload protection | Inverse characteristic overload protection. Max. 150% inverter current rating / 60 sec. |
| Fuse protection | The motor stops after FUSE melt |
| Overvoltage | 200V class: DC voltage > 410V 400V class: DC voltage > 820V |
| Undervoltage | 200V class: DC voltage < 190V 400V class: DC voltage < 380V |
| Momentary power loss restart | Restart after more than 15ms-power loss possible. Programmed up to 2 sec. |
| Stall prevention | Stall prevention for Acceleration / Deceleration / Operation |
| Short-circuit output terminal | Electronic circuit protection |
| Grounding fault | Electronic circuit protection |
| Other protections | Heatsink overtemperature, overtorque detection, error contact control, reverse run restriction, restrictions for direct start after power up, error recovery and parameter lock out |

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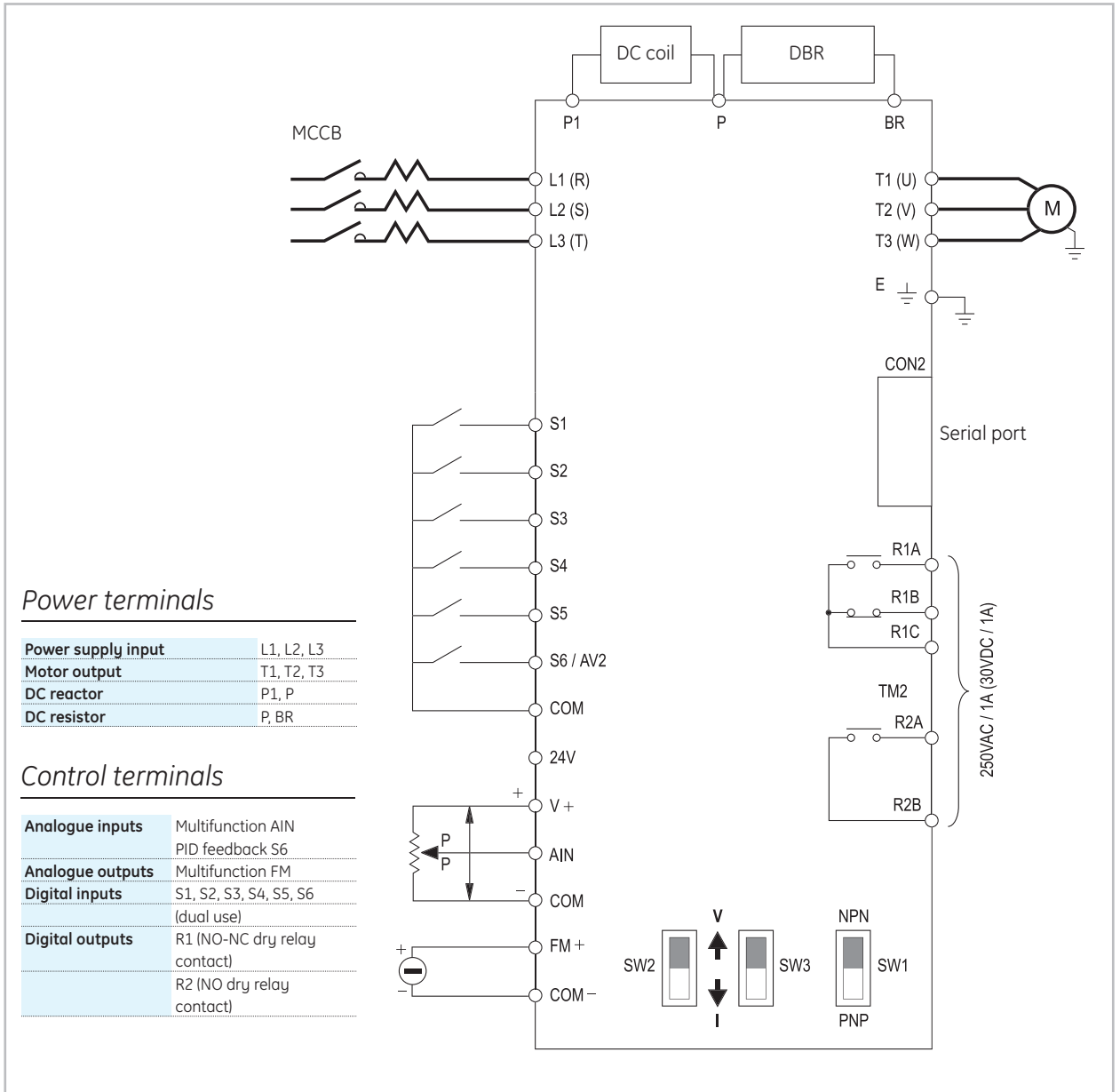
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I/O Power & control layout



I/O Control terminal description

| Symbol | Description |
|----------|--|
| R2A | Multifunctional terminals - Normally Open |
| R2B | Multifunctional terminals - Normally Open |
| R1C | Common contact |
| R1B | Normally Closed contact |
| R1A | Normally Open contact |
| 10V | Frequency knob (VR) power source terminal |
| AIN | Analogue frequency signal input terminal |
| 24V | Common source for S1 to S5 in PNP input. |
| COM | Selectable by switch on main PCB Common terminal for S1 to S5 in NPN input. Selectable by switch on main PCB |
| FM + | Multifunction analog output, 0-10V DC |
| S1 | Multifunction input terminals |
| S2 | |
| S3 | |
| S4 | |
| S5 | |
| S6 / AV2 | Digital input or PID input terminal (selectable) |



External accessories

| | VAT200 | Losses W | AC reactors | | DC reactors | | Encapsulated resistor | | Tubular resistors | | |
|----------------------------|----------------------------|-------------|--------------|-------------|-------------|-------------|-----------------------|---------|---------------------------|------------|--------|
| 1ph 200-240V | U201N00K4FS | 167400 | 32 | ACRP8A2H5 | 168491 | DCR4A5H7 | 168387 | ERN00K7 | 129148 | TLR200P200 | 129165 |
| | With EMC filter | | | | | | | | | | |
| | U201N00K7FS | 167401 | 50 | ACRP12A2H5 | 168492 | DCR6A3H9 | 168388 | ERN00K7 | 129148 | TLR200P200 | 129165 |
| | U201N01K5FS | 167402 | 85 | ACRP18A1H3 | 168493 | DCR9A2H4 | 168389 | ERN01K5 | 129149 | TLR100P200 | 108223 |
| | U201N02K2FS | 167403 | 157 | ACRP22A0H84 | 168494 | DCR12A1H7 | 168390 | ERN02K2 | 129150 | TLR75P200 | 116300 |
| | Without EMC filter | | | | | | | | | | |
| | U201N00K4SS | 167411 | 28 | ACRP8A2H5 | 168491 | DCR4A5H7 | 168387 | ERN00K7 | 129148 | TLR200P200 | 129165 |
| U201N00K7SS | 167412 | 45 | ACRP12A2H5 | 168492 | DCR6A3H9 | 168388 | ERN00K7 | 129148 | TLR200P200 | 129165 | |
| U201N01K5SS | 167413 | 77 | ACRP18A1H3 | 168493 | DCR9A2H4 | 168389 | ERN01K5 | 129149 | TLR100P200 | 108223 | |
| U201N02K2SS | 167414 | 142 | ACRP22A0H84 | 168494 | DCR12A1H7 | 168390 | ERN02K2 | 129150 | TLR75P200 | 116300 | |
| 3ph 200-240V | U203N00K4SS | 167415 | 28 | ACRP4A2H5 | 168495 | DCR4A5H7 | 168387 | ERN00K7 | 129148 | TLR200P200 | 129165 |
| | Without EMC filter | | | | | | | | | | |
| | U203N00K7SS | 167416 | 44 | ACRP6A2H5 | 168496 | DCR6A3H9 | 168388 | ERN00K7 | 129148 | TLR200P200 | 129165 |
| | U203N01K5SS | 167417 | 74 | ACRP9A1H3 | 168497 | DCR9A2H4 | 168389 | ERN01K5 | 129149 | TLR100P200 | 108223 |
| | U203N02K2SS | 167418 | 140 | ACRP12A0H84 | 168498 | DCR12A1H7 | 168390 | ERN02K2 | 129150 | TLR75P200 | 116300 |
| | U203N04K0SS | 167419 | 247 | ACRP18A0H56 | 168499 | DCR18A1H0 | 168391 | ERN04K0 | 129151 | TLR44P600 | 129166 |
| | U203N05K5SS | 167420 | 274 | ACRP27A0H37 | 168500 | DCRP32A0H78 | 168542 | ERN05K5 | 129152 | TLR29P600 | 129167 |
| U203N07K5SS | 167422 | 372 | ACRP35A0H27 | 168501 | DCRP45A0H55 | 168543 | ERN07K5 | 129153 | TLR22P600 | 129168 | |
| 3ph 380-480V | U203X00K7FS | 167404 | 45 | ACRP3A8H1 | 168509 | DCR3A15H2 | 168392 | ERX00K7 | 129154 | TLR750P200 | 116301 |
| | With EMC filter | | | | | | | | | | |
| | U203X01K5FS | 167405 | 69 | ACRP4A5H1 | 168510 | DCR4A9H2 | 168393 | ERX01K5 | 129155 | TLR400P200 | 116302 |
| | U203X02K2FS | 167406 | 137 | ACRP6A3H4 | 168511 | DCR6A6H8 | 168394 | ERX02K2 | 129156 | TLR240P200 | 108227 |
| | U203X04K0FS | 167407 | 231 | ACRP10A2H | 168512 | DCR9A4H0 | 168395 | ERX04K0 | 129157 | TLR175P600 | 129173 |
| | U203X05K5FS | 167408 | 361 | ACRP14A1H4 | 168513 | DCRP18A2H9 | 168555 | ERX05K5 | 129158 | TLR118P600 | 129174 |
| | U203X07K5FS | 167409 | 446 | ACRP18A1H1 | 168514 | DCRP25A2H1 | 168556 | ERX07K5 | 129159 | TLR86P600 | 129175 |
| | Without EMC filter | | | | | | | | | | |
| | U203X11K0FS | 167410 | 656 | ACRP27A0H75 | 168515 | DCRP32A1H6 | 168557 | - | - | TLR43P1000 | 129177 |
| | U203X00K7SS | 167424 | 40 | ACRP3A8H1 | 168509 | DCR3A15H2 | 168392 | ERX00K7 | 129154 | TLR750P200 | 116301 |
| | U203X01K5SS | 167425 | 62 | ACRP4A5H1 | 168510 | DCR4A9H2 | 168393 | ERX01K5 | 129155 | TLR400P200 | 116302 |
| | U203X02K2SS | 167426 | 123 | ACRP6A3H4 | 168511 | DCR6A6H8 | 168394 | ERX02K2 | 129156 | TLR240P200 | 108227 |
| | U203X04K0SS | 167427 | 208 | ACRP10A2H | 168512 | DCR9A4H0 | 168395 | ERX04K0 | 129157 | TLR175P600 | 129173 |
| | U203X05K5SS | 167428 | 325 | ACRP14A1H4 | 168513 | DCRP18A2H9 | 168555 | ERX05K5 | 129158 | TLR118P600 | 129174 |
| | U203X07K5SS | 167429 | 402 | ACRP18A1H1 | 168514 | DCRP25A2H1 | 168556 | ERX07K5 | 129159 | TLR86P600 | 129175 |
| | U203X11K0SS | 167430 | 591 | ACRP27A0H75 | 168515 | DCRP32A1H6 | 168557 | - | - | TLR43P1000 | 129177 |
| | U203X15K0SS | 167481 | 1051 | ACRP35A0H58 | 168516 | - | - | - | - | TLR43P1000 | 129177 |
| | U203X18K0SS ⁽¹⁾ | 167482 | 1218 | ACRP38A0H58 | 168517 | - | - | - | - | TLR35P1500 | 129877 |
| | U203X22K0SS ⁽¹⁾ | 167483 | 1449 | ACRP45A0H45 | 168518 | - | - | - | - | TLR29P1800 | 129878 |
| | U203X30K0SS ⁽¹⁾ | 167484 | 1608 | ACRP70A0H29 | 168519 | included | - | - | - | TLR22P2500 | 129879 |
| U203X37K0SS ⁽²⁾ | 167485 | 1993 | ACRP90A0H22 | 168520 | included | - | - | - | TLR35P1500 ⁽³⁾ | 129877 | |
| U203X45K0SS ⁽²⁾ | 167486 | 2270 | ACRP115A0H18 | 168521 | included | - | - | - | TLR29P1800 ⁽³⁾ | 129878 | |
| U203X55K0SS ⁽²⁾ | 167487 | 2957 | ACRP160A0H14 | 168522 | included | - | - | - | TLR22P2500 ⁽³⁾ | 129879 | |

(1) (2) Drives 18.5kW and above do not built dynamic braking. In case this is needed, use external braking unit U200ABU430.
 (2) (3) Dynamic braking for drives 45kW, 55kW may need the use of two sets of braking units U200ABU430 in parallel with two sets of braking resistors (one resistor per braking unit).

Mini speed drives

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EMC compliance

Drives with built-in filter type U20...FS, comply with EN 618000-3 second environment.
To comply with first environment restricted sector, or to allow EMC compliance to U20...SS drives, an external filter has to be used according following table

| | | VAT200 | | Second environment | | First environment | |
|--------------------|--------------|--------------------|-------------|--------------------|-------------|-------------------|--------|
| Speed drive units | 1ph 200-240V | With EMC filter | U201N00K4FS | 167400 | Not needed | U200F611TA1 | 167453 |
| | | | U201N00K7FS | 167401 | Not needed | U200F611TA1 | 167453 |
| | | | U201N01K5FS | 167402 | Not needed | U200F627TA2 | 167454 |
| | | Without EMC filter | U201N02K2FS | 167403 | Not needed | U200F627TA2 | 167454 |
| | | | U201N00K4SS | 167411 | U200F611TA1 | 167453 | |
| | | | U201N00K7SS | 167412 | U200F611TA1 | 167453 | |
| | 3ph 200-240V | Without EMC filter | U203N00K4SS | 167415 | U200F709TA1 | 167456 | |
| | | | U203N00K7SS | 167416 | U200F709TA1 | 167456 | |
| | | | U203N01K5SS | 167417 | U200F709TA1 | 167456 | |
| | | | U203N02K2SS | 167418 | U200F719TA2 | 167457 | |
| | | | U203N04K0SS | 167419 | U200F719TA2 | 167457 | |
| | | | U203N05K5SS | 167420 | U200F739TA3 | 167458 | |
| | 3ph 380-480V | With EMC filter | U203X00K7FS | 167404 | Not needed | U200F905TA1 | 167459 |
| | | | U203X01K5FS | 167405 | Not needed | U200F905TA1 | 167459 |
| | | | U203X02K2FS | 167406 | Not needed | U200F910TA2 | 167460 |
| | | | U203X04K0FS | 167407 | Not needed | U200F910TA2 | 167460 |
| | | | U203X05K5FS | 167408 | Not needed | U200F928TA3 | 167461 |
| | | | U203X07K5FS | 167409 | Not needed | U200F928TA3 | 167461 |
| Without EMC filter | | U203X11K0FS | 167410 | Not needed | U200F928TA3 | 167461 | |
| | | U203X00K7SS | 167424 | U200F905TA1 | 167459 | | |
| | | U203X01K5SS | 167425 | U200F905TA1 | 167459 | | |
| | | U203X02K2SS | 167426 | U200F910TA2 | 167460 | | |
| | | U203X04K0SS | 167427 | U200F910TA2 | 167460 | | |
| | | U203X05K5SS | 167428 | U200F928TA3 | 167461 | | |
| | | U203X07K5SS | 167429 | U200F928TA3 | 167461 | | |
| | | U203X11K0SS | 167430 | U200F928TA3 | 167461 | | |
| | | U203X15K0SS | 167481 | U200F34048SMA | 167474 | | |
| | | U203X18K0SS | 167482 | U200F370A | 167475 | | |
| | | U203X22K0SS | 167483 | U200F370A | 167475 | | |
| | | U203X30K0SS | 167484 | U200F3100A | 167476 | | |
| U203X37K0SS | 167485 | U200F3100A | 167476 | | | | |
| U203X45K0SS | 167486 | U200F3150A | 167477 | | | | |
| U203X55K0SS | 167487 | U200F3180A | 167478 | | | | |

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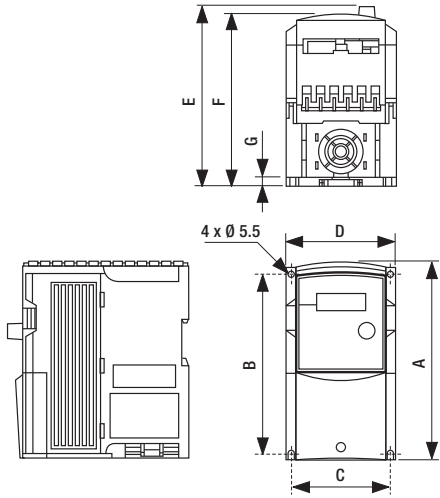
I

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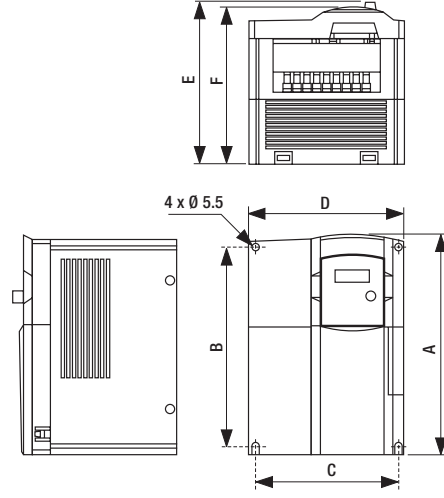


Dimensions

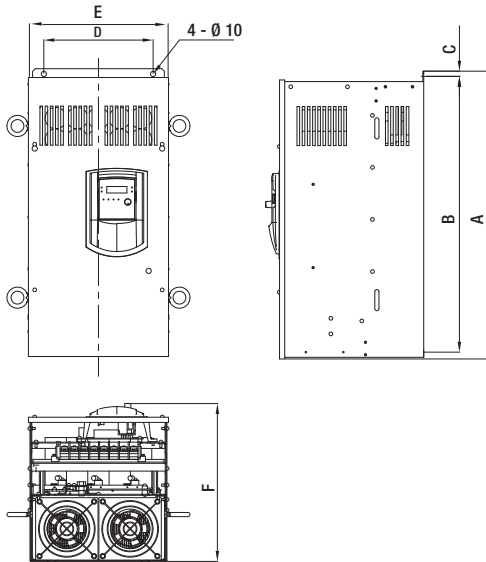
Speed drive



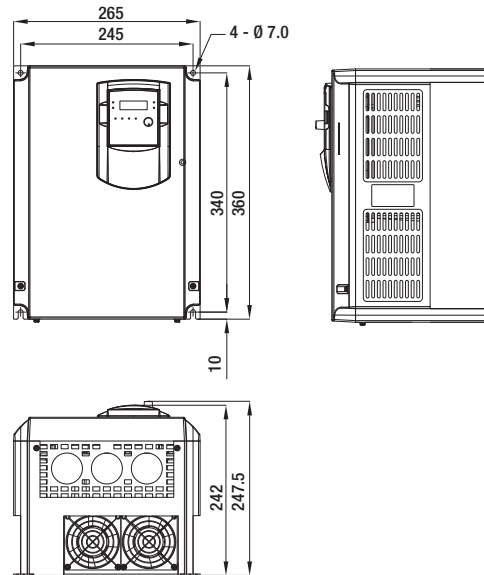
| Series | Weight (kg) | | Dimensions (mm) | | | | | | |
|-------------|-------------|-----|-----------------|-------|-------|-----|-----|-----|---|
| | SS | FS | A | B | C | D | E | F | G |
| U201N00K4.. | 1.2 | 1.3 | 163 | 150 | 78 | 90 | 147 | 141 | 7 |
| U201N00K7.. | 1.2 | 1.3 | | | | | | | |
| U203N00K4.. | 1.2 | - | | | | | | | |
| U203N00K7.. | 1.2 | - | | | | | | | |
| U203N01K5.. | 1.2 | - | | | | | | | |
| U203X00K7.. | 1.2 | 1.3 | | | | | | | |
| U203X01K5.. | 1.2 | 1.3 | | | | | | | |
| U201N01K5.. | 1.5 | 1.8 | 187 | 170.5 | 114.5 | 128 | 148 | 142 | 7 |
| U201N02K2.. | 1.9 | 2.3 | | | | | | | |
| U203N02K2.. | 1.75 | - | | | | | | | |
| U203N04K0.. | 1.9 | - | | | | | | | |
| U203X02K2.. | 1.8 | 2.2 | | | | | | | |
| U203X04K0.. | 1.9 | 2.3 | | | | | | | |



| Series | Weight (kg) | | Dimensions (mm) | | | | | |
|-------------|-------------|-----|-----------------|-----|-----|-----|-----|-----|
| | SS | FS | A | B | C | D | E | F |
| U203N05K5.. | 5.6 | - | 260 | 244 | 173 | 186 | 195 | 188 |
| U203N07K5.. | 5.6 | - | | | | | | |
| U203X05K5.. | 5.6 | 6.6 | | | | | | |
| U203X07K5.. | 5.6 | 6.6 | | | | | | |
| U203X11K0.. | 5.6 | 6.6 | | | | | | |



| Series | Weight (kg) | Dimensions (mm) | | | | | |
|-------------|-------------|-----------------|-----|----|-----|-----|-----|
| | | A | B | C | D | E | F |
| U203X30K0SS | 33 | 553 | 530 | 10 | 210 | 269 | 303 |
| U203X37K0SS | 33 | 553 | 530 | 10 | 210 | 269 | 303 |
| U203X45K0SS | 50 | 653 | 630 | 10 | 250 | 308 | 308 |
| U203X55K0SS | 50 | 653 | 630 | 10 | 250 | 308 | 308 |



| Weight (kg) | |
|-------------|----|
| U203X15K0SS | 15 |
| U203X18K5SS | 15 |
| U203X22K0SS | 15 |

Micro AC speed drives

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Dimensions (continued)

Braking resistor

| | | A | B | C | D | E |
|---------|--------|-----|-----|-----|----|----|
| ERN00K7 | 129148 | 115 | 80 | 175 | 40 | 20 |
| ERX00K7 | 219154 | | | | | |
| ERN01K5 | 129149 | 215 | 200 | 175 | 40 | 20 |
| ERX01K5 | 129155 | | | | | |
| ERN02K2 | 129150 | 165 | 150 | 125 | 60 | 30 |
| ERX02K2 | 129156 | | | | | |
| ERN04K0 | 129151 | 215 | 200 | 175 | 60 | 30 |
| ERX04K0 | 129157 | | | | | |
| ERN05K5 | 129152 | 335 | 320 | 295 | 60 | 30 |
| ERN07K5 | 129153 | | | | | |
| ERX05K5 | 129158 | | | | | |
| ERX07K5 | 129159 | | | | | |

EMC external filter

| | | Inverter mounting | | External filter size | | | External filter mount. | |
|-------------|--------|-------------------|-------|----------------------|-----|----|------------------------|-----|
| | | A | B | C | D | E | F | G |
| U200F611TA1 | 167453 | 78 | 150 | 91 | 192 | 28 | 74 | 181 |
| U200F709TA1 | 167456 | | | | | | | |
| U200F905TA1 | 167459 | | | | | | | |
| U200F627TA2 | 167454 | 114.5 | 170.5 | 128 | 215 | 37 | 111 | 204 |
| U200F719TA2 | 167457 | | | | | | | |
| U200F910TA2 | 167460 | | | | | | | |
| U200F739TA3 | 167458 | 173 | 244 | 188 | 289 | 42 | 165 | 278 |
| U200F928TA3 | 167461 | | | | | | | |

U200F34048SMA 167474

| | | Dimensions (mm) | | | | | | |
|------------|--------|-----------------|-----|-----|-----|-----|---|----|
| | | W | W1 | H | H1 | D | d | M |
| U200F370A | 167475 | 93 | 79 | 312 | 298 | 190 | 7 | M6 |
| U200F3100A | 167476 | 93 | 79 | 312 | 298 | 190 | 7 | M6 |
| U200F3150A | 167477 | 126 | 112 | 312 | 298 | 224 | 7 | M6 |
| U200F3180A | 167478 | 126 | 112 | 312 | 298 | 224 | 7 | M6 |

External dynamic braking unit

| | | Weight (kg) |
|------------|--------|-------------|
| U200ABU430 | 167468 | 2.3 |



Dimensions (continued)

AC Input reactors

Fig. 1

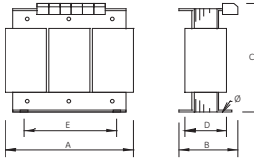


Fig. 3

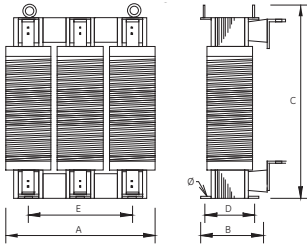
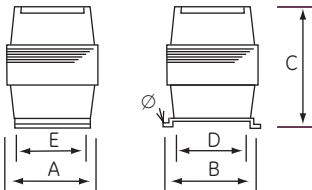


Fig. 4



| Cat. No. | Ref.No. | Losses W | Fig. | Dimensions (mm) | | | | | | Weight (kg) |
|--------------|---------|----------|------|-----------------|-----|-----|-----|-----|---|-------------|
| | | | | A | B | C | D | E | Ø | |
| ACRP8A2H5 | 168491 | 5.2 | 4 | 75 | 96 | 100 | 80 | 56 | 6 | 1.8 |
| ACRP12A2H5 | 168492 | 6.8 | 4 | 84 | 102 | 110 | 86 | 65 | 6 | 2.7 |
| ACRP18A1H3 | 168493 | 7.3 | 4 | 96 | 112 | 106 | 96 | 77 | 6 | 3.2 |
| ACRP22A0H84 | 168494 | 8 | 4 | 96 | 112 | 116 | 96 | 77 | 6 | 3.7 |
| ACRP4A2H5 | 168495 | 16 | 1 | 120 | 80 | 152 | 41 | 100 | 6 | 1.3 |
| ACRP6A2H5 | 168496 | 18 | 1 | 120 | 80 | 152 | 41 | 100 | 6 | 1.5 |
| ACRP9A1H3 | 168497 | 17 | 1 | 120 | 80 | 152 | 41 | 100 | 6 | 1.6 |
| ACRP12A0H84 | 168498 | 18 | 1 | 120 | 80 | 152 | 41 | 100 | 6 | 1.7 |
| ACRP18A0H56 | 168499 | 21 | 1 | 120 | 90 | 152 | 51 | 100 | 6 | 2.4 |
| ACRP27A0H37 | 168500 | 32 | 1 | 150 | 95 | 183 | 46 | 125 | 6 | 3.3 |
| ACRP35A0H27 | 168501 | 35 | 1 | 150 | 95 | 183 | 46 | 125 | 6 | 3.7 |
| ACRP3A8H1 | 168509 | 17 | 1 | 120 | 80 | 152 | 41 | 100 | 6 | 1.4 |
| ACRP4A5H1 | 168510 | 16 | 1 | 120 | 80 | 152 | 41 | 100 | 6 | 1.5 |
| ACRP6A3H4 | 168511 | 19 | 1 | 120 | 80 | 152 | 41 | 100 | 6 | 1.7 |
| ACRP10A2H | 168512 | 23 | 1 | 120 | 90 | 152 | 51 | 100 | 6 | 2.5 |
| ACRP14A1H4 | 168513 | 29 | 1 | 150 | 95 | 178 | 46 | 125 | 6 | 3.2 |
| ACRP18A1H1 | 168514 | 35 | 1 | 150 | 95 | 178 | 46 | 125 | 6 | 4 |
| ACRP27A0H75 | 168515 | 77 | 1 | 150 | 106 | 233 | 72 | 100 | 9 | 4.8 |
| ACRP35A0H58 | 168516 | 98 | 1 | 150 | 111 | 233 | 77 | 100 | 9 | 5.5 |
| ACRP38A0H58 | 168517 | 96 | 1 | 150 | 116 | 233 | 82 | 100 | 9 | 6.4 |
| ACRP45A0H45 | 168518 | 102 | 1 | 150 | 121 | 233 | 87 | 100 | 9 | 7.1 |
| ACRP70A0H29 | 168519 | 147 | 1 | 150 | 151 | 250 | 117 | 100 | 9 | 11 |
| ACRP90A0H22 | 168520 | 158 | 1 | 180 | 136 | 286 | 102 | 120 | 9 | 13.1 |
| ACRP115A0H18 | 168521 | 186 | 1 | 180 | 156 | 301 | 122 | 120 | 9 | 16.9 |
| ACRP160A0H14 | 168522 | 268 | 3 | 240 | 181 | 288 | 107 | 160 | 9 | 25.7 |

Mini speed drives

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DC reactors

Fig. 2

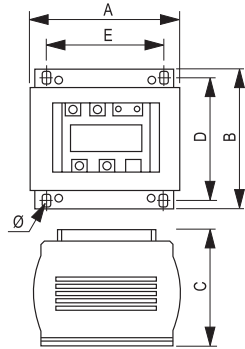
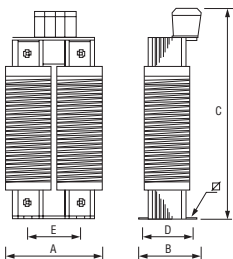


Fig. 5



| Cat. No. | Ref.No. | Losses W | Fig. | Dimensions (mm) | | | | | | Weight (kg) |
|-------------|---------|----------|------|-----------------|-----|-----|----|----|---|-------------|
| | | | | A | B | C | D | E | Ø | |
| DCR4A5H7 | 168387 | 4 | 2 | 50 | 97 | 84 | 80 | 34 | 6 | 0.78 |
| DCR6A3H9 | 168388 | 6 | 2 | 50 | 97 | 94 | 80 | 34 | 6 | 0.94 |
| DCR9A2H4 | 168389 | 9 | 2 | 75 | 96 | 95 | 80 | 56 | 6 | 1.3 |
| DCR12A1H7 | 168390 | 15 | 2 | 75 | 96 | 95 | 80 | 56 | 6 | 1.3 |
| DCR18A1H0 | 168391 | 22 | 2 | 75 | 96 | 110 | 80 | 56 | 6 | 1.8 |
| DCR3A15H2 | 168392 | 4 | 2 | 50 | 97 | 94 | 80 | 34 | 6 | 0.94 |
| DCR4A9H2 | 168393 | 4 | 2 | 75 | 96 | 95 | 80 | 56 | 6 | 1.3 |
| DCR6A6H8 | 168394 | 6 | 2 | 75 | 96 | 95 | 80 | 56 | 6 | 1.3 |
| DCR9A4H0 | 168395 | 9 | 2 | 75 | 96 | 95 | 80 | 56 | 6 | 1.3 |
| DCRP32A0H78 | 168542 | 37 | 5 | 100 | 110 | 173 | 91 | 75 | 6 | 3.9 |
| DCRP45A0H55 | 168543 | 33 | 5 | 120 | 110 | 203 | 86 | 90 | 6 | 6.1 |
| DCRP18A2H9 | 168555 | 42 | 5 | 100 | 95 | 178 | 76 | 75 | 6 | 3.5 |
| DCRP25A2H1 | 168556 | 54 | 5 | 100 | 95 | 183 | 76 | 75 | 6 | 3.5 |
| DCRP32A1H6 | 168557 | 59 | 5 | 100 | 110 | 183 | 91 | 75 | 6 | 3.9 |



Advanced general purpose AC drive

VAT300 is a new generation of high performance VSD, including latest technology in both software and hardware.

Approvals

CE Compliance, UL, cUL

Features

- The new drive, with smaller foot print than the former generation, covers the power ratings from 0.75kW to 475kW in normal duty, or up to 400kW in heavy duty.
- High starting torque up to 200% or more, can be achieved even using standard induction motors.
- VAT300 is able to drive, not only the standard induction motors, but also the new generation of permanent magnet motors. In both cases, sensorless or close loop control are available.
- As well as satisfying industry requirements, with its advanced and high performance functions, VAT300 is hailed a truly environmentally friendly drive with dedicated energy saving functions and careful selection of components to meet environmental directives.

Advantages

- **Multimode control - All in one single drive**
 - V/f control for constant torque loads and quadratic loads
 - Vector control, both closed loop and sensorless
 - PM motor control, both closed loop and sensorless
- **Dynamic braking built-in the drive up to 22kW**
- **Advanced features**
 - User programmable built-in PLC
 - Configurable PID control
 - Multi-pump control
- **Communications**
 - ModBus, ProfibusDP, DeviceNet, CANopen, CC-Link
- **Dedicated version drive for lift application - VAT300L**
- **Environmentally friendly design**
 - RoHS Directive compliant
 - High efficiency operation
 - Dioxin-free plastic cases
- **Global design**
 - Meet global standards UL, cUL, CE
 - Multi-language interface

High performance AC drive

| Input Voltage ⁽¹⁾ | Normal Duty Overload 120%, 60s ⁽²⁾ | | | Heavy Duty Overload 150%, 60s ⁽³⁾ | | | Protection degree | Cat. no. ⁽⁴⁾ | Ref. no. |
|-------------------------------------|--|--------------------|-------------------|---|--------------------|-------------------|-------------------|-------------------------|----------|
| | Maximum motor power (kW) | Output current (A) | Input power (kVA) | Maximum motor power (kW) | Output current (A) | Input power (kVA) | | | |
| With built-in EMC filters | | | | | | | | | |
| 3ph 380-480V 50/60Hz, +/-5% | 0.75 | 2,5 | 1,7 | 0,4 | 1,5 | 1,0 | IP20 | U3SX000K7FBS | 129318 |
| | 1,5 | 3,6 | 2,5 | 0,75 | 2,5 | 1,7 | IP20 | U3SX001K5FBS | 129319 |
| | 2,2 | 5,5 | 3,8 | 1,5 | 3,6 | 2,5 | IP20 | U3SX002K2FBS | 129320 |
| | 3,7 | 8,6 | 6,0 | 2,2 | 5,5 | 3,8 | IP20 | U3SX004K0FBS | 129321 |
| | 5,5 | 13 | 9,0 | 3,7 | 8,6 | 6,0 | IP20 | U3SX005K5FBS | 129322 |
| | 7,5 | 17 | 12 | 5,5 | 13 | 9,0 | IP20 | U3SX007K5FBS | 129323 |
| | 11 | 23 | 16 | 7,5 | 17 | 12 | IP20 | U3SX011K0FBS | 129324 |
| | 15 | 31 | 21 | 11 | 23 | 16 | IP20 | U3SX015K0FBS | 129325 |
| | 18,5 | 37 | 26 | 15 | 31 | 21 | IP20 | U3SX018K5FBS | 129326 |
| | 22 | 44 | 30 | 18,5 | 37 | 26 | IP20 | U3SX022K0FBS | 129327 |
| 30 | 60 | 42 | 22 | 44 | 30 | IP20 | U3SX030K0FNS | 129328 | |
| Without built-in EMC filters | | | | | | | | | |
| 3ph 380-480V 50/60Hz, +/-5% | 0.75 | 2,5 | 1,7 | 0,4 | 1,5 | 1,0 | IP20 | U3SX000K7SBS | 129329 |
| | 1,5 | 3,6 | 2,5 | 0,75 | 2,5 | 1,7 | IP20 | U3SX001K5SBS | 129330 |
| | 2,2 | 5,5 | 3,8 | 1,5 | 3,6 | 2,5 | IP20 | U3SX002K2SBS | 129331 |
| | 3,7 | 8,6 | 6,0 | 2,2 | 5,5 | 3,8 | IP20 | U3SX004K0SBS | 129332 |
| | 5,5 | 13 | 9,0 | 3,7 | 8,6 | 6,0 | IP20 | U3SX005K5SBS | 129333 |
| | 7,5 | 17 | 12 | 5,5 | 13 | 9,0 | IP20 | U3SX007K5SBS | 129334 |
| | 11 | 23 | 16 | 7,5 | 17 | 12 | IP20 | U3SX011K0SBS | 129335 |
| | 15 | 31 | 21 | 11 | 23 | 16 | IP20 | U3SX015K0SBS | 129336 |
| | 18,5 | 37 | 26 | 15 | 31 | 21 | IP20 | U3SX018K5SBS | 129337 |
| | 22 | 44 | 30 | 18,5 | 37 | 26 | IP20 | U3SX022K0SBS | 129338 |
| | 30 | 60 | 42 | 22 | 44 | 30 | IP20 | U3SX030K0SNS | 129339 |
| | 37 | 73 | 51 | 30 | 60 | 42 | IP00 | U3SX037K0SNS | 129340 |
| | 45 | 87 | 60 | 37 | 73 | 51 | IP00 | U3SX045K0SNS | 129341 |
| | 55 | 108 | 75 | 45 | 87 | 60 | IP00 | U3SX055K0SNS | 129342 |
| | 75 | 147 | 102 | 55 | 108 | 75 | IP00 | U3SX075K0SNS | 129343 |
| | 90 | 179 | 124 | 75 | 147 | 102 | IP00 | U3SX090K0SNS | 129344 |
| | 110 | 214 | 148 | 90 | 179 | 124 | IP00 | U3SX110K0SNS | 129345 |
| | 132 | 249 | 173 | 110 | 214 | 148 | IP00 | U3SX132K0SNS | 129346 |
| | 160 | 321 | 222 | 132 | 249 | 173 | IP00 | U3SX160K0SNS | 129347 |
| | 200 | 428 | 297 | 160 | 321 | 222 | IP00 | U3SX200K0SNS | 129348 |
| 250 | 519 | 360 | 200 | 428 | 297 | IP00 | U3SX250K0SNS | 129349 | |
| 315 | 590 | 409 | 250 | 519 | 360 | IP00 | U3SX315K0SNS | 129350 | |
| 400 | 740 | 513 | 315 | 590 | 409 | IP00 | U3SX400K0SNS | 129351 | |
| 475 | 870 | 603 | 400 | 740 | 513 | IP00 | U3SX475K0SNS | 129352 | |
| With built-in EMC filters | | | | | | | | | |
| 3ph 200-240V 50/60Hz, +/-5% | 0.75 | 5 | 1,7 | 0,4 | 3 | 1,0 | IP20 | U3SN000K7FBS | 129300 |
| | 1,5 | 8 | 2,8 | 0,75 | 5 | 1,7 | IP20 | U3SN001K5FBS | 129301 |
| | 2,2 | 11 | 3,8 | 1,5 | 8 | 2,8 | IP20 | U3SN002K2FBS | 129302 |
| | 3,7 | 16 | 5,5 | 2,2 | 11 | 3,8 | IP20 | U3SN004K0FBS | 129303 |
| | 5,5 | 24 | 8,3 | 3,7 | 16 | 5,5 | IP20 | U3SN005K5FBS | 129304 |
| Without built-in EMC filters | | | | | | | | | |
| 3ph 200-240V 50/60Hz, +/-5% | 0.75 | 5 | 1,7 | 0,4 | 3 | 1,0 | IP20 | U3SN000K7SBS | 129305 |
| | 1,5 | 8 | 2,8 | 0,75 | 5 | 1,7 | IP20 | U3SN001K5SBS | 129306 |
| | 2,2 | 11 | 3,8 | 1,5 | 8 | 2,8 | IP20 | U3SN002K2SBS | 129307 |
| | 3,7 | 16 | 5,5 | 2,2 | 11 | 3,8 | IP20 | U3SN004K0SBS | 129308 |
| | 5,5 | 24 | 8,3 | 3,7 | 16 | 5,5 | IP20 | U3SN005K5SBS | 129309 |
| | 7,5 | 33 | 11 | 5,5 | 24 | 8,3 | IP20 | U3SN007K5SBS | 129310 |
| | 11 | 46 | 16 | 7,5 | 33 | 11 | IP20 | U3SN011K0SBS | 129311 |
| | 15 | 61 | 21 | 11 | 46 | 16 | IP20 | U3SN015K0SBS | 129312 |
| | 18,5 | 76 | 26 | 15 | 61 | 21 | IP20 | U3SN018K5SBS | 129313 |
| | 22 | 88 | 30 | 18,5 | 76 | 26 | IP00 | U3SN022K0SNS | 129314 |
| | 30 | 118 | 41 | 22 | 88 | 30 | IP00 | U3SN030K0SNS | 129315 |
| | 37 | 146 | 51 | 30 | 118 | 41 | IP00 | U3SN037K0SNS | 129316 |
| | 45 | 174 | 60 | 37 | 146 | 51 | IP00 | U3SN045K0SNS | 129317 |

(1) Voltage tolerance

380-480V series: +/-10% up to drive U3SX055K0. For U3SX075K0 and above +5%.
200-240V series: +/-10% all range.

(2) Normal duty: 120% for 1 min., 140% for 2.5 seconds

- Ambient temperature -10 to 50°C. Above 40°C note following deratings:
For drive U3SN005K0, reduce output current by 2% per 1°C.
For drives U3SN011K0, U3SX005K5 and U3SX015K0, reduce output current by 1% per 1°C.
- For carrier frequency above 4kHz, note following deratings:
For 200-240V series, reduce output current by 3% per kHz.
For 380-480V series, reduce output current by 5% per kHz.
Check user manual of VAT300 for additional details.

(3) Heavy duty: 150% for 1 min., 175% for 2.5 seconds

- Ambient temperature -10 to 50°C, for all ratings.
- For carrier frequency above 4kHz, note following deratings.
For 200-240V series, reduce output current by 3% per kHz.
For 380-480V series, reduce output current by 3-5% per kHz, depending the unit rating.
Check user manual of VAT300 for additional details.

(4) Dynamic braking circuit

This is included as standard for all drives up to 22kW (400V series), and up to 18.5kW (200V series). Catalogue numbers, up to U3SX022K0 or up to U3SN018K5.

