YATRON® 日騰

GENERAL CATALOGUE

綜合型錄

ISO 9001 | Authorized P.B / Distributor

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Power Protection

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Sheet steel distribution system

GE imagination at work

Low voltage distribution boards for Industrial and Commercial applications

Industrial

- Construction materials
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- Food - Beverage
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- Railways
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- Governemental buildings

Low commercial

- Large commercial offices
- Shopping malls
- Schools
- Stores
- Small offices
- Gasoline stations
- Restaurants
- Small shops

Applications

Modula Plus has been developed as an universal range of system enclosures for all kind of applications in low voltage distribution for the commercial and industrial environment.
Modula Plus is offered in kit-form to be assembled, equipped and wired by Panelbuilder and Installer.
The range consists of sheet steel floor standing enclosures, busbar systems and functional units prepared to mount LV devices offered by GE.
Modula Plus complies with standard IEC 60439-1 for Low Voltage application with rated current up to 4000A, offering protection degree from IP30 up to IP55.
Its aesthetically pleasing characteristics allow flexibility when selecting a suitable location.
Designed as an integrated system it combines both flexibility and ease of assembly with the reliability of a development dedicated for use in LV distribution.

Modula Plus

Description

Modula Plus is a range of sheet steel system enclosures offered in kit-form, designed for low voltage distribution boards up to 4000A

Cabinets are offered in depth 500mm and 700mm, in width 650mm and 900mm. In addition, enclosures of 400mm width allow flexible layout of vertical risers and offering wide wiring space.
The doors are equipped with a four point closing mechanism, operated by a central handle. As standard, the closing mechanism is operated by a double-bit lock which can easily be replaced by a handle prepared to receive standard profile half cylinders.
Plain doors offer an opening angle of 130°, transparent and design doors can be opened to an angle up to 180°.

For ease of incoming cables each cabinet includes an entry plate at the bottom, made of three parts.

All external panels, like rear- or sidepanels as well as the roofplate, may be removed to facilitate assembly and wiring.

Protection degree

With door IP55
Without door IP30 (equipped with functional units and coverplates)

Protection class

Earthing, protection class I

Material

Cabinet structure	Sheet steel, thickness 1mm
External panel	Sheet steel, tickness 2mm, powder coated
Doors	Sheet steel, thickness 2mm, powder coated
Colour	
External panel	RAL 7035
Coverplates	RAL 7024
Design doors	RAL 7035 / 7024
Mounting plates	Sendzimir zinc plated steel
Mounting profiles	Sendzimir zinc plated steel

Technical data

Nominal voltage	690V, 50/60 Hz
Nominal current	up to 4000A

Standards

IEC EN 60439 part 1

Technical data

Electrical data

Rated operational voltage Ue		690V
Rated insulation voltage Ui		1000V
Rated frequency		50-60Hz

Rated current of busbar systems

- horizontal in the top	IP55	3000A
	IP30	4000A
- vertical busbar	IP55	3000A
	IP30	4000A
Rated short-circuit current Icw		70kA /1s

Mechanical data

Dimensions	Height	2000mm
	Depth	500mm, 700mm
	Width	400mm, 650mm, 900

Internal separation Form 1, form 2
Form 3 (incoming section)

Standard application

Feeder

Air circuit breaker	400 up to 4000A	fixed withdraw
Loadbreak switches	up to 2500A	fixed fused or fuseless
Moulded case circuit breakers	up to 1600A	fixed plug-in

Outgoing circuits

Moulded case circuit breakers	up to 1600A	fixed or plug-in
Loadbreak switches	up to 2500A	fixed, fused or fuseless
Miniature circuit breakers		

Modula Plus

Safety
- Tested according IEC 60439-1
- Short-circuit proof
- Earth continuity proven

Ease of handling
- Lifting eye bolts are delivered as standard with each enclosure
- Transport segments can be coupled with stable lifting brackets for crane transport

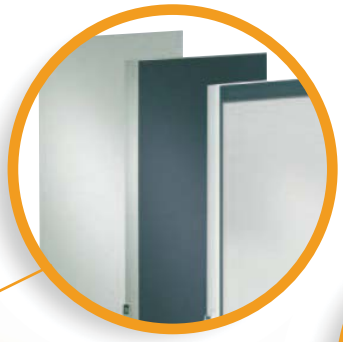
Flexible layout
- Equipment zone
  - width 650mm
  - width 900mm
- Busbar zone
  - in the top
  - lateral
- Cabling zone
  - integrated cable compartment
  - enclosure of 400mm width

Cable entry
- Cable entry plate made of 3 parts included as standard in enclosures of width 650mm and 900mm
- Bases are offered in height of 100mm or 200mm

Reliable construction
- Welded top- and bottom frame
- Painted frame
- Doors and covers 2mm sheet steel, powder coated

Accessibility
- Door opening angle
  - 130° as standard
  - 180° with transparent and design doors
- Doors can easily be removed
- Removable side and rear panel
- Coverplates can be removed individually

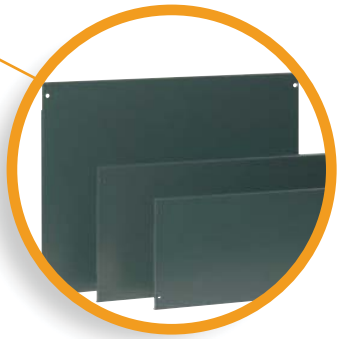
Aesthetics
- Finish in light grey, RAL 7035
- Choice of doors
  - plain sheet steel
  - transparent, with wide area equipped with glass
  - design door

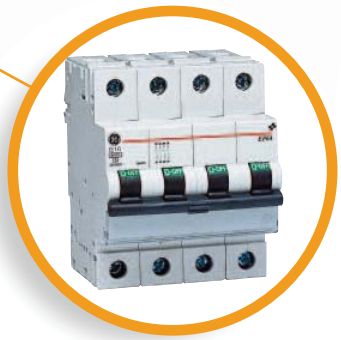


Safety
- IP20 separation shrouds offered to prevent from accidential access to the busbars

Ease of cabling
- Wide lateral cut-outs in mounting plates of functional units
- Integrated or separate cable compartment

Modularity
- Coverplates and functional units offered from height 50mm up to 700mm
- LV devices can be mounted in horizontal or vertical position





Integrated system
- Modula Plus is developed as an integrated system prepared to receive all kind of GE low voltage devices – in conformity to standards proven by typetesting.

GE Consumer & Industrial
Power Protection

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WORLDWIDE PARTNER

Industrial Enclosures

Wall mounting system enclosures : Modula 630K

GE imagination at work

Type tested distribution board

Applications

Type tested distribution board in industrial and commercial markets

Standards

EN 60439-1
IEC 60439-1

Approvals

Lovag

Features

- Delivered in kit form
- Form 1 and Form 2
- Easy wiring, due to the direct mounting of the functional units on the rear panel, used as a mounting plate
- Protection level
  - Without door IP40 - IK07
  - With plain door IP41 - IK08 **(IP55 is available)**
  - With transparent door IP41 - IK07 **(IP55 is available)**

Material used

Sheet steel coated with oven-baked epoxy paint
- Doors, side panels and roof: 1 mm thick
- Upper/bottom panels and bases: 2 mm thick

Sendzimir zinc plated steel
- Rear panel: 1.5 mm thick
- Coupling kit: 2 mm thick

Colours
- RAL 7035: enclosure, doors and protective covers
- RAL 7024: bases

Electrical characteristics

- Rated voltage: 690V - 40/60Hz
- Rated current: max. 630A
- Rated short current Icw: max. 30kA (1 sec.)
- Rated peak short-circuit current Ipk: max. 60kA peak

Dimensions

Height: 545 to 1,910 mm
Width: 600 or 900 mm
Depth: 220 mm (250 with the door)
Usable width: 500 mm

Modula 630K

Modula 630K is a wall-mounted sheet-metal enclosure supplied in kit form which is particularly suited for setting up switch and low-voltage distribution boards in the services and industrial sectors.
Due to its modularity and simplicity, Modula 630K offers numerous practical advantages to facilitate mounting and wiring operations, i.e. ultra-quick assembly, optimised functionality, user-friendliness and time-saving connection or handling.

The rear panel comprises all the functional construction components.
Modula 630K has been designed to allow direct mounting and wiring of the functional units on the back panel and to provide access to the equipment, terminals and busbar system from all sides. Top, side and cover panels can be easily installed later in the workshop or on-site.

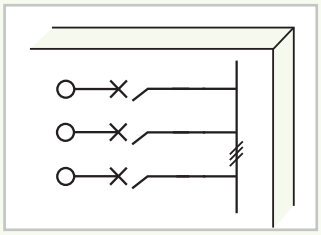
The system is made of sheet steel and is protected by a coating of epoxy paint (colour RAL 7035). The enclosures are available in two widths (600 and
900 mm) and six heights (from 545 to 1295 mm), increasing in increments of 150 mm.
Supplied in space-saving kit form, the enclosures can be assembled in a few minutes using a few screws.

The cable or busbar compartment is included in the 900 mm wide enclosure.
All components are mounted on the sheet-metal rear panel.
The compartment can be positioned on the left or right as wished when the enclosure is being installed.
Protective covers and/or doors made of 1 mm thick sheet steel are coated with an attractive, safe epoxy paint (colour RAL 7035).

Form 1

According to EN 60439-1 and IEC 60439-1

- No compartment
- No separation between the enclosure, busbar system, functional units and terminals



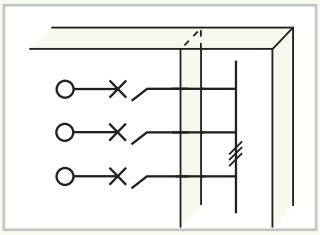
With Modula 630K

- 600 mm wide individual enclosure
- 900 mm wide enclosure with integrated cable/busbar compartment **without partition**

Form 2

According to EN 60439-1 and IEC 60439-1

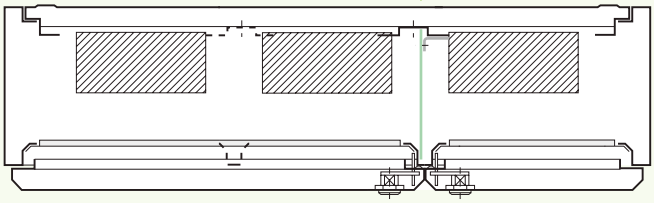
The busbar system is protected from the functional units



With Modula 630K

- 900 mm wide enclosure with integrated busbar compartment **with separation between busbar compartment and functional units**
- The separation screen is made of 3 mm thick, halogen free polyester.
- The openings are easy to break out, for the passage of cables, Cu, flexible brass, ...
- **With preservation of IP20**
- Easy to place with the help of simple wire-cutters

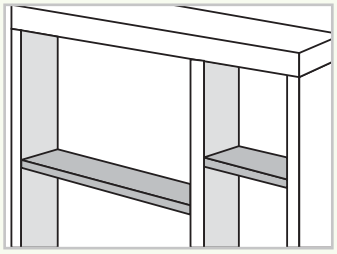
separation



Form 2 horizontal separation screen

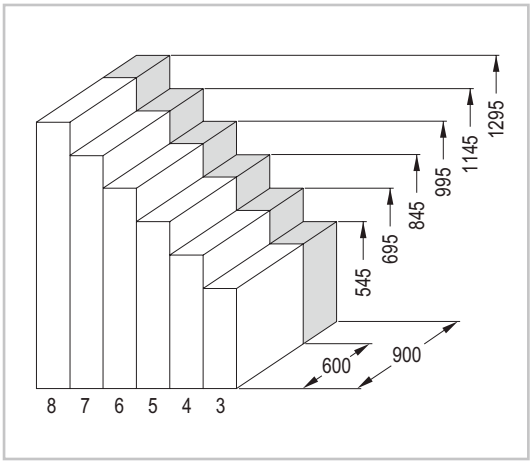
For functional unit and cable/busbar compartment, e.g.

- In cable/busbar compartment:
  - separation between incoming feeder and busbar
- Separation between "Main" switchboard and "Secure" switchboard
- Separation between electrical distribution (High voltage) and data / telecom (Low voltage)

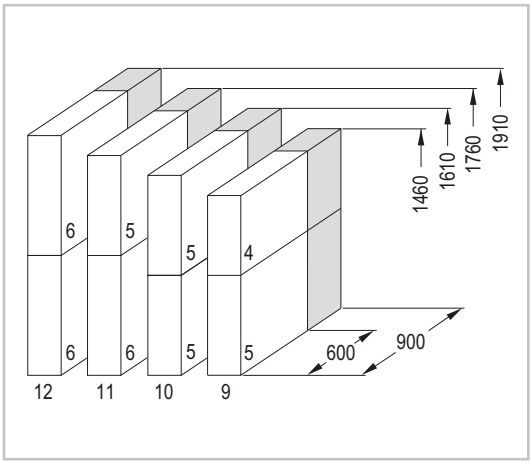


Range

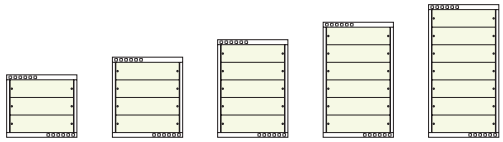
Individual enclosures



Stacked enclosures



Dimensions



Stacked units					
3	4	5	6	7	8
Basic height (mm)					
545	695	845	995	1,145	1,295
Usable height (mm)					
450	600	750	900	1,050	1,200
Maximum number of 18 mm modules					
81	108	135	162	189	216

MCCB Panelboards
Industrial and commercial

GE imagination at work

Quick selector guide

The quick selector guide shortlists the most commonly used products from the main catalogue to speed up your selection process. For a comprehensive listing please refer to the page indicated.

Compact panelboards - 500 mm wide

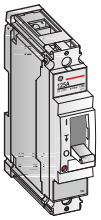
Side Incomer
Bottom incomer

TP ways	Page	Order Code 250A	Page	Order Code 400A
3	13	MOD8SEPB4C	-	-
6	13	MOD8PB2506C	14	MOD8PB4006C
8	13	MOD8PB2508C	14	MOD8PB4008C
12	13	MOD8PB25012C	14	MOD8PB40012C

Incomers - 3 pole

Type	Page	250A	Page	400A
Isolator	13	MOD8ISO2503C	14	MOD8ISO4003C
MCCB	13	MOD825MI2503C	14	MOD8MI4003C
Direct	13	MOD8DC250C	14	MOD8DC400C
Side incomer	13	FEY306D250KF	-	-

Outgoing MCCB's - 1 pole



In (A)	Page	Order Code
16	16	FDN13TF016EU
20	16	FDN13TF020EU
25	16	FDN13TF025EU
32	16	FDN13TF032EU
40	16	FDN13TF040EU
50	16	FDN13TF050EU
63	16	FDN13TF063EU
80	16	FDN13TF080GU
100	16	FDN13TF100GU
125	16	FDN13TF125GU
160	16	FDN13TF160GU

Important note
All 1P MCCB's require a FD1PM mount
1 x FD1PM can accept 3 x 1P MCCB's

Accessories

Description	Order Code	Page
1P FD frame MCCB busbar mount	FD1PM	16
Busbar cover plate 3P	FBCI3	17
Cover blanking plate 1.2m	FBF6	17
Spreader box - compact	MOD8SBC	18
Modular device box 18 mod - compact	MOD8MX18C	18

Contents

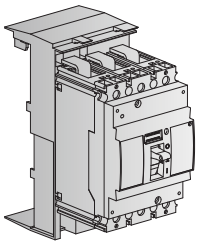
Standard panelboards - 750 mm wide

TP ways	Page	Order Code 630A	Page	Order Code 800A
6	15	MOD8PB6306S	15	MOD8PB8006S
8	15	MOD8PB6308S	15	MOD8PB8008S
12	15	MOD8PB63012S	15	MOD8PB80012S
18	15	MOD8PB63018S	15	MOD8PB80018S

Incomers - 3 pole

Type	Page	630A	Page	800A
Isolator	15	MOD8ISO6303S	15	MOD8ISO8003S
MCCB	15	MOD863MI6303S	15	MOD8MI8003S
Direct	15	MOD8DC630S	15	MOD8DC800S

Outgoing MCCB's - 3 pole



In (A)	Page	18kA	Page	36kA
16	16	FDC36TE016ET	16	FDS36TD016ET
20	16	FDC36TE020ET	16	FDS36TD020ET
25	16	FDC36TE025ET	16	FDS36TD025ET
32	16	FDC36TE032ET	16	FDS36TD032ET
40	16	FDC36TE040ET	16	FDS36TD040ET
50	16	FDC36TE050ET	16	FDS36TD050ET
63	16	FDC36TE063ET	16	FDS36TD063ET
80	16	FDC36TE080GT	16	FDS36TD080GT
100	16	FDC36TE100GT	16	FDS36TD100GT
125	16	FDC36TE125GT	16	FDS36TD125GT
160	16	FDC36TE160GT	16	FDS36TD160GT

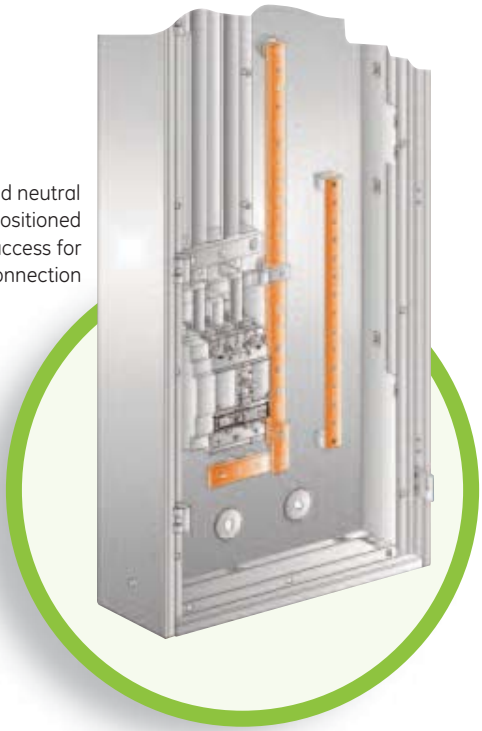
Accessories

MCCB busbar mount

Description	Order Code	Page
3P FD frame MCCB busbar mount	FD3PM	16
3P FE frame MCCB busbar mount	FE3PM	16
Busbar cover plate 3P	FBCI3	17
Cover blanking plate 1.2m	FBF6	17
Spreader box - standard	MOD8SBS	18
Modular device box 18 mod - standard	MOD8MX24S	18

Easy to install

Earth and neutral terminals positioned for easy access for cable connection

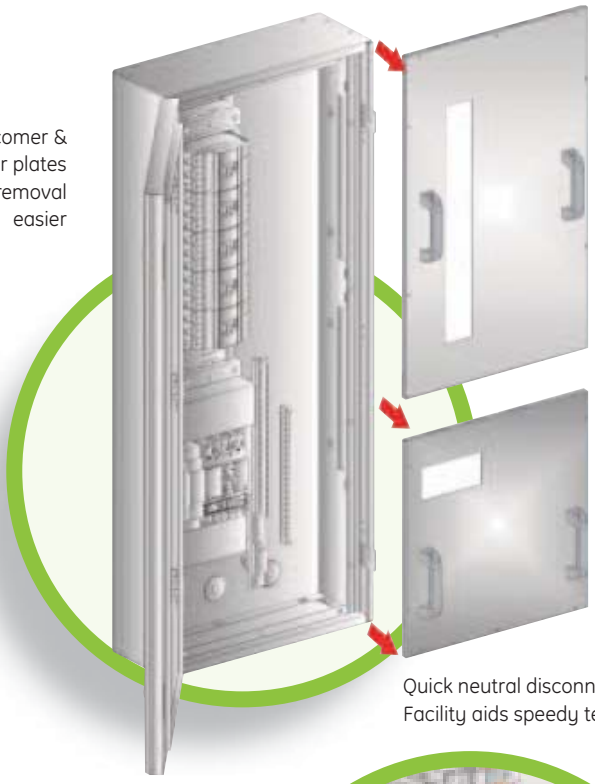


Easy to remove door to aid installation of the enclosure

New "Compact" MCCB panelboard 500 mm wide ideal for those restricted space applications

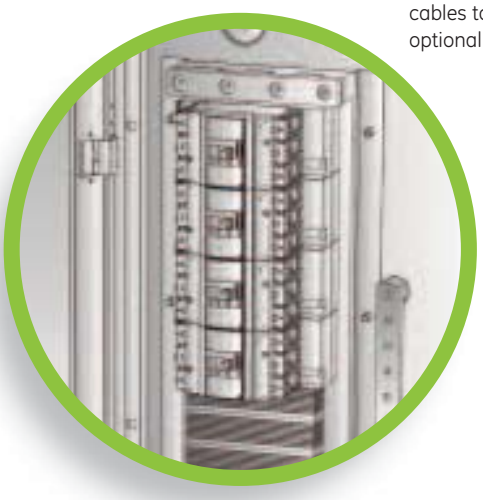
Removable top and bottom gland plates ensures making clean holes for cable glands

Split incomer &
outgoer cover plates
makes fitting and removal
easier



Quick neutral disconnect
Facility aids speedy testing

Flexible neutral and earth bars allows for most
cables to be terminated using cable lugs or
optional neutral terminals

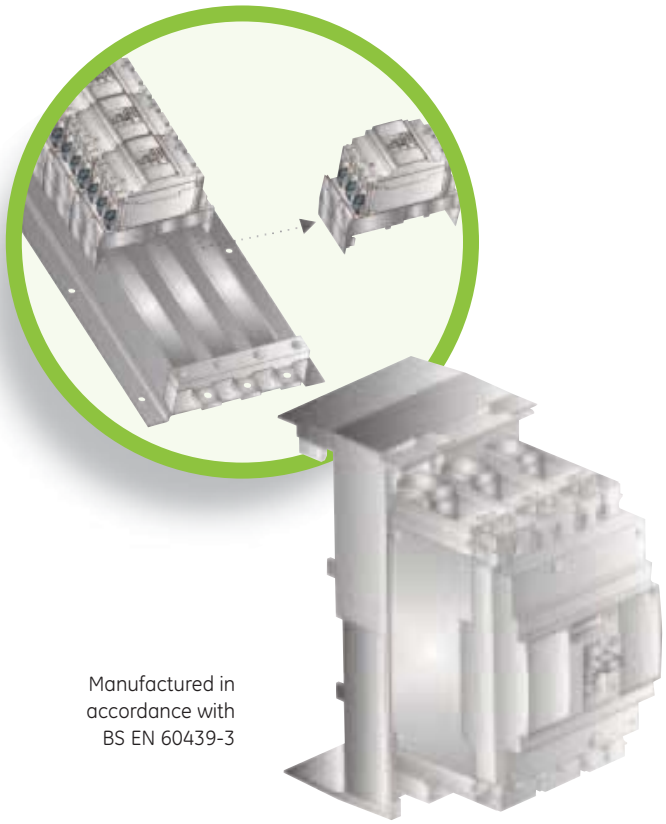


Speedy MCCB fitting
saves on site
installation time

Safe and reliable

High quality durable sheet-steel construction

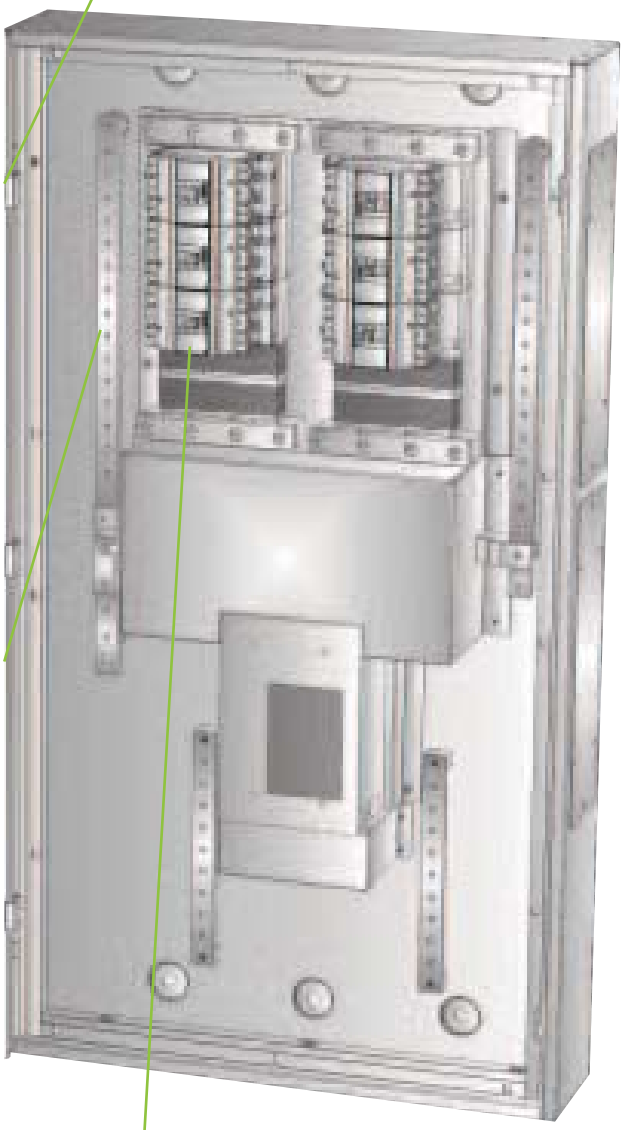
Plug on MCCB mounting system ensures reliable installation



Manufactured in accordance with BS EN 60439-3

Fully shrouded incoming and outgoing connections

Easy to remove
door to aid installation
of the enclosure

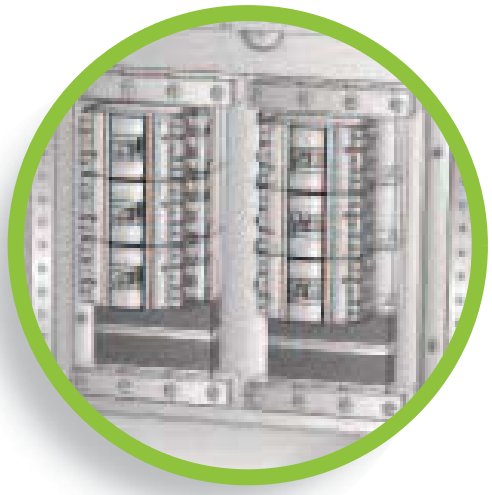


Busbar fault ratings
up to 50kA 1sec

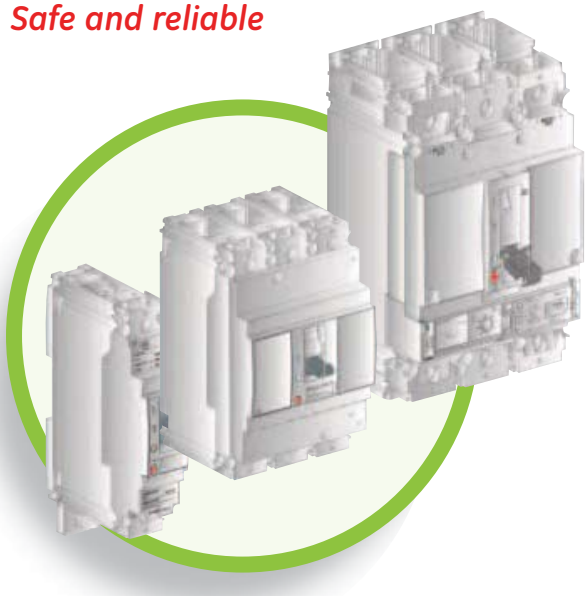
CE marked

Enhanced security
to restrict
unauthorised access
or device operation

Full shrouding of
unused outgoing ways



Safe and reliable

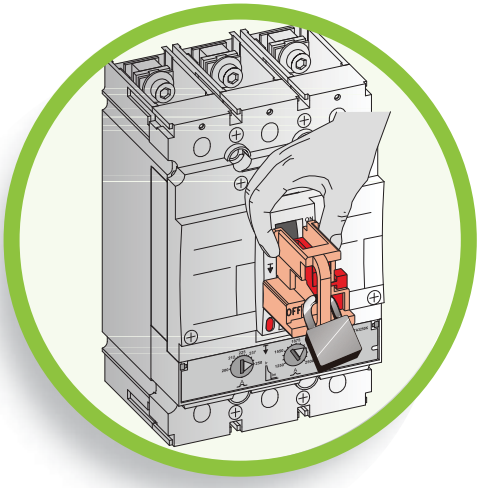


1P MCCB's up to 160A
3P MCCB's up to 250A
in all busbar types allowing
maximum flexibility

Common easy to
fit MCCB
accessories

Overcurrent or short
circuit fault indication
on 3P & 4P MCCB's

9

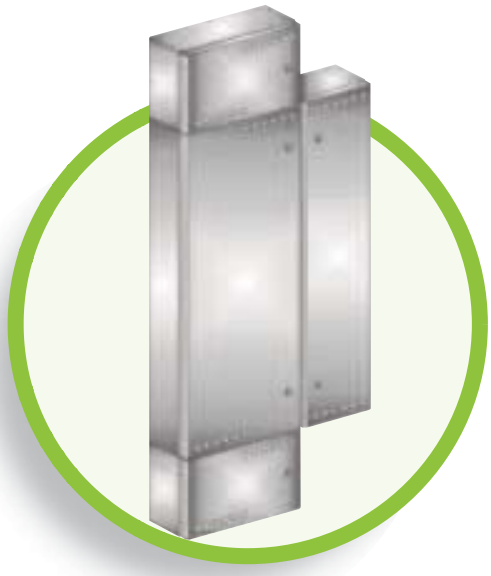


Padlockable MCCB
operating handles

Full door prevents
unauthorised tampering

90 mm tunnel terminals
available on MCCB's
up to 160A

Comprehensive
range of
incoming devices



Top, bottom and
side entry extension
boxes allow for easier spreading
of larger outgoing cables

MCCB Panelboard
BS 5486-1 & BS EN 60439-3

- *Total Safety*
- *Complete*
- *Time Saving Features*
- *High Quality*
- *Great Design*

Applications

Approvals

KEMA KEUR

Performance

Busbar rating	(A)	250, 400, 630, 800
Busbar short-circuit capacity	(kA)	35kA (250, 400A)
	(kA)	50kA (630, 800A)
Rated voltage	(V)	415
Earth bar (accepts lug)	(mm^2)	M6/M8
Neutral bar (accepts lug)	(mm^2)	M6/M8
No of TP ways		4, 6, 8, 12, 18
Max. rating outgoing MCCB		250A
Ingress protection		IP30
Enclosure colour		Light grey RAL7035
Segregation		Form 3b type 2

Features

- Eas to install plug-on outgoing MCCB's
- Outgoing MCCB's up to 160A 1P and 250A 3P
- Incoming devices up to 800A
- Compact dimension only 500mm or 750mm wide
- Split incoming/outgoing cover plates for easy installation
- Split earth and neutral bars for easy cable termination
- Stur folded sheet steel construction
- Generous wiring room for incoming and outgoing MCCB's
- Comprehensive range of incomer options

250A busbar system - 35kA

MCCB panelboard - Compact

	No TP ways*	Order Code	Ref. No.
Side incomer	3	MOD8SEPB4C	411500
Bottom incomer	6	MOD8PB2506C	411501
	8	MOD8PB2508C	411502
	12	MOD8PB25012C	411503

* Number of outgoing ways shown = when fitted with FD160 3P frame size MCCB's

Incoming devices

Non-Auto MCCB (Isolator)

		3 pole		4 pole	
	In (A)	Order Code	Ref. No.	Order Code	Ref. No.
Side incomer	250*	FEY306D250KF*	433797*	-	-
Bottom incomer	250	MOD8ISO2503C	411518	MOD8ISO2504C	411522

*Plug-on mount order code FE3PM required

Auto MCCB (Thermal/Magnetic)

	In (A)	Order Code	Ref. No.	Order Code	Ref. No.
Side incomer	250*	FEN36TD250KF	432982*	-	-
Bottom incomer	100	MOD825MI1003C	411526	MOD825MI1004C	411535
	160	MOD825MI1603C	411527	MOD825MI1604C	411536
	200	MOD825MI2003C	411528	MOD825MI2004C	411537
	250	MOD825MI2503C	411529	MOD825MI2504C	411538

*Plug-on mount order code FE3PM required

250A Main lugs (Direct connection kit)

In (A)	Order Code	Ref. No.
250	MOD8DC250C	411544

400A busbar system - 35kA

MCCB panelboard - Compact 500 mm

		Panelboard		Pan assembly	
	No TP ways	Order Code	Ref. No.	Order Code	Ref. No.
Bottom incomer	6	MOD8PB4006C	411504	MOD8PA4006C	411566
	8	MOD8PB4008C	411505	MOD8PA4008C	411567
	12	MOD8PB40012C	411506	MOD8PA40012C	411568

400A panelboards can accept up to 2 x FE frame MCCB's

Compact incomers

		3 pole		4 pole	
	In (A)	Order Code	Ref. No.	Order Code	Ref. No.
Isolator	400A	MOD8ISO4003C	411519	MOD8ISO4004C	411523
MCCB Thermal/Magnetic	320A	MOD840MI3203C	411530	MOD840MI3204C	411539
	400A	MOD840MI4003C	411531	MOD840MI4004C	411540
Direct connection	400A	MOD8DC400C	411545	-	-

MCCB panelboard - Standard 750 mm

		Panelboard		Pan assembly	
	No TP ways	Order Code	Ref. No.	Order Code	Ref. No.
Bottom incomer	8	MOD8PB4008S	411507	MOD8PA4008S	411569
	12	MOD8PB40012S	411508	MOD8PA40012S	411570
	18	MOD8PB40018S	411509	MOD8PA40018S	411571

400A panelboards can accept up to 2 x FE frame MCCB's one each side of busbar

Standard incomers

		3 pole		4 pole	
	In (A)	Order Code	Ref. No.	Order Code	Ref. No.
Isolator	400A	MOD8ISO4003S	411576	MOD8ISO4004S	411577
MCCB Thermal/Magnetic	320A	MOD840MI3203S	411578	MOD840MI3204S	411580
	400A	MOD840MI4003S	411579	MOD840MI4004S	411581
Direct connection	400A	MOD8DC400S	411582	-	-

630A busbar system - 50kA

MCCB panelboard - Standard

	No TP ways	Order Code	Ref. No.
Bottom incomer	6	MOD8PB6306S	411510
	8	MOD8PB6308S	411511
	12	MOD8PB63012S	411512
	18	MOD8PB63018S	411513

630A panelboards can accept up to 2 x FE frame MCCB's one each side of busbar

Incoming devices

Non-Auto MCCB (Isolator)

	3 pole		4 pole	
In (A)	Order Code	Ref. No.	Order Code	Ref. No.
630	MOD8ISO6303S	411520	MOD8ISO6304S	411524

Auto MCCB (Thermal/Magnetic Ith = 0.8 -1)

In (A)	Order Code	Ref. No.	Order Code	Ref. No.
500	MOD863MI5003S	411532	MOD863MI5004S	411541
630	MOD863MI6303S	411533	MOD863MI6304S	411542

Main lugs (Direct connection kit)

In (A)	Order Code	Ref. No.	Order Code	Ref. No.
630	MOD8DC630S	411546	-	-

MCB distribution boards
Industrial & commercial

GE imagination at work

Quick selector guide

The quick selector guide shortlists the most commonly used products from the main catalogue to speed up your selection process. For a comprehensive listing please refer to the page indicated.

Boards - Type A

Order Codes	SP ways	Incomer Type	Rating	Page
MOD1DB60	6	Main switch disconnector	100A	A.3
MOD1DB90	9	Main switch disconnector	100A	A.3
MOD1DB130	13	Main switch disconnector	100A	A.3
MOD1DBA60	6	RCD Main switch	80A 30mA	A.3
MOD1DBA90	9	RCD Main switch	80A 30mA	A.3
MOD1DBA130	13	RCD Main switch	80A 30mA	A.3

Busbar suitable to accept 1P ElfaPlus MCBs only.

Outgoing devices - 1 pole 10kA MCBs

B	C		
Order Codes	Order Codes	Rating	Page
EP101B06	EP101C06	6A	C.5
EP101B10	EP101C10	10A	C.5
EP101B16	EP101C16	16A	C.5
EP101B20	EP101C20	20A	C.5
EP101B25	EP101C25	25A	C.5
EP101B32	EP101C32	32A	C.5
EP101B40	EP101C40	40A	C.5
EP101B50	EP101C50	50A	C.5
EP101B63	EP101C63	63A	C.5

Outgoing devices - 1 module 30mA RCBOs

B	C		
Order Codes	Order Codes	Rating	Page
DPE100B06/030	DPE100C06/030	6A	C.11
DPE100B10/030	DPE100C10/030	10A	C.11
DPE100B16/030	DPE100C16/030	16A	C.11
DPE100B20/030	DPE100C20/030	20A	C.11
DPE100B25/030	DPE100C25/030	25A	C.11
DPE100B32/030	DPE100C32/030	32A	C.11
DPE100B40/030	DPE100C40/030	40A	C.11

Accessories

Order Codes	Description	Page
MOD2LCK	Security lock with 2 keys	A.4
KS	MCB padlocking bracket	A.4
BLNK4	4 module blanking plate	A.4
SHR3	3 module busbar shroud	A.4

Boards and incomers - Type B

Order Codes	TP ways	Description	Rating	Page
MOD2DB40	4	Type B MCB distribution board	200A	B.3
MOD2DB60	6	Type B MCB distribution board	200A	B.3
MOD2DB80	8	Type B MCB distribution board	200A	B.3
MOD2DB120	12	Type B MCB distribution board	200A	B.3
MOD2DB180	18	Type B MCB distribution board	200A	B.3
MOD2DB240	24	Type B MCB distribution board	200A	B.3
MOD2ISO3	-	3P Integral main switch	100A	B.3
MOD2DIL125	-	3P Integral switch disconnector	125A	B.3
MOD2DIL200	-	3P Extension switch disconnector	200A	B.4

Busbar suitable to accept 1P, 2P and 3P ElfaPlus MCBs only.

Outgoing devices - 3P 10kA MCBs

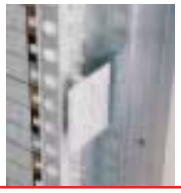
B	C		
Order Codes	Order Codes	Rating	Page
EP103B06	EP103C06	6A	C.5
EP103B10	EP103C10	10A	C.5
EP103B16	EP103C16	16A	C.5
EP103B20	EP103C20	20A	C.5
EP103B25	EP103C25	25A	C.5
EP103B32	EP103C32	32A	C.5
EP103B40	EP103C40	40A	C.5
EP103B50	EP103C50	50A	C.5
EP103B63	EP103C63	63A	C.5

Outgoing devices - 2 module 30mA RCBOs

B	C		
Order Codes	Order Codes	Rating	Page
DPT100B06/030	DPT100C06/030	6A	C.11
DPT100B10/030	DPT100C10/030	10A	C.11
DPT100B16/030	DPT100C16/030	16A	C.11
DPT100B20/030	DPT100C20/030	20A	C.11
DPT100B25/030	DPT100C25/030	25A	C.11
DPT100B32/030	DPT100C32/030	32A	C.11
DPT100B40/030	DPT100C40/030	40A	C.11

Accessories

Order Codes	Description	Page
KS	MCB padlocking bracket	B.5
BLNK4	4 module blanking plate	B.5
SHR3	3 module busbar shroud	B.5
MOD218D	Modular devices extension box	B.4
MOD2SB1	Modular spreader box	B.4



Winning combinations

For all applications

GE is known throughout the world for manufacturing innovative, quality products that are easy to install and provide flexible user friendly features as standard.

Modular 200 and ElfaPlus are a complete range of type A and B MCB distribution boards and modular DIN rail devices that are the result of comprehensive market research with customers throughout the UK.

The range has now been extended with the addition of the Modular 200 24 way TP+N board and the space saving ElfaPlus single module RCBO.

Together Modular 200 and ElfaPlus are a winning combination.