Multimode speed drives

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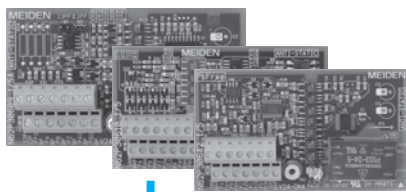
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Optional interfaces and accessories

| | Item | Description | Cat. No. | Ref. no. |
|---------------------------------|---------------------------------|--|-------------------|----------|
| I/O interfaces | | | | |
| | Encoder interface DN1 | For 12VDC, A/B phase, complimentary type encoder | U30V24DN1 | 129388 |
| | Encoder interface DN2 | For 5VDC, A/B/Z/S phase, line driver type encoder | U30V24DN2 | 129389 |
| | Encoder interface DN3 | For 5VDC, A/B/Z/U/V/W phase encoder, for the PM drive control (pole position). This encoder interface is compatible with the line driver output type encoder | U30V24DN3 | 129390 |
| | Encoder interface DN5 | Speed detection interface, compatible with Heidenhain ERN 1387. | U30V24DN5 | 129391 |
| | Encoder interface DN6 | 1Vpp 2-phase, 2-set sine wave + Z-phase pulse encoders | U30V24DN6 | 129393 |
| | Digital I/O interface | 5VDC, A/B phase, complimentary type encoder | U30V24RY0 | 129394 |
| | Analog I/O interface | Additional 4 I + 4 O (relay) interface | U30V24AIO | 129396 |
| Communication interfaces | | | | |
| | ProfibusDP interface | Standard field bus communications interface ProfibusDP | U30V24SL0 | 129397 |
| | CAN-Open interface | Standard field bus communications interface CAN-Open | U30V24SL1 | 129398 |
| | DeviceNet interface | Standard field bus communications interface DeviceNet | U30V24SL2 | 129399 |
| | CC-Link interface | Standard field bus communications interface DeviceNet | U30V24SL3 | 129400 |
| Other accessories | | | | |
| | Extension keypad's cable | For keypad remote mounting (length = 3 meter) | U2KV23W103 | 168102 |
| | LCD keypad | Operator interface LCD | U30V24OP1 | 129353 |
| | LED keypad | Operator interface LED | U30V24OP2 | 129354 |

Speed drive units

A

B

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Technical data

Ratings

| | | |
|---|--|--------------------------------|
| Voltage ratings 200V series (U3SN _) 400V series (U3SX _) | Supply Voltage: 3ph, 200-240VAC, ±10%. Supply Voltage: 3ph, 380-480VAC, ±10%(*) (*) For drives above U3SX055K0 (>55kW), Voltage tolerance is -10%, +5%, over 480VAC | Supply frequency: 50/60Hz, ±5% |
|---|--|--------------------------------|

Frequency control

| | | |
|------------------------------|---|---|
| Control method | All digital control, sine wave approximation PWM | |
| Carrier frequency | Mono-Sound Mode Soft Sound Mode | 1 to 15kHz (0.1kHz increments) Average frequency 2.1 to 5kHz with 3 or 4 tone modulation |
| Output frequency resolution | 0.01Hz | |
| Frequency setting resolution | Digital Analogue | 0.01Hz 0.03% . In respect to maximum frequency |
| Frequency accuracy | Digital Analogue | ±0.01% at 25±10°C ±0.0% at 25±10°C |
| Output frequency | 0-440Hz in V/f control 0-180Hz in vector control for induction motors 0-210Hz in PM mode control, for PM motors | |

Control specifications

| | | |
|---|--|--|
| V/f control | Standard control for induction motors, with advanced characteristics: - Constant torque, constant output and quadratic characteristics randomly set in range 3-440Hz - High performance torque boost. (Automatic Torque Control) | |
| Speed control for IM ⁽¹⁾ | High performance vector control for Induction motors <u>Sensorless</u> <u>Close Loop</u> Control range 1:100 1:1000 Constant output range Up to 1:2 Up to 1:4 Speed accuracy (Fmax≥50Hz) ±0.5% ±0.01% Control response 5Hz 30Hz | |
| Speed control for PM ⁽¹⁾ | High performance control for permanent magnet motors <u>Sensorless</u> <u>Close Loop</u> Control range 1:5 1:100 Constant output range Up to 1:1.5 Up to 1:1.5 Speed accuracy (Fmax≥50Hz) ±0.01% ±0.01% | |
| Automatic tuning | Automatic measurements of motor constants and critical parameters, for all mode control Available for all control modes, V/f, vector control and PM motor control | |
| Starting torque ⁽¹⁾ | 200% of more, using standard motor, 150% rated current | |
| Acceleration / deceleration time | 0.01 to 60000sec, 11 independent settings Two for standard accel/decel. time, other for jogging, and eight more for program cushion Linear and S-Ramp available | |
| Operating mode (three selective modes) | - Forward run or reverse run, permanent command by two digital inputs - Run / stop and forward / reverse changeover, permanent command by two digital inputs - RUN / STOP, pulse command by push buttons | |
| Stop method | Selectable either ramp down to stop or coast to stop - Independent selectable for run/stop, jog, and emergency stop | |
| Dynamic braking | Included as standard for all drives up to 22kW (400V series), and up to 18.5kW (200V series) | |
| DC braking | - Braking frequency, set from 0.1 to 60.0Hz - Braking voltage, set between 0.1 and 20% - Braking time, set between 0.0 and 20s | |

I/O control

| | | |
|-------------------|--|--|
| Operator keypad | - Local (keypad) and remote operation changeover - Forward, reverse, stop by key-switches - Change, copy, save facilities of all parameters - Removable and mountable outside the unit by extension wirings | |
| | LCD keypad | Two rows, 16 characters each. Multi-language format Quick parameter search by rotary knob |
| | LED keypad | 7 segment LED, five digit display and seven points LED indications Parameter search by up / down keys |
| Analogue I/O | Analogue inputs | Three analogue inputs for speed or torque control, and two analogue output as standard. All programmable AI1 and AI2: Either voltage 0-10V, 0-5V, 1-5V or current 0-20mA, 4-20mA AI3: Voltage input 0 to ±10V, 0 to ±5V P10: Voltage source for potentiometer speed setting |
| | Analogue outputs | AO1 and AO2: Both configurable either as voltage 0-10V or current 4-20mA, for metering purpose Programmable with more than 20 available functions |
| Digital I/O | Digital inputs | Seven digital inputs, and five digital outputs as standard. All programmable. Seven, PSI1-PSI7. Configurable source or sink logic. Programmable with more than 50 functions. Input PSI7, can be used as pulse setting (max 10kHz). |
| | Digital outputs | Two dry relay and three open collector transistors. Programmable with more than 50 functions |
| Communication I/O | Standard RS485 port. I/O carried out by standard RJ connector or screw terminals. ModBus RTU, standard protocol is built-in the drive as standard | |

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Functions

Standard functions

| | |
|---|---|
| Multi-pump control | Control of up to 8 pumps, one controlled in speed and the others ON/OFF. Allows rotation of the outputs to ensure same running time for all the pumps, including the speed controlled pump. Sleep / wake-up function included |
| PID regulator | Allows close-loop control for process like pressure control, flow etc, including limit detection. When this function is enabled, VAT300 automatically controls the motor speed to keep the process required set point |
| Energy saving function Built-in PLC | This function automatically decreases output voltage according to the load, improving motor efficiency Logic and arithmetic operations. I/O management Program capacity: 16 instructions per bank (max 20 banks). Scan: 2ms per bank |
| Automatic run | 10 step automatic run function |
| Traverse run | Specific function for textile industry, weaving machines |
| Speed time pattern | Specific function for spinning frame machines |
| Auxiliary drives | Switchover of up to four sets of motor parameters |
| External brake control UP/DOWN | ON / OFF control of external mechanical brake with feedback and other advanced features Function that allow motor speed UP/DOWN by push buttons. This function can be combined with other reference signals, analogue or digital |
| Multi-step speed setting Acceleration / deceleration multiple ramp times | 8 fixed speed, selectable, with independent acceleration / deceleration time setting Up to 11 independent time settings. One for Jogging, two for default acceleration / deceleration and eight more for the multi-speed function |
| Multi-step speed setting Ratio interlock speed | 8 fixed speed, selectable, with independent acceleration / deceleration time setting Speed reference input / Output ratio is can be controlled according $y = Ax + B + C$ y: Output frequency or Speed x: Frequency or speed reference A: Gain, adjustable from 0.000 to ± 10.000 B: Adjustable from 0.00 to $\pm 440.00\text{Hz}$ C: Bias signal from auxiliary input |
| Ratio interlock torque Pick-Up (Flying start) Retry | Torque reference input / Output ratio is can be controlled according above given expression This function is useful to restart a free-wheel rotating motor even if it is rotating in reverse direction Automatic re-start after a failure. Provides up to 10 programmable re-trials with programmable time between trials |
| Frequency skip Droop Automatic tuning | Three skip areas. Width can be varied from 0.0Hz up to 10Hz. Operates in V/f control only Useful function that help load balance when several motors are mechanically coupled Automatic measurements of motor constants and other critical parameters, for all mode of control like V/f, Vector control and PM motor control |
| Torque control Adaptable and programmable I/O | By this function, is possible to control the motor torque by means of analogue or digital signals Programmable inputs and outputs can be assigned up to 50 functions each. Can be adapted to application needs |

Other important functions

| | | |
|---|---|--|
| <ul style="list-style-type: none"> - Automatic start - Reverse RUN prevention - Torque limits - Multiple current limits - Adaptable V/f control - Parameter protection lock - DC braking - Cooling fan ON/OFF control | <ul style="list-style-type: none"> - Pre-excitation - Password protection - Parameter protection - Automatic braking on power failure - Simple speed control - Pulse train I/O function - Extended and configurable display indication | <ul style="list-style-type: none"> - Jog forward & reverse function - Direct and inverse PID type mode selection - S-Ramps - Multiple stop mode, all configurable, like ramp down, emergency, coast to stop, by DC injection |
|---|---|--|

Protections

| | | |
|---------------------------|--|---|
| Motor & drive protections | <ul style="list-style-type: none"> - Overload independent for ND, HD - Overcurrent trip - Overcurrent limit - Overvoltage trip - Overvoltage limit - Drive overheat - Ground fault - Phase failure | <ul style="list-style-type: none"> - Overspeed protection - Fuse blown indication - External fault (from I/O) - Precharging circuit fault - EEPROM data Error - PM module fault - Self diagnostics for CPU, and PCBs |
|---------------------------|--|---|

Speed drive units

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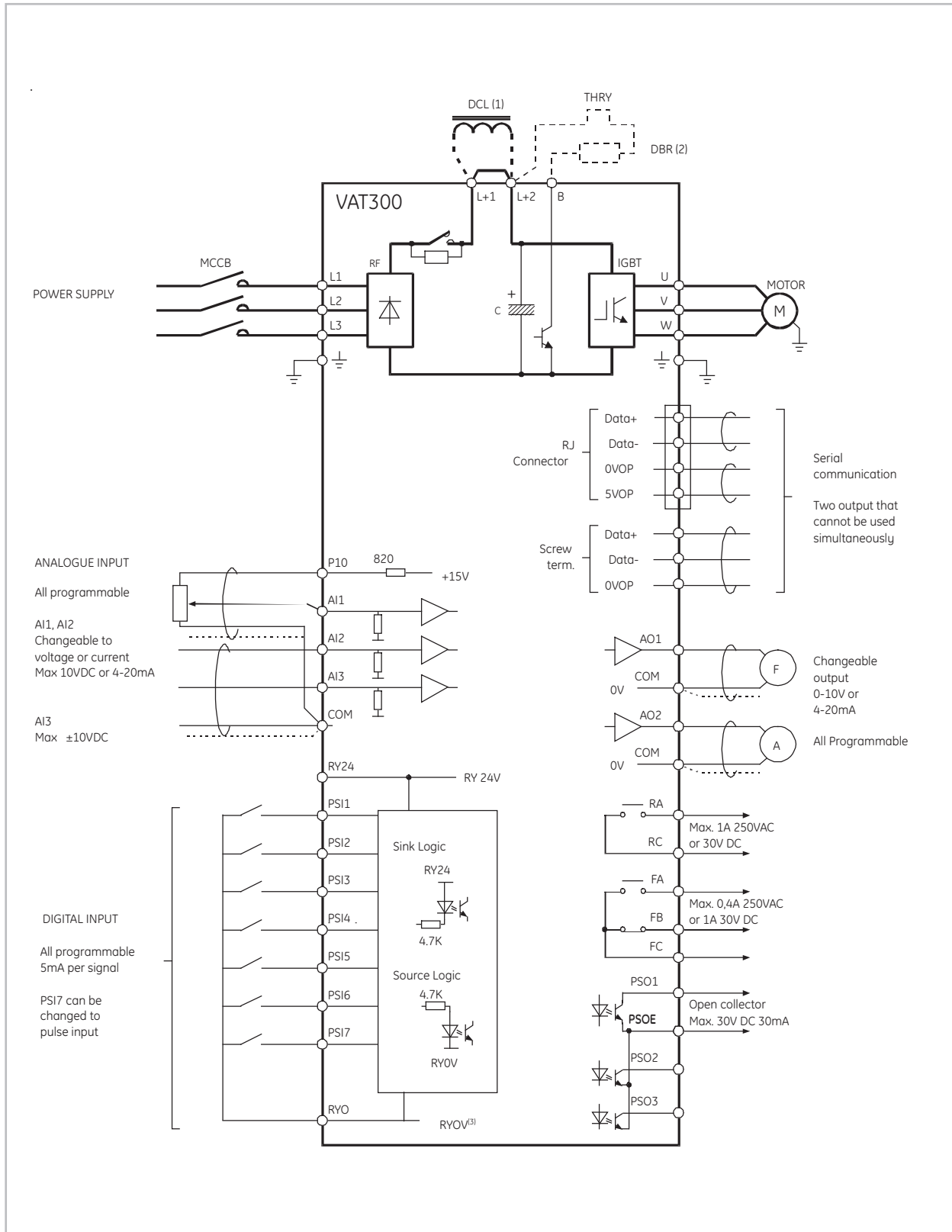
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I/O wiring basic scheme



- (1) Remove link between L+1 and L+2 when using DC reactor
- (2) Built-in dynamic braking is included up to U3SX22K0, and U3SN18K5 drives.
Use external braking devices for large units. Check user manual for details
- (3) No connection should be made between RYO and COM, due to these sections are isolated

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I/O terminal board specifications

Control terminal board

Speed drive units

| | Terminals | Function | Description |
|------------------|-----------------|--------------------------------|---|
| Digital inputs | RY0, RY24 | Common inputs | Common terminal for digital inputs. Available sink / source logic. RY24 and RY0 must not be shorted |
| | PSI1 to PSI7 | Programmable inputs | These commands can be arbitrarily set to any input sequence function. Programmable with more than 50 functions. Input PSI7, can be used as pulse setting (max 10kHz) |
| Analogue inputs | AI1, 2 | Programmable inputs | 12 bits, programmable analogue input, for input voltage in the range of 0 to 10V or input current in the range of 0 to 20mA. Usually dedicated for speed or torque control |
| | AI3 | Programmable input | 12 bits, programmable analogue input allowing voltage input of the range of -10 to +10V |
| | COM P10 | Common input Source voltage | Common terminal for the analogue inputs Exclusively dedicated for potentiometer source voltage of 10V, in combination with analogue inputs AI1 or AI2 |
| Analogue outputs | AO1, AO2 COM | Output metering Common | 10 bits, programmable analogue outputs for metering purposes Common terminal for analogue outputs |
| Digital outputs | RA, RC | Relay (1NO) | Programmable relay to any sequence output, assigned by default to RUN function |
| | FA, FB, FC | Relay (1NO/NC) | Programmable relay to any sequence output, assigned by default to fault function |
| | PSO1 to PSO3 | Transistor output | Programmable transistor outputs, assigned by default to RDY (ready), IDET (current detection) and ATN (speed reached) functions. Can be programmed with any sequence output function. |
| | PSOE | Common | Common terminal for digital open collector transistors output |

Input sequence functions (assignable to any programmable digital input)

| | Symbol | Function | Description |
|---|-------------|---|---|
| A | F RUN | Forward run | Forward run command for the remote operation mode |
| | EMS | Emergency stop | Cancels all run commands. The operation can be stopped with ramp deceleration stop or coast to stop. This signal can also be output as a fault (FLT) (C00-4) |
| B | R RUN | Reverse run | Command for reverse run |
| | F JOG | Forward jogging | Jogging commands, with specific speed settings. Either ramp down to stop or coast to stop are available |
| C | R JOG | Reverse jogging | |
| | HOLD | Hold | Used for stopping, when forward or reverse commands are operated by push buttons |
| D | BRAKE | DC brake | DC injection voltage to the motor can be enabled with this signal In the case of PM motor control, this function enables DC field |
| | RESET | Fault reset | Resets the fault state |
| E | COP | Switch selector for serial transmission | Selects command control either from VAT300's digital inputs or from serial communication command control signals |
| | CSEL | Ramp selection | Selects either two acceleration/deceleration ramp settings |
| F | I PASS | Ratio interlock bypass | Bypasses ratio interlock function |
| | CPASS | Ramp bypass | Bypasses acceleration or deceleration ramp function |
| G | PIDEN | PID control selection | Enables or disables the PID function |
| | AFS1, 2, 3 | Speed setting 1, 2 or 3 | Functions used for selection of speed or torque analogue inputs |
| H | PROG | Program function | Used for multiple setting, up to 8 speeds. Speed selection is made by sequence functions S0, S1, S2, S3, SE |
| | CFS | Switch selector for serial transmission | Selects speed setting either from VAT300's analogue inputs or from serial communication command signals |
| I | S0 to S3 SE | Program setting selection | Auxiliary functions used for multi-speed operation and other purposes |
| | FUP, FDW | Speed Up/Down | Allows speed up and down command by push-buttons |
| X | BUP, BDW | Ratio interlock bias Up/Down | These functions allow to increase or decrease the variable bias "C" in the ratio interlock function, $Y=Ax+B+C$ |
| | IVLM | Ratio interlock bias selection | Enables or disables the ratio interlock bias function |
| I | AUXDV | Auxiliary drive selection | Enables or disables auxiliary drive function, which allows to use a unique drive with 4 different set of motor parameters |
| | PICK | Pick-Up | Also called "flying start", allows to re-start a motor which is free wheel rotating |
| I | MBRK_ans | External brake feedback | Used to input brakes ON/OFF status, from external mechanical brake |
| | PRST | STP reset | Used to input RESET signal while running the spinning function |
| I | S5 to S7 | Digital torque bias 0 to 4 | Selects either of the 5 torque bias settings |
| | AUXSW0, 1 | Auxiliary drive no. selection L and H | Selects up to four set of parameters, for example, to use the drive with four different motors or settings |
| I | PLS_IN | Pulse train input selection | Enables or disables the digital input PSI7, as pulse input |
| | OCLLV1, V2 | OCL settings 1, 2 | Enables or disables the two additional overcurrent limit levels |
| I | E.FLT1 to 8 | External fault | External signals to the VAT300, can be input through digital programmable inputs PSI, then to generate a fault, and to stop the drive In this case the drive stops by coast to stop only |
| | EXC | Pre-excitation | This provides excitation flux in the motor, before to start, in order to have immediate torque at starting time |
| I | ACR | ACR | ACR operation is selected, to provide torque control |
| | PCTL | P control | ASR control is changed from the PI control to the P control |
| I | LIM1, 2 | Drive torque limiter changeovers | Enables the drive torque limiter reduction setting by the analogue input or serial transmission |
| | MCH | Machine time constant changeover | During ASR operation, ASR gain may be changed by this parameter switch, then select settings either from two different sets of machine time constants |
| I | RF0 | 0 setting | The speed setting is changed to 0 min-1 (Zero Speed) |
| | DROOP | Drooping changeover | Enables drooping function, to synchronize several drives |
| I | DEDB | Dead band setting | Sets dead band of ASR (speed regulator) |
| | TRQB1, 2 | Torque bias set 1, 2 | Enables torque bias input 1 or 2 |



Output sequence functions (assignable to any digital programmable output)

| Symbol | Function | Description |
|-----------|---------------------------------------|---|
| RUN | Run | Turns ON during running, jogging or DC braking. Also can be ON during pre-excitation |
| FLT | Fault | Turns ON during a fault |
| MC | Precharge completed | Turns ON when the DC main circuit voltage reaches the required voltage after Power ON |
| RDY1 | Ready (1) | Turns ON when there is no fault, EMS is not activated, pre-charging is complete and the encoder signal is detected (this last, only in PM motor control with sensor mode) |
| RDY2 | Ready (2) | Turns ON when there is no fault, pre-charging is complete and the encoder signal is detected (this last only in PM motor control with sensor mode) |
| LCL | Local | Turns ON when the operation mode is local (operation from the keypad) |
| REV | Reverse run | - V/f Control: This turns ON while the output frequency is reverse running - Vector and PM control: This turns ON while the motor is reverse running |
| IDET | Current detection | Turns ON when the output current reaches the detection level set in the drive or higher |
| ATN | Frequency or speed attainment | Turns ON when the output frequency or speed reaches the reference set in the drive |
| SPD1, 2 | Frequency or speed detection (1 or 2) | Turns ON when the output frequency or speed, reaches the value set by detection speed levels 1 or 2 |
| COP | Transmission selection | Turns ON when serial transmission operation switch is enabled |
| ECO~EC3 | Specific fault output | ECO to EC3 functions, can be programmed with any of the fault events which are available in the VAT300. If one of the programmed faults occurs, then the corresponding ECx function turns ON |
| ACC | Acceleration | Turns ON during acceleration |
| DCC | Deceleration | Turns ON during deceleration |
| AUXDV | Auxiliary drive selection | Turns ON when the auxiliary drive parameter setting is enabled |
| ALM | Minor fault | Turns ON during a minor fault |
| FAN | Fan control | Turns ON during running, jogging, pre-excitation and DC braking. After these events, the function turns OFF with three minutes delay |
| ASW | Automatic start wait | When the automatic start function is used, ASW will turn ON while waiting for automatic start |
| ZSP | Zero speed | Turns ON when the output frequency (speed) absolute value is below the level set with zero speed (C15-4) |
| LL MT | PID lower limit output | Turns ON when the feedback value is below the lower limit value (<B43-4) during PID control |
| ULMT | PID upper limit output | Turns ON when the feedback exceeds the upper limit value (>B43-3) during PID control |
| Doff-End | Doff-End alarm output | Turns ON only at a specific sequence of spinning frame operation |
| MBRK | External brake output | Outputs an external ON/OFF signal to control an external mechanical brake |
| DVER | Speed deviation error | Turns ON during a speed deviation error |
| BPF | Stoppage deceleration output | BPF turns ON when the DC voltage drops below the set value in parameter B12-1, then allowing the automatic braking on power failure if this is enabled |
| RDELAY | Run delay answer | Delays the turning OFF of the sequence output RUN, according to time set on C15-5 |
| MPO1 to 8 | Multi-pump output | Output signal for multi-pump control |
| PLC1 to 8 | Built-in PLC output | Sequence output signal of built-in PLC |

Multimode speed drives

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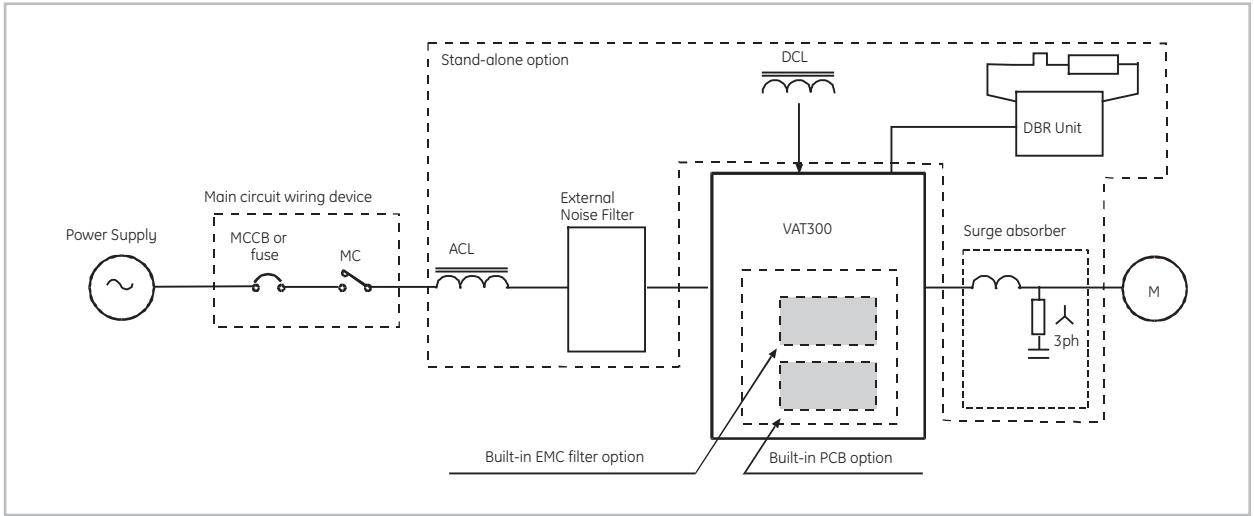
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External accessories



Speed drive units

Stand-alone options

| | | | |
|---|-------------------------------------|----------------------------|--|
| A | Line contactor and circuit breakers | CLxx, CKxx | MC line contactor, fuses or MCCBs (Moulded Case Circuit Breakers) must be installed to protect the installation, according either IEC or UL standards. Check application table, for selecting these devices |
| B | Noise filter DB units | U30F_xxxxx U2KV23DBU_xx | External filters for suppressing the electromagnetic noise generated from the drive Dynamic braking devices. These are required to absorb the regenerative energy during fast braking, or during deceleration of high friction loads. To be used with following VAT300 drives: 400V series: From U3SX030K0 and above (30kW and above) 200V series: From U3SN022K0 and above (22kW and above) |
| C | DBR units | ER_xxxxx TLR_xxxxx | Always install the appropriate braking resistor. Braking resistors, to be used in combination with external dynamic braking modules, or with VAT300 provided with built-in dynamic braking. |
| D | ACL | ACRP_xxxxx | Note VAT300 up to U3SX015K0 and up to U3SN011K0, are provided with a small capacity, built-in braking resistor as standard. When braking torque with built-in resistors is not enough, use external braking resistors. Check VAT300 user manual for technical details ACL provides significant benefits, in reducing the harmonic content, improving the power factor and reducing the ripple in the converter DC stage. In addition, ACL provides additional protection to the VAT300 against surge voltage from the mains. If the line impedance is too low, the current ripple trough converter may become excessive, current peaks too high, and this may produce permanent damage on the VAT300. |
| E | DCL | DGRP_xxxxx | Always install an ACL, (AC Input reactor), in below cases: - When mains transformer is larger than 500kVA, for VAT300 drives up to 55kW in heavy duty ratings - When mains transformer is larger than 10 times inverter capacity kVA, for drives larger than 55kW in heavy duty, or all range of VAT300 in normal duty ratings |
| F | Surge absorber | ACFRP_xxxxx N11P34018=7 | Same benefits than ACL reactors, except for surge voltage protection This protection, ia a combination of output reactor ACFRP and a RC filter N11P34018=7. This is used to protect standard motors against surge voltage. It may be required for 400-480VAC systems, when power wirings from VAT300 to the motor are larger than 40mts |

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VAT300 application with Normal Duty ratings

| VAT300 Type | Losses W | Motor kW ⁽¹⁾ | MCCB ⁽²⁾ (A) | Contact- tor | EMC filter ⁽³⁾ | Dynamic braking module | DBR ⁽⁴⁾ | INPUT AC reactor | DC reactor | Surge absorber ⁽⁵⁾ reactor + RC |
|-------------|----------|-------------------------|-------------------------|-----------------|---------------------------|------------------------|--------------------|------------------|---------------|--|
| X000K7 | 58 | 0.75 | 15 | CL00 | Built-in | Built-in | TLR864P200 | ACRP3A8H1 | - | ACFRP10A + RC |
| X001K5 | 72 | 1.5 | 15 | CL00 | Built-in | Built-in | TLR432P200 | ACRP4A5H1 | - | ACFRP10A + RC |
| X002K2 | 110 | 2.2 | 15 | CL00 | Built-in | Built-in | TLR295P200 | ACRP6A3H4 | - | ACFRP10A + RC |
| X004K0 | 160 | 4 | 15 | CL00 | Built-in | Built-in | TLR175P600 | ACRP10A2H | - | ACFRP10A + RC |
| X005K5 | 210 | 5.5 | 20 | CL00 | Built-in | Built-in | TLR118P600 | ACRP14A1H4 | - | ACFRP14A + RC |
| X007K5 | 240 | 7.5 | 25 | CL02 | Built-in | Built-in | TLR86P600 | ACRP18A1H1 | DCRP25A2H1 | ACFRP18A + RC |
| X011K0 | 350 | 11 | 30 | CL04 | Built-in | Built-in | TLR59P1000 | ACRP27A0H75 | DCRP32A1H6 | ACFRP27A + RC |
| X015K0 | 470 | 15 | 40 | CL04 | Built-in | Built-in | TLR43P1000 | ACRP35A0H58 | DCRP40A1H2 | ACFRP35A + RC |
| X018K5 | 500 | 18.5 | 50 | CL04 | Built-in | Built-in | TLR35P1500 | ACRP38A0H58 | DCRP50A0H96 | ACFRP38A + RC |
| X022K0 | 610 | 22 | 60 | CL06 | Built-in | Built-in | TLR29P1800 | ACRP45A0H45 | DCRP60A0H82 | ACFRP45A + RC |
| X030K0 | 800 | 30 | 80 | CL06 | Built-in | U2KV23DBUH3 | TLR22P2500 | ACRP70A0H29 | DCRP80A0H58 | ACFRP62A + RC |
| X037K0 | 1000 | 37 | 100 | CL07 | External | U2KV23DBUH3 | TLR18P3000 | ACRP90A0H22 | DCRP100A0H49 | ACFRP90A + RC |
| X045K0 | 1150 | 45 | 125 | CL09 | External | U2KV23DBUH4 | TLR15P3700 | ACRP90A0H22 | DCRP125A0H40 | ACFRP90A + RC |
| X055K0 | 1620 | 55 | 150 | CL09 | External | U2KV23DBUH4 | - | ACRP115A0H18 | DCRP140A0H32 | ACFRP115A + RC |
| X075K0 | 1670 | 75 | 200 | CK75 | External | U2KV23DBUH4 | - | ACRP160A0H14 | DCRP180A0H25 | ACFRP160A + RC |
| X090K0 | 2300 | 90 | 225 | CK08 | External | U2KV23DBUH4 | - | ACRP185A0H11 | DCRP210A0H25 | ACFRP185A + RC |
| X110K0 | 2860 | 110 | 300 | CK85 | External | U2KV23DBUH4 | - | ACRP225A0H096 | DCRP270A0H18 | ACFRP300A + RC |
| X132K0 | 3130 | 132 | 350 | CK09 | External | U2KV23DBUH4 | - | ACRP300A0H067 | DCRP310A0H14 | ACFRP300A + RC |
| X160K0 | 4110 | 160 | 400 | CK09 | External | U2KV23DBUH4 | - | ACRP360A0H056 | DCRP400A0H13 | ACFRP360A + RC |
| X200K0 | 6560 | 200 | 500 | CK95 | External | U2KV23DBUH4 | - | ACRP460A0H056 | DCRP540A0H08 | ACFRP460A + RC |
| X250K0 | 8050 | 250 | 600 | CK10 | External | 2xU2KV23DBUH4 | - | ACRP550A0H039 | DCRP650A0H07 | ACFRP550A + RC |
| X315K0 | 9500 | 315 | 800 | CK11 | External | 2xU2KV23DBUH4 | - | ACRP700A0H035 | DCRP740A0H06 | ACFRP700A + RC |
| X400K0 | 12140 | 400 | 1000 | CK12 | External | 2xU2KV23DBUH4 | - | ACRP850A0H023 | DCRP950A0H05 | ACFRP850A + RC |
| X475K0 | 14370 | 475 | 1200 | CK13 | External | 3xU2KV23DBUH4 | - | ACRP950A0H016 | DCRP1000A0H04 | ACFRP950A + RC |
| N000K7 | 65 | 0.75 | 15 | CL00 | Built-in | Built-in | TLR216P200 | ACRP6A2H5 | - | - |
| N001K5 | 92 | 1.5 | 15 | CL00 | Built-in | Built-in | TLR108P200 | ACRP9A1H3 | - | - |
| N002K2 | 130 | 2.2 | 15 | CL00 | Built-in | Built-in | TLR74P200 | ACRP12A0H84 | - | - |
| N004K0 | 160 | 4 | 20 | CL01 | Built-in | Built-in | TLR44P600 | ACRP18A0H56 | - | - |
| N005K5 | 230 | 5.5 | 30 | CL02 | Built-in | Built-in | TLR29P600 | ACRP27A0H37 | - | - |
| N007K5 | 350 | 7.5 | 40 | CL04 | External | Built-in | TLR22P600 | ACRP35A0H27 | DCRP45A0H55 | - |
| N011K0 | 440 | 11 | 60 | CL04 | External | Built-in | TLR15P1000 | ACRP55A0H18 | DCRP60A0H4 | - |
| N015K0 | 510 | 15 | 80 | CL06 | External | Built-in | TLR11P1200 | ACRP70A0H14 | DCRP80A0H3 | - |
| N018K5 | 710 | 18.5 | 100 | CL07 | External | Built-in | TLR8,8P1500 | ACRP80A0H14 | DCRP100A0H24 | - |
| N022K0 | 700 | 22 | 125 | CL09 | External | U2KV23DBUL2 | TLR7,4P1800 | ACRP97A0H11 | DCRP120A0H2 | - |
| N030K0 | 930 | 30 | 150 | CL10 | External | U2KV23DBUL3 | TLR5P2500 | ACRP140A0H072 | DCRP150A0H17 | - |
| N037K0 | 1210 | 37 | 200 | CK75 | External | U2KV23DBUL3 | TLR4P3000 | ACRP180A0H056 | DCRP180A0H14 | - |
| N045K0 | 1480 | 45 | 225 | CK75 | External | U2KV23DBUL4 | - | ACRP200A0H051 | DCRP220A0H11 | - |

- Device selection conditions, for Normal Duty (overload capacity 120%, 60s).
- Fuses or MCCB given are for IEC ratings.
When complying with UL/cUL, use a UL certified fuse as indicated in section 9-1 of VAT300 user manual.
- Built-in EMC filters only in specified ratings and for drives U3SNxxxxFxx or U3SXxxxxFxx. For drives without built-in filter, or larger than U3SN005K5 or U3SX030K0, select an external EMC filter from tables on page H.31.
- External braking resistors for optimal performance. Note drives up to U3SN011K0 and U3SX11K0 include a built-in braking resistor, which should be disconnected when using the external braking resistors. Check 7-3-1 section of VAT300 user manual.
- The surge absorber -useful when length of motor cable is more than 40mts- is configured using the output reactor shown in above table plus RC filter, N11P34018=7 (Set VAT300 with carrier frequency of 1kHz).

Multimode speed drives

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VAT300 application with Heavy Duty ratings

Speed drive units

| VAT300 Type | Losses W | Motor kW ⁽¹⁾ | MCCB ⁽²⁾ (A) | Contact- tor | EMC filter ⁽³⁾ | Dynamic braking module | DBR ⁽⁴⁾ | INPUT AC reactor | DC reactor | Surge absorber ⁽⁵⁾ reactor + RC |
|-------------|----------|-------------------------|-------------------------|-----------------|---------------------------|------------------------|--------------------|------------------|--------------|--|
| X000K7 | 53 | 0.4 | 15 | CL00 | Built-in | Built-in | TLR864P200 | ACRP3A8H1 | - | ACFRP10A + RC |
| X001K5 | 65 | 0.75 | 15 | CL00 | Built-in | Built-in | TLR864P200 | ACRP3A8H1 | - | ACFRP10A + RC |
| X002K2 | 90 | 1.5 | 15 | CL00 | Built-in | Built-in | TLR432P200 | ACRP4A5H1 | - | ACFRP10A + RC |
| X004K0 | 120 | 2.2 | 15 | CL00 | Built-in | Built-in | TLR295P200 | ACRP6A3H4 | - | ACFRP10A + RC |
| X005K5 | 170 | 4 | 15 | CL00 | Built-in | Built-in | TLR175P600 | ACRP10A2H | - | ACFRP10A + RC |
| X007K5 | 230 | 5.5 | 20 | CL00 | Built-in | Built-in | TLR118P600 | ACRP14A1H4 | DCRP18A2H9 | ACFRP14A + RC |
| X011K0 | 300 | 7.5 | 25 | CL02 | Built-in | Built-in | TLR86P600 | ACRP18A1H1 | DCRP25A2H1 | ACFRP18A + RC |
| X015K0 | 400 | 11 | 35 | CL04 | Built-in | Built-in | TLR59P1000 | ACRP27A0H75 | DCRP32A1H6 | ACFRP27A + RC |
| X018K5 | 460 | 15 | 50 | CL04 | Built-in | Built-in | TLR43P1000 | ACRP35A0H58 | DCRP40A1H2 | ACFRP35A + RC |
| X022K0 | 550 | 18.5 | 60 | CL04 | Built-in | Built-in | TLR35P1500 | ACRP38A0H58 | DCRP50A0H96 | ACFRP38A + RC |
| X030K0 | 620 | 22 | 70 | CL06 | Built-in | U2KV23DBUH2 | TLR29P1800 | ACRP45A0H45 | DCRP60A0H82 | ACFRP45A + RC |
| X037K0 | 860 | 30 | 80 | CL06 | External | U2KV23DBUH3 | TLR22P2500 | ACRP70A0H29 | DCRP80A0H58 | ACFRP62A + RC |
| X045K0 | 930 | 37 | 100 | CL07 | External | U2KV23DBUH3 | TLR18P3000 | ACRP90A0H22 | DCRP100A0H49 | ACFRP90A + RC |
| X055K0 | 1260 | 45 | 125 | CL09 | External | U2KV23DBUH4 | TLR15P3700 | ACRP115A0H18 | DCRP125A0H40 | ACFRP115A + RC |
| X075K0 | 1190 | 55 | 150 | CK75 | External | U2KV23DBUH4 | - | ACRP115A0H18 | DCRP140A0H32 | ACFRP115A + RC |
| X090K0 | 1830 | 75 | 200 | CK08 | External | U2KV23DBUH4 | - | ACRP160A0H14 | DCRP180A0H25 | ACFRP160A + RC |
| X110K0 | 2280 | 90 | 225 | CK85 | External | U2KV23DBUH4 | - | ACRP185A0H11 | DCRP210A0H25 | ACFRP185A + RC |
| X132K0 | 2600 | 110 | 300 | CK09 | External | U2KV23DBUH4 | - | ACRP225A0H096 | DCRP270A0H18 | ACFRP225A + RC |
| X160K0 | 3200 | 132 | 350 | CK09 | External | U2KV23DBUH4 | - | ACRP300A0H067 | DCRP310A0H14 | ACFRP300A + RC |
| X200K0 | 4750 | 160 | 400 | CK95 | External | U2KV23DBUH4 | - | ACRP360A0H056 | DCRP400A0H13 | ACFRP360A + RC |
| X250K0 | 6350 | 200 | 500 | CK10 | External | U2KV23DBUH4 | - | ACRP460A0H056 | DCRP540A0H08 | ACFRP460A + RC |
| X315K0 | 7880 | 250 | 700 | CK11 | External | 2xU2KV23DBUH4 | - | ACRP550A0H039 | DCRP650A0H07 | ACFRP550A + RC |
| X400K0 | 9300 | 315 | 800 | CK12 | External | 2xU2KV23DBUH4 | - | ACRP700A0H035 | DCRP740A0H06 | ACFRP700A + RC |
| X475K0 | 11860 | 400 | 1000 | CK13 | External | 2xU2KV23DBUH4 | - | ACRP850A0H023 | DCRP950A0H05 | ACFRP850A + RC |
| N000K7 | 55 | 0.4 | 15 | CL00 | Built-in | Built-in | TLR405P200 | ACRP4A2H5 | - | - |
| N001K5 | 69 | 0.75 | 15 | CL00 | Built-in | Built-in | TLR216P200 | ACRP6A2H5 | - | - |
| N002K2 | 110 | 1.5 | 15 | CL00 | Built-in | Built-in | TLR108P200 | ACRP9A1H3 | - | - |
| N004K0 | 130 | 2.2 | 20 | CL00 | Built-in | Built-in | TLR74P200 | ACRP12A0H84 | - | - |
| N005K5 | 190 | 4 | 30 | CL01 | Built-in | Built-in | TLR44P600 | ACRP18A0H56 | - | - |
| N007K5 | 320 | 5.5 | 35 | CL02 | External | Built-in | TLR29P600 | ACRP27A0H37 | DCRP32A0H78 | - |
| N011K0 | 400 | 7.5 | 50 | CL04 | External | Built-in | TLR22P600 | ACRP35A0H27 | DCRP45A0H55 | - |
| N015K0 | 450 | 11 | 70 | CL04 | External | Built-in | TLR15P1000 | ACRP55A0H18 | DCRP60A0H4 | - |
| N018K5 | 550 | 15 | 90 | CL06 | External | Built-in | TLR11P1200 | ACRP70A0H14 | DCRP80A0H3 | - |
| N022K0 | 610 | 18.5 | 125 | CL07 | External | U2KV23DBUL2 | TLR8.8P1500 | ACRP80A0H14 | DCRP100A0H24 | - |
| N030K0 | 690 | 22 | 125 | CL09 | External | U2KV23DBUL2 | TLR7.4P1800 | ACRP97A0H11 | DCRP120A0H2 | - |
| N037K0 | 950 | 30 | 150 | CL10 | External | U2KV23DBUL3 | TLR5P2500 | ACRP140A0H072 | DCRP150A0H17 | - |
| N045K0 | 1150 | 37 | 200 | CK75 | External | U2KV23DBUL3 | TLR4P3000 | ACRP180A0H056 | DCRP180A0H14 | - |

- (1) Device selection conditions for heavy duty (overload capacity 150%, 60s).
- (2) Fuses or MCCB given are for IEC ratings.
When complying with UL/cUL, use a UL certified fuse as indicated in section 9-1 of VAT300 user manual.
- (3) Built-in EMC filters only in specified ratings and for drives U3SNxxxxFxx or U3SXxxxxFxx. For drives without built-in filter, or larger than U3SN005K5 or U3SX030K0, select an external EMC filter from tables on page H.31.
- (4) External braking resistors for optimal performance. Note drives up to U3SN011K0 and U3SX11K0 include a built-in braking resistor, which should be disconnected when using the external braking resistors. Check 7-3-1 section of VAT300 user manual.
- (5) The surge absorber -useful when length of motor cable is more than 40mts- is configured using the output reactor shown in above table plus RC filter, N11P34018=7 (Set VAT300 with carrier frequency of 1kHz).

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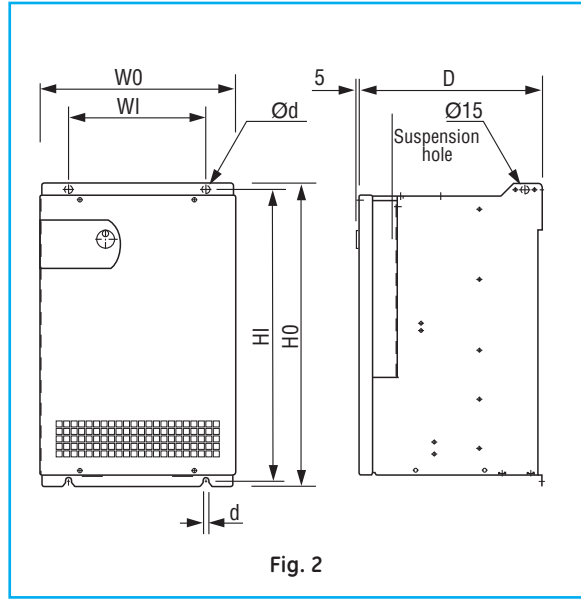
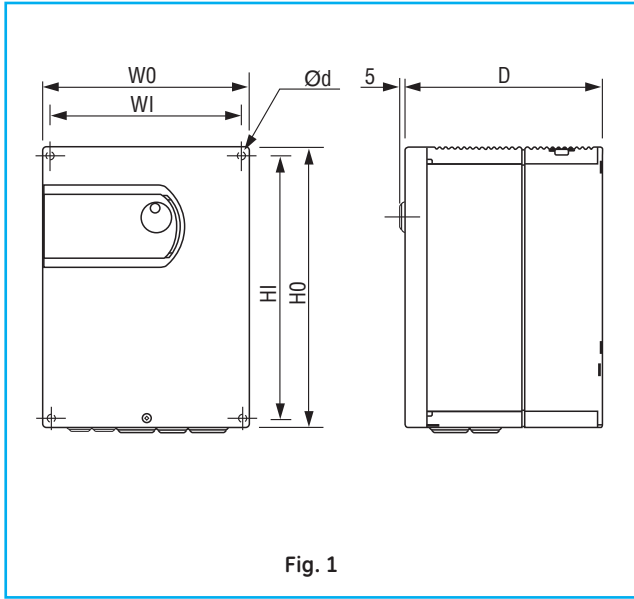
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Dimensional drawings and weights

Drives



200V Series: N000K7 to N045K0.
400V Series: X000K7 to X055K0

| Type | | Dimensions (mm) | | | | | | Main circuit terminal | Weight (kg) | Fig. |
|-------------|-------------|-----------------|-----|-----|-----|-----|----|-----------------------|-------------|------|
| 200V Series | 400V Series | W0 | W1 | H0 | H1 | D | Ød | | | |
| N000K7 | X000K7 | 155 | 140 | 250 | 235 | 180 | 6 | M4 | 3 | 1 |
| N001K5 | X001K5 | | | | | | | | | |
| N002K2 | X002K2 | | | | | | | | | |
| N004K0 | X004K0 | | | | | | | | | |
| N005K5 | X005K5 | | | | | | | | | |
| N007K5 | X007K5 | 205 | 190 | 275 | 260 | 196 | 7 | M5 | 5 | |
| N011k0 | X011K0 | | | | | | | | | |
| N015K0 | X015K0 | 260 | 240 | 350 | 330 | 298 | | M6 | 12 | |
| N018K5 | X018K0 | | | | | | | | | |
| N022K0 | X022K0 | | | | | | | | | |
| N030K0 | X030K0 | 300 | 200 | 470 | 450 | 317 | 10 | M8 | 23 | 2 |
| N037K0 | X037K0 | | | | | | | | | |
| N045K0 | X045K0 | | | | | | | | | |
| N037K0 | X055K0 | 340 | 240 | 520 | 500 | | | M10 | 30 | |
| N045K0 | X055K0 | | | | | | | | | |

Multimode speed drives

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Dimensional drawings and weights

Drives

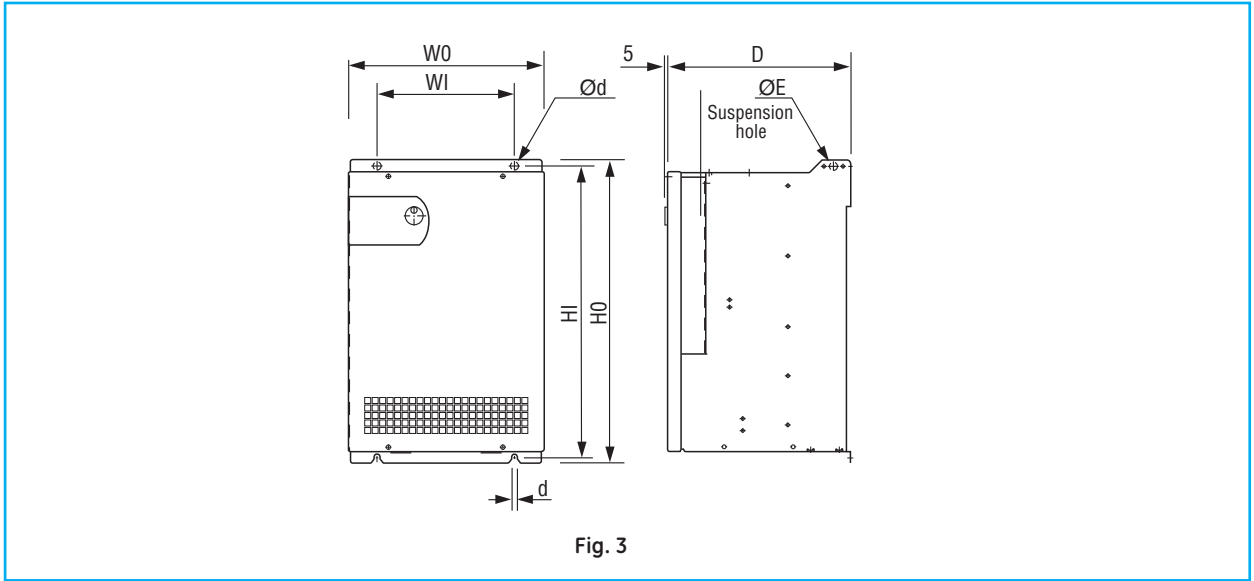


Fig. 3

400V Series: X075K0 to X475K0

| Type | Dimensions (mm) | | | | | | | Main circuit terminal | Weight (kg) | Fig. |
|-------------|-----------------|-----|------|------|-----|----|----|-----------------------|-------------|------|
| 400V Series | W0 | W1 | H0 | H1 | D | Ød | ØE | | | |
| X075K0 | 435 | 300 | 615 | 595 | 350 | 10 | 20 | M10 | 42 | 3 |
| X090K0 | | | | | | | | | 45 | |
| X110K0 | | | | | | | | | 60 | |
| X132K0 | 500 | 400 | 710 | 684 | 470 | 13 | 23 | M16 | 65 | |
| X160K0 | | | | | | | | | 90 | |
| X200K0 | | | | | | | | | 100 | |
| X250K0 | 580 | 400 | 1020 | 990 | 470 | 15 | 23 | M16 | 200 | |
| X315K0 | | | | | | | | | 285 | |
| X400K0 | | | | | | | | | 290 | |
| X475K0 | 870 | 600 | 1260 | 1230 | | | | | 295 | |

Speed drive units

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EMC Filters

EMC compliance for VAT300 is achieved either by built-in filters in the drive or by external filters. Built-in filters are available for drives up to 30kW/400V (U30SX030K0_) only. For larger drives, an external EMI filter should be used when compliance with EMC is required. Check the tables below to select the filter according to inverter type.