Commercial

Industrial

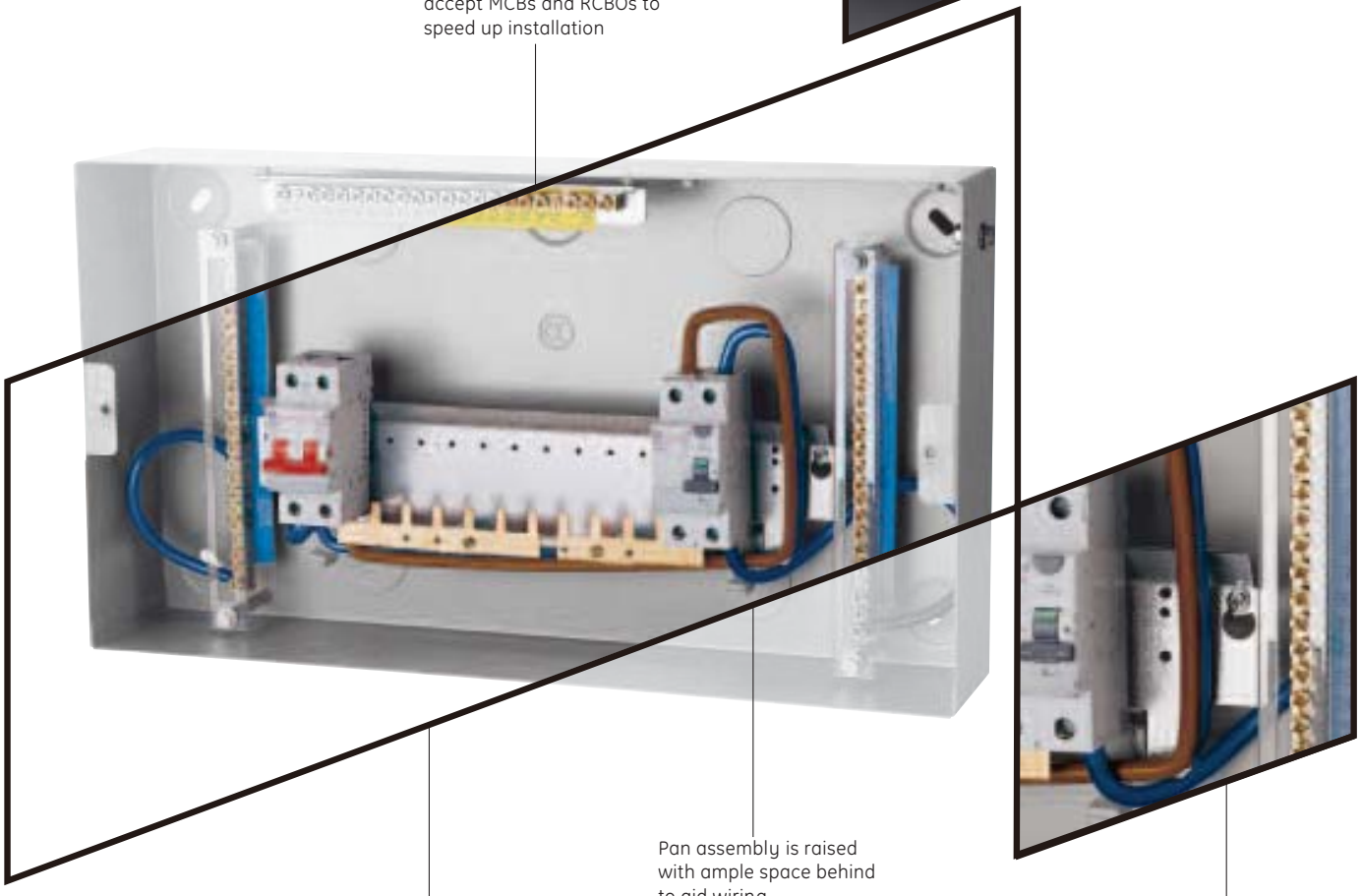
The complete range

Easy to install

Generous wiring space even when using the single module RCBO

Easy to fit modular devices

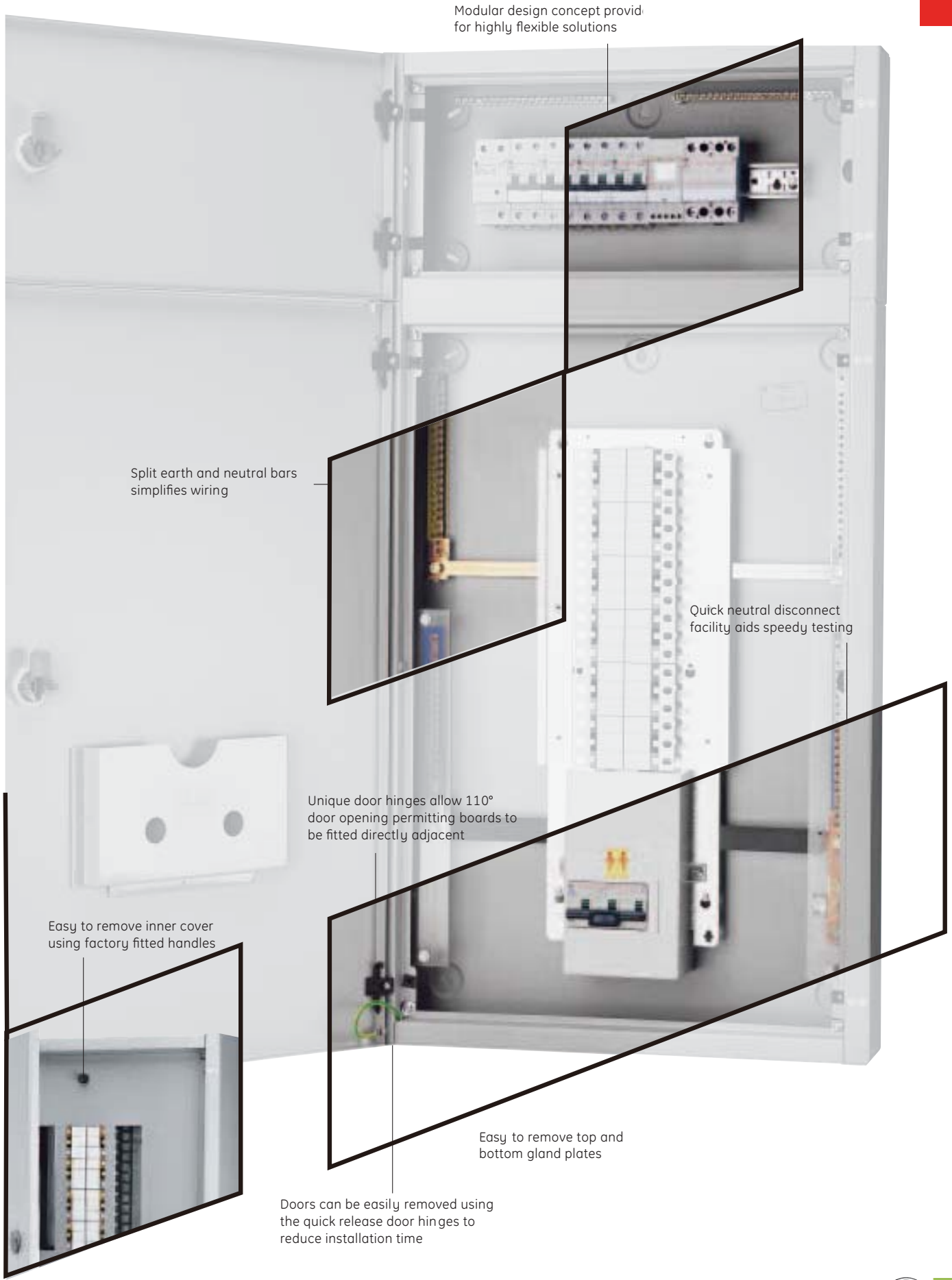
Incomers fitted ready to accept MCBs and RCBOs to speed up installation



Comprehensive range of incomer combinations for all applications

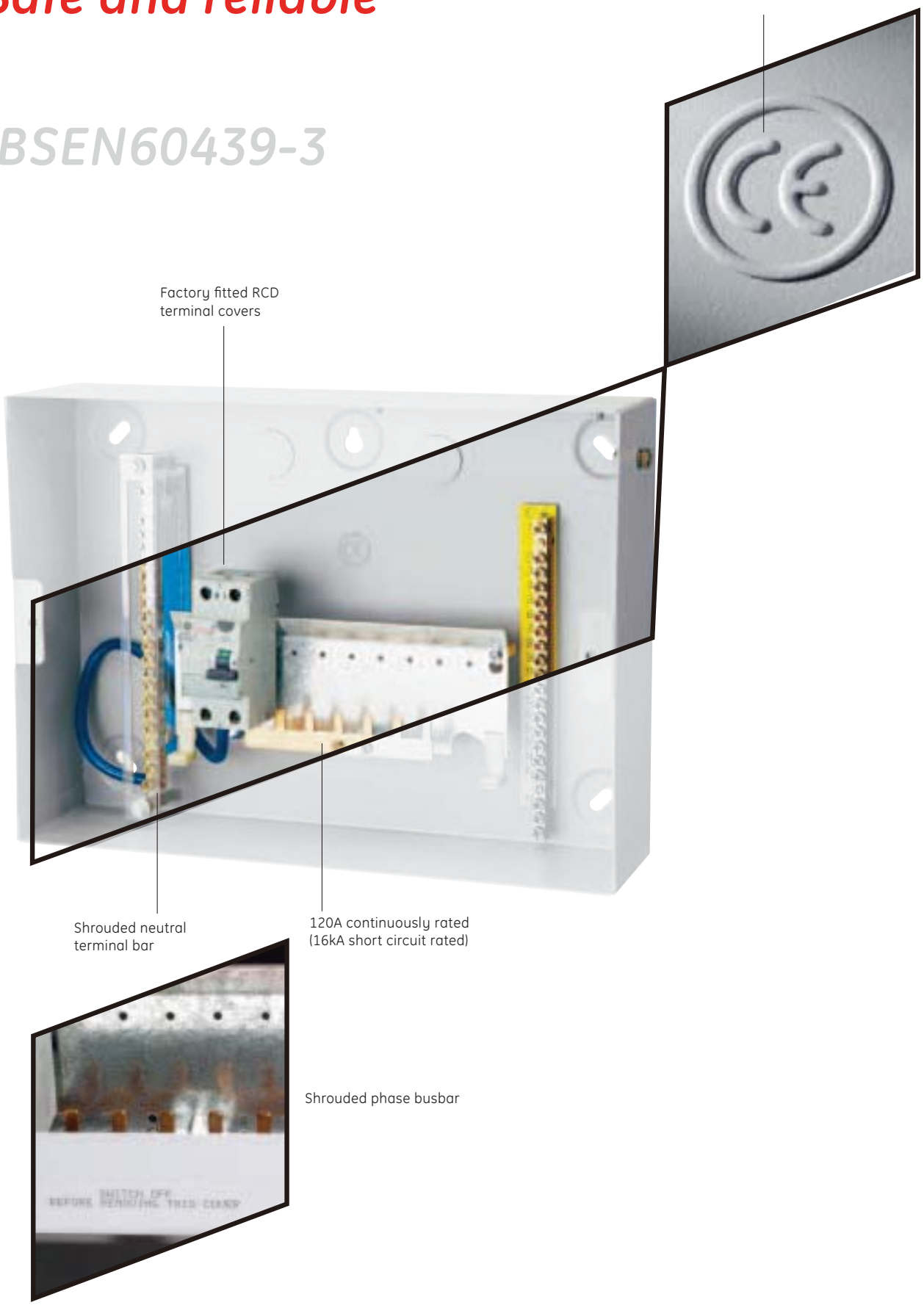
Pan assembly is raised with ample space behind to aid wiring

Pan assembly easy to remove to help when mounting the enclosure

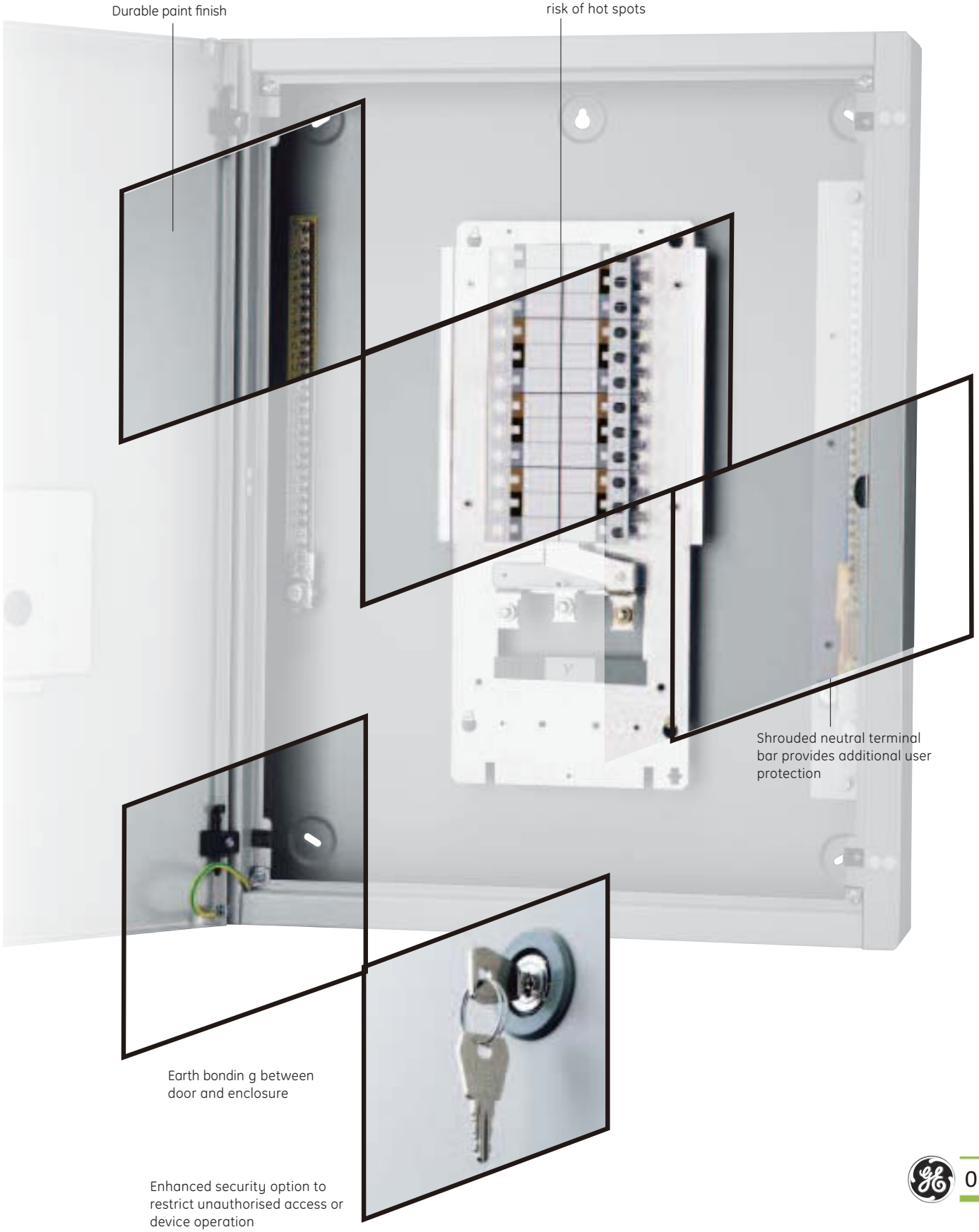

Modular design concept provid
for highly flexible solutions
Split earth and neutral bars
simplifies wiring
Quick neutral disconnect
facility aids speedy testing
Unique door hinges allow 110°
door opening permitting boards to
be fitted directly adjacent
Easy to remove inner cover
using factory fitted handles
Easy to remove top and
bottom gland plates
Doors can be easily removed using
the quick release door hinges to
reduce installation time

Safe and reliable

BSEN60439-3



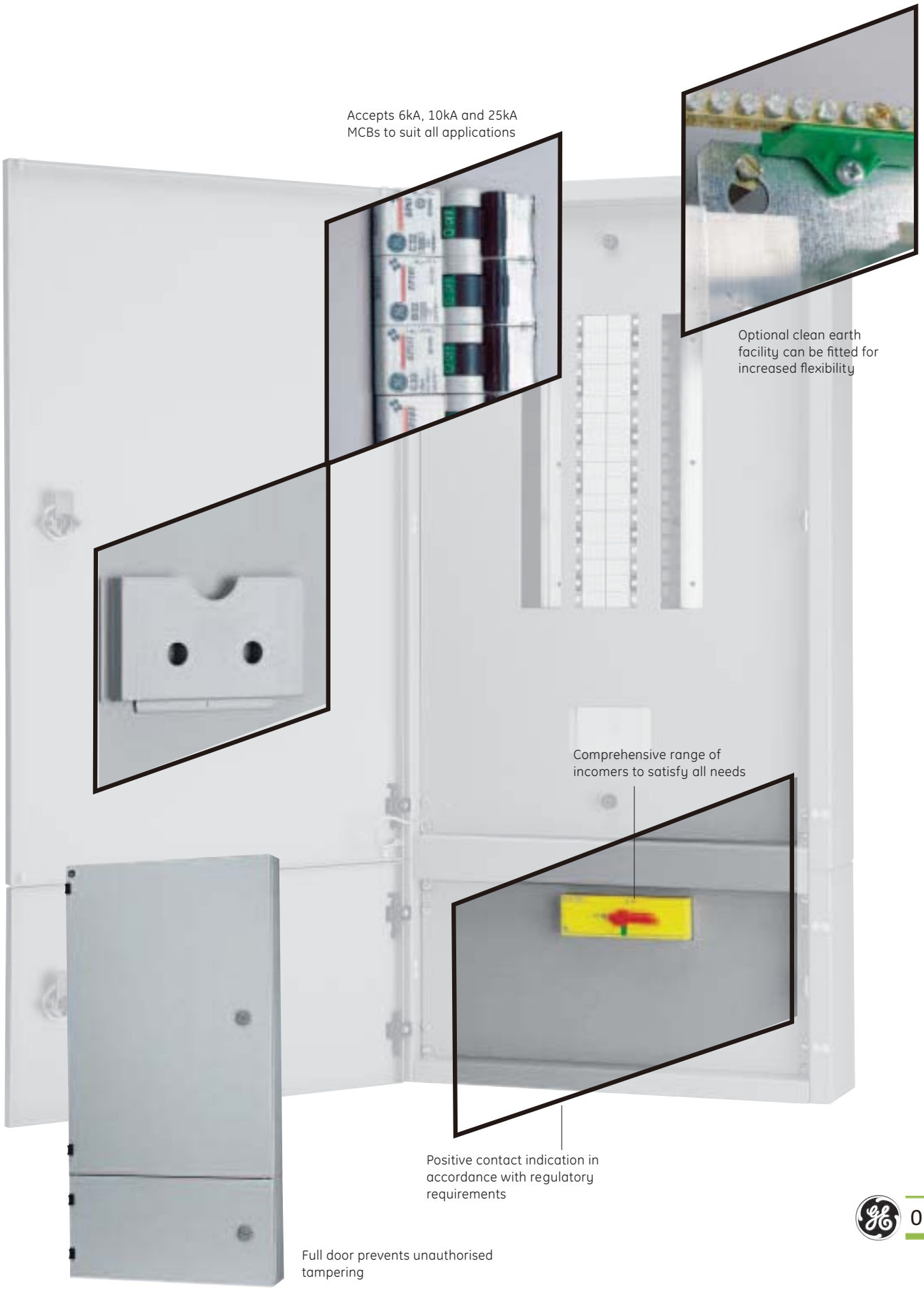
Durable



User friendly

Easy to maintain

Door opens through 180°to allow easy access to devices



Accepts 6kA, 10kA and 25kA MCBs to suit all applications

Optional clean earth facility can be fitted for increased flexibility

Comprehensive range of incomers to satisfy all needs

Positive contact indication in accordance with regulatory requirements

Full door prevents unauthorised tampering

Type A MCB Distribution Board
BSEN60439-3 and BS5486

- *Total safety*
- *Complete*
- *Time-saving features*
- *High quality*
- *Great design*

Applications

Performance

Incomer ratings	(A)	100 (main switch)
		80 (RCD)
RCD sensitivity	(mA)	30
Rated voltage	(V)	240
Busbar rating	(A)	120
Busbar short-circuit capacity	(kA)	16
Terminal capacity	(mm^2)	50 (main switch/RCD)
	(mm^2)	25 (E+N terminal bars)
Enclosure colour		Light grey (RAL7035)
Ingress protection		IP40

Features

- Sturdy folded sheet steel construction
- Durable structured powder coated finish
- Matching light grey used throughout range
- Phase busbar rating 120A
- Incoming device cable terminal capacity 50mm^2
- Terminal bar cable capacity 25mm^2
- Shrouded neutral terminal bar
- Generous wiring room even using 1 module RCBO
- Comprehensive range of incomers
- Pre assembled ready to accept MCBs and RCBOs
- DIN enclosure option so you can "design it yourself"

Type A MCB Distribution Board

	Order Code	Ref. No.	No of outgoing ways	Dimension Code	Terminal Capacity
Main Switch – 2P 100A	**MOD1DB60**	617971	6	A	50mm²
	MOD1DB90	617972	9	B	50mm²
	MOD1DB130	617973	13	C	50mm²

MOD1DB130

RCD – 2P 80A 30mA	**MOD1DBA60**	619974	6	A	50mm²
	MOD1DBA90	619975	9	B	50mm²
	MOD1DBA130	619976	13	C	50mm²

MOD1DBA130

Split Load 2P 100A Main Switch, 2P 80A 30mA RCD	**MOD1DB5A5**	619977	10	B	50mm²
	MOD1DB6A4	619978	10	B	50mm²
	MOD1DB7A7	619979	14	C	50mm²

MOD1DB7A7

DIN Enclosure	**MOD1ADIN10**	617957	10	A	-
	MOD1ADIN14	617958	14	B	-
	MOD1ADIN18	617959	18	C	-

MOD1ADIN18

Type A MCB Distribution Board Accessories

Security

MOD2LCK	610063	

Ronis security door lock supplied with two keys

Clean earth kit

MOD1ACEK	617960	

Safety

KS	624929	

MCB padlocking bracket (padlocks not supplied)

Blank plate

BLNK4	610142	4

4 module blank for unused ways can be cut to 1/2 module widths

Busbar shroud

SHR3	619018	

Busbar shroud 3 modules

VBS Busbar System and Accessories (1)

BUS/3P	644829	10

1P pin busbar 56 x 1P

BUS/3F	644830	10

1P fork busbar 56 x 1P

BUS/5P	644840	20

2P pin busbar 28 x 2P

BUS/5F	644841	20

2P fork busbar 28 x 2P

BUS/7P	644848	20

3P pin busbar 19 x 3P

BUS/7F	644849	20

3P fork busbar 19 x 3P

BUS/9P	644853	15

3P+N pin busbar 14 x 3P+N

BUS/9F	644854	15

3P+N fork busbar 19 x 3P+N

BUS/SS	624815	10

Busbar shrouding strip for unused comb busbar 3 modules

BUS/EC3-4P	624817	10

3P and 4P busbar end cap

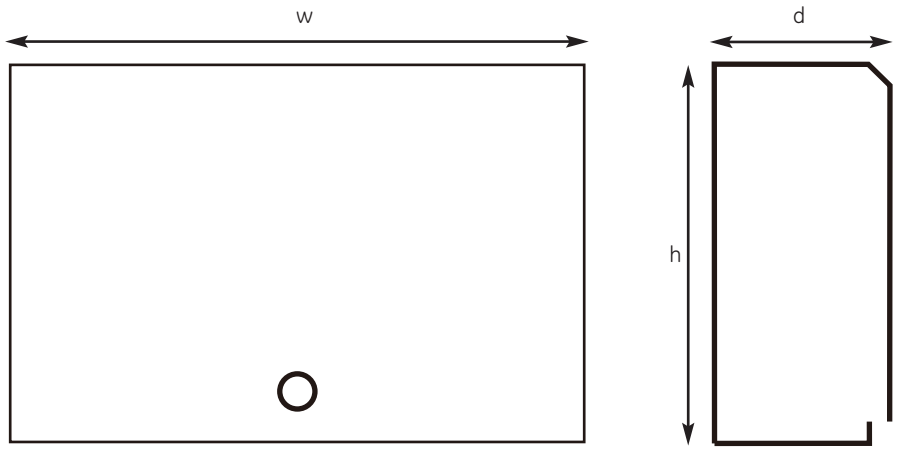
BUS/EC2P	624814	10

2P busbar end cap

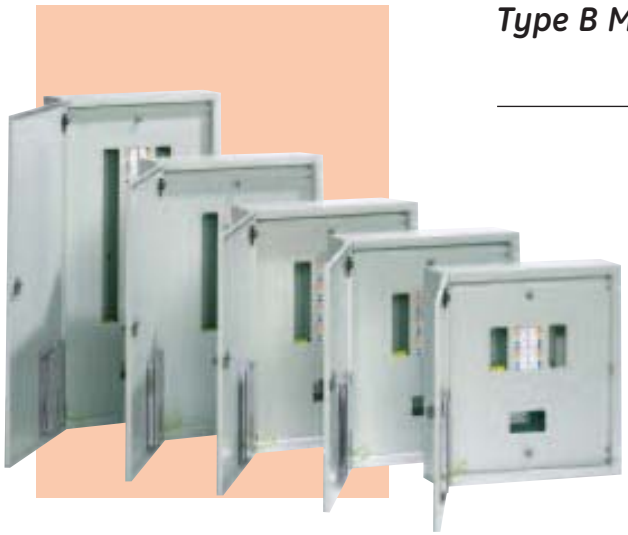
(1) VBS Busbar S ystem is for use with T ype A DIN enclosures, T ype B modular device extension box.

Dimensional drawings

Type A



Dimensions (mm)			
Dimension code	Height (h)	Depth (d)	Width (w)
A	270	127	368
B	270	127	412
C	270	127	484



Type B MCB Distribution Board

BSEN60439-3 and BS5486

- Total safety
- Complete
- Time-saving features
- High quality
- Great design

Applications

Performance

Busbar rating	(A)	200
Busbar short circuit capacity	(kA)	16
Rated voltage	(V)	415
E+N out terminal capacity	(mm^2)	25
E+N incoming cable capacity	(mm^2)	70
No of TP ways		4, 6, 8, 12, 18, 24
Ingress protection		IP40
Enclosure colour		Light grey (RAL7035)

Features

- Durable structured powder coated finish
- Matching light grey throughout the range
- All incomers benefit from positive contact indication
- Modular extension boxes to install modular control devices
- Pan assembly can be easily removed to ease installation
- One piece (no welds or rivets) phase busbar - NO hot spots!
- Ample space behind pan assembly aids wiring installation
- Split terminal bars to reduce wiring installation time
- Neutral disconnect as standard to aid speedy testing
- Doors can be removed to ease installation
- Sturdy folded sheet steel construction
- Accepts 6kA, 10kA and 25kA MCB's
- Generous wiring room even when using 1 module RCBO

Type B MCB Distribution Board

	Order Code	Ref. No.	No of TP Ways	Dimension Code	Busbar Rating
Boards	MOD2DB40	619100	4	A	200A
	MOD2DB60	619101	6	B	200A
	MOD2DB80	619102	8	C	200A
	MOD2DB120	619103	12	D	200A
	MOD2DB180	619104	18	E	200A
	MOD2DB240	619122	24	F	200A
Pan assembly	MOD2PA40	619177	4	-	200A
	MOD2PA60	619178	6	-	200A
	MOD2PA80	619179	8	-	200A
	MOD2PA120	619180	12	-	200A
	MOD2PA180	619181	18	-	200A
	MOD2PA240	619192	24	-	200A

Integral Incomer Kits

	Order Codes	Ref. no.	Rating	Description	Poles	Terminal Capacity
Switch Disconnectors	MOD2ISO3	619111	100A	Switch disconnector	3	50mm^2
	MOD2DIL125	619114	125A	Switch disconnector	3	50mm^2
	MOD2DIL125/4	619124	125A	Switch disconnector	4	50mm^2

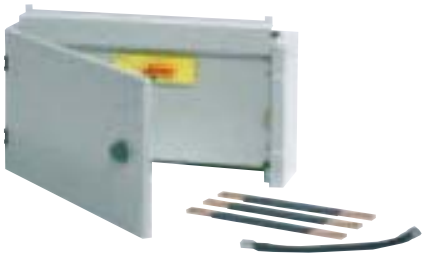
RCD Main Switch	MOD2RCDA	619119	100A	30mA RCD	4	50mm^2
	MOD2RCDB	619112	100A	100mA RCD	4	50mm^2
	MOD2RCDC	619113	100A	300mA RCD	4	50mm^2
	MOD2RCDBTD	619120	100A	100mA time delayed RCD	4	50mm^2

MCB Main Switch	MOD2MCB63	619605	63A	MCB main switch	3	35mm^2
	MOD2MCB100	619606	100A	MCB main switch	3	70mm^2

Direct Connection Kit	MOD2DC	619115	200A	Direct connection kit	3	95mm^2

Single Phase Kit	MOD2SPK1	618300	100A	Single phase conversion kit	1P+N	50mm^2

Add-on Incomer Extension Kits



Order Codes	Ref. no.	Rating	Description	Poles	Terminal Capacity		Dimension code
					Standard palm	Narrow palm	
MOD2DIL200	619110	200A	Switch disconnector	4	70mm²	150mm²	G
MOD2MC200NA	619107	200A	MCCB non auto	3	70mm²	150mm²	H
MOD2MC200A	619109	200A	TP automatic MCCB	3	70mm²	150mm²	H
MOD2MCRCD	619108	200A	TP MCCB with RCD	4	70mm²	150mm²	H

For increased terminal capacity narrow palm lugs must be used in conjunction with MOD2SB1.

Add-on Extension Modules

Order Codes	Ref. no.	Description	Dimension code
MOD218D	619105	18 module modular devices	G
MOD2SB1	619106	Modular spreader box	G
MOD2HDGP	619116	Heavy duty gland plate 2mm thick	-

Type B MCB Distribution Board Accessories

Busbar shroud

SHR3	619018	10

3 module busbar shroud for unused ways preformed in 1 module widths.

Blank plate

BLNK4	610142	4

4 module blank for unused ways can be cut to 1/2 module widths

Clean earth facility

	619118	1

can be fitted for increased flexibility

Security

MOD2LOCK	610063	1

Ronis security door lock supplied with two keys

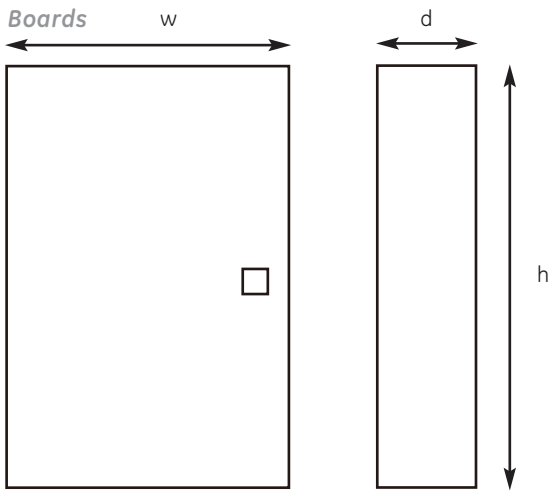
Safety

KS	624929	2

MCB padlocking bracket (padlocks not supplied)

Dimensional drawings

Type B



Dimensions (mm)			
Dimension code	Height (h)	Depth (d)	Width (w)
A	534	135	500
B	588	135	500
C	642	135	500
D	750	135	500
E	912	135	500
F	1136	135	500
G	250	135	500
H	500	135	500
I	250	135	500

GE Consumer & Industrial
Power Protection

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WORLDWIDE PARTNER

Industrial Enclosures ED. 04

For indoor and outdoor industrial applications

Sheltering as a second nature

GE imagination at work

MultiBox

Small multipurpose boxes

Wide range of small to medium size multipurpose boxes for in- and outdoor applications.

- Automation and control applications in industry, machinery, toolshop and OEM.
- Electronic applications in data and telecom industry.
- As commercial and industrial power distribution boxes.

All boxes are made from polystyrene or glass-fibre reinforced polycarbonate, offering a high protection degree of IP66 with mechanical impact strength of IK07 for polystyrene and IK08 for polycarbonate.

MultiBox enclosures can be easily modified and/or customized (coloured, printed, with cut-outs...).

VJ-BOX

Polyester NEMA sized boxes

Seven NEMA sized boxes according to the Joint Industrial Council (JIC) for in- and outdoor applications.

- Automation and control applications in oil and steel industry, petrochemical plants, breweries.
- Applications in utilities such as public lighting, traffic control, signalisation.
- For installation in aggressive environments such as ship-yards, offshore oil production platforms, mining sites.

All boxes are made of hot moulded, glass-fibre reinforced polyester, offering a high protection degree of IP67/IP66 with a mechanical impact strength of IK10.

VJ-Boxes can be readily worked with conventional tools such as drills, cutting mills, saws, punches, etc.

APO

Modular polyester boxes

Range of nine medium sized, modular, multipurpose boxes for in- and outdoor applications.

- Automation and control applications in oil and steel industry, petrochemical plants, breweries.
- Applications in utilities such as public lighting, traffic control, signalisation.
- For installation in aggressive environments such as ship-yards, offshore oil production platforms, mining sites.

All boxes are made of hot moulded, glass-fibre reinforced polyester, offering a high protection degree of IP67 with a mechanical impact strength of IK10.

APO-boxes can be readily worked with conventional tools such as drills, cutting mills, saws, punches, etc.

ARIA

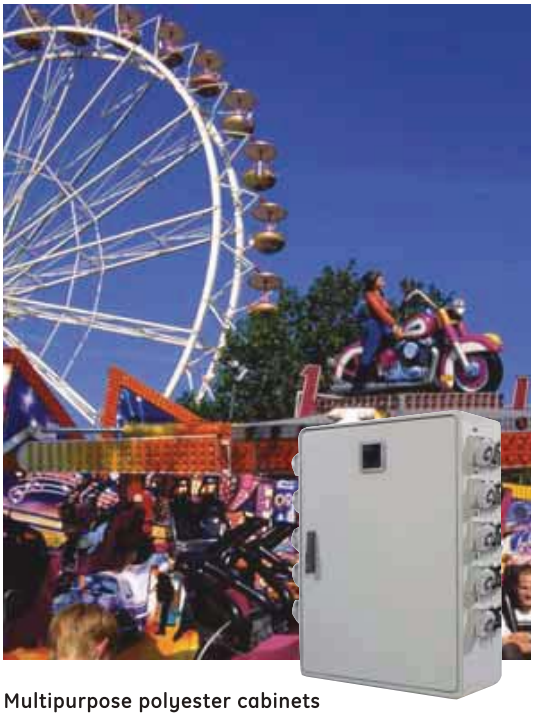
Universal polyester cabinets

Range of seven universal multipurpose cabinets for in- and outdoor applications. Ideal for high performance applications in

- Heavy industry (pulp & paper mills, mining sites, wood & lumber production, steel mills,...).
- Petroleum refineries, chemical and petrochemical plants.
- Temporary connection (for construction yards, camping sites, harbours for pleasure crafts, market places, fairs, ...).
- Alimentation industry and breweries.
- Waste water treatment, public lighting, traffic control, signalisation.
- For installation in aggressive environments such as ship-yards, offshore oil production platforms, mining sites.

All cabinets are made of hot moulded, glass-fibre reinforced polyester, offering a high protection degree of IP66 with a mechanical impact strength of IK10 (IK07 for cabinets with glazed door).

PolySafe



Multipurpose polyester cabinets

Range of fourteen multipurpose, factory assembled cabinets in one depth 320 mm, for in- and outdoor stationary use. Applications in

- Commercial: leisure (market places, camping sites, harbours for pleasure crafts, amusement parks), fuel stations, car washes, launderettes and laundries, service enclosures for construction yards, ...
- Industrial: shipyards, mining, automotive, paper & pulp, food and beverage, petrochemicals, transformers, system monitoring, ...
- Utilities: waste water treatment, waste management, telecommunications, traffic signalisation, traffic control, public transport, energy distribution (electricity, gas, water), cable television (CATV), public lighting, railways, ...

All cabinets are made of self-extinguishing, hot moulded, glass-fibre reinforced polyester, offering a high protection degree of IP65 with a mechanical impact strength of IK10 (IP55-IK07 for cabinets with glazed door).

VMS

Modular enclosures system

Range of five modular boxes based on a 100mm module. Rapid assembly of any configuration of units without the need for tools. For indoor application.

- Industry
- Public utilities
- Motor control centers
- Electronic instrumentation
- Low voltage distribution boards

The boxes are made of glass-fibre reinforced polycarbonate. Covers are made of either transparent or opaque polycarbonate. VMS boxes provide a high protection degree of IP65 and a mechanical impact strength of IK08 for the bases and end-plates and IK10 for the covers.

RVS

Stainless steel pedestals

A wide range of stainless steel RVS pedestals for outdoor use complies with the standard EN 60439-5 and the IEC 60439-5.

The RVS stainless steel pedestals make it possible to offer professional above ground solutions for cable networks, telecommunications, recreation grounds and other general applications.

In stainless steel AISI 304, painted in a polyester coating RAL 7034.

A range from DIN 00 up to DIN 4 in the width and deliverable in 5 different heights and one depth of 355 mm.

The cabinets have partially sunken bases in stainless steel or in concrete.

The pedestals offers maximum protection to the user and equipment thanks to the protection degree IP43 – IK10 according the IEC 60529, EN 60529 and EN 50102

UC-Cabinet

Subterranean enclosures

Stainless steel enclosures used in underground applications and suitable for installing all kinds of equipment for permanent or temporary connectivity.

In stainless steel AISI 304, with bulb plate cover.

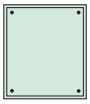
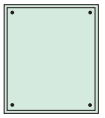
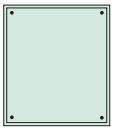
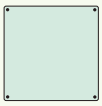
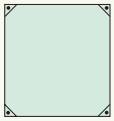
They can remain underground both in active and passive condition.

They avoid obstacles at street level and are vandalism approved.

The enclosure offers maximum protection to the user and equipment due to the high protection degree of the diving bell principle and the very strong structure and cover according the IEC 60529, EN 124 and EN 1.4452

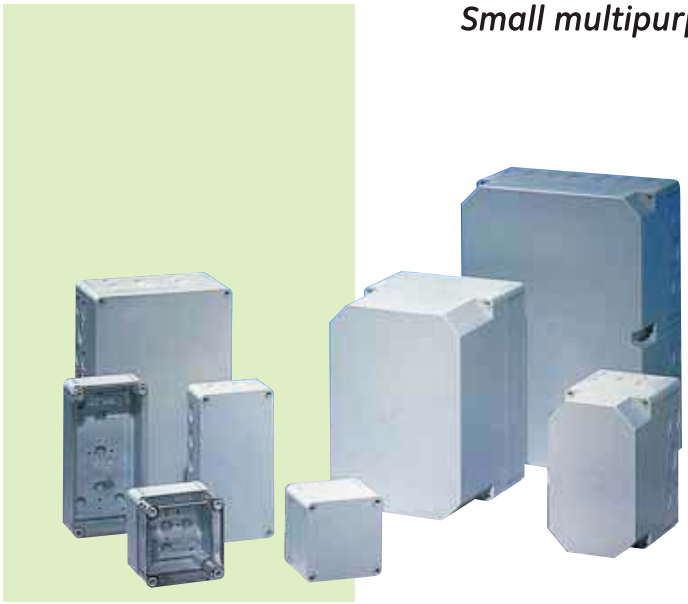
Used on markets, fairs and other events, but they are also suitable for permanent connections, low voltage energy distribution, glass fiber connections for IT related applications or for installing equipment for mobile telephony.

Overview Insulated Boxes

MultiBox IP66	VJ-BOX IP67/IP66	APO IP67
 65 x 65 x 57/81	 186 x 186 x 126	 186 x 151 x 140
 94 x 65 x 57/81	 236 x 186 x 126	 302 x 186 x 175
 94 x 94 x 57/81	 287 x 236 x 138/176	 302 x 302 x 175
 110 x 110 x 66/90	 338 x 287 x 142/180	 372 x 302 x 175
 130 x 94 x 57/81	 389 x 338 x 170/208	 488 x 302 x 175
 130 x 130 x 75/99	 440 x 389 x 170/208	 558 x 302 x 175
 180 x 94 x 57/81	 491 x 440 x 243	 603 x 302 x 175
 180 x 110 x 90/111/165		 603 x 372 x 175
 182 x 180 x 90/111/165		 603 x 603 x 175
 254 x 180 x 90/111/165		
 361 x 254 x 111/165		

H x W x D in mm

Small multipurpose boxes



Applications

- Ideal for automation and control applications in industry, machinery, tool-shop and OEM.
- Electronic applications in data and telecom industry.
- Also suitable for use as commercial and industrial distribution boxes.