VAT300 Drives with built-in filter

| VAT300 Series | VAT300 Model | Second environment EN61800-3 category C3 | First environment EN61800-3 category C2 |
|-------------------------------------|--------------|---|---|
| | | Filter type | Add ferrite cores ⁽¹⁾ |
| 200V Series with built-in filter | U3SN000K7F | Built-in | P:ZCAT3035-1330x3 C:ZCAT3035-1330x1 M:ZCAT3035-1330x1 |
| | U3SN001K5F | | |
| | U3SN002K2F | | |
| | U3SN004K0F | | |
| | U3SN005K5F | | |
| 400V Series with built-in filter | U3SX000K7F | Built-in | P:ZCAT3035-1330x3 C:ZCAT3035-1330x1 M:ZCAT3035-1330x1 |
| | U3SX001K5F | | |
| | U3SX002K2F | | |
| | U3SX004K0F | | |
| | U3SX005K5F | | |
| | U3SX007K5F | | |
| | U3SX011K0F | Built-in | NA |
| | U3SX015K0F | | |
| | U3SX018K5F | | |
| | U3SX022K0F | | |
| | U3SX030K0F | | |
| | U3SX030K0F | | |

(1) P: Ferrite cores for power cable
C: Ferrite cores for control cable
M: Ferrite cores for motor cable

External filters for VAT300 drives without built-in Filter (200V series)

| VAT300 Series | VAT300 Model | Second environment (EN61800-3 category C3) External filter selection | |
|---------------|--------------|---|-----------------------|
| | | Use with VAT300 in ND | Use with VAT300 in HD |
| 200V Series | U3SN000K7S | U30F3016EB | U30F3016EB |
| | U3SN001K5S | U30F3016EB | U30F3016EB |
| | U3SN002K2S | U30F3016EB | U30F3016EB |
| | U3SN004K0S | U30F3030EB | U30F3030EB |
| | U3SN005K5S | U30F3030EB | U30F3030EB |
| | U3SN007K5S | U30F3075EB | U30F3075EB |
| | U3SN011K0S | U30F3075EB | U30F3075EB |
| | U3SN015K0S | U30F3100EB | U30F3100EB |
| | U3SN018K5S | U30F3100EB | U30F3100EB |
| | U3SN022K0S | U30F3130EB | U30F3130EB |
| | U3SN030K0S | U30F3180EB | U30F3180EB |
| | U3SN037K0S | U30F3250ES | U30F3250ES |
| | U3SN045K0S | U30F3250ES | U30F3250ES |

External filters for VAT300 drives without built-in filter (400V series)

| VAT300 Series | VAT300 Model | Second environment (EN61800-3 category C3) External filter selection | |
|---------------|--------------|---|-----------------------|
| | | Use with VAT300 in ND | Use with VAT300 in HD |
| 400V Series | U3SX000K7S | U30F3016EB | U30F3016EB |
| | U3SX001K5S | U30F3016EB | U30F3016EB |
| | U3SX002K2S | U30F3016EB | U30F3016EB |
| | U3SX004K0S | U30F3016EB | U30F3016EB |
| | U3SX005K5S | U30F3030EB | U30F3030EB |
| | U3SX007K5S | U30F3030EB | U30F3030EB |
| | U3SX011K0S | U30F3030EB | U30F3030EB |
| | U3SX015K0S | U30F3055EB | U30F3055EB |
| | U3SX018K5S | U30F3055EB | U30F3055EB |
| | U3SX022K0S | U30F3075EB | U30F3075EB |
| | U3SX030K0S | U30F3100EB | U30F3100EB |
| | U3SX037K0S | U30F3100EB | U30F3100EB |
| | U3SX045K0S | U30F3130EB | U30F3130EB |
| | U3SX055K0S | U30F3180EB | U30F3180EB |
| | U3SX075K0S | U30F3250ES | U30F3180EB |
| | U3SX090K0S | U30F3250ES | U30F3250ES |
| | U3SX110K0S | U30F3320ES | U30F3320ES |
| | U3SX132K0S | U30F3400ES | U30F3320ES |
| | U3SX160K0S | U30F3600ES | U30F3400ES |
| | U3SX200K0S | U30F3600ES | U30F3600ES |
| | U3SX250K0S | U30F31000ES | U30F3600ES |
| | U3SX315K0S | U30F31000ES | U30F31000ES |
| | U3SX400K0S | U30F31000ES | U30F31000ES |
| | U3SX475K0S | U30F31600ES | U30F31000ES |

Multimode speed drives

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Dimensional drawings and weights

External filter book case type

| Cat. no. | Ref. no. | Dimensions | | | | | | | | Weight (kg) |
|------------|----------|------------|-----|-----|-----|-----|-----|-----|----|-------------|
| | | L | L-1 | H | W | X | Y | M | D | |
| U30F3016EB | 129284 | 250 | 220 | 70 | 45 | 235 | 25 | M5 | M5 | 1.7 |
| U30F3030EB | 129285 | 270 | 240 | 85 | 50 | 255 | 30 | M5 | M5 | 1.8 |
| U30F3055EB | 129286 | 250 | 220 | 90 | 85 | 235 | 60 | M6 | M5 | 3.1 |
| U30F3075EB | 129287 | 270 | 240 | 135 | 80 | 255 | 60 | M6 | M6 | 4 |
| U30F3100EB | 129288 | 270 | 240 | 150 | 90 | 255 | 65 | M10 | M6 | 5.5 |
| U30F3130EB | 129289 | 270 | 240 | 150 | 90 | 255 | 65 | M10 | M6 | 7.5 |
| U30F3180EB | 129290 | 380 | 350 | 170 | 120 | 365 | 102 | M10 | M6 | 11 |

External filter brick case type

| Cat. no. | Ref. no. | Dimensions | | | | | | | | | | | | | | Weight (kg) | |
|-------------|----------|------------|-----|-----|-----|-----|-----|-----|------|----|-----|----|----|-----|----|-------------|------|
| | | W | W1 | X | L | L1 | Y | H | H1 | K | M | D | D1 | F | I | | PE |
| U30F3250ES | 129291 | 190 | 140 | 165 | 300 | 392 | 240 | 116 | 41 | 20 | Ø12 | 15 | 42 | Ø11 | 40 | M10 | 7 |
| U30F3320ES | 129292 | 260 | 210 | 235 | 300 | 392 | 240 | 116 | 41 | 20 | Ø12 | 15 | 42 | Ø11 | 60 | M10 | 10.3 |
| U30F3400ES | 129293 | 260 | 210 | 235 | 300 | 392 | 240 | 116 | 41 | 20 | Ø12 | 15 | 42 | Ø11 | 60 | M10 | 10.3 |
| U30F3600ES | 129294 | 260 | 210 | 235 | 300 | 392 | 240 | 116 | 48.5 | 20 | Ø12 | 15 | 42 | Ø11 | 60 | M10 | 11 |
| U30F31000ES | 129295 | 280 | 230 | 255 | 350 | 460 | 290 | 166 | 64 | 25 | Ø12 | 25 | 50 | Ø17 | 65 | M12 | 18 |
| U30F31600ES | 129296 | 300 | 250 | 275 | 400 | 592 | 340 | 166 | 61 | 25 | Ø12 | 25 | 52 | Ø17 | 80 | M12 | 27 |



External dynamic braking units

VAT300 includes a built-in dynamic braking feature as standard, in drives up to U3SX022K0 and up to U3SX18K5. For larger drives the dynamic braking is achieved by using the external dynamic braking device U2KV23DBU__

Fig. 1

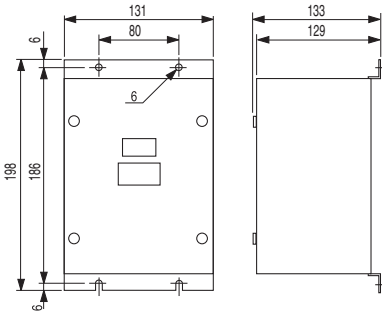
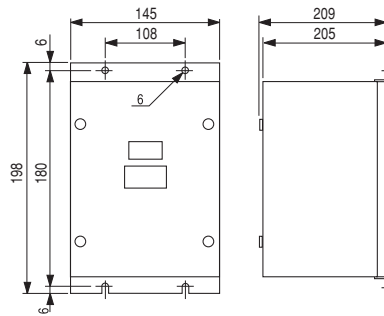


Fig. 2



| Cat. no. | Ref. no. | Fig. | Weight (kg) |
|-------------|----------|------|-------------|
| U2KV23DBUL1 | 168098 | 1 | 1,7 |
| U2KV23DBUL2 | 168099 | 1 | 1,7 |
| U2KV23DBUL3 | 168100 | 1 | 1,7 |
| U2KV23DBUH1 | 168084 | 1 | 1,7 |
| U2KV23DBUH2 | 168085 | 1 | 1,7 |
| U2KV23DBUH3 | 168086 | 1 | 1,7 |
| U2KV23DBUH4 | 168083 | 2 | 3,5 |

Multimode speed drives

Braking resistors

A small capacity braking resistor is included in drives up to U3SX015K0 and up to U3SN011K0 as standard. Check VAT300 user manual for technical details.

For larger drives, or when braking torque with Built-in resistors, is not enough, use external braking resistors.

The external braking optional resistors for 100% braking capacity, 10% ED are shown in below table:

Fig. 1

Resistors with terminals for

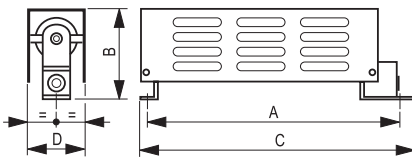
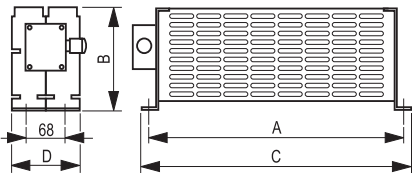


Fig. 2

Resistors with terminals for



| Cat. no. | Ref. no. | Fig. | Dimensions (mm) | | | | Weight (kg) |
|-------------|----------|------|-----------------|-----|-----|-----|-------------|
| | | | A | B | C | D | |
| TLR405P200 | 129867 | 1 | 195 | 65 | 210 | 60 | 0.6 |
| TLR216P200 | 129868 | 1 | 195 | 65 | 210 | 60 | 0.6 |
| TLR108P200 | 129869 | 1 | 195 | 65 | 210 | 60 | 0.6 |
| TLR74P200 | 129870 | 1 | 195 | 65 | 210 | 60 | 0.6 |
| TLR44P600 | 129166 | 1 | 450 | 95 | 465 | 60 | 1.2 |
| TLR29P600 | 129167 | 1 | 450 | 95 | 465 | 60 | 1.2 |
| TLR22P600 | 129168 | 1 | 450 | 95 | 465 | 60 | 1.2 |
| TLR15P1000 | 129169 | 1 | 450 | 100 | 465 | 70 | 1.8 |
| TLR11P1200 | 129170 | 1 | 450 | 120 | 465 | 75 | 2.4 |
| TLR8,8P1500 | 129171 | 2 | 440 | 100 | 460 | 140 | 2.2 |
| TLR7,4P1800 | 129172 | 2 | 440 | 100 | 460 | 140 | 3.4 |
| TLR5P2500 | 129871 | 2 | 440 | 180 | 460 | 140 | 3.2 |
| TLR4P3000 | 129872 | 2 | 440 | 180 | 460 | 140 | 5.5 |
| TLR864P200 | 129873 | 1 | 195 | 65 | 210 | 60 | 0.6 |
| TLR432P200 | 129875 | 1 | 195 | 65 | 210 | 60 | 0.6 |
| TLR295P200 | 129876 | 1 | 195 | 65 | 210 | 60 | 0.6 |
| TLR175P600 | 129173 | 1 | 450 | 95 | 465 | 60 | 1.2 |
| TLR118P600 | 129174 | 1 | 450 | 95 | 465 | 60 | 1.2 |
| TLR86P600 | 129175 | 1 | 450 | 95 | 465 | 60 | 1.2 |
| TLR59P1000 | 129176 | 1 | 450 | 100 | 465 | 70 | 1.8 |
| TLR43P1000 | 129177 | 1 | 450 | 100 | 465 | 70 | 1.8 |
| TLR35P1500 | 129877 | 2 | 440 | 100 | 460 | 140 | 2.2 |
| TLR29P1800 | 129878 | 2 | 440 | 100 | 460 | 140 | 3.4 |
| TLR22P2500 | 129879 | 2 | 440 | 180 | 460 | 140 | 3.2 |
| TLR18P3000 | 129880 | 2 | 440 | 180 | 460 | 140 | 5.5 |
| TLR15P3700 | 129881 | 2 | 440 | 180 | 460 | 140 | 5.8 |

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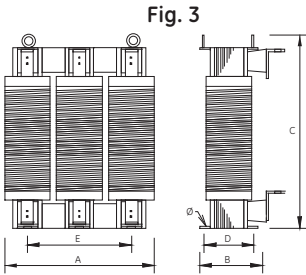
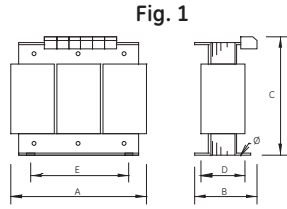
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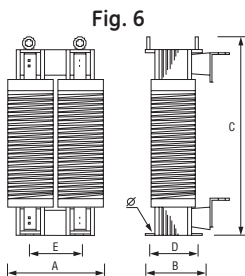
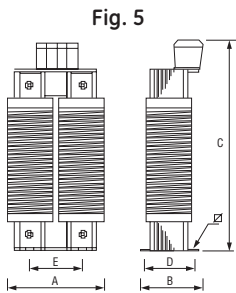
Dimensional drawings and weights

AC input reactors



| Cat. no. | Ref. no. | Losses W | Fig. | Dimensions (mm) | | | | | | Weight (kg) |
|---------------|----------|----------|------|-----------------|-----|-----|-----|-----|----|-------------|
| | | | | A | B | C | D | E | Ø | |
| ACRP4A2H5 | 168495 | 16 | 1 | 120 | 80 | 152 | 41 | 100 | 6 | 1,3 |
| ACRP6A2H5 | 168496 | 18 | 1 | 120 | 80 | 152 | 41 | 100 | 6 | 1,5 |
| ACRP9A1H3 | 168497 | 17 | 1 | 120 | 80 | 152 | 41 | 100 | 6 | 1,6 |
| ACRP12A0H84 | 168498 | 18 | 1 | 120 | 80 | 152 | 41 | 100 | 6 | 1,7 |
| ACRP18A0H56 | 168499 | 21 | 1 | 120 | 90 | 152 | 51 | 100 | 6 | 2,4 |
| ACRP27A0H37 | 168500 | 32 | 1 | 150 | 95 | 183 | 46 | 125 | 6 | 3,3 |
| ACRP35A0H27 | 168501 | 35 | 1 | 150 | 95 | 183 | 46 | 125 | 6 | 3,7 |
| ACRP55A0H18 | 168502 | 42 | 1 | 150 | 110 | 183 | 61 | 125 | 6 | 5,5 |
| ACRP70A0H14 | 168503 | 100 | 1 | 150 | 111 | 250 | 77 | 100 | 9 | 5,6 |
| ACRP80A0H14 | 168504 | 108 | 1 | 150 | 121 | 250 | 87 | 100 | 9 | 7,1 |
| ACRP97A0H11 | 168505 | 124 | 1 | 150 | 126 | 250 | 92 | 100 | 9 | 7,8 |
| ACRP140A0H072 | 168506 | 155 | 3 | 180 | 166 | 216 | 92 | 120 | 9 | 11,9 |
| ACRP180A0H056 | 168507 | 175 | 3 | 180 | 176 | 216 | 102 | 120 | 9 | 14,2 |
| ACRP200A0H051 | 168508 | 210 | 3 | 180 | 186 | 216 | 112 | 120 | 9 | 15,9 |
| ACRP3A8H1 | 168509 | 17 | 1 | 120 | 80 | 152 | 41 | 100 | 6 | 1,4 |
| ACRP4A5H1 | 168510 | 16 | 1 | 120 | 80 | 152 | 41 | 100 | 6 | 1,5 |
| ACRP6A3H4 | 168511 | 19 | 1 | 120 | 80 | 152 | 41 | 100 | 6 | 1,7 |
| ACRP10A2H | 168512 | 23 | 1 | 120 | 90 | 152 | 51 | 100 | 6 | 2,5 |
| ACRP14A1H4 | 168513 | 29 | 1 | 150 | 95 | 178 | 46 | 125 | 6 | 3,2 |
| ACRP18A1H1 | 168514 | 35 | 1 | 150 | 95 | 178 | 46 | 125 | 6 | 4 |
| ACRP27A0H75 | 168515 | 77 | 1 | 150 | 106 | 233 | 72 | 100 | 9 | 4,8 |
| ACRP35A0H58 | 168516 | 98 | 1 | 150 | 111 | 233 | 77 | 100 | 9 | 5,5 |
| ACRP38A0H58 | 168517 | 96 | 1 | 150 | 116 | 233 | 82 | 100 | 9 | 6,4 |
| ACRP45A0H45 | 168518 | 102 | 1 | 150 | 121 | 233 | 87 | 100 | 9 | 7,1 |
| ACRP70A0H29 | 168519 | 147 | 1 | 150 | 151 | 250 | 117 | 100 | 9 | 11 |
| ACRP90A0H22 | 168520 | 158 | 1 | 180 | 136 | 286 | 102 | 120 | 9 | 13,1 |
| ACRP115A0H18 | 168521 | 186 | 1 | 180 | 156 | 301 | 122 | 120 | 9 | 16,9 |
| ACRP160A0H14 | 168522 | 268 | 3 | 240 | 181 | 288 | 107 | 160 | 9 | 25,7 |
| ACRP185A0H11 | 168523 | 255 | 3 | 240 | 181 | 288 | 107 | 160 | 9 | 26,3 |
| ACRP225A0H096 | 168524 | 305 | 3 | 240 | 191 | 288 | 117 | 160 | 9 | 30,7 |
| ACRP300A0H067 | 168525 | 356 | 3 | 240 | 226 | 288 | 142 | 160 | 9 | 40,4 |
| ACRP360A0H056 | 168526 | 425 | 3 | 240 | 226 | 288 | 142 | 160 | 9 | 42,2 |
| ACRP460A0H056 | 168527 | 595 | 3 | 300 | 258 | 400 | 142 | 200 | 9 | 64,1 |
| ACRP550A0H039 | 168528 | 636 | 3 | 300 | 258 | 400 | 142 | 200 | 9 | 64,9 |
| ACRP700A0H035 | 168530 | 991 | 3 | 360 | 316 | 472 | 202 | 300 | 11 | 116,2 |
| ACRP850A0H023 | 168531 | 856 | 3 | 420 | 296 | 544 | 178 | 350 | 11 | 115 |
| ACRP950A0H016 | 168532 | 934 | 3 | 420 | 306 | 544 | 188 | 350 | 11 | 123,6 |

DC reactors



| Cat. no. | Ref. no. | Losses W | Fig. | Dimensions (mm) | | | | | | Weight (kg) |
|---------------|----------|----------|------|-----------------|-----|-----|-----|-----|----|-------------|
| | | | | A | B | C | D | E | Ø | |
| DCRP32A0H78 | 168542 | 37 | 5 | 100 | 110 | 173 | 91 | 75 | 6 | 3,9 |
| DCRP45A0H55 | 168543 | 33 | 5 | 120 | 110 | 203 | 86 | 90 | 6 | 6,1 |
| DCRP60A0H4 | 168544 | 41 | 5 | 120 | 120 | 220 | 96 | 90 | 6 | 6,4 |
| DCRP80A0H3 | 168545 | 45 | 5 | 120 | 135 | 220 | 111 | 90 | 6 | 7,1 |
| DCRP100A0H24 | 168546 | 51 | 5 | 120 | 135 | 235 | 111 | 90 | 6 | 7,1 |
| DCRP120A0H2 | 168547 | 43 | 5 | 160 | 150 | 285 | 130 | 120 | 9 | 13,4 |
| DCRP150A0H17 | 168548 | 50 | 5 | 160 | 160 | 285 | 140 | 120 | 9 | 15 |
| DCRP180A0H14 | 168549 | 263 | 6 | 160 | 156 | 288 | 82 | 120 | 9 | 11,6 |
| DCRP220A0H11 | 168550 | 286 | 6 | 160 | 161 | 288 | 87 | 120 | 9 | 12,9 |
| DCRP18A2H9 | 168555 | 42 | 5 | 100 | 95 | 178 | 76 | 75 | 6 | 3,5 |
| DCRP25A2H1 | 168556 | 54 | 5 | 100 | 95 | 183 | 76 | 75 | 6 | 3,5 |
| DCRP32A1H6 | 168557 | 59 | 5 | 100 | 110 | 183 | 91 | 75 | 6 | 3,9 |
| DCRP40A1H2 | 168558 | 56 | 5 | 100 | 110 | 183 | 91 | 75 | 6 | 3,9 |
| DCRP50A0H96 | 168559 | 60 | 5 | 120 | 110 | 209 | 86 | 90 | 6 | 6,1 |
| DCRP60A0H82 | 168560 | 65 | 5 | 120 | 120 | 226 | 96 | 90 | 6 | 6,4 |
| DCRP80A0H58 | 168561 | 58 | 5 | 120 | 135 | 226 | 111 | 90 | 6 | 7,1 |
| DCRP100A0H49 | 168562 | 91 | 5 | 120 | 135 | 241 | 111 | 90 | 6 | 7,1 |
| DCRP125A0H40 | 168563 | 79 | 5 | 160 | 150 | 293 | 130 | 120 | 9 | 13,4 |
| DCRP140A0H32 | 168564 | 74 | 5 | 160 | 150 | 293 | 130 | 120 | 9 | 3,9 |
| DCRP180A0H25 | 168565 | 332 | 6 | 160 | 186 | 288 | 112 | 120 | 9 | 18,3 |
| DCRP210A0H25 | 168566 | 479 | 6 | 160 | 216 | 288 | 142 | 120 | 9 | 24,2 |
| DCRP270A0H18 | 168567 | 452 | 6 | 160 | 226 | 288 | 152 | 120 | 9 | 27,7 |
| DCRP310A0H14 | 168568 | 542 | 6 | 160 | 246 | 288 | 162 | 120 | 9 | 29,8 |
| DCRP400A0H13 | 168569 | 677 | 6 | 200 | 231 | 400 | 147 | 150 | 9 | 40,9 |
| DCRP540A0H08 | 168570 | 756 | 6 | 200 | 251 | 400 | 157 | 150 | 9 | 45,7 |
| DCRP650A0H07 | 168571 | 840 | 6 | 200 | 281 | 400 | 177 | 150 | 9 | 56,2 |
| DCRP740A0H06 | 168572 | 941 | 6 | 200 | 296 | 400 | 192 | 150 | 9 | 61,6 |
| DCRP950A0H05 | 168574 | 810 | 6 | 240 | 356 | 472 | 252 | 180 | 11 | 99,3 |
| DCRP1000A0H04 | 168575 | 800 | 6 | 240 | 366 | 472 | 262 | 180 | 11 | 103,1 |

Speed drive units

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X

Surge absorber

Multimode speed drives

ACFR reactors

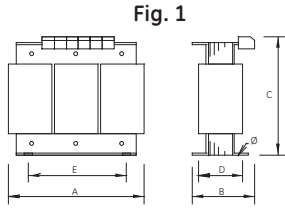


Fig. 1

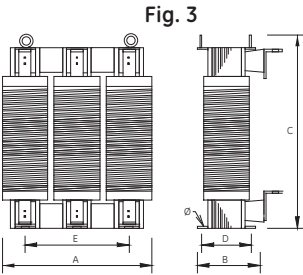
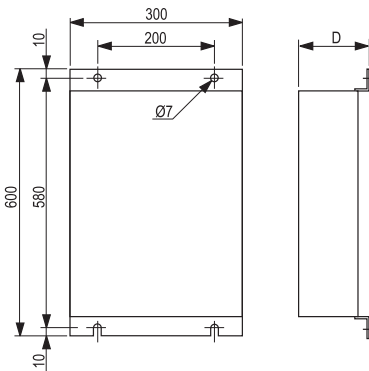


Fig. 3

| Cat. no. | Ref. no. | Losses W | Fig. | Dimensions (mm) | | | | | | Weight (kg) |
|-----------|----------|----------|------|-----------------|-----|-----|-----|-----|----|-------------|
| | | | | A | B | C | D | E | Ø | |
| ACFRP10A | 168576 | 16 | 1 | 120 | 80 | 152 | 41 | 100 | 6 | 1,2 |
| ACFRP14A | 168577 | 15 | 1 | 120 | 80 | 152 | 41 | 100 | 6 | 1,2 |
| ACFRP18A | 168578 | 17 | 1 | 120 | 80 | 152 | 41 | 100 | 6 | 1,2 |
| ACFRP27A | 168579 | 18 | 1 | 120 | 80 | 157 | 41 | 100 | 6 | 1,4 |
| ACFRP35A | 168580 | 21 | 1 | 120 | 90 | 157 | 51 | 100 | 6 | 2,2 |
| ACFRP38A | 168581 | 21 | 1 | 120 | 90 | 157 | 51 | 100 | 6 | 2,2 |
| ACFRP45A | 168582 | 33 | 1 | 150 | 110 | 183 | 67 | 125 | 6 | 4,1 |
| ACFRP62A | 168583 | 66 | 1 | 150 | 101 | 250 | 67 | 100 | 9 | 4,2 |
| ACFRP90A | 168584 | 84 | 1 | 150 | 121 | 250 | 87 | 100 | 9 | 7,5 |
| ACFRP115A | 168585 | 112 | 1 | 180 | 131 | 299 | 97 | 120 | 9 | 12,1 |
| ACFRP160A | 168586 | 183 | 3 | 180 | 211 | 216 | 137 | 120 | 9 | 21,1 |
| ACFRP185A | 168587 | 218 | 3 | 240 | 181 | 288 | 107 | 160 | 9 | 25,5 |
| ACFRP225A | 168588 | 304 | 3 | 240 | 216 | 288 | 142 | 160 | 9 | 36,6 |
| ACFRP300A | 168589 | 477 | 3 | 300 | 231 | 400 | 147 | 200 | 9 | 59,3 |
| ACFRP360A | 168590 | 593 | 3 | 300 | 266 | 400 | 182 | 200 | 9 | 78,3 |
| ACFRP460A | 168591 | 728 | 3 | 360 | 308 | 472 | 212 | 300 | 11 | 122,4 |
| ACFRP550A | 168592 | 863 | 3 | 360 | 338 | 472 | 242 | 300 | 11 | 145,8 |
| ACFRP700A | 168594 | 1486 | 3 | 420 | 371 | 544 | 273 | 350 | 11 | 209,7 |
| ACFRP850A | 168595 | 1104 | 3 | 480 | 446 | 616 | 328 | 400 | 11 | 336,3 |
| ACFRP950A | 168596 | 1267 | 3 | 480 | 476 | 616 | 358 | 400 | 11 | 377 |

RC filter



| Cat. no. | Ref. no. | Losses (W) | Max carrier frequency | Dimensions D | Weight (kg) |
|-------------|----------|------------|-----------------------|--------------|-------------|
| N11P3401806 | 168260 | 1470 | 4 | 275 | 14 |
| N11P3401806 | 168261 | 297 | 1 | 135 | 8 |

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Everything is

| | | |
|--|---|----------|
| | Plug-in relays and Auxiliary contactors | A |
| | Motor protection devices | B |
| | Contactors and Thermal overload relays | C |
| | Motorstarters | D |
| | Control and signalling units | E |
| Series ML - Main switches & Emergency-stop switches for machinery | | |
| I.3 | Mounting possibilities | F |
| I.4 | Standard programme | G |
| I.6 | Accessories | H |
| I.7 | Enclosed switches | |
| I.8 | Technical data | |
| I.9 | Dimensions | |
| | Electronic relays | |
| | Limit switches | |
| | Speed drive units | |
| | Main switches | I |
| | Numerical index | X |

under control





Main switches

A manual operated main switch must be provided for every mains circuit. It must be a switch-disconnector corresponding to utilization category AC23 (IEC 947-3) fulfils the following requirements:

- Disconnecting the electrical equipment from the main.
- Visible contact indication or a disconnection function by construction (the handle is in the "OFF" position when all contacts are open).
- If the main switch does not serve simultaneously as an emergency-stop switch, its handle should not be red. Black or grey handles are recommended.
- It should be lockable in the off-position (e.g. by padlock).
- All active conductors are to be disconnected from the main.
- The breaking capacity should be sufficient. In order to break the current of the largest motor in a blocked state together with the sum of the operating currents of the remaining motors/loads.
- The handle of the main switch must be easily accessible and must lie between 0.6 and 1.9 m above the incomer level.

A

Standards

- Complying with:
- IEC 60947-3
 - EN 60947-3
 - DIN VDE 0660 Teil 107
 - low voltage directive 73/73 EEC
 - low voltage directive EMC 89/336 EEC

B

C

D

Approvals



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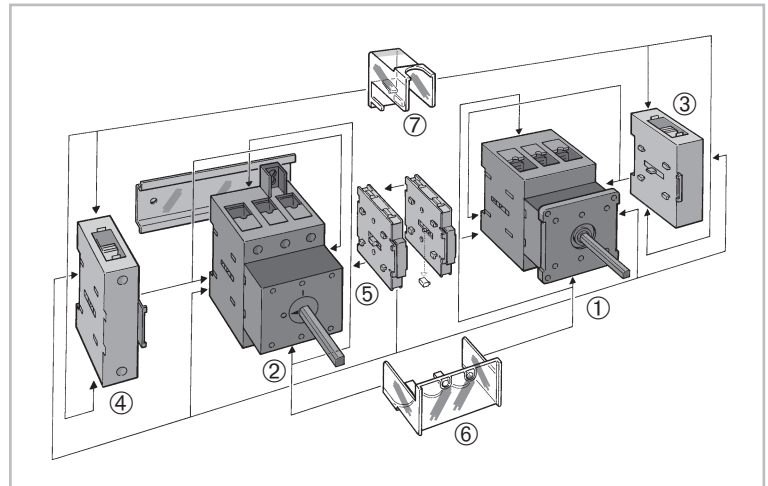
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Emergency-stop equipment

The main switch may fulfil the function of an emergency-stop switch on certain machines.

The handles must be red on a yellow background.

The contacts of manual operated emergency-stop switch has to be opened by force.



- ① Front mounting (flush mounting)
- ② Rear mounting
- ③ Main contact and PE-or N-terminals for ①
- ④ Main contact and PE-or N-terminals for ②
- ⑤ Auxiliary switch 1NO/1NG for ① and ②
- ⑥ Terminal cover triple for ① and ②
- ⑦ Terminal cover single for ③ and ④

- Mounting possibilities ● pg. I.3
 Accessories ● pg. I.6
 Technical data ● pg. I.8
 Dimensions ● pg. I.9

Mounting possibilities

| | lth | 25A | 40A | 63A | 80A | 125A |
|------------------------------------|------------|--------|--------|--------|--------|--------|
| | Series | ML 1 | ML 1 | ML 2 | ML 2 | ML 3 |
| | Type | 640 | 650 | 660 | 670 | 680 |
| Front mounting (flush mounting) | Colour | | | | | |
| Central fixing | | | | | | |
| Ø 22.5/30.5 mm for 3 padlocks | red/yellow | 789178 | 789179 | | | |
| Ø 22.5/30.5 mm for 3 padlocks | black | 789180 | 789181 | | | |
| Ø 22.5/30.5 mm for 1 or 2 padlocks | red/yellow | 789174 | 789175 | | | |
| Ø 22.5/30.5 mm for 1 or 2 padlocks | black | 789176 | 789177 | | | |
| 4-hole fixing | | | | | | |
| With standard handle | black | 789239 | 789240 | 789241 | 789242 | 789243 |
| For 3 padlocks | red/yellow | 789186 | 789187 | 789188 | 789189 | 789190 |
| For 3 padlocks | black | 789191 | 789192 | 789193 | 789194 | 789195 |
| For 1 or 2 padlocks | red/yellow | 789182 | 789183 | | | |
| For 1 or 2 padlocks | black | 789184 | 789185 | | | |
| Rear mounting | | | | | | |
| With cover coupling | | | | | | |
| For 3 padlocks | red/yellow | 789200 | 789201 | 789202 | 789203 | 789204 |
| For 3 padlocks | black | 789205 | 789206 | 789207 | 789208 | 789209 |
| For 1 or 2 padlocks | red/yellow | 789196 | 789197 | | | |
| For 1 or 2 padlocks | black | 789198 | 789199 | | | |
| With door coupling | | | | | | |
| For 3 padlocks | red/yellow | 789214 | 789215 | 789216 | 789217 | 789218 |
| For 3 padlocks | black | 789219 | 789220 | 789221 | 789122 | 789223 |
| For 1 or 2 padlocks | red/yellow | 789210 | 789211 | | | |
| For 1 or 2 padlocks | black | 789212 | 789213 | | | |
| DIN-rail mounting | | | | | | |
| With standard handle | black | 789234 | 789235 | 789236 | 789237 | 789238 |
| For 1 or 2 padlocks | red/yellow | 789224 | 789225 | 789226 | 789227 | 789228 |
| For 1 or 2 padlocks | black | 789229 | 789230 | 789231 | 789232 | 789233 |

Main switches

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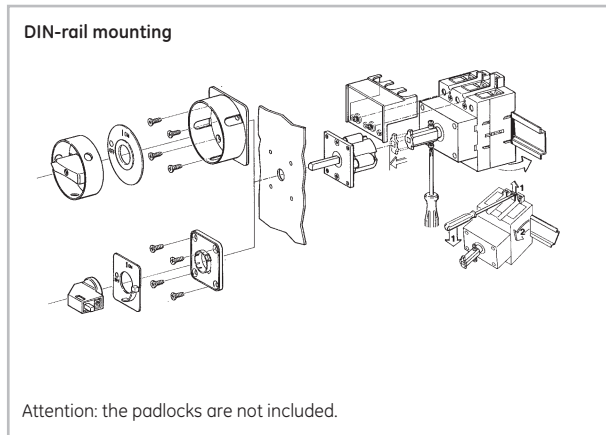
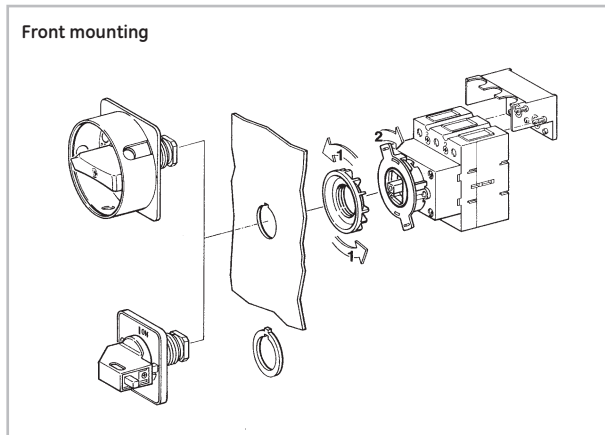
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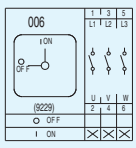

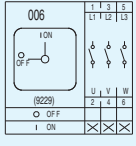

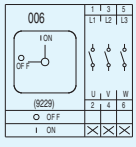

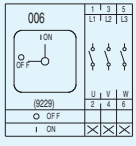

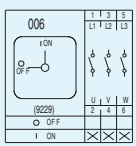
H

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Standard programme - Front mounting

| Central fixing Ø 22.5/30.5 mm | | Diagram | Protection | Ithe | Type | Red/yellow | Black/gray | Pack | |
|---|--|---|---------------------|------|------|------------|---------------|---------------|---|
| | | | | | | Ref. no. | Ref. no. | | |
|  | Locking handle by 1 or 2 padlocks |  | With terminal cover | IP65 | 25A | 640 | 789174 | 789176 | 1 |
| | | | With terminal cover | IP65 | 40A | 650 | 789175 | 789177 | 1 |
|  | Locking handle by 3 padlocks |  | With terminal cover | IP65 | 25A | 640 | 789178 | 789180 | 1 |
| | | | With terminal cover | IP65 | 40A | 650 | 789179 | 789181 | 1 |
| 4-hole fixing | | | | | | | | | |
|  | Locking handle by 1 or 2 padlocks |  | With terminal cover | IP55 | 25A | 640 | 789182 | 789184 | 1 |
| | | | With terminal cover | IP55 | 40A | 650 | 789183 | 789185 | 1 |
|  | Locking handle by 3 padlocks |  | With terminal cover | IP55 | 25A | 640 | 789186 | 789191 | 1 |
| | | | With terminal cover | IP55 | 40A | 650 | 789187 | 789192 | 1 |
| | | | With terminal cover | IP55 | 63A | 660 | 789188 | 789193 | 1 |
| | | | With terminal cover | IP55 | 80A | 670 | 789189 | 789194 | 1 |
| | | | With terminal cover | IP55 | 125A | 680 | 789190 | 789195 | 1 |
|  | With standard black handle |  | | IP55 | 25A | 640 | | 789239 | 1 |
| | | | | IP55 | 40A | 650 | | 789240 | 1 |
| | | | | IP55 | 63A | 660 | | 789241 | 1 |
| | | | | IP55 | 80A | 670 | | 789242 | 1 |
| | | | | IP55 | 125A | 680 | | 789243 | 1 |

Accessories see I.6

Main switches

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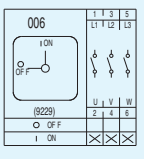

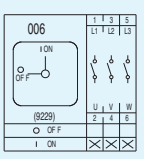

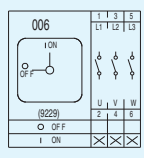

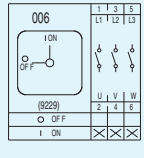
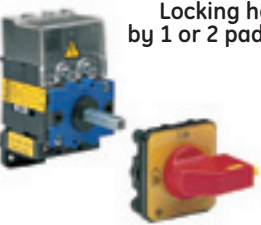
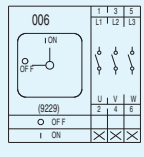

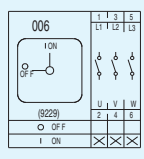
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Standard programme - Rear mounting

| DIN-rail mounting | | | | | | Red/yellow | Black/gray | |
|--|---|---------------------|------|------|----------|------------|------------|---|
| | | Protection | Ithe | Type | Ref. no. | Ref. no. | Pack | |
|  <p>Locking handle by 1 or 2 padlocks</p> |  | With terminal cover | IP30 | 25A | 640 | 789224 | 789229 | 1 |
| | | With terminal cover | IP30 | 40A | 650 | 789225 | 789230 | 1 |
| | | With terminal cover | IP30 | 63A | 660 | 789226 | 789231 | 1 |
| | | With terminal cover | IP30 | 80A | 670 | 789227 | 789232 | 1 |
| | | With terminal cover | IP30 | 125A | 680 | 789228 | 789233 | 1 |
|  <p>With standard black handle</p> |  | IP30 | 25A | 640 | | 789234 | 1 | |
| | | IP30 | 40A | 650 | | 789235 | 1 | |
| | | IP30 | 63A | 660 | | 789236 | 1 | |
| | | IP30 | 80A | 670 | | 789237 | 1 | |
| | | IP30 | 125A | 680 | | 789238 | 1 | |
| With door coupling | | | | | | | | |
|  <p>Locking handle by 1 or 2 padlocks</p> |  | With terminal cover | IP55 | 25A | 640 | 789210 | 789212 | 1 |
| | | With terminal cover | IP55 | 40A | 650 | 789211 | 789213 | 1 |
|  <p>Locking handle by 3 padlocks</p> |  | With terminal cover | IP55 | 25A | 640 | 789214 | 789219 | 1 |
| | | With terminal cover | IP55 | 40A | 650 | 789215 | 789220 | 1 |
| | | With terminal cover | IP55 | 63A | 660 | 789216 | 789221 | 1 |
| | | With terminal cover | IP55 | 80A | 670 | 789217 | 789222 | 1 |
| | | With terminal cover | IP55 | 125A | 680 | 789218 | 789223 | 1 |
| With cover coupling | | | | | | | | |
|  <p>Locking handle by 1 or 2 padlocks</p> |  | With terminal cover | IP65 | 25A | 640 | 789196 | 789198 | 1 |
| | | With terminal cover | IP65 | 40A | 650 | 789197 | 789199 | 1 |
|  <p>Locking handle by 3 padlocks</p> |  | With terminal cover | IP65 | 25A | 640 | 789200 | 789205 | 1 |
| | | With terminal cover | IP65 | 40A | 650 | 789201 | 789206 | 1 |
| | | With terminal cover | IP65 | 63A | 660 | 789202 | 789207 | 1 |
| | | With terminal cover | IP65 | 80A | 670 | 789203 | 789208 | 1 |
| | | With terminal cover | IP65 | 125A | 680 | 789204 | 789209 | 1 |

Accessories see I.6

Main switches

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X

Accessories - Fitable contactbloccs ⁽¹⁾

| | Neutral switched | | | Fixed neutral module | | |
|--|---------------------------|--------|---|---|--------|---|
| | Front | Rear | | Front | Rear | |
|  | 789244 | 789245 | 1 | 789262 | 789263 | 1 |
| | Series ML1 - Type 640/650 | | | Series ML1 - Type 640/650 | | |
| | 789246 | 789247 | 1 | 789264 | 789265 | 1 |
| | Series ML2 - Type 660/670 | | | Series ML2 - Type 660/670 | | |
| | 789248 | 789249 | 1 | 789266 | 789267 | 3 |
| | Series ML3 - Type 680 | | | Series ML3 - Type 680 | | |
| | | | |  | | |
| | Switching contact | | | Auxiliary contact NO+NC Ith = 16A | | |
| | Front | Rear | | Front | Rear | |
|  | 789250 | 789251 | 1 | 789268 | 789269 | 1 |
| | Series ML1 - Type 640/650 | | | Series ML1 - Type 640/650 | | |
| | 789252 | 789253 | 1 | 789268 | 789269 | 1 |
| | Series ML2 - Type 660/670 | | | Series ML2 - Type 660/670 | | |
| | 789254 | 789255 | 1 | 789268 | 789269 | 1 |
| | Series ML3 - Type 680 | | | Series ML3 - Type 680 | | |
| | | | |  | | |
| | PE-terminal (Fixed) | | | | | |
| | Front | Rear | | | | |
|  | 789256 | 789257 | 1 | | | |
| | Series ML1 - Type 640/650 | | | | | |
| | 789258 | 789259 | 1 | | | |
| | Series ML2 - Type 660/670 | | | | | |
| | 789260 | 789261 | 1 | | | |
| | Series ML3 - Type 680 | | | | | |

Accessories - Terminal cover

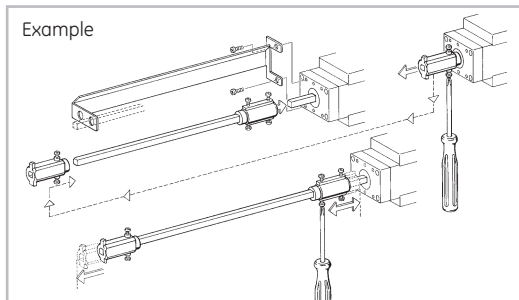
| | Single terminal cover (HS1) | | Triple terminal cover (HS3) | |
|---|-----------------------------|--------|-----------------------------|---|
| | | | | |
|  | | 789270 | 1 | |
| | Series ML1 - Type 640/650 | | | |
| | | 789271 | 1 | |
| | Series ML2 - Type 660/670 | | | |
| | | 789271 | 1 | |
| | Series ML3 - Type 680 | | | |
| | | | | 789272 |
| | | | | Series ML1 - Type 640/650 |
| | | | | 789273 |
| | | | | Series ML2 - Type 660/670 |
| | | | | 789274 |
| | | | | Series ML3 - Type 680 |
| | | | | Same cover for front- or base mounting |
| | | | |  |

Extension shafts for door coupling

| Shaft length | Depth range between door and base (mm) | | Cat. no. |
|----------------------------------|--|------------|----------|
| | ML1 | ML2, ML3 | |
| AL-65 | 170-215 mm | 185-320 mm | 789275 |
| AL-165 | 265-335 mm | 280-350 mm | 789276 |
| AL-265 ⁽²⁾ | 365-435 mm | 380-450 mm | 789277 |
| AL-365 ⁽²⁾ | 465-535 mm | 480-550 mm | 789278 |
| Shaft support for 265 and 365 mm | | | 789279 |

An extension shaft is necessary when the depth is higher than the length of the standard shaft.
ML1: 105-135 mm
ML2 and ML3: 120-150 mm

- (1) ML1: max. 2 units
ML2 and ML3: max 3 units
- (2) Shaft support included.