Standards

IEC 60529 EN 60529
IEC 62208 EN 62208
IEC 62262 EN 62262
DIN VDE 0606 Teil 1/11.84

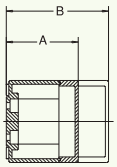
Approvals

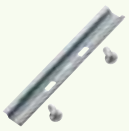
Only for polycarbonate boxes

Features and benefits

- 11 different basic enclosures (from 65 x 65 mm up to 361 x 254 mm) with up to 3 different cover depths.
- Material: made of polystyrene or glass-fibre reinforced polycarbonate.
- Colour: Grey RAL 7035
- High protection degree, IP66-IK07 for polystyrene, and IP66-IK08 for polycarbonate, by means of injected polyurethane seal.
- Polycarbonate boxes are available with smooth side walls (only one entry) or with several metric knock-outs.
  Polystyrene boxes are available with smooth side walls or with several metric knock-outs.
- Opaque grey or transparent covers.
- Designed for surface mounting.
- Combinations of heights and widths optional.
- Polystyrene boxes (650° glow wire test) are suitable for use in temperatures up to +70°C, polycarbonate boxes (960° glow wire test) are suitable for use in temperatures up to +120°C.
- Total insulation ⧈
- High resistance to chemical and aggressive influences.
- Non-corrosive and maintenance-free.
- Halogen-free.
- Self-extinguishing (UL94-V2).
- Rated insulation voltage Ui = 1000V

Small multipurpose boxes



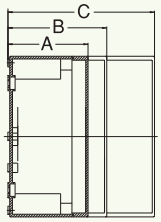


Base	Depth	Polystyrene		Polycarbonate (*)		Mounting plate (Insulated)	DIN profile 15x5x1 (for terminals)	DIN profile 35x7,5x1 (for terminals and components)
		Grey Cover RAL 7035	Transparent Cover	Grey Cover RAL 7035	Transparent Cover			
		Ref. No.	Ref. No.	Ref. No.	Ref. No.	Ref. No.	Ref. No.	Ref. No.
		MB 11 H x W = 65 x 65 mm				45 x 45 mm	L=49,5 long/short side	
With metric knock-outs	A = 57	861612	861613	861500	861501	861730	861741	-
	B = 81	861614	861615	861502	861503			
Smooth	A = 57	861668	861669	861556	861557			
	B = 81	861670	861671	861558	861559			
		MB 21 H x W = 94 x 65 mm				74 x 45 mm	L=49,5 short side	
With metric knock-outs	A = 57	861616	861617	861504	861505	861731	861741	-
	B = 81	861618	861619	861506	861507		L=80 long side	
Smooth	A = 57	861672	861673	861560	861561		861742	-
	B = 81	861674	861675	861562	861563			
		MB 22 H x W = 94 x 94 mm				74 x 74 mm	L=80 long/short side	
With metric knock-outs	A = 57	861620	861621	861508	861509	861732	861742	-
	B = 81	861622	861623	861510	861511			
Smooth	A = 57	861676	861677	861564	861565			
	B = 81	861678	861679	861566	861567			
		MB 33 H x W = 110 x 110 mm				90 x 90 mm	L=92 long/short side	L=81 long/short side
With metric knock-outs	A = 66	861624	861625	861512	861513	861733	861743	861746
	B = 90	861626	861627	861514	861515			
Smooth	A = 66	861680	861681	861568	861569			
	B = 90	861682	861683	861570	861571			
		MB 42 H x W = 130 x 94 mm				110 x 74 mm	L=111 long side	L=106 long side
With metric knock-outs	A = 57	861628	861629	861516	861517	861734	861744	861747
	B = 81	861630	861631	861518	861519			
Smooth	A = 57	861684	861685	861572	861573			
	B = 81	861686	861687	861574	861575			
		MB 44 H x W = 130 x 130 mm				110 x 110 mm	L=111 long/short side	L=106 long/short side
With metric knock-outs	A = 75	861632	861633	861520	861521	861735	861744	861747
	B = 99	861634	861635	861522	861523			
Smooth	A = 75	861688	861689	861576	861577			
	B = 99	861690	861691	861578	861579			
		MB 52 H x W = 180 x 94 mm				160 x 74 mm	L=154 long side	L=144 long side
With metric knock-outs	A = 57	861636	861637	861524	861525	861736	861745	861748
	B = 81	861638	861639	861526	861527			
Smooth	A = 57	861692	861693	861580	861581			
	B = 81	861694	861695	861582	861583			

(*) Smooth = one metric knock-out on short side for power supply cord ! (See dimensional drawings on I.10)

Pack.=1

Small multipurpose boxes



(for terminals and components)

Base	Depth	Polystyrene		Polycarbonate (*)		Mounting plate (Insulated)	DIN profile 35x7,5x1
		Grey Cover RAL 7035	Transparent Cover	Grey Cover RAL 7035	Transparent Cover		
		Ref. No.	Ref. No.	Ref. No.	Ref. No.	Ref. No.	Ref. No.
		MB 53 H x W = 180 x 110 mm				150 x 90 mm	L=144 long side
With metric knock-outs	A = 90	861640	861641	861528	861529	861737	861748
	B = 111	861642	861643	861530	861531		
	C = 165	861644	861645	861532	861533		
Smooth	A = 90	861696	861697	861584	861585		
	B = 111	861698	861699	861586	861587		
	C = 165	861700	861701	861588	861589		
		MB 65 H x W = 182 x 180 mm				150 x 150 mm	L=144 long side
With metric knock-outs	A = 90	861646	861647	861534	861535	861738	861748
	B = 111	861648	861649	861536	861537		
	C = 165	861650	861651	861538	861539		
Smooth	A = 90	861702	861703	861590	861591		
	B = 111	861704	861705	861592	861593		
	C = 165	861706	861707	861594	861595		
		MB 75 H x W = 254 x 180 mm				220 x 150 mm	L=216 long side
With metric knock-outs	A = 90	861654	861655	861542	861543	861739	861749
	B = 111	861656	861657	861544	861545		
	C = 165	861658	861659	861546	861547		
Smooth	A = 90	861710	861711	861598	861599		
	B = 111	861712	861713	861600	861601		
	C = 165	861714	861715	861602	861603		
		MB 87 H x W = 361 x 254 mm				331 x 220 mm	L=336 long side
With metric knock-outs	A = 111	861662	861663	861550	861551	861740	861750
	B = 165	861664	861665	861552	861553		
Smooth	A = 111	861718	861719	861606	861607		
	B = 165	861720	861721	861608	861609		

(*) Smooth = one metric knock-out on short side for power supply cord ! (See dimensional drawings on I.10)

Pack.=1

MultiBox Matrix

MB (MultiBox)	Height	Width
11	65	65
21	94	65
22	94	94
33	110	110
42	130	94
44	130	130
52	180	94
53	180	110
65	182	180
75	254	180
87	361	254

Polyester NEMA sized boxes

Applications

- Industry
- Steel works
- Oil refineries
- Petrochemical plants
- Breweries
- Shipyards
- Public utilities

Standards

IEC 60439-1	EN 60439-1
IEC 60529	EN 60529
IEC 62208	EN 62208

Approvals

UL types 3, 3R, 3S, 4, 4X, 6, 12 and 13

CSA types 3, 3R, 3S, 4, 4X, 6, 12 and 13

AS 3132-1991 (Australian Standards)

Features

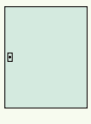
- VJ-boxes are designed in accordance with the Joint Industrial Council (JIC) - USA.
- The VJ-range consists of seven box sizes in three versions:
  - with screw cover
  - with stainless steel hinges
  - with plastic hinges
- The bases and covers are made of light grey (RAL 7035), hot moulded, glass fibre reinforced polyester, dyed in mass. They come complete with 4 threaded inserts (Dodge) for fixing a mounting plate.
- Gaskets that guarantee an optimal tightness degree, are made of polyurethane foam.
- All fixing hardware is made of stainless steel.
- The box can be readily worked with conventional tools, such as drills, cutting mills, saws, punches, etc.
- Versatile service conditions: polyester enclosures can withstand continuous temperatures up to 70°C (158°F) (peak temperatures up to 150°C or 302°F)
- VJ-boxes provide optimum security to both operators and equipment because they feature total insulation ⧈ and protection degree IP67/IP66 according to IEC 60529 (IP68 on demand)
  Protection degree IK10 against external mechanical impacts according to EN 62262 and IEC 62262.
  This protection degree covers the total volume of the enclosure according to EN 62208 and IEC 62208.
- VJ polyester boxes are maintenance-free and corrosion resistant.
- Rated insulation voltage Ui = 1000V
- VJ-boxes are UL listed, as per UL Standard 508 and CSA approved as per C22.2 nr. 94 types 3, 3R, 3S, 4, 4X, 6, 12 and 13.

Special versions

With air vents

With inset polycarbonate window (226 x 175)

Overview insulated wall mounting cabinets

ARIA IP66	PolySafe IP65
	 500 x 500 x 320
	 500 x 750 x 320
	 750 x 500 x 320
	 750 x 750 x 320
	 750 x 1000 x 320
	 750 x 1250 x 320
	 1000 x 500 x 320
	 1000 x 750 x 320
	 1000 x 1000 x 320
	 1000 x 1000 x 320
	 1000 x 1250 x 320
	 1250 x 750 x 320
	 1250 x 1000 x 320
	 1250 x 1000 x 320

H x W x D in mm

Universal polyester cabinets

Standards

IEC 60439-1	EN 60439-1
IEC 60529	EN 60529
IEC 62208	EN 62208

Approvals

UL types 3, 3R, 3S, 4, 4X, 12 and 13

CSA types 3, 3R, 3S, 4, 4X, 12 and 13

AS 3132-1991
Australian Standards

Features

- The range is available in seven sizes, ranging from 315 x 215 to 1035 x 835 mm.
- The cabinets are made of light-grey (RAL 7035) hot moulded, glass fibre reinforced polyester, dyed in mass. The enclosure is furnished with four threaded studs and bolts for mounting plate or mounting frame installation.
- The enclosure provides total insulation and a protection degree of **IP66** following IEC 60529 and EN 60529.
- Protection degree IK10 against external mechanical impacts according to EN 62262 and IEC 62262 (IK07 for cabinets with glazed door).
- This protection covers the total volume of the enclosure according to EN 62208 and IEC 62208.
- Resists temperatures up to 70°C in continuous use (peak temperatures up to 150°C).
- Self extinguishing and halogen-free.
- Cabinets are maintenance free and corrosion resistant.
- Rated insulation voltage Ui = 1000V.

Applications

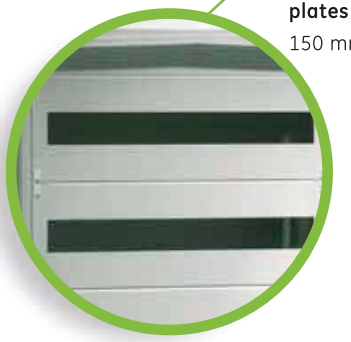
- Heavy industry
- Steel mills
- Petrochemical plants
- Temporary connection (for construction sites)
- Brewery
- Public services
- Street signalisation
- Telecom
- Photovoltaic energy

ARIA

- Monobloc type of cabinet
- In and outdoor use
- 7 dimensions 315x215x170 up to 1035x835x300 mm
- 1, 2 or 3 point locking mechanism
- Glass fibre reinforced polyester
- Protection degree **IP66***-IK10 (plain door)
- Fitted for mounting plate and modular mounting frame
- Wall mounting/pole fixing
- Execution on base (metal or concrete)
- Approvals: UL/CSA/AS

Self-adhesive rainhood
(as a standard accessory with each cabinet) avoiding dripping water drops while opening the door

Mounting frame with individual modular cover plates for DIN-rail equipment
150 mm between centres, up to 180 modules !



REAL IP66*

*	ARIA	Product of competitor A	Product of competitor B
Catalogue	IP66	IP66	IP65
Lab Tests	IP66	IP65/54	IP42

Construction

Petrochemicals

Conveyer belts

Durable polyurethane gasket

Ergonomic new closing mechanism

- Reducing closing force by 25%
- Can also be operated by swing-handle

Patented doorlifter for bigger dimensions ensuring the door takes it's center position during closing

Traffic

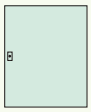
Water treatment

Camping and Hotels

Universal polyester cabinets

		Type	ARIA 32	ARIA 43	ARIA 54	ARIA 64
		H x W x D	315 x 215 x 170	415 x 315 x 170	515 x 415 x 230	615 x 415 x 230
	IP65 - IK10 With individual double bit lock 3 mm	Ref. No.	831025 1-point	831035 1-point	831809 2-point	831810 2-point
	**Cabinet** IP66 - IK10 With central double bit lock 3 mm	Ref. No.	-	831036	831052	831065
	**Cabinet** IP66 - IK10 With central swing handle for profile half cylinder	Ref. No.	-	831034	831051	831064
	**Glazed door cabinet** IP65 - IK07 With individual double bit lock 3 mm	Ref. No.	–	831128 1-point	831812 2-point	831813 2-point
	**Glazed door cabinet** IP66 - IK07 With central double bit lock 3 mm	Ref. No.	–	831815	831129	831130
	**Glazed door cabinet** IP66 - IK07 With central swing handle for profile half cylinder	Ref. No.	–	–	831284	831285

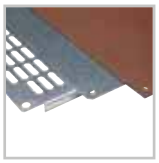
Pack: 1

		
ARIA 75	**ARIA 86**	**ARIA 108**
735 x 535 x 270	835 x 635 x 300	1035 x 835 x 300
831811 2-point	-	-
831081	**831098**	**831112**
831080	**831097**	**831111**
831814 2-point	-	-
831131	**831132**	**831133**
831286	**831287**	**831288**

Applications

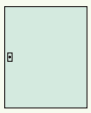
- Industry
- Steel works
- Oil refineries
- Breweries
- Shipyards
- Public utilities

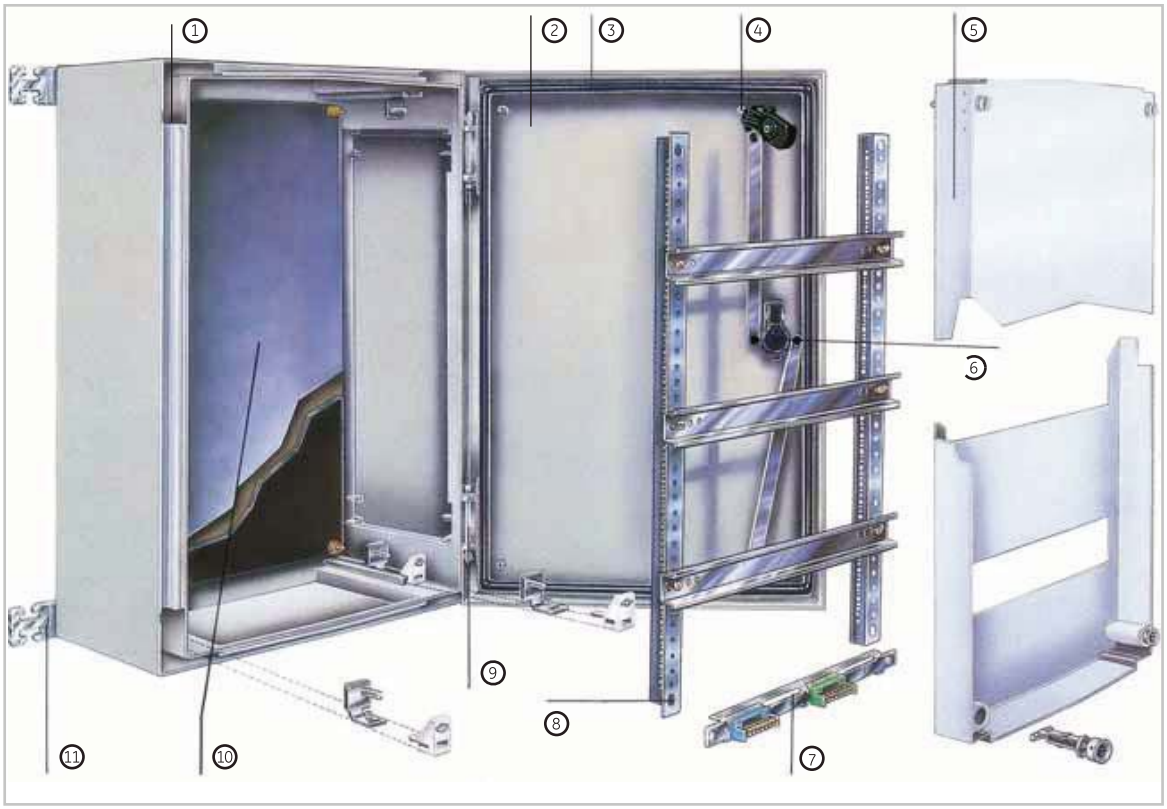
Universal polyester cabinets - Accessories

	Type	ARIA 32	ARIA 43	ARIA 54	ARIA 64
	H x W x D	315 x 215 x 170	415 x 315 x 170	515 x 415 x 230	615 x 415 x 230
	H x W	250 x 150	350 x 250	450 x 350	550 x 350
	Ref. No.	831027	831038	831054	831067
	Ref. No.	831026	831037	831053	831066
	Ref. No.	831332	831333	831334	831335
	Ref. No.	831030	831041	831057	831070
		2	2	3	3
		12	24	54	54
	Ref. No.	831018	831019	831020	831020
		2	3	4	4
	Ref. No.	831028	831039	831055	831068
	Ref. No.	831029	831040	831056	831069
	Ref. No.	-	831790	831791	831792
		-	2	3	3
	H x W	-	150 x 239	150 x 343	150 x 343
	IP20 (PVC) Plain Ref. No.	-	831797 (1)	831799	831801 (2)
	With cut-out for DIN-rail equipment Ref. No.	-	831796 (1)	831798	831800 (2)
	Modules	-	12	17	18

Pack: 1

(1) and (2): see page B.10

	ARIA 75	ARIA 86	ARIA 108
			
	735 x 535 x 270	835 x 635 x 300	1035 x 835 x 300
	650 x 450	750 x 550	950 x 750
	831083	**831100**	**831114**
	831082	**831099**	**831113**
	831336	**831337**	**831338**
	831086	**831103**	**831117**
	4	4	5
	88	96	180
	831021	**831022**	**831023**
	6	7	10
	831084	**831101**	**831115**
	831085	**831102**	**831116**
	831793	**831794**	**831795**
	4	8	10
	150 x 423	150 x 239	150 x 343
	831803	**831797 (1)**	**831801 (2)**
	831802	**831796 (1)**	**831800 (2)**
	22	12	18



1. Housing in one piece
2. Removable door: left- or right-hand hinged
   (not for version with swing-handle)
3. Slightly curved gasket-slot avoiding stagnant water
4. Fixing points at rear of door
5. Cover plate:
   - polyester RAL 7035
   - hinged
   - independent
   - reversible
   - sealable
   - with snap-on fixing
6. Three point closing system with one lock.
   Exchangeable locks.
7. Independent rail for terminal blocks
8. Mounting frame
   - removable
   - predrilled
   - reinforced DIN-rails
9. Integrated hinges.
   Door opens 180°
10. Mounting plate
    - metal
    - pertinax
    - perforated
11. Direct wall fixing points or wall fixing lugs in plastic material or stainless steel.

Multipurpose polyester cabinets

Standards

IEC 60529	EN 60529
IEC 62208	EN 62208
IEC 62262	EN 62262

Approvals

- Cabinets with one door: type 3, 3R, 3S, 4, 4X, 12, 12K and 13
- Cabinets with two doors: type 3, 3R, 3S, 4, 4X, 12, 12K and 13
- Coupled cabinets: type 3, 3R, 3S, 12, 12K and 13

Ambient conditions

- Indoor and outdoor stationary use, at temperatures between -50°C and 70°C in continuous use and at peak temperatures up to +150°C and excessive height up to 2000 m
- Suitable for aggressive and marine or corrosive environments

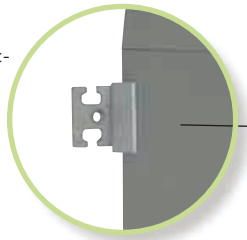
Features

- 14 standard dimensions (from 500 x 500 up to 1250 x 1000) in one depth 320 mm
- Cabinets are standard factory assembled (empty or equipped)
- High protection degree **IP65**-IK10 (20J) according to IEC 60529 and EN 62262 and IEC 62262 (IP55 - IK07 for cabinets with glazed door) This protection covers the total volume of the enclosure according to EN 62208 and IEC 62208.
- Material: self-extinguishing, hot moulded, halogen-free, fiberglass reinforced polyester (environment friendly)
- Colour: grey RAL7035, dyed in mass
- Designed for wall mounting, floor standing and pole fixing
- Coupling possibilities in height, width and depth
- Total insulation ⧈
- Door with 5-point latching mechanism
- Execution as pedestal possible
- Rated insulation voltage Ui= 1000V
- Corrosion and maintenance free
- Easy recyclable: no moulded-in metal parts

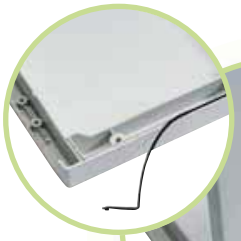
Rainhood for outdoor use
- Up to IP65, not necessary
- Possibility of ventilation through cut-outs in top panel and air vents on side panels (to prevent internal condensation)
- Protection degree: IP44/IP54 in case of ventilation
- Moulded-in markings on the inside top panel shows the cut-out and fixation points

Backpanel
- Enclosed in main structure
- Has a seamless top panel as a result
- No inserts
- PUR sealing directly injected and responsible for high protection degree IP65

Wall mounting brackets
- No mounting screws necessary
- Can be mounted vertical or horizontal

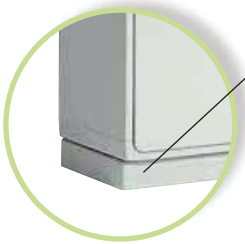


Mounting frame
- In Alu with standard horizontal Alu C-profiles for all four widths
- Regulation in depth possible for all sizes
- Offering a complete solution (no more sawing necessary)



Neoprene gasket
- Preformed and premounted

Side panels
- Integrated into top and bottom
- Provide a very solid and stable construction



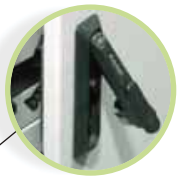
Floor mounting frame
Base in polyester (height 65 mm)
- For anchoring the cabinet with the floor
- Moulded-in markings on the inside bottom panel shows the cut-out and fixation points for anchoring

Mounting plates
- Metal 2 mm
- Pertinax 5 mm
- Metal perforated 2 mm
- Fixed (by means of HiLo) as well as adjustable in depth for all sizes

Self tapping HiLo screws
(no inserts)
- For assembling main structure and fixation of the back panel
- Makes the cabinet easily dismantled for recycling

Hinges
- Mounted directly on the side panels, each step of 250 mm
- Direct access outside the functional part of the cabinet

Standard ergonomic operating handle
- Premounted on the door
- Suitable for all types of profile half cylinder locks (standard depth 40 mm/ alt. depth 45 mm)
- Possibility of padlocking (no access to unauthorised persons)



Doorlifter
- For bigger dimensions
- Ensuring the door takes its center position during closing

Door
- Flush mounted
- Plain or glazed
- No inserts (HiLo screws)
- Inclosed in main structure
- Has a seamless top panel as a result
- PUR sealing directly injected results in high protection degree IP65
- Opening angle 100°

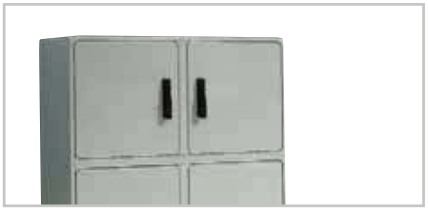
Standard 5 point latching mechanism
- Operated by one handle
- Provides secure closing (IP65)

Doorstop
Prevents stressing the door hinges caused by wind in outside use

Door conducting
For exact door positioning in the main structure

Customisation

Cabinet can be ordered with preformed cut-outs to suit your application: ease and speed of mounting.



Lay-out in compartments and internal separations as a flexible solution for the end customer (e.g. separation of distribution and instrumentation sections).

Coupling in depth by means of a depth extension kit (unlimited).

Cabinet also available with inset polycarbonate window: visability of operating components, internal signalisation.

Coupling in height and width by means of a coupling kit (see accessories): ease of extension.

Cabinet can be factory equipped and wired according to the customers requirements: ready to install and operate.

Customisation

Cabinet also available in kit-form on demand: ease of transportation, space saving storage.

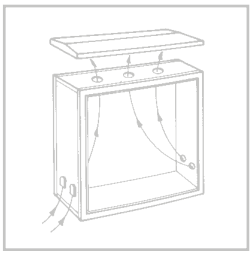
Cabinet can be provided with door on the front and at the rear: easy access, two different individual compartments.

Cabinet can be supplied painted in other colours or with personal identification: environmental influence adaptation, ease of recognition, anti-graffiti.

Mounting applications

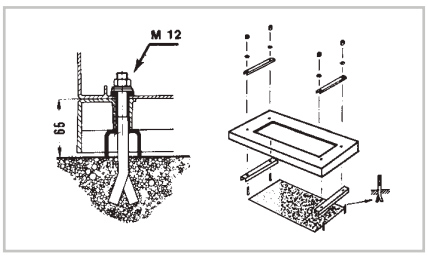
Rainhoods

Four fixing points for securing rainhood are marked off in top panel. By drilling holes in the top panel and by fitting air vents (Ref. No. 833677) on the side panels, the cabinet with rainhood will be efficiently ventilated. (IP44)
For extra depth or extra width, please contact us.

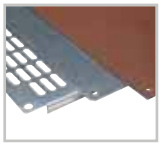


Plinth

Easily mounted in accordance with the enclosed instructions



Multipurpose polyester cabinets

	Depth = 320 mm	PS 220	PS 230	PS 320	PS 330	PS 340
	**Factory-assembled cabinet** IP65 - IK10 Complete with handle and wall mounting brackets of AISI 304 stainless steel (without cylinder lock)					
	Dimensions (H x W)	500 x 500	500 x 750	750 x 500	750 x 750	750 x 1000
	Cabinet with plain door	**833000**	**833004**	**833008**	**833012**	**833016**
	Cabinet with glazed door (polycarbonate window) (IP55)	**833001**	**833005**	**833009**	**833013**	**833017**
	Weight (kg)	16	19	20	25	30
	**Cabinet** with door on the front and at the back	**833076**	**833086**	**833219**	**833373**	**833077**
	**Mounting plate** Dimensions (H - 110 mm x W - 110 mm)					
	Sendzimir zinc coated sheet steel 2 mm	**833500**	**833501**	**833501**	**833502**	**833504**
	Perforated 2 mm	**833516**	**833517**	**833518**	**833519**	**833520**
	Pertinax 5 mm	**833508**	**833509**	**833509**	**833510**	**833512**
	Pertinax 10 mm	-	-	-	-	-
	**Depth extension kit** IP65 To increase the standard depth 320 mm of the cabinet up to 640 mm. The kit consists out of two side panels, one top and bottom panel and two open backpanels.	**833584**	**833585**	**833586**	**833587**	**833588**
	**Rainhood** For an efficient ventilation (IP44) in outdoor use by drilling holes in the top panel. As the standard enclosure is IP65, a rainhood is not necessary. In case of extra width or depth, please contact us.	**833566**	**833568**	**833566**	**833568**	**833570**
	**Plinth** or floor mounting frame. Cabinet and plinth are anchored together in the flooring - H = 65 mm	**833574**	**833575**	**833574**	**833575**	**833576**
	**Adaptor frame for DIN-base mounting** Cabinet and adaptor frame are anchored on the DIN base (polyester or concrete)	-	**833582**	-	**833582**	**833583**
	DIN-base For more information, see page E.11	-	**842100**	-	**842100**	**842101**
	**Mounting frame in Alu** Consisting out of: four attachment brackets, two vertical C-profiles. Horizontal profiles to be ordered separately, see B.19					
	Continuously adjustable	**833533**	**833533**	**833534**	**833534**	**833534**
	Adjustable in steps of 12,5 mm	**833529**	**833529**	**833530**	**833530**	**833530**
	Length of horizontal profile (mm)	468	718	468	718	968

	PS 352	PS 420	PS 430	PS 440	PS 442	PS 452	PS 530	PS 542	PS 546
	750 x 1250	1000 x 500	1000 x 750	1000 x 1000	1000 x 1000	1000 x 1250	1250 x 750	1250 x 1000	1250 x 1000
	833020	833024	833028	833032	833036	833040	833044	833052	833056
	833021	833025	833029	-	833037	833041	833045	833053	833057
	38	25	30	36	39	41	37	45	45
	833374	833375	833085	833376	833377	833378	833379	833380	833381
	833506	833503	833504	833505	833505	833507	833506	833507	833507
	833521	833522	833523	833524	833524	833525	833526	833527	833527
	833514	833511	833512	833513	833513	833515	833514	833515	833515
	833385	-	-	833386	833386	833387	833385	833387	833387
	833589	833590	833591	833592	833592	833593	833594	833595	833595
	833572	833566	833568	833570	833570	833572	833568	833570	833570
	833577	833574	833575	833576	833576	833577	833575	833576	833576
	-	-	833582	833583	833583	-	833582(1)	833583(1)	833583(1)
	-	-	842100	842101	842101	-	842100	842101	842101
	833534	833535	833535	833535	833535	833535	833536	833536	833536
	833530	833531	833531	833531	833531	833531	833532	833532	833532
	1218	468	718	968	968	1218	718	968	968

YATRON 日騰™

低壓配電系統

LV Distribution System

YT-E / E Plus 系列 – 低壓配電櫃
YT-E / E Plus Series – LV Switchboard

Yatron E / E PLUS

產品目錄 版本. 01
Catalogue ED. 01

產品說明 Product Introduction

- **Yatron E / E Plus** 系列低壓配電櫃的結構分**金屬鋼板門**和**玻璃門**兩種類型，全部產品採用冷軋鋼板折彎而成，表面經過環氧樹脂靜電噴塗處理，美觀耐用。
- **The Yatron E / E Plus** series LV Switchboard can be divided into two categories in terms of structure, one is **Plain doors** and the other one is **Glass door**. All of the products are bended with Cold Rolled Steel Sheet, while the surfaces are treated with epoxy resin electrostatic spraying in order to be attractive and durable.

- IP55 型號之櫃體具有之防水折邊，門板上使用機械人成型之密封橡膠條，更有效地防止油污、雨水等液體及灰塵滲入。
- The enclosures of models IP55 with waterproof bevel edges and rubber seals fitted by Robots around the door can effectively prevent any liquids (such as the oil, rainwater etc.) and dust from permeating into the enclosure.

- 外觀設計美觀、結構佈局緊湊合理、電路配置安全可靠、性能卓越、持久耐用等優點。
- Its advantages are: attractive appearance design, reasonable frame, safe circuit layout, excellent performance, long lasting etc. advantages.

- 獨特之 45 度斜角外門，使液體及灰塵更容易地掉落，以免沉積在箱體上，延長使用壽命。
- The external door with the unique 45° bevel enables liquids and dust to drop down easier rather than accumulate on the enclosure, so as to extend the service life.

- 電纜進線底板可在箱體上方或下方。
- The cable entrance plates can be located on top or below the enclosures.

- 外門開啟大於 140 度，轉動靈活。
- The door opening degrees of the exterior door is more than 140 degrees, and it is easy to open and close the door.

- 多種尺寸規格供客戶選用，或可以訂製其它規格。
- There are some standard size specifications provided for customers, or custom-made are also available.

- 標準顏色為淡灰色(RAL7035)，或可以自由訂製其它顏色。
- The standard color is light grey (RAL7035) or custom-made colors are also available.

產品說明 Product Introduction

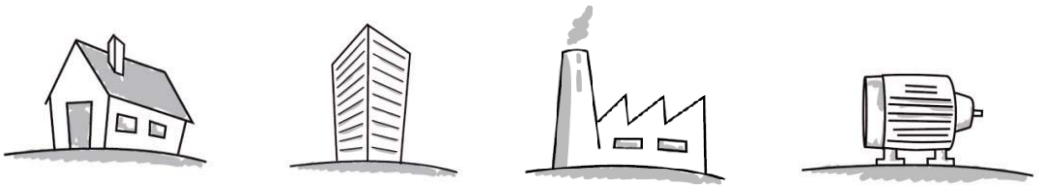
- 通用性強，款式靈活多樣，除可作一般商用、工業配電及控制用途外，還可按需要配裝成不同電氣性能的控制系統，如：通訊中心、馬達控制中心、自動化設備控制櫃、空調控制櫃、機床傳動控制櫃、水泵控制櫃等。
- It is high universality with variety of styles and it can be used not only in the general commercial and industrial power distributions and control, it also can be assembled for different electrical control systems such as the Communication Center, MCC (Motor Control Center), PLC Control Board, AC Control Board, Transmission Control Board, Pump Control Board etc.

- 配件齊全，可按使用要求，組合出多種方案。另外，可根據特殊要求，選擇地使用安裝底板或支架安裝箱內之電氣元件。
- A lot of accessories in order to assemble several solutions. Besides, the components could be installed by Mounting plates or Supporting accessories according to the special requirements.

- 工業級別 Industrial Type
- 符合 BS EN / IEC / GB (歐盟，英國，中國)
  Comply with BS EN / IEC / GB (EU, UK, China)
- 優越性能 Excellent performances

用　　途 Applications

- Yatron E / E Plus 適用於住宅、商業和工業(通訊、石油、礦場、化工、冶金、紡織、橡膠、設備製造等)配電系統中。
- The Yatron E / E Plus is suitable to be used in residential, commercial and industrial (communication, petroleum, mine , chemical industry, metallurgy, textile, rubber, equipment manufacturing etc.) power distribution systems.



規　　格 Specifications

■ 特　　徵 Features

☐ 模塊化組件 Delivered in kit form
- *隔離方式 Partition types:*
  E: Form 1, 2 / E Plus: Form 1, 2, 3, 4
- *外門 Exterior door*
- *鋼板門 Plain door / 玻璃門 Glass door*

☐ 內門 Interior door
- *單體式 Single*
- *模塊式 Modular*

☐ 防護等級 Degrees of protection
- *IP41 / IP43 / IP55*

☐ 抗外部械機衝擊
Protected against external mechanical impacts
- *鋼板門 Plain door: IK10*
- *玻璃門 Glass door: IK08*

■ 標　　準 Standards

☐ BS EN / IEC 60439.1 (歐盟 EU, 英國 UK)

☐ GB 7251.1 (中國 China)

■ 材　　料 Materials

☐ *結構 / 外部面板及門*
Structure / External Panel and Doors:
- *E : 鋼板及噴粉, 厚度 1.2 ~ 2 mm*
  Steel Sheet, Powder Coated, Thickness 1.2~2 mm
- *E Plus: 鋼板及噴粉, 厚度 1 mm / 2mm*
  Steel sheet, Powder Coated, Thickness 1 / 2 mm

☐ *固定板及固定支架* Mounting plates and profiles
- *鍍鋅鋼板 Zinc galvanized steel sheet*

☐ 連接件 Adaptor
- *鍍鋅鋼板 Zinc galvanized steel sheet*

☐ 顏色 Colors
- *外門: 淡灰色 Light grey (RAL 7035)*
- *內門: 淡灰色 Light grey (RAL 7035) / RAL 7024*
  其它 (米黃色, 大紅色, 淺黃灰色, 蘋果綠, 白色或自選)
  Other (cream, red, light yellowish grey, apple green, white or custom-made)

■ 電氣參數 Electrical Characteristics

☐ 額定電壓 Rated voltage : 690AC - 50/60Hz

☐ 額定電流 Rated current :
最大 Max. : E (630 A) / E Plus (4000 A)

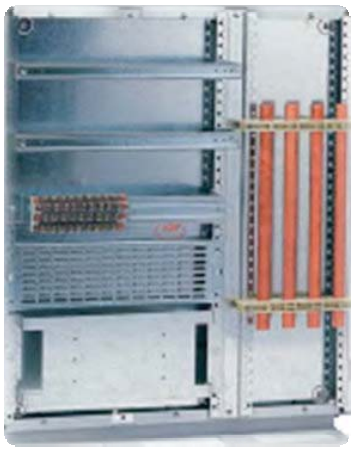
☐ 額定短時耐受電流 I_{cw} Rated short current I_{cw}:
最大 E (30 kA) / E Plus (70 kA) (1 秒)
Max. E (30 kA) / E Plus (70kA) (1 sec.)

■ 幾何尺寸 Dimensions

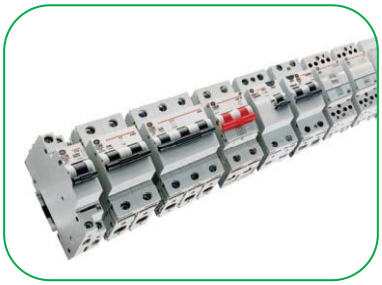
☐ 高(H) : E (545~1910 mm) / E Plus (2000 mm)

☐ 寬(W) : E (600, 900 mm) / E Plus (400, 650, 900 mm)

☐ 深(D) : E (250, 300 mm) / E Plus (500, 700, 1000 mm)

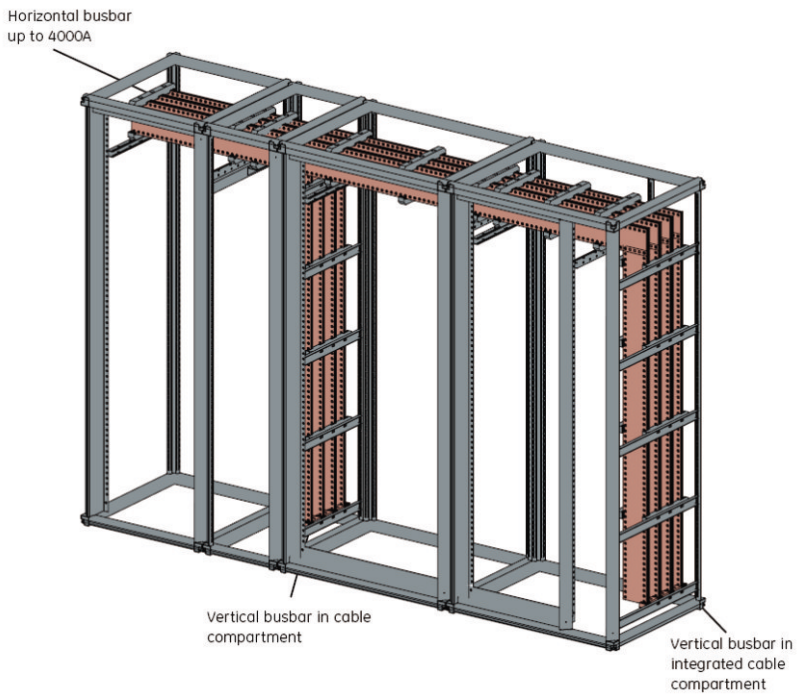


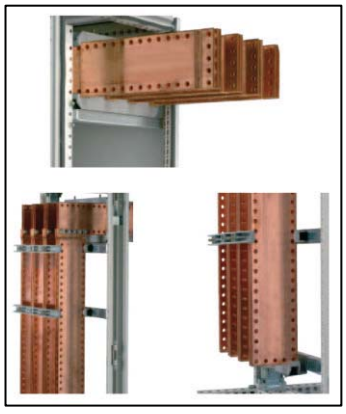
Yatron E Series



訂貨資料 Ordering Information

箱/櫃體型號 Enclosure Model	高度 H Height (mm)	寬度 W Width (mm)	深度 D Depth (mm)	內門 INT. Door	安裝支架/板 Supporting/ Mounting Plate
YT-E-56250	545	600	250	YT-E-ID-56	YT-E-S/MP-56
YT-E-59250	545	900	250	YT-E-ID-59	YT-E-S/MP-59
YT-E-86250	845	600	250	YT-E-ID-86	YT-E-S/MP-86
YT-E-89250	845	900	250	YT-E-ID-89	YT-E-S/MP-89
YT-E-196250	1910	600	250	YT-E-ID-196	YT-E-S/MP-196
YT-E-199250	1910	900	250	YT-E-ID-199	YT-E-S/MP-199
YT-E Plus-204500	2000	400	500	YT-E Plus-ID-204	YT-E Plus-S/MP-204
YT-E Plus-206500	2000	650	500	YT-E Plus-ID-206	YT-E Plus-S/MP-206
YT-E Plus-209500	2000	900	500	YT-E Plus-ID-209	YT-E Plus-S/MP-209
YT-E Plus-204700	2000	400	700	YT-E Plus-ID-204	YT-E Plus-S/MP-204
YT-E Plus-206700	2000	650	700	YT-E Plus-ID-206	YT-E Plus-S/MP-206
YT-E Plus-209700	2000	900	700	YT-E Plus-ID-209	YT-E Plus-S/MP-209
YT-E Plus-2041000	2000	400	1000	YT-E Plus-ID-204	YT-E Plus-S/MP-204
YT-E Plus-2061000	2000	650	1000	YT-E Plus-ID-206	YT-E Plus-S/MP-206
YT-E Plus-2091000	2000	900	1000	YT-E Plus-ID-209	YT-E Plus-S/MP-209





水平/垂直母線
Horizontal / Vertical busbar

YATRON® 日騰

低壓配電系統

LV Distribution System

YT-WM 系列 – 工業電箱
YT-WM Series – Industrial Enclosures

Yatron WM

產品目錄
Catalogue ED. 01.2

產品說明 Product Introduction

- **Yatron WM** 系列工業電箱的結構分**金屬鋼板門**和**玻璃門**兩種類型，全部產品採用冷軋鋼板折彎而成，表面經過環氧樹脂靜電噴塗處理，美觀耐用。
- **The Yatron WM** Series Industrial Enclosures can be divided into two categories in terms of structure, one is **Plain doors** and the other one is **Glass door**. All of the products are bended with Cold Rolled Steel Sheet, while the surfaces are treated with epoxy resin electrostatic spraying in order to be attractive and durable.

- IP55 及 IP66 型號之箱體具有斜度之防水折邊，門板上使用機械人成型之密封橡膠條，更有效地防止油污、雨水等液體及灰塵滲入。
- The enclosures of models IP55 and IP66 with waterproof bevel edges and rubber seals fitted by Robots around the door can effectively prevent any liquids (such as the oil, rainwater etc.) and dust from permeating into the enclosure.

- 外觀設計美觀、結構佈局緊湊合理、電路配置安全可靠、性能卓越、通過 BS/EN/IEC 的鹽霧及抗老化試驗，持久耐用等優點。
- Its advantages are: attractive appearance design, reasonable frame, safe circuit layout, excellent performance, passed the salt mist and aging tests of BS/EN/IEC standards, long lasting etc. advantages.

- 獨特之 45 度斜角外門，使液體及灰塵更容易地掉落，以免沉積在箱體上，延長使用壽命。
- The external door with the unique 45° bevel enables liquids and dust to drop down easier rather than accumulate on the enclosure, so as to extend the service life.

- 電纜進線底板可在箱體上方或下方。
- The cable entrance plates can be located on top or below the enclosures.

- 外門開啟大於 130 度，轉動靈活。
- The door opening degrees of the exterior door is more than 130 degrees, and it is easy to open and close the door.

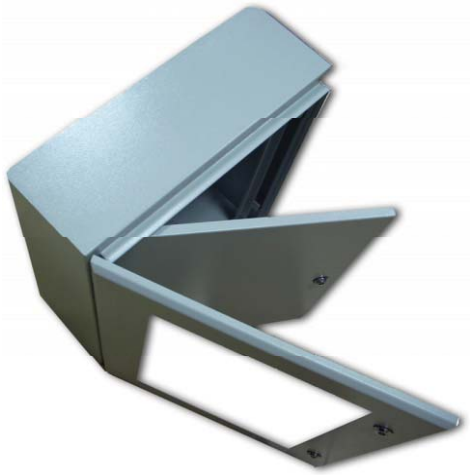
- 42 種尺寸規格供客戶選用，或可以訂製其它規格。
- There are 42 kinds of size specifications provided for customers, or custom-made are also available.

- 標準顏色為淡灰色(RAL7035)、可以自由訂製其它顏色或不锈鋼。
- The standard color is light grey (RAL7035), custom-made colors or Stainless steel is also available.

產品說明 Product Introduction

- 通用性強，款式靈活多樣，除可作一般商用、工業配電及控制用途外，還可按需要配裝成不同電氣性能的控制系統，如：自動化設備控制箱、空調控制箱、機床傳動控制箱、水泵控制箱等。
- It is high universality with variety of styles and it can be used not only in the general commercial and industrial power distributions and control, it also can be assembled for different electrical control systems such as the PLC Control Panel, AC Control Panel, Transmission Control Panel, Pump Control Panel etc.

- 配件齊全，可按使用要求，組合出多種方案。另外，可根據特殊要求，選擇地使用安裝底板或支架安裝箱內之電氣元件。
- A lot of accessories in order to assemble several solutions. Besides, the components could be installed by Mounting plates or Supporting accessories according to the special requirements.



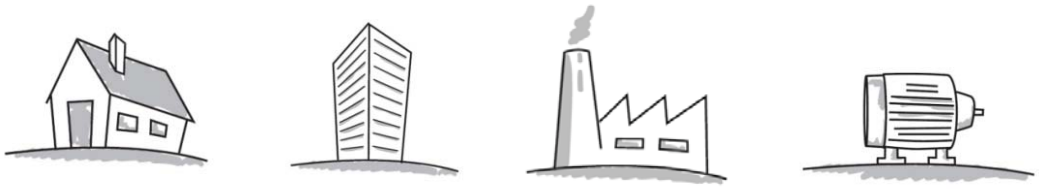
- 工業級別 Industrial Type
- 符合 BS EN / IEC / GB (歐盟，英國，中國)
  Comply with BS EN / IEC / GB (EU, UK, China)
- 優越性能 Excellent performances

證　　書 Certifications

- **Yatron WM** 系列工業電箱根據 BS EN / IEC 62208 標準成功通過測試並已取得德國 TUV 認證證書。
- **The Yatron WM** Series Industrial Enclosures has been issued certificates from TUV Germany, following successful testing in according with BS EN / IEC 62208 standards.

用　　途 Applications

- Yatron WM 適用於住宅、商業和工業(石油、礦場、化工、冶金、紡織、橡膠、設備製造等)配電系統中。
- The Yatron WM is suitable to be used in residential, commercial and industrial (petroleum, mine , chemical industry, metallurgy, textile, rubber, equipment manufacturing etc.) power distribution systems.



規　　格 Specifications

■ 特　　徵 Features

☐ 模塊化組件 Delivered in kit form
- *隔離方式 Partition types: Form 1 / Form 2*
- *外門 Exterior door*
- *鋼板門 Plain door / 玻璃門 Glass door*

☐ 內門 Interior door
- *單體式 Single*
- *模塊式 Modular*

☐ 防護等級 Degrees of protection
- *IP41 / IP43 / IP55 / IP66*

☐ 抗外部械機衝擊
Protected against external mechanical impacts
- *鋼板門 Plain door: IK10*
- *玻璃門 Glass door: IK08*

■ 標　　準 Standards

☐ BS EN / IEC 62208 (歐盟 EU, 英國 UK)

☐ GB/T20641 (中國 China)

■ 證　書 / 標　誌 Certificates / Marking

■ 材　　料 Materials

☐ 門, 側板和蓋板 Door, side panels and cover panel
- *環氧樹脂漆塗層鋼板或不銹鋼*
  Steel panel coated with epoxy resin or Stainless steel

☐ 連接件 Adaptor
- *鍍鋅冷軋鋼板 Zinc galvanized cold rolled steel sheet*

☐ 顏色 Colors
- *淡灰色 Light grey (RAL7035)*

其它 (米黃色, 大紅色, 淺黃灰色, 蘋果綠, 白色或自選) 或 不銹鋼
Other (cream, red, light yellowish grey, apple green, white or custom-made) or Stainless steel

■ 電氣參數 Electrical Characteristics

☐ 額定電壓 Rated voltage : 690AC - 50/60Hz

☐ 額定電流 Rated current : 最大 Max. 630A

☐ 額定短時耐受電流 I_{CW} : 最大 30kA (1 秒)
Rated short current I_{CW} : Max 30kA (1 sec.)

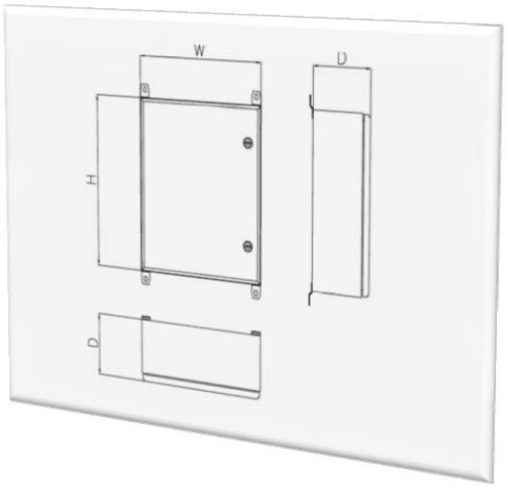
☐ 額定峰值耐受電流 I_{PK} : 峰值 60kA (1 秒)
Rated peak short circuit current I_{PK} : 60kA peak (1 sec.)

■ 幾何尺寸 Dimensions

☐ 高(H) : 300 ~ 1200 mm

☐ 寬(W) : 300 ~ 1000 mm

☐ 深(D) : 200 ~ 300 mm



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WORLDWIDE PARTNER

M-PACT New

Air Circuit Breaker 400-4000A

GE imagination at work

Rated from 400 to 4000A the M-PACT circuit breaker has been designed to meet the most stringent demands in fault detection and safe interruption thereof.

Available in 2 frame sizes:
- frame size 1 ranging from 400 to 2500A
- frame size 2 ranging from 800 to 4000A

The range has been developed to be aesthetically and technically co-ordinated with other protective devices within the GE Power Controls industrial product ranges.

The breaker range has a common height and depth and is available in both fixed pattern and drawout versions which can be manually or electrically operated. Designed to offer multiple mains connection options it also comes with a wide range of easy-to-install accessories.

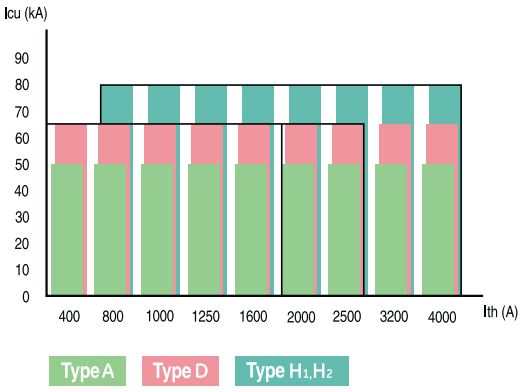
Specification

M-PACT air circuit breakers comply with the following specifications for Low Voltage Switchgear:
- IEC 60947-1
- IEC 60947-2
- IEC 60947-3
- Utilisation category B

Approvals

KEMA certification in accordance with IEC 60947-2
CCC certification in accordance with GB14048-2
CCS certification in accordance with China Certification of shipping

3 performance ranges*
A -50 kA (Icu)
D -65 kA (Icu)
H1, H2 -80 kA (Icu)
*Ratings shown at 415V AC
2 compact frame sizes
Frame size 1 - 400 to 2500A
Frame size 2 - 800 to 4000A
Fixed pattern and withdrawable versions
3 or 4 pole configuration
Front and rear access connections (horizontal/vertical)
Devices provided with or without protection relay
Manual or electrical operation
Common height and depth dimensions
Built-in safety features e.g. safety shutters
Wide range of protection settings offering full selectivity
Combinations of earth fault protection
Easy-to-install accessories, common to entire range
Simple and efficient servicing on site



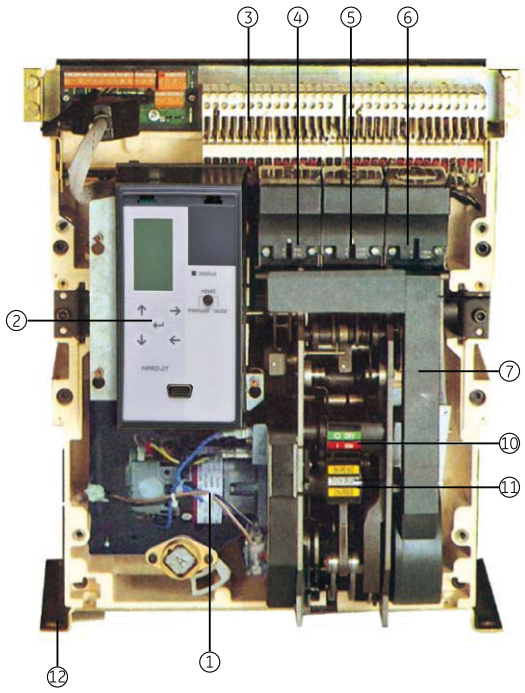
Fixed circuit breaker

All M-PACT fixed pattern air circuit breakers incorporate a stored energy mechanism. The spring can be charged either manually or electrically via a motor operator that is automatically activated after the closing operation.
IP43 front panel and door escutcheon seals are standard features with IP20 protected secondary isolating contacts. For enhanced protection, an optional
IP54 door panel is also available.

- Trip-free operating mechanism
- Positive 'ON/OFF' contact indication
- Mechanical/electrical anti-pumping device
- Charging spring status indication (optional)
- Ergonomic manual spring charging handle
- Field-mountable range of accessories
- Auxiliary switches 5 NO and 3 NC, 10A 250V (standard)
- Mechanical Trip Alarm switch (1NO) (optional)
- Padlockable push-button cover
- Mechanical cable interlocking (optional)
- Termination: rear, horizontal or front access (optional)
- Electrical clearances according to IEC60947-2
- Front access of secondary terminals for simple connection

Power Supply

All stated short circuit ratings are certified with incoming supply connection made to either upper or lower terminals.



1. Motorised spring charging unit (optional)
2. M-PRO Protection Relay (optional)
3. Secondary contacts
4. Shunt trip (optional)
5. Closing coil (optional)
6. Undervoltage release (optional)
7. Manual charging handle
8. ON/OFF push-buttons
9. Push-button padlockable covers
10. Positive contact indication
11. Charging spring status indication
12. Mounting plate

Installation

Fixed pattern M-PACT can be fastened into any suitable switchboard or cubicle arrangement using four M8 bolts. Clearance is only required above the unit for the removal and inspection of the arc chutes (see dimensional drawings for mounting details and recommended clearance distances).
An earthing point is provided on either side of the circuit breaker.

Withdrawable circuit breaker

Pre-mounted into a self-contained 'cassette', this versatile circuit breaker can be inserted or withdrawn via sliding rails using a racking drive mechanism controlled by a racking handle.
It provides three set positions:
Disconnected / Test / Connected.
Any attempt to withdraw the unit whilst in service will automatically trip the breaker, either by the racking position safety mechanism or by the insertion of the racking handle. It can be racked to the dis-connected position with the cubicle door closed or open.

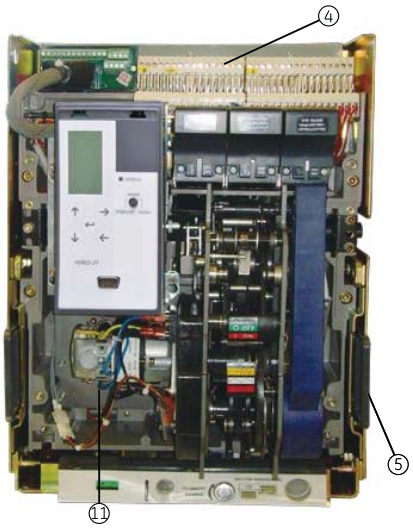
- Insulated, earthed steel shutters to isolate the main contact zone
- Front access padlocking for safety shutters
- Secure padlocking in the "Disconnect" position
- Clearly visible operational position indication
- Carriage position switch (optional)
- Termination: Flat copper palms (standard) with captive M10 fixing nuts
- 'T' terminal adaptors for horizontal/vertical connection (optional)
- Front access connections (optional)
- Automatic disconnect of secondary circuits
- Lifting lugs for ease of removing the circuit breaker from the cassette
- Front access of secondary terminals for simpleconnection
- Cassette side mounting fixing parts (optional)

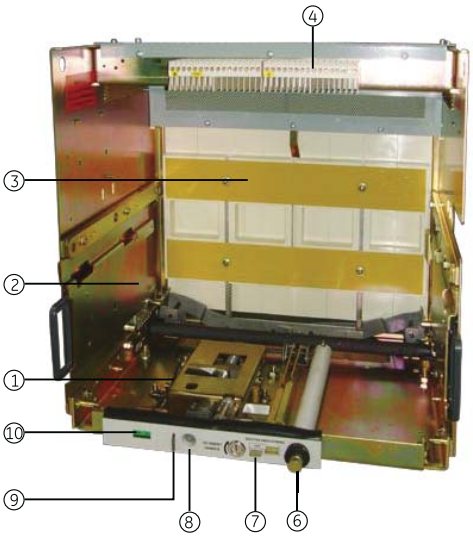
Installation

Circuit breakers are delivered pre-mounted in the cassette (standard)
Versatile fixing arrangements allow mounting onto any switchboard or cubicle using four M8 bolts (see dimensional drawings for mounting details and recommended clearance distances)
Earthing point situated on the right hand side of cassette (front view)

Power Supply

All stated short circuit ratings are certified with incoming supply connection made to either upper or lower terminals.





1. Carriage position switch (optional)
2. Extension rail
3. Earthed steel safety shutter
4. Secondary terminals
5. 2 way cable interlock mechanism (optional)
6. Racking handle (storage)
7. Padlocking for safety shutters
8. Insertion hole for racking handle
9. Padlocking in the DISCONNECTED position
10. Operational position indication
11. Key interlock (optional)

Characteristics

Performance Data

Characteristic	Symbol	Units																
Rated current (40°C)				400		800				1000				1250				
Endurance (number of operating cycles)																		
Mechanical (with maintenance)				20000		20000				20000				20000				
Mechanical (without maintenance)				10000		10000				10000				10000				
Electrical (at rated current)				5000		5000				5000				5000				
Rated service voltage (50/60 Hz)	Ue	V		415	690	415	690	415	690	415	690	415	690	415	690	415	690	
Rated insulation voltage (50/60 Hz)	Ui	V		1000		1000				1000				1000				
Rated impulse withstand voltage	Uimp	V		8000		8000				8000				8000				
Number of poles				3 & 4		3 & 4				3 & 4				3 & 4				
Rating of 4th pole				100%		100%				100%				100%				
ACB type				A	D	A	D	H1	H2	A	D	H1	H2	A	D	H1	H2	
Frame size				1	1	1	1	2	2	1	1	2	2	1	1	2	2	
Rated ultimate short-circuit	Icu	kA (rms)	220V	50	65	50	65	80	80	50	65	80	80	50	65	80	80	
breaking capacity			415V	50	65	50	65	80	80	50	65	80	80	50	65	80	80	
			500V	-	65	-	65	-	80	-	65	-	80	-	65	-	80	
			600V	-	50	-	50	-	65	-	50	-	65	-	50	-	65	
			690V	-	40	-	40	-	60	-	40	-	60	-	40	-	60	
Rated service short-circuit	Ics	kA (rms)	220V	50	65	50	65	80	80	50	65	80	80	50	65	80	80	
breaking capacity			415V	50	65	50	65	80	80	50	65	80	80	50	65	80	80	
			500V	-	65	-	65	-	80	-	65	-	80	-	65	-	80	
			600V	-	50	-	50	-	65	-	50	-	65	-	50	-	65	
			690V	-	40	-	40	-	60	-	40	-	60	-	40	-	60	
Rated short time withstand current																		
1 second	Icw	kA (rms)		50	50	50	50	65	80	50	50	65	80	50	50	65	80	
3 seconds	Icw	kA (rms)		40	50	40	50	50	50	40	50	50	50	40	50	50	50	
Rated short-circuit making capacity	Icm	kA (peak)	415V	105	143	105	143	176	176	105	143	176	176	105	143	176	176	
			500V	-	143	-	143	-	176	-	143	-	176	-	143	-	176	
			600V	-	105	-	105	-	143	-	105	-	143	-	105	-	143	
			690V	-	84	-	84	-	105	-	84	-	105	-	84	-	105	
Power dissipation at In (Fixed breaker)		Watts		15	10	63	43	23	20	106	68	36	32	175	105	60	53	
Power dissipation at In (Withdrawable)		Watts		30	21	127	86	49	43	211	135	77	68	351	211	128	113	

Design and specifications are subject to changes without notice.

Selectivity

The following table shows the conditions to satisfy full selectivity between UP-STREAM and DOWN-STREAM devices.
Up-stream: M-PACT
Down-stream: M-PACT
ST delay 50 ms minimum between up-stream and downstream ACB Multiplication coefficient between LT-ratings≥1,56

	Down-stream									
Up-stream	-	400	800	1000	1250	1600	2000	2500	3200	4000
	400	-	-	-	-	-	-	-	-	-
	800	Full	-	-	-	-	-	-	-	-
	1000	Full	-	-	-	-	-	-	-	-
	1250	Full	Full	-	-	-	-	-	-	-
	1600	Full	Full	Full	-	-	-	-	-	-
	2000	Full	Full	Full	Full	-	-	-	-	-
	2500	Full	Full	Full	Full	Full	Full	-	-	-
	3200	Full	Full	Full	Full	Full	Full	-	-	-
	4000	Full	Full	Full	Full	Full	2000	Full	-	-

Temperature Deratings

Free Air[1]
The M-PACT ACBs may operate at higher ambient temperatures than 40°C in certain installation conditions. In this case the current rating in Amperes should be reduced as indicated below.

Ambient Temperature	Current Rating (A)							
	800	1000	1250	1600	2000	2500	3200	4000
50°C	800	1000	1250	1600	2000	2450	3200	3727
60°C	800	1000	1250	1445	2000	2232	3200	3367
65°C	800	1000	1250	1364	2000	2092	3019	3175
70°C	800	1000	1250	1280	1970	1970	2831	2978

The figures specified apply to withdrawable ACB's with flat face vertical copper connections
(1) Protection degree IP00.For use in enclosures with interior temperatures of 40°C to 70°C the relevant IP values can be applied.

	1600				2000				2500				3200				4000			
	20000				20000				20000				20000				20000			
	10000				10000				10000				10000				10000			
	5000				5000				5000				5000				5000			
	415	690	415	690	415	690	415	690	415	690	415	690	415	415	415	690	415	415	415	690
	1000				1000				1000				1000				1000			
	8000				8000				8000				8000				8000			
	3 & 4				3 & 4				3 & 4				3 & 4				3 & 4			
	100%				100%				100%				100%				100%			
	A	D	H1	H2	A	D	H1	H2	A	D	H1	H2	A	D	H1	H2	A	D	H1	H2
	1	1	2	2	1	1	2	2	1	1	2	2	2	2	2	2	2	2	2	2
	50	65	80	80	50	65	80	80	50	65	80	80	50	65	80	80	50	65	80	80
	50	65	80	80	50	65	80	80	50	65	80	80	50	65	80	80	50	65	80	80
	-	65	-	80	-	65	-	80	-	65	-	80	-	-	-	80	-	-	-	80
	-	50	-	65	-	50	-	65	-	50	-	65	-	-	-	65	-	-	-	65
	-	40	-	60	-	40	-	60	-	40	-	60	-	-	-	60	-	-	-	60
	50	50	65	80	50	65	80	80	50	65	80	80	50	65	80	80	50	65	80	80
	50	50	65	80	50	65	80	80	50	65	80	80	50	65	80	80	50	65	80	80
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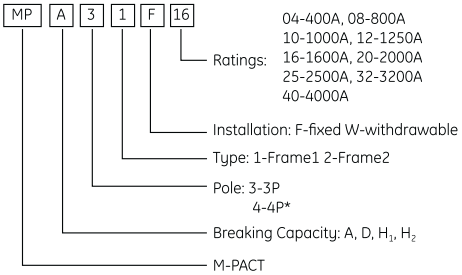
	-	40	-	40	-	40	-	60	-	40	-	60	-	-	-	60	-	-	-	60
	50	50	65	65	80	65	65	80	50	65	65	80	50	65	65	80	50	65	65	80
	40	40	50	50	50	50	50	50	40	50	50	50	40	50	50	50	40	50	50	50
	105	105	143	176	176	143	176	176	105	143	176	176	105	143	176	176	105	143	176	176
	-	105	-	143	-	143	-	176	-	143	-	176	-	-	-	176	-	-	-	176
	-	105	-	105	-	105	-	143	-	105	-	143	-	-	-	143	-	-	-	143
	-	84	-	84	-	84	-	105	-	84	-	105	-	-	-	105	-	-	-	105
	284	284	196	98	86	224	163	143	351	351	255	223	418	418	418	366	571	571	571	571
	574	574	392	209	184	490	347	306	765	765	542	478	888	888	888	783	1224	1224	1224	1224

Catalog NO.Configuration



* Letter 'L' & 'R' only for type selection, not shown on nameplate.

Recommended Minimum Copper Size

In accordance with IEC 60947-2

Rating (A)	Copper / phase
400	2 x 50 x 5
800	2 x 50 x 5
1000	2 x 60 x 5
1250	2 x 100 x 5
1600	2 x 100 x 5
2000	3 x 100 x 5
2500	4 x 100 x 5
3200	4 x 100 x 10
4000	4 x 100 x 10 + 1 x 100 x 5

Dimensions in mm

Frame Size	Rating (A)	Poles	Type	Height[1]	Width	Depth[2]
1	400 to 2500	3	Withdrawable	440	329	422
			Fixed	430	342	352
		4	Withdrawable	440	429	422
			Fixed	430	442	352
2	800 to 4000	3	Withdrawable	440	419	424
			Fixed	430	432	352
		4	Withdrawable	440	549	424
			Fixed	430	562	352

(1) Height is from mounting surface to highest part of the ACB.
(2) Depth is from the cubicle door to the back of terminals.
* 4P,Neutral on the left or right Please specified on sdection form,the defaule option is Neutral on night.

Weights (kg)

		A range		D range		H range	
Fixed pattern ACB	**Frame**	**3 Pole**	**4 Pole**	**3 Pole**	**4 Pole**	**3 Pole**	**4 Pole**
400 to 1600A	1	39	49	39	49	/	/
2000 to 2500A	1	43	54	43	54	/	/
800 to 3200A	2	53	68	53	68	53	68
4000A	2	53	68	53	68	53	68
Withdrawable ACB	**Frame**	**3 Pole**	**4 Pole**	**3 Pole**	**4 Pole**	**3 Pole**	**4 Pole**
400 to 1600A	1	68	79	68	79	/	/
2000 to 2500A	1	74	85	74	85	/	/
800 to 3200A	2	90	109	90	109	90	109
4000A	2	113	128	113	128	113	128

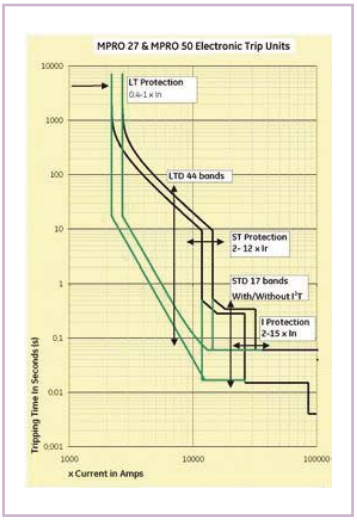
State of the Art Electronic Trip Units

- A line offering a new range of electronic trip units designed to extend and/or upgrade the functionality offered by the existing M-PACT Plus air circuit breaker.
- Two types are available. The simple and effective MPRO-27 and the MPRO-50 offering extended functionality .
- Each has a LCD screen with ammeter and a menu driven setting interface, allowing a simple and accurate setting of all parameters.
- This global line of electronic trip units uses the most recent technology to offer each user an unique combination of selectivity speed and functionality.

Plug'n Play

Electronic trip units are normally supplied factory fitted. However spares are available that can be simply plugged in to breakers installed in the field.

Each trip unit then needs to be adjusted to the required settings. If the installation is not powered up the installed battery pack or the seperately available test kit with Power Pack can be used as alternate power source.



MPRO-27 & MPRO-50

The basic MPRO-27 type has been designed to replace the existing MPRO-17 and MPRO-18 plus units offering an extended functionality and a standard ammeter.

The MPRO-50 type replaces the existing MPRO-30 and MPRO-40 designs covering an extended functionality with protection devices as fuse links, overload protection and reduced instantaneous (RELT). Each MPRO-50 comes with a simple to connect 4 wire modbus communciation option.

Main Adjustment Options

- **LT-LTD protection**
  Each device has an overload setting range of 0.4 to a times In and offer a choice of 22 time bands designed for use with circuit breakers.
  A second set of 22 time bands shaped to match the time current curves of fuses is available on the MPRO-50 type.
- **ST-STD protection**
  A timed delayed short circuit protection is installed with a current setting of 2 to 12 times the set LT current value. The short circuit protection time can be set, at one of 17 bands ranging from 90 milliseconds to 1 second.
  Optionaly this device can be set to one of three I^2t curves.
- **I-protection**
  A switchable and selective instantaneous protection with a setting range of 2 to 15 times the breaker rating that is programmed to wait one half cycle until the downstream device has reacted.
- **Other protection features**
  A host of other protection devices is availble including Ground Fault sum and Ground Fault source return (allowing UEF, SEF & REF) and a reduced instantaneous device. The reduced instanataneous device allows the user to conditionally programme the breaker to trip faster and at lower short circuit settings than it would on the standard instantaneuos device.
  This RELT device allows the user to reduce the short circuit current level and its time span, thus reducing the amount of electrical energy in the direct vicinity of the breaker.

Trip Unit	MPRO-27	MPRO-50
Setting Interface		
LCD screen allowing access to 4 distinct menu's	X	X
Touch pad adjustments	X	X
Multilingual	X	X
Adjustable manual or automatic RESET option	X	X
Long Time or Overload Current Protection		
13 current settings Ir 1, 0.95, 0.9. 0,85, 0.8, 0.75, 0.7, 0.65, 0.6, 0.55, 0.5, 0.45 & 0.4 x breaker rating In	X	X
22 thermal protection (C type) time bands available ranging from class 0.5 to 40 (bands at 7.2 x Ir)	X	X
22 I^2t protection (F type {fuse}) time bands available	-	X
Neutral protection 0-50%-63%-100%	X	X
Possibility to switch OFF	-	X
Cooling function and thermal memory	X	X
Short Time Short-Circuit Current Protection		
Setting range from 1.5 to 12 x Ir (LT setting)	X	X
Steps of 0.5 (a total of 22 settings)	X	X
Possibility to switch OFF	-	X
17 time delay settings (STDB) ranging from 30 to 940 milliseconds delay setting result in a 90 to 1000 milliseconds	X	X
Clearance times to IEC 40979-1 and IEC 60364		
3 I^2t Protection time bands available		
Instantaneous Short-Circuit Current		
• Standard		
Ii setting range from 2 to 15 x breaker rating In	X	X
Steps of 0.5 (a total of 28 settings)	X	X
Possibility to switch OFF	X	X
Selective execution	X	X
Fixed instantaneous or HSIOC protection	X	X
• Reduced		
Ii setting range from 1.5 to 15 x Ie (primary setting)	-	X
Steps of 0.5 (a total of 29 settings)	-	X
Possibility to switch OFF	-	X
Remote and local ON and OFF with position indication signal	-	X
Ground or Earth Fault Protection		
Setting range from 0.1 to 1 x In (breaker rating) (1)	•(1)	•(1)
Steps of 0.01 (a total of 92 settings)	•	•
Possibility to switch OFF	•	•
14 time delay settings (GFDB) ranging from 50 to 840 milliseconds delay setting resulting in a 110 to 900 milliseconds	•	•
Clearance times to IEC 40979-1 and IEC 60364	•	•
3 I^2t protection time bands available	•	•
1 I^4t protection time bands available	•	•
Residual principle (UEF application possible)	•	•
Source ground return principle	-	•
UEF, REF and SEF applications possible	-	•
Combinations of UEF, REF and SEF applications possible	-	•
Other Functions		
Current measurement (L1, L2, L3, N)	X	X
Trip target (trip reason indication)	X	X
Trip info (magnitude / phase)	X	X
Trip counter	X	X
Event logger (trip events)	X	X
General inputs (4 availble)	-	X
General relay outputs (4 available)	-	X
Relay based on current level (load shedding)	-	X
Good & bad health indicator	-	X
Watchdog	-	X
Communication 2 way	-	X
Modbus	-	X
24V DC auxiliary power supply	X	X
Test kit with power support function	•	•

(1) A 24V auxiliary power supply is required.

Key
X = Present
• = Optional
- = Not possible

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WORLDWIDE PARTNER

Record Plus Ed. 05

Moulded Case Circuit Breakers
Selective & Current Limiting

GE imagination at work

092

GE imagination at work

EN 60947-2 Standard

Circuit Breaker type		FD160		FD160						FE160		
Denomination		N	H	C	E	S	N	H	L	N	H	L
Poles	Number of	1		3,4			2[1],3,4			3,4		
Rated insulation voltage	Ui (Volts)	750		500	750	750	750			750		
Rated impulse withstand voltage	Uimp (Kilovolt)	3		6	8	8	8			8		
Rated operational voltage Ue	Volts AC	240		500	690	690	690			690		
	Volts DC	250		-	-	500	500			500		
Line Protection device												
Category of use		A		A			A			A		
Suitable for use as a isolator	Positive ON & OFF	yes		yes			yes			yes		
Rated current Ith = Ie	A at 40°C	160		160			160			160		
Ultimate breaking capacity Icu (kA)	230/240V AC	25	50	25	40	50	85	100	200	85	100	200
	400/415V AC	-	-	18	25	36	50	80	150	50	80	150
	440V AC	-	-	14	14	25	30	65	130[4]	42	65	130
	500V AC	-	-	10	12	18	22	36	50[4]	30	50	100
	690V AC	-	-	-	4,5	6	8	10	12	10	22	75
	250V DC Single pole	-	50	-	-	25	40	65	100	50	85	100
	500V DC Two Pole	-	-	-	-	25	40	65[2]	100[2]	50	85[2]	100[2]
Service breaking capacity Ics (%Icu)	≤ 500V	100%	100%	75%	75%	100%	100%	100%	100%	100%	100%	100%
	690V AC	-	-	-	-	50%	50%	50%	50%	100%	75%	25%
Making capacity Icm (kA peak)	400/415V AC	-	-	36	52,5	75	110	176	330	110	176	330
	500V AC	-	-	17	24	36	46	75	110	63	110	220
Single phase breaking capacity I_{IT} (kA)	230V AC	25	50	16	25	30	50	80	150	50	80	150
	400/415V AC	-	-	-	4,5	6	8	10	12	15	22	36
Endurance (CO operations)	Mechanical	10000		10000			25000			40000		
	Electrical at In	5000		5000			10000			20000		
	Electrical at In/2	10000		10000			20000			30000		
Endurance (On-Tripped operations)	Mechanical	4000		4000			10000			16000		
Trip Units	Interchangeable	no		no			no			yes		
	Thermal Magnetic line	LTM								LTM		
	Thermal Magnetic generator						GTM			GTM		
	Thermal Magnetic discriminating						LTMD			LTMD		
	Magnetic Only						Mag Break™			Mag Break™		
	Electronic discriminating									SMR1		
	Electronic enhanced											

NEMA AB-1 Standard

3 ph, Interruption rating	240V AC	-	-	-	-	50	65	100	-	100	150	200
	480V AC	-	-	-	-	25	36	50	-	50	65	130
	600V AC	-	-	-	-	6	8	10	-	25	36	42

EN 60947-3 Standard

Non Automatic Circuit Breaker/Switch type		FD160			FE160		
Denomination		Y - 63A			Y - 160A		Y
Rated current In (class AC23)	220V AC to 690V AC	63			160		160
Rated making capacity	Icm (kA peak)	1,7			2,8		4,2
Short-term withstand current Icw (A)	Icw eff. 1 second	1,2			2		3
	Icw eff. 3 seconds	1,2			2		3

EN 60947-4 Standard

Use in motor circuits							
Rated current Ith	A at 65°C			125			150
Endurance (CO operations)	Mechanical			25000			40000
	Electrical at In class AC23			10000			20000
	Operations per hour			120			120
Protection	Short Circuit only (separate overload device)			Mag Break™			Mag Break™
	Overload class 10 and Short circuit						SMR1
	Max In (A) class 10			100			150
	Max In (A) class 30			50			150
	Earth fault unit (differential)			Optional FDQ type			Optional FEQ type

Installation

Circuit Breaker or Switch type		FD160			FE160		
Number of poles		1	3	4	3		4
Mounting	On symmetrical DIN Rail	yes	yes	yes	no		no
	Fixed	yes	yes	yes	yes		yes
	Plug-in	no	yes	yes	yes		yes
	Draw-out	no	no	no	yes		yes
Connection	Front	yes	yes	yes	yes		yes
	Rear	yes	yes	yes	yes		yes
Dimensions (w x h x d) mm	Fixed front connection	27x130 x85	81x130 x85	108x130 x85	105x170 x95		140x265 x115
Weights (kg)	Fixed front connection	0,4	0,9	1,3	1,5		2

(1) N type only
(2) 3 poles are needed.
(3) 2 poles are needed
(4) The 160Amp current rating of the L type is limited to 65kA at 440v & 36kA at 500V.