Enclosed switches

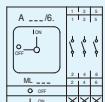
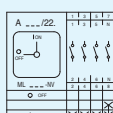
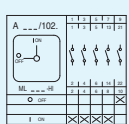
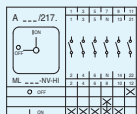
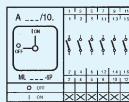
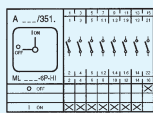


The maintenance switch is an enclosed main switch with locking handle by 3 padlocks. With red handle and yellow front plate, if it should be used as an emergency-stop switch, otherwise black/grey.

There are six sizes of standard enclosures for the series ML. Each is equipped with a cover coupling and a double PE-terminal. Switches type 640 (3 and 4-pole) are provided with an additional N-terminal.

All enclosures have a degree of protection IP65 and are of solid impact and flame resistant polyester.

Enclosed switches

| | Diagram | Type | Ithe | Type of enclosure | Red/yellow 3 padlocks | Black/grey 3 padlocks | Pack. |
|-----------------------------|---|------|------|-------------------|--------------------------|--------------------------|-------|
| | | | | | Ref. no. | Ref. no. | |
| Three poles |  | 640 | 25A | E2 | 789280 | 789285 | 1 |
| | | 650 | 32A | E3 | 789281 | 789286 | 1 |
| | | 660 | 50A | E4 | 789282 | 789287 | 1 |
| | | 670 | 63A | E5 | 789283 | 789288 | 1 |
| | | 680 | 100A | E7 | 789284 | 789289 | 1 |
| | | 640 | 25A | E2 | 789290 | 789295 | 1 |
| Four poles |  | 650 | 32A | E3 | 789291 | 789296 | 1 |
| | | 660 | 50A | E4 | 789292 | 789297 | 1 |
| | | 670 | 63A | E5 | 789293 | 789298 | 1 |
| | | 680 | 100A | E7 | 789294 | 789299 | 1 |
| | | 640 | 25A | E2 | 789300 | 789305 | 1 |
| | | 650 | 32A | E3 | 789301 | 789306 | 1 |
| Three poles + (1 NO + 1 NC) |  | 660 | 50A | E4 | 789302 | 789307 | 1 |
| | | 670 | 63A | E5 | 789303 | 789308 | 1 |
| | | 680 | 100A | E7 | 789304 | 789309 | 1 |
| | | 640 | 25A | E2 | 789310 | 789315 | 1 |
| | | 650 | 32A | E3 | 789311 | 789316 | 1 |
| | | 660 | 50A | E4 | 789312 | 789317 | 1 |
| Four poles + (1 NO + 1 NC) |  | 670 | 63A | E5 | 789313 | 789318 | 1 |
| | | 680 | 100A | E7 | 789314 | 789319 | 1 |
| | | 640 | 25A | E2 | 789320 | 789325 | 1 |
| | | 650 | 32A | E3 | 789321 | 789326 | 1 |
| | | 660 | 50A | E4 | 789322 | 789327 | 1 |
| | | 670 | 63A | E5 | 789323 | 789328 | 1 |
| Six poles |  | 680 | 100A | E7 | 789324 | 789329 | 1 |
| | | 640 | 25A | E2 | 789330 | 789335 | 1 |
| | | 650 | 32A | E3 | 789331 | 789336 | 1 |
| | | 660 | 50A | E4 | 789332 | 789337 | 1 |
| | | 670 | 63A | E5 | 789333 | 789338 | 1 |
| | | 680 | 100A | E7 | 789334 | 789339 | 1 |
| Six poles + (1 NO + 1 NC) |  | 640 | 25A | E2 | 789330 | 789335 | 1 |
| | | 650 | 32A | E3 | 789331 | 789336 | 1 |
| | | 660 | 50A | E4 | 789332 | 789337 | 1 |
| | | 670 | 63A | E5 | 789333 | 789338 | 1 |
| | | 680 | 100A | E7 | 789334 | 789339 | 1 |

Main switches

A

B

C

D

E

F

G

H

I

X

Technical data

Main switches - According to IEC 60947-3, EN 60947-3, DIN VDE 0660 part 107, UL and CSA

Main switches

A

B

C

D

E



F

G

H

I

X

| Series | | | ML 1 | ML 1 | ML 2 | ML 2 | ML 3 |
|--|------------------------|--------------------------------|------------|------------|-------------------|-------------------|------------|
| Types | | | 640 | 650 | 660 | 670 | 680 |
| Rated uninterrupted current | $I_{u\ open} = I_{th}$ | (A) | 25 | 40 | 63 | 80 | 125 |
| | $I_{the\ enclosed}$ | (A) | 25 | 32 | 50 | 63 | 100 |
| Rated insulation voltage U_i (III/3) | | (V) | 690 | 690 | 690 | 690 | 690 |
| Rated impulse withstand voltage U_{imp} (III/3) | | (kV) | 6 | 6 | 6 | 6 | 6 |
| Rated operational current I_e AC21 A ⁽³⁾ | | (A) | 25 | 40 | 63 | 80 | 125 |
| Rated operational voltage U_e | | (V) | 690 | 690 | 690 | 690 | 690 |
| Frequency | | (Hz) | 50/60 | 50/60 | 50/60 | 50/60 | 50/60 |
| Making/breaking capacity | | | | | | | |
| Utilization category AC3: | 3 x 230V | (kW) | 5.5 | 7.5 | 15 | 18.5 | 22 |
| Motor switches for | 3 x 400V | (kW) | 7.5 | 11 | 22 | 30 | 37 |
| operational switching | 3 x 690V | (kW) | 7.5 | 11 | 22 | 30 | 45 |
| Utilization category AC23A ⁽³⁾ | 3 x 230V | (kW) | 7.5 | 11 | 18.5 | 22 | 25 |
| Motor switches | 3 x 400V | (kW) | 11 | 15 | 30 ⁽¹⁾ | 37 ⁽²⁾ | 45 |
| (Main switches for machinery) | 3 x 690V | (kW) | 11 | 15 | 30 ⁽¹⁾ | 37 ⁽²⁾ | 45 |
| Rated breaking category AC23 A ⁽³⁾ | 3 x 230V | (A) | 260 | 390 | 630 | 750 | 870 |
| | 3 x 400V | (A) | 220 | 300 | 570 | 700 | 850 |
| | 3 x 690V | (A) | 130 | 170 | 330 | 400 | 490 |
| Short-circuit capacity | | | | | | | |
| Max. fuse rating gG | | (A) | 50 | 50 | 80 | 80 | 125 |
| Rated conditional short-circuit current | | (kA _{eff}) | 10 | 10 | - | - | - |
| Rated short-circuit making capacity I_{cm} | | (kA) | - | - | 2.1 | 2.1 | 3.4 |
| Rated short-time withstand I_{cw} (1s-current) | | (A _{eff}) | 300 | 480 | 765 | 960 | 1500 |
| Disconnect function up to | | (V) | 690 | 690 | 690 | 690 | 690 |
| Terminal screws (Pozidriv) | | | M4 | M4 | M5 | M5 | M6 |
| Torque terminal screws | | (Nm) | 2.5 | 2.5 | 4 | 4 | 6 |
| Cable cross section | | | | | | | |
| Solid or multi-stranded (Cu) | | min. - max. (mm ²) | 1.5-10 | 1.5-10 | 2.5-35 | 2.5-35 | 6-70 |
| Flexible with ferrule (DIN 46228) | | min. - max. (mm ²) | 1.5-6 | 1.5-6 | 1.5-25 | 1.5-25 | 6-50 |
| General purpose 3-phase | | (A) | 25 | 40 | 63 | 80 | 125 |
| | | (V) | 600 | 600 | 600 | 600 | 600 |
|  Motor 3-phase | 240V | (HP) | 7.5 | 10 | 15 | 20 | 25 |
| | 480V | (HP) | 10 | 20 | 30 | 40 | 50 |
| | 600V | (HP) | 10 | 20 | 30 | 40 | 50 |
|  Motor 1-phase (2 pole) | 120V | (HP) | 1 | 1.5 | 3 | 4 | 6 |
| | 240V | (HP) | 2 | 3 | 7.5 | 10 | 15 |
| Cable cross section | | AWG-No | 14-7 | 14-3 | 14-2 | 14-2 | 8-1/0 |

(1) 22 kW in enclosure
 (2) 30 kW in enclosure
 (3) ML2/ML3 according to EN 60947-3 category B

Auxiliary contact for ML 1/2/3 - According to IEC 60947-5-1

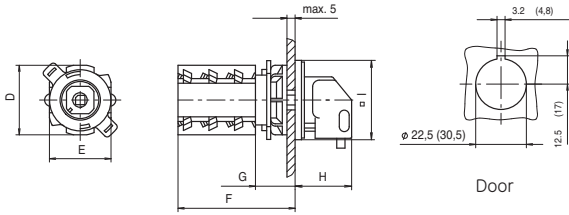
| Series | | | ML 1/2/3 | | | |
|--|------------------------|--------------------------------|----------|--|--|--|
| Rated uninterrupted current | $I_{u\ open} = I_{th}$ | (A) | 16 | | | |
| | $I_{the\ enclosed}$ | (A) | 16 | | | |
| Rated insulation voltage U_i (III/3) | | (V) | 690 | | | |
| Rated impulse withstand voltage U_{imp} | | (kV) | 6 | | | |
| Rated operational current | I_e (AC15) | | | | | |
| | 230V | (A) | 6 | | | |
| | 400V | (A) | 4 | | | |
| | 690V | (A) | 2 | | | |
| Max. fuse rating gG | | (A) | 16 | | | |
| Rated conditional short-circuit current | | (kA _{eff}) | 3 | | | |
| Cable cross section, solid or multi-stranded | | min. - max. (mm ²) | 1-4 | | | |
| Flexible with ferrule (DIN 46228) | | min. - max. (mm ²) | 1-2.5 | | | |
| Terminal screws (Pozidriv) | | | M3 | | | |
| Torque terminal screws | | (Nm) | 0.6 | | | |



Dimensional drawings

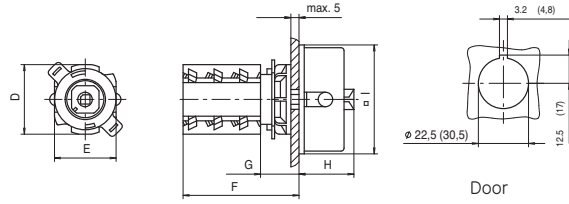
Front mounting - Central fixing \varnothing 22.5/30.5 mm

For 1 or 2 padlocks, \varnothing max. 5 mm



| Series | D | E | F | G | H | I |
|--------|----|----|----|----|----|----|
| ML1 | 55 | 45 | 75 | 25 | 35 | 48 |

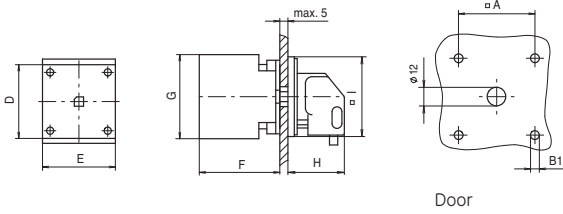
For 3 padlocks, \varnothing max. 9 mm



| Series | D | E | F | G | H | I |
|--------|----|----|----|----|----|----|
| ML1 | 55 | 45 | 75 | 25 | 35 | 66 |

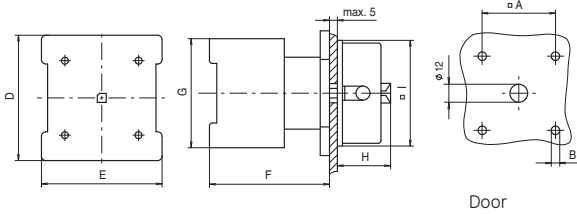
Front mounting - 4-hole fixing

For 1 or 2 padlocks, \varnothing max. 5 mm



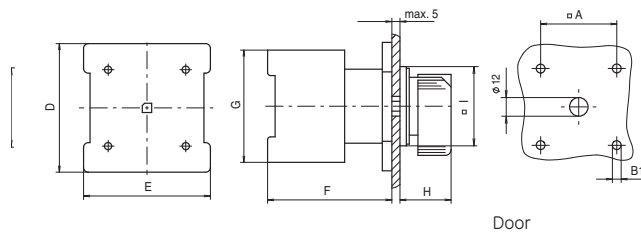
| Series | A | B1 | D | E | F | G | H | I |
|--------|----|-----|----|----|----|----|----|----|
| ML1 | 36 | 4.5 | 44 | 44 | 50 | 55 | 35 | 48 |

For 3 padlocks, \varnothing max. 5 mm



| Series | A | B1 | D | E | F | G | H | I |
|--------|----|-----|----|----|----|----|----|----|
| ML1 | 36 | 4.5 | 44 | 44 | 50 | 55 | 32 | 66 |
| ML2 | 48 | 5.5 | 58 | 58 | 72 | 75 | 37 | 86 |
| ML3 | 48 | 5.5 | 78 | 78 | 72 | 80 | 37 | 86 |

Front mounting - 4-hole fixing, with standard black handle



| Series | A | B1 | D | E | F | G | H | I |
|--------|----|-----|----|----|----|----|----|----|
| ML1 | 36 | 4.5 | 44 | 44 | 50 | 55 | 29 | 48 |
| ML2 | 48 | 5.5 | 58 | 58 | 72 | 75 | 33 | 64 |
| ML3 | 69 | 5.5 | 78 | 78 | 72 | 80 | 35 | 88 |

A

B

C

D

E

F

G

H

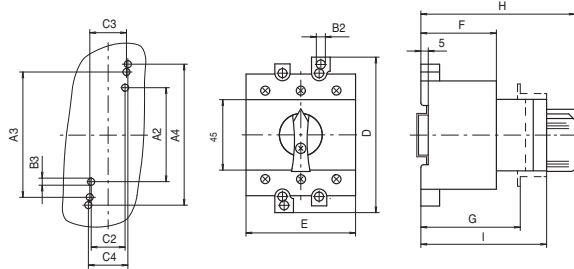
I

X

Dimensional drawings

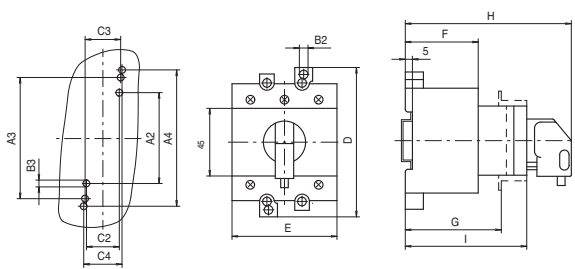
Rear mounting - DIN-rail mounting

With standard black handle



| Series | A2 | A3 | A4 | B2 | B3 | C2 | C3 |
|--------|----|-----|------|-----|------|------|------|
| ML1 | 60 | 65 | 70 | 4.2 | 3.8 | 22 | 30 |
| ML2 | - | 80 | 90 | 5.5 | 5.2 | - | 23.5 |
| ML3 | - | 80 | 90 | 5.5 | 5.2 | - | 23.5 |
| Series | C4 | D | E | F | G | H | I |
| ML1 | 25 | 78 | 52.5 | 42 | 48.5 | 87.5 | 67.5 |
| ML2 | 25 | 100 | 53.5 | 49 | - | 100 | 79 |
| ML3 | 25 | 100 | 70 | 49 | - | 100 | 79 |

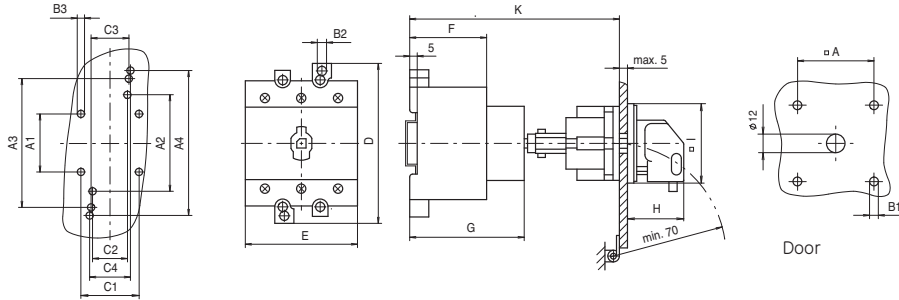
For 1 or 2 padlocks, Ø max. 5 mm



| Series | A2 | A3 | A4 | B2 | B3 | C2 | C3 |
|--------|----|-----|------|-----|------|------|------|
| ML1 | 60 | 65 | 70 | 4.2 | 3.8 | 22 | 30 |
| ML2 | - | 80 | 90 | 5.5 | 5.2 | - | 23.5 |
| ML3 | - | 80 | 90 | 5.5 | 5.2 | - | 23.5 |
| Series | C4 | D | E | F | G | H | I |
| ML1 | 25 | 78 | 52.5 | 42 | 48.5 | 91.5 | 67.5 |
| ML2 | 25 | 100 | 53.5 | 49 | - | 104 | 79 |
| ML3 | 25 | 100 | 70 | 79 | - | 104 | 79 |

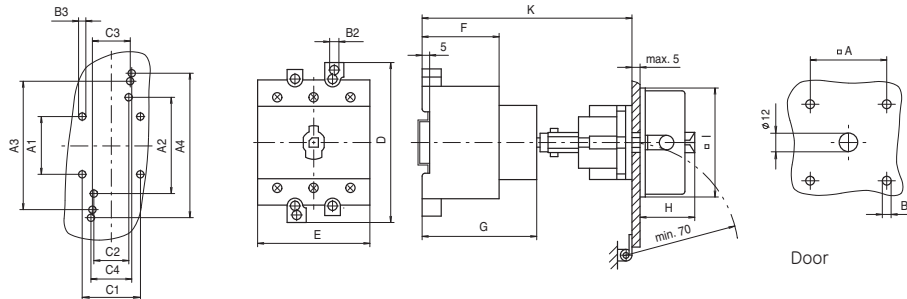
Rear mounting - With door coupling

For 1 or 2 padlocks, Ø max. 5 mm



| Series | A | A2 | A3 | A4 | B1 | B2 | B3 | C2 | C3 | C4 | D | E | F | G | H | I | K |
|--------|----|----|----|----|-----|-----|-----|----|----|----|----|----|----|----|----|----|---------|
| ML1 | 36 | 60 | 65 | 70 | 4.5 | 4.2 | 3.8 | 22 | 30 | 25 | 78 | 45 | 42 | 55 | 35 | 48 | 105-135 |

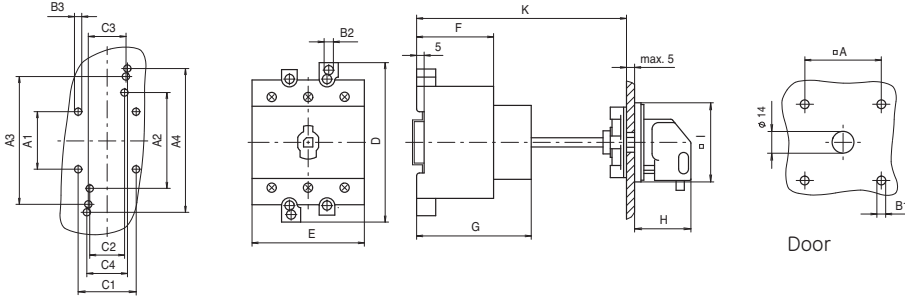
For 3 padlocks, Ø max. 5 mm



| Series | A | A2 | A3 | A4 | B1 | B2 | B3 | C2 | C3 | C4 | D | E | F | G | H | I | K |
|--------|----|----|----|----|-----|-----|-----|----|------|----|-----|------|----|----|----|----|---------|
| ML1 | 36 | 60 | 65 | 70 | 4.5 | 4.2 | 3.8 | 22 | 30 | 25 | 78 | 45 | 42 | 55 | 32 | 66 | 105-135 |
| ML2 | 36 | - | 80 | 90 | 5.5 | 5.5 | 5.2 | - | 23.5 | 25 | 100 | 53.5 | 49 | 72 | 37 | 86 | 120-150 |
| ML3 | 36 | - | 80 | 90 | 5.5 | 5.5 | 5.2 | - | 23.5 | 25 | 100 | 70 | 49 | 72 | 37 | 86 | 120-150 |

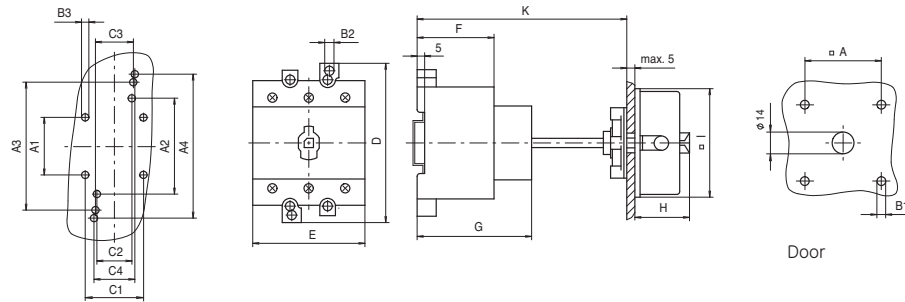
Rear mounting - With cover coupling

For 1 or 2 padlocks, Ø max. 9 mm



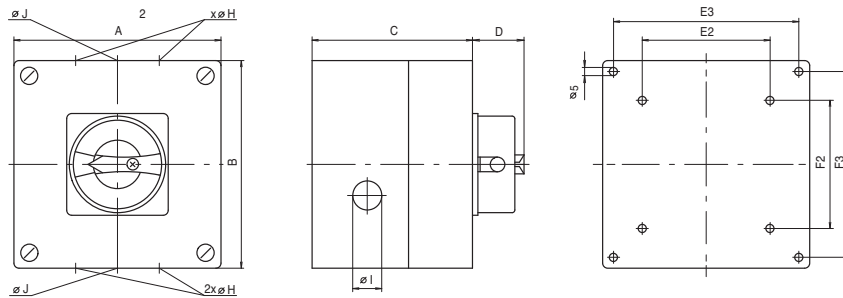
| Series | A | A2 | A3 | A4 | B1 | B2 | B3 | C2 | C3 | C4 | D | E | F | G | H | I | K |
|--------|----|----|----|----|-----|-----|-----|----|----|----|----|----|----|----|----|----|---------|
| ML1 | 36 | 60 | 65 | 70 | 4.5 | 4.2 | 3.8 | 22 | 30 | 25 | 78 | 45 | 42 | 55 | 35 | 48 | 105-135 |

For 3 padlocks, Ø max. 9 mm



| Series | A | A2 | A3 | A4 | B1 | B2 | B3 | C2 | C3 | C4 | D | E | F | G | H | I | K |
|--------|----|----|----|----|-----|-----|-----|----|------|----|-----|------|----|----|----|----|---------|
| ML1 | 36 | 60 | 65 | 70 | 4.5 | 4.2 | 3.8 | 22 | 30 | 25 | 78 | 45 | 42 | 55 | 32 | 66 | 88-98 |
| ML2 | 36 | - | 80 | 90 | 5.5 | 5.5 | 5.2 | - | 23.5 | 25 | 100 | 53.5 | 49 | 72 | 37 | 86 | 103-113 |
| ML3 | 36 | - | 80 | 90 | 5.5 | 5.5 | 5.2 | - | 23.5 | 25 | 100 | 70 | 49 | 72 | 37 | 86 | 103-113 |

Enclosed switches



| Enclosure | | | | | | | | |
|-----------|-----|-----|-----|----|-----|-----|-----|-----|
| Type | A | B | C | D | E2 | E3 | F2 | F3 |
| E2 | 94 | 130 | 81 | 32 | - | 79 | - | 115 |
| E3 | 130 | 130 | 99 | 32 | - | 115 | - | 115 |
| E4 | 110 | 180 | 11 | 32 | 50 | 95 | 120 | 165 |
| E5 | 180 | 182 | 111 | 37 | 120 | 165 | 120 | 167 |
| E6 | 180 | 254 | 111 | 37 | 120 | 165 | 190 | 239 |
| E7 | 265 | 265 | 140 | 37 | 194 | - | 230 | - |

| Cable entry | | | | | |
|-------------|----------|-------|-------|-------|-------|
| Type | H (1) | I (1) | H (2) | I (2) | J (2) |
| E2 | PG 16/11 | PG 11 | - | - | - |
| E3 | PG 21/16 | PG 16 | - | - | - |
| E4 | - | - | PG 21 | PG 11 | - |
| E5 | - | - | PG 29 | - | PG 11 |
| E6 | - | - | PG 29 | PG 11 | - |
| E7 | PG 36/29 | PG 29 | - | - | - |

(1) Knock-out entry
(2) Cable entry

Dimensions

A

B

C

D

E

F

G

H

I

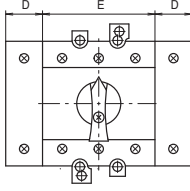
J

Series ML

Dimensional drawings

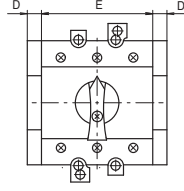
Accessories

N-module and PE-terminal



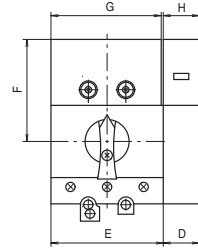
| Series | D | E |
|--------|------|------|
| ML1 | 14.5 | 45 |
| ML2 | 23 | 53.5 |
| ML3 | 23 | 70 |

Auxiliary contacts (NO + NC)



| Series | D | E |
|--------|-----|------|
| ML1 | 9.5 | 45 |
| ML2 | 9.5 | 53.5 |
| ML3 | 9.5 | 70 |

Terminal covers



| Series | D | E | F | G | H |
|--------|------|------|----|----|------|
| ML1 | 14.5 | 45 | 53 | 41 | 14 |
| ML2 | 23 | 53.5 | 61 | 52 | 22.5 |
| ML3 | 23 | 70 | 65 | 68 | 22.5 |

Main switches

A

B

C

D

E

F

G

H

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X

| | | | |
|------|---|---|---|
| | | Plug-in relays and Auxiliary contactors | A |
| | | Motor protection devices | B |
| X.2 | Completed catalogue numbers | Contactors and Thermal overload relays | C |
| X.2 | Chap. A - Series M - Auxiliary minicontactors | Motorstarters | D |
| X.3 | Chap. A - Series RL - Auxiliary contactors | | |
| X.4 | Chap. C - Series M - Minicontactors | Control and signalling units | E |
| X.6 | Chap. C - Series CL - Contactors | | |
| X.7 | Chap. C - Series CK - Contactors | Electronic relays | F |
| X.8 | Chap. E - Series P9 - Control and signalling units Ø 22 mm | | |
| X.8 | Chap. E - Series 077 - Control and signalling units Ø 30 mm | Limit switches | G |
| X.9 | General index by catalogue number | Speed drive units | H |
| X.17 | General index by reference number | Main switches | I |
| | | Numerical index | X |



Series M

Completed catalogue numbers

A

B

C

D

E

F

G

H

I

X

This list shows the catalogue and reference numbers for the auxiliary minicontactors with the most usual voltages. For other voltages/ types, please consult us.

| Cat. no. | Ref. no. |
|---|-----------------|
| 50Hz pg. A.17 | |
| MBOAG | 100452 48V |
| MBOAK | 102400 115/127V |
| MBOAN | 100454 220/240V |
| MBOAS | 102403 260V |
| MBOAU | 213532 380/400V |
| MBOAW | 102405 415/440V |
| MCRA004AFN | 100094 220/240V |
| MCRA004AIN | 100144 220/240V |
| MCRA004ATG | 100042 48V |
| MCRA004ATK | 102090 115/127V |
| MCRA004ATN | 100044 220/240V |
| MCRA004ATS | 102093 260V |
| MCRA004ATU | 100045 380/400V |
| MCRA004ATW | 102095 415/440V |
| MCRA013AFN | 100084 220/240V |
| MCRA013AIN | 100134 220/240V |
| MCRA013ATG | 100032 48V |
| MCRA013ATK | 102069 115/127V |
| MCRA013ATN | 100034 220/240V |
| MCRA013ATS | 102072 260V |
| MCRA013ATU | 100035 380/400V |
| MCRA013ATW | 102074 415/440V |
| MCRA022AFG | 100072 48V |
| MCRA022AFN | 100074 220/240V |
| MCRA022AIN | 100124 220/240V |
| MCRA022AIU | 100125 380/400V |
| MCRA022ATG | 100022 48V |
| MCRA022ATK | 102048 115/127V |
| MCRA022ATN | 100024 220/240V |
| MCRA022ATS | 102051 260V |
| MCRA022ATU | 100025 380/400V |
| MCRA022ATW | 102053 415/440V |
| MCRA031AFG | 100062 48V |
| MCRA031AFN | 100064 220/240V |
| MCRA031AFU | 100065 380/400V |
| MCRA031AIG | 100112 48V |
| MCRA031AIN | 100114 220/240V |
| MCRA031AIU | 100115 380/400V |
| MCRA031ATG | 100012 48V |
| MCRA031ATK | 102027 115/127V |
| MCRA031ATN | 100014 220/240V |
| MCRA031ATS | 102030 260V |
| MCRA031ATU | 100015 380/400V |
| MCRA031ATW | 102032 415/440V |
| MCRA040AFN | 100054 220/240V |
| MCRA040AFU | 100055 380/400V |
| MCRA040AIN | 100104 220/240V |
| MCRA040ATG | 100002 48V |
| MCRA040ATK | 102006 115/127V |
| MCRA040ATN | 100004 220/240V |
| MCRA040ATS | 102009 260V |
| MCRA040ATU | 100005 380/400V |
| MCRA040ATW | 102011 415/440V |
| 50Hz pg. A.17 | |
| MBOAE | 102397 32V |
| MBOAF | 102398 48V |
| MBOAM | 102401 208/220V |
| MBOAU | 213532 440V |
| MBOAY | 102406 600V |
| MCRA004ATE | 102087 32V |
| MCRA004ATM | 102091 208/220V |
| MCRA004ATU | 100045 440V |
| MCRA004ATY | 102096 600V |
| MCRA013ATE | 102066 32V |
| MCRA013ATM | 102070 208/220V |
| MCRA013ATU | 100035 440V |
| MCRA013ATY | 102075 600V |
| MCRA022AIU | 100125 440V |
| MCRA022ATE | 102045 32V |
| MCRA022ATH | 102047 110V |
| MCRA022ATM | 102049 208/220V |
| MCRA022ATU | 100025 440V |
| MCRA022ATY | 102054 600V |
| MCRA031AFU | 100065 440V |
| MCRA031AIU | 100115 440V |
| MCRA031ATE | 102024 32V |
| MCRA031ATM | 102028 208/220V |
| MCRA031ATU | 100015 440V |
| MCRA031ATY | 102033 600V |
| MCRA040ATE | 102003 32V |
| MCRA040ATM | 102007 208/220V |
| MCRA040ATU | 100005 440V |
| MCRA040ATY | 102012 600V |

| Cat. no. | Ref. no. | Cat. no. | Ref. no. |
|---|-----------------|------------|-------------|
| 50/60Hz pg. A.17 | | | |
| MBOA1 | 102407 24V | MCRC031ATG | 100017 48V |
| MBOA2 | 102408 42V | MCRC031ATH | 102327 60V |
| MBOA3 | 102409 110/115V | MCRC031ATI | 102328 72V |
| MBOA4 | 102410 120V | MCRC031ATJ | 100018 110V |
| MBOA5 | 102411 220V | MCRC031ATK | 102329 120V |
| MBOA6 | 102412 230V | MCRC031ATL | 102330 125V |
| MBOA7 | 102413 240V | MCRC031ATN | 100019 220V |
| MBOA8 | 102414 440V | MCRC031ATR | 102331 240V |
| MBOA9 | 133717 48V | MCRC031ATS | 102324 250V |
| MCRA004AT1 | 102097 24V | MCRC040AFD | 100056 24V |
| MCRA004AT2 | 102098 42V | MCRC040AFG | 100057 48V |
| MCRA004AT3 | 102099 110/115V | MCRC040AID | 102332 24V |
| MCRA004AT4 | 102100 120V | MCRC040ATB | 100000 12V |
| MCRA004AT5 | 102101 220V | MCRC040ATC | 102315 32V |
| MCRA004AT6 | 102102 230V | MCRC040ATD | 100006 24V |
| MCRA004AT7 | 102103 240V | MCRC040ATE | 102316 36V |
| MCRA004AT8 | 102104 440V | MCRC040ATF | 102317 42V |
| MCRA004AT9 | 108859 48V | MCRC040ATG | 100007 48V |
| MCRA013AT1 | 102076 24V | MCRC040ATH | 102318 60V |
| MCRA013AT2 | 102077 42V | MCRC040ATI | 102319 72V |
| MCRA013AT3 | 102078 110/115V | MCRC040ATJ | 100008 110V |
| MCRA013AT4 | 102079 120V | MCRC040ATK | 102320 120V |
| MCRA013AT5 | 102080 220V | MCRC040ATL | 102321 125V |
| MCRA013AT6 | 102081 230V | MCRC040ATN | 100009 220V |
| MCRA013AT7 | 102082 240V | MCRC040ATR | 102322 240V |
| MCRA013AT8 | 102083 440V | MCRC040ATS | 100040 250V |
| MCRA022AFB | 107493 440V | | |
| MCRA022AI5 | 100129 220V | | |
| MCRA022AT1 | 102055 24V | | |
| MCRA022AT2 | 102056 42V | | |
| MCRA022AT3 | 102057 110/115V | | |
| MCRA022AT4 | 102058 120V | | |
| MCRA022AT5 | 102059 220V | | |
| MCRA022AT6 | 102060 230V | | |
| MCRA022AT7 | 102061 240V | | |
| MCRA022AT8 | 102062 440V | | |
| MCRA022AT9 | 108236 48V | | |
| MCRA031AT1 | 102034 24V | | |
| MCRA031AT2 | 102035 42V | | |
| MCRA031AT3 | 102036 110/115V | | |
| MCRA031AT4 | 102037 120V | | |
| MCRA031AT5 | 102038 220V | | |
| MCRA031AT6 | 102039 230V | | |
| MCRA031AT7 | 102040 240V | | |
| MCRA031AT8 | 102041 440V | | |
| MCRA031AT9 | 108238 48V | | |
| MCRA040AT1 | 102013 24V | | |
| MCRA040AT2 | 102014 42V | | |
| MCRA040AT3 | 102015 110/115V | | |
| MCRA040AT4 | 102016 120V | | |
| MCRA040AT5 | 102017 220V | | |
| MCRA040AT6 | 102018 230V | | |
| MCRA040AT7 | 102019 240V | | |
| MCRA040AT8 | 102020 440V | | |
| MCRA040AT9 | 108237 48V | | |
| Direct current pg. A.17 | | | |
| MBOCA | 102415 6V | | |
| MBOCB | 100460 12V | | |
| MBOCC | 102416 32V | | |
| MBOCD | 100466 24V | | |
| MBOCE | 102417 36V | | |
| MBOCF | 102418 42V | | |
| MBOCG | 100467 48V | | |
| MBOCI | 102420 72V | | |
| MBOCJ | 100468 110V | | |
| MBOCK | 102421 120V | | |
| MBOCL | 102422 125V | | |
| MBOCN | 100469 220V | | |
| MBOCR | 102423 240V | | |
| MBOCS | 100449 250V | | |
| MBOCH | 102419 60V | | |
| MCRC022AFG | 100077 48V | | |
| MCRC022AFL | 102366 125V | | |
| MCRC022AFN | 100079 220V | | |
| MCRC022AID | 100126 24V | | |
| MCRC022AIJ | 100128 110V | | |
| MCRC022ATB | 100020 12V | | |
| MCRC022ATC | 102333 32V | | |
| MCRC022ATD | 100026 24V | | |
| MCRC022ATE | 102334 36V | | |
| MCRC022ATF | 102335 42V | | |
| MCRC022ATG | 100027 48V | | |
| MCRC022ATH | 102336 60V | | |
| MCRC022ATI | 102337 72V | | |
| MCRC022ATJ | 100028 110V | | |
| MCRC022ATK | 102338 120V | | |
| MCRC022ATL | 102339 125V | | |
| MCRC022ATN | 100029 220V | | |
| MCRC022ATR | 102340 240V | | |
| MCRC022ATS | 108953 250V | | |
| MCRC031AFD | 100066 24V | | |
| MCRC031AID | 100116 24V | | |
| MCRC031ATA | 102323 6V | | |
| MCRC031ATB | 100010 12V | | |
| MCRC031ATD | 100016 24V | | |
| MCRC031ATE | 102325 36V | | |
| MCRC031ATF | 102326 42V | | |



This list shows the catalogue and reference numbers for the **auxiliary contactors** with the most usual voltages.
For other voltages/ types, please consult us.

| Cat. no. | Ref. no. |
|------------|-----------------|
| RL4RA040T3 | 109018 110/115V |
| RL4RA040T4 | 109019 120V |
| RL4RA040T5 | 109020 220V |
| RL4RA040T6 | 109021 230V |
| RL4RA040T7 | 109022 240V |
| RL4RA040T8 | 109023 440V |

Direct current pg. A.23

| | |
|--------|------------------|
| LB1DB | 112310 12V |
| LB1DD | 112316 24V |
| LB1DE | 112650 36V |
| LB1DF | 112651 42V |
| LB1DG | 112317 48V |
| LB1DH | 112652 60V |
| LB1DI | 112653 72V |
| LB1DJ | 112318 110V |
| LB1DK | 112654 120/125V |
| LB1DN | 112319 220V |
| LB1DP | 112655 230V |
| LB1DR | 112656 240V |
| LB1DT | 112657 250V |
| LB1DWB | 113523 12V (WR) |
| LB1DWD | 113524 24V (WR) |
| LB1DWE | 113525 33V (WR) |
| LB1DWG | 113526 48V (WR) |
| LB1DWI | 113527 72V (WR) |
| LB1DWJ | 113528 110V (WR) |
| LB1DWN | 113529 220V (WR) |
| LB1DX | 112658 440V |

| | |
|------------|-----------------|
| RL4RD004TB | 113030 12V |
| RL4RD004TD | 113036 24V |
| RL4RD004TE | 113077 36V |
| RL4RD004TG | 113037 48V |
| RL4RD004TJ | 113038 110V |
| RL4RD004TK | 113081 120/125V |
| RL4RD004TN | 113039 220V |
| RL4RD004TT | 113084 250V |
| RL4RD022GD | 113046 24V |
| RL4RD022GJ | 113048 110V |
| RL4RD022TB | 113020 12V |
| RL4RD022TD | 113026 24V |
| RL4RD022TE | 113068 36V |
| RL4RD022TG | 113027 48V |
| RL4RD022TJ | 113028 110V |
| RL4RD022TK | 113072 120/125V |
| RL4RD022TN | 113029 220V |
| RL4RD022TP | 113073 230V |
| RL4RD022TT | 113075 250V |
| RL4RD031TB | 113010 12V |
| RL4RD031TD | 113016 24V |
| RL4RD031TE | 113059 36V |
| RL4RD031TG | 113017 48V |
| RL4RD031TH | 113061 60V |
| RL4RD031TJ | 113018 110V |
| RL4RD031TK | 113063 120/125V |
| RL4RD031TN | 113019 220V |
| RL4RD031TT | 113066 250V |
| RL4RD031TX | 113067 440V |
| RL4RD040TB | 113000 12V |
| RL4RD040TD | 113006 24V |
| RL4RD040TE | 113050 36V |
| RL4RD040TG | 113007 48V |
| RL4RD040TJ | 113008 110V |
| RL4RD040TK | 113054 120/125V |
| RL4RD040TN | 113009 220V |
| RL4RD040TT | 113057 250V |

Mechanical latch blocks pg. A.24

| | |
|-------|--------|
| RMLFD | 112992 |
| RMLFG | 112993 |
| RMLFJ | 112994 |
| RMLFN | 112995 |
| RMLFU | 112996 |
| RMLFY | 112997 |

50Hz pg. A.23

| | |
|------------|-----------------|
| LB1AE | 110401 32V |
| LB1AK | 110405 127V |
| LB1AN | 104634 220/230V |
| LB1AU | 104635 380/400V |
| LB1AW | 110412 415V |
| LB1AZ | 110415 660/690V |
| RL4RA004TE | 109073 32V |
| RL4RA004TK | 109077 127V |
| RL4RA004TN | 104034 220/230V |
| RL4RA004TU | 104035 380/400V |
| RL4RA004TW | 109084 415V |
| RL4RA004TZ | 109087 660/690V |
| RL4RA022TE | 109049 32V |
| RL4RA022TK | 109053 127V |
| RL4RA022TN | 104024 220/230V |
| RL4RA022TU | 104025 380/400V |
| RL4RA022TW | 109060 415V |
| RL4RA022TZ | 109063 660/690V |
| RL4RA031TE | 109025 32V |
| RL4RA031TK | 109029 127V |
| RL4RA031TN | 104014 220/230V |
| RL4RA031TU | 104015 380/400V |
| RL4RA031TW | 109036 415V |
| RL4RA031TZ | 109039 660/690V |
| RL4RA040TE | 109001 32V |
| RL4RA040TK | 109005 127V |
| RL4RA040TN | 104004 220/230V |
| RL4RA040TU | 104005 380/400V |
| RL4RA040TW | 109012 415V |
| RL4RA040TZ | 109015 660/690V |

60Hz pg. A.23

| | |
|------------|-------------|
| LB1AL | 110406 208V |
| LB1AT | 110410 380V |
| LB1AY | 110414 600V |
| RL4RA004TL | 109078 208V |
| RL4RA004TT | 109082 380V |
| RL4RA004TY | 109086 600V |
| RL4RA022TL | 109054 208V |
| RL4RA022TT | 109058 380V |
| RL4RA022TY | 109062 600V |
| RL4RA031TL | 109030 208V |
| RL4RA031TT | 109034 380V |
| RL4RA031TY | 109038 600V |
| RL4RA040TL | 109006 208V |
| RL4RA040TT | 109010 380V |
| RL4RA040TY | 109014 600V |

50/60Hz pg. A.23

| | |
|------------|-----------------|
| LB1A1 | 110416 24V |
| LB1A2 | 110417 42V |
| LB1A3 | 110418 110/115V |
| LB1A4 | 110419 120V |
| LB1A5 | 110420 220V |
| LB1A6 | 110421 230V |
| LB1A7 | 110422 240V |
| LB1A8 | 110423 440V |
| LB1A9 | 113979 48V |
| RL4RA004T1 | 109088 24V |
| RL4RA004T2 | 109089 42V |
| RL4RA004T3 | 109090 110/115V |
| RL4RA004T4 | 109091 120V |
| RL4RA004T5 | 109092 220V |
| RL4RA004T6 | 109093 230V |
| RL4RA004T7 | 109094 240V |
| RL4RA004T8 | 109095 440V |
| RL4RA022T1 | 109064 24V |
| RL4RA022T2 | 109065 42V |
| RL4RA022T3 | 109066 110/115V |
| RL4RA022T4 | 109067 120V |
| RL4RA022T5 | 109068 220V |
| RL4RA022T6 | 109069 230V |
| RL4RA022T7 | 109070 240V |
| RL4RA022T8 | 109071 440V |
| RL4RA031T1 | 109040 24V |
| RL4RA031T2 | 109041 42V |
| RL4RA031T3 | 109042 110/115V |
| RL4RA031T4 | 109043 120V |
| RL4RA031T5 | 109044 220V |
| RL4RA031T6 | 109045 230V |
| RL4RA031T7 | 109046 240V |
| RL4RA031T8 | 109047 440V |
| RL4RA040T1 | 109016 24V |
| RL4RA040T2 | 109017 42V |

A

B

C

D

E

F

G

H

I

X



Series M

Completed catalogue numbers

This list shows the catalogue and reference numbers for the minicontactors with the most usual voltages. For other voltages/types, please consult us.

| Cat. no. | Ref. no. | Cat. no. | Ref. no. | Cat. no. | Ref. no. | Cat. no. | Ref. no. |
|-------------|-----------------|-------------|-----------------|------------|-----------------|----------------|-----------------|
| MC1A310ATG | 100212 48V | MC1A301AFY | 102679 600V | MC0A400AT5 | 102801 220V | MC1AA00AT7 | 103034 240V |
| MC1A310ATK | 102610 115/127V | MC1A301AIM | 102716 208/220V | MC0A400AT6 | 102802 230V | MC1AA00AT8 | 103035 440V |
| MC1A310ATN | 100214 220/240V | MC1A301AIU | 102625 440V | MC0A400AT7 | 102803 240V | MC1AB00AF1 | 103070 24V |
| MC1A310ATS | 102613 260V | MC1A301AIU | 103404 440V | MC0A400AT8 | 102804 440V | MC1AB00AF2 | 103071 42V |
| MC1A310ATU | 100215 380/400V | MC1A301ATE | 102628 32V | MC0A400AT9 | 100290 48V | MC1AB00AF3 | 103072 110/115V |
| MC1A310ATW | 102615 415/440V | MC1A301ATM | 102632 208/220V | MC0A400AT1 | 102839 24V | MC1AB00AF4 | 103073 120V |
| MC1A400AFG | 100392 48V | MC1A301ATY | 100225 440V | MC0A400AT2 | 102840 42V | MC1AB00AF5 | 103074 220V |
| MC1A400AFK | 103042 115/127V | MC1A301ATY | 102637 600V | MC0A400AT3 | 102841 110/115V | MC1AB00AF6 | 103075 230V |
| MC1A400AFN | 100394 220/240V | MC1A301OFE | 102649 32V | MC0A400AT4 | 102842 120V | MC1AB00AF7 | 103076 240V |
| MC1A400AFS | 103045 260V | MC1A301OFM | 102653 208/220V | MC0A400AT5 | 102843 220V | MC1AB00AF8 | 103077 440V |
| MC1A400AFU | 100395 380/400V | MC1A301OFU | 100235 440V | MC0A400AT6 | 102844 230V | MC1AB00AF9 | 103078 48V |
| MC1A400AFW | 103047 415/440V | MC1A301OFA | 102658 600V | MC0A400AT7 | 102845 240V | MC1AB00AT1 | 103007 24V |
| MC1A400AIG | 100422 48V | MC1A301OFA | 102658 600V | MC0A400AT8 | 102846 440V | MC1AB00AT2 | 103008 42V |
| MC1A400AIN | 100424 220/240V | MC1A301OAU | 103391 440V | MC0A400AT9 | 102819 42V | MC1AB00AT3 | 103009 110/115V |
| MC1A400AIU | 100425 380/400V | MC1A301OAU | 103391 440V | MC0A400AT1 | 102819 42V | MC1AB00AT4 | 103010 120V |
| MC1A400AIW | 103110 415/440V | MC1A301OAT | 102607 32V | MC0A400AT2 | 102820 110/115V | MC1AB00AT5 | 103011 220V |
| MC1A400AOTG | 100362 48V | MC1A301OAT | 102611 208/220V | MC0A400AT3 | 102821 120V | MC1AB00AT6 | 103012 230V |
| MC1A400AOTK | 102979 115/127V | MC1A301OAT | 100215 440V | MC0A400AT4 | 102822 20V | MC1AB00AT7 | 103013 240V |
| MC1A400AOTN | 100364 220/240V | MC1A301OAT | 100215 440V | MC0A400AT5 | 102822 20V | MC1AB00AT8 | 103014 440V |
| MC1A400AOTS | 102982 260V | MC1A400AFE | 103039 32V | MC0A400AT6 | 102823 230V | MC1AB00AT9 | 103015 48V |
| MC1A400ATU | 100365 380/400V | MC1A400AFM | 103043 208/220V | MC0A400AT7 | 102824 240V | MC1AB00AT1 | 103016 48V |
| MC1A400ATW | 102984 415/440V | MC1A400AFU | 100395 440V | MC0A400AT8 | 102825 440V | MC2A301AI1 | 103273 24V |
| MC1A400AFG | 100412 48V | MC1A400AFY | 103048 600V | MC1A301AF1 | 102680 24V | MC2A301AI9 | 103272 48V |
| MC1A400AFK | 103084 115/127V | MC1A400AIY | 113267 600V | MC1A301AF2 | 102681 42V | MC2A301AR1 | 103425 24V |
| MC1A400AFN | 100414 220/240V | MC1A400ATE | 102976 32V | MC1A301AF3 | 102682 110/115V | MC2A301AR9 | 103426 48V |
| MC1A400AFS | 103087 260V | MC1A400ATM | 102980 208/220V | MC1A301AF4 | 102683 120V | MC2A301AT1 | 103569 24V |
| MC1A400AFU | 100415 380/400V | MC1A400ATN | 103365 440V | MC1A301AF5 | 102684 220V | MC2A301AT3 | 103558 110/115V |
| MC1A400AFW | 100415 380/400V | MC1A400ATU | 102985 600V | MC1A301AF6 | 102685 230V | MC2A301AT5 | 103570 220V |
| MC1A400AIG | 100412 48V | MC1A400ATY | 103081 32V | MC1A301AF7 | 102686 240V | MC2A301AT6 | 103571 230V |
| MC1A400AIN | 100444 220/240V | MC1A400ATY | 103085 208/220V | MC1A301AF8 | 102687 440V | MC2A301AI1 | 103271 24V |
| MC1A400AIU | 100382 48V | MC1A400AFU | 100415 440V | MC1A301AI1 | 102722 24V | MC2A301AI9 | 103270 48V |
| MC1A400AIW | 103021 115/127V | MC1A400AFY | 103090 600V | MC1A301AI3 | 102724 110/115V | MC2A301AR1 | 103412 24V |
| MC1A400AOTG | 103084 220/240V | MC1A400ATE | 103018 32V | MC1A301AI5 | 102726 220V | MC2A301AR9 | 103413 48V |
| MC1A400AOTK | 103024 260V | MC1A400ATM | 103022 208/220V | MC1A301AI6 | 102717 230V | MC2A301AT1 | 103577 24V |
| MC1A400AOTN | 103085 380/400V | MC1A400ATN | 103385 440V | MC1A301AI9 | 103399 24V | MC2A301AT5 | 103578 220V |
| MC1A400AOTS | 103026 415/440V | MC1A400ATU | 103027 600V | MC1A301AR1 | 103400 48V | MC2A301AT6 | 103579 230V |
| MC1A400ATU | 100402 48V | MC1A400ATY | 103060 32V | MC1A301AT1 | 102638 24V | MC2A400AT6 | 103595 230V |
| MC1A400ATW | 103063 115/127V | MC1A400ATE | 103060 32V | MC1A301AT2 | 102639 42V | | |
| MC1A800AFK | 100404 220/240V | MC1A800AFM | 100405 440V | MC1A301AT3 | 102640 110/115V | Direct current | pg. C.3-C.5 |
| MC1A800AFN | 100404 220/240V | MC1A800AFU | 100405 440V | MC1A301AT4 | 102641 120V | MBOCA | 102415 6V |
| MC1A800AFS | 103066 260V | MC1A800AFY | 103069 600V | MC1A301AT5 | 102642 220V | MBOCB | 102416 12V |
| MC1A800AFU | 100405 380/400V | MC1A800ATE | 102997 32V | MC1A301AT6 | 102643 230V | MBOCC | 102416 32V |
| MC1A800AFW | 103068 415/440V | MC1A800ATM | 103001 208/220V | MC1A301AT7 | 102644 240V | MBOCD | 102416 24V |
| MC1A800AIG | 100404 220/240V | MC1A800ATN | 103375 440V | MC1A301AT7 | 102645 440V | MBOCE | 102417 36V |
| MC1A800AIN | 103072 48V | MC1A800ATY | 103006 600V | MC1A301AT8 | 102645 440V | MBOCF | 102418 42V |
| MC1A800AIU | 103000 115/127V | MC2A301ARU | 103430 440V | MC1A301AT9 | 100320 48V | MBOCG | 102418 48V |
| MC1A800AIW | 103074 220/240V | MC2A301ATU | 103567 440V | MC1A301AF1 | 102659 24V | MBOCH | 102419 60V |
| MC1A800AOTG | 103003 260V | MC2A301OAU | 103417 440V | MC1A301AF2 | 102660 42V | MBOCI | 102420 72V |
| MC1A800AOTK | 103003 260V | MC2A301OAU | 103575 440V | MC1A301AF3 | 102661 110/115V | MBOCJ | 102420 110V |
| MC1A800AOTN | 103003 260V | MC2A400ATU | 103292 440V | MC1A301AF4 | 102662 120V | MBOCK | 102421 120V |
| MC1A800AOTS | 103005 415/440V | | | MC1A301AF5 | 102663 220V | MBOCL | 102422 125V |
| MC1A800ATU | 101019 220/240V | 50/60Hz | pg. C.3-C.5 | MC1A301AF6 | 102664 230V | MBOCN | 100469 220V |
| MC1A800ATW | 103289 380/400V | MBOA1 | 102407 24V | MC1A301AF7 | 102665 240V | MBOCR | 102423 240V |
| MC2A301AI1 | 101019 220/240V | MBOA2 | 102408 42V | MC1A301AF8 | 102666 440V | MBOCS | 100449 250V |
| MC2A301AI9 | 103289 380/400V | MBOA3 | 102409 110/115V | MC1A301AI1 | 102701 24V | MCOC301AFD | 100186 24V |
| MC2A301ARN | 103429 220/240V | MBOA4 | 102410 120V | MC1A301AI3 | 102703 110/115V | MCOC301AID | 100206 24V |
| MC2A301ARU | 103430 440V | MBOA5 | 102411 220V | MC1A301AI5 | 102705 220V | MCOC301AIB | 103379 12V |
| MC2A301ATG | 103564 48V | MBOA6 | 102412 230V | MC1A301AI9 | 102706 48V | MCOC301ARD | 103380 24V |
| MC2A301ATN | 103566 220/240V | MBOA7 | 102413 240V | MC1A301AR1 | 103386 24V | MCOC301ARH | 103381 48V |
| MC2A301ATU | 103567 380/400V | MBOA8 | 102414 440V | MC1A301AR9 | 103387 48V | MCOC301ARR | 103382 60V |
| MC2A301OAU | 103417 440V | MBOA9 | 133717 48V | MC1A301AT1 | 102617 24V | MCOC301ARJ | 103383 110V |
| MC2A301OAU | 103575 440V | MC0A301AI1 | 102542 24V | MC1A301AT2 | 102618 42V | MCOC301ATK | 103384 120V |
| MC2A301OAT | 103572 48V | MC0A301AI3 | 102544 110/115V | MC1A301AT3 | 102619 110/115V | MCOC301ARL | 103385 220V |
| MC2A301OATN | 103574 220/240V | MC0A301AI5 | 102546 220V | MC1A301AT4 | 102620 120V | MCOC301ATB | 100160 12V |
| MC2A301OATU | 103575 380/400V | MC0A301AI6 | 102547 230V | MC1A301AT5 | 102621 220V | MCOC301ATD | 100166 24V |
| | | MC0A301AR1 | 103373 24V | MC1A301AT6 | 102622 230V | MCOC301ATE | 102561 36V |
| | | MC0A301AR9 | 103374 48V | MC1A301AT7 | 102623 240V | MCOC301ATF | 102562 42V |
| | | MC0A301AT1 | 102458 24V | MC1A301AT8 | 102624 440V | MCOC301ATG | 100167 48V |
| | | MC0A301AT2 | 102459 42V | MC1A301AT9 | 100298 48V | MCOC301ATH | 102563 60V |
| | | MC0A301AT3 | 102471 110/115V | MC1A400AF1 | 103049 24V | MCOC301ATJ | 102564 72V |
| | | MC0A301AT4 | 102461 120V | MC1A400AF2 | 103050 42V | MCOC301ATK | 100168 110V |
| | | MC0A301AT5 | 102462 220V | MC1A400AF3 | 103051 110/115V | MCOC301ATL | 102565 120V |
| | | MC0A301AT6 | 102463 230V | MC1A400AF4 | 103052 120V | MCOC301ATN | 102566 220V |
| | | MC0A301AT7 | 102464 240V | MC1A400AF5 | 103053 220V | MCOC301ATR | 102567 240V |
| | | MC0A301AT8 | 102465 440V | MC1A400AF6 | 103054 230V | MCOC301AUF | 100170 12V |
| | | MC0A301AT9 | 102466 440V | MC1A400AF7 | 103055 240V | MCOC301AUG | 100176 24V |
| | | MC0A301OAT1 | 102499 48V | MC1A400AF8 | 103056 440V | MCOC301AUF | 100176 24V |
| | | MC0A301OAT2 | 102438 42V | MC1A400AI1 | 103112 24V | MCOC301AFG | 100258 48V |
| | | MC0A301OAT3 | 102439 110/115V | MC1A400AI2 | 102986 24V | MCOC301AIF | 100196 24V |
| | | MC0A301OAT4 | 102440 120V | MC1A400AT2 | 102987 42V | MCOC301AIG | 100259 48V |
| | | MC0A301OAT5 | 102441 220V | MC1A400AT3 | 102988 110/115V | MCOC301AIJ | 100198 110V |
| | | MC0A301OAT6 | 102442 230V | MC1A400AT4 | 102989 120V | MCOC301ARB | 103366 12V |
| | | MC0A301OAT7 | 102443 240V | MC1A400AT5 | 102990 220V | MCOC301ARD | 103367 24V |
| | | MC0A301OAT8 | 102444 440V | MC1A400AT6 | 102991 230V | MCOC301ARG | 103368 48V |
| | | MC0A301OAT9 | 102497 48V | MC1A400AT7 | 102992 240V | MCOC301ARH | 103369 60V |
| | | MC0A400AF1 | 113318 24V | MC1A400AT8 | 102993 440V | MCOC301ARJ | 103370 110V |
| | | MC0A400AF5 | 102620 220V | MC1A400AT9 | 100296 48V | MCOC301ARK | 103371 120V |
| | | MC0A400AI1 | 100408 24V | MC1AA00AF1 | 103091 24V | MCOC301ARN | 103372 220V |
| | | MC0A400AT1 | 102797 24V | MC1AA00AF2 | 103092 42V | MCOC301ATB | 100150 12V |
| | | MC0A400AT2 | 102798 42V | MC1AA00AF3 | 103093 110/115V | MCOC301ATC | 102551 32V |
| | | MC0A400AT3 | 102799 42V | MC1AA00AF4 | 103094 120V | MCOC301ATD | 100156 24V |
| | | MC0A400AT4 | 102799 110/115V | MC1AA00AF5 | 103095 220V | MCOC301ATE | 102552 36V |
| | | MC0A400AT5 | 102800 120V | MC1AA00AF6 | 103096 230V | MCOC301ATF | 102553 42V |
| | | | | MC1AA00AF7 | 103097 240V | MCOC301ATG | 100157 48V |
| | | | | MC1AA00AF8 | 103098 440V | MCOC301ATH | 102554 60V |
| | | | | MC1AA00AT1 | 103028 24V | MCOC301ATI | 102555 72V |
| | | | | MC1AA00AT2 | 103029 42V | MCOC301ATJ | 100158 110V |
| | | | | MC1AA00AT3 | 103030 110/115V | MCOC301ATK | 102556 120V |
| | | | | MC1AA00AT4 | 103031 120V | MCOC301ATL | 102557 125V |
| | | | | MC1AA00AT5 | 103032 220V | MCOC301ATN | 100159 220V |
| | | | | MC1AA00AT6 | 103033 230V | MCOC301ATR | 102558 60V |



| Cat. no. | Ref. no. | Cat. no. | Ref. no. | | |
|------------|----------|----------|------------|--------|------|
| MC0C400AFD | 100306 | 24V | MC1CB00ATI | 103230 | 72V |
| MC0C400AFG | 100267 | 48V | MC1CB00ATJ | 100378 | 110V |
| MC0C400AID | 100336 | 24V | MC1CB00ATK | 103231 | 120V |
| MC0C400AIH | 103202 | 60V | MC1CB00ATN | 100379 | 220V |
| MC0C400ATB | 100270 | 12V | MC1CB00ATR | 103233 | 240V |
| MC0C400ATD | 100276 | 24V | MC1I301ARD | 103441 | 24V |
| MC0C400ATE | 103164 | 36V | MC1I301ATD | 100573 | 24V |
| MC0C400ATF | 103165 | 42V | MC1I310ARD | 103440 | 24V |
| MC0C400ATG | 100277 | 48V | MC1I310ATD | 100572 | 24V |
| MC0C400ATH | 103166 | 60V | MC2C301AIB | 103287 | 12V |
| MC0C400ATI | 103167 | 72V | MC2C301AID | 103286 | 24V |
| MC0C400ATJ | 100278 | 110V | MC2C301AIG | 103285 | 48V |
| MC0C400ATK | 103168 | 120V | MC2C301AIH | 103284 | 60V |
| MC0C400ATL | 103169 | 125V | MC2C301AIJ | 103283 | 110V |
| MC0C400ATN | 100279 | 220V | MC2C301AIK | 103282 | 120V |
| MC0C400ATR | 103170 | 240V | MC2C301AIN | 103281 | 220V |
| MC0CB00ATB | 100280 | 12V | MC2C301ARB | 103431 | 12V |
| MC0CB00ATD | 100286 | 24V | MC2C301ARD | 103432 | 24V |
| MC0CB00ATE | 103173 | 36V | MC2C301ARG | 103433 | 48V |
| MC0CB00ATF | 103174 | 42V | MC2C301ARH | 103434 | 60V |
| MC0CB00ATG | 100287 | 48V | MC2C301ARJ | 103435 | 110V |
| MC0CB00ATH | 103175 | 60V | MC2C301ARK | 103436 | 120V |
| MC0CB00ATI | 103176 | 72V | MC2C301ARN | 103437 | 220V |
| MC0CB00ATJ | 100288 | 110V | MC2C301ATB | 103589 | 12V |
| MC0CB00ATK | 103177 | 120V | MC2C301ATD | 103580 | 24V |
| MC0CB00ATL | 103178 | 125V | MC2C301ATG | 103581 | 48V |
| MC0CB00ATN | 100289 | 220V | MC2C301ATJ | 103582 | 110V |
| MC0CB00ATR | 103179 | 240V | MC2C301ATN | 103583 | 220V |
| MC1C301AFD | 100246 | 24V | MC2C310AIB | 103280 | 12V |
| MC1C301AFJ | 100248 | 110V | MC2C310AID | 103279 | 24V |
| MC1C301AID | 100266 | 24V | MC2C310AIG | 103278 | 48V |
| MC1C301ARB | 103405 | 12V | MC2C310AIH | 103277 | 60V |
| MC1C301ARD | 103406 | 24V | MC2C310AIJ | 103276 | 110V |
| MC1C301ARG | 103407 | 48V | MC2C310AIK | 103275 | 120V |
| MC1C301ARH | 103408 | 60V | MC2C310AIN | 103274 | 220V |
| MC1C301ARJ | 103409 | 110V | MC2C310ARB | 103418 | 12V |
| MC1C301ARK | 103410 | 120V | MC2C310ARD | 103419 | 24V |
| MC1C301ARN | 103411 | 220V | MC2C310ARG | 103420 | 48V |
| MC1C301ATB | 100220 | 12V | MC2C310ARH | 103421 | 60V |
| MC1C301ATC | 102740 | 32V | MC2C310ARJ | 103422 | 110V |
| MC1C301ATD | 100226 | 24V | MC2C310ARK | 103423 | 120V |
| MC1C301ATE | 102741 | 36V | MC2C310ARN | 103424 | 220V |
| MC1C301ATF | 102742 | 42V | MC2C310ATB | 103588 | 12V |
| MC1C301ATG | 100227 | 48V | MC2C310ATD | 103584 | 24V |
| MC1C301ATH | 102743 | 60V | MC2C310ATG | 103585 | 48V |
| MC1C301ATI | 102744 | 72V | MC2C310ATJ | 103586 | 110V |
| MC1C301ATJ | 100228 | 110V | MC2C310ATN | 103587 | 220V |
| MC1C301ATK | 102745 | 120V | | | |
| MC1C301ATL | 102746 | 125V | | | |
| MC1C301ATN | 100229 | 220V | | | |
| MC1C301ATR | 102747 | 240V | | | |
| MC1C310AFB | 100230 | 12V | | | |
| MC1C310AFD | 100236 | 24V | | | |
| MC1C310AID | 100256 | 24V | | | |
| MC1C310AIG | 100257 | 48V | | | |
| MC1C310ARB | 103392 | 12V | | | |
| MC1C310ARD | 103393 | 24V | | | |
| MC1C310ARG | 103394 | 48V | | | |
| MC1C310ARH | 103395 | 60V | | | |
| MC1C310ARJ | 103396 | 110V | | | |
| MC1C310ARK | 103397 | 120V | | | |
| MC1C310ARN | 103398 | 220V | | | |
| MC1C310ATB | 100210 | 12V | | | |
| MC1C310ATD | 100216 | 24V | | | |
| MC1C310ATE | 102732 | 36V | | | |
| MC1C310ATF | 102733 | 42V | | | |
| MC1C310ATG | 100217 | 48V | | | |
| MC1C310ATH | 102734 | 60V | | | |
| MC1C310ATI | 102735 | 72V | | | |
| MC1C310ATJ | 100218 | 110V | | | |
| MC1C310ATK | 102736 | 120V | | | |
| MC1C310ATL | 102737 | 125V | | | |
| MC1C310ATN | 100219 | 220V | | | |
| MC1C310ATR | 102738 | 240V | | | |
| MC1C400AIB | 100420 | 12V | | | |
| MC1C400AID | 100426 | 24V | | | |
| MC1C400ATB | 100360 | 12V | | | |
| MC1C400ATD | 100366 | 24V | | | |
| MC1C400ATE | 103218 | 36V | | | |
| MC1C400ATF | 103219 | 42V | | | |
| MC1C400ATG | 100367 | 48V | | | |
| MC1C400ATH | 103220 | 60V | | | |
| MC1C400ATI | 103221 | 72V | | | |
| MC1C400ATJ | 100368 | 110V | | | |
| MC1C400ATK | 103222 | 120V | | | |
| MC1C400ATL | 103223 | 125V | | | |
| MC1C400ATN | 100369 | 220V | | | |
| MC1C400ATR | 103224 | 240V | | | |
| MC1CB00AFD | 100406 | 24V | | | |
| MC1CB00AFG | 100407 | 48V | | | |
| MC1CB00AHD | 103232 | 24V | | | |
| MC1CB00AID | 100436 | 24V | | | |
| MC1CB00ATB | 100370 | 12V | | | |
| MC1CB00ATC | 103226 | 32V | | | |
| MC1CB00ATD | 100376 | 24V | | | |
| MC1CB00ATE | 103227 | 36V | | | |
| MC1CB00ATF | 103228 | 42V | | | |
| MC1CB00ATG | 100377 | 48V | | | |
| MC1CB00ATH | 103229 | 60V | | | |

A

B

C

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E

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X



Series CL

Completed catalogue numbers

This list shows the catalogue and reference numbers for the **contactors** with the most usual voltages. For other voltages/types, please consult us.

| Cat. no. | Ref. no. |
|-----------------------|-----------------|
| 50Hz | |
| pg. C.11-12/13 | |
| CL00A300TN | 104044 220/230V |
| CL00A300TU | 104045 380/400V |
| CL00A301TN | 104064 220/230V |
| CL00A301TU | 104065 380/400V |
| CL00A310TN | 104054 220/230V |
| CL00A310TU | 104055 380/400V |
| CL01A300TN | 104074 220/230V |
| CL01A300TU | 104075 380/400V |
| CL01A301TN | 104094 220/230V |
| CL01A301TU | 104095 380/400V |
| CL01A310TN | 104084 220/230V |
| CL01A310TU | 104085 380/400V |
| CL01A400TN | 104314 220/230V |
| CL01A400TU | 104315 380/400V |
| CL01A800TN | 104384 220/230V |
| CL01A800TU | 104385 380/400V |
| CL02A300TN | 104104 220/230V |
| CL02A300TU | 104105 380/400V |
| CL02A301RN | 108894 220/230V |
| CL02A301TN | 104124 220/230V |
| CL02A301TU | 104125 380/400V |
| CL02A310TN | 104114 220/230V |
| CL02A310TU | 104115 380/400V |
| CL02A400TN | 104324 220/230V |
| CL02A400TU | 104325 380/400V |
| CL02A800TN | 104394 220/230V |
| CL02A800TU | 104395 380/400V |
| CL03A300MN | 104134 220/230V |
| CL03A300MU | 104135 380/400V |
| CL03A301MN | 104154 220/230V |
| CL03A301MU | 104155 380/400V |
| CL03A310MN | 104144 220/230V |
| CL03A310MU | 104145 380/400V |
| CL03A400MN | 104334 220/230V |
| CL03A400MU | 104335 380/400V |
| CL03A800MN | 104404 220/230V |
| CL03A800MU | 104405 380/400V |
| CL04A300MN | 104164 220/230V |
| CL04A300MU | 104165 380/400V |
| CL04A301MN | 104184 220/230V |
| CL04A301MU | 104185 380/400V |
| CL04A310MN | 104174 220/230V |
| CL04A310MU | 104175 380/400V |
| CL04A400MN | 104344 220/230V |
| CL04A400MU | 104345 380/400V |
| CL04A800MN | 104414 220/230V |
| CL04A800MU | 104415 380/400V |
| CL05A400MN | 104354 220/230V |
| CL05A400MU | 104355 380/400V |
| CL05A800MN | 104424 220/230V |
| CL05A800MU | 104425 380/400V |
| CL06A300MN | 104214 220/230V |
| CL06A300MU | 104215 380/400V |
| CL06A311MN | 104224 220/230V |
| CL06A311MU | 104225 380/400V |
| CL07A300MN | 104234 220/230V |
| CL07A300MU | 104235 380/400V |
| CL07A311MN | 104244 220/230V |
| CL07A311MU | 104245 380/400V |
| CL07A400MN | 104364 220/230V |
| CL07A400MU | 104365 380/400V |
| CL07A800MN | 104434 220/230V |
| CL07A800MU | 104435 380/400V |
| CL08A300MN | 104254 220/230V |
| CL08A300MU | 104255 380/400V |
| CL08A311MN | 104264 220/230V |
| CL08A311MU | 104265 380/400V |
| CL08A800MN | 104444 220/230V |
| CL08A800MU | 104445 380/400V |
| CL09A300MN | 104274 220/230V |
| CL09A300MU | 104275 380/400V |
| CL09A311MN | 104284 220/230V |
| CL09A311MU | 104285 380/400V |
| CL09A400MN | 104374 220/230V |
| CL09A400MU | 104375 380/400V |
| CL10A300MN | 104294 220/230V |
| CL10A300MU | 104295 380/400V |
| CL10A311MN | 104304 220/230V |
| CL10A311MU | 104305 380/400V |
| CL25A300TN | 110804 220/230V |
| CL25A300TU | 110805 380/400V |
| CL25A301TN | 112354 220/230V |
| CL25A301TU | 112355 380/400V |
| CL25A310TN | 112344 220/230V |
| CL25A310TU | 112345 380/400V |
| CL45A300MN | 110814 220/230V |
| CL45A300MU | 110815 380/400V |
| CL45A311MN | 112804 220/230V |
| CL45A311MU | 112805 380/400V |

| Cat. no. | Ref. no. | Cat. no. | Ref. no. |
|----------|-----------------|------------|-----------------|
| LB1AN | 104634 220/230V | CL02A800T7 | 110670 240V |
| LB1AU | 104635 380/400V | CL03A300M1 | 109365 24V |
| LB3AN | 104644 220/230V | CL03A300M3 | 109367 110/115V |
| LB3AU | 104645 380/400V | CL03A300M5 | 109369 220V |
| LB4AN | 104654 220/230V | CL03A300M7 | 109371 240V |
| LB4AU | 104655 380/400V | CL03A301M1 | 109413 24V |
| | | CL03A301M3 | 109415 110/115V |
| | | CL03A301M5 | 109417 220V |
| | | CL03A301M7 | 109419 240V |
| | | CL03A310M1 | 109389 24V |
| | | CL03A310M3 | 109391 110/115V |
| | | CL03A310M5 | 109393 220V |
| | | CL03A310M7 | 109395 240V |
| | | CL03A400M1 | 110616 24V |
| | | CL03A400M3 | 110618 110/115V |
| | | CL03A400M5 | 110620 220V |
| | | CL03A400M7 | 110622 240V |
| | | CL03A800M1 | 110672 24V |
| | | CL03A800M3 | 110674 110/115V |
| | | CL03A800M5 | 110676 220V |
| | | CL03A800M7 | 110678 240V |
| | | CL04A300M1 | 109437 24V |
| | | CL04A300M3 | 109439 110/115V |
| | | CL04A300M5 | 109441 220V |
| | | CL04A300M7 | 109443 240V |
| | | CL04A301M1 | 109485 24V |
| | | CL04A301M3 | 109487 110/115V |
| | | CL04A301M5 | 109489 220V |
| | | CL04A301M7 | 109491 240V |
| | | CL04A310M1 | 109461 24V |
| | | CL04A310M3 | 109463 110/115V |
| | | CL04A310M5 | 109465 220V |
| | | CL04A310M7 | 109467 240V |
| | | CL04A400M1 | 110624 24V |
| | | CL04A400M3 | 110626 110/115V |
| | | CL04A400M5 | 110628 220V |
| | | CL04A400M7 | 110630 240V |
| | | CL04A800M1 | 110680 24V |
| | | CL04A800M3 | 110682 110/115V |
| | | CL04A800M5 | 110684 220V |
| | | CL04A800M7 | 110686 240V |
| | | CL05A400M1 | 110632 24V |
| | | CL05A400M3 | 110634 110/115V |
| | | CL05A400M5 | 110636 220V |
| | | CL05A400M7 | 110638 240V |
| | | CL05A800M1 | 110688 24V |
| | | CL05A800M3 | 110690 110/115V |
| | | CL05A800M5 | 110692 220V |
| | | CL05A800M7 | 110694 240V |
| | | CL06A300M1 | 109556 24V |
| | | CL06A300M3 | 109558 110/115V |
| | | CL06A300M5 | 109560 220V |
| | | CL06A300M7 | 109562 240V |
| | | CL06A311M1 | 109580 24V |
| | | CL06A311M3 | 109582 110/115V |
| | | CL06A311M5 | 109584 220V |
| | | CL06A311M7 | 109586 240V |
| | | CL07A300M1 | 109604 24V |
| | | CL07A300M3 | 110243 110/115V |
| | | CL07A300M5 | 109608 220V |
| | | CL07A300M7 | 109610 240V |
| | | CL07A311M1 | 109628 24V |
| | | CL07A311M3 | 109630 110/115V |
| | | CL07A311M5 | 109632 220V |
| | | CL07A311M7 | 109634 240V |
| | | CL07A400M1 | 110762 24V |
| | | CL07A400M3 | 110642 110/115V |
| | | CL07A400M5 | 110644 220V |
| | | CL07A400M7 | 110646 240V |
| | | CL07A800M1 | 110696 24V |
| | | CL07A800M3 | 110698 110/115V |
| | | CL07A800M5 | 110700 220V |
| | | CL07A800M7 | 110702 240V |
| | | CL08A300M1 | 109652 24V |
| | | CL08A300M3 | 109654 110/115V |
| | | CL08A300M5 | 109656 220V |
| | | CL08A300M7 | 109658 240V |
| | | CL08A311M1 | 109676 24V |
| | | CL08A311M3 | 109678 110/115V |
| | | CL08A311M5 | 109680 220V |
| | | CL08A311M7 | 109682 240V |
| | | CL08A800M1 | 110704 24V |
| | | CL08A800M3 | 110706 110/115V |
| | | CL08A800M5 | 110708 220V |
| | | CL08A800M7 | 110710 240V |
| | | CL09A300M1 | 109700 24V |
| | | CL09A300M3 | 109702 110/115V |
| | | CL09A300M5 | 109704 220V |
| | | CL09A300M7 | 109706 240V |
| | | CL09A311M1 | 109724 24V |
| | | CL09A311M3 | 109726 110/115V |
| | | CL09A311M5 | 109728 220V |
| | | CL09A311M7 | 109730 240V |
| | | CL09A400M1 | 110648 24V |
| | | CL09A400M3 | 110650 110/115V |
| | | CL09A400M5 | 110652 220V |
| | | CL09A400M7 | 110654 240V |
| | | CL10A300M1 | 109748 24V |
| | | CL10A300M3 | 109750 110/115V |
| | | CL10A300M5 | 109752 220V |
| | | CL10A300M7 | 109754 240V |
| | | CL10A311M1 | 109772 24V |
| | | CL10A311M3 | 109774 110/115V |
| | | CL10A311M5 | 109776 220V |
| | | CL10A311M7 | 109778 240V |

| Cat. no. | Ref. no. | Cat. no. | Ref. no. |
|------------|-----------------|-------------|------------------|
| CL25A300T1 | 110728 24V | CL04D400MN | 112209 220V |
| CL25A300T3 | 110730 110/115V | CL04D800MB | 112270 12V |
| CL25A300T5 | 110732 220V | CL04D800MD | 112276 24V |
| CL25A300T7 | 110734 240V | CL04D800MJ | 112278 110V |
| CL45A300M1 | 110752 24V | CL04D800MN | 112279 220V |
| CL45A300M3 | 110754 110/115V | CL25D300TB | 112060 12V |
| CL45A300M5 | 110756 220V | CL25D300TD | 112066 24V |
| CL45A300M7 | 110758 240V | CL25D300TJ | 112068 110V |
| CL45A311M1 | 112821 24V | CL25D300TN | 112069 220V |
| CL45A311M3 | 112823 110/115V | CL45D300MB | 112110 12V |
| CL45A311M5 | 112825 220V | CL45D300MD | 112116 24V |
| CL45A311M7 | 112827 240V | CL45D300MJ | 112118 110V |
| LB1A1 | 110416 24V | CL45D300MN | 112119 220V |
| LB1A3 | 110418 110/115V | CL45D300MWD | 113515 24V (WR) |
| LB1A5 | 110420 220V | CL45D300MVG | 113452 48V (WR) |
| LB1A7 | 110422 240V | CL45D300MWN | 113491 220V (WR) |
| LB3A1 | 110449 24V | LB1DB | 112310 12V |
| LB3A3 | 110451 110/115V | LB1DD | 112316 24V |
| LB3A5 | 110453 220V | LB1DJ | 112318 110V |
| LB3A7 | 110455 240V | LB1DN | 112319 220V |
| LB4A1 | 110482 24V | LB1DWD | 113524 24V (WR) |
| LB4A3 | 110484 110/115V | LB1DVG | 113526 48V (WR) |
| LB4A5 | 110486 220V | LB1DWN | 113529 220V (WR) |
| LB4A7 | 110488 240V | LB3DB | 112320 12V |
| | | LB3DD | 112326 24V |
| | | LB3DJ | 112328 110V |
| | | LB3DN | 112329 220V |
| | | LB3DWD | 113531 24V (WR) |
| | | LB3DVG | 113533 48V (WR) |
| | | LB3DWN | 113536 220V (WR) |

| Cat. no. | Ref. no. | Cat. no. | Ref. no. |
|-----------------------|------------------|-------------|------------------|
| Direct current | | | |
| pg. C.11-C.13 | | | |
| CL00D301TD | 112016 24V | CL00D301TJ | 112008 110V |
| CL00D301TJ | 112018 110V | CL00D310TD | 112006 24V |
| CL00D301TN | 112019 220V | CL00D310TJ | 112008 110V |
| CL00D310TB | 112000 12V | CL00D310TN | 112009 220V |
| CL00D310TD | 112006 24V | CL00D310TWD | 113510 24V (WR) |
| CL00D310TJ | 112008 110V | CL00D310TWG | 113447 48V (WR) |
| CL00D310TN | 112009 220V | CL00D310TWN | 113486 220V (WR) |
| CL00D310TWD | 113447 48V (WR) | CL01D301TD | 112036 24V |
| CL00D310TWG | 113486 220V (WR) | CL01D301TJ | 112038 110V |
| CL00D310TWN | 113486 220V (WR) | CL01D301TN | 112039 220V |
| CL01D | | | |

This list shows the catalogue and reference numbers for the **contactors** with the most usual voltages. For other voltages/types, please consult us.

| Cat. no. | Ref. no. | Cat. no. | Ref. no. | Cat. no. | Ref. no. |
|------------|----------|----------|-------------|----------|-----------|
| C04255Y | 110513 | 600V | CK10CE311D | 133783 | 24/28V |
| C04787C | 110515 | 24V | CK10CE311F | 113692 | 42/48V |
| C04787F | 119517 | 48V | CK10CE311J | 133784 | 110/127V |
| C04787H | 110518 | 110V | CK10CE311N | 133286 | 220/250V |
| C04787I | 110519 | 120V | CK10CE311U | 133785 | 380/415V |
| C04787M | 110522 | 220V | CK10CE311Y | 113694 | 440/500V |
| C04787S | 110523 | 240V | CK10CE411D | 133786 | 24/28V |
| C04787T | 110525 | 380V | CK10CE411J | 133787 | 110/127V |
| C04787V | 110526 | 440V | CK10CE411N | 133287 | 220/250V |
| C04787Y | 110529 | 600V | CK10CE411U | 133788 | 380/415V |
| C12168C | 105302 | 24V | CK11CE311D | 133789 | 24/28V |
| C12168F | 105304 | 48V | CK11CE311F | 113691 | 42/48V |
| C12168H | 133886 | 110V | CK11CE311J | 133790 | 110/127V |
| C12168I | 104891 | 120V | CK11CE311N | 133288 | 220/250V |
| C12168M | 105308 | 220V | CK11CE311U | 133791 | 380/415V |
| C12168S | 105309 | 240V | CK11CE311Y | 113688 | 440/500V |
| C12168T | 101060 | 380V | CK11CE411D | 133792 | 24/28V |
| C12168V | 105312 | 440V | CK11CE411F | 113680 | 42/48V |
| C12168Y | 133838 | 600V | CK11CE411J | 133793 | 110/127V |
| CK07BA411C | 110322 | 24V | CK11CE411N | 133289 | 220/250V |
| CK07BA411F | 110760 | 48V | CK11CE411U | 133794 | 380/415V |
| CK07BA411H | 110325 | 110V | CK12BE311D | 104516 | 24/28V |
| CK07BA411I | 133798 | 120V | CK12BE311F | 110304 | 42/48V |
| CK07BA411M | 110330 | 220V | CK12BE311J | 104518 | 110/127V |
| CK07BA411S | 110331 | 240V | CK12BE311N | 104519 | 220/250V |
| CK07BA411T | 110333 | 380V | CK12BE311U | 110305 | 380/415V |
| CK07BA411V | 110334 | 440V | CK12BE311Y | 110823 | 440/500V |
| CK07BA411Y | 110337 | 600V | CK12BE411D | 104596 | 24/28V |
| CK08BA411M | 110348 | 220V | CK12BE411F | 110383 | 42/48V |
| CK08CA311F | 113272 | 48V | CK12BE411J | 104598 | 110/127V |
| CK08CA311H | 113130 | 110V | CK12BE411N | 104599 | 220/250V |
| CK08CA311M | 111581 | 220V | CK12BE411U | 110384 | 380/415V |
| CK08CA311S | 113890 | 240V | CK75CE311D | 113106 | 24/28V |
| CK08CA311V | 113891 | 440V | CK75CE311F | 108972 | 42/48V |
| CK08CA311Y | 101047 | 600V | CK75CE311J | 113108 | 110/127V |
| CK75CA311C | 113100 | 24V | CK75CE311N | 113109 | 220/250V |
| CK75CA311F | 113102 | 48V | CK75CE311U | 113125 | 380/415V |
| CK75CA311H | 113111 | 110V | CK75CE311WD | 113521 | 24V (WR) |
| CK75CA311I | 113112 | 120V | CK75CE311WE | 113445 | 33V (WR) |
| CK75CA311M | 133219 | 220V | CK75CE311WF | 113458 | 48V (WR) |
| CK75CA311S | 113894 | 240V | CK75CE311WH | 113471 | 72V (WR) |
| CK75CA311V | 113895 | 440V | CK75CE311WJ | 113484 | 110V (WR) |
| CK75CA311Y | 113122 | 600V | CK75CE311WN | 113497 | 220V (WR) |
| CK85BA311H | 110267 | 110V | CK75CE311Y | 113126 | 440/500V |
| CK85BA311I | 110268 | 120V | CK85BE311D | 104476 | 24/28V |
| CK85BA311M | 110271 | 220V | CK85BE311F | 110280 | 42/48V |
| CK85BA311S | 110272 | 240V | CK85BE311J | 104478 | 110/127V |
| CK85BA311V | 110275 | 440V | CK85BE311N | 104479 | 220/250V |
| CK85BA311Y | 101048 | 600V | CK85BE311U | 110281 | 380/415V |
| | | | CK95BE311D | 104616 | 24/28V |
| | | | CK95BE311F | 104610 | 42/48V |
| | | | CK95BE311J | 104618 | 110/127V |
| | | | CK95BE311N | 104614 | 220/250V |
| | | | CK95BE311U | 104611 | 380/415V |
| | | | CK95BE311WH | 104617 | 72V (WR) |
| | | | CK95BE311Y | 113375 | 440/500V |
| | | | CK95BE411D | 104560 | 24/28V |
| | | | CK95BE411F | 110377 | 42/48V |
| | | | CK95BE411J | 104572 | 110/127V |
| | | | CK95BE411N | 104569 | 220/250V |
| | | | CK95BE411U | 110378 | 380/415V |
| | | | KB4ED | 104956 | 24/28V |
| | | | KB4EF | 133913 | 42/48V |
| | | | KB4EJ | 104957 | 110/127V |
| | | | KB4EN | 104958 | 220/250V |
| | | | KB4EU | 104959 | 380/415V |
| | | | KB4EWD | 113543 | 24V (WR) |
| | | | KB4EWE | 113544 | 33V (WR) |
| | | | KB4EWF | 113545 | 48V (WR) |
| | | | KB4EWH | 113546 | 72V (WR) |
| | | | KB4EY | 113547 | 110V (WR) |
| | | | KB4EWN | 113548 | 220V (WR) |
| | | | KB4EY | 105317 | 440/500V |
| | | | KB5ED | 104850 | 24/28V |
| | | | KB5EF | 104856 | 42/48V |
| | | | KB5EJ | 104857 | 110/127V |
| | | | KB5EN | 104858 | 220/250V |
| | | | KB5EU | 104859 | 380/415V |
| | | | KB5EWH | 104855 | 72V (WR) |
| | | | KB5EY | 110831 | 440/500V |
| | | | KB6ED | 104860 | 24/28V |
| | | | KB6EF | 104866 | 42/48V |
| | | | KB6EJ | 104867 | 110/127V |
| | | | KB6EN | 104868 | 220/250V |
| | | | KB6EU | 104869 | 380/415V |
| | | | KB6EY | 110832 | 440/500V |
| | | | KB7ED | 113675 | 24/28V |
| | | | KB7EF | 133911 | 42/48V |
| | | | KB7EJ | 113673 | 110/127V |
| | | | KB7EN | 113672 | 220/250V |
| | | | KB7EU | 113671 | 380/415V |
| | | | KB7EY | 113670 | 440/500V |
| | | | KM4ED | 104960 | 24/28V |
| | | | KM4EF | 104966 | 42/48V |
| | | | KM4EJ | 104967 | 110/127V |
| | | | KM4EN | 104968 | 220/250V |
| | | | KM4EU | 104969 | 380/415V |
| | | | KM4EWD | 113549 | 24V (WR) |
| | | | KM4EWE | 113550 | 33V (WR) |