	FE250				FG400			FG630			FK800			FK1250			FK1600	
V	N	H	L		N	H	L	N	H	L	N	H	L	N	H	L	N	H
	3,4				3,4			3,4			3,4			3,4			3,4	
690	750				750			750			1000			1000			1000	
8	8				8			8			8			8			8	
500	690				690			690			690			690			690	
250	500				500			500			500			500			500	
	A				B			B[5]			B			B			B	
	yes				yes			yes			yes			yes			yes	
	250				400			630			800			1250			1600	
65	85	100	200	90	100	200	85	100	200	85	100	170	85	100	170	85	100	
36	50	80	150	50	80	150	50	80	150	50	80	100	50	80	100	50	80	
25	42	65	130	42	65	130	42	65	130	42	50	80	42	50	80	42	50	
18	30	50	100	30	50	100	30	50	100	36	42	50	36	42	50	36	42	
-	10	15	22	10	22	75[7]	10	22	40[7]	20	25	30	20	25	30	20	25	
25	50	85	100							50	80	100	50	80	100	-	-	
-	50	85[2]	100[2]							36	50	65	36	50	65	-	-	
100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
-	100%	75%	50%	100%	75%	25%	100%	75%	50%	100%	100%	75%	100%	75%	50%	100%	75%	
75	110	176	330	110	176	330	110	176	330	110	176	220	110	176	220	110	176	
36	63	110	220	63	110	220	63	110	220	75	110	220	75,6	110	220	75	110	
36	50	80	150	50	80	150	50	80	150	50	80	150	50	80	150	50	80	
-	10	15	22	10	(6)	(6)	10	(6)	(6)	20	25	30	20	25	30	20	25	
10000		25000			20000			20000			10000			10000			10000	
5000		10000			7500			5000			4000			3000			2000	
10000		20000			15000			10000			8000			6000			4000	
4000		10000			8000			8000			4000			3000			2000	
	yes				yes			yes			yes			yes			yes	
LTM											LTM			LTM				
	GTM																	
	LTMD																	
	Mag Break™				Mag Break™													
	SMR1				SMR1									SMR1e				
	SMR2				SMR2						SMR 1s & g							

65	100	150	200	100	150	200	100	150	200	85	-	-	85	-	-	85	-	
36	50	65	130	50	65	130	50	65	130	42	-	-	42	-	-	42	-	
22	25	36	42	25	36	42	25	36	42	25	-	-	25	-	-	25	-	

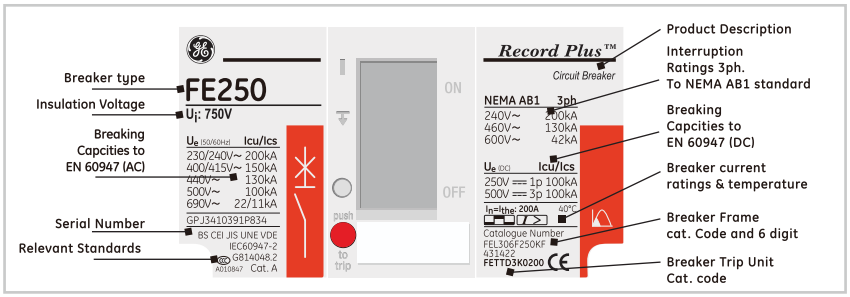
	FE250				FG400			FG630			FK800			FK1250			FK1600	
	V				V			V			V			V			V	
	250				400			630			800			1250			1600	
	5,7				7,1			9,2			14,1			21,2			28,3	
	4				5			6,5			10			15			20	
	4				5			6,5			10			15			20	

	230			400			500			720			1000					
	25000			20000			20000			10000			10000					
	10000			7500			5000			4000			3000					
	120			120			60			60			60					
	Mag Break™			Mag Break™			Mag Break™			Mag Break™			Mag Break™					
	SMR1			SMR1 or SMR2			SMR1 or SMR2											
	225			400			500			720			1000					
	225			400			500			720			1000					
	Optional FEQ type			Optional FGQ type			Optional FGQ type											

	FE250			FG400			FG630			FK800			FK1250			FK1600	
	3		4	3		4	3		4	3		4	3		4	3	4
	no		no	no		no	no		no	no		no	no		no	no	no
	yes		yes	yes		yes	yes		yes	yes		yes	yes		yes	yes	yes
	yes		yes	yes		yes	yes		yes	yes		yes	yes		yes	yes	yes
	yes		yes	yes		yes	yes		yes	yes		yes	yes		yes	yes	yes
	yes		yes	yes		yes	yes		yes	yes		yes	yes		yes	yes	yes
	yes		yes	yes		yes	yes		yes	yes		yes	yes		yes	yes	yes
	105x170		140x265	140x265		185x265	140x265		185x265	210x320		280x320	210x320		280x320	210x320	280x320
	x95		x115	x115		x115	x115		x115	x160		x160	x160		x160	x160	x160
	1,5		2,0	4,5		6,0	4,5		6,0	12,2		15,1	18,0		23,4	18,0	23,4

(5) Limited to 500Amp
(6) Please contact your nearest GE Sales Office

(7) At a voltage of 690V the uses of a long widened Shield is mandatory (see page D.9)



Certification

The ***Record Plus™*** line of circuit breakers has been designed to comply with the following standards:

EN 60947 Low-voltage switchgear and controlgear

EN 60947-1:	General rules
EN 60947-2:	Circuit-breakers
EN 60947-3:	Switches, disconnectors, switch-disconnectors and fuse-combination units
EN 60947-4-1:	Contactors and motor-starters
Section One:	Electromechanical contactors and motorstarters
EN 60947-5-1:	Control circuit devices and switching elements
Section One:	Electromechanical control circuit devices

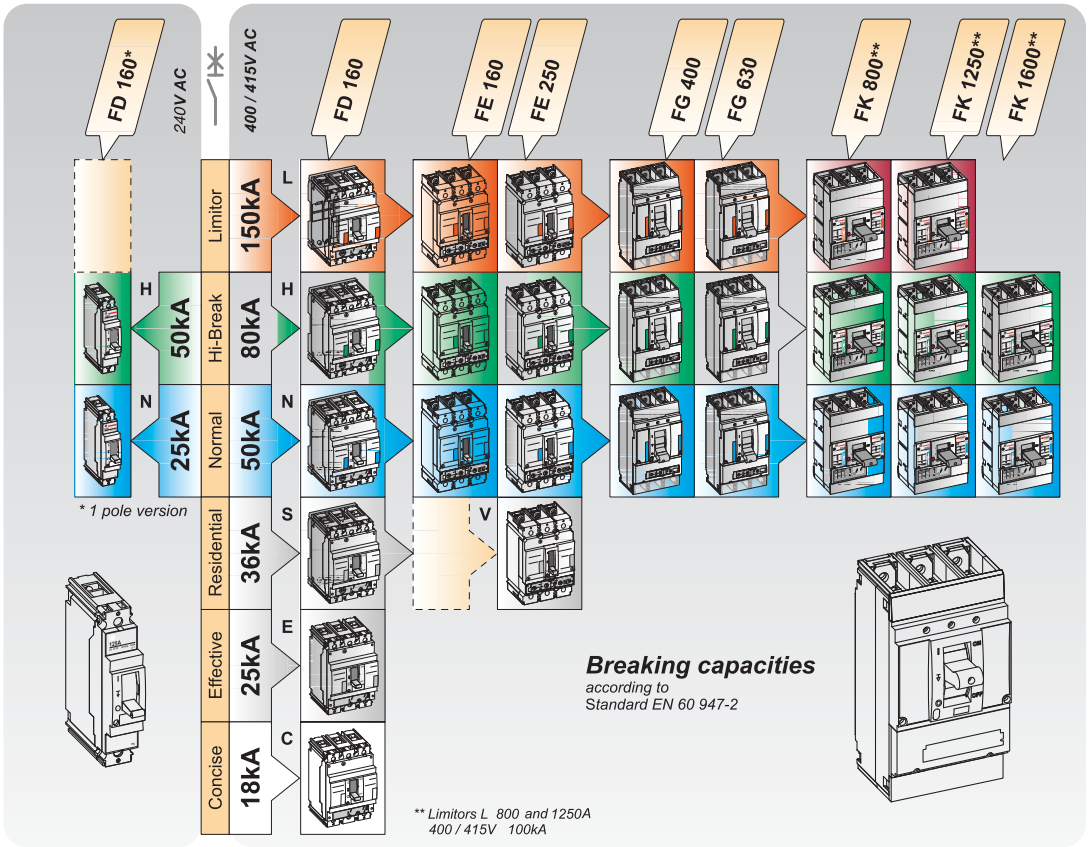
This compliance has been verified by three authorities; the Kema, the CCC organization and Lovag. (Appropiate certificates can be made available on request)

Meeting the international standards. The requirements are met of **BS, VDE, UTE, KEMA, CEI**. Record Plus breakers have been tested in acordance with the NEMA standards

For the Record Plus product certificates are available from the following regulatory bodies:
Germanische Lloyds - RINA
Lloyds Register of Shipping - CCC (China)
Further tests are being undertaken to meet the requirements of the following regulatory bodies:
Bureau Veritas - Det Norske Veritas

Please contact us to check the availability of individual certificates.

A UL489 certified variant of the Record Plus line of Molded Case Circuit Breakers is also available. The line covers three frame sizes with current ratings of 3 to 600Amps. Please contact our GE sales offices in the U.S.A for further details.



Moulded Case Circuit Breakers
designed for global applications

Contents

Record Plus

The ***Record Plus™*** family of circuit breakers has been developed as a line of aesthetically and technically coordinated protection devices for low voltage distribution and control applications. The circuit breakers are available in four sizes, each of which is tailored to the individual requirements associated with its application.
The line offers a current range running from 3A to 1600A in single, 3 and 4 pole ratings. Numerous versions as fixed, plug-in and draw-out are available and the line is completed with a full range of accessories.

FD160

Rated at 160A, the FD160 frame size is designed for use in both a DIN-rail environment with modular equipment and in industrial applications. It is supplied with IPXXB terminals suitable for direct connection of one or two conductors totalling up to 95 mm^2 and is available as a thermal-magnetic breaker, a moulded case switch, and as a magnetic-only motor circuit protector.
The FD160 bridges the gap between residential miniature circuit breakers and industrial moulded case circuit breakers.

FE160 and FE250

Rated at 160 and 250A, the FE frame sizes are designed for side-by-side mounting with FD160 types in panels. FE sizes are equipped with an easily accessible busbar connection and can also be supplied with cable lugs for use with copper or aluminum conductors.
The design allows the use of interchangeable thermal-magnetic, magnetic-only, and electronic trip units.

A complete line of
selective & current limiting breakers

FG400 and FG 630
Rated at 400 and 630A, the FG frame size includes all of the advanced features of the FD and FE frame sizes.
The FG connection area features easy-to-access busbar connections. Cable lugs for use with single or multiple copper or aluminum conductors are optionally available. The breaker is designed for use with interchangeable electronic units that can be easily adapted to multiple levels of protection.

FK 800, 1250 and 1600
Rated at 800,1250 and 1600A, the FK frame sizes are designed for use with the FG400 and 630 frame sizes. The design uses electronic trips units available in a number of performance ranges and allowing a wide variety of setting options and groundfault protection. If needed thermal-magnetic and magnetic only trip units are also available.
The FK connection area features easy-to-access busbar connections or cable lugs for use with single or multiple copper or aluminum conductors.

Record Plus

Record Plus™ circuit breakers are designed to protect, isolate and switch circuits in low voltage distribution networks. Circuit protection is provided by a combination of the devices unique current limiting properties and integrated protection devices commonly referred to as trip units.

The trip units are designed to protect circuits and/or the equipment connected to these circuits and exist as electromechanical or electronic devices. Numerous electromechanical types are available as thermal magnetic devices with overload and short-circuit protection or magnetic-only types providing short-circuit protection. Electronic devices offering wide setting ranges and a more sophisticated level of protection are available in several versions. Each trip unit has a setting area finished with a sealable transparant trip unit door.

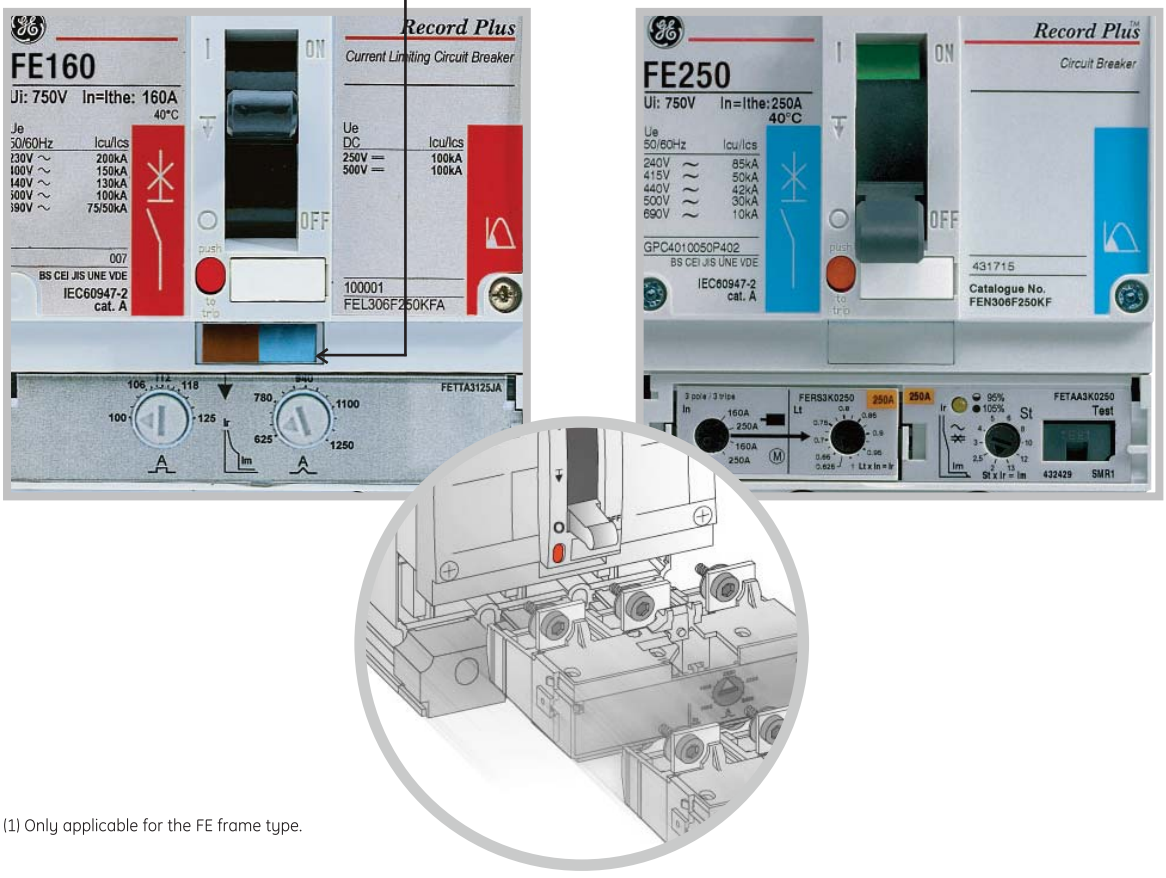
Electromechanical devices

Devices available in a current range of 16 to 1250A as single, two, three or four pole devices. The electromechanical trip units exist as thermal magnetic, magnetic-only and generator protection models. The high-performance thermal magnetic trip units exist as selective and non-selective versions and are equipped with a fault indicator that distinguishes between overload and short-circuit events in accordance with HD 384(1). This patented safety feature allows users to reduce downtime by resetting the breaker directly after an overload event.

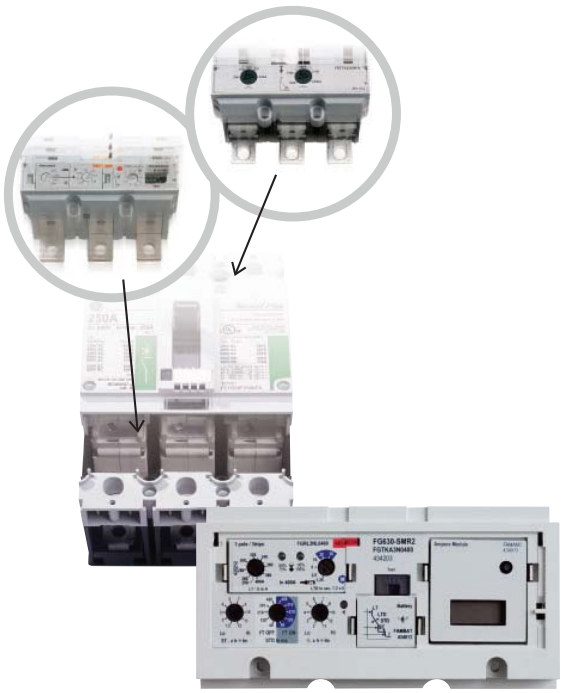
Electronic devices SMR1

The ***Record Plus™*** FE, FG and FK sizes can be equipped with rigorously designed and tested interchangeable electronic trip units available in three and four pole units in currents ranging from 25 to 1600A.

The SMR1 and SMR2 types offer ajustable overload and selective short-circuit protection. The SMR1 range is designed for simplicity and includes numerous exciting features such as an overload signalling option, a built-in temperature sensor and rating plugs suitable for both line and motor protection.



(1) Only applicable for the FE frame type.



Protection with
flexible & interchangeable trip units

Electronic devices SMR2

Designed to provide a flexible solution for all protection scenarios the standard device provides an extensive set of protection features as:

- Long Time Protection adjustable from 0.4 to 1 x In.
- A choice of up to five Long Time Delay Bands.
- Short Time protection adjustable from 2 to 12 x In
- A choice of up to five Short Time Delay Bands with a set of optional I^2T bands.
- Instantaneous Short Circuit Protection adjustable from 2 to 13 x In.
- Zone selective interlock on ST and GF functions (When a GF module is added)
- A Battery that supplies the Thermal Mermory function.

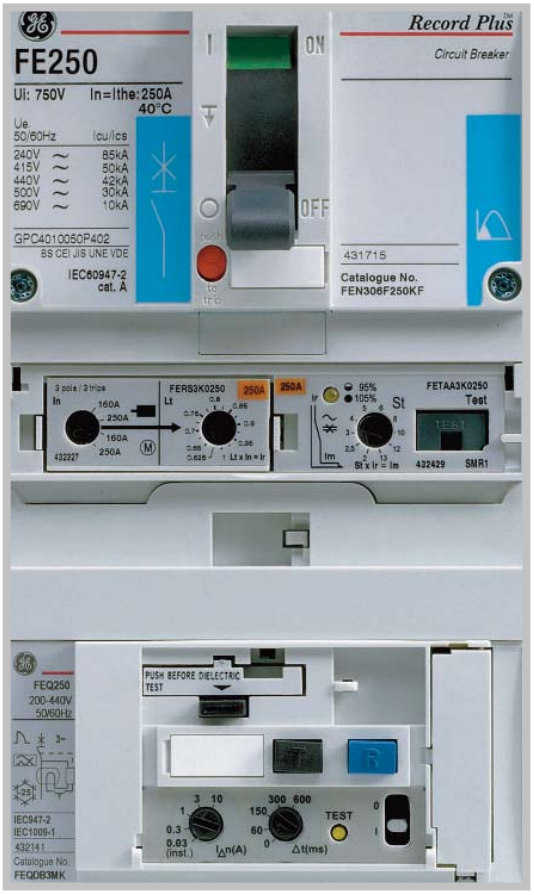
An SMR2 can be equipped with unique Field mountable Plug-in modules that extend the Trip Units functionality to include:

- Modbus Communication
- Ground Fault Protection (GF)
- A two Channel Load Shedding Option.
- Trip Reason Indication module (LT, ST & I)
- Current measurement by Ammeter

An external Contact/Communication module allows the user to monitor the SMR2 via Modbus rtu communication or by using the available 1A relay contacts.

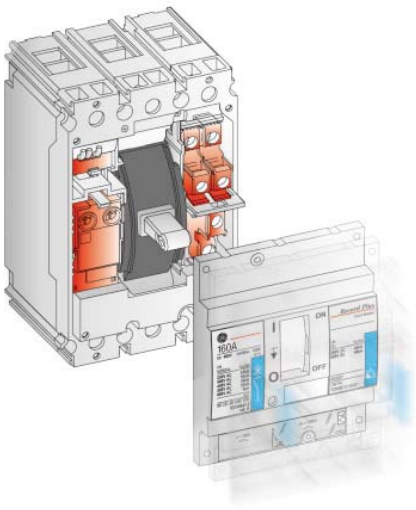
Personnel protection

A line of three and four pole add-on residual current devices are available as side or bottom mounted units with ratings up to 630A and sensitivities of 30mA to 10A.
The devices slide on to the breaker easily and are fixed by simply tightening the main electrical connections. Designed to meet the latest standards, they each have a mechanical and electrical test option and share a common cut out.
A de-electric disconnect plug unit and setting areas with transparent, tamper-free cover are standard for the whole line.
For ratings above 630A, seperate sensors and relays are available, or an integrated ground fault protection can be used.



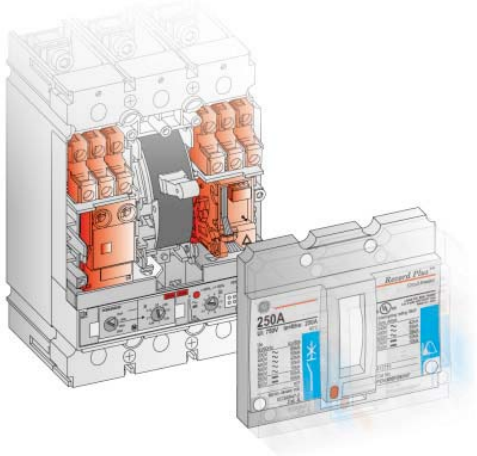
Common accessories

safe & easy to mount



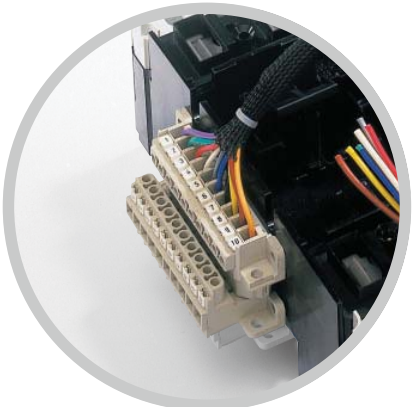
Safe and easy to mount

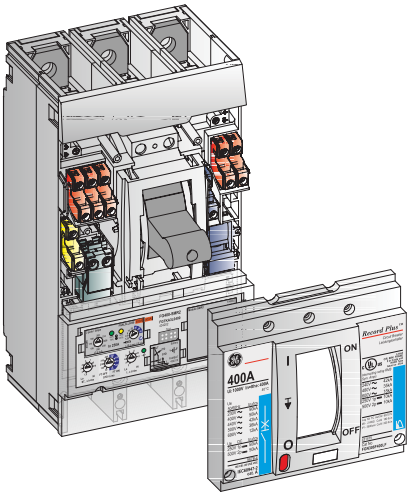
The internal accessories are designed for safe and easy mounting. The breaker trips upon cover removal and remains tripped until the cover is replaced. Cover removal provides access to a specifically designed, isolated compartment into which the accessories can be mounted easily and safely in conveniently marked areas.
The advanced design includes routing channels for external wiring that allows access to internal terminals, making it easier to connect accessories. Particular attention has been paid to the design of these terminals that allow the connection of wiring from 0.5 to 2.5 mm^2.

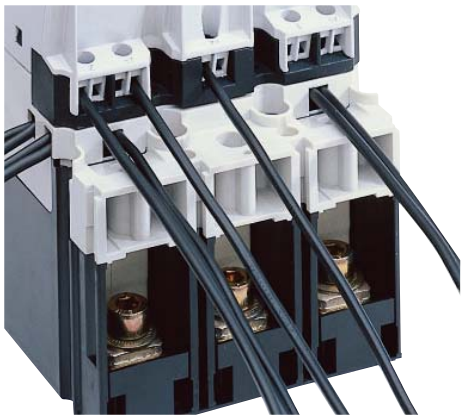


Common and adaptable

The same internal accessories are used in the FD, FE and FG frame sizes. The mounting system and wiring access methodology remains the same: simple and effective.
The FK frame has equivalent accessories and the same connection options.
For plug-in and draw-out breakers 6, 8 and 10 pole plug/socket combinations are available. These are equipped with wiring that can be led through specific openings in the breaker rear.







Mounting

Internal accessories can be easily clicked into conveniently marked areas in the isolated compartment.
Clearly marked indication of the accessory position and a mechanical interchange prevention system assure an error-proof and solid mounting of the accessory.

Wiring

External wiring is routed through the top or the side of the breaker lid through break out openings.
The wiring can then be connected to the accessory terminals. These cage terminals allow for cross sections from 0.75 to 2.5 mm^2 and even allow the connection of two wires.
All contact points are coded in accordance with the EN 60947 standard thus allowing for universal wiring diagrams.

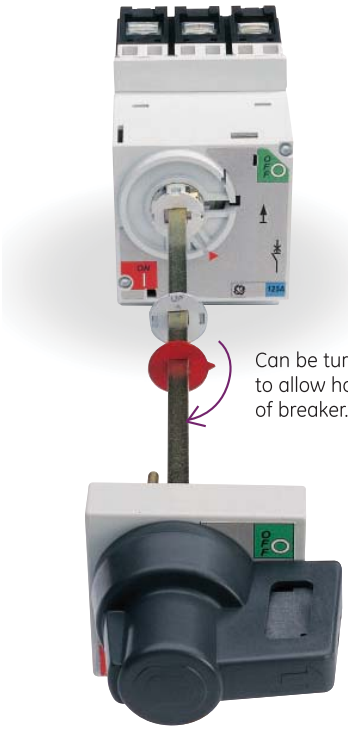
Auxiliary and Bell Alarm contacts

The internal accessories are common to ***Record Plus™*** FD, FE and FG circuit breakers. They offer a unique, patented, auxiliary contact block with normally open and normally closed contacts which are suitable for use in high current and high fidelity applications. Selective Fault Indication is possible by using one or a a combination of the two Bell Alarm contact types.

Releases

The shunt and undervoltage releases are a totally new design combining the best in electromechanical and electronic engineering. Most releases are common for AC and DC voltages and are available in a wide voltage range. They combine low power consumption, a kiss-free, lock-out design and the ease of use common to all ***Record Plus™*** internal accessories.

Wide range of
electrical & mechanical operators



Easy-to-mount rotary handles

Fitted onto the breaker front the device allows the vertical handle movement to be changed into a rotary operation with the OFF position at 3 o'clock and the OFF position at 6 o'clock. An accurate position indication of the three breaker positions ON-OFF and TRIPPED is provided by a totally new internal design that also allows the user to install one or two early closing and late opening contact blocks which are the same as the standard internal accessory types.

Easy to install

The handles are available as a breaker mounted device, a type that can be mounted through a door or a panel and a version where the operator is mounted on the door or panel front.
The door and/or panel mounted units are equipped with (bypassable) interlocks to prevent the door from opening or the panel being removed whilst the breaker is ON. The door/panel mounted operators use a drilling common across the line.
Each breaker size and breaking capacity rating has its own escutcheon and handle that can be equipped with padlocks and/or a keylock.

Safe to operate

Locking/Interlocking devices

To allow users to safely work on the installations or installation segments protected by the ***Record Plus™*** moulded case circuit breakers it is possible to padlock the devices in their OFF position. A padlocking facility can be attached to the breaker front allowing the breaker to be equipped with up to three padlocks of 5 to 8 mm.

A second type (depicted in the photo) is only firmly attached to the breaker when it is padlocked and can be removed for use on another breaker when not in use. Key locking devices allow the creation of multiple key interlocking configurations. A walking beam system is available for interlocking two or three breakers. The system can be upgraded to a fully automatic power transfer system.

Easy to operate

Electrical operators

Front mounted devices that allow electrical operation of the breaker on which the device is mounted. The Record Plus line offers five different electrical operators each tailored to the characteristics of a specific frame size. Four of the these devices (one for each frame size) can be mounted in the field. An aditional Hi speed factory fitted operator is available for the FK frame size.

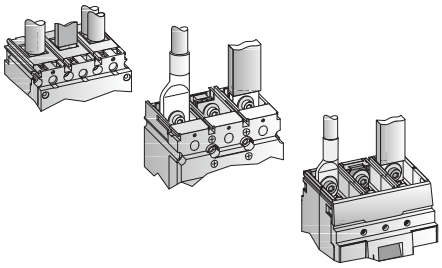
Common to each of these devices is that they can be used in a simple 3 wire connection scheme that can be extended to include a more complex functionality.

All Electrical Operators have a user interface that includes a CLEAR and ACCURATE ON, OFF and TRIPPED indication and offer the option to operate locally (Manual) or remotely (Auto).

All devices can be padocked or keylocked in OFF position.

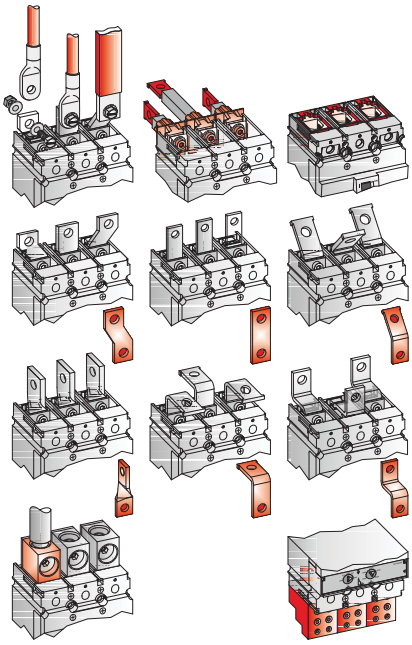
Easy connection is achieved by locating the terminals in the immediate vicinity of those of the internal accessories and by using terminals with a connection capacity of 0.5 to 2.5 mm^2.

Versatile installation options



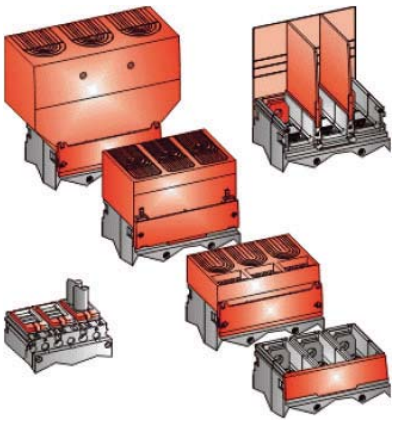
Standard connection options

The breakers are equipped with front access terminals designed to allow the user to quickly and easily connect standard conductors. The FD160 frame has box clamps suited for one or two cable cores or busbars while the FE, FG and FK frame sizes are configured to allow for easy busbar connection.



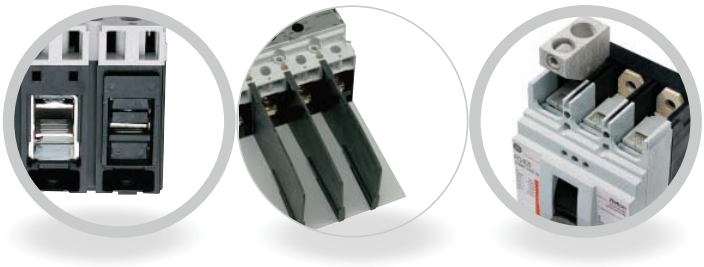
Configurable connection options

A wide range of alternatives are available in kit form with rear and angular connectors, spreaders, customised ring terminal connectors and extenders. Single and multiple box clamps can be directly fitted to the breaker terminals or in combination with extenders and spreaders. This flexibility allows the user to adapt ***Record Plus***™ circuit breakers to almost all standard connection configurations while at the same time allowing for the use of over-dimensioned and/or multiple conductors.



Terminal shields

Each breaker can be fitted with tamper resistant, short or long, terminal shields that allow a IP30 finishing of the product. Backplates and phase separators complete this line and consistently enable the user to connect the products safely. Additionally, frame specific accessories as the IPXXB terminal cover for the FD160 and the widened and elongated terminal shield for the FG frame are available.



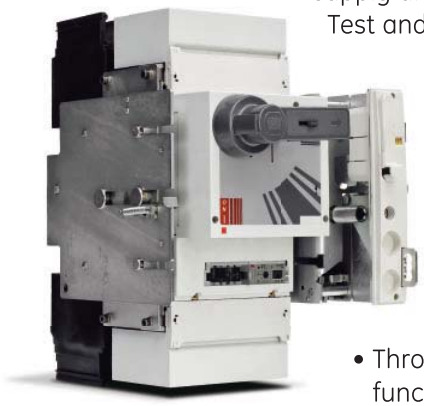
Plug-in systems

Plug-in mounting systems are available for current ratings through 630A in both kit and assembled options. The plug-in system consists of a single-piece moulded base in an IPXXB configuration. The mounting system features a safety interlock which ensures that the breaker is mechanically tripped before it is fully withdrawn or re-inserted in the ON position.

An optional set of plug-in terminal block(s) are available for use with internal accessory connections. Plug-in mounting bases are normally supplied with exactly the same front access terminal configuration as the standard fixed breaker. This allows the use of the same wide range of connection accessories that are available in kit form on the fixed version. These include rear and angular connectors, spreaders, customised ring terminal connectors and extenders. Internal accessories can be easily clicked into conveniently marked areas in the isolated compartment. Clearly marked indication of the accessory position and a mechanical interchange prevention system assures an error-proof and solid mounting of the accessory.

Draw-out system

A simple, hand operated draw-out system is available for the FE, FG and FK frame sizes. The draw-out system enables ***Record Plus™*** breakers with rating from 3A to 1600A to be configured as devices that can be fully insulated from the power supply and installation. Each device has three positions inserted and connected Test and isolated, and withdrawn.



A design modelled on our ACB constructions and incorperating a standard plug-in base encapsulated it in a sturdy metal cradle. The devices have a protection degree of IP40 in withdrawn or inserted position and offer a major step forward in MCCB draw-out constructio
A system offering a host of features as:

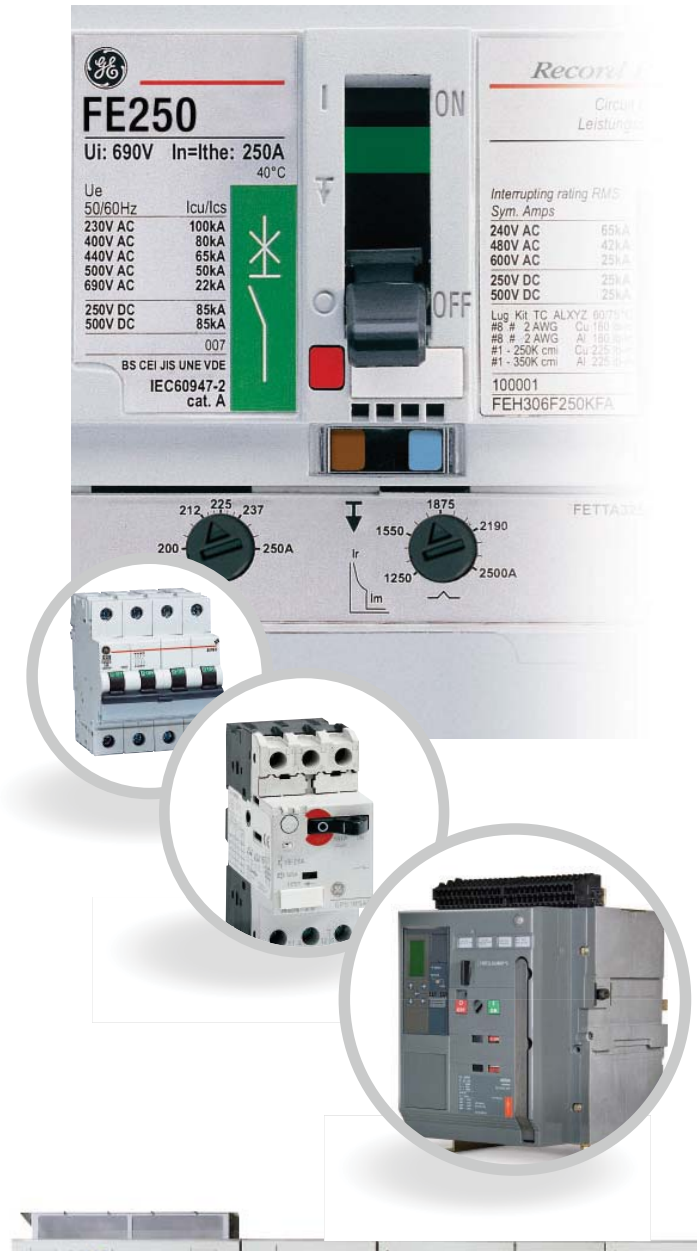
- Use behind door.
- Trip functionality on insertion and withdrawal.
- With MCCB style test position.
- Easily accessible earthing point.
- Through door version allowing accessibility of all draw-out and/or breaker functions from the door front.
- A locking option for multiple padlocks and/or multiple key locks.
- Multiple carriage indication switches for each position.
- Optional ACB style TEST position.

Connectivity

The installation of a breaker is much easier and more cost effective when the mounting and connecting of the breaker can be reduced to a few simple, automateable tasks. Based on these principles GE have devised a unique system that allows the user to mount and connect the breaker before installation.

An adaptor plate, specifically designed for the ***Record Plus™*** breaker line and incorporating all the connection hardware, is fitted to the breaker using 5 to 6 simple screws. Once mounted the adaptor is then simply plugged onto a three or four pole busbar system already installed in the equipment.

Record Plus



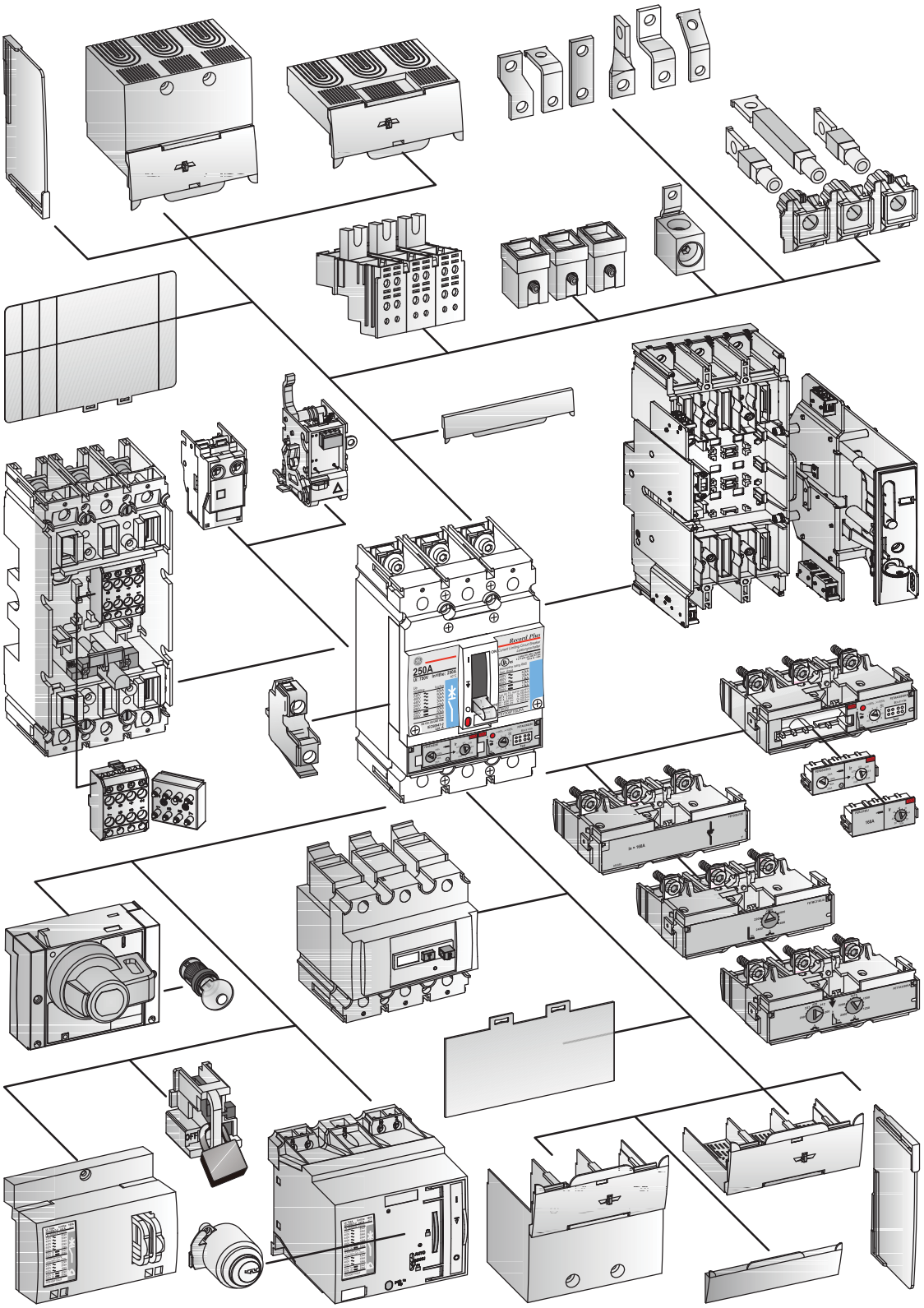
Using world class design and development tools like Six Sigma, Computer Simulation and Lean Manufacturing, ***Record Plus™*** is intended to meet and exceed the most stringent quality and safety standards. At GE we are proud to offer a product that will offer years of reliable and dependable protection.

GE's name is synonymous with a broad range of products designed to meet our customer's changing and competitive environment. Our drive to exceed our customer's expectations is the foundation for continual renewal of our commitment to provide innovative low voltage solutions.

The ***Record Plus™*** MCCB, Elfa Plus MCB, Surion Breaker and Motor starter line and the new EntelliGuard™ G Power Circuit Breaker lines combine to offer a full line of hi-performance protection devices. They Provide a Fully co-ordinated approach to circuit and device protection for use in the Domestic, Commercial and Industrial environment.

GE's new lines meet the latest technical standards and regulations and have been certified by authorities as Lovag, the KEMA and Lloyd's. The components in these lines have been designed to be an integral part of a solution. A complete low voltage distribution and control range including components, accessories and the distribution and controls equipment they go into.

Record Plus



Dilos/Fulos

Loadbreak disconnectors
Fused loadbreak disconnectors

GE imagination at work

Dilos/Fulos

Dilos Loadbreak disconnectors 16A up to 4000A
Fulos Fused loadbreak disconnectors 32A up to 1000/1250A
Fulos Plus New Generation Fused loadbreak disconnectors 32A up to 63A

The new generation of loadbreak disconnectors Dilos, the fused execution Fulos, Fulos Plus and the changeover switches meet today's tertiary and industrial market needs.

Featuring superior technical performance, the switches satisfy the requirements of all modern low voltage installations of which the short-circuit level can now be calculated rapidly, reliable and durable at each level in the installation with adapted software (Procera Plus....).