A

B

C

D

E

F

G

H

I

X



This list shows the catalogue and reference numbers for the **control and signalling units Ø 22 mm** with the most usual colours. For other types, please consult us.

| Cat. no. | Ref. no. | |
|-----------|----------|--------|
| P9XEM3LN | 185036 | bleu |
| P9XEM3NN | 185030 | black |
| P9XEM4VN | 185042 | green |
| P9XEM4RN | 185041 | red |
| P9XEM4GN | 185043 | yellow |
| P9XEM4LN | 185046 | bleu |
| P9XEM4NN | 185040 | black |
| P9XET4VN1 | 185062 | green |
| P9XET4RN1 | 185061 | red |
| P9XET4GN1 | 185063 | yellow |
| P9XET4LN1 | 185066 | bleu |
| P9XET4NN1 | 185057 | black |

| Cat. no. | Ref. no. | |
|---------------------------------------|----------|------------|
| Push-buttons standard pg. E.11 | | |
| P9XPNVG | 185002 | green |
| P9XPNRG | 185001 | red |
| P9XPNGG | 185003 | yellow |
| P9XPNLG | 185006 | bleu |
| P9XPNBG | 185007 | white |
| P9XPNNG | 185000 | black |
| P9XPNHG | 185008 | grey |
| P9XPNMG | 185004 | brown |
| P9XPNOG | 185009 | w/o button |
| P9XPNVS | 185012 | green |
| P9XPNRS | 185011 | red |
| P9XPNGS | 185013 | yellow |
| P9XPNLS | 185016 | bleu |
| P9XPNBS | 185017 | white |
| P9XPNNS | 185010 | black |
| P9XPNHS | 185018 | grey |
| P9XPNMS | 185014 | brown |
| P9XPNOS | 185019 | w/o button |
| P9MPNVE | 184022 | green |
| P9MPNRE | 184021 | red |
| P9MPNGE | 184023 | yellow |
| P9MPNLE | 184026 | bleu |
| P9MPNBE | 184027 | white |
| P9MPNNE | 184020 | black |
| P9MPNHE | 184028 | grey |
| P9MPNME | 184024 | brown |
| P9MPNOE | 184029 | w/o button |

| Cat. no. | Ref. no. | |
|--|----------|--------|
| illuminated push-buttons pg. E.16 | | |
| P9XPLVGD | 185492 | green |
| P9XPLRGD | 185491 | red |
| P9XPLGGD | 185493 | yellow |
| P9XPLLGD | 185496 | bleu |
| P9XPLBGD | 185497 | white |
| P9XPLAGD | 185495 | amber |
| P9XPLIGD | 185498 | clear |
| P9XPLVSD | 185502 | green |
| P9XPLRSD | 185501 | red |
| P9XPLGSD | 185503 | yellow |
| P9XPLLSD | 185506 | bleu |
| P9XPLBSD | 185507 | white |
| P9XPLASD | 185505 | amber |
| P9XPLISD | 185508 | clear |
| P9MPLVED | 184512 | green |
| P9MPLRED | 184511 | red |
| P9MPLGED | 184513 | yellow |
| P9MPLLED | 184516 | bleu |
| P9MPLBED | 184517 | white |
| P9MPLAED | 184515 | amber |
| P9MPLIED | 184518 | clear |

| Cat. no. | Ref. no. | |
|------------------------------|----------|--------|
| Pilot lights pg. E.18 | | |
| P9XLVD | 185792 | green |
| P9XLRD | 185791 | red |
| P9XLGD | 185793 | yellow |
| P9XLDD | 185796 | bleu |
| P9XLBD | 185797 | white |
| P9XLAD | 185795 | amber |
| P9XLID | 185798 | clear |

| Cat. no. | Ref. no. | |
|--------------------------------------|----------|--------|
| Pilot lights unibloc pg. E.18 | | |
| P9XUVDDO | 185822 | green |
| P9XURDDO | 185821 | red |
| P9XUGDDO | 185823 | yellow |
| P9XULDDO | 185826 | bleu |
| P9XUBDDO | 185827 | white |
| P9XUADDO | 185825 | amber |
| P9XUIDDO | 185828 | clear |
| P9XUVDNR | 185842 | green |
| P9XURDRN | 185841 | red |
| P9XUGDRN | 185843 | yellow |
| P9XULDRN | 185846 | bleu |
| P9XUBDRN | 185847 | white |
| P9XUADRN | 185845 | amber |
| P9XUIDRN | 185848 | clear |

| Cat. no. | Ref. no. | |
|--|----------|--------|
| Emergency push-buttons pg. E.11 | | |
| P9XEM3VN | 185032 | green |
| P9XEM3RN | 185031 | red |
| P9XEM3GN | 185033 | yellow |

| Cat. no. | Ref. no. | |
|--|----------|--------|
| Emergency illuminated push-buttons pg. E.16 | | |
| P9XEM4VL | 185552 | green |
| P9XEM4RL | 185551 | red |
| P9XEM4GL | 185553 | yellow |
| P9XEM4LL | 185556 | bleu |
| P9XEM4BL | 185557 | white |
| P9XEM4AL | 185555 | amber |
| P9XEM4IL | 185558 | clear |
| P9XET4VL1 | 185562 | green |
| P9XET4RL1 | 185561 | red |
| P9XET4GL1 | 185563 | yellow |
| P9XET4LL1 | 185566 | bleu |
| P9XET4BL1 | 185567 | white |
| P9XET4AL1 | 185565 | amber |
| P9XET4IL1 | 185568 | clear |

| Cat. no. | Ref. no. | |
|--|----------|--------|
| Selector switches not illuminated pg. E.12/13 | | |
| P9XSMD5V | 185142 | green |
| P9XSMD5R | 185141 | red |
| P9XSMD5G | 185143 | yellow |
| P9XSMD5L | 185146 | bleu |
| P9XSMD5N | 185140 | black |

| Cat. no. | Ref. no. | |
|---|----------|--------|
| illuminated selector switches pg. E.16 | | |
| P9XSLDOV | 185592 | green |
| P9XSLDOR | 185591 | red |
| P9XSLDOG | 185593 | yellow |
| P9XSLDOL | 185596 | bleu |
| P9XSLDOB | 185597 | white |
| P9XSLDOA | 185595 | amber |
| P9XSLDOI | 185598 | clear |
| P9XSLZOV | 185602 | green |
| P9XSLZOR | 185601 | red |
| P9XSLZOG | 185603 | yellow |
| P9XSLZOL | 185606 | bleu |
| P9XSLZOB | 185607 | white |
| P9XSLZOA | 185605 | amber |
| P9XSLZOI | 185608 | clear |

| Cat. no. | Ref. no. | |
|--|----------|---------|
| Selector switches with key, 3 positions pg. E.14/15 | | |
| P9XSC0T95 | 185418 | Func. E |
| P9XSCLO795 | 185425 | Func. L |
| P9XSCU0795 | 185432 | Func. U |
| P9XSC3C95 | 185464 | Func. E |
| P9XSC13C95 | 185465 | Func. L |
| P9XSCU3C95 | 185466 | Func. U |
| P9XSC1N95 | 185442 | Func. E |
| P9XSC1N95 | 185445 | Func. L |
| P9XSCU1N95 | 185448 | Func. U |
| P9XSC5H95 | 185454 | Func. E |
| P9XSC5H95 | 185457 | Func. L |
| P9XSC5H95 | 185460 | Func. U |

| Cat. no. | Ref. no. | |
|---|----------|-------|
| Not illuminated selector switches, 5 positions pg. E.12/13 | | |
| P9TSMYON | 191350 | black |
| P9TSMWON | 191360 | black |
| P9XSVMON | 183897 | green |
| P9XSVMOR | 183896 | red |

| Cat. no. | Ref. no. | |
|--|----------|--------|
| Power supplies, integrated LED pg. E.23 | | |
| P9PLNBDA | 197036 | amber |
| P9PLNBDL | 197037 | white |
| P9PLNBDG | 197038 | yellow |
| P9PLNBDR | 197039 | bleu |
| P9PLNBDR | 197040 | red |
| P9PLNBDR | 197041 | green |

This list shows the catalogue and reference numbers for the **control and signalling units Ø 30 mm** with the most usual colours. For other types, please consult us.

| Cat. no. | Ref. no. | |
|------------------------------------|----------|--------|
| Mushroom head caps pg. E.45 | | |
| 077EN | 180070 | black |
| 077ER | 180071 | red |
| 077EG | 180073 | yellow |

| Cat. no. | Ref. no. | |
|---|----------|-------|
| Selector switches with knob - 2 positions pg. E.46 | | |
| 077SHN11 | 180180 | black |
| 077SHR11 | 180181 | red |
| 077SHV11 | 180182 | green |

| Cat. no. | Ref. no. | |
|---|----------|--------|
| illuminated push-buttons - Lenses pg. E.49 | | |
| 077GPLR | 180961 | red |
| 077GPLV | 180962 | green |
| 077GPLG | 180963 | yellow |
| 077GPLA | 180965 | orange |
| 077GPLBL | 180966 | blue |
| 077GPLB | 180967 | white |
| 077GPLI | 180968 | clear |

| Cat. no. | Ref. no. | |
|--|----------|--------|
| illuminated selector switches Lenses pg. E.50 | | |
| 077MISR | 181151 | red |
| 077MISV | 181152 | green |
| 077MISG | 181153 | yellow |

| Cat. no. | Ref. no. | |
|---|----------|----------|
| illuminated selector switches - 3 positions pg. E.50 | | |
| 077ISB11TJRC | 181225 | 110-120V |

| Cat. no. | Ref. no. | |
|--|----------|--------|
| Pilot lights - Lenses pg. E.50/51 | | |
| 077GLR | 181401 | red |
| 077GLV | 181402 | green |
| 077GLG | 181403 | yellow |
| 077GLA | 181405 | orange |
| 077GLBL | 181406 | blue |
| 077GLB | 181407 | white |
| 077GLI | 181408 | clear |
| 099GW1R | 181271 | red |
| 099GW1V | 181272 | green |
| 099GW1A | 181275 | orange |
| 099GW1BL | 181276 | blue |
| 099GW1B | 181277 | white |
| 099GW1I | 181278 | clear |

| Cat. no. | Ref. no. | |
|-----------------------------|----------|--------|
| Accessories pg. E.52 | | |
| 077MN | 181590 | black |
| 077MR | 181591 | red |
| 077MV | 181592 | green |
| 077MG | 181593 | yellow |
| 077MBL | 181596 | blue |
| 077CPN | 181580 | black |
| 077CPR | 181581 | red |
| 077CPV | 181582 | green |
| 077CPG | 181583 | yellow |
| BA9S6LR | 187871 | red |
| BA9S6LV | 187872 | green |
| BA9S6LG | 187873 | yellow |
| BA9S6LB | 187875 | white |
| BA9S12LR | 187881 | black |
| BA9S12LV | 187882 | green |
| BA9S12LG | 187883 | yellow |
| BA9S24LR | 187891 | black |
| BA9S24LV | 187892 | green |
| BA9S24LG | 187893 | yellow |
| BA9S24LB | 187895 | white |
| BA9S48LR | 187901 | black |
| BA9S48LV | 187902 | green |
| BA9S48LG | 187903 | yellow |
| BA9S110LR | 187911 | black |
| BA9S110LV | 187912 | green |
| BA9S110LG | 187913 | yellow |
| BA9S110LB | 187915 | white |
| BA9S230LR | 187921 | red |
| BA9S230LG | 187922 | yellow |
| BA9S230LB | 187926 | white |



| Cat. no | Ref. no. | Page | Cat. no | Ref. no. | Page | Cat. no | Ref. no. | Page | Cat. no | Ref. no. | Page |
|---------------|----------|------|--------------|----------|------|------------|----------|------|------------------|----------|------|
| 077... | | | 077SBN11SC | 180240 | E.46 | 080SP12SFC | 170856 | E.28 | 105GP1P220M | 132251 | E.70 |
| 077-01 | 180003 | E.53 | 077SCB1120 | 180843 | E.47 | 080SP12SFC | 170856 | E.54 | 105GP1P500 | 132252 | E.70 |
| 077-01R | 180008 | E.53 | 077SCB11DC07 | 180852 | E.47 | 080SP12SFC | 170856 | E.54 | 105GP1P500M | 132253 | E.70 |
| 077-10 | 180002 | E.53 | 077SCB11RC03 | 180853 | E.47 | 080SP12SFE | 170857 | E.28 | 105PT | 132234 | G.9 |
| 077-10A | 180007 | E.53 | 077SCD1101 | 180630 | E.47 | 080SP18 | 170809 | E.28 | 114... | | |
| 077-11 | 180001 | E.53 | 077SCD1105 | 180631 | E.47 | 080SP18SF | 170861 | E.28 | 114FACT03 | 130320 | E.70 |
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| 3906Y197D | 244066 | C.90 | ACRP14A1H4 | 168513 | H.34 | BA15D115LA | 222337 | E.63 | BSLR2K | 104714 | A.24 |
| 3906Y20D | 244065 | C.90 | ACRP160A0H14 | 168522 | H.34 | BA15D115LB | 222341 | E.63 | BSLR2K | 104714 | C.16 |
| 3906Y220D | 213612 | C.90 | ACRP160A0H14 | 168522 | H.17 | BA15D115LG | 222338 | E.63 | BSLR2R | 104715 | A.24 |
| 3906Y230D | 211770 | C.90 | ACRP160A0H14 | 168522 | H.34 | BA15D115LL | 222340 | E.63 | BSLR2R | 104715 | C.16 |
| 3906Y24D | 244064 | C.90 | ACRP180A0H056 | 168507 | H.34 | BA15D115LR | 222336 | E.63 | BSLR3G | 104716 | C.16 |
| 3906Y40D | 244063 | C.90 | ACRP180A0H056 | 168507 | H.34 | BA15D115LV | 222339 | E.63 | BSLR3G | 104716 | C.21 |
| 3906Y48D | 212707 | C.90 | ACRP185A0H11 | 168523 | H.34 | BA15D125 | 222348 | E.63 | BSLR3K | 104717 | C.16 |
| 3906Y97D | 202533 | C.90 | ACRP185A0H11 | 168523 | H.34 | BA15D2305 | 222352 | E.63 | BSLR3K | 104717 | C.21 |
| 3907Y110D | 202547 | C.90 | ACRP18A0H56 | 168499 | H.34 | BA15D230LA | 222343 | E.63 | BSLR3R | 104718 | C.16 |
| 3907Y125D | 211713 | C.90 | ACRP18A0H56 | 168499 | H.17 | BA15D230LB | 222347 | E.63 | BSLR3R | 104718 | C.21 |
| 3907Y197D | 244059 | C.90 | ACRP18A0H56 | 168499 | H.34 | BA15D230LG | 222344 | E.63 | BSLV3G | 104720 | A.24 |
| 3907Y20D | 244058 | C.90 | ACRP18A1H1 | 168514 | H.34 | BA15D230LL | 222346 | E.63 | BSLV3G | 104720 | C.16 |
| 3907Y220D | 202548 | C.90 | ACRP18A1H1 | 168514 | H.17 | BA15D230LR | 222342 | E.63 | BSLV3K | 104721 | A.24 |
| 3907Y230D | 211712 | C.90 | ACRP18A1H1 | 168514 | H.34 | BA15D230LV | 222345 | E.63 | BSLV3K | 104721 | C.16 |
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| 3908/9M4/2 | 214141 | C.92 | ACRP225A0H096 | 168524 | H.34 | BA15D24LR | 222330 | E.63 | BTLF30C | 104709 | A.23 |
| 3908/9M5/2 | 214142 | C.92 | ACRP22A0H84 | 168494 | H.4 | BA15D24LV | 222333 | E.63 | BTLF30C | 104709 | C.15 |
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| 3908PMZ | 202563 | C.92 | ACRP27A0H75 | 168515 | H.17 | BA9S130 | 187857 | E.52 | BTLF60D | 104712 | C.15 |
| 3908PZ | 202564 | C.92 | ACRP27A0H75 | 168515 | H.34 | BA9S130 | 187857 | G.19 | BTLFX | 113001 | A.23 |
| 3908Y110D | 202565 | C.90 | ACRP300A0H067 | 168525 | H.34 | BA9S242 | 187853 | E.34 | BTLFX | 113001 | C.15 |
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| 3908Y220D | 202566 | C.90 | ACRP35A0H27 | 168501 | H.34 | BA9S242 | 187853 | G.19 | BTRF30C | 108903 | C.15 |
| 3908Y97D | 212959 | C.90 | ACRP35A0H27 | 168501 | H.17 | BA9S30 | 187854 | E.34 | BTRF30D | 108905 | A.23 |
| 3909F4/2 | 204179 | C.92 | ACRP35A0H27 | 168501 | H.34 | BA9S30 | 187854 | E.52 | BTRF30D | 108905 | C.15 |
| 3909F5/2 | 204180 | C.92 | ACRP35A0H58 | 168516 | H.34 | BA9S30 | 187854 | G.19 | BTRF60C | 108904 | A.23 |
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| IMGL-B411 | 130029 | G.3 | MACL101AF | 100563 | C.7 | MCRK022ATD | 100535 | A.17 | NLT2ANV | 222251 | E.62 |
| IMGM-B311 | 130041 | G.3 | MACL101AI | 100565 | C.7 | MCRK031ATD | 100534 | A.17 | NLT2BDA | 222237 | E.62 |
| IMGP-B311 | 130035 | G.3 | MACL101AR | 103556 | C.7 | MCRK040ATD | 100533 | A.17 | NLT2BDG | 222238 | E.62 |
| IMGQ-B311 | 130039 | G.3 | MACL101AT | 100561 | C.7 | MG0004PATO | 209780 | D.19 | NLT2BDI | 222241 | E.62 |
| IMGR-B411 | 130021 | G.3 | MACL110AF | 100562 | C.7 | MG0004QATO | 137566 | D.19 | NLT2BDL | 222240 | E.62 |
| IMGT-B311 | 130031 | G.3 | MACL110AI | 100564 | C.7 | MG0004RATO | 137567 | D.19 | NLT2BDLA | 222290 | E.62 |
| IPA1-D422B | 132214 | E.67 | MACL110AR | 103555 | C.7 | MG0006PATO | 209781 | D.19 | NLT2BDLG | 222291 | E.62 |
| IPA1-N211B | 132170 | E.67 | MACL110AT | 100560 | C.7 | MG0006QATO | 116074 | D.19 | NLT2BDLI | 222294 | E.62 |
| IPA1-N411B | 132198 | E.67 | MACN202AR | 103558 | C.6 | MG0006RATO | 116402 | D.19 | NLT2BDLL | 222293 | E.62 |
| IPA1-N422B | 132213 | E.67 | MACN202AT | 100998 | C.6 | MMHO | 100547 | A.20 | NLT2BDLR | 222289 | E.62 |
| IPA1-P211B | 132171 | E.67 | MACN211AR | 103557 | C.6 | MMHO | 100547 | C.8 | NLT2BDLV | 222292 | E.62 |
| IPA2-N211B | 132182 | E.67 | MACN211AT | 100999 | C.6 | MPOAAE1 | 100544 | A.20 | NLT2BDR | 222236 | E.62 |
| IPB1-D422B | 132216 | E.67 | MACN413AR | 103561 | C.6 | MPOAAE1 | 100544 | C.8 | NLT2BDV | 222239 | E.62 |
| IPB1-N211B | 132172 | E.67 | MACN413AT | 100995 | C.6 | MPOAAE2 | 100545 | A.20 | NLT3AJA | 222261 | E.62 |
| IPB1-N222B | 132186 | E.67 | MACN422AR | 103560 | C.6 | MPOAAE2 | 100545 | C.8 | NLT3AJG | 222262 | E.62 |
| IPB1-N411B | 132201 | E.67 | MACN422AT | 100996 | C.6 | MPOCAE3 | 100546 | A.20 | NLT3AJI | 222265 | E.62 |
| IPB1-N422B | 132215 | E.67 | MACN431AR | 103559 | C.6 | MPOCAE3 | 100546 | C.8 | NLT3AJL | 222264 | E.62 |
| IPB1-P211B | 132173 | E.67 | MACN431AT | 100997 | C.6 | MPODAE4 | 100536 | A.20 | NLT3AJR | 222260 | E.62 |
| IPB1-R411B | 132203 | E.67 | MAGL110AT | 100608 | D.19 | MPODAE4 | 100536 | C.8 | NLT3AJV | 222263 | E.62 |
| IPSF1 | 223000 | E.68 | MARL101AF | 100516 | A.19 | MRBEC10AC2 | 100541 | A.20 | NLT3ANA | 222267 | E.62 |
| ISGA-B411 | 130018 | G.3 | MARL101AFS | 100522 | A.19 | MRBEC10AC2 | 100541 | C.8 | NLT3ANG | 222268 | E.62 |
| ISGH-B411 | 130022 | G.3 | MARL101AFS | 100522 | C.7 | MRBEC20AC2 | 100542 | A.20 | NLT3ANI | 222271 | E.62 |
| ISGL-B411 | 130028 | G.3 | MARL101AI | 100518 | A.19 | MRBEC20AC2 | 100542 | C.8 | NLT3ANL | 222270 | E.62 |
| ISGM-B311 | 130040 | G.3 | MARL101AIS | 100524 | A.19 | MT03A | 101000 | C.61 | NLT3ANR | 222266 | E.62 |
| ISGR-B411 | 130020 | G.3 | MARL101AIS | 100524 | C.7 | MT03B | 101001 | C.61 | NLT3ANV | 222269 | E.62 |
| ISGT-B311 | 130030 | G.3 | MARL101AR | 103557 | A.19 | MT03C | 101002 | C.61 | NLT3BDA | 222255 | E.62 |
| IUGA-B211 | 130060 | G.5 | MARL101ARS | 103298 | A.19 | MT03D | 101003 | C.61 | NLT3BDG | 222256 | E.62 |
| IUGA-B211 S | 209140 | G.5 | MARL101ARS | 103298 | C.7 | MT03E | 101004 | C.61 | NLT3BDI | 222259 | E.62 |
| IUGA-B411 | 130082 | G.5 | MARL101AT | 100514 | A.19 | MT03F | 101005 | C.61 | NLT3BDL | 222258 | E.62 |
| IUGE-B211 | 130072 | G.5 | MARL101ATS | 100520 | A.19 | MT03G | 101006 | C.61 | NLT3BDR | 222254 | E.62 |
| IUGE-B411 | 130094 | G.5 | MARL101ATS | 100520 | C.7 | MT03H | 101007 | C.61 | NLT3BDV | 222257 | E.62 |
| IUGH-B211 | 130066 | G.5 | MARL110AF | 100515 | A.19 | MT03I | 101008 | C.61 | NLT5BT | 222284 | E.63 |
| IUGH-B411 | 130088 | G.5 | MARL110AFS | 100521 | A.19 | MT03J | 101009 | C.61 | NLT5ET | 222285 | E.63 |
| IUGI-B411 | 130090 | G.5 | MARL110AFS | 100521 | C.7 | MT03K | 101010 | C.61 | NLT73BD | 222278 | E.63 |
| IUGL-B211 | 130074 | G.5 | MARL110AI | 100517 | A.19 | MT03L | 101011 | C.61 | NLT75AJ | 222287 | E.63 |
| IUGL-B411 | 130096 | G.5 | MARL110AIS | 100523 | A.19 | MT03M | 101012 | C.61 | NLT75AN | 222288 | E.63 |
| IUGM-B311 | 130104 | G.5 | MARL110AIS | 100523 | C.7 | MT03N | 101013 | C.61 | NLT75BD | 222286 | E.63 |
| IUGP-B311 | 130100 | G.5 | MARL110AR | 103556 | A.19 | MT03P | 101014 | C.61 | NLT77AJ | 222280 | E.63 |
| IUGQ-B111 | 130080 | G.5 | MARL110ARS | 103299 | A.19 | MT03R | 101015 | C.61 | NLT77AN | 222281 | E.63 |
| IUGQ-B311 | 130102 | G.5 | MARL110ARS | 103299 | C.7 | MT03RA | 103540 | C.61 | NLT77BD | 222279 | E.63 |
| IUGR-B411 | 130086 | G.5 | MARL110AT | 100513 | A.19 | MT03RB | 103541 | C.61 | NLT90BT | 222307 | E.63 |
| IUGT-B111 | 130076 | G.5 | MARL110ATS | 100519 | A.19 | MT03RC | 103542 | C.61 | NLT9TC | 222282 | E.63 |
| IUGT-B311 | 130098 | G.5 | MARL110ATS | 100519 | C.7 | MT03RD | 103543 | C.61 | NMETV | 124908 | F.3 |
| IUGU-B211 S | 130057 | G.5 | MARN202AR | 103351 | A.18 | MT03RE | 103544 | C.61 | NMETV t AU | 124911 | F.3 |
| IUGU-B411 | 130084 | G.5 | MARN202AR | 103351 | C.6 | MT03RF | 103545 | C.61 | NMIVV | 124929 | F.3 |
| IZMA-B311 | 130144 | G.6 | MARN202AT | 100992 | A.18 | MT03RG | 103546 | C.61 | NMMFV | 124930 | F.3 |
| IZMR-B311 | 130146 | G.6 | MARN202AT | 100992 | C.6 | MT03RH | 103547 | C.61 | NMRDV 2-6 | 124915 | F.3 |
| IZMS-B211 | 130141 | G.6 | MARN211AR | 103350 | A.18 | MT03RI | 103548 | C.61 | NMRDV 2-60 | 124916 | F.3 |
| IZMS-B311 | 130145 | G.6 | MARN211AR | 103350 | C.6 | MT03RJ | 103549 | C.61 | NMRDV 2-600 | 124917 | F.3 |
| K... | | | MARN211AT | 100993 | A.18 | MT03RK | 103550 | C.61 | NMTCV 2 | 124901 | F.3 |
| KRC24 | 104760 | C.21 | MARN211AT | 100993 | C.6 | MT03RL | 103551 | C.61 | P... | | |
| KRC380/415 | 104762 | C.21 | MARN220AR | 103349 | A.18 | MT03RM | 103552 | C.61 | P9ACA6 | 188804 | E.20 |
| KRC48/260 | 104761 | C.21 | MARN220AR | 103349 | C.6 | MT03RN | 103553 | C.61 | P9ACAFV | 187847 | E.33 |
| KVB10E | 104597 | D.23 | MARN220AT | 100994 | A.18 | MT03RP | 103554 | C.61 | P9ACAFV | 187847 | E.33 |
| KVB10I | 104692 | D.21 | MARN220AT | 100994 | C.6 | MVB0R | 100543 | A.20 | P9ACDPP | 187843 | E.33 |
| KVB12E | 104587 | D.23 | MARN404AR | 103300 | A.18 | MVB0R | 100543 | C.8 | P9ACDPP | 187843 | E.33 |
| KVB12I | 104693 | D.21 | MARN404AR | 103300 | C.6 | MVB0T | 101021 | C.61 | P9ACFS3 | 187841 | E.33 |
| KVB75E | 104694 | D.23 | MARN404AT | 100987 | A.18 | MVE0R | 103562 | C.61 | P9ACFS3 | 187841 | E.33 |
| KVB75I | 104690 | D.21 | MARN404AT | 100987 | C.6 | MVE0T | 101020 | C.61 | P9ACFS5 | 187842 | E.33 |
| KVB95E | 104695 | D.23 | MARN413AR | 103355 | A.18 | MVPOC | 100600 | C.8 | P9ACFS5 | 187842 | E.33 |
| KVB95I | 104691 | D.21 | MARN413AR | 103355 | C.6 | N... | | | P9ACFSM | 187846 | E.20 |
| KVP08E | 116212 | D.23 | MARN413AT | 100988 | A.18 | N11P3401806 | 168260 | H.35 | P9ACFSM | 187846 | E.33 |
| KVP10E | 133380 | D.23 | MARN413AT | 100988 | C.6 | N11P3401806 | 168261 | H.35 | P9ACFSM | 187846 | E.33 |
| KVP10G | 104771 | D.19 | MARN422AR | 103354 | A.18 | N211B | 116113 | E.67 | P9ACPBS | 188015 | E.35 |
| KVP10I | 133371 | D.21 | MARN422AR | 103354 | C.6 | N222B | 116664 | E.67 | P9ACPBS039 | 188030 | E.35 |
| KVP10U | 133374 | D.21 | MARN422AT | 100989 | A.18 | N411B | 116663 | E.67 | P9ACPBS201 | 188201 | E.35 |
| KVP12E | 116235 | D.23 | MARN422AT | 100989 | C.6 | N422B | 116665 | E.67 | P9ACPBS202 | 188202 | E.35 |
| KVP12G | 104767 | D.19 | MARN431AR | 103353 | A.18 | NLT1A | 222231 | E.62 | P9ACPBS203 | 188203 | E.35 |
| KVP12I | 113633 | D.21 | MARN431AR | 103353 | C.6 | NLT1G | 222232 | E.62 | P9ACPBS204 | 188204 | E.35 |
| KVP12U | 113630 | D.21 | MARN431AT | 100990 | A.18 | NLT1I | 222235 | E.62 | P9ACPBS205 | 188205 | E.35 |
| KVP75E | 133378 | D.23 | MARN431AT | 100990 | C.6 | NLT1L | 222234 | E.62 | P9ACPBS206 | 188206 | E.35 |
| KVP75I | 133370 | D.21 | MARN440AR | 103352 | A.18 | NLT1R | 222230 | E.62 | P9ACPBS207 | 188207 | E.35 |
| KVP75U | 113627 | D.21 | MARN440AR | 103352 | C.6 | NLT1V | 222233 | E.62 | P9ACPBS208 | 188208 | E.35 |
| KVP85E | 133379 | D.23 | MARN440AT | 100991 | A.18 | NLT2AJA | 222243 | E.62 | P9ACPBS215 | 188215 | E.35 |
| KVP85G | 104770 | D.19 | MARN440AT | 100991 | C.6 | NLT2AJG | 222244 | E.62 | P9ACPBS222 | 188222 | E.35 |
| KVP85I | 113631 | D.21 | MATV10AR | 103563 | C.61 | NLT2AJJ | 222247 | E.62 | P9ACPBS224 | 188224 | E.35 |
| KVP85U | 113628 | D.21 | MATV10AT | 101022 | C.61 | NLT2AJL | 222246 | E.62 | P9ACPBS231 | 188231 | E.35 |
| KVP95E | 113637 | D.23 | MB0ID | 100470 | A.17 | NLT2AJLA | 222296 | E.62 | P9ACPBS232 | 188232 | E.35 |
| ... | | | MB0ID | 100470 | C.4 | NLT2AJLG | 222297 | E.62 | P9ACPBS233 | 188233 | E.35 |
| LG0004P180 | 209344 | D.19 | MB0KD | 100471 | A.17 | NLT2AJLI | 242464 | E.62 | P9ACPBS234 | 188234 | E.35 |
| LG0004R180 | 116651 | D.19 | MB0KD | 100471 | C.4 | NLT2AJLL | 222299 | E.62 | P9ACPBS239 | 188239 | E.35 |
| LG0004S180 | 209347 | D.19 | MC0I301ATD | 100571 | C.4 | NLT2AJLR | 222295 | E.62 | P9ACPBS243 | 188243 | E.35 |
| LG0006P180 | 200004 | D.19 | MC0I310ATD | 100570 | C.4 | NLT2AJLV | 222298 | E.62 | P9ACPBS258 | 188258 | E.35 |
| LG0006R180 | 116652 | D.19 | MCOK301ATD | 100575 | C.4 | NLT2AJR | 222242 | E.62 | P9ACPIU | 188016 | E.35 |
| LG0006S180 | 116011 | D.19 | MCOK310ATD | 100574 | C.4 | NLT2AJV | 222245 | E.62 | P9ACPTS | 188018 | E.35 |
| LG0404P180 | 116653 | D.19 | MCI1301ATD | 100573 | C.4 | NLT2ANA | 222249 | E.62 | P9ACPWS | 188017 | E.35 |
| LG0404R180 | 133264 | D.19 | MCI1310ATD | 100572 | C.4 | NLT2ANG | 222250 | E.62 | P9ACRCL | 187840 | E.33 |
| LG0404S180 | 116996 | D.19 | MCI1K301ATD | 100577 | C.4 | NLT2ANI | 222253 | E.62 | P9ACRCL | 187840 | E.33 |
| LG0406P180 | 116656 | D.19 | MCI1K310ATD | 100576 | C.4 | NLT2ANJ | 222252 | E.62 | P9ACVLR | 187844 | E.33 |
| LG0406R180 | 133265 | D.19 | MCI2I301ATD | 100538 | C.4 | NLT2ANLA | 222302 | E.62 | P9ACVLR | 187844 | E.33 |
| LG0406S180 | 116997 | D.19 | MCI2I310ATD | 100539 | C.4 | NLT2ANLG | 222303 | E.62 | P9ACWAF | 187845 | E.33 |
| LG2504P180 | 100885 | D.19 | MC2K301ATD | 103591 | C.4 | NLT2ANLI | 222306 | E.62 | P9ACWAF | 187845 | E.33 |
| LG2504R180 | 116226 | D.19 | MC2K310ATD | 103590 | C.4 | NLT2ANLL | 222305 | E.62 | P9ADCST | 187796 | E.19 |
| LG2506P180 | 101095 | D.19 | MCRIO22ATD | 100532 | A.17 | NLT2ANLR | 222301 | E.62 | P9ADCST | 187796 | E.19 |
| LG2506R180 | 133611 | D.19 | MCRI031ATD | 100531 | A.17 | NLT2ANLV | 222304 | E.62 | P9AELN | 189030 | E.24 |



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| P9AELN006 | 189041 | E.24 | P9ARTWS | 188005 | E.34 | P9MER4RN | 185071 | E.11 | P9XET52121 | 152121 | E.8 |
| P9AELN028 | 189042 | E.24 | P9ASBGB 006 | 187552 | E.30 | P9MER53161 | 153161 | E.8 | P9XLD52610 | 152610 | E.9 |
| P9AELN029 | 189043 | E.24 | P9ASBGB 028 | 187551 | E.30 | P9MET53121 | 153121 | E.8 | P9XLD52611 | 152611 | E.9 |
| P9AELN035 | 189044 | E.24 | P9ASBGB 202 | 189859 | E.30 | P9MLD53610 | 153610 | E.9 | P9XLD52620 | 152620 | E.9 |
| P9AELN038 | 189045 | E.24 | P9ASBGL 037 | 187543 | E.30 | P9MLD53611 | 153611 | E.9 | P9XLD52621 | 152621 | E.9 |
| P9AELN039 | 189046 | E.24 | P9ASBGN 006 | 187517 | E.30 | P9MLD53620 | 153623 | E.9 | P9XMB2A | 185712 | E.17 |
| P9AELN042 | 189047 | E.24 | P9ASBGN 028 | 187511 | E.30 | P9MLD53621 | 153621 | E.9 | P9XMB2B | 185713 | E.17 |
| P9AELN201 | 189032 | E.24 | P9ASBGN 029 | 187550 | E.30 | P9MMB2A | 184712 | E.17 | P9XMB2F | 185710 | E.17 |
| P9AELN202 | 189031 | E.24 | P9ASBGN 030 | 187545 | E.30 | P9MMB2B | 184713 | E.17 | P9XMB2F | 185711 | E.17 |
| P9AELN203 | 189038 | E.24 | P9ASBGN 020 | 187548 | E.30 | P9MMB2F | 184710 | E.17 | P9XMB4F | 185740 | E.17 |
| P9AELN204 | 189037 | E.24 | P9ASBGR 029 | 187510 | E.30 | P9MMB2T | 184711 | E.17 | P9XMB4T | 185741 | E.17 |
| P9AELN205 | 189035 | E.24 | P9ASBGR 201 | 187547 | E.30 | P9MMB4F | 184740 | E.17 | P9XMN2F | 185700 | E.17 |
| P9AELN206 | 189036 | E.24 | P9ASBGV 006 | 187518 | E.30 | P9MMB4T | 184741 | E.17 | P9XMN2T | 185701 | E.17 |
| P9AELN214 | 189033 | E.24 | P9ASBGV 020 | 187512 | E.30 | P9MMN2A | 184702 | E.17 | P9XMN4F | 185720 | E.17 |
| P9AELN215 | 189034 | E.24 | P9ASBGV 038 | 187546 | E.30 | P9MMN2B | 184703 | E.17 | P9XMN4T | 185721 | E.17 |
| P9AELN222 | 189152 | E.24 | P9ASBGV 202 | 187549 | E.30 | P9MMN2F | 184700 | E.17 | P9XPL52502 | 152502 | E.9 |
| P9AELN224 | 189154 | E.24 | P9ASBSB 006 | 187652 | E.30 | P9MMN2T | 184701 | E.17 | P9XPL52511 | 152511 | E.9 |
| P9AEMT | 189029 | E.24 | P9ASBSB 028 | 187651 | E.30 | P9MMN4F | 184720 | E.17 | P9XPL52513 | 152513 | E.9 |
| P9ARBGB 006 | 187152 | E.30 | P9ASBSB 202 | 189928 | E.30 | P9MMN4T | 184721 | E.17 | P9XPL52514 | 152514 | E.9 |
| P9ARBGB 028 | 187151 | E.30 | P9ASBSL 037 | 187643 | E.30 | P9MPL53502 | 153501 | E.9 | P9XPL52515 | 152515 | E.9 |
| P9ARBGB 202 | 188909 | E.30 | P9ASBSN 006 | 187617 | E.30 | P9MPL53511 | 153511 | E.9 | P9XPN52002 | 152002 | E.8 |
| P9ARBGL 037 | 187143 | E.30 | P9ASBSN 028 | 187611 | E.30 | P9MPL53513 | 153513 | E.9 | P9XPN52007 | 152007 | E.8 |
| P9ARBGN 006 | 187117 | E.30 | P9ASBSN 029 | 187650 | E.30 | P9MPL53514 | 153514 | E.9 | P9XPN52061 | 152061 | E.8 |
| P9ARBGN 017 | 187125 | E.30 | P9ASBSN 030 | 187645 | E.30 | P9MPL53515 | 153515 | E.9 | P9XRGR | 184771 | E.18 |
| P9ARBGN 018 | 187127 | E.30 | P9ASBSN 020 | 187648 | E.30 | P9MPN53006 | 153006 | E.8 | P9XSC52435 | 152435 | E.8 |
| P9ARBGN 028 | 187111 | E.30 | P9ASBSR 029 | 187610 | E.30 | P9MPN53007 | 153007 | E.8 | P9XSC52497 | 152497 | E.8 |
| P9ARBGN 029 | 187150 | E.30 | P9ASBSR 201 | 187647 | E.30 | P9MPN53061 | 153061 | E.8 | P9XSCD0A95 | 185400 | E.14 |
| P9ARBGN 030 | 187145 | E.30 | P9ASBSV 006 | 187618 | E.30 | P9MPS21G | 184690 | E.17 | P9XSCD0E95 | 185401 | E.14 |
| P9ARBGN 202 | 187148 | E.30 | P9ASBSV 028 | 187612 | E.30 | P9MPS22G | 184691 | E.17 | P9XSCD0K95 | 185402 | E.14 |
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| P9ARBGV 006 | 187118 | E.30 | P9ASCST | 187791 | E.32 | P9MRG | 185771 | E.18 | P9XSC20A95 | 185433 | E.14 |
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| P9ARBGV 030 | 187146 | E.30 | P9ASHAC | 187794 | E.33 | P9MSC33497 | 153497 | E.8 | P9XSC20E95 | 185435 | E.14 |
| P9ARBGR 202 | 187149 | E.30 | P9ASHP3 | 187792 | E.33 | P9MSM53293 | 153293 | E.8 | P9XSC20T95 | 185439 | E.14 |
| P9ARBSB 006 | 187252 | E.30 | P9ASHP5 | 187793 | E.33 | P9MSM53391 | 153391 | E.8 | P9XSC23C95 | 185467 | E.15 |
| P9ARBSB 028 | 187251 | E.30 | P9ASTBS | 188010 | E.34 | P9MWR | 184770 | E.18 | P9XSC25A95 | 185461 | E.15 |
| P9ARBSB 202 | 188978 | E.30 | P9ASTTS | 188014 | E.34 | P9MZ | 185772 | E.18 | P9XSC25C95 | 185462 | E.15 |
| P9ARBSN 006 | 187217 | E.30 | P9ASTWS | 188011 | E.34 | P9PDHF | 187056 | E.20 | P9XSC25H95 | 185463 | E.15 |
| P9ARBSN 028 | 187211 | E.30 | P9B01BN | 187017 | E.23 | P9PDHF | 187056 | E.21 | P9XSM52293 | 152293 | E.8 |
| P9ARBSN 029 | 187250 | E.30 | P9B01FH | 187014 | E.20 | P9PDMVD | 187040 | E.21 | P9XSM52391 | 152321 | E.8 |
| P9ARBSN 030 | 187245 | E.30 | P9B01FN | 187012 | E.20 | P9PDMVJ | 187041 | E.21 | P9XSM5D0N | 186110 | E.12 |
| P9ARBSN 202 | 187248 | E.30 | P9B01VN | 187001 | E.20 | P9PDNBO | 187070 | E.23 | P9XSM5D5N | 186140 | E.12 |
| P9ARBSR 029 | 187210 | E.30 | P9B01VN | 187001 | E.53 | P9PDNFO | 187055 | E.21 | P9XSMI0N | 186120 | E.12 |
| P9ARBSR 201 | 187247 | E.30 | P9B01VR | 187003 | E.20 | P9PDNVO | 187020 | E.21 | P9XSMU0N | 185190 | E.12 |
| P9ARBSV 006 | 187218 | E.30 | P9B02VN | 187008 | E.20 | P9PDTVO | 187027 | E.21 | P9XSMX0N | 185330 | E.12 |
| P9ARBSV 028 | 187212 | E.30 | P9B10BN | 187018 | E.23 | P9PRDVN | 187022 | E.21 | P9XSMZ0N | 185200 | E.12 |
| P9ARBSV 030 | 187246 | E.30 | P9B10FH | 187015 | E.20 | P9PREVJ | 187025 | E.21 | P9XSMZ1N | 185240 | E.12 |
| P9ARBSV 202 | 187249 | E.30 | P9B10FN | 187013 | E.20 | P9PREVL | 187026 | E.21 | P9XSMZ3N | 186320 | E.12 |
| P9ARCAST | 187490 | E.32 | P9B10VA | 187004 | E.20 | P9PRLVJ | 187021 | E.21 | P9XSMZ5N | 185280 | E.12 |
| P9ARDLS | 187300 | E.31 | P9B10VN | 187002 | E.20 | P9PRNVJ | 187023 | E.21 | P9XSV00N | 185370 | E.13 |
| P9ARDLS001 | 187315 | E.31 | P9B10VN | 187002 | E.53 | P9PRNVN | 187024 | E.21 | P9XSV05N | 185373 | E.13 |
| P9ARDLS002 | 187316 | E.31 | P9B11VN | 187000 | E.20 | P9PRTVN | 187028 | E.21 | P9XSVX0N | 185392 | E.13 |
| P9ARDLS006 | 187305 | E.31 | P9B11VN | 187000 | E.53 | P9PSB | 186773 | E.18 | P9XSVZ0N | 185379 | E.13 |
| P9ARDLS017 | 187309 | E.31 | P9B20VN | 187009 | E.20 | P9SBM | 186774 | E.18 | P9XSVZ3N | 185391 | E.13 |
| P9ARDLS018 | 187310 | E.31 | P9DPL54700 | 154700 | E.9 | P9SCD | 185695 | E.17 | P9XZ | 186772 | E.18 |
| P9ARDLS026 | 187311 | E.31 | P9DPL54701 | 154701 | E.9 | P9SEC4RA95 | 186073 | E.11 | PCP12G | 241749 | D.19 |
| P9ARDLS027 | 187312 | E.31 | P9DPL54720 | 154720 | E.9 | P9SEM3RL | 186551 | E.16 | PRC1S13ANL | 222012 | A.5 |
| P9ARDLS028 | 187302 | E.31 | P9DPL54721 | 154721 | E.9 | P9SEM3RN | 186031 | E.11 | PRC1S13BDL | 222004 | A.5 |
| P9ARDLS029 | 187301 | E.31 | P9DPLNRG00 | 156880 | E.19 | P9SER4RA | 185077 | E.11 | PRC1S13BNL | 222013 | A.5 |
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| P9ARDLS031 | 187313 | E.31 | P9DPLNRS00 | 186882 | E.19 | P9SET4RL1 | 186561 | E.16 | PRC1S13CDL | 222008 | A.5 |
| P9ARDLS032 | 187314 | E.31 | P9DPLNRS01 | 186892 | E.19 | P9SSC00A95 | 186400 | E.14 | PRC1T10ADD | 221883 | A.5 |
| P9ARDLS201 | 187319 | E.31 | P9DPLVRG00 | 186881 | E.19 | P9SSC05A95 | 186409 | E.14 | PRC1T10AJL | 221884 | A.5 |
| P9ARDLS202 | 187320 | E.31 | P9DPLVRG01 | 186891 | E.19 | P9SSCI5C95 | 186410 | E.14 | PRC1T10ANL | 221885 | A.5 |
| P9ARDPL | 187350 | E.31 | P9DPLVRS00 | 186883 | E.19 | P9SSC20T95 | 186439 | E.14 | PRC1T10CBL | 221875 | A.5 |
| P9ARDPL001 | 187365 | E.31 | P9DPLVRS01 | 186893 | E.19 | P9SSC23C95 | 186467 | E.15 | PRC1T10CDL | 221876 | A.5 |
| P9ARDPL002 | 187366 | E.31 | P9EPA01Y02 | 189010 | E.24 | P9SSC25A95 | 186461 | E.15 | PRC1T10CJL | 221877 | A.5 |
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| PRC4M30DCGL | 221076 | A.3 | QA12P044S | 120896 | D.67 | RDHA 1-10AEN | 123964 | F.4 | RT12K | 113640 | C.63 |
| PRC4M30DCJL | 221077 | A.3 | QA12P058S | 120897 | D.67 | RDHT 1-1,2AEN | 123744 | F.4 | RT12L | 113641 | C.63 |
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| PRC4M40AGL | 221811 | A.3 | QA22P022S | 120900 | D.67 | RDIT2-5AEN | 124754 | F.6 | RT12P | 113644 | C.63 |
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| PRC4M40ANL | 221816 | A.3 | QA22P044S | 120902 | D.67 | RE1D | 101866 | C.67 | RT12RF | 114061 | C.63 |
| PRC4M40CBL | 221812 | A.3 | QA22P058S | 120903 | D.67 | RE1H | 101867 | C.67 | RT12RG | 114062 | C.63 |
| PRC4M40CDL | 221813 | A.3 | QA32P008S | 120904 | D.67 | RE1K | 101868 | C.67 | RT12RH | 114063 | C.63 |
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| PRC4M40CJL | 221817 | A.3 | QA32P022S | 120906 | D.67 | RE1S | 101870 | C.67 | RT12RK | 114114 | C.63 |
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| U2KV23DBUL2 | 168099 | H.33 | U3SX030K0SNS | 129339 | H.19 | WLSL | 103247 | D.23 |
| U2KV23DBUL3 | 168100 | H.33 | U3SX037K0SNS | 129340 | H.19 | WLSL | 103247 | D.23 |
| U2KV23DBUL3 | 168100 | H.33 | U3SX045K0SNS | 129341 | H.19 | WLSL | 103247 | D.23 |
| U2KV23W103 | 168102 | H.20 | U3SX055K0SNS | 129342 | H.19 | WLSL | 103247 | D.23 |
| U2KV23W103 | 168102 | H.20 | U3SX075K0SNS | 129343 | H.19 | WLSL | 103247 | D.23 |
| U30F3016EB | 129284 | H.32 | U3SX090K0SNS | 129344 | H.19 | WLSL | 103247 | D.23 |
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| U30F3030EB | 129285 | H.32 | U3SX132K0SNS | 129346 | H.19 | WLSL | 103247 | D.23 |
| U30F3030EB | 129285 | H.32 | U3SX160K0SNS | 129347 | H.19 | WLSL | 103247 | D.23 |
| U30F3055EB | 129286 | H.32 | U3SX200K0SNS | 129348 | H.19 | WLSL | 103247 | D.23 |
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| U30F3075EB | 129287 | H.32 | U3SX315K0SNS | 129350 | H.19 | WLSL | 103247 | D.23 |
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| U30F31000ES | 129295 | H.32 | U3SX475K0SNS | 129352 | H.19 | WLSL | 103247 | D.23 |
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| U30F3130EB | 129289 | H.32 | V1108CA | 113614 | C.21 | WLSL | 103247 | D.23 |
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| U30F31600ES | 129296 | H.32 | V1109BA | 113616 | C.21 | WLSL | 103247 | D.23 |
| U30F31600ES | 129296 | H.32 | V1110CE | 113618 | C.21 | WLSL | 103247 | D.23 |
| U30F3180EB | 129290 | H.32 | V1111CE | 113619 | C.21 | WLSL | 103247 | D.23 |
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| U30F3320ES | 129292 | H.32 | V1195BA | 113617 | C.21 | WLSL | 103247 | D.23 |
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| U30F3400ES | 129293 | H.32 | V31201B | 104739 | C.17 | WLSL | 103247 | D.23 |
| U30F3600ES | 129294 | H.32 | V31202B | 104741 | C.17 | WLSL | 103247 | D.23 |
| U30F3600ES | 129294 | H.32 | V31203B | 104743 | C.17 | WLSL | 103247 | D.23 |
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| U30V24AIO | 129396 | H.20 | V31205B | 104747 | C.17 | WLSL | 103247 | D.23 |
| U30V24DN1 | 129388 | H.20 | V31206B | 104749 | C.17 | WLSL | 103247 | D.23 |
| U30V24DN1 | 129388 | H.20 | V31207B | 104750 | C.17 | WLSL | 103247 | D.23 |
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| U30V24DN3 | 129390 | H.20 | V31210B | 104755 | C.17 | WLSL | 103247 | D.23 |
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| 100541 | MREBC10AC2 | C.8 | 101207 | GPS1BSANMP | B.9 | 101304 | GPAC01FBA | B.17 | 101387 | GPELCAU | B.4 |
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| 101869 | RE1M | C.67 | 104712 | BTLF60D | C.15 | 108223 | TLR100P200 | H.4 | 113726 | RT2M | C.63 |
| 101870 | RE1S | C.67 | 104713 | BSLR2G | A.24 | 108227 | TLR250P200 | H.4 | 113727 | RT3B | C.64 |
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| 103349 | MARN220AR | C.6 | 104721 | BSLV3K | C.16 | 110836 | BSLV3U | A.24 | 113744 | RT4LK | C.64 |
| 103350 | MARN211AR | A.18 | 104722 | BSLV3R | A.24 | 110836 | BSLV3U | C.16 | 113745 | RT4LL | C.64 |
| 103350 | MARN211AR | C.6 | 104722 | BSLV3R | C.16 | 110836 | BSLV3U | C.21 | 113746 | RT4LM | C.64 |
| 103351 | MARN202AR | A.18 | 104723 | BELA | A.24 | 112185 | GPAU20LCAA11 | B.18 | 113747 | RT4LN | C.64 |
| 103351 | MARN202AR | C.6 | 104723 | BELA | C.15 | 113001 | BTLFX | A.23 | 113748 | RT4LP | C.64 |
| 103352 | MARN440AR | A.18 | 104724 | BELA02 | A.24 | 113001 | BTLFX | C.15 | 113749 | RT4LR | C.64 |
| 103352 | MARN440AR | C.6 | 104724 | BELA02 | C.15 | 113505 | V1108B4 | C.21 | 113750 | RT5A | C.64 |
| 103353 | MARN431AR | A.18 | 104738 | V31200B | C.17 | 113602 | BETL02C | A.25 | 113751 | RT5B | C.64 |
| 103353 | MARN431AR | C.6 | 104739 | V31201B | C.16 | 113602 | BETL02C | C.16 | 113752 | RT5C | C.64 |
| 103354 | MARN422AR | A.18 | 104740 | VB1201B | C.17 | 113603 | BETL45C | A.25 | 113753 | RT5D | C.64 |
| 103354 | MARN422AR | C.6 | 104741 | V31202B | C.17 | 113603 | BETL45C | C.16 | 113754 | RT5E | C.64 |
| 103355 | MARN413AR | A.18 | 104742 | VB1202B | C.17 | 113604 | BETL02D | A.25 | 113755 | RT5LA | C.64 |
| 103355 | MARN413AR | C.6 | 104743 | V31203B | C.17 | 113604 | BETL02D | C.16 | 113756 | RT5LB | C.64 |
| 103540 | MT03RA | C.61 | 104745 | V31204B | C.17 | 113605 | BETL45D | A.25 | 113757 | RT5LC | C.64 |
| 103541 | MT03RB | C.61 | 104747 | V31205B | C.17 | 113605 | BETL45D | C.16 | 113758 | RT5LD | C.64 |
| 103542 | MT03RC | C.61 | 104748 | VB1205B | C.17 | 113612 | V1107BA | C.21 | 113759 | RT5LE | C.64 |
| 103543 | MT03RD | C.61 | 104749 | V31206B | C.17 | 113613 | V1175CA | C.21 | 113760 | RT6A | C.64 |
| 103544 | MT03RE | C.61 | 104750 | V31207B | C.17 | 113614 | V1108CA | C.21 | 113761 | RT6LA | C.64 |
| 103545 | MT03RF | C.61 | 104751 | VB1207B | C.17 | 113615 | V1185BA | C.21 | 113762 | RTX3 | C.65 |
| 103546 | MT03RG | C.61 | 104752 | V31208B | C.17 | 113616 | V1109BA | C.21 | 113764 | RT2XP | C.65 |
| 103547 | MT03RH | C.61 | 104753 | VB1208B | C.17 | 113617 | V1195BA | C.21 | 113850 | PTP04 | C.17 |
| 103548 | MT03RI | C.61 | 104754 | V31209B | C.17 | 113618 | V1110CE | C.21 | 113851 | PTP45 | C.17 |
| 103549 | MT03RJ | C.61 | 104755 | V31210B | C.17 | 113619 | V1111CE | C.21 | 113852 | PTP08 | C.17 |
| 103550 | MT03RK | C.61 | 104757 | V31225B | C.17 | 113620 | V1112BA | C.21 | 113853 | PTP10 | C.17 |
| 103551 | MT03RL | C.61 | 104758 | V31245B | C.17 | 113621 | V1113BA | C.21 | 113855 | RTXS | C.65 |
| 103552 | MT03RM | C.61 | 104760 | KRC24 | C.21 | 113627 | KVP75U | D.21 | 113856 | RTXSL | C.65 |
| 103553 | MT03RN | C.61 | 104761 | KRC48/260 | C.21 | 113628 | KVP85U | D.21 | 113899 | V1109B4 | C.21 |
| 103554 | MT03RP | C.61 | 104762 | KRC380/415 | C.21 | 113630 | KVP12U | D.21 | 114060 | RT12RD | C.63 |
| 103555 | MACL110AR | C.7 | 104763 | BEKH | C.21 | 113631 | KVP85I | D.21 | 114061 | RT12RF | C.63 |
| 103556 | MACL101AR | C.7 | 104764 | BEKV | C.21 | 113633 | KVP12I | D.21 | 114062 | RT12RG | C.63 |
| 103556 | MARL110AR | A.19 | 104766 | C09476 | C.21 | 113637 | KVP95E | D.23 | 114063 | RT12RH | C.63 |
| 103557 | MACN211AR | C.6 | 104767 | KVP12G | D.19 | 113640 | RT12K | C.63 | 114087 | RT1RB | C.63 |
| 103557 | MARL101AR | A.19 | 104770 | KVP85G | D.19 | 113641 | RT12L | C.63 | 114088 | RT1RC | C.63 |
| 103558 | MACN202AR | C.6 | 104771 | KVP10G | D.19 | 113642 | RT12M | C.63 | 114089 | RT1RD | C.63 |
| 103559 | MACN431AR | C.6 | 104785 | BEKVA 1 | C.21 | 113643 | RT12N | C.63 | 114090 | RT1RF | C.63 |
| 103560 | MACN422AR | C.6 | 104786 | BEKVS 1 | C.21 | 113644 | RT12P | C.63 | 114091 | RT1RG | C.63 |
| 103561 | MACN413AR | C.6 | 104797 | BNL | D.19 | 113645 | RT12S | C.63 | 114092 | RT1RH | C.63 |
| 103562 | MVEOR | C.61 | 104798 | EPL | D.19 | 113646 | RT12T | C.63 | 114093 | RT1RJ | C.63 |
| 103563 | MATV10AR | C.61 | 104800 | BMLF | D.19 | 113647 | RT12U | C.63 | 114094 | RT1RK | C.63 |
| 103590 | MC2K310ATD | C.4 | 105170 | RTXP | C.65 | 113648 | RT12V | C.63 | 114095 | RT1RL | C.63 |
| 103591 | MC2K301ATD | C.4 | 105200 | CM1CA5F | C.15 | 113649 | RT12W | C.63 | 114096 | RT1RM | C.63 |
| 103747 | PTPCK75 | C.65 | 106622 | BRLL02 | C.20 | 113650 | RT22D | C.63 | 114097 | RT1RN | C.63 |
| 103747 | PTPCK75 | C.65 | 106622 | BRLL02 | C.20 | 113651 | RT22E | C.63 | 114098 | RT1RP | C.63 |
| 103748 | PTPCK95 | C.21 | 107097 | GPEUTA | B.21 | 113652 | RT22G | C.63 | 114099 | RT1RS | C.63 |
| 103749 | PTPCK11 | C.21 | 107098 | GPFO0C02 | D.3 | 113653 | RT22H | C.63 | 114100 | RT1RT | C.63 |
| 104587 | KVB12E | D.23 | 107098 | GPFO0C02 | D.3 | 113654 | RT22J | C.63 | 114101 | RT1RU | C.63 |
| 104597 | KVB10E | D.23 | 107099 | GPFI0C02 | D.3 | 113655 | RT22L | C.63 | 114102 | RT1RV | C.63 |
| 104690 | KVB75I | D.21 | 107099 | GPFI0C02 | D.3 | 113656 | RT22M | C.63 | 114103 | RT1RW | C.63 |
| 104691 | KVB95I | D.21 | 107100 | GPFO1C02 | D.3 | 113657 | RT32C | C.64 | 114104 | RT2RA | C.63 |
| 104692 | KVB10I | D.21 | 107100 | GPFO1C02 | D.3 | 113658 | RT32D | C.64 | 114105 | RT2RB | C.63 |
| 104693 | KVB12I | D.21 | 107101 | GPFO0C25 | D.3 | 113659 | RT32E | C.64 | 114106 | RT2RC | C.63 |
| 104694 | KVB75E | D.23 | 107101 | GPFO0C25 | D.3 | 113660 | RT32F | C.64 | 114107 | RT2RD | C.63 |
| 104695 | KVB95E | D.23 | 107102 | GPFO0C04 | D.3 | 113700 | RT1B | C.63 | 114108 | RT2RE | C.63 |
| 104700 | BCLF10 | A.23 | 107102 | GPFO0C04 | D.3 | 113701 | RT1C | C.63 | 114109 | RT2RG | C.63 |
| 104700 | BCLF10 | C.15 | 107103 | GPFI0C04 | D.3 | 113702 | RT1D | C.63 | 114110 | RT2RH | C.63 |
| 104701 | BCLF01 | A.23 | 107103 | GPFI0C04 | D.3 | 113703 | RT1F | C.63 | 114111 | RT2RJ | C.63 |
| 104701 | BCLF01 | C.15 | 107105 | GPFO1C04 | D.3 | 113704 | RT1G | C.63 | 114112 | RT2RL | C.63 |
| 104702 | BCLF10G | A.23 | 107105 | GPFO1C04 | D.3 | 113705 | RT1H | C.63 | 114113 | RT2RM | C.63 |
| 104702 | BCLF10G | C.15 | 107106 | GPFO0C45 | D.3 | 113706 | RT1J | C.63 | 114114 | RT2RK | C.63 |
| 104703 | BCLF01G | A.23 | 107106 | GPFO0C45 | D.3 | 113707 | RT1K | C.63 | 114115 | RT2RL | C.63 |
| 104703 | BCLF01G | C.15 | 107107 | GPFO0C08 | D.3 | 113708 | RT1L | C.63 | 114116 | RT2RM | C.63 |
| 104704 | BRLL20 | A.23 | 107107 | GPFO0C08 | D.3 | 113709 | RT1M | C.63 | 114117 | RT2RN | C.63 |
| 104704 | BRLL20 | C.15 | 107119 | GPS2BSAL | B.11 | 113710 | RT1N | C.63 | 114118 | RT2RP | C.63 |
| 104704 | BRLL20 | C.20 | 107120 | GPS2BHAL | B.11 | 113711 | RT1P | C.63 | 114119 | RT2RS | C.63 |
| 104705 | BRLL11 | A.23 | 107121 | GPS2MSAL | B.15 | 113712 | RT1S | C.63 | 114120 | RT2RT | C.63 |
| 104705 | BRLL11 | C.15 | 107122 | GPS2MHAL | B.15 | 113713 | RT1T | C.63 | 114121 | RT2RU | C.63 |
| 104705 | BRLL11 | C.20 | 107163 | GPFI1B4A | D.3 | 113714 | RT1U | C.63 | 114122 | RT2RV | C.63 |
| 104706 | BCLL20 | C.15 | 107165 | GPFI1L04AA | D.3 | 113715 | RT1V | C.63 | 114123 | RT2RW | C.63 |
| 104706 | BCLL20 | C.20 | 107166 | GPFI1L04DA | D.3 | 113716 | RT1W | C.63 | 114124 | RT2RD | C.63 |
| 104707 | BCLL11 | C.15 | 107182 | GPAPT2A | B.18 | 113717 | RT2A | C.63 | 114125 | RT2RE | C.63 |
| 104707 | BCLL11 | C.20 | 107186 | GPB1FA | B.19 | 113718 | RT2B | C.63 | 114126 | RT2RG | C.63 |
| 104709 | BTLF30C | A.23 | 107187 | GPB2FA | B.19 | 113719 | RT2C | C.63 | 114127 | RT2RH | C.63 |
| 104709 | BTLF30C | C.15 | 107190 | GPFI2L04AA | D.3 | 113720 | RT2D | C.63 | 114128 | RT2RJ | C.63 |
| 104710 | BTLF60C | A.23 | 107191 | GPFI2L04DA | D.3 | 113721 | RT2E | C.63 | 114129 | RT2RL | C.63 |
| 104710 | BTLF60C | C.15 | 107252 | GPFI3L09AA | D.3 | 113722 | RT2G | C.63 | 114130 | RT2RM | C.63 |
| 104711 | BTLF30D | A.23 | 107253 | GPFI3B5A | D.3 | 113723 | RT2H | C.63 | 114131 | RT2RJ | C.63 |
| 104711 | BTLF30D | C.15 | 107256 | SFB0RJM | B.3 | 113724 | RT2J | C.63 | 116011 | LG0006S180 | D.19 |



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|---------|---------------|------|---------|--------------|------|---------|--------------|------|---------|---------------|------|
| 116074 | MG0006QATO | D.19 | 124104 | RMM 2 EN | F.5 | 129318 | U3SX000K7FBS | H.19 | 130028 | ISGL-B411 | G.3 |
| 116113 | N211B | E.67 | 124184 | ROD2400VEN | F.6 | 129319 | U3SX001K5FBS | H.19 | 130029 | IMGL-B411 | G.3 |
| 116212 | KVP08E | D.23 | 124354 | RODIT2-02VEN | F.6 | 129320 | U3SX002K2FBS | H.19 | 130030 | ISGT-B311 | G.3 |
| 116226 | LG2504R1B0 | D.19 | 124373 | RS01NAJ | F.6 | 129321 | U3SX004K0FBS | H.19 | 130031 | IMGT-B311 | G.3 |
| 116235 | KVP12E | D.23 | 124433 | RCF-1 AJ | F.6 | 129322 | U3SX005K5FBS | H.19 | 130035 | IMGP-B311 | G.3 |
| 116300 | TLR75P200 | H.4 | 124434 | RCF-1 EN | F.6 | 129323 | U3SX007K5FBS | H.19 | 130037 | IMGC-B411 | G.3 |
| 116301 | TLR750P200 | H.4 | 124435 | RCF-1 AU | F.6 | 129324 | U3SX011K0FBS | H.19 | 130039 | IMGO-B311 | G.3 |
| 116302 | TLR400P200 | H.4 | 124622 | RSFF1-50AU | F.5 | 129325 | U3SX015K0FBS | H.19 | 130040 | ISGM-B311 | G.3 |
| 116402 | MG0006RATO | D.19 | 124754 | RODIT2-5AEN | F.6 | 129326 | U3SX018K5FBS | H.19 | 130041 | IMGM-B311 | G.3 |
| 116651 | LG0004R1B0 | D.19 | 124901 | NMTCV 2 | F.3 | 129327 | U3SX022K0FBS | H.19 | 130057 | IUGU-B211 S | G.5 |
| 116652 | LG0006R1B0 | D.19 | 124908 | NMETV | F.3 | 129328 | U3SX030K0FNS | H.19 | 130060 | IUGA-B211 | G.5 |
| 116653 | LG0404P1B0 | D.19 | 124911 | NMETV t AU | F.3 | 129329 | U3SX000K7SBS | H.19 | 130066 | IUGH-B211 | G.5 |
| 116656 | LG0406P1B0 | D.19 | 124915 | NMRDV 2-6 | F.3 | 129330 | U3SX001K5SBS | H.19 | 130072 | IUGE-B211 | G.5 |
| 116663 | N411B | E.67 | 124916 | NMRDV 2-60 | F.3 | 129331 | U3SX002K2SBS | H.19 | 130074 | IUGL-B211 | G.5 |
| 116664 | N222B | E.67 | 124917 | NMRDV 2-600 | F.3 | 129332 | U3SX004K0SBS | H.19 | 130076 | IUGT-B111 | G.5 |
| 116665 | N422B | E.67 | 124929 | NMIV | F.3 | 129333 | U3SX005K5SBS | H.19 | 130080 | IUGQ-B111 | G.5 |
| 116996 | LG0404S1B0 | D.19 | 124930 | NMMFV | F.3 | 129334 | U3SX007K5SBS | H.19 | 130082 | IUGA-B411 | G.5 |
| 116997 | LG0406S1B0 | D.19 | 129148 | ERN00K7 | H.16 | 129335 | U3SX011K0SBS | H.19 | 130084 | IUGU-B411 | G.5 |
| 120000 | | | 129149 | ERN01K5 | H.16 | 129336 | U3SX015K0SBS | H.19 | 130086 | IUGR-B411 | G.5 |
| 120001 | SFK0A | B.2 | 129150 | ERN02K2 | H.16 | 129337 | U3SX018K5SBS | H.19 | 130088 | IUGH-B411 | G.5 |
| 120002 | SFK0B | B.2 | 129151 | ERN04K0 | H.16 | 129338 | U3SX022K0SBS | H.19 | 130090 | IUGI-B411 | G.5 |
| 120003 | SFK0C | B.2 | 129152 | ERN05K5 | H.16 | 129339 | U3SX030K0SNS | H.19 | 130094 | IUGE-B411 | G.5 |
| 120004 | SFK0D | B.2 | 129153 | ERN07K5 | H.16 | 129340 | U3SX037K0SNS | H.19 | 130096 | IUGL-B411 | G.5 |
| 120005 | SFK0E | B.2 | 129155 | ERX01K5 | H.16 | 129341 | U3SX045K0SNS | H.19 | 130098 | IUGT-B311 | G.5 |
| 120006 | SFK0F | B.2 | 129156 | ERX02K2 | H.16 | 129342 | U3SX055K0SNS | H.19 | 130100 | IUGP-B311 | G.5 |
| 120007 | SFK0G | B.2 | 129157 | ERX04K0 | H.16 | 129343 | U3SX075K0SNS | H.19 | 130102 | IUGO-B311 | G.5 |
| 120008 | SFK0H | B.2 | 129158 | ERX05K5 | H.16 | 129344 | U3SX090K0SNS | H.19 | 130104 | IUGM-B311 | G.5 |
| 120009 | SFK0I | B.2 | 129159 | ERX07K5 | H.16 | 129345 | U3SX110K0SNS | H.19 | 130141 | IZMS-B211 | G.6 |
| 120010 | SFK0J | B.2 | 129166 | TLR44P600 | H.33 | 129346 | U3SX132K0SNS | H.19 | 130144 | IZMA-B311 | G.6 |
| 120011 | SFK0K | B.2 | 129166 | TLR44P600 | H.33 | 129347 | U3SX160K0SNS | H.19 | 130145 | IZMS-B311 | G.6 |
| 120012 | SFK0L | B.2 | 129167 | TLR29P600 | H.33 | 129348 | U3SX200K0SNS | H.19 | 130146 | IZMR-B311 | G.6 |
| 120013 | SFK0M | B.2 | 129167 | TLR29P600 | H.33 | 129349 | U3SX250K0SNS | H.19 | 130310 | 090M1 | G.19 |
| 120020 | SFAL11N | B.3 | 129168 | TLR22P600 | H.33 | 129350 | U3SX315K0SNS | H.19 | 130311 | 090M2 | G.19 |
| 120021 | SFAL20N | B.3 | 129168 | TLR22P600 | H.33 | 129351 | U3SX400K0SNS | H.19 | 130320 | 114FCT03 | G.9 |
| 120022 | SFAL11D | B.3 | 129169 | TLR15P1000 | H.33 | 129352 | U3SX475K0SNS | H.19 | 130320 | 114FCT03 | E.70 |
| 120023 | SFAL20D | B.3 | 129169 | TLR15P1000 | H.33 | 129353 | U30V24OP1 | H.20 | 130321 | 114FCT03T | G.9 |
| 120024 | SFA11 | B.3 | 129170 | TLR11P1200 | H.33 | 129353 | U30V24OP1 | H.20 | 130321 | 114FCT03T | E.70 |
| 120025 | SFAK10 | B.3 | 129170 | TLR11P1200 | H.33 | 129354 | U30V24OP2 | H.20 | 132170 | IPA1-N211B | E.67 |
| 120026 | SFAK01 | B.3 | 129171 | TLR8,8P1500 | H.33 | 129354 | U30V24OP2 | H.20 | 132171 | IPA1-P211B | E.67 |
| 120027 | SFAL11S | B.3 | 129171 | TLR8,8P1500 | H.33 | 129388 | U30V24DN1 | H.20 | 132172 | IPB1-N211B | E.67 |
| 120030 | SFBOAJ | B.3 | 129172 | TLR7,4P1800 | H.33 | 129388 | U30V24DN1 | H.20 | 132173 | IPB1-P211B | E.67 |
| 120031 | SFBOAN | B.3 | 129172 | TLR7,4P1800 | H.33 | 129389 | U30V24DN2 | H.20 | 132182 | IPB2-N211B | E.67 |
| 120032 | SFBOAU | B.3 | 129173 | TLR175P600 | H.33 | 129389 | U30V24DN2 | H.20 | 132186 | IPB1-N222B | E.67 |
| 120034 | SFBOBJ | B.3 | 129173 | TLR175P600 | H.33 | 129390 | U30V24DN3 | H.20 | 132198 | IPA1-N411B | E.67 |
| 120035 | SFBORN | B.3 | 129174 | TLR118P600 | H.33 | 129390 | U30V24DN3 | H.20 | 132201 | IPB1-N411B | E.67 |
| 120036 | SFBORU | B.3 | 129174 | TLR118P600 | H.33 | 129391 | U30V24DN5 | H.20 | 132203 | IPB1-R411B | E.67 |
| 120040 | SFS04 | B.4 | 129175 | TLR86P600 | H.33 | 129391 | U30V24DN5 | H.20 | 132213 | IPA1-N422B | E.67 |
| 120041 | SFS05 | B.4 | 129175 | TLR86P600 | H.33 | 129393 | U30V24DN6 | H.20 | 132214 | IPA1-D422B | E.67 |
| 120042 | SFE04 | B.4 | 129176 | TLR59P1000 | H.33 | 129393 | U30V24DN6 | H.20 | 132215 | IPB1-N422B | E.67 |
| 120043 | SFE05 | B.4 | 129176 | TLR59P1000 | H.33 | 129394 | U30V24RY0 | H.20 | 132216 | IPB1-D422B | E.67 |
| 120046 | SFS0K2 | B.4 | 129177 | TLR43P1000 | H.33 | 129394 | U30V24RY0 | H.20 | 132230 | 105DTL220 | E.70 |
| 120047 | SFE0K2 | B.4 | 129177 | TLR43P1000 | H.33 | 129396 | U30V24AIO | H.20 | 132231 | 105DTL500 | E.70 |
| 120051 | SFPO5 | B.4 | 129284 | U30F3016EB | H.32 | 129396 | U30V24AIO | H.20 | 132232 | 105DTL690 | E.70 |
| 120052 | SFPO6 | B.4 | 129284 | U30F3016EB | H.32 | 129397 | U30V24SLO | H.20 | 132234 | 105PT | G.9 |
| 120053 | SFPE0 | B.4 | 129285 | U30F3030EB | H.32 | 129397 | U30V24SLO | H.20 | 132234 | 105 PT | E.70 |
| 120054 | SFVCD | B.4 | 129285 | U30F3030EB | H.32 | 129398 | U30V24SL1 | H.20 | 132240 | 105 GIL | E.71 |
| 120114 | SFBORN | B.3 | 129286 | U30F3055EB | H.32 | 129398 | U30V24SL1 | H.20 | 132241 | 105 GIL 10 | E.71 |
| 120115 | SFBORUM | B.3 | 129286 | U30F3055EB | H.32 | 129399 | U30V24SL2 | H.20 | 132242 | 105 CI | E.71 |
| 120881 | QA02P008S | D.67 | 129287 | U30F3075EB | H.32 | 129399 | U30V24SL2 | H.20 | 132243 | 105 CI 10 | E.71 |
| 120882 | QA02P017S | D.67 | 129287 | U30F3075EB | H.32 | 129400 | U30V24SL3 | H.20 | 132244 | 105 PM | E.71 |
| 120883 | QA02P022S | D.67 | 129288 | U30F3100EB | H.32 | 129400 | U30V24SL3 | H.20 | 132250 | 105GPIP220 | E.70 |
| 120884 | QA02P031S | D.67 | 129288 | U30F3100EB | H.32 | 129867 | TLR405P200 | H.33 | 132251 | 105GPIP220M | E.70 |
| 120885 | QA02P044S | D.67 | 129289 | U30F3130EB | H.32 | 129867 | TLR405P200 | H.33 | 132252 | 105GPIP500 | E.70 |
| 120886 | QA02P058S | D.67 | 129289 | U30F3130EB | H.32 | 129868 | TLR216P200 | H.33 | 132253 | 105GPIP500M | E.70 |
| 120892 | QA12P008S | D.67 | 129290 | U30F3180EB | H.32 | 129868 | TLR216P200 | H.33 | 132500 | 115PC002 | G.18 |
| 120893 | QA12P017S | D.67 | 129290 | U30F3180EB | H.32 | 129869 | TLR108P200 | H.33 | 132501 | 115PC015 | G.18 |
| 120894 | QA12P022S | D.67 | 129291 | U30F3250ES | H.32 | 129869 | TLR108P200 | H.33 | 132502 | 115PC018 | G.18 |
| 120895 | QA12P031S | D.67 | 129291 | U30F3250ES | H.32 | 129870 | TLR74P200 | H.33 | 132503 | 115PC119 | G.18 |
| 120896 | QA12P044S | D.67 | 129292 | U30F3320ES | H.32 | 129870 | TLR74P200 | H.33 | 132504 | 115PC2002 | G.18 |
| 120897 | QA12P058S | D.67 | 129292 | U30F3320ES | H.32 | 129871 | TLR5P2500 | H.33 | 132505 | 115PC2015 | G.18 |
| 120898 | QA22P008S | D.67 | 129293 | U30F3400ES | H.32 | 129871 | TLR5P2500 | H.33 | 132506 | 115PC2119 | G.18 |
| 120899 | QA22P017S | D.67 | 129293 | U30F3400ES | H.32 | 129872 | TLR4P3000 | H.33 | 132507 | 115PC002L | G.18 |
| 120900 | QA22P022S | D.67 | 129294 | U30F3600ES | H.32 | 129872 | TLR4P3000 | H.33 | 132508 | 115PC015L | G.18 |
| 120901 | QA22P031S | D.67 | 129294 | U30F3600ES | H.32 | 129873 | TLR864P200 | H.33 | 132509 | 115PC018 | G.18 |
| 120902 | QA22P044S | D.67 | 129295 | U30F31000ES | H.32 | 129873 | TLR864P200 | H.33 | 132510 | 115PC119 | G.18 |
| 120903 | QA22P058S | D.67 | 129295 | U30F31000ES | H.32 | 129875 | TLR432P200 | H.33 | 132511 | 115PC2002L | G.18 |
| 120904 | QA32P008S | D.67 | 129296 | U30F31600ES | H.32 | 129875 | TLR432P200 | H.33 | 132512 | 115PC2015L | G.18 |
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| 120906 | QA32P022S | D.67 | 129300 | U3SN000K7FBS | H.19 | 129876 | TLR295P200 | H.33 | 132514 | 115PC2119 | G.18 |
| 120907 | QA32P031S | D.67 | 129301 | U3SN001K5FBS | H.19 | 129877 | TLR35P1500 | H.33 | 132515 | 115PC2018 | G.18 |
| 120908 | QA32P044S | D.67 | 129302 | U3SN002K2FBS | H.19 | 129877 | TLR35P1500 | H.33 | 132562 | 115807SP | G.19 |
| 120909 | QA32P058S | D.67 | 129303 | U3SN004K0FBS | H.19 | 129878 | TLR29P1800 | H.33 | 132563 | 115803SP | G.19 |
| 120910 | QA0PTDIN | D.67 | 129304 | U3SN005K5FBS | H.19 | 129878 | TLR29P1800 | H.33 | 132564 | 115805SP | G.19 |
| 123623 | RCRT 6 - 60AJ | F.4 | 129305 | U3SN000K7SBS | H.19 | 129879 | TLR22P2500 | H.33 | 132565 | 115804SP | G.19 |
| 123624 | RCRT 6 - 60AN | F.4 | 129306 | U3SN001K5SBS | H.19 | 129879 | TLR22P2500 | H.33 | 132566 | 1158029-01GI | G.19 |
| 123656 | DINIL 02E ENU | F.4 | 129307 | U3SN002K2SBS | H.19 | 129880 | TLR18P3000 | H.33 | 132567 | 1158029-02GI | G.19 |
| 123700 | SON-3 | F.4 | 129308 | U3SN004K0SBS | H.19 | 129880 | TLR18P3000 | H.33 | 132568 | 1158029-03GIT | G.19 |
| 123744 | RDHT 1-1,2AEN | F.4 | 129309 | U3SN005K5SBS | H.19 | 129881 | TLR15P3700 | H.33 | 132569 | 1158029-04GIT | G.19 |
| 123754 | RDHT 1-10AEN | F.4 | 129310 | U3SN007K5SBS | H.19 | 129881 | TLR15P3700 | H.33 | 132570 | 115MA | G.19 |
| 123964 | RDHA 1-10AEN | F.4 | 129311 | U3SN011K0SBS | H.19 | 130000 | | | 132571 | 115CA | G.19 |
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| 133379 | KVP85E | D.23 | 167133 | U20N0K4PS | H.7 | 167429 | U203X07K5SS | H.14 | 167485 | U203X37KOSS | H.9 |
| 133380 | KVP10E | D.23 | 167134 | U20N0K7PS | H.3 | 167430 | U203X11KOSS | H.9 | 167485 | U203X37KOSS | H.13 |
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| 137567 | MG0004RATO | D.19 | 167136 | U20N2K2PS | H.3 | 167434 | U200ADN | H.9 | 167486 | U203X45KOSS | H.14 |
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| 139140 | RT12G | C.63 | 167137 | U20X0K7PS | H.7 | 167437 | U200AMP | H.9 | 167487 | U203X55KOSS | H.14 |
| 139141 | RT12H | C.63 | 167138 | U20X1K5PS | H.3 | 167438 | U200ALEDK | H.9 | 168083 | U2KV23DBUH4 | H.33 |
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| 152007 | P9XPN52007 | E.8 | 167400 | U201N00K4FS | H.9 | 167442 | U200AW10 | H.9 | 168085 | U2KV23DBUH2 | H.33 |
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| 167087 | U20AR0K7 | H.4 | 167422 | U203N07K5SS | H.9 | 167476 | U200F3100A | H.14 | 168506 | ACRP140A0H072 | H.34 |
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| 168513 | ACRP14A1H4 | H.17 | 168568 | DCRP310A0H14 | H.34 | 169104 | QT20058U21MS | D.73 | 170859 | 080SP18SFC | E.28 |
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| 168519 | ACRP70A0H29 | H.34 | 168577 | ACFRP14A | H.35 | 169124 | QT30072N21MS | D.72 | 170883 | 080KCSF | E.54 |
| 168519 | ACRP70A0H29 | H.17 | 168578 | ACFRP18A | H.35 | 169125 | QT30085N21MS | D.72 | 173033 | 077CF73033 | E.34 |
| 168519 | ACRP70A0H29 | H.34 | 168578 | ACFRP18A | H.35 | 169126 | QT30105N21MS | D.72 | 173034 | 077CF73034 | E.34 |
| 168520 | ACRP90A0H22 | H.34 | 168579 | ACFRP27A | H.35 | 169127 | QT30145N21MS | D.72 | 173037 | 077CF73037 | E.34 |
| 168520 | ACRP90A0H22 | H.17 | 168579 | ACFRP27A | H.35 | 169128 | QT30170N21MS | D.72 | 173038 | 077CF73038 | E.34 |
| 168520 | ACRP90A0H22 | H.34 | 168580 | ACFRP35A | H.35 | 169129 | QT30210N21MS | D.72 | 173040 | 077CF73040 | E.34 |
| 168521 | ACRP115A0H18 | H.34 | 168580 | ACFRP35A | H.35 | 169130 | QT30310N21MS | D.72 | 173095 | 077C3095 | E.34 |
| 168521 | ACRP115A0H18 | H.17 | 168581 | ACFRP38A | H.35 | 169131 | QT30390N21MS | D.72 | 173095 | 077C3095 | E.52 |
| 168521 | ACRP115A0H18 | H.34 | 168581 | ACFRP38A | H.35 | 169132 | QT30460N21MS | D.72 | 173208 | 080CPDT | E.19 |
| 168522 | ACRP160A0H14 | H.34 | 168582 | ACFRP45A | H.35 | 169133 | QT30580N21MS | D.72 | 173208 | 080CPDT | E.19 |
| 168522 | ACRP160A0H14 | H.17 | 168582 | ACFRP45A | H.35 | 169134 | QT30650N21MS | D.72 | 173220 | 080QDF | E.31 |
| 168522 | ACRP160A0H14 | H.34 | 168583 | ACFRP62A | H.35 | 169135 | QT30950N21MS | D.72 | 173353 | 077C3353 | E.34 |
| 168523 | ACRP185A0H11 | H.34 | 168583 | ACFRP62A | H.35 | 169136 | QT31100N21MS | D.72 | 173455 | 077CR455 | E.34 |
| 168523 | ACRP185A0H11 | H.34 | 168584 | ACFRP90A | H.35 | 169137 | QT31400N21MS | D.72 | 173901 | 077C9901 | E.34 |
| 168524 | ACRP225A0H096 | H.34 | 168584 | ACFRP90A | H.35 | 170000 | | | 173902 | 077C9902 | E.34 |
| 168524 | ACRP225A0H096 | H.34 | 168585 | ACFRP115A | H.35 | 170198 | 080CPT | E.32 | 173903 | 077C9903 | E.34 |
| 168525 | ACRP300A0H067 | H.34 | 168585 | ACFRP115A | H.35 | 170212 | 080ESL | E.33 | 173904 | 077C9904 | E.34 |
| 168525 | ACRP300A0H067 | H.34 | 168586 | ACFRP160A | H.35 | 170212 | 080ESL | E.33 | 173905 | 077C9905 | E.34 |
| 168526 | ACRP360A0H056 | H.34 | 168586 | ACFRP160A | H.35 | 170790 | P9ASCST | E.32 | 173910 | 077C9910 | E.34 |
| 168526 | ACRP360A0H056 | H.34 | 168587 | ACFRP185A | H.35 | 170801 | 080SP1 | E.28 | 173916 | 077C9916 | E.34 |
| 168527 | ACRP460A0H056 | H.34 | 168587 | ACFRP185A | H.35 | 170802 | 080SP2 | E.28 | 173919 | 077C9919 | E.34 |
| 168527 | ACRP460A0H056 | H.34 | 168588 | ACFRP225A | H.35 | 170803 | 080SP3 | E.28 | 179510 | 080XTGR03 | E.35 |
| 168528 | ACRP550A0H039 | H.34 | 168588 | ACFRP225A | H.35 | 170804 | 080SP4 | E.28 | 179514 | 080XTGR | E.35 |
| 168528 | ACRP550A0H039 | H.34 | 168589 | ACFRP300A | H.35 | 170806 | 080SP6 | E.28 | 179525 | 080XTGR01 | E.35 |
| 168530 | ACRP700A0H035 | H.34 | 168589 | ACFRP300A | H.35 | 170807 | 080SP8 | E.28 | 179526 | 080XTGR02 | E.35 |
| 168530 | ACRP700A0H035 | H.34 | 168590 | ACFRP360A | H.35 | 170808 | 080SP12 | E.28 | 179527 | 080XTGR04 | E.35 |
| 168531 | ACRP850A0H023 | H.34 | 168590 | ACFRP360A | H.35 | 170809 | 080SP18 | E.28 | 179528 | 080XTGR05 | E.35 |
| 168531 | ACRP850A0H023 | H.34 | 168591 | ACFRP460A | H.35 | 170810 | 080SP24 | E.28 | 179529 | 080XTGR06 | E.35 |
| 168532 | ACRP950A0H016 | H.34 | 168591 | ACFRP460A | H.35 | 170811 | 080SP35 | E.28 | 179530 | 080XTGR07 | E.35 |
| 168532 | ACRP950A0H016 | H.34 | 168592 | ACFRP550A | H.35 | 170831 | 080SP1M | E.28 | 179531 | 080XTGR08 | E.35 |
| 168542 | DCRP32A0H78 | H.34 | 168592 | ACFRP550A | H.35 | 170832 | 080SP2M | E.28 | 180000 | | |
| 168542 | DCRP32A0H78 | H.17 | 168594 | ACFRP700A | H.35 | 170834 | 080SP4M | E.28 | 180001 | 077-11 | E.53 |
| 168542 | DCRP32A0H78 | H.34 | 168594 | ACFRP700A | H.35 | 170835 | 080SP1SFC | E.28 | 180002 | 077-10 | E.53 |
| 168543 | DCRP45A0H55 | H.34 | 168595 | ACFRP850A | H.35 | 170835 | 080SP1SFC | E.54 | 180003 | 077-01 | E.53 |
| 168543 | DCRP45A0H55 | H.17 | 168595 | ACFRP850A | H.35 | 170836 | 080SP1SFE | E.28 | 180007 | 077-10A | E.53 |
| 168543 | DCRP45A0H55 | H.34 | 168596 | ACFRP950A | H.35 | 170837 | 080SP1SF | E.28 | 180008 | 077-01R | E.53 |
| 168544 | DCRP60A0H4 | H.34 | 168596 | ACFRP950A | H.35 | 170837 | 080SP1SF | E.54 | 180009 | 099SPD0TB | E.53 |
| 168544 | DCRP60A0H4 | H.34 | 169075 | QT10008U21MS | D.73 | 170838 | 080SP1MSFC | E.28 | 180010 | 077GSBCN | E.44 |
| 168545 | DCRP80A0H3 | H.34 | 169075 | QT10008U21MS | D.72 | 170838 | 080SP1MSFC | E.54 | 180019 | 077P11 | E.44 |
| 168545 | DCRP80A0H3 | H.34 | 169076 | QT10017U21MS | D.72 | 170839 | 080SP1MSFE | E.28 | 180020 | 077GGBCN | E.44 |
| 168546 | DCRP100A0H24 | H.34 | 169076 | QT10017U21MS | D.73 | 170840 | 080SP1MSF | E.28 | 180029 | 077P10 | E.44 |
| 168546 | DCRP100A0H24 | H.34 | 169077 | QT10031U21MS | D.72 | 170840 | 080SP1MSF | E.54 | 180039 | 077P01 | E.44 |
| 168547 | DCRP120A0H2 | H.34 | 169077 | QT10031U21MS | D.73 | 170841 | 080SP2SFC | E.28 | 180040 | 077GSBCS | E.44 |
| 168547 | DCRP120A0H2 | H.34 | 169078 | QT10044U21MS | D.72 | 170841 | 080SP2SFC | E.28 | 180049 | 077E11 | E.45 |
| 168548 | DCRP150A0H17 | H.34 | 169078 | QT10044U21MS | D.73 | 170841 | 080SP2SFC | E.54 | 180050 | 077GGBCS | E.44 |
| 168548 | DCRP150A0H17 | H.34 | 169079 | QT10058U21MS | D.72 | 170842 | 080SP2SFE | E.28 | 180059 | 077E10 | E.45 |
| 168549 | DCRP180A0H14 | H.34 | 169079 | QT10058U21MS | D.73 | 170843 | 080SP2SF | E.28 | 180069 | 077E01 | E.45 |
| 168549 | DCRP180A0H14 | H.34 | 169080 | QT10072U21MS | D.72 | 170843 | 080SP2SF | E.28 | 180079 | 077RE11 | E.45 |
| 168550 | DCRP220A0H11 | H.34 | 169080 | QT10072U21MS | D.73 | 170843 | 080SP2SF | E.54 | 180089 | 077RE10 | E.45 |
| 168550 | DCRP220A0H11 | H.34 | 169081 | QT10085U21MS | D.72 | 170844 | 080SP2MSFC | E.28 | 180090 | 077RER | E.45 |
| 168555 | DCRP18A2H9 | H.34 | 169081 | QT10085U21MS | D.73 | 170844 | 080SP2MSFC | E.28 | 180099 | 077RE01 | E.45 |
| 168555 | DCRP18A2H9 | H.17 | 169082 | QT10105U21MS | D.72 | 170844 | 080SP2MSFC | E.54 | 180100 | 077PC11C | E.45 |
| 168555 | DCRP18A2H9 | H.34 | 169082 | QT10105U21MS | D.73 | 170845 | 080SP2MSFE | E.28 | 180104 | 077PC11G | E.45 |
| 168556 | DCRP25A2H1 | H.34 | 169083 | QT10145U21MS | D.72 | 170846 | 080SP2MSF | E.28 | 180120 | 077P11T30 | E.44 |
| 168556 | DCRP25A2H1 | H.17 | 169083 | QT10145U21MS | D.73 | 170846 | 080SP2MSF | E.28 | 180121 | 077P11T180 | E.44 |
| 168556 | DCRP25A2H1 | H.34 | 169084 | QT10170U21MS | D.72 | 170846 | 080SP2MSF | E.54 | 180136 | 077GSBCF | E.44 |
| 168557 | DCRP32A1H6 | H.34 | 169084 | QT10170U21MS | D.73 | 170847 | 080SP3SFC | E.28 | 180137 | 077GGBCF | E.44 |
| 168557 | DCRP32A1H6 | H.17 | 169085 | QT10210U21MS | D.73 | 170847 | 080SP3SFC | E.28 | 180170 | 077SDN11 | E.46 |
| 168557 | DCRP32A1H6 | H.34 | 169086 | QT10310U21MS | D.73 | 170847 | 080SP3SFC | E.28 | 180180 | 077SHN11 | E.46 |
| 168558 | DCRP40A1H2 | H.34 | 169087 | QT10390U21MS | D.73 | 170848 | 080SP3SFE | E.28 | 180230 | 077SBN11 | E.46 |
| 168558 | DCRP40A1H2 | H.34 | 169088 | QT10460U21MS | D.72 | 170849 | 080SP3SF | E.28 | 180240 | 077SBN11DC | E.46 |
| 168559 | DCRP50A0H96 | H.34 | 169088 | QT10460U21MS | D.73 | 170849 | 080SP3SF | E.28 | 180250 | 077SBN11D | E.46 |
| 168559 | DCRP50A0H96 | H.34 | 169089 | QT10580U21MS | D.72 | 170849 | 080SP3SF | E.54 | 180260 | 077SBN11RC | E.46 |
| 168560 | DCRP60A0H82 | H.34 | 169089 | QT10580U21MS | D.73 | 170850 | 080SP4SFE | E.28 | 180440 | 077SN22 | E.46 |
| 168560 | DCRP60A0H82 | H.34 | 169090 | QT10820U21MS | D.72 | 170851 | 080SP4MSFE | E.28 | 180480 | 077SN22 | E.46 |
| 168561 | DCRP80A0H58 | H.34 | 169090 | QT10820U21MS | D.73 | 170852 | 080SP6SFE | E.28 | 180510 | 077SN22RC | E.46 |
| 168561 | DCRP80A0H58 | H.34 | 169091 | QT10210N21MS | D.72 | 170853 | 080SP8SFC | E.28 | 180521 | 077SP1 | E.54 |
| 168562 | DCRP100A0H49 | H.34 | 169092 | QT10310N21MS | D.72 | 170853 | 080SP8SFC | E.54</ | | | |