They comply with the latest specifications and safety requirements such as visible contact indication, positive contact indication (PCI), quick make and quick break operation, independent opening and closing mechanism, by-pass and padlocking features, auxiliary contacts, etc.

The concept integrates the requirements of installers and panelbuilders: fast and easy installation, reliable and durable connections.

Features

- Complete choice of current ratings
- In Dilos from 16A up to 4000A
- In Fulos from 32A up to 1000A/1250A
- Compact moulded body with transparent cover (visible contacts)
- Universal mechanism (unambiguous)
- Clear "ON/OFF"indication
- Double break contacts with separate arcing contacts
- Padlocking in "OFF" – position up to three padlocks
- Very high short-circuit resistance
- Extension shaft with defeat mechanism and positive contact indication

Applications

Dilos and Fulos switches can be utilised as:

- main switch
- outgoing switch
- incoming switch
- coupling switch

The compact design allows easy mounting in all types of enclosures, distribution boards and industrial panels.

Complete range

Dilos

Rated current (A)	20	32	40	63	80	100	125	160	200	250	315	400	630	800	1000	1250	1600	2000	2500	3150	4000
DIN-rail		Dilos 0																			
	Dilos 00							Dilos 2													
			Dilos 1																		
Wall mounted		Dilos 0						Dilos 3						Dilos 6s				Dilos 8s			Dilos 9
				Dilos 1H								Dilos 4					Dilos 7s			Dilos 9s	
	Dilos 00																				

Fulos

Rated current (A)	20	32	40	63	80	100	125	160	200	250	315	400	630	800	1000	1250	1600	2000	2500	3150	4000
DIN-rail	Fulos PLUS / NH-000																				
Wall mounted	Fulos PLUS / NH-000																				
	Fulos 000 / NH-000																				
	Fulos 00 / NH-00																				
				Fulos 1 / NH-1																	
					Fulos 2 / NH-2																
											Fulos 3S / NH-3										
												Fulos 4 / NH-4									

Two systems

- **DIN-rail** type disconnectors from 16A up to 200A
  The most complete range in the market
  Easy to install

- **Wall mounted** disconnectors from 40A up to 4000A and fused disconnectors from 32A up to 1250A

Complete range of accessories
which are mostly common for all disconnectors

- Outside auxiliary contacts
  (simultaneously with main contact)

- Inside auxiliary contact
  (anticipated with main contact)

- Rotary handles (padlockable)
  with extension shafts

- Changeover systems

- Terminal covers

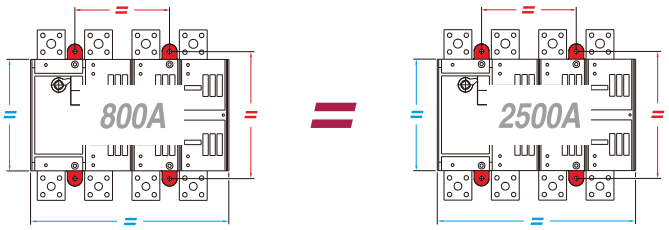
High performances

All disconnectors have double interruption on the four contact points
to reach **high short-circuit resistance**

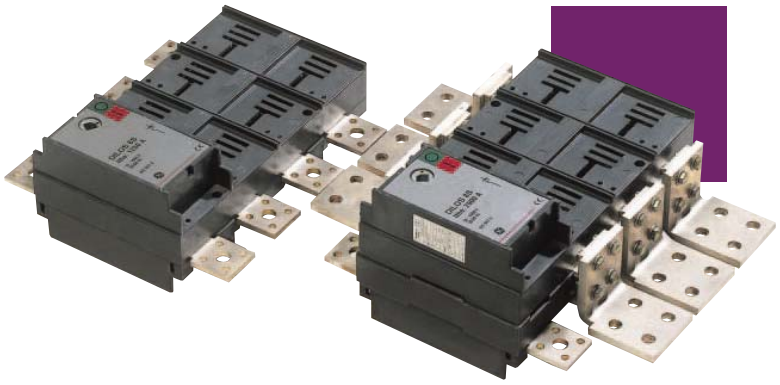
Easy to install

Disconnectors **Dilos S** (800A-3150A) and **Fulos 3S**

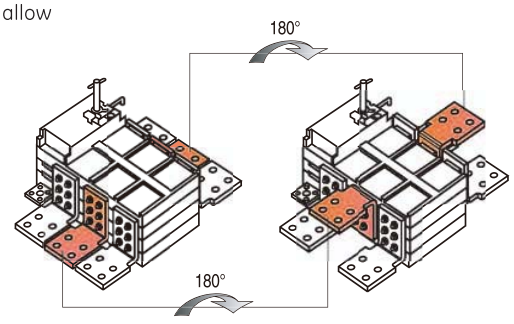
- One frame size (one dimension)
- Same fixation points for the installer
- Most compact size in the market



Unique layer system with **terminal connection** always at the same depth (800 up to 2500A)



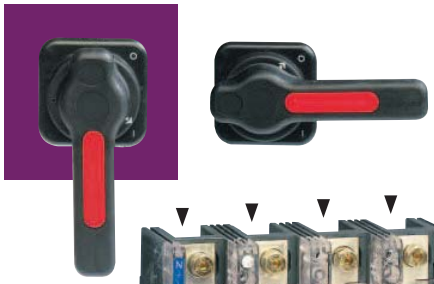
The terminal connections (1600A-2500A)
are symmetrical and can be turned 180° to allow
easy installation of current transformers



Safe and reliable

Visible contacts and disconnect functions

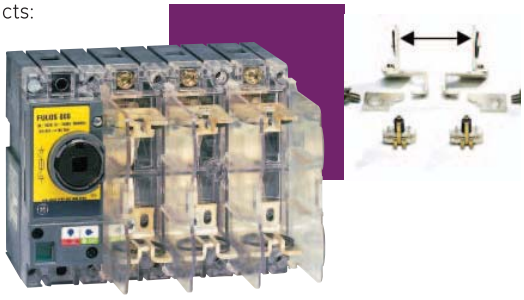
Independent opening and closing
(quick make-quick brake),
no intermediate position of the handle is possible



The power source for all disconnectors may be upstream or downstream

All disconnectors have a **defeat mechanism**

Fused disconnectors have double contacts:
replacement of the fuses
is possible without any danger
in OFF position and dead.



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Power Protection

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WORLDWIDE PARTNER

Redline Edition 2010

Modular DIN-rail devices and residential enclosures

Just feel protected

GE imagination at work

Selection table of MCB's

Page no.	Series	Applications	Poles	Add-on devices	Tripping charac-terestic	Rating current (A)	Short-circuit capacity (kA)
A.14	G30		1, 2, 3, 4	yes	B	6 - 40	3 5 10
				yes	C	2 - 40	3 5 10
A.16	G45		1, 2, 3, 4	yes	B	6 - 40	4.5 6 14
				yes	C	2 - 40	4.5 6 14
A.18	G60		1, 1+N, 2, 3, 4	yes	B	6 - 63	6 10(1) 20
				yes	C	0.5 - 63	6 10(1) 20
				yes	D	0.5 - 63	6 10(1) 20
A.20	EP60		1, 2, 3, 4	yes	K	0.5 - 63	6 10(1) 20
A.22	G100		1, 1+N, 2, 3, 4	yes	B	6 - 63	10(1) 15(2) 30
				yes	C	0.5 - 63	10(1) 15(2) 30
				yes	D	0.5 - 63	10(1) 15(2) 30
A.24	EP100		1, 2, 3, 4	yes	K	0.5 - 63	10 15(2) 30(2)
A.26	GT10		1, 2, 3, 4	yes	B	6 - 63	10(1) 30
				yes	C	0.5 - 63	10(1) 30
				yes	D	0.5 - 63	10(1) 30
A.28	GT25		1, 2, 3, 4	yes	B	6 - 63	15(2) 20(2) 25(2)
				yes	C	0.5 - 63	15(2) 20(2) 25(2)
				yes	D	0.5 - 63	15(2) 20(2) 25(2)
A.30	EP100 UC		1, 2	yes	B	6 - 63	6 10
				yes	C	0.5 - 63	6 10
A.32	Hti		1, 2, 3, 4	yes	B	80 -125	10 15
				yes	C	80 -125	10 15
				yes	D	80 -125	10 15
A.36	EP60 UL		1, 2, 3, 4	yes	B	6 - 63	6 6 10(1)
				yes	C	0.5 - 63	6 6 10(1)
				yes	D	0.5 - 63	6 6 10(1)
A.38	EP100 UL		1, 2, 3, 4	yes	B	6 - 63	10 10 15(1)
				yes	C	0.5 - 63	10 10 15(1)
				yes	D	0.5 - 63	10 10 15(1)
A.40	EP100 ULH		1, 2, 3	yes	B	5 - 32	10 15(2)
				yes	C	0.5 - 32	10 15(2)
				yes	D	0.5 - 32	10 15(2)

domestic
commercial
industrial
motors

B: 3-5 In
C: 5-10 In
D: 10-20 In
K: 8-12 In

EN/IEC 60898-1
EN/IEC 60947-2
NEMA AB1
UL 489
UL 1077

(1) Ics = 75% Icu
(2) Ics = 50% Icu

Selection table of MCB's - continued

Page no.	Series	Applications	Poles	Add-on devices	Tripping charac-terestic	Rating current (A)	Short-circuit capacity (kA)
A.42	EP100R		3	yes	B	0.5 - 63	10 15
				yes	C	0.5 - 63	10 15
A.44	EP100 UCR		1,2	yes	B	2 - 63	6 10
				yes	C	0.5 - 63	6 10
				yes	K	0.5 - 63	6 10
A.46	EP100T		1, 2, 3, 4	yes	Z	0.5 - 63	10 15
				yes	B	6 - 63	10 15
				yes	C	0.5 - 63	10 15
				yes	K	0.5 - 63	10 15
A.48	EP100 UCT		1, 2	yes	Z	0.5 - 63	6 10
				yes	B	6 - 63	6 10
				yes	C	0.5 - 63	6 10
				yes	K	0.5 - 63	6 10

Selection table of compact MCB's - Unibis™

Page no.	Series	Applications	Poles	Add-on devices	Tripping charac-terestic	Rating current (A)	Short-circuit capacity (kA)
A.60	EPC 451N		1+N(1mod)	yes	B-C	2 - 40	4.5 6
A.61	EPC 61N		1+N(1mod)	yes	B-C	2 - 40	6 10
A.63	EPC 611		1P+1P(1mod)	yes	B-C	2 - 40	6 6
A.64	EPC 45		2,3,4	yes	B-C	2 - 40	4.5 6
A.66	EPC 60		2,3,4	yes	B-C	2 - 40	6 10

3

Selection table of screwless MCB's - Fixwell™

Page no.	Series	Applications	Poles	Add-on devices	Tripping charac-terestic	Rating current (A)	Short-circuit capacity (kA)
A.76	EPP60		1, 1+N, 2, 3, 3+N, 4	yes	C	2 - 40	6(1) 10
A.78	EPP100		1, 2, 3, 3+N, 4	yes	B-C	2 - 40	10(1) 15(2)

domestic
commercial
industrial
railways

B: 3-5 In
C: 5-10 In
K: 8-12 In
Z: 2-3 In

EN/IEC 60898-1
EN/IEC 60947-2

(1) Ics = 75% Icu
(2) Ics = 50% Icu

Technical data of MCB's

Series				G30 / G45	G60 / EP60 char. K	G100 / EP100 char. K
Standards				EN/IEC 60898-1	EN/IEC 60898-1	EN/IEC 60898-1
Tripping characteristics				B, C	B, C, D, K(2)	B, C, D, K(2)
Nominal current			A	2-40	B(6-63), C/D/K(0.5-63)	B(6-63), C/D/K(0.5-63)
Calibration temperature			°C	30	30	30
Number of poles (# mod)				1/2/3/4	1/1+N/2/3/4(2)	1/1+N/2/3/4(2)
Neutral pole protected				-	yes	yes
Nominal voltage Un	AC	1P	V	240/415	240/415	240/415
		1P+N	V	240	-	-
		2P	V	415	415	415
		3P/3P+N/4P	V	415	415	415
	DC	1P (1)	VDC	48	48	48
		2P (in series) (1)	VDC	110	110	110
Frequency			Hz	50/60	50/60	50/60
			Hz	DC: magn.trip +40%	DC: magn.trip +40%	DC: magn.trip +40%
			Hz	400: magn.trip +50%	400: magn.trip +50%	400: magn.trip +50%
Maximum service voltage Ubmax between two wires			V	250/440; 53/120 ⎓	250/440; 53/120 ⎓	250/440; 53/120 ⎓
Minimum service voltage Ubmin			V	12; 12 ⎓	12; 12 ⎓	12; 12 ⎓
Selectivity class (EN/IEC 60898-1)				3	3	3
Isolator application	EN/IEC 60947-2			yes	yes	yes
Rated insulation voltage	Pollution degree 2		V	500	500	500
	Pollution degree 3		V	440	440	440
Impulse withstand test voltage			kV	6	6	6
Insulation resistance			MΩ	10000	10000	10000
Dielectric rigidity			kV	2.5	2.5	2.5
Vibrations resistance (in x, y, z direction) (EN/IEC 77/16.3)				3g	3g	3g
Endurance	electrical at Un, In			10000	10000	10000
	mechanical			20000	20000	20000
Utilisation category (EN/IEC 60947-2)				A	A	A
Mounting position (for all devices): any except upside down				any	any	any
Incoming top or bottom				yes	yes	yes
Protection degree (outside / inside enclosure with door)				IP20/IP40	IP20/IP40	IP20/IP40
Self-extinguish degree (according to UL94)				V2	V2	V2
Tropicalisation (according to EN/IEC 60068-2 / DIN 40046)			°C/RH	+55°C/95% RH	+55°C/95% RH	+55°C/95% RH
Operating temperature			°C	-25/+55	-25/+55	-25/+55
Storage temperature			°C	-55/+55	-55/+55	-55/+55
Terminal capacity	Rigid cable min/max (top)		mm^2	1/35	1/35	1/35
	Flexible cable min*/max (top)		mm^2	0.75/25	0.75/25	0.75/25
	Rigid cable min/max (bottom)		mm^2	1/35	1/35	1/35
	Flexible cable min*/max (bottom)		mm^2	0.75/25	0.75/25	0.75/25
	(* Flexible cable 0.75/1/1.5 mm^2 with cable lug)					
	Torque		Nm	4.5	4.5	4.5
Add-on devices (side add-on)	Auxiliary contacts			yes	yes	yes
	Tele U			yes	yes	yes
	Tele L			yes	yes	yes
	Tele MP			yes	yes	yes
	PBS			yes	yes	yes
Busbar systems	Pin (top/bottom)			yes/yes	yes/yes	yes/yes
	Fork (top/bottom)			-/yes	-/yes	-/yes
Accessories				yes	yes	yes
Dimensions	(HxDxW) 86x68xW		mm/mod.	18	18	18
Weight/mod.			g	120	120	120
Package			mod.	12	12	12
Approvals				KEMA	KEMA	KEMA
CE-marking				yes	yes	yes
Page				A.14/A.16	A.18/A.20(2)	A.22/A.24(2)

(1) Preferred values of rated control supply voltage (EN/IEC 60947-2): 24V, 48V, 110V, 125V, 220V, 250V

GT10 / GT25	EP100 UC	Hti	EP100R / EP100T	EP100UCR / EP100UCT
EN/IEC 60947-2	(3)	EN/IEC 60947-2	EN/IEC 60898-1	EN/IEC 60947-2[3]
3-5In/5-10In/10-20In	B, C	3-5In/5-10In/10-20In	Z, B, C, D, K[5]	Z, B, C, K[4]
0.5-63	B(6-63), C(0.5-63)	80 upto 125	B(6-63), C/D/K(0.5-63)	0.5 - 63
40	30	40	30	30
1/2/3/4	1/2/4	1/2/3/4	1/2/3/4[6]	1/2
-	-	-	yes	-
240/415	240/415	230/400	240/415	240/415
-	-	-	-	-
415	415	415	415	415
415	415	415	415	415
48	250	48	48	250
110	500	110	110	500
50/60	50/60	50/60	50/60	50/60
DC: magn.trip +40%	DC: magn.trip +40%	DC: magn.trip +40%	DC: magn.trip +40%	DC: magn.trip +40%
400: magn.trip +50%	400: magn.trip +50%	400: magn.trip +50%	400: magn.trip +50%	400: magn.trip +50%
250/440; 53/120 ⎓	250/440; 250/440 ⎓	250/440; 53/120 ⎓	250/440; 53/120 ⎓	250/440; 250/440 ⎓
12; 12 ⎓	12; 12 ⎓	12; 12 ⎓	12; 12 ⎓	12; 12 ⎓
-	3	-	3	3
yes	yes	yes	yes	yes
500	500	500	500	500
440	440	440	440	440
6	6	6	6	6
10000	10000	10000	10000	10000
2.5	2.5	2.5	2.5	2.5
3g	5g	3g	3g	5g
4000	1000	4000	10000	1000
20000	20000	20000	20000	20000
A	A	A	A	A
any	any	any	any	any
yes	follow polarity	yes	yes	follow polarity
IP20/IP40	IP20/IP40	IP20/IP40	IP20/IP40	IP20/IP40
V2	V2	V2	V2	V2
+55°C/95% RH	+55°C/95% RH	+55°C/95% RH	+55°C/95% RH	+55°C/95% RH
-25/+55	-25/+55	-25/+55	-40/+70	-40/+70
-55/+55	-55/+55	-55/+55	-40/+70	-40/+70
1/35	1/35	70	1/35	1/35
0.75/25	0.75/25	-	0.75/25	0.75/25
1/35	1/35	70	1/35	1/35
0.75/25	0.75/25	-	0.75/25	0.75/25
4.5	4.5	5	4.5	4.5
yes	yes	yes	yes	yes
yes	yes	-	yes	yes
yes	yes	yes	yes	yes
yes	yes	-	yes	yes
yes	yes	yes	yes	yes
yes/yes	yes/yes	-	yes/yes	yes/yes
-/yes	yes/yes	-	-/yes	yes/yes
yes	yes	-	yes	yes
18	18	27	18	18
120	125	210	120	125
12	12	1/4/8	12	12
-	-	-	KEMA	-
yes	yes	yes	yes	yes
A.26/A.28	A.30	A.32	A.42/A.46	A.44/A.48

(2) Motor lines application
no I+N execution in K curve
EP60K in page A.21
EP100K in page A.25

(3) EN/IEC 60898-2 and VDE 0641-2/3
(4) For EP100 UCR no K curve
(5) For EP100 R only B-C curves
(6) For EP100 R only 3

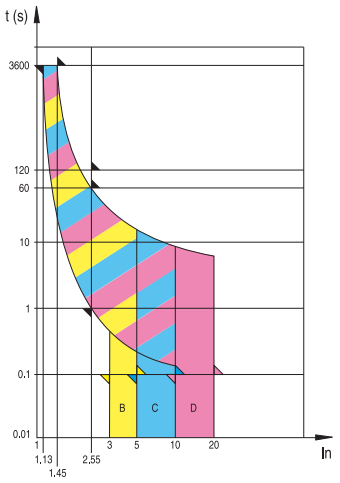
Short-circuit capacity of MCB's

Series				G30	G45	G60 / EP60 char. K
Short-circuit capacity AC			(kA)			
EN/IEC 60898-1	**Icn**	1P	230/400V	3	4.5	6
		1P+N	230V	3	4.5	6
		2P	230/400V	3	4.5	6
		3P/3P+N/4P	230/400V	3	4.5	6
	Ics (service)			100% Icn	100% Icn	100% Icn
EN/IEC 60947-2	**Icu** (ultimate)	1P	127V	-	-	20
			240V	5	6	10
			415V	3	3	3
		1P+N/2P	127V	-	15	30
			240	10	10	20
		2P	415V	5	6	10
		3P, 4P	240V	10	10	20
			415V	5	6	10
			440V	-	-	6
	Ics (service)			75% Icu	75% Icu	75% Icu
	NEMA AB1 (120/240V)			10	14	20
Short-circuit capacity DC			(kA)			
EN/IEC 60947-2	**Icu** (ultimate)	1P	≤60V ⎓	-	-	20
			≤220V ⎓	-	-	-
		2P	≤125V ⎓	-	-	25
			≤440V ⎓	-	-	-
	Ics (service)			-	-	100% Icu
Page				A.14	A.16	A.18/A.20

Characteristics according to EN/IEC 60898-1

Miniature Circuit Breakers (MCB) are intended for the protection of wiring installations against both overloads and short-circuits in domestic or commercial wiring installations where operation is possible by uninstructed people.

Tripping characteristic curves (EN/IEC 60898-1)



Magnetic release

An electromagnet with plunger ensures instantaneous tripping in the event of short-circuit. The standard distinguishes three different types, following the current for instantaneous release: type B,C,D.

Icn (A)	Test current	Tripping time	Applications
B	3 x In	0.1 < t < 45s (In ≤ 32A) 0.1 < t < 90s (In > 32A)	Only for resistive loads such as: - electrical heating
	5 x In	t < 0.1s	- water heater - stoves
C	5 x In	0.1 < t < 15s (In ≤ 32A) 0.1 < t < 30s (In > 32A)	Usual loads such as: - lighting
	10 x In	t < 0.1s	- socket-outlets - small motors
D	10 x In	0.1 < t < 4s[1] (In ≤ 32A) 0.1 < t < 8s (In > 32A)	Control and protection of circuits having important transient inrush currents
	20 x In	t < 0.1s	

(1) if In ≤ 10A, t < 8s

Thermal release

The release is initiated by a bimetal strip in case of overload. The standard defines the range of releases for specific overload values.
Reference ambient temperature is 30°C.

Test current	Tripping time
1.13 x In	t ≥ 1h (In ≤ 63A) t ≥ 2h (In > 63A)
1.45 x In	t < 1h (In ≤ 63A) t < 2h (In > 63A)
2.55 x In	1s < t < 60s (In ≤ 32A) 1 s < t < 120s (In > 32A)

G100 / EP100 char. K EP100T / EP100R	GT10	GT25	EP100 UC / EP100 UCR	Hti
10	-	-	6 (220VDC)[2]	-
10	-	-	-	-
10	-	-	6 (440VDC)[3]	-
10	-	-	-	-
75% Icn	-	-	100% Icn	-
30	25	50	-	-
15	10	50/25/20/15[1]	6[5]	B/C 10; D 7.5
4	-	-	-	4.5
40	30	-	-	-
30	20	50/50/40/30[1]	-	B/C 15
15	10	50/25/20/15[1]	6[5]	B/C 10; D 7.5
30	20	50/50/40/30[1]	-	B/C 15
15	10	50/25/20/15[1]	-	B/C 10; D 7.5
10	-	50/20/15/10[1]	-	-
50% Icu	75% Icu	50% Icu	-	100% Icu
30	30	-	-	-
25	20	25	-	10
-	-	-	10[4]	-
30	25	30	20[4]	15
-	-	-	10[4]	-
100% Icu	100% Icu	100% Icu	-	100% Icu
A.22/A.24/A.42/A.46	A.26	A.28	A.30/A.44	A.32

(1) 0.5-4A/6-25A/32-40A/50-63A
(2) 10 (125VDC)
(3) 10 (250VDC)
(4) T = 4ms
(5) 4.5kA for 50A & 63A

Characteristics according to EN/IEC 60947-2

Magnetic release

An electromagnet with plunger ensures instantaneous tripping in the event of short-circuit. The standard leaves the calibration of magnetic release to the manufacturer's discretion.

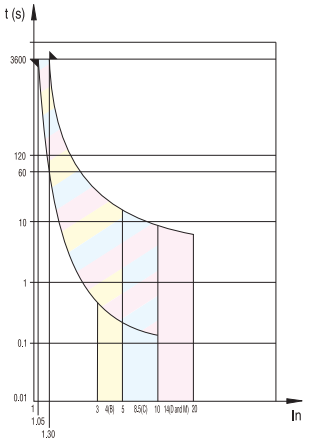
GE offers instantaneous tripping ranges:
- B: 4 In
- C: 8.5 In (7.5 In for 63A)
- D and M: 14 In
- K: 10 In (6 In ≥ 2 s.)

Thermal release

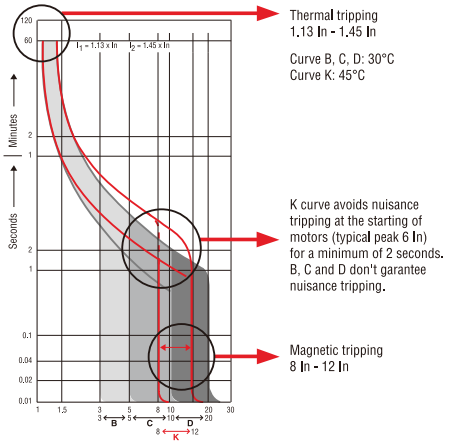
The release is initiated by a bimetal strip in case of overload. The standard defines the range of releases for two special overload values.
Reference ambient temperature is:
- 40°C for GT10 and GT25
- 50°C for G60 and G100, except for K: 45°C

Test current		Tripping time
B - C - D	K	
1.05 x In	1.13 x In	t ≥ 1h (In ≤ 63A) t ≥ 2h (In > 63A)
1.30 x In	1.45 x In	t < 1h (In ≤ 63A) t < 2h (In > 63A)

Tripping characteristic curves (EN/IEC 60947-2)



Curve K (EN/IEC 60947-2) versus B,C,D (EN/IEC 60898-1)



Technical data of MCB's

Series				EP60 UL	EP100 UL	EP100 ULH
Standards UL 1077 (recognized) & CSA C22.2				yes	yes	-
Standards UL 489 (listed)				-	-	yes
UL file				E151139	E151139	E256870
CSA file				235-04	235-04	-
Nominal voltage acc. UL & CSA			1P	277VAC/50VDC	277VAC/50VDC	120VAC/50VDC
			2P	480VAC/110VDC	480VAC/110VDC	240VAC/110VDC
			3P	480VAC/110VDC	480VAC/110VDC	240VAC/110VDC
			4P	480VAC/110VDC	480VAC/110VDC	-
Reference temperature			°C	25	25	25
Terminal capacity			60/75°C	14-4 AWG	14-4 AWG	14-8 AWG
Torque			N.m/lbs.in	2.5/22.5	2.5/22.5	2.5/22.5
Standards EN/IEC 60947-2				yes	yes	yes
Tripping characteristics				B,C,D	B,C,D	B,C,D
Nominal current			A	B 6-63, C/D 0.5-63	B 6-63, C/D 0.5-63	B 5-32, C/D 0.5-32
Calibration temperature			°C	50	50	50
Number of poles				1/2/3/4	1/2/3/4	1/2/3
Number of modules				1,2,3,4	1,2,3,4	1,2,3
Nominal voltage Un						
AC	1P		V	230/400	230/400	230/400
	1P+N		V	-	-	-
	2P		V	400	400	400
	3P		V	400	400	400
	3P+N/4P		V	400	400	400
DC	1P [1]		VDC	48	48	48
	2P (in series) [1]		VDC	110	110	110
Frequency			Hz	50/60	50/60	50/60
Maximum service voltage Ubmax between two wires			V	250/440; 53/120 ⎓	250/440; 53/120 ⎓	250/440; 53/120 ⎓
Minimum service voltage Ubmin			V	12 and 12 ⎓	12 and 12 ⎓	12 and 12 ⎓
Selectivity class (EN/IEC 60898)				3	3	3
Isolator application	EN/IEC 60947-2			yes	yes	yes
Rated insulation voltage	Pollution degree 2		V	500	500	500
	Pollution degree 3		V	440	440	440
Impulse withstand test voltage			kV	6	6	6
Insulation resistance			MΩ	10000	10000	10000
Dielectric rigidity			kV	2.5	2.5	2.5
Mounting position				Any	Any	Any
Incoming top or bottom				Any	Any	Any
Vibrations resistance (in x, y, z direction) (EN/IEC 77/16.3)				3g	3g	3g
Endurance	electrical at Un, In			10000	10000	10000
	mechanical			20000	20000	20000
Utilisation category (EN/IEC 60947-2)				A	A	A
Protection distance (EN/IEC 60947-2)			mm	12	12	12
Protection degree (outside / inside enclosure with door)				IP20/IP40	IP20/IP40	IP20/IP40
Self-extinguish degree (according to UL94)				V0	V0	V0
Tropicalisation (according to EN/IEC 60068-2 / DIN 40046)			°C/RH	+55°C / 95%RH	+55°C / 95%RH	+55°C / 95%RH
Operating temperature			°C	-25/+55	-25/+55	-25/+55
Storage temperature			°C	-55/+55	-55/+55	-55/+55
Terminal capacity						
	Rigid cable min/max (top)		mm^2	1/35	1/35	1/35
	Flexible cable min*/max (top)		mm^2	0.75/25	0.75/25	0.75/25
	Rigid cable min/max (bottom)		mm^2	1/35	1/35	1/35
	Flexible cable min*/max (bottom)		mm^2	0.75/25	0.75/25	0.75/25
	(* Flexible cable 0.75/1/1.5 mm^2 with cable lug)					
	Torque		Nm	max 4.5	max 4.5	max 4.5
Add-on devices (side add-on)	Auxiliary contacts			yes	yes	yes
	Tele L			yes	yes	yes
	Tele MP			yes	yes	yes
Dimensions (HxDxW) 86x68xW [2]			mm/mod.	18	18	18
Weight/mod.			g	125	125	130
Package			mod.	see page A.37	see page A.39	see page A.41
Approvals				UL/CSA/VDE	UL/CSA/VDE	UL
CE-marking				yes	yes	yes
Page				A.36	A.38	A.40

(1) Preferred values of rated control supply voltage (EN/IEC 60947-2): 24VDC, 48VDC, 110VDC, 125VDC, 220VDC, 250VDC

'2) EP100ULH executions 2P & 3P: H = 116 mm

Short-circuit capacity of MCB's

Series			EP60 UL	EP100 UL	EP100 ULH
Interrupting capacity acc. to		kA	UL1077	UL1077	UL489
UL	1P	277VAC	6	10	-
	2P/3P/4P	480VAC	6	10	-
	1P	120VAC	6	10	10
	2P/3P	240VAC	6	10	10
	1P	50VDC	6	10	10
	2P	110VDC	6	10	10
Short-circuit capacity AC					
EN/IEC 60947-2	Icu (ultimate)	kA			
	1 P	127 V	20	30	30
		240V	10	15	15
		415 V	3	4	4
	1+N /2P	127 V	30	40	40
		240 V	20	30	30
	2 P	415 V	10	15	15
	3/3+N/4P	240 V	20	30	30
		415 V	10	15	15
		440 V	6	10	10
	Ics (service)		75% Icu	50% Icu	50% Icu
Short-circuit capacity DC					
EN/IEC 60947-2	Icu (ultimate)	kA			
	1 P	≤ 60 V ⎓	20	25	25
		≤ 220 V ⎓	-	-	-
	2 P	≤ 125 V ⎓	25	30	30
		≤ 440 V ⎓	-	-	-
	Ics (service)		100%Icu	100%Icu	10%Icu
Page			A.36	A.38	A.40

Characteristics according to EN/IEC 60947-2

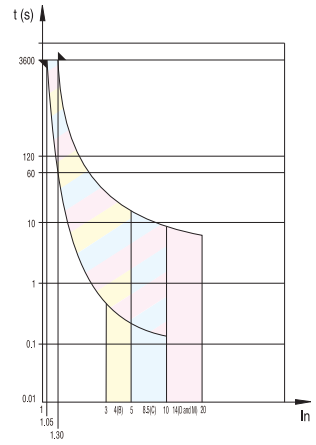
Magnetic release
An electromagnet with plunger ensures instantaneous tripping in the event of short-circuit. The standard leaves the calibration of magnetic release to the manufacturer's discretion.

GE offers instantaneous tripping ranges:
- B: 4 In
- C: 8.5 In (7.5 In for 63A)
- D: 14 In

Thermal release
The release is initiated by a bimetal strip in case of overload. The standard defines the range of releases for two special overload values.
Reference ambient temperature is 50°C

Test current B - C - D	Tripping time
1.05 x In	t ≥ 1h (In ≤ 63A) t ≥ 2h (In > 63A)
1.30 x In	t < 1h (In ≤ 63A) t < 2h (In > 63A)

Tripping characteristic curves (EN/IEC 60947-2)



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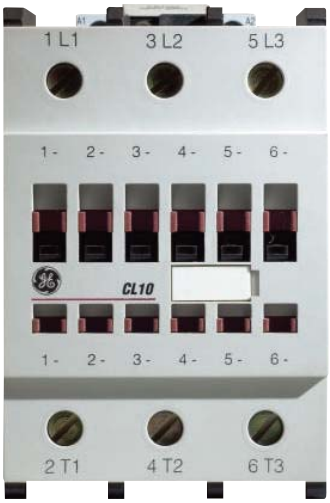
WORLDWIDE PARTNER

Control and Automation

For industrial applications ED.03

Everything is under control



GE imagination at work

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

Ith = 16A

● A.16

Series RL - Auxiliary contactors

Ith = 20A

● A.22

B

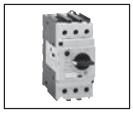
Motor protection devices

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

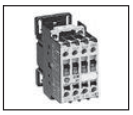
Contactors and Thermal overload relays

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

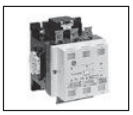
Series CL - Contactors



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

● C.10

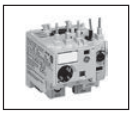
Series CK - Contactors



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

● C.18

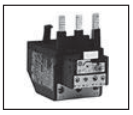
Series MTO - Thermal overload relays



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

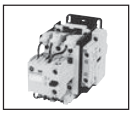
● C.62

Series RE - Electronic overload relays

For contactors series CL from 0.1 to 150A

● C.66

Series CSCN - Contactors for capacitors switching



● C.78

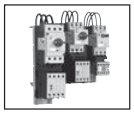
Series 390.R - Clapper contactors

● C.86

D

Motorstarters

Coordination



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

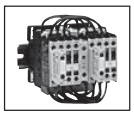
● D.2

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

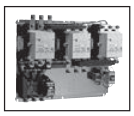
Reversing starters



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

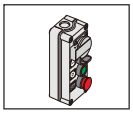
Series P9 - Base mounting

● 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

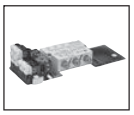
Series IP - Foot switches

● 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

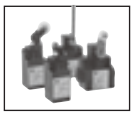
Limit switches

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

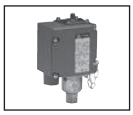
● G.6

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 controlling 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 Emergency-stop switches for machinery

● I.4

Series ML - enclosed switches

● I.7

KSPA-20 MULTIFUNCTION POWER

DESCRIPTION

The KSPA-20 series Multifunction Power Meter provide high accuracy measurement, display and communication(Modbus RTU) of all electrical and power quality parameters, including harmonic measurement THD(Total Harmonic distortion)

Provides electricity bill ratio (Cost) and carbon dioxide ratio (Co_2) set can show cumulative electricity bills and carbon emissions, and suitable for the installation in the power management of remote communication, such as the use of demand.