Control and Automation

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|---------|---------------|------|---------|-------------|------|---------|-------------|------|---------|-------------|------|
| 180531 | 077SP16 | E.54 | 181722 | 077TNA313 | E.53 | 186240 | P9SSM21N | E.12 | 187316 | P9ARDLS002 | E.31 |
| 180532 | 077SP20 | E.54 | 181840 | 077TGR02 | E.53 | 186280 | P9SSM25N | E.12 | 187318 | P9ARDLS030 | E.31 |
| 180533 | 077SP25 | E.54 | 181930 | 077TNA40 | E.53 | 186320 | P9XSMZ3N | E.12 | 187319 | P9ARDLS201 | E.31 |
| 180534 | 077SP30 | E.54 | 181951 | 077TNA230 | E.53 | 186330 | P9SSMX0N | E.12 | 187320 | P9ARDLS202 | E.31 |
| 180535 | 077SP36 | E.54 | 181962 | 077TNA3 | E.53 | 186400 | P9SSCDOA95 | E.14 | 187350 | P9ARDPL | E.31 |
| 180536 | 077SP15FE | E.54 | 181963 | 077TNA301 | E.53 | 186409 | P9SSCDA95 | E.14 | 187351 | P9ARDPL029 | E.31 |
| 180537 | 077SP1MSFE | E.54 | 184070 | P9XER3RN | E.11 | 186410 | P9SSCI5C95 | E.14 | 187352 | P9ARDPL028 | E.31 |
| 180538 | 077SP2SFE | E.54 | 184071 | P9XER4RN | E.11 | 186439 | P9SSCZ0T95 | E.14 | 187355 | P9ARDPL006 | E.31 |
| 180539 | 077SP2MSFE | E.54 | 184690 | P9MPS21G | E.17 | 186461 | P9SSCZ5A95 | E.15 | 187359 | P9ARDPL017 | E.31 |
| 180540 | 077SP3SFE | E.54 | 184691 | P9MPS22G | E.17 | 186467 | P9SSCZ3C95 | E.15 | 187360 | P9ARDPL018 | E.31 |
| 180541 | 077SP4VSFE | E.54 | 184692 | P9MPS23G | E.17 | 186551 | P9SEM3RL | E.16 | 187361 | P9ARDPL026 | E.31 |
| 180542 | 077SP4SFE | E.54 | 184693 | P9MPS34G | E.17 | 186561 | P9SET4RL1 | E.16 | 187362 | P9ARDPL027 | E.31 |
| 180543 | 077SP6SFE | E.54 | 184694 | P9MPS35G | E.17 | 186695 | P9XCD | E.17 | 187363 | P9ARDPL031 | E.31 |
| 180544 | 077SP9SFE | E.54 | 184695 | P9MCD | E.17 | 186772 | P9XZ | E.18 | 187364 | P9ARDPL032 | E.31 |
| 180545 | 077SP12SFE | E.54 | 184696 | P9MCB | E.17 | 186773 | P9SBD | E.18 | 187365 | P9ARDPL001 | E.31 |
| 180546 | 077SP16SFE | E.54 | 184697 | P9MCC | E.17 | 186774 | P9SBL | E.18 | 187366 | P9ARDPL002 | E.31 |
| 180547 | 077SP20SFE | E.54 | 184700 | P9MMN2F | E.17 | 186880 | P9DPLNRG00 | E.19 | 187368 | P9ARDPL030 | E.31 |
| 180548 | 077SP25SFE | E.54 | 184701 | P9MMN2T | E.17 | 186881 | P9DPLVRG00 | E.19 | 187369 | P9ARDPL201 | E.31 |
| 180549 | 077SP30SFE | E.54 | 184702 | P9MMN2A | E.17 | 186882 | P9DPLNRS00 | E.19 | 187370 | P9ARDPL202 | E.31 |
| 180550 | 077SP36SFE | E.54 | 184703 | P9MMN2B | E.17 | 186883 | P9DPLVRS00 | E.19 | 187490 | P9ARCT | E.32 |
| 180551 | 077SP4VSFC | E.54 | 184710 | P9MMB2F | E.17 | 186890 | P9DPLNRG01 | E.19 | 187491 | P9ARHPR | E.33 |
| 180552 | 077SP36SFC | E.54 | 184711 | P9MMB2T | E.17 | 186891 | P9DPLVRS01 | E.19 | 187492 | P9ARRE4 | E.33 |
| 180552 | 077SP36SFC | E.54 | 184712 | P9MMB2A | E.17 | 186892 | P9DPLNRS01 | E.19 | 187495 | P9ARSGMN | E.32 |
| 180553 | 077SP4VSF | E.54 | 184713 | P9MMB2B | E.17 | 186893 | P9DPLVRS01 | E.19 | 187496 | P9ARSGMB | E.32 |
| 180554 | 077SP36SF | E.54 | 184720 | P9MMN4F | E.17 | 187000 | P9B11VN | E.20 | 187510 | P9ASBGR 029 | E.30 |
| 180554 | 077SP36SF | E.54 | 184721 | P9MMN4T | E.17 | 187000 | P9B11VN | E.53 | 187511 | P9ASBGN 028 | E.30 |
| 180601 | 077SLD11 | E.46 | 184740 | P9MMB4F | E.17 | 187001 | P9B01VN | E.20 | 187512 | P9ASBVG 028 | E.30 |
| 180606 | 077SLX22 | E.46 | 184741 | P9MMB4T | E.17 | 187001 | P9B01VN | E.53 | 187517 | P9ASBGN 006 | E.30 |
| 180607 | 077SLB11 | E.46 | 184770 | P9MWR | E.18 | 187002 | P9B10VN | E.20 | 187518 | P9ASBVG 006 | E.30 |
| 180623 | 077SLZ22 | E.46 | 184771 | P9XRG | E.18 | 187002 | P9B10VN | E.53 | 187543 | P9ASBGL 037 | E.30 |
| 180625 | 077SLZ22DC | E.46 | 184772 | P9SZ | E.18 | 187003 | P9B01VR | E.20 | 187545 | P9ASBGN 030 | E.30 |
| 180626 | 077SLZ22RC | E.46 | 185070 | P9MER3RN | E.11 | 187004 | P9B10VA | E.20 | 187546 | P9ASBVG 030 | E.30 |
| 180630 | 077SLCB1101 | E.47 | 185071 | P9MER4RN | E.11 | 187008 | P9B02VN | E.20 | 187547 | P9ASBGR 201 | E.30 |
| 180631 | 077SCD1105 | E.47 | 185077 | P9SER4RA | E.11 | 187009 | P9B20VN | E.20 | 187548 | P9ASBGN 202 | E.30 |
| 180632 | 077SCD1109 | E.47 | 185078 | P9XER4RAW | E.11 | 187012 | P9B01FN | E.20 | 187549 | P9ASBGV 202 | E.30 |
| 180636 | 077SCH115C03 | E.47 | 185079 | P9XEC4RA95N | E.11 | 187013 | P9B10FN | E.20 | 187550 | P9ASBGN 029 | E.30 |
| 180640 | 077SCH11DC03 | E.47 | 185110 | P9SSMDON | E.12 | 187014 | P9B01FH | E.20 | 187551 | P9ASBGN 028 | E.30 |
| 180843 | 077SCH1120 | E.47 | 185120 | P9SSMI0N | E.12 | 187015 | P9B10FH | E.20 | 187552 | P9ASBGB 006 | E.30 |
| 180852 | 077SCH11DC07 | E.47 | 185150 | P9SSMDSN | E.12 | 187017 | P9B01BN | E.23 | 187610 | P9ASBSR 029 | E.30 |
| 180853 | 077SCH11RC03 | E.47 | 185190 | P9XSMUON | E.12 | 187018 | P9B10BN | E.23 | 187611 | P9ASBSN 028 | E.30 |
| 180906 | 077SCZ22DC01 | E.47 | 185200 | P9XSMZON | E.12 | 187020 | P9PDNV0 | E.21 | 187612 | P9ASBSV 028 | E.30 |
| 180910 | 077MTS2422 | E.48 | 185240 | P9XSMZ1N | E.12 | 187021 | P9PRLV | E.21 | 187617 | P9ASBSN 006 | E.30 |
| 180911 | 077MT24S22 | E.48 | 185280 | P9XSMZ5N | E.12 | 187022 | P9PRDVN | E.21 | 187618 | P9ASBSV 006 | E.30 |
| 180912 | 077MTS2422R | E.48 | 185320 | P9SSMZ3N | E.12 | 187023 | P9PRNVJ | E.21 | 187643 | P9ASBSL 037 | E.30 |
| 180913 | 077MT24S22R | E.48 | 185330 | P9XSMXON | E.12 | 187024 | P9PRNVN | E.21 | 187645 | P9ASBSN 030 | E.30 |
| 180914 | 077M2S2S2X44 | E.48 | 185370 | P9XSVDON | E.13 | 187025 | P9PREVJ | E.21 | 187646 | P9ASBSV 030 | E.30 |
| 180915 | 077M2T2TX44 | E.48 | 185371 | P9XgSVION | E.13 | 187026 | P9PREVL | E.21 | 187647 | P9ASBSR 201 | E.30 |
| 180918 | 077M2S2TX44 | E.48 | 185373 | P9XSVDSN | E.13 | 187027 | P9PDTVO | E.21 | 187648 | P9ASBSN 202 | E.30 |
| 180919 | 077M2T2TX44 | E.48 | 185379 | P9XSVZON | E.13 | 187028 | P9PRTVN | E.21 | 187649 | P9ASBSV 202 | E.30 |
| 180921 | 077M4T4TX88 | E.48 | 185391 | P9XSVZ3N | E.13 | 187040 | P9PDMVD | E.21 | 187650 | P9ASBSN 029 | E.30 |
| 180923 | 077M4S4TX88 | E.48 | 185392 | P9XSVXON | E.13 | 187041 | P9PDMVJ | E.21 | 187651 | P9ASBSB 028 | E.30 |
| 180927 | 077M4T4TY88 | E.48 | 185400 | P9XSCDOA95 | E.14 | 187055 | P9PDNFO | E.21 | 187652 | P9ASBSB 006 | E.30 |
| 180929 | 077MTS123422 | E.48 | 185401 | P9XSCDO95 | E.14 | 187056 | P9PDHF | E.20 | 187701 | 080QDF029 | E.31 |
| 180931 | 077MT1234S22 | E.48 | 185402 | P9XSCDOK95 | E.14 | 187056 | P9PDHF | E.21 | 187702 | 080QDF028 | E.31 |
| 180971 | 077GELR | E.49 | 185409 | P9XSCDA95 | E.14 | 187070 | P9PDNBO | E.23 | 187705 | 080QDF006 | E.31 |
| 180980 | 077GG03 | E.49 | 185410 | P9XSCI5C95 | E.14 | 187110 | P9ARBGR 029 | E.30 | 187709 | 080QDF017 | E.31 |
| 180981 | 077GGM | E.49 | 185432 | P9XSCUOT95 | E.14 | 187111 | P9ARBGN 028 | E.30 | 187710 | 080QDF018 | E.31 |
| 180982 | 077GGT | E.49 | 185433 | P9XSCZ0A95 | E.14 | 187112 | P9ARBGV 028 | E.30 | 187711 | 080QDF026 | E.31 |
| 181000 | 077MTS2422B | E.48 | 185434 | P9XSCZ0C95 | E.14 | 187117 | P9ARBGN 006 | E.30 | 187713 | 080QDF031 | E.31 |
| 181001 | 077MT24S22B | E.48 | 185435 | P9XSCZ0E95 | E.14 | 187118 | P9ARBGV 006 | E.30 | 187714 | 080QDF032 | E.31 |
| 181002 | 077MTS2422RB | E.48 | 185439 | P9XSCZ0T95 | E.14 | 187125 | P9ARBGN 017 | E.30 | 187715 | 080QDF001 | E.31 |
| 181003 | 077MT24S22RB | E.48 | 185461 | P9XSCZ5A95 | E.15 | 187127 | P9ARBGN 018 | E.30 | 187716 | 080QDF002 | E.31 |
| 181004 | 077M2S2S2X44B | E.48 | 185462 | P9XSCZ5C95 | E.15 | 187143 | P9ARBGL 037 | E.30 | 187719 | 080QDF201 | E.31 |
| 181005 | 077M2T2TX44B | E.48 | 185463 | P9XSCZ5H95 | E.15 | 187144 | P9ARBGR 036 | E.30 | 187720 | 080QDF202 | E.31 |
| 181008 | 077M4S4TX88B | E.48 | 185467 | P9XSCZ3C95 | E.15 | 187145 | P9ARBGN 030 | E.30 | 187791 | P9ASCST | E.32 |
| 181009 | 077M4T4TY88B | E.48 | 185571 | P9XET4RL2 | E.16 | 187146 | P9ARBGV 030 | E.30 | 187792 | P9ASHP3 | E.33 |
| 181019 | 077MTS123422B | E.48 | 185695 | P9SCD | E.17 | 187147 | P9ARBGR 201 | E.30 | 187793 | P9ASHP5 | E.33 |
| 181021 | 077MT1234S22B | E.48 | 185700 | P9XMMN2F | E.17 | 187148 | P9ARBGN 202 | E.30 | 187794 | P9ASHAC | E.33 |
| 181040 | 077PLM11D0 | E.49 | 185701 | P9XMMN2T | E.17 | 187149 | P9ARBGV 202 | E.30 | 187795 | P9ASEBG | E.33 |
| 181041 | 077PLM20D0 | E.49 | 185710 | P9XMB2F | E.17 | 187150 | P9ARBGN 029 | E.30 | 187796 | P9ADCST | E.19 |
| 181043 | 077PLM10D0 | E.49 | 185711 | P9XMB2T | E.17 | 187151 | P9ARBGB 028 | E.30 | 187796 | P9ADCST | E.19 |
| 181060 | 077ISD11D0 | E.50 | 185712 | P9XMB2A | E.17 | 187152 | P9ARBGB 006 | E.30 | 187840 | P9ACRCL | E.33 |
| 181170 | 077ISB11D0 | E.50 | 185713 | P9XMB2B | E.17 | 187210 | P9ARBSR 029 | E.30 | 187840 | P9ACRCL | E.33 |
| 181174 | 077ISB11D0RC | E.50 | 185720 | P9XMMN4F | E.17 | 187211 | P9ARBSN 028 | E.30 | 187841 | P9ACFS3 | E.33 |
| 181176 | 077IS211D0RC | E.50 | 185721 | P9XMMN4T | E.17 | 187212 | P9ARBSV 028 | E.30 | 187841 | P9ACFS3 | E.33 |
| 181260 | 077DLE14 | E.51 | 185740 | P9XMB4F | E.17 | 187217 | P9ARBSN 006 | E.30 | 187842 | P9ACFS5 | E.33 |
| 181300 | 077LDNV0 | E.51 | 185741 | P9XMB4T | E.17 | 187218 | P9ARBSV 006 | E.30 | 187842 | P9ACFS5 | E.33 |
| 181301 | 077LRNVJ | E.51 | 185771 | P9MRG | E.18 | 187245 | P9ARBSN 030 | E.30 | 187843 | P9ACDPP | E.33 |
| 181302 | 077LRNVN | E.51 | 185772 | P9MZ | E.18 | 187246 | P9ARBSV 030 | E.30 | 187843 | P9ACDPP | E.33 |
| 181305 | 077LDMVD | E.51 | 185773 | P9XBD | E.18 | 187247 | P9ARBSR 201 | E.30 | 187844 | P9ACVLR | E.33 |
| 181550 | 077DPP | E.52 | 185774 | P9XBM | E.18 | 187248 | P9ARBSN 202 | E.30 | 187844 | P9ACVLR | E.33 |
| 181554 | 077DAE | E.52 | 185788 | 080QDF027 | E.31 | 187249 | P9ARBSV 202 | E.30 | 187845 | P9ACWAF | E.33 |
| 181570 | 077OPZ | E.52 | 185789 | 080QDF030 | E.31 | 187250 | P9ARBSN 029 | E.30 | 187845 | P9ACWAF | E.33 |
| 181588 | 077CPT | E.52 | 186031 | P9SEM3RN | E.11 | 187251 | P9ARBSB 028 | E.30 | 187846 | P9ACFSM | E.20 |
| 181600 | 077CPLT | E.52 | 186061 | P9SET4R | E.11 | 187252 | P9ARBSB 006 | E.30 | 187846 | P9ACFSM | E.33 |
| 181601 | 077TFF | E.52 | 186072 | P9XER4RAN | E.11 | 187300 | P9ARDLS | E.31 | 187846 | P9ACFSM | E.33 |
| 181602 | 077ECR | E.45 | 186073 | P9SEC4RA95 | E.11 | 187301 | P9ARDLS029 | E.31 | 187847 | P9ACAFV | E.33 |
| 181603 | 077CST | E.52 | 186110 | P9XSMDON | E.12 | 187302 | P9ARDLS028 | E.31 | 187847 | P9ACAFV | E.33 |
| 181608 | 077PTB10 | E.53 | 186120 | P9XSMION | E.12 | 187305 | P9ARDLS006 | E.31 | 187850 | BA95606 | E.52 |
| 181609 | 077PTB01 | E.53 | 186140 | P9XSMDSN | E.12 | 187309 | P9ARDLS017 | E.31 | 187850 | BA95606 | E.52 |
| 181615 | 077PTB11 | E.53 | 186150 | P9SSMI5N | E.12 | 187310 | P9ARDLS018 | E.31 | 187851 | BA95615 | E.54 |
| 181620 | 077GE35 | E.52 | 186170 | P9SSMEON | E.12 | 187311 | P9ARDLS026 | E.31 | 187851 | BA95615 | E.32 |
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| 187853 | BA9S242 | G.19 | 189152 | P9AELN222 | E.24 | 211728 | RSS13/64TA33 | C.90 | 215320 | 1158065SPA | G.19 |
| 187854 | BA9S30 | E.34 | 189154 | P9AELN224 | E.24 | 211730 | RSS13/64TA39 | C.90 | 215321 | 1158067SPA | G.19 |
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| 187855 | BA9S48 | E.52 | 200004 | LG0006P1B0 | D.19 | 211737 | RSS13/64TA15 | C.90 | 215433 | P9EPC01X01 | E.26 |
| 187855 | BA9S48 | G.19 | 200909 | 114FCT12 | G.9 | 211739 | RSS20/165TA470 | C.90 | 216100 | 3903Y125D | C.90 |
| 187856 | BA9S6012 | E.34 | 200910 | 114FCT21 | G.9 | 211742 | RSS13/64TA10 | C.90 | 216604 | SFE04K1 | B.4 |
| 187856 | BA9S6012 | E.52 | 202273 | 390/3921PFZCS14 | C.91 | 211743 | RSS13/64TA100 | C.90 | 219154 | ERX00K7 | H.16 |
| 187856 | BA9S6012 | G.19 | 202274 | 390/3921PFZCS45 | C.91 | 211744 | RSS13/64TA100 | C.90 | 220000 | | |
| 187857 | BA9S130 | E.34 | 202275 | 390/3921PMRN | C.91 | 211744 | RSS13/64TA180 | C.90 | 220019 | PRC2P20ABL | A.4 |
| 187857 | BA9S130 | E.52 | 202276 | 390/3921PMZI | C.91 | 211744 | RSS13/64TA180 | C.90 | 220020 | PRC2P20ADL | A.4 |
| 187857 | BA9S130 | G.19 | 202277 | 390/3921PZ | C.91 | 211744 | RSS13/64TA180 | C.90 | 220021 | PRC2P20AGL | A.4 |
| 187860 | BA9SN110 | E.34 | 202278 | 390/3922PFZCS90 | C.91 | 211744 | RSS13/64TA180 | C.90 | 220022 | PRC2P20CBL | A.4 |
| 187860 | BA9SN110 | E.52 | 202279 | 390/3922PMZI | C.91 | 211744 | RSS13/64TA180 | C.90 | 220023 | PRC2P20CDL | A.4 |
| 187860 | BA9SN110 | G.19 | 202280 | 390/3922PZ | C.91 | 211744 | RSS13/64TA180 | C.90 | 220024 | PRC2P20AJL | A.4 |
| 187861 | BA9SN220 | E.34 | 202281 | 390/3923PFZCS125 | C.91 | 211744 | RSS13/64TA180 | C.90 | 220025 | PRC2P20CGL | A.4 |
| 187861 | BA9SN220 | E.52 | 202282 | 390/3923PMRN | C.91 | 211745 | RSS13/64TA330 | C.90 | 220026 | PRC2P20ANL | A.4 |
| 188000 | P9ARTBS | E.34 | 202283 | 390/3923PMZI | C.91 | 211745 | RSS13/64TA330 | C.90 | 220027 | PRC2P20CJL | A.4 |
| 188001 | P9ARTBM | E.34 | 202284 | 390/3923PZ | C.91 | 211745 | RSS13/64TA330 | C.90 | 220041 | PRC2P20DCBL | A.4 |
| 188002 | P9ARPB | E.35 | 202287 | 390/3924PFRN | C.91 | 211745 | RSS13/64TA330 | C.90 | 220042 | PRC2P20DCDL | A.4 |
| 188005 | P9ARTWS | E.34 | 202288 | 390/3924PFZCS125 | C.91 | 211746 | RSS13/64TA390 | C.90 | 220043 | PRC2P20DCGL | A.4 |
| 188008 | P9ARTWM | E.34 | 202289 | 390/3924PFZCS200 | C.91 | 211748 | RSS20/165TA390 | C.90 | 220044 | PRC2P20DCJL | A.4 |
| 188010 | P9ASTBS | E.34 | 202290 | 390/3924PMRN | C.91 | 211748 | RSS20/165TA390 | C.90 | 220216 | PRCZ8 | A.4 |
| 188011 | P9ASTWS | E.34 | 202291 | 390/3924PMZI | C.91 | 211770 | 3906Y230D | C.90 | 220217 | PRCG8 | A.4 |
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| 188018 | P9ACPTS | E.35 | 202303 | 390/3926PFZCS270 | C.91 | 212707 | 3906Y48D | C.90 | 220311 | PRC3P30ADL | A.4 |
| 188019 | P9ARPTM | E.35 | 202304 | 390/3926PMZI | C.91 | 212709 | 390/3922PFRN | C.91 | 220312 | PRC3P30AGL | A.4 |
| 188019 | P9ARTTM | E.34 | 202306 | 390/3927PFRN | C.92 | 212759 | RS01NEN | F.6 | 220313 | PRC3P30CBL | A.4 |
| 188028 | P9ARPWM | E.35 | 202307 | 390/3927PFZCS320 | C.92 | 212959 | 3908Y97D | C.90 | 220314 | PRC3P30CDL | A.4 |
| 188030 | P9ACPBS039 | E.35 | 202308 | 390/3927PFZCS630 | C.92 | 212962 | 3909PMZ | C.92 | 220315 | PRC3P30DCJL | A.4 |
| 188043 | P9ARSCMN | E.32 | 202309 | 390/3927PMRN | C.92 | 213014 | 390/3922PMRN | C.91 | 220316 | PRC3P30CGL | A.4 |
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| 188201 | P9ACPBS201 | E.35 | 202311 | 390/3927PZ | C.92 | 213034 | RSS13/64TA1200 | C.90 | 220318 | PRC3P30CJL | A.4 |
| 188202 | P9ACPBS202 | E.35 | 202323 | 39012Y110D | C.90 | 213034 | RSS13/64TA1200 | C.90 | 220335 | PRC3P30DCDL | A.4 |
| 188203 | P9ACPBS203 | E.35 | 202324 | 39012Y125D | C.90 | 213034 | RSS13/64TA1200 | C.90 | 220336 | PRC3P30DCJL | A.4 |
| 188204 | P9ACPBS204 | E.35 | 202325 | 39012Y197D | C.90 | 213034 | RSS13/64TA1200 | C.90 | 220337 | PRC3P30DCGL | A.4 |
| 188205 | P9ACPBS205 | E.35 | 202326 | 39012Y220D | C.90 | 213573 | 390/3925PFZCS150 | C.91 | 220338 | PRC3P30DCJL | A.4 |
| 188206 | P9ACPBS206 | E.35 | 202327 | 39012Y240D | C.90 | 213574 | 390/3926PFZCS450 | C.91 | 220647 | PRCZ11 | A.4 |
| 188207 | P9ACPBS207 | E.35 | 202328 | 39012Y97D | C.90 | 213601 | 3904Y97D | C.90 | 220647 | PRCZ11 | F.4 |
| 188208 | P9ACPBS208 | E.35 | 202437 | 3903Y110D | C.90 | 213612 | 3906Y220D | C.90 | 220648 | PRCG11 | A.4 |
| 188215 | P9ACPBS215 | E.35 | 202438 | 3903Y220D | C.90 | 213663 | RSS20/165TA100 | C.90 | 220710 | PRC4M20ABL | A.3 |
| 188222 | P9ACPBS222 | E.35 | 202479 | 3904Y110D | C.90 | 213664 | RSS20/165TA120 | C.90 | 220711 | PRC4M20ADL | A.3 |
| 188224 | P9ACPBS224 | E.35 | 202480 | 3904Y125D | C.90 | 213691 | 3903Y97D | C.90 | 220712 | PRC4M20AGL | A.3 |
| 188231 | P9ACPBS231 | E.35 | 202481 | 3904Y197D | C.90 | 213814 | 3904Y48D | C.90 | 220713 | PRC4M20CBL | A.3 |
| 188232 | P9ACPBS232 | E.35 | 202482 | 3904Y220D | C.90 | 213986 | 390/3923PFRN | C.91 | 220714 | PRC4M20CDL | A.3 |
| 188233 | P9ACPBS233 | E.35 | 202483 | 3904Y240D | C.90 | 214066 | 3908Y197D | C.90 | 220715 | PRC4M20AJL | A.3 |
| 188234 | P9ACPBS234 | E.35 | 202512 | 3905Y110D | C.90 | 214081 | RSS20/165TA82 | C.90 | 220716 | PRC4M20CGL | A.3 |
| 188239 | P9ACPBS239 | E.35 | 202513 | 3905Y97D | C.90 | 214120 | 390/3921/2FOM4/2 | C.91 | 220717 | PRC4M20ANL | A.3 |
| 188243 | P9ACPBS243 | E.35 | 202532 | 3906Y110D | C.90 | 214120 | 390/3921/2FOM4/2 | C.91 | 220718 | PRC4M20CJL | A.3 |
| 188258 | P9ACPBS258 | E.35 | 202533 | 3906Y97D | C.90 | 214121 | 390/3922FOM5/2 | C.91 | 220754 | PRC4M20DCBL | A.3 |
| 188804 | P9ACA6 | E.20 | 202547 | 3907Y110D | C.90 | 214121 | 390/3922FOM5/2 | C.91 | 220755 | PRC4M20DCDL | A.3 |
| 188805 | P9ARSN1 | E.33 | 202548 | 3907Y220D | C.90 | 214122 | 390/3923/2FOM4/2 | C.91 | 220756 | PRC4M20DCJL | A.3 |
| 188909 | P9ARBGB 202 | E.30 | 202555 | 3908PFZCS400 | C.92 | 214123 | 390/3923FOM5/2 | C.91 | 220757 | PRC4M20DCJL | A.3 |
| 188978 | P9ARBSB 202 | E.30 | 202562 | 3908PFZCS800 | C.92 | 214124 | 390/3924F4 | C.91 | 220912 | PRCG-ES15/2N | A.3 |
| 189000 | P9EPEG1 | E.24 | 202563 | 3908PMZ | C.92 | 214126 | 390/3924M4/2 | C.91 | 220914 | PRCG1052 | A.3 |
| 189001 | P9EPE01 | E.24 | 202564 | 3908PZ | C.92 | 214127 | 390/3924M5/2 | C.91 | 220914 | PRCG1052 | A.3 |
| 189002 | P9EPE02 | E.24 | 202565 | 3908Y110D | C.90 | 214128 | 390/3925F4/2 | C.91 | 220914 | PRCG1052 | A.3 |
| 189003 | P9EPE03 | E.24 | 202566 | 3908Y220D | C.90 | 214129 | 390/3925F5/2 | C.91 | 220915 | PRCMS35 | A.3 |
| 189004 | P9EPE04 | E.24 | 202572 | 3909Y110D | C.90 | 214130 | 390/3925M4/2 | C.91 | 220915 | PRCMS35 | A.3 |
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| 189010 | P9EPA01Y02 | E.24 | 204177 | RSS13/64TA8,2 | C.90 | 214136 | 390/3926M5/2 | C.91 | 221051 | PRC4M30ABL | A.3 |
| 189011 | P9EPA01Y03 | E.24 | 204177 | RSS13/64TA82 | C.90 | 214137 | 390/3927F4/2 | C.92 | 221052 | PRC4M30ADL | A.3 |
| 189016 | P9EPA02Y01 | E.25 | 204178 | 390/3924F5/2 | C.91 | 214138 | 390/3927F5/2 | C.92 | 221053 | PRC4M30AGL | A.3 |
| 189018 | P9EPA03Y01 | E.25 | 204179 | 3909F4/2 | C.92 | 214139 | 390/3927M4/2 | C.92 | 221054 | PRC4M30CBL | A.3 |
| 189022 | P9EPA03Y05 | E.25 | 204180 | 3909F5/2 | C.92 | 214140 | 390/3927M5/2 | C.92 | 221055 | PRC4M30CDL | A.3 |
| 189029 | P9AEMT | E.24 | 204181 | 3909Y197D | C.90 | 214141 | 3908/9M4/2 | C.92 | 221056 | PRC4M30AJL | A.3 |
| 189030 | P9AELN | E.24 | 204800 | C09479 | C.21 | 214141 | 3908/9M4/2 | C.92 | 221057 | PRC4M30CGL | A.3 |
| 189031 | P9AELN202 | E.24 | 209140 | IUGA-B211 S | G.5 | 214142 | 3908/9M5/2 | C.92 | 221058 | PRC4M30ANL | A.3 |
| 189032 | P9AELN201 | E.24 | 209344 | LG0004P1B0 | D.19 | 214142 | 3908/9M5/2 | C.92 | 221059 | PRC4M30CJL | A.3 |
| 189033 | P9AELN214 | E.24 | 209347 | LG0004S1B0 | D.19 | 214144 | 3908F4/2 | C.92 | 221074 | PRC4M30DCBL | A.3 |
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| 189035 | P9AELN205 | E.24 | 209781 | MG0006PATO | D.19 | 214146 | 3909Y97D | C.90 | 221076 | PRC4M30DCGL | A.3 |
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| 221891 | PRCT1CD | A.5 | 222289 | NLT2BDLR | E.62 | 264826 | SFALPEN | B.3 |
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| 221906 | PRCT2CD | A.5 | 222295 | NLT2AJLR | E.62 | | | |
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| 221913 | PRCT2AD | A.5 | 222297 | NLT2AJLG | E.62 | | | |
| 221914 | PRCT2AJ | A.5 | 222298 | NLT2AJLV | E.62 | | | |
| 221915 | PRCT2AN | A.5 | 222299 | NLT2AJLL | E.62 | | | |
| 221918 | PRCGZT80 | A.5 | 222301 | NLT2ANLR | E.62 | | | |
| 221920 | PRCMS16 | A.5 | 222302 | NLT2ANLA | E.62 | | | |
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| 221934 | PRCG-ES15/4N | A.3 | 222304 | NLT2ANLV | E.62 | | | |
| 222004 | PRC1S13BDL | A.5 | 222305 | NLT2ANLL | E.62 | | | |
| 222007 | PRC1S13CBL | A.5 | 222306 | NLT2ANLI | E.62 | | | |
| 222008 | PRC1S13CDL | A.5 | 222307 | NLT90BT | E.63 | | | |
| 222012 | PRC1S13ANL | A.5 | 222330 | BA15D24LR | E.63 | | | |
| 222013 | PRC1S13BNL | A.5 | 222331 | BA15D24LA | E.63 | | | |
| 222039 | PRCW20 | A.5 | 222332 | BA15D24LG | E.63 | | | |
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| 222100 | PRCM21P | A.6 | 222334 | BA15D24LL | E.63 | | | |
| 222101 | PRCM21N | A.6 | 222335 | BA15D24LB | E.63 | | | |
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| 222103 | PRCM32R | A.6 | 222337 | BA15D115LA | E.63 | | | |
| 222104 | PRCM31G | A.6 | 222338 | BA15D115LG | E.63 | | | |
| 222105 | PRCM32G | A.6 | 222339 | BA15D115LV | E.63 | | | |
| 222106 | PRCM33G | A.6 | 222340 | BA15D115LL | E.63 | | | |
| 222107 | PRCM41G | A.6 | 222341 | BA15D115LB | E.63 | | | |
| 222109 | PRCM33R | A.6 | 222342 | BA15D230LR | E.63 | | | |
| 222110 | PRCM41R | A.6 | 222343 | BA15D230LA | E.63 | | | |
| 222111 | PRCM42R | A.6 | 222344 | BA15D230LG | E.63 | | | |
| 222112 | PRCM43R | A.6 | 222345 | BA15D230LV | E.63 | | | |
| 222113 | PRCM51 | A.6 | 222346 | BA15D230LL | E.63 | | | |
| 222114 | PRCM52 | A.6 | 222347 | BA15D230LB | E.63 | | | |
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| 222116 | PRCM91R | A.6 | 222349 | BA15D245 | E.63 | | | |
| 222120 | PRCM93G | A.6 | 222350 | BA15D305 | E.63 | | | |
| 222121 | PRCM71 | A.6 | 222351 | BA15D1155 | E.63 | | | |
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| 222230 | NLT1R | E.62 | 241748 | PVP10G | D.19 | | | |
| 222231 | NLT1A | E.62 | 241749 | PCP12G | D.19 | | | |
| 222232 | NLT1G | E.62 | 241750 | WLS1 | D.23 | | | |
| 222233 | NLT1V | E.62 | 241751 | WKI0910 | D.21 | | | |
| 222234 | NLT1L | E.62 | 241752 | WKI0608 | D.21 | | | |
| 222235 | NLT1I | E.62 | 242260 | 3905Y125D | C.90 | | | |
| 222236 | NLT2BDR | E.62 | 242464 | NLT2AJLI | E.62 | | | |
| 222237 | NLT2BDA | E.62 | 243281 | RSS13/64TA120 | C.90 | | | |
| 222238 | NLT2BDG | E.62 | 243713 | SFVH03 | B.3 | | | |
| 222239 | NLT2BDV | E.62 | 244056 | 3907Y40D | C.90 | | | |
| 222240 | NLT2BDL | E.62 | 244057 | 3907Y24D | C.90 | | | |
| 222241 | NLT2BDI | E.62 | 244058 | 3907Y20D | C.90 | | | |
| 222242 | NLT2AJR | E.62 | 244059 | 3907Y197D | C.90 | | | |
| 222243 | NLT2AJA | E.62 | 244063 | 3906Y40D | C.90 | | | |
| 222244 | NLT2AJG | E.62 | 244064 | 3906Y24D | C.90 | | | |
| 222245 | NLT2AJV | E.62 | 244065 | 3906Y20D | C.90 | | | |
| 222246 | NLT2AJL | E.62 | 244066 | 3906Y197D | C.90 | | | |
| 222247 | NLT2AJI | E.62 | 244071 | 3905Y40D | C.90 | | | |
| 222248 | NLT2ANR | E.62 | 244072 | 3905Y24D | C.90 | | | |
| 222249 | NLT2ANA | E.62 | 244073 | 3905Y20D | C.90 | | | |
| 222250 | NLT2ANG | E.62 | 244074 | 3905Y197D | C.90 | | | |
| 222251 | NLT2ANV | E.62 | 244083 | 3904Y40D | C.90 | | | |
| 222252 | NLT2ANL | E.62 | 244084 | 3904Y20D | C.90 | | | |
| 222253 | NLT2ANI | E.62 | 244088 | 3903Y40D | C.90 | | | |
| 222254 | NLT3BDR | E.62 | 244106 | 39012Y40D | C.90 | | | |
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| 222256 | NLT3BDG | E.62 | 244172 | 390/3921PFZCS25 | C.91 | | | |
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| 222259 | NLT3BDI | E.62 | 244191 | RSS13/64TA470 | C.90 | | | |
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| 222261 | NLT3AJA | E.62 | 244192 | RSS13/64TA27 | C.90 | | | |
| 222262 | NLT3AJG | E.62 | 244192 | RSS13/64TA27 | C.90 | | | |
| 222263 | NLT3AJV | E.62 | 244192 | RSS13/64TA27 | C.90 | | | |
| 222264 | NLT3AJL | E.62 | 244734 | 39012Y48D | C.90 | | | |
| 222265 | NLT3AJI | E.62 | 244735 | 3903Y24D | C.90 | | | |
| 222266 | NLT3ANR | E.62 | 244736 | 3905Y48D | C.90 | | | |
| 222267 | NLT3ANA | E.62 | 244737 | 3907Y48D | C.90 | | | |

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