APPLICATION

Control panels and Motor, Generator monitoring
Switchgear distribution systems , Energy Management
Power quality analysis

ORDERING INFORMATION

KSPA– [Model Number] – [A Input range / V Input range] – [AUX. POWER]

CODE	MODEL
20	Standard

CODE		INPUT RANGE
A1		0 ~ 1 A
A5		0 ~ 5 A
	V6	40 ~ 600 V

CODE	AXU. POWER
ADH	AC85~264V / DC100~300V
ADL	DC 20~56V

PARAMETERS			KSPA-20	
Power Measurements	Voltage	V_{12} V_{23} V_{31} V_{LL_Avg} V_1 V_2 V_3 V_{LN_Avg}	●	
	Current	I_1 I_2 I_3 I_{Avg} I_N	●	
	Active Power	P_1 P_2 P_3 ΣP	●	
	Reactive Power	Q_1 Q_2 Q_3 ΣQ	●	
	Apparent Power	S_1 S_2 S_3 ΣS	●	
	Power factor	PF_1 PF_2 PF_3 PF_{Avg}	●	
	Frequency	Hz	●	
	Active Energy	WH_{Total}	●	
	Reactive Energy	QH_{Total}	●	
	THD for voltage	THD_{V12} THD_{V23} THD_{V31} THD_{V_Avg}	●	
	THD for current	THD_{I1} THD_{I2} THD_{I3} THD_{I_Avg}	●	
	RS485 Port	Modbus RTU mode	●	
	Cumulative electricity	Cost (Only a single rate)	●	
	CO2 emissions	Co^2	●	
	Date time	Year, Month ,Day ,Hour ,Min, Sec.	●	

Accuracy & Resolutions

PARAMETERS	ACCURACY	RESOLUTION	INPUT RANGE
Voltage	0.25%	0.1%	40~600Vac(VL-N)
Current	0.25%	0.02%	1%~120% Rated
Neutral Current	1.0%	0.1%	1%~120% Rated
Active Power	0.5%	0.1%	0~9999MW
Reactive Power	0.5%	0.1%	0~9999MVar
Apparent Power	0.5%	0.1%	0~9999MVA
Power factor	0.5%	0.1%	±0.02~1.00
Frequency	0.2%	0.01Hz	45~65Hz
Active Energy	0.5%	0.1KWh	0~9999999.9KWh
Reactive Energy	0.5%	0.1KVarh	0~9999999.9KVarh
THD	1.0%	0.01%	0~100%

TECHNICAL SPECIFICATION

Input

Measurement: True rms measurement
Sampling: 128point/Cycle
Connection: 1P2W、1P3W、3P3W(2、3CT) 、3P4W：Balanced/ Programmable by front buttons(Actual wiring must be
Input range: Voltage：40~600 V L-N
PT Primary range：100~500000V
PT Secondary range：100~600V
Current：0~5A, (Optional:0~1A)
CT Primary range：5~10000A
Frequency：45~65Hz
Max. Input over capability: Voltage:2 X rated continuous；2500V, 1 sec
Current: 2 X rated continuous；20 X rated 1 sec
Input burden: Voltage：< 0.2VA；Current：< 0.1VA

Power Quality

THD: Total harmonic distortion for Voltage and Current

RS485 communication (standard)

Protocol: Modbus RTU mode
Baud rate: 1200/2400/4800/9600/19200/38400
Data bits: 8 bits
Parity: None / Even / Odd
Stop bits: 1 or 2
Address: 1~255
Wiring: 1200M max,
Termination Res.: 120~300Ω/0.25W(typical: 150Ω)
Calibration: Through RS485

Electrical safety

Dielectric Strength: AC 2KV, 50/60Hz, 1 min .Between Input / Output / Power
Surge test: 3KV, 1.2 x 50 µsec. Common mode & differential mode
Insulation Res: ≥100M ohm, DC 500V
Isolation: Between input / Output / Power
Input voltage terminal common ground non isolation
Input current terminal CT and external isolation
EMC: EN 55011:2002; EN 61326:2003
Safety(LVD): EN 61010-1:2001

Environmental

Operating Temp.: 0~60 ˚C
Operating Hum(%RH): 5~95 %RH, non-condensing
Temp. Coefficient: ≤100 PPM/˚C
Storage Temperature: -10~70 ˚C
Enclosure: Front panel: IEC 529 (IP50)；Housing: IP20

Power

Power supply: AC 85~265V / DC 100~300V
Power consumption: AC:≤ 10W / DC:≤ 3W @ 230V
Back up memory: By EEPROM
Dimension: 96mm(W) x 96mm(H) x 71mm(D)
Panel cutout: 90mm(W) x 90mm(H)

Case material: Black PC (non-flammable)

KSPA-20　多功能電力表

■ 產品介紹

KSPA-20 電表提供多樣單相、三相電量參數 (電壓、電流、有效功率、無效功效、視在功率、功率因數、頻率、有效電能)的高精度測量，顯示和遠端 RS485 通訊(Modbus RTU Mode)功能，更提供了電費比率(Cost)與二氧化碳比率(Co_2)設定，可以顯示累積電費與碳排放量，適合裝置在電量管理遠端通信等的運用需求。

■ 應用

馬達控制盤的電量監控　　分電盤的電量監控
電能管理及電費分攤系統　　電力品質分析

■ 訂貨型號

KSPA– [Model Number] – [A Input range | V Input range] – [AUX. POWER]

CODE	MODEL
20	Standard

CODE	INPUT RANGE
A1	0 ~ 1 A
A5	0 ~ 5 A
V6	40 ~ 600 V

CODE	AXU. POWER
ADH	AC85~264V / DC100~300V
ADL	DC 20~56V

量測顯示參數			KSAP-20	
電量參數	電壓	V_{12} V_{23} V_{31} V_{LL_Avg} V_1 V_2 V_3 V_{LN_Avg}	●	
	電流	I_1 I_2 I_3 I_{Avg} I_N	●	
	有效功率	P_1 P_2 P_3 ΣP	●	
	無效功率	Q_1 Q_2 Q_3 ΣQ	●	
	視在功率	S_1 S_2 S_3 ΣS	●	
	功率因素	PF_1 PF_2 PF_3 PF_{Avg}	●	
	頻率	Hz	●	
	有效電能	WH_{Total}	●	
	無效電能	QH_{Total}	●	
	電壓諧波失真率	THD_{V12} THD_{V23} THD_{V31} THD_{V_Avg}	●	
	電流諧波失真率	THD_{I1} THD_{I2} THD_{I3} THD_{I_Avg}	●	
	RS485 Port	Modbus RTU mode	●	
	累積電費	Cost (僅單一費率)	●	
	二氧化碳排放量	Co_2	●	
	日期時間	年, 月, 日, 時, 分, 秒.	●	

精確度 & 解析度

量測顯示參數	精確度	解析度	量測範圍
電壓	0.25%	0.1%	40~600Vac(V_{L-N})
電流	0.25%	0.02%	1%~120% 額定
中性線電流	1.0%	0.1%	1%~120% 額定
有效功率	0.5%	0.1%	0~9999MW
無效功率	0.5%	0.1%	0~9999MVar
視在功率	0.5%	0.1%	0~9999MVA
功率因素	0.5%	0.1%	±0.02~1.00
頻率	0.2%	0.01Hz	45~65Hz
有效電能	0.5%	0.1KWh	0~9999999.9KWh
無效電能	0.5%	0.1KVarh	0~9999999.9KVarh
總諧波失真率	1.0%	0.01%	0~100%

■ 技術規格

輸入

量測方式: True rms measurement (均方根值量測)
取樣速度: 128point/Cycle
相線系統: 1P2W、1P3W、3P3W(2、3CT) 、3P4W；平衡/非平衡可由盤面按鍵規劃(設定與實際接線方式需相符)
輸入範圍: 電壓：40~600 V L-N
PT 一次測 設定範圍：100~500000V
PT 二次測 設定範圍：100~600V
電流：0~5A, (Optional:0~1A)
CT 一次測 設定範圍：5~10000A
頻率：45~65Hz
電壓最大過載能力: 2 倍額定 連續；2500V, 1 秒

電力品質

總諧波失真率(THD): 各相與平均的電壓及電流的 波形畸變之百分比值

RS485 電腦連線(標準配備)

通訊協定(Protocol): Modbus RTU mode
波特率(Baud rate): 1200/2400/4800/9600/19200/38400
資料位元(Data bits): 8 bits
同位元檢查(Parity): None / Even / Odd
停止位元(Stop bits): 1 or 2
通訊地址(Address): 1~255
接線長度: 1200M max,
終端電阻: 120~300Ω/0.25W(typical: 150Ω)
自動校正: 透過 RS485

電氣特性及規範

介電強度: AC 2KV, 50/60Hz, 1 min. ; 輸入/輸出/電源/外殼 之間
突波測試: 3KV, 1.2 x 50 µsec. Common mode & differential mode
絕緣電阻: ≥100M ohm, DC 500V
隔離: 輸入/輸出/電源 之間

EMC: EN 55011:2002; EN 61326:2003
Safety(LVD): EN 61010-1:2001

使用環境

工作溫度: 0~60 ˚C
工作溼度(%RH): 5~95 %RH, 無結露
溫度係數: ≤100 PPM/˚C
儲存溫度: -10~70 ˚C
保護等級: 前面蓋: IEC 529 (IP50)；殼體: IP20

工作電源

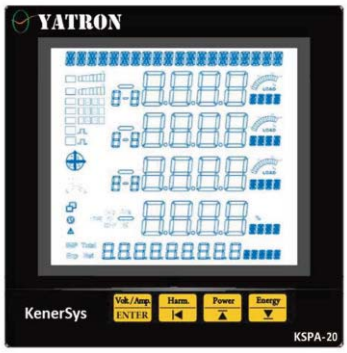
工作電源: AC 85~265V / DC 100~300V
功率消耗: AC:≤ 10W / DC:≤ 3W @ 230V
參數資料儲存: By EEPROM

機械結構

外觀尺寸: 96mm(寬) x 96mm(高) x 71mm(深)
開孔尺寸: 90mm(寬) x 90mm(高)
外殼材質: 黑色 PC (添加阻燃)
安裝方式: 盤面安裝
接線端子: 螺絲端子, Plastic NYLON 66 (UL 94V-0)
電流/電壓輸入端子(#1~#10): 1.5~2.5mm^2(AWG15~10)
其他端子: 0.5~1.3mm^2(AWG22~16)
重量: 小於 400g

Installation: Panel mounting
Wiring terminal: Screw terminal, Plastic NYLON 66 (UL 94V-0)
Current/Voltage input(#1~#10): 1.5~2.5mm^2(AWG15~10)
Other terminal: 0.5~1.3mm^2(AWG22~16)
Weight: Around 400g

Front Panel



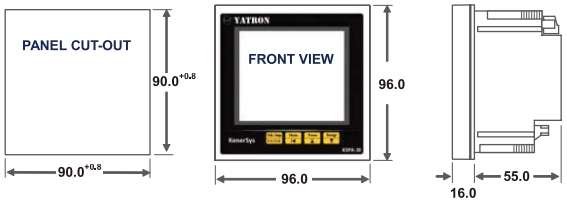
Display: LCD 65(W)x58(H)mm ; White backlight ; Blue wording
Visible under direct sunlight
LCD LED: **Backlight on time**1~15Min ("0" is always light)
Reading: Upper row 20 digits: Display date. time
8888 4 Digitsx 4 rows, 10.0mm Display V, A, Power, PF, THD,..
88888888 8 Digits x 1 row, 6.0mm Display Energy parameters(kWh , kVarh)
:RS485 communication status ; 2 square status icons Display Master and Slave status ; Both square on for normal communication

Load status indication:
IND :On when load is inductive
CAP :On when load is capacitive
LOAD% :Display load percentage
:Display load quadrant

Reading variety symbols:
a-b, b-c, c-a :When on ,value showing Line-Line
a, b, c : When on ,value showing in Phase
N : When on ,value showing in Neutral
Total : When on ,value showing Total value
Avg : When on ,value showing Average
MAX MIN : When on ,value showing Maximun/Minimum
THD : When on ,value showing Total harmonics distortion
V KV A KW MVar .. LED-16 byte display parameters Unit

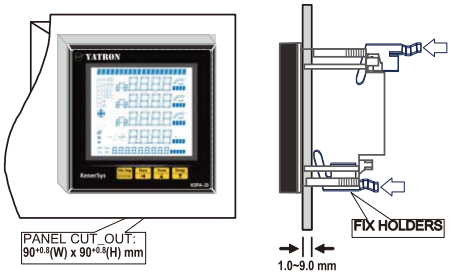
Display value update: 0.5 sec
Control button: 4 control buttons
ENTER Enter Key / Voltage /Current display page
Harmonic Shift Key / Main electric parameters display page
Power Up Key / Electric parameters display page
Energy Down Key / Energy parameters display page
Passwords: 4 digits passwords ; Range : 0000~9999 (Default 1000)

Dimensions



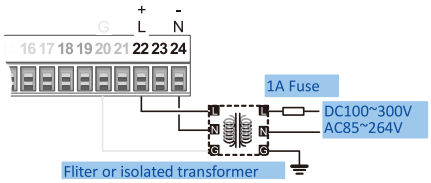
Unit: mm

Installation



Connection diagram

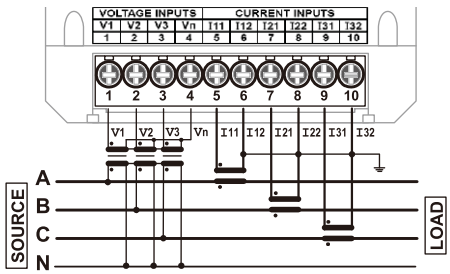
Aux Power (Terminal Block 2)



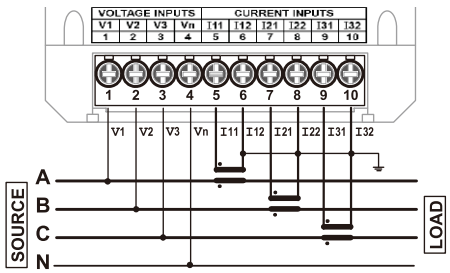
Voltage and Current input (Terminal block1)

Voltage wire: AWG16~12(1.3~2.0mm^2)
Current wire: AWG15~10(1.5~2.5mm^2)

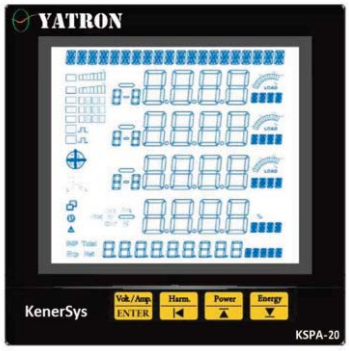
- 3Phase 4 Wire – 3PT / 3CT [Set: 3P4W]



- 3 Phase 4wire – Direct Voltage (no PT) /3CT[Set:3P4W]



■ 面板說明



顯示視窗: LCD 65(W)x58(H)mm；白色高亮度背光；藍色字體
即使在陽光直接照射下依然清晰可見
螢幕保護功能: 背光時間可設定 1~120 分鐘

量測值顯示: 上排 20 碼: 顯示日期-時間
8888 4 位數 x 4 行, 10.0mm 顯示 V, A, Power, Hz, PF, THD,..
88888888 8 位數 x 1 行, 6.0mm 顯示 電能參數(kWh、kVarh)
:RS485 通訊狀態顯示；通訊狀態由二個方形來顯示 Master 與 Slave 通訊狀態；若二個方形都被點亮，表示通訊正常

負載狀態顯示:

IND :負載為電感性負載時點亮
CAP :負載為電容性負載時點亮
LOAD% :顯示負載百分比
:負載的象限顯示

量測值附加符號:

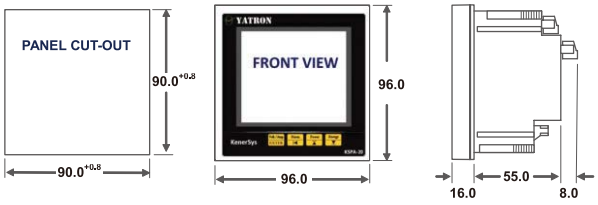
a-b, b-c, c-a :點亮時，表示量測視窗顯示值為 線-線(Line-Line)
a, b, c :點亮時，表示量測視窗顯示值為 相(Phase)
N :點亮時，表示量測視窗顯示值為 中性線
Total :點亮時，表示量測視窗顯示值為 加總值
Avg :點亮時，表示量測視窗顯示值為 平均值
MAX MIN :點亮時，表示量測視窗顯示值為 最大(小)值
THD :點亮時，表示量測視窗顯示值為 總諧波失真率
V kV A kW MVar.. 米字節顯示，量測視窗顯示值的單位

顯示值更新: 0.5 秒

操作按鍵: 4 個按鍵操作
Enter Key / 電壓/電流 快速翻頁鍵
Shift Key / 綜合電力參數 快速翻頁鍵
Up Key / 電力參數 快速翻頁鍵
Down Key / 電能參數 快速翻頁鍵

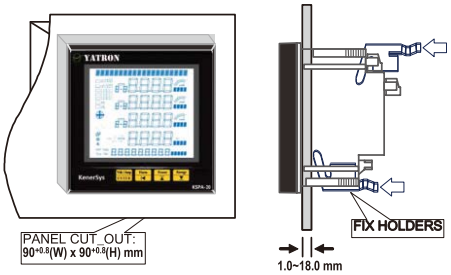
安全密碼: 4 位數密碼；設定範圍：0000~9999

■ 外觀尺寸及盤面開孔



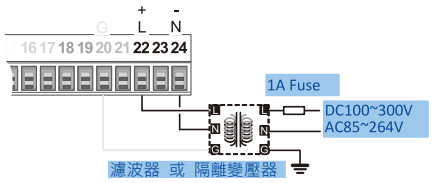
Unit: mm

■ 安裝方式



■ 接線方式

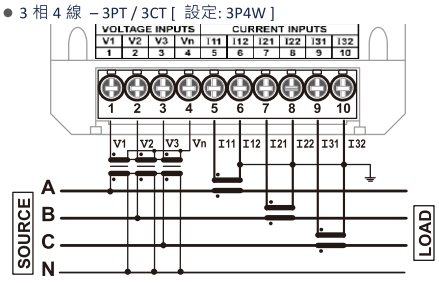
輔助電源(端子台 2)



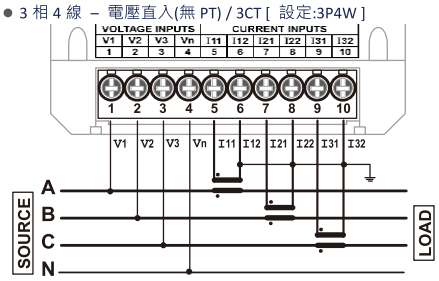
電壓與電流輸入(端子台 1)

電壓線徑: AWG16~12(1.3~2.0mm^2)
電流線徑: AWG15~10(1.5~2.5mm^2)

● 3 相 4 線 – 3PT / 3CT [設定: 3P4W]



● 3 相 4 線 – 電壓直入(無 PT) / 3CT [設定:3P4W]



KSPA-80 Power Analyzer

DESCRIPTION

KSPA-80 is a high level power analyzer along with advanced DSP chip, high accuracy measurement, display, networking (via RS485 & Ethernet) and wide spectrum of analysis (2~63th THD & individual harmonic readings). Provide more than 50 types energy and power quality parameters, total cost and CO_2 emission in display, diverse I/O controlling functionality (4 DI/ 4DO/ 2RO/ 2 AO), and up to 1MB embedded Flash memory for Data-Logging. It is an accurate and easy-to-use power meter in power quality controlling system nowadays.

APPLICATIONS

- Power Monitoring of Motor Control Switchboard
- Energy Management and Electricity Cost Allocation System
- Distribution Power Monitoring
- Power Quality Analysis

ORDERING INFORMATION

KSPA– [Model Number] – [A Input range | V Input range] – [Option Output 1] – [Option Output 2] – [AUX. POWER]

C	MODEL NUMBER
80	Standard

CODE		INPUT RANGE
A1		0 ~ 1 A
A5		0 ~ 5 A
	V6	40 ~ 600 V

CODE	ANALOG OUTPUT
AN	NONE
AO2	2 analog output, set by the internal parameters scope

CODE	RS485
U81	RS485*1
U82	RS485*2

CODE	AXU.POWER
AD	AC 85~264
H	DC100~300V
ADL	DC20~56

PARAMETERS			
Power Measurements	Voltage	V_{12} V_{23} V_{31} V_{LL_Avg} V_1 V_2 V_3 V_{LN_Avg}	
	Current	I_1 I_2 I_3 I_{Avg} I_N	
	Active Power	P_1 P_2 P_3 ΣP	
	Reactive Power	Q_1 Q_2 Q_3 ΣQ	
	Apparent Power	S_1 S_2 S_3 ΣS	
	Power Factor	PF_1 PF_2 PF_3 PF_{Avg}	
	Frequency	Hz	
	Active Energy	WH Imp WH Exp WH Total WH Net	
	Reactive Energy	QH Imp QH Exp QH Total QH Net	
	THD for Voltage	THD_{V12} THD_{V23} THD_{V31} THD_{V_Avg}	
	THD for Current	THD_{I1} THD_{I2} THD_{I3} THD_{I_Avg}	
	Individual	2nd~63th	
	Max/Mini	Recording Max & Min. of each parameter with time stamp	
	External control	ECI1 ECI 2 ECI 3 ECI 4	
	Pulse output	PO1 PO2	
	Relay Output	RO1 RO2 RO3 RO4	
	Analog output	AO1 AO2 23322026	**(Optional)**
	RS485 Port	Modbus RTU mode x 2(The 2nd RS485 is optional)	
	Date Time	Year, Month, Date, Hour, Minute, Second	

Accuracy & Resolutions

PARAMETERS	ACCURACY	RESOLUTION	INPUT RANGE
Voltage	0.1%	0.1%	40~347Vac(V_{L-N})
Current	0.1%	0.02%	1%~120% rated
Neutral Current	1.0%	0.1%	1%~120% reated
Active Power	0.25%	0.1%	0~9999MW
Reactive Power	0.25%	0.1%	0~9999MVar
Apparent Power	0.25%	0.1%	0~9999MVA
Power Factor	0.5%	0.001	±0.02~1.000
Frequency	0.2%	0.01Hz	45~65Hz
Active Energy	0.25%	0.1KWh	0~9999999.9KWh
Reactive Energy	0.25%	0.1KVarh	0~9999999.9KVarh
THD	1.0%	0.01%	0~100%
Individual Harmonic	1.0%	0.01%	0~100%
Un-balance	0.5%	0.1%	0~300%

Input

Measurement:	True-RMS measuring Parameter Demand current for each phase and three-phase Demand active power,three-phase total Demand apparent power,three-phase total
Sampling rate:	256 point/Cycle
Phase & Wiring:	1P2W, 1P3W, 3P3W(1, 2, 3CT), 3P4W(1,3CT) ; Balance/Unbalance System Programmed by front keys (must be the same with rea
Input Range:	Voltage:40~347 V L-N ;70~600VL-L PT ratio(primary) programmable: 100~500000V PT ratio(secondary) programmable:100~600V Current: 5A, (Optional:0~1A) CT ratio(primary) programmable: 5~10000A Frequency: 45~65Hz
Max. Input Withstand:	
Relay output contact:	4 relay: FORM-A, 3A/250Vac, 3A/30Vdc, Common Mode
Relay mode:	Hi/ Lo/ Hi. hold/ Lo. hold/ do
Function:	Corresponding to 30 types power and demand V/I/P/Q/S/PF/Hz/THD/Hamonic/Unb/Phase.....

Analogue Output(AO) (Option)

Analogue Output:	Option ：2 relay
Output range:	Voltage: 0~5V / 0~10V Current: 0~20mA / 4~20mA / 0~10mA /4~12~20 mA
Accuracy:	≤± 0.1% of F.S.; 16 bits DA converter
Ripple:	≤± 0.1% of F.S.
Response time:	≤100 m-sec. (10~90% of input)
Isolation:	AC 2500V between input and output

External Control Inputs(ECI)

Input mode:	4 ECI points, Contact or open collect input, Level trigger
Functions:	Reset for Totalizer / Reset Max or Mini. Hold / Reset for Relay Energized latch / DI
Debouncing time:	Settable range 5 ~255 x (8m seconds)

Pulse output (PO)

Output mode:	2 Open collect (O.C.)outputs: 5~30Vdc, 30mA(max)
Reaction time:	≤ 300ms
Isolation:	2500Vac

TECHNICAL SPECIFICATION

KenerSys

KSPA-80　多功能電力分析表

■ 產品介紹

KSPA-80 多功能電力分析表，提供多樣單相、三相電量參數 (電壓、電流、有效功率、無效功效、視在功率、功率因數、頻率、有效電能)的高精度測量，具有 4 組數位輸入/4 點接點輸出/2 點數位輸出/2 組類比輸出及遠端 RS485 通訊(Modbus RTU Mode)與 Ethernet 與 Zigbee 齊全的介面與功能。

可量測電壓/電流 2~63 次諧波含量，並可以顯示累積電費與 CO_2 碳排放量，適合裝置在電量管理、用電品質分析、遠端通信等的運用需求。並具備分時計費(TOU)的功能具有2M bytes 的記錄容量，可供使用者長時間資料記錄。

另具有相序調整功能，減輕現場查線工作。

■ 應用

馬達控制盤的電量監控　　分電盤的電量監控
電能管理及電費分攤系統　　電力品質分析

■ 訂貨型號

KSPA– [Model Number] – [A Input range | V Input range] – [Optional Output 1] – [Optional Output 2] – [AUX. POWER]

CODE	MODEL NUMBER
80	Standard

CODE	INPUT RANGE
A1	0 ~ 1 A
A5	0 ~ 5 A
V6	40 ~400 V_{LN}(600V_{LL})

CODE	ANALOG OUTPUT
AN	NONE
AO2	2 analog output, set by the internal parameters scope

CODE	RS485 OUTPUT
U81	RS485*1
U82	RS485*2

CODE	AXU.POWER
ADH	AC 85~264 DC100~300V
ADL	AC/DC 20~56V

量測顯示參數			
電量參數	電壓	V_{12} V_{23} V_{31} V_{LL_Avg} V_1 V_2 V_3 V_{LN_Avg}	
	電流	I_1 I_2 I_3 I_{Avg} I_N	
	有效功率	P_1 P_2 P_3 ΣP	
	無效功率	Q_1 Q_2 Q_3 ΣQ	
	視在功率	S_1 S_2 S_3 ΣS	
	功率因素	PF_1 PF_2 PF_3 PF_{Avg}	
	頻率	Hz	
	有效電能	WH Imp　WH Exp　WH Total　WH Net	
	無效電能	QH Imp　QH Exp　QH Total　QH Net	
	視在電能	VAH	
	電壓諧波失真率	THD_{V12} THD_{V23} THD_{V31} THD_{V_Avg}	
	電流諧波失真率	THD_{I1} THD_{I2} THD_{I3} THD_{I_Avg}	
	分次諧波含量	2nd~63 th 諧波	
	需量與最大(小)值記錄	記錄各參數最小值、最大值及發生時間	
	預報需量		
	外部控制輸入	ECI1　ECI 2　ECI 3　ECI 4	
	脈衝輸出	DO1　DO2	
	繼電器輸出	RO1　RO2　RO3　RO4	
	類比訊號輸出	AO1　AO2	
	TOU(分時計費)	4 個時區，8 個時段，4 種費率自動結算	
	RS485 Port	Modbus RTU mode x 2(第二組為選購功	
	日期時間	年, 月, 日, 時, 分, 秒.	

精確度 & 解析度

量測顯示參數	精確度	解析度	量測範圍
電壓	0.1%	0.1%	40~400Vac(V_{L-N})
電流	0.1%	0.02%	1%~120% 額定
中性線電流	0.5%	0.1%	1%~120% 額定
有效功率	0.25%	0.1%	0~9999MW
無效功率	0.25%	0.1%	0~9999MVar
視在功率	0.25%	0.1%	0~9999MVA
功率因素	0.25%	0.001	±0.02~1.000
頻率	0.2%	0.01Hz	45~65Hz
有效電能	Class 0.5s(注 1)	0.1KWh	0~9999999.9KWh
無效電能	Class 1.0(注 2)	0.1KVarh	0~9999999.9KVarh
總諧波失真率	1.0%	0.01%	0~100%
分次諧波含量	1.0%	0.01%	0~100%
三相不平衡度	0.5%	0.1%	0~300%

注 1:IEC 62053-22,ANSI C 12.20 ,Class 0.5s;　注 2 :IEC 62053-23, Class 1.0

輸入

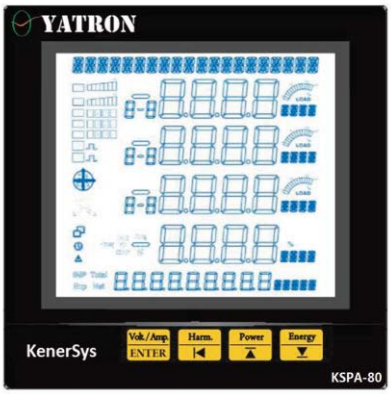
量測方式:	True rms measurement (均方根值量測)
取樣速度:	256 point/Cycle
相線系統:	1P2W、1P3W、3P3W(1、2、3CT) 、3P4W(1、3CT)；
四種費率	每個時段可指定所屬(尖、峰、谷、平)費率，累積每個時段(尖、峰、谷、平)的各種分時用電量參數
分時電量參數	分相與總和的 消耗有功電量、釋放有功電量、感性無功電量、容性無功電量、絕對值和有功電量、淨有功電量、絕對值和無功電量、淨無功電量、視在功電量
結算	可依設定日期結算或是一自然月底，進行結算
自動結算	可設定每月結算的日期時間，自動結算分時電度值與電費，並可儲存記錄本月、上月與累計的結算資料
RS485 電腦連線	(第二組為選購功能)
輸出組數:	2 埠設計，可滿足現場人機介面與中央監控連線需求
通訊協定:	Modbus RTU mode
通訊地址:	1~255
波特率:	1200/2400/4800/9600/19200/38400
同位元檢查:	None / Even / Odd
資料位元:	8 bits
停止位元:	1 or 2
接線長度:	1200M max,
終端電阻:	120~300Ω/0.25W(typical: 150Ω)
Ethernet 連線	(選購功能)
網路介面:	10M/100M BASE-T, RJ-45 連接
通訊協定:	TCP/ IP，UDP，DHCP Client， HTTP， Modbus/TCP
ZigBee 連線	(選購功能)
	符合 802.15.4 標準
	傳輸距離:100m
	傳輸速率最大 250Kbps
	安全性 128 bit AES
	網路節點最大可至 65000 個
	平衡/非平衡系統
	可由盤面按鍵規劃(設定與實際接線方式需相符)
輸入範圍:	電壓：40~400 V_{L-N} ;60~600V_{L-L}
	PT 一次測 設定範圍：100~500000V
	PT 二次測 設定範圍：100~600V
	電流：0~5A, (Optional:0~1A)
	CT 一次測 設定範圍：5~9999A
	頻率：45~65Hz

■ 技術規格

RS485 communication	(The second set of features is optional)
Output port:	2 ports to meet the needs of man-machine interface and central monitoring
Protocol:	Modbus RTU mode
Address:	1~255
Baud rate:	1200/2400/4800/9600/19200/38400
Parity:	None / Even / Odd
Data bits:	8 bits
Stop bits:	1 or 2
Wiring:	1200M max,
Terminal Resistance:	120~300Ω/0.25W(typical: 150Ω)
Environmental	
Operation Temp.:	0~60 ˚C / Display 0~50 ˚C
Operation Humidity:	5~95 %RH, Non-condensing
Temp. Coefficient:	≤100 PPM/˚C
Storage Temperature::	-10~70 ˚C
Enclosure:	Front panel: IEC 529 (IP50) ; Housing: IP20
Power	
Power supply:	AC 85~264V / DC 100~300V
Power consumption:	AC:≤ 10VA @ 230V / DC:≤ 3W
Back up memory:	By EEPROM

Mechanical	
Dimension:	96mm(W) x 96mm(H) x83mm(D)
Panel cutout:	90mm(W) x 90mm(H)
Case material:	Black ABS (Add retardant)
Mounting:	Panel flush mounting
Electrical safety	
Dielectric Strength:	AC 2KV, 50/60Hz, 1 min. ; Between Input / Output / Power / Case
Surge test:	3KV, 1.2 x 50 µsec. Common mode & differential mode
Insulating Resistance:	≥100M ohm, DC 500V
Isolation:	Between Input / Output / Power /
Standard:	EN 55011:2002; EN 61326:2003; EN 61010-1:2001 IEC 61000-4-2; IEC 61000-4-3; IEC 61000-4-4, IEC 61000-4-5; IEC 61000-3-2
Terminal Block:	Screw terminal, Plastic NYLON 66 (UL 94V-0) Voltage input (P1~#12): 0.2~2.5mm2(AWG28~12) Current input (P13~P18): 0.5~2.5mm2(AWG22~12) Signal input (P19~P46): 0.5~1.3mm2(AWG22~16)
Weight:	Under 400g

FRONT PANEL

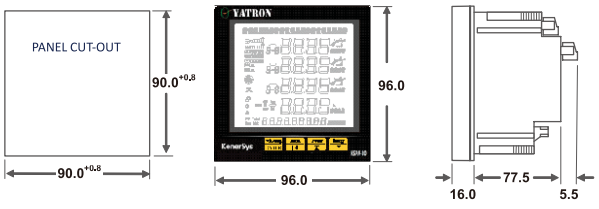


Display:	LCD 65(W)x58(H)mm, blue character with white back light
	LCD protection function: the period time of back light on can be set from 0~15 minutes ("0" stands forever bright)
Reading:	Upper row 20 digits: Display date. time
	4 digital x 4 line, 10.0mm high for V, A, Power, Hz, PF, THD,..
	9 digital x 1 line, 6.0mm high for Power parameters (kWh 、kVarh)
	:RS485 communication status ; 2 square status icons Display Master and Slave status ; Both square on for normal communication
Load status	
IND	:On when load is inductive
CAP	:On when load is capacitive
LOAD%	:Display load percentage
	:Display load quadrant
Reading variety	
1-2, 2-3,3-1	:When on ,value showing Line-Line
1, 2,3	: When on ,value showing in Phase
N	: When on ,value showing in Neutral
Totel	: When on ,value showing Total value
Avg	: When on ,value showing Average
MAX MIN	: When on ,value showing Maximun/Minimum
THD	: When on ,value showing Total harmonics distortion
Remark	: When on · Display sub harmonic content
V、A、KW、HZ、...	LED-4 byte display parameters Unit
Output symbol	
AO1 AO2	: When on · Analog output
DI	: When 1~4 point on · ECI signal input
RO	: When 1~4 point on · Relay Output
DO1 DO2	: When on · Pulse signal output (PO)
Display value update:	0.5 sec

Display value update:	0.5 sec
Control button:	4 control buttons
	Enter Key / Voltage /Current display page
	Shift Key / Main electric parameters display page
	Up Key / Electric parameters display page
	Down Key / Energy parameters display page
Passwords:	4 digits passwords ; Range ：0000~9999 (Default 1000)
Alarm events:	The digital power analyser shall provide date and time stamped event log. The type of alarm events and size of the event log shall be user definable. The following classes of events shall be available as alarm events :

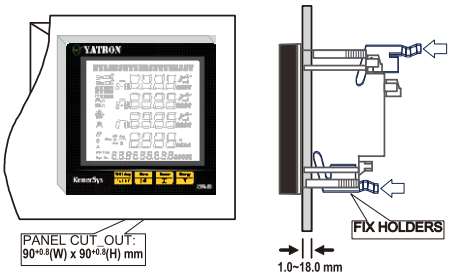
- Over / under voltage
- Over / under current
- Current or voltage unbalance
- Phase loss, voltage or current
- Over / under frequency
- Over kVA, kW or kVAr into / out of load
- Under power factor, true or displacement
- OverTHD
- Over demand, current or power
- Phase reversal
- Voltage or current sag / swell

Dimensions



Unit: mm

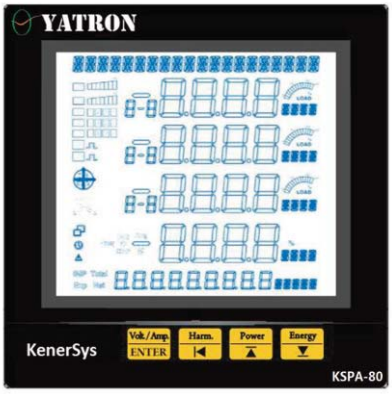
Installation



電壓最大過載能力:	2 倍額定 連續；2500V, 1 秒
電流最大過載能力:	2 倍額定 連續；20 倍額定 1 秒
輸入消耗功率:	電壓：< 0.2VA；電流：< 0.1VA
電力品質	
總諧波失真率(THD):	各相與平均的電壓及電流的 波形畸變之百分比值
分次諧波含量:	可切換顯示電壓/電流 2nd~63 th 的諧波含量
繼電器功能(RO)	
繼電器輸出接點:	4 組 FORM-A；3A/250Vac；3A/30Vdc；共點模式
輸出動作模式:	Hi/Lo/Hi.hold/Lo.hold/do
設定動作點:	可對應為 30 種中的任何電量參數及需量參數。
類比輸出(AO)	(選購功能)
輸出組數:	選購：2 組
輸出信號:	電壓輸出: 0~5V / 0~10V 電流輸出: 0~20mA / 4~20mA / 0~10mA / 4~12~20 mA
輸出推動能力:	電壓輸出: ≥1000Ω; 電流輸出: ≤530Ω
精確度:	≤± 0.1% of F.S.; 16 bits DA 轉換器
漣波率:	≤± 0.1% of F.S.
反應速度:	≤100 m-sec. (輸入的 10~90%)
隔離度:	耐壓交流 2500V 在輸出及輸入之間
外部控制輸入(ECI)	
輸入模式:	4 組外部控制點；接點或開極集輸入；電位觸發
功能:	可設定為 清除瓦(乏)時累積量/ 復歸最大(小)值保持 / 復歸繼電器動作保持/ DI(接點狀態輸入)
輸入確認時間:	可設定 5 ~255 x (8ms.)
脈衝輸出(DO)	
輸出電氣規格:	2 組開集極(O.C.)輸出:5~30Vdc, 30mA(max)
最大輸出頻率:	125Hz,duty cycle 50%
脈衝波除頻功能:	1~6000(x0.1)kwH / Pulse
脈衝波寬度:	1~250(x4ms)
反應時間:	≤ 300ms
隔離:	2500Vac
分時計費功能 (TOU)	**(CPM-83 才有此功能)**

四個時區	每年最多可設定 1~4 時區，可指定是否啟用該時區 起始時間~終止時間:XX 月 XX 日 XX 時 XX 分 XX 秒
八個時段	每個時區可設定 1~8 時段，可指定是否啟用該時段
使用環境	
工作溫度:	0~60 ˚C / 顯示器(Display) 0~50 ˚C
工作溼度(%RH):	5~95 %RH, 無結露
溫度係數:	≤50 PPM/˚C
儲存溫度:	-10~70 ˚C
保護等級:	前面蓋: IEC 529 (IP50)；殼體: IP20
工作電源	
工作電源:	ADH:AC 85~264V / DC 100~300V;ADL:DC/AC 20~56V
功率消耗:	AC:≤ 15VA @ 230V / DC:≤ 5W
參數資料儲存:	By EEPROM
機械結構	
外觀尺寸:	96mm(寬) x 96mm(高) x 83mm(深)
開孔尺寸:	90mm(寬) x 90mm(高)
外殼材質:	黑色 ABS (添加阻燃)
安裝方式:	盤面安裝
電氣特性及規範	
介電強度:	AC 2KV, 50/60Hz, 1 min.；輸入/輸出/電源/外殼 之間
突波測試:	4KV, 1.2 x 50 µsec. Common mode & differential mode
絕緣電阻:	≥100M ohm, DC 500V
隔離:	輸入/輸出/電源 之間
EMC:	EN 61326:2003
Safety(LVD):	EN 61010-1:2001
接線端子:	螺絲端子, Plastic NYLON 66 (UL 94V-0) 電壓輸入端子(P1~#12): 0.2~2.5mm2(AWG28~12) 電流輸入端子(P13~P18): 0.5~2.5mm2(AWG22~12) 訊號輸入端子(P19~P46): 0.5~1.3mm2(AWG22~16)
重量:	小於 600g

■ 面板說明



顯示視窗: 3.5" TFT LCD
即使在陽光直接照射下依然清晰可見,螢幕保護功能:
背光時間可設定 1~15 分鐘 (0 分鐘代表永遠亮)

量測值顯示: 上排 20 碼 畫面信息顯示

即時顯示值 :4 位數 x 4 行,顯示 V, A, Power, Hz, PF, THD,..

累積顯示值 :9 位數 x 1 行,顯示電能參數(kWh 、kVarh)

:RS485 通訊狀態顯示；通訊狀態由二個方形
來顯示 Master 與 Slave 通訊狀態；若二個方形都
被點亮，表示通訊正常

負載狀態顯示:

IND :負載為電感性負載時點亮
CAP :負載為電容性負載時點亮
:顯示負載百分比
:負載的象限顯示

量測值附加符號:

1-2、 2-3、3-1 :點亮時，表示量測視窗顯示值為 線-線(Line-Line)
1、 2、3 :點亮時，表示量測視窗顯示值為 相(Phase)
N :點亮時，表示量測視窗顯示值為 中性線
∑ :點亮時，表示量測視窗顯示值為 加總值
AVG :點亮時，表示量測視窗顯示值為 平均值

Max :點亮時，表示量測視窗顯示值為 最大(小)值
THD :點亮時，表示量測視窗顯示值為 總諧波失真率
HARM :點亮時，視窗可顯示各分次諧波含量
V、A、KW、HZ、... 顯示量測視窗顯示值的單位

輸出值符號

AO: 1 2 點亮時，表示為類比訊號輸出
ECI: 1 2 3 4 1~4 點亮時，表示為 ECI 訊號輸入
RO: 1 2 3 4 1~4 點亮時，表示為繼電器輸出
DO: 1 2 點亮時，表示為脈衝訊號(PO)輸出

顯示更新時間: 0.5 秒

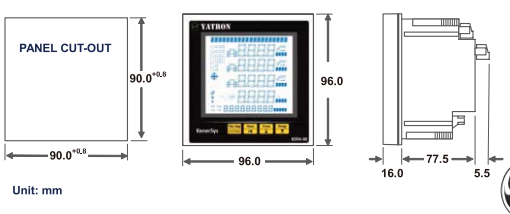
操作按鍵: 4 個按鍵操作
Enter Key / 電壓/電流 快速翻頁鍵
Shift Key / 綜合電力參數 快速翻頁鍵
Up Key / 電力參數 快速翻頁鍵
Down Key / 電能參數 快速翻頁鍵

安全密碼: 4 位數密碼；設定範圍：0000~9999

事件報警: 多功能電力分析表提供日期和時間戳記記的事件日誌。報警事件和事件日誌的類型使用者自訂。以下事件類可作為報警事件：

- 過 / 欠電壓
- 過 / 欠電流
- 電壓或電流不平衡
- 缺相
- 低 / 超頻率
- 超負荷
- 功率因數低,
- 諧波含量超標
- 電流或電壓超過設定值
- 相序逆轉
- 電流或電壓驟變

■ 外觀尺寸及盤面開孔



KSTH 2 WIRE TEMP. Transmitter WITH SENSOR

FEATURE

- Accuracy: RTD: 0.5%, T/C: 0.75%
- Wide selection of input
- Low output ripple
- High stability & low cost

SPECIFICATION

2 - WIRE TEMP. TRANSMITTER

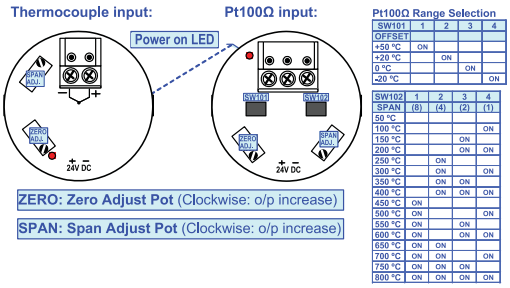
Input Range	Input Impedance	Output Range	Load Resistance
Type K, 0 ~ 1200°C	≥ 1M ohm	4 ~ 20 mA	≤ (Vs-12) / 20mA (ohm)
Type J, 0 ~ 1000°C	≥ 1M ohm		
Type E, 0 ~ 800°C	≥ 1M ohm		
Type T, -50 ~ 400°C	≥ 1M ohm		
Pt100Ω, -100 ~ 800°C	≥ 10M ohm		

Accuracy:	RTD (Pt100): ±0.15% of FSO T/C (K, J, E, T): ±0.3% of FSO
Response time:	≤ 300 msec.
Span adjustment:	≤ 10% of FSO
Zero adjustment:	≤ 5% of FSO
Output ripple:	≤ 0.3% of FSO
Power Supply:	DC 16 ~ 36V
Open circuit protection:	Upscale ≥ 22mA
Operating temperature:	0~60°C
Operating relative humidity:	20~95 %RH
Temperature coefficient:	≤ 100 PPM/°C
Cold junction compensation:	25±10°C, error ≤ 0.5°C
Storage temperature:	-10~70°C
Weight:	50g

Mechanical

Material:	Tube, Connection: St. Steel 316 Head: Aluminum case
Tube diameter:	3.2, 4.8, 6.4, 8.0, 9.0, 12.75 mm
Connection:	1/4", 3/8", 1/2" NPT or PT male Sliding connection or Flange available
Thermo-Well:	1/4", 3/8", 1/2" NPT or PT male Flange available

ADJUSTMENT

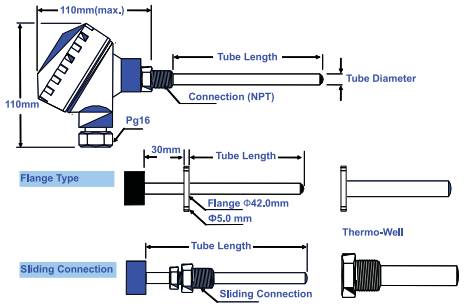


Pt100Ω Range Selection

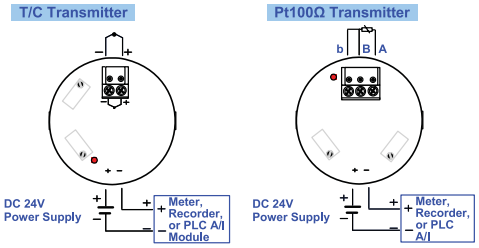
SW101	1	2	3	4
OFFSET				
+50 °C	ON			
+20 °C		ON		
0 °C			ON	
-20 °C				ON

SW102 SPAN	1 (8)	2 (4)	3 (2)	4 (1)
50 °C				
100 °C				ON
150 °C			ON	
200 °C			ON	ON
250 °C		ON		
300 °C		ON		ON
350 °C		ON	ON	
400 °C		ON	ON	ON
450 °C	ON			
500 °C	ON			ON
550 °C	ON		ON	
600 °C	ON		ON	ON
650 °C	ON	ON		
700 °C	ON	ON		ON
750 °C	ON	ON	ON	
800 °C	ON	ON	ON	ON

DIMENSIONS



CONNECTION DIAGRAM



ORDER INFORMATION

KSTH — Input Type — Input Range — Tube Length — Tube Diameter — Connection — Thermo-Well

RTD P	THERMOCOUPLE K	J	E	T	CODE	TEMPERATURE RANGE
●				●	A	-50 ~+100°C
●					B	-10 ~+40°C
●	●	●	●	●	C	0 ~ 50°C
●	●	●	●	●	D	0 ~ 100°C
●	●	●	●	●	E	0 ~ 200°C
●	●	●	●	●	F	0 ~ 400°C
●	●	●	●		G	0 ~ 500°C
●	●	●	●		H	0 ~ 600°C
●	●	●	●		I	0 ~ 800°C
	●	●			J	0 ~ 1000°C
	●				K	0 ~ 1200°C
					O	Specify

CODE	LENGTH
03	30 mm
04	40 mm
05	50 mm
06	60 mm
08	80 mm
10	100 mm
12	120 mm
15	150 mm
20	200 mm
25	250 mm
30	300 mm
40	400 mm
O	Specify

CODE	DIAMETER
3	3.2 mm
4	4.8 mm
6	6.4 mm
8	8.0 mm
9	9.0 mm
C	12.75
O	Specify

CODE	CONNECTION
N2	1/4" NPT
N3	3/8" NPT
N4	1/2" NPT
P2	1/4" PT
P3	3/8" PT
P4	1/2" PT
G2	1/4" PF
G3	3/8" PF
G4	1/2" PF
S2	1/4" NPT
S3	3/8" NPT
S4	1/2" NPT
F4	Ø42mm Flange
N	None
O	Specify

CODE	THERMO-WELL
N2	1/4" NPT
N3	3/8" NPT
N4	1/2" NPT
P2	1/4" PT
P3	3/8" PT
P4	1/2" PT
G2	1/4" PF
G3	3/8" PF
G4	1/2" PF
F4	Ø42mm Flange
N	None
O	Specify

KenerSys

KSTH 2 線式溫度傳送器 (含感測元件)

■特點

- 精度: RTD: 0.5%, T/C: 0.75%
- 輸入選擇廣泛。
- 低漣波輸出。
- 高穩定性與低成本。

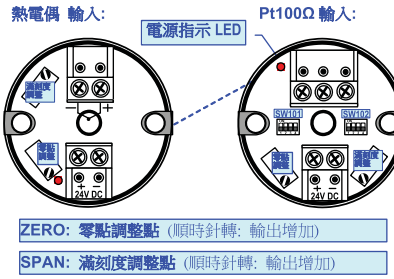
■技術規格

2線式溫度傳送器

輸入範圍	輸入阻抗	輸出範圍	負載阻抗
Type K, 0 ~ 1200°C	≥ 1M ohm	4 ~ 20 mA	≤ (Vs-12) / 20mA (ohm)
Type J, 0 ~ 1000°C	≥ 1M ohm		
Type E, 0 ~ 800°C	≥ 1M ohm		
Type T, -50 ~ 400°C	≥ 1M ohm		
Pt100Ω, -100 ~ 800°C	≥ 10M ohm		

精度:	RTD (Pt100): ±0.15% of FSO T/C (K, J, E, T): ±0.3% of FSO
反應時間:	≤ 300 msec.
滿刻度調整:	≤ 10% of FSO
零點調整:	≤ 5% of FSO
輸出漣波:	≤ 0.3% of FSO
工作電源:	DC 16 ~ 36V
開路保護:	輸出最大值 ≥ 22mA
工作溫度:	0~60°C
工作相對濕度:	20~95 %RH
溫度係數:	≤ 100 PPM/°C
冷接點補償:	25±10°C, 誤差≤ 0.5°C
儲存溫度:	-10~70°C
重量:	50 克(不含感測器重量)
機械結構	
材質:	連接管:不鏽鋼 316 頭部:鋁殼
管徑:	3.2, 4.8, 6.4, 8.0, 9.0, 12.75 mm
連接:	1/4", 3/8", 1/2" NPT 或 PT 公螺牙 可用滑動螺牙或法蘭連接
保護套管螺牙型式:	1/4", 3/8", 1/2" NPT 或 PT 公螺牙 可法蘭連接

■校正調整

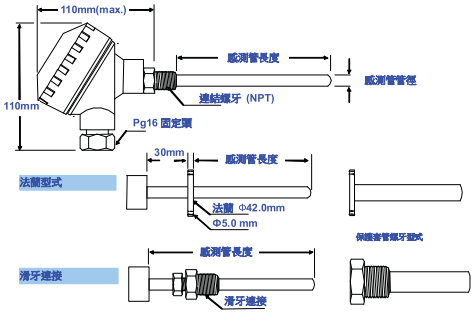


Pt100Ω 範圍選擇

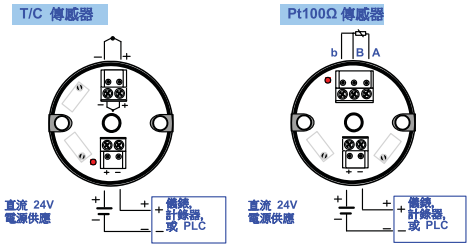
SW101	1	2	3	4
無補償				
+50 °C	ON			
+20 °C		ON		
0 °C			ON	
-20 °C				ON

SW102	1	2	3	4
滿刻度	(8)	(4)	(2)	(1)
50 °C				
100 °C				ON
150 °C			ON	
200 °C			ON	ON
250 °C		ON		
300 °C		ON		ON
350 °C		ON	ON	
400 °C		ON	ON	ON
450 °C	ON			
500 °C	ON			ON
550 °C	ON		ON	
600 °C	ON		ON	ON
650 °C	ON	ON		
700 °C	ON	ON		ON
750 °C	ON	ON	ON	

■尺寸外觀



■接線圖



■規格選擇表

KSTH — 輸入型式 — 溫度範圍 — 感測器管長 — 感測器管徑 — 固定螺牙型式 — 保護套管螺牙型式

RTD	熱電偶				CODE	溫度範圍
P	K	J	E	T		
●				●	A	-50 ~+100°C
●					B	-10 ~+40°C
●	●	●	●	●	C	0 ~ 50°C
●	●	●	●	●	D	0 ~ 100°C
●	●	●	●	●	E	0 ~ 200°C
●	●	●	●	●	F	0 ~ 400°C
●	●	●	●		G	0 ~ 500°C
●	●	●	●		H	0 ~ 600°C
●	●	●	●		I	0 ~ 800°C
	●	●			J	0 ~ 1000°C
	●				K	0 ~ 1200°C
					O	指定溫度範圍

CODE	管長
03	30 mm
04	40 mm
05	50 mm
06	60 mm
08	80 mm
10	100 mm
12	120 mm
15	150 mm
20	200 mm
25	250 mm
30	300 mm
40	400 mm
O	指定

CODE	管徑
3	3.2 mm
4	4.8 mm
6	6.4 mm
8	8.0 mm
9	9.0 mm
C	12.75
O	指定

CODE	固定螺牙型式
N2	1/4" NPT
N3	3/8" NPT
N4	1/2" NPT
P2	1/4" PT
P3	3/8" PT
P4	1/2" PT
G2	1/4" PF
G3	3/8" PF
G4	1/2" PF
S2	1/4" NPT 移動
S3	3/8" NPT 移動
S4	1/2" NPT 移動
F4	Ø42mm 法蘭
N	無螺牙
O	指定

CODE	保護套管螺牙型式
N2	1/4" NPT
N3	3/8" NPT
N4	1/2" NPT
P2	1/4" PT
P3	3/8" PT
P4	1/2" PT
G2	1/4" PF
G3	3/8" PF
G4	1/2" PF
F4	Ø42mm 法蘭
N	無螺牙
O	指定

CO1 Carbon Monoxide CO Transmitter (Indoor use)

Features

Long life span, Electrochemistry sensing theory, low gas interference,
External sensor increase accuracy and CO acuity,
High Stability, linear output.

Applications

HVAC air-con system、Instrument equipment/Environment monitoring and system control, Car Park/Green house ,farm etc
(Product use only in environmental monitoring control)

Product code

CO1 — Install — Range — Output — Power — Option

CODE	Type
1	Wall
2	Duct

CODE	Measurment
1	0 ~ 100 PPM
3	0 ~ 300 PPM
5	0 ~ 500 PPM

CODE	Output
A	4 ~ 20 mA
V	0~10 V

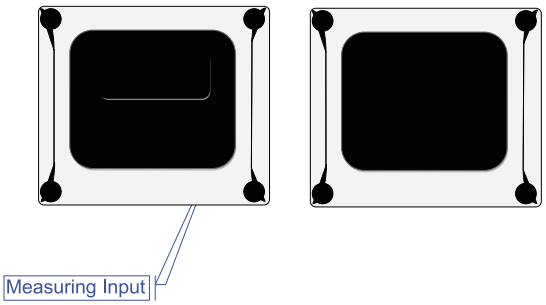
CODE	Aux Power
24	DC 24V

CODE	Option
N	Nile
D	LCD

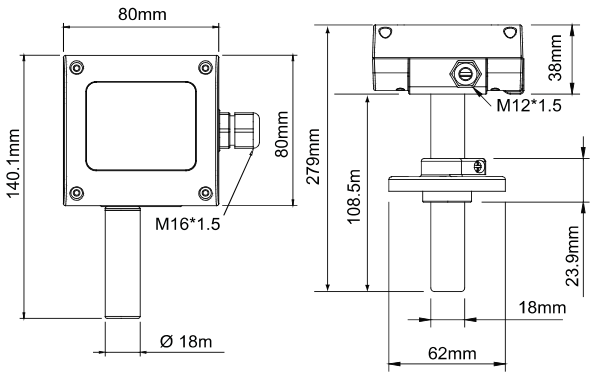
Specifications

Sensor：	Electrochemistry CO sensor
Input ：	Specify
Range：	0~500PPM
Output：	0~10V OR 4~20mA
Accuracy：	±3 % F.S
Acuity：	< ±10ppm
Load Resistance：	Output 4~20mA，≦500Ω； Output 0~10V ，≧10KΩ；
Response Time：	60 sec (Diffusion time)
Wiring：	3 Wire type
Measuring medium：	Non-invasive gas，In HVAC (Air-con、ventilation) systems.
Zero and span setting：	Adjustable range 10 %
Medium temperature range：	0~50°C
Zero Basis ：	< 10ppm
Temperature	
Working Temperature：	0 ~ 50°C
Humidity：	5 ~ 95 %RH,(Non-condensing)
Storage：	-10 ~ 60°C
Power	
Auxilary：	DC 24V±10%
Power Comsumption：	< 40mA ;Display < 80mA
Operating Current：	> 0.6A
Electric connection：	3P Terminal and M16 head fastener
Installation	
Type：	Wall Mount / Duct
Protection Class：	Body IP64 / Sensor:IP20
Electric Protection：	Over Voltage / Reverse wire
Hardware	
Dimension：	Body：80mm(W) x 80mm(L) x38mm(H
Case：	PC non-flammable
Weight：	Wall Mount165g / Duct:210g
Mounting：	Base screw mount
Display panel(LCD Type only)	
Display type:	LCD module and backlight
Display range:	According to specify range, single row digit
Digits Height:	5.56mm

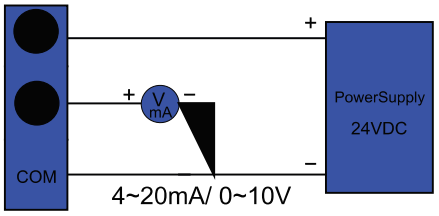
Front Panel



Dimension



Wiring diagram



CO1 一氧化碳傳送器(室內型)

■特點

使用壽命長、電化學感應原理、低氣體干擾性
外露式測棒, 增加 CO 感應靈敏度
穩定性高與輸出線性佳

■應用

HVAC 空調系統、儀器設備/環境控制與監控系統、停車場/溫室蔬果園(倉庫)...等

(本產品只適用於環境品質監控)

■規格選擇表

CO1 — 安裝方式 — 量測範圍 — 輸出信號 — 工作電源 — 附加功能

CODE	安裝方式
1	壁掛式
2	風管式

CODE	量測範圍
1	0 ~ 100 PPM
3	0 ~ 300 PPM
5	0 ~ 500 PPM

CODE	輸出信號
A	4 ~ 20 mA
V	0~10 V

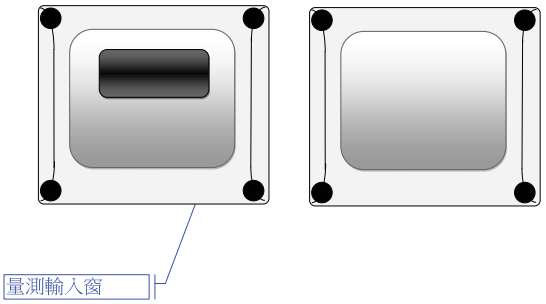
CODE	工作電源
24	DC 24V

CODE	附加功能
N	無
D	LCD 顯示

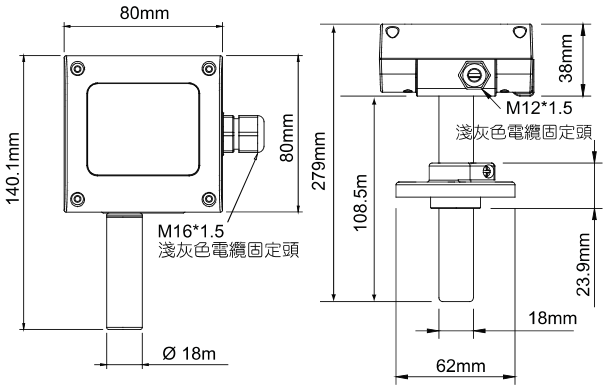
■技術規格

感測訊號種類：	電化學 CO 感應器
量測範圍：	依規格選型
工作範圍：	0~500PPM
輸出訊號：	0~10V 或 4~20mA
精度：	±3 % F.S
靈敏度：	＜±10ppm
負載阻抗：	輸出為 4~20mA 時，≦500Ω； 輸出為 0~10V 時，≧10KΩ；
反應時間：	60 sec (擴散時間)
接線方式：	三線式
測量介質：	不具侵襲性氣體，在 HVAC (供暖、通風、空調)系統中。
歸零點與滿刻度調整範圍：	零點與滿刻度的 10 %
測量介質溫度：	0~50°C
基準零點：	＜10ppm
工作環境	
工作溫度：	0 ~ 50°C
工作相對濕度：	5 ~ 95 %RH, 不結露
儲存溫度：	-10 ~ 60°C
電源	
工作電源：	DC 24V±10%
消耗電流：	＜40mA；有顯示＜80mA
啟動電流：	＞0.6A
電氣連接：	3P 端子台與 M16 電纜固定頭
安裝方式	
產品安裝：	壁掛式 / 風管式
保護等級：	本體 IP64 / Sensor:IP20
電氣保護：	過電壓 / 逆向保護
機械結構	
外觀尺寸：	本體：80mm(寬) x 80mm(長) x38mm(高)
外殼：	PC 防火材質
重量：	壁掛式:約 165 克 / 風管式:約 210 克
固定方式：	底座螺絲固定
面版顯示(有 LCD 顯示)	
顯示器種類:	LCD 模組與背光
顯示範圍:	依選擇的量測範圍做顯示，單排顯示
顯示字高:	5.56mm

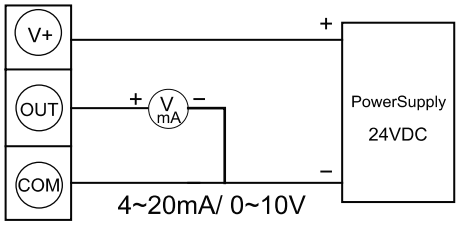
■面板



■尺寸外觀



■接線圖



CO2 CO_2 Concentration Transmitter

FEATURES

The CO_2 - carbon dioxide level is recently regarded as an important parameter that substantially determines the quality of the interior climate. With the CO_2 Concentration Transmitter, people can optimize the ventilation for creation of a healthy interior climate, and agriculturist can make the plants grow faster and healthier

APPLICATION

- ●Building HVAC management ●climate technology
- ●Schools, universities ●weather stations
- ●Environmental Control and Monitoring System
- ●meeting rooms, hospitals, cinemas, theatres
- ●parking lot/ greenhouse/ warehouse

ORDERING INFORMATION

CO2 — Installation — Range — Output — AUX. POWER — Option

CODE	Installatio
W	Indoor
H	Duct

CODE	Range
2	0 ~ 2000
5	0 ~ 5000
A	0 ~ 10000 PPM

CODE	Output
I	4 ~ 20 mA
V	0~10 V

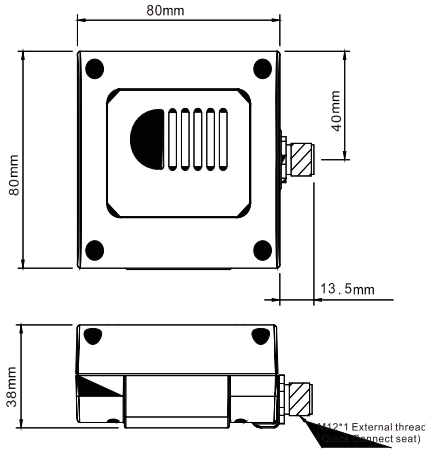
CODE	AUX. POWER
24	DC 24V

CODE				
N5	1	80.17	4	252.62
	2	137.32	With plastic catheter: 1M x2 article	
	3	197.47		

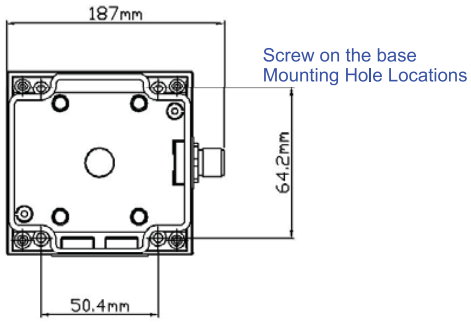
TECHNICAL SPECIFICATION

Sensing signal:	NDIR infrared non-distributed sensor
Measurement range:	2000 / 5000 / 10000 PPM
Operating range:	2000 / 5000 / 10000 PPM
Output signal:	0~10V or 4~20mA
Accuracy:	±30ppm±3 %
Sensitivity:	±20ppm±1 %
Load impedance:	Output:4~20mA，≦500Ω； Output:0~10V ，≧10KΩ；
Reaction time:	Wall Mount：20 sec Diffusion time Duct Type：@ 2 m/s wind speed， < 15 min。
Measuring medium:	Non-eroding gas in HVAC systems.
Zero and span adjustment:	Zero & Span 10 %
Medium temperature:	0~50°C
Wiring:	Three-wire
Zero point error:	±30ppm/10K
Range of measurement error:	±30ppm/10K
Working environment	
Operating Temperature:	0 ~ 50°C
Relative humidity:	0 ~ 95 %RH, Non-condensing
Storage Temperature:	-30 ~ 70°C
Power supply	
Power Supply:	DC 24V±10%
Power consumption:	< 70mA
Start-up current:	> 0.6A
Electrical connection:	M12 Quick Connect seat
Mounting	Wall-mounted / Duct type
Hosing classification:	Wall-mounted type:IP54 / Duct type:IP64
Electrical protection:	Over voltage/Reverse power protection
Mechanical	
Dimensions:	Main：80mm(W) x 80mm(H) x38mm(D)
Housing material:	Flame retardant ABS
Probe material:	Flame retardant ABS
Weight:	Wall-mounted：140g
Fixed:	Wall -mounted: screw on 風管型：法蘭基座固定
選購配件	風壓套管組，N51~N54 可選

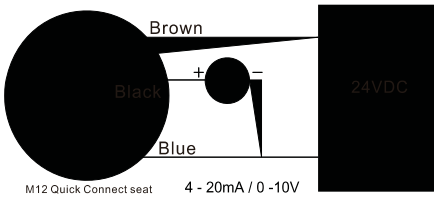
FRONT PANEL



DIMENSIONS



CONNECTION DIAGRAM



KenerSys

CO2 二氧化碳傳送器(室內型/風管型)

■特點

量測室內空氣中的 CO2 二氧化碳濃度。
當室內的二氧化碳濃度太高，會使人疲累，可透過通風調節系統來控制室內、室外空氣，讓 CO2 控制在最合適的環境；農業應用提供植物的 CO2 讓植物生長快速建康。

■應用

- ●HVAC 空調系統、儀器設備
- ●學校、大學
- ●環境控制與監控系統
- ●会议室/医院/电影院/剧院
- ●停车场/溫室蔬果園/仓库...等
- ●气候技术
- ●氣象站

■規格選擇表

CO2 — 安裝型式 — 量測範圍 — 輸出信號 — 工作電源 — 附加功能

CODE	安裝型式
W	室內型
H	風管型

CODE	量測範圍
2	0 ~ 2000
5	0 ~ 5000
A	0 ~ 10000 PPM

CODE	輸出信號
I	4 ~ 20 mA
V	0~10 V

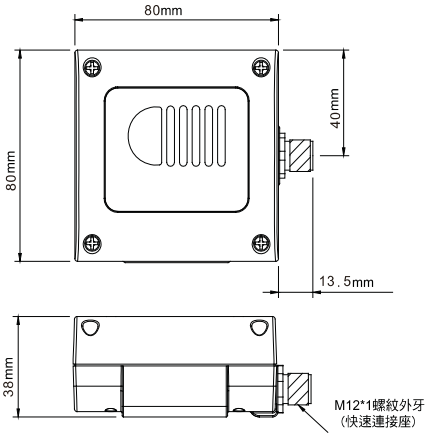
C	工作電源
2	DC 24V

CODE	風壓管套組 (探測管長單位:mm)		
N5	1 80.17	4 252.62	
	2 137.32	搭配塑膠導管:1M x2 條	
	3 197.47		

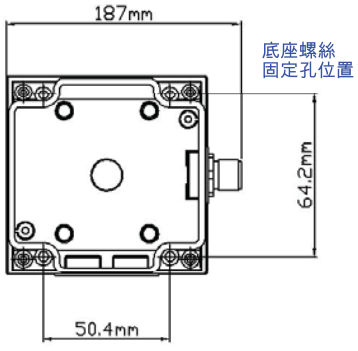
■技術規格

偵測訊號種類：	NDIR 紅外線非分散式感應器
量測範圍：	2000 / 5000 / 10000 PPM
工作範圍：	2000 / 5000 / 10000 PPM
輸出訊號：	0~10V 或 4~20mA
精度：	±30ppm±3 %
靈敏度：	±20ppm±1 %
負載阻抗：	輸出為 4~20mA 時，≦500Ω；
	輸出為 0~10V 時，≧10KΩ；
反應時間：	壁掛型：20 sec 擴散時間
	風管型：在 2 m/s 風速下，< 15 min。
測量介質：	不具腐蝕性氣體，在 HVAC (供暖、通風、空調)系統中。
輸出調整範圍：	零點與滿刻度的±10 %
測量介質溫度：	0~50℃
接線方式：	三線式
零點誤差：	±30ppm/10K
量測範圍誤差：	±30ppm/10K
工作環境	
工作溫度：	0 ~ 50℃
工作相對濕度：	0 ~ 95 %RH, 不結露
儲存溫度：	-30 ~ 70℃
電源	
工作電源：	DC 24V±10%
消耗電流：	< 70mA
啟動電流：	> 0.6A
電氣連接：	M12 快速連接座
安裝方式	壁掛型 / 風管型
保護等級：	室內型:IP54 / 風管型:IP64
電氣保護：	過電壓 / 逆向保護
機械結構	
外觀尺寸：	本體：80mm(寬) x 80mm(長) x38mm(高)
外殼材質：	ABS 阻燃材質
探棒材質：	ABS 阻燃材質
重量：	壁掛型：140 克
固定方式：	壁掛型：底座螺絲
	風管型：法蘭基座固定
選購配件	風壓套管組，N51~N54 可選

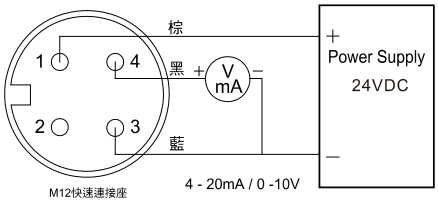
■尺寸外觀



■開孔尺寸



■接線圖



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WORLDWIDE PARTNER

WavePro LT Busway

GE imagination at work

Product Overview

With the booming of the U.S. automobile industry in the last century, the world's earliest busway products born in the 1940s, which is the first generation of busway products developed by General Electric Company - steel housing LVD busway.

In 1989, GE developed an innovative new product - Spectra Series Busway, which became a milestone in busway history and the creator of a new industry standard. It was the first time aluminum housing and epoxy insulating material had been used in busway design.

GE low voltage busway have complete product lines, including power busway, lighting busway etc. GE busway system complies with UL, NEMA and IEC standards.

All four global R&D centers co-operate in global technolgy and process for the busway system development to maintain a leading position in industry.

Spectra Series™

GE Spectra Series™ is a high performance, sandwich type busway product line featuring GE's unique Blue Coat epoxy insulation which provides the industries longest insulation life of more than 50 years. GE Spectra Series™ uses a lightweight Aluminum housing that is optimized for effective heat dissipation. New Joint Guard Protection System dynamically indicates proper joint tension through color for easy installation and maintenance. The product is leading in US and South-east Asia market.

- Spectra Series Busway Manufacturing center in Selmer, USA

WavePro LT busway

The WavePro LT busway launched by GE considering the specific characteristic of Asia-Pacific market. Using the latest design, it has superior performance. Rated working voltage up to 415V, rated insulation voltage up to 690V, and rated working current 100-5000A.

With low magnetic material housing, WavePro LT busway system can effectively reduce the eddy current hysteresis loss. The conductors, made from high conductivity copper or aluminum, will deliver a superior performance. It is particularly suitable for applications of high-rise commercial buildings, industrial plants and acts as an important part of the high-performance power distribution system:

WavePro LT busway system provides 100% or 200% neutral busbar, which can meet with the requirements of power system with high level of harmonic.

The all-aluminum housing of WavePro LT busway provides perfect ground path. WavePro LT busway system has a variety of protection class such as IP40 the IP42, IP54 and IP65. Users can choose according to installation environment. Busway of different protection class can be freely combined.

IEC

KEMA KEUR

- GE China Technology Center

WavePro LT Busway

WavePro LT Busway Introduction

Reference standards

Complies with:	Certificates
IEC 60439-1	KEMA KEUR
IEC 60439-2	CCC
GB 7251.1	
GB 7251.2	

Production facility

WavePro LT busway factory has the first class equipment capacity and industry-leading CNC machining equipment such as bronze welding robots, automated assembly lines, GEMA automatic powder coating system, busbar profiles CNC machining centers made in Germany. Advanced technology delivers short lead times.

- Strictly enforced and adopted the management system certifications such as ISO9001, ISO 14001 and OHSAS 18001

- Welding robot, to ensure stable and reliable welding quality

- Circular sawing machines made in Germany ensure the flat faying surface of the busbar. Advanced cutting and plating process brings the smoothness of conductor section

- Busbar profiles CNC machining centers made in Germany

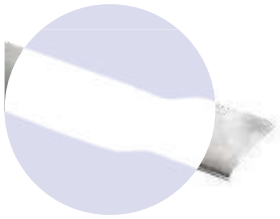
Features of WavePro LT Busway

Light-weight aluminum alloy housing

- The housing is robust and reliable. The corrosion resistant, has been tested to withstand 1000 hours salt spray test
- The all-aluminum housing provides 50% capacity of ground path
- With low magnetic material housing, WavePro LT busway system can effectively reduce the eddy current hysteresis loss

Optimized structure design

- With the most concise structure design, WavePro LT busway has cut the unnecessary weight and improved reliability
- Compact "sandwich" design in whole length, which provides good heat dissipation performance without temperature bottleneck



Advanced conductor processing technology

- Advanced cutting and plating process brings the smoothness of conductor section, Overall plating of the conductor, including cross section, delivers a more comprehensive protection.

Reliable insulation

- The busbar is wholly wrapped with polyester film, which meets the requirements of RoHS and UL94
- Every busway length and fitting must pass the 3750Vac "hi-pot" test before leave the factory

Ease of installation

- WavePro LT busway offers removable joint, which is easy for installation and maintenance
- Large sized Belleville washers ensure even pressure on Contact area
- ±4mm per joint adjustable clearance allows for the expansion and contraction of busbar
- Unique temperature indicator can remind maintenance in case of system fault

Double-headed torque limiting joint bolt

- No special torque wrench is required. Only a 16mm wrench is used to fasten the fixed captive torque bolt. When the red indication disc falls off that indicates joint is properly tightened
- The bolt is reusable after the top head is broken off by using a standard torque wrench on the second bolt head
- The standard torque is 66 ± 5N·m

Safety Feature of the Bus Plug

- The rotary handle of plug on the top has clear ON/OFF indication
- The key lock mechanism is set for protecting the plug from maloperation and any unauthorized access
- Outlet covers prevent unintentional contact of the busbar
- Bus Plugs are automatically grounded on installation. Polarized engagement of the plug to the busway provides the installer with positive plug/phase alignment
- Bus plugs with rotary handle are provided with internal interlocking mechanisms to prevent their doors from being opened whilst energized, ensuring operational safety

GE Breakers

GE Record Plus™ circuit breakers are provided as standard offering for bus plug. Record Plus™ breakers have unique current limiting devices and integrated protection devices known as trip unit. They meet the needs of protection and isolation for low-voltage distribution lines.

IP Rating

A variety of shell protection classes meet different application environment requirements. For different application environments, WavePro LT busway provides many different options: IP40, IP42, IP54 and IP65.

Electrical Data

WavePro LT busway's aluminum housing provide an extremely low impedance ground path with small resistance (reduced watt losses) for both copper and aluminum systems.

Internal ground with 50% capacity is also available for customers with special requirements.

Grounding resistance of WavePro LT busway system (temperature=20℃)

DC resistance copper bar (Internal 50% ground bus)

No.	Rated current (A)	Resistance ($10^{-6}\Omega$/m)
1	250	207.9
2	400	207.9
3	630	179.1
4	800	141.1
5	1000	94.2
6	1250	81.0
7	1600	64.2
8	2000	50.0
9	2500	37.6
10	3150	28.9
11	3800	24.8
12	4000	23.3
13	4500	18.8
14	5000	17.4

table.10-1

DC resistance aluminum bar (Internal 50% ground bus)

No.	Rated current (A)	Resistance ($10^{-6}\Omega$/m)
1	100	342.7
2	160	342.7
3	200	342.7
4	250	342.7
5	400	259.8
6	500	210.7
7	630	178.1
8	800	138.0
9	1000	119.4
10	1250	95.2
11	1350	86.1
12	1600	73.4
13	2000	63.3
14	2500	50.4
15	3150	35.0
16	3800	28.6
17	4000	25.2

table.10-2

Ambient Temperature's influence on application

Within the ambient temperature of 35℃, WavePro LT busway system can continuously operate at rated current.

If the busway needs to be continuously operated at higher ambient temperature, it should be derated.

The busway current-carrying capacity = rated current x de-rating factor. (Asshown in below given tables)

Ambient temperature (℃)	Factor
35	1.00
40	0.95
45	0.90
50	0.85
55	0.80
60	0.74
65	0.67

table.10-3

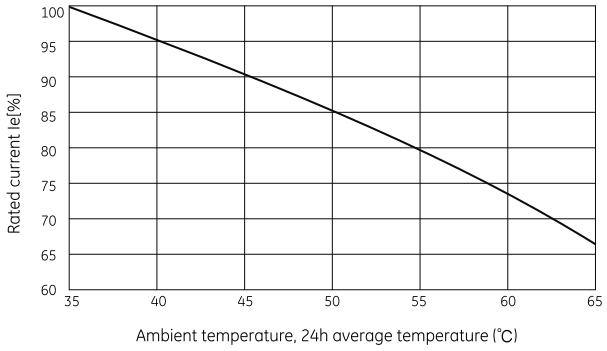


table.10-4

Resistance, reactance, impedance and voltage drop

WavePro LT busway has low voltage-drop values. Minimum reactance (X) is due to very close bar spacings (sandwiched construction) and a non-magnetic housing. Values shown are identical for plug-in and feeder.

Copper

Rated current	Rated short-time tolerant current (Icw)	Rated peak tolerant current (Ipk)	20℃	Full load/Steady-state (50Hz)							
			Resistance	Resistance	Reactance	Impedance	Voltage Drop-Concentrated Load① Line-to-Line (V/m) @ 100% Rated Load				
A	kA/s	kA	(10^{-6}Ω/m, Line-to-Neutral)				cosϕ=0.6	cosϕ=0.7	cosϕ=0.8	cosϕ=0.9	cosϕ=1.0
250	30	63	104.0	114.4	35.3	119.7	0.042	0.046	0.049	0.051	0.050
400	30	63	104.0	114.4	35.3	119.7	0.067	0.073	0.078	0.082	0.079
630	30	63	89.6	116.1	32.1	120.5	0.104	0.114	0.122	0.129	0.127
800	30	63	70.5	92.8	27.4	96.8	0.108	0.117	0.126	0.132	0.129
1000	50	105	47.1	56.1	20.7	59.8	0.087	0.093	0.099	0.103	0.097
1250	50	105	40.5	47.4	18.3	50.8	0.093	0.100	0.106	0.110	0.103
1600	50	105	32.1	41.4	15.7	44.3	0.104	0.111	0.118	0.122	0.115
2000	65	143	25.0	28.0	12.5	30.6	0.093	0.099	0.104	0.106	0.097
2500	80	176	18.8	23.9	10.7	26.2	0.099	0.105	0.111	0.113	0.103
3150	100	220	14.4	18.1	9.5	20.5	0.101	0.106	0.110	0.112	0.099
3800	100	220	12.4	15.7	6.5	17.0	0.096	0.103	0.109	0.112	0.104
4000	100	220	11.7	15.0	6.3	16.3	0.097	0.104	0.110	0.113	0.104
4500	100	220	9.4	11.5	5.4	12.7	0.088	0.093	0.097	0.099	0.090
5000	100	220	8.7	10.9	5.0	11.9	0.091	0.097	0.101	0.104	0.094

table.11-1

Aluminium

Rated current	Rated short-time tolerant current (Icw)	Rated peak tolerant current (Ipk)	20℃	Full load/Steady-state (50Hz)							
			Resistance	Resistance	Reactance	Impedance	Voltage Drop-Concentrated Load① Line-to-Line (V/m) @ 100% Rated Load				
A	kA/s	kA	(10^{-6}Ω/m, Line-to-Neutral)				cosϕ=0.6	cosϕ=0.7	cosϕ=0.8	cosϕ=0.9	cosϕ=1.0
100	10	17	171.3	187.9	35.3	191.2	0.024	0.027	0.030	0.032	0.033
160	10	17	171.3	187.9	35.3	191.2	0.039	0.043	0.048	0.051	0.052
200	10	17	171.3	187.9	35.3	191.2	0.049	0.054	0.059	0.064	0.065
250	10	17	171.3	187.9	35.3	191.2	0.061	0.068	0.074	0.080	0.081
400	30	63	129.9	148.7	29.5	151.6	0.078	0.087	0.095	0.102	0.103
500	30	63	105.3	128.3	25.6	130.8	0.084	0.093	0.102	0.110	0.111
630	30	63	89.0	108.8	22.8	111.1	0.091	0.101	0.110	0.118	0.119
800	30	63	69.0	84.0	19.1	86.2	0.091	0.100	0.109	0.116	0.116
1000	50	105	59.7	74.9	17.1	76.8	0.101	0.112	0.122	0.130	0.130
1250	50	105	47.6	60.3	14.5	62.0	0.103	0.114	0.123	0.131	0.130
1350	50	105	43.0	52.1	13.6	53.8	0.098	0.108	0.116	0.124	0.122
1600	50	105	36.7	44.7	12.1	46.3	0.101	0.110	0.119	0.126	0.124
2000	50	105	31.7	40.6	10.9	42.0	0.115	0.125	0.135	0.143	0.141
2500	50	105	25.2	30.8	9.1	32.1	0.111	0.121	0.130	0.137	0.133
3150	80	176	17.5	21.4	5.8	22.2	0.095	0.104	0.112	0.119	0.117
3800	80	176	14.3	17.5	5.0	18.2	0.096	0.104	0.112	0.118	0.115
4000	80	176	12.6	15.5	4.8	16.2	0.091	0.099	0.106	0.111	0.107

table.11-2

Note:

① Concentrated Load: Voltage Drop $= \sqrt{3}I(R\cos\varphi+X\sin\varphi)$

Distributed Load: Voltage Drop $= [\sqrt{3}I(R\cos\varphi+X\sin\varphi)]/2$

Physical Data

Straight lengths: Plug-in and feeder

Feeder busway has the minimum length of 400mm, and the maximum length of 3000mm. Other lengths can customize as needed.
Plug-in busway has the minimum length of 1000mm, and the maximum length of 3000mm.
Plug-in busway has a flexible design with optional plug outlets on both sides. The minimum space between plugs is 600mm and up to 4 plug outlets may be fixed on each side of the 3-meter standard length. The customer may reserve plug outlets for extension in the future when changes occurs in terms of the equipment load or busway run.

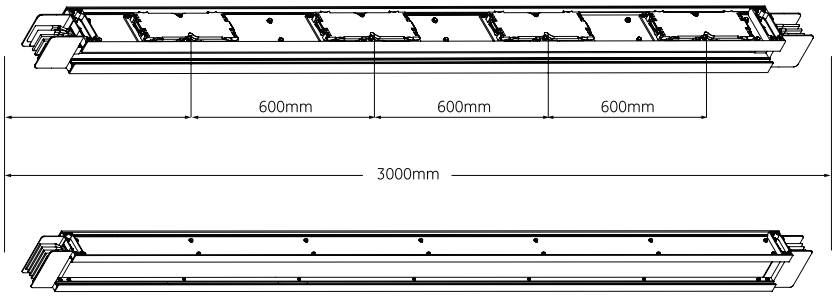


fig.12-1

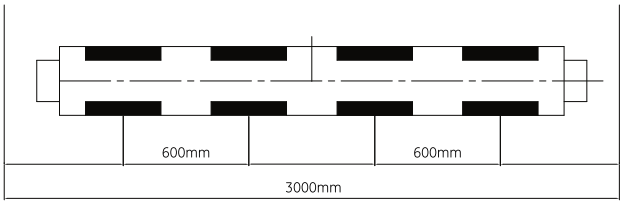


fig.12-2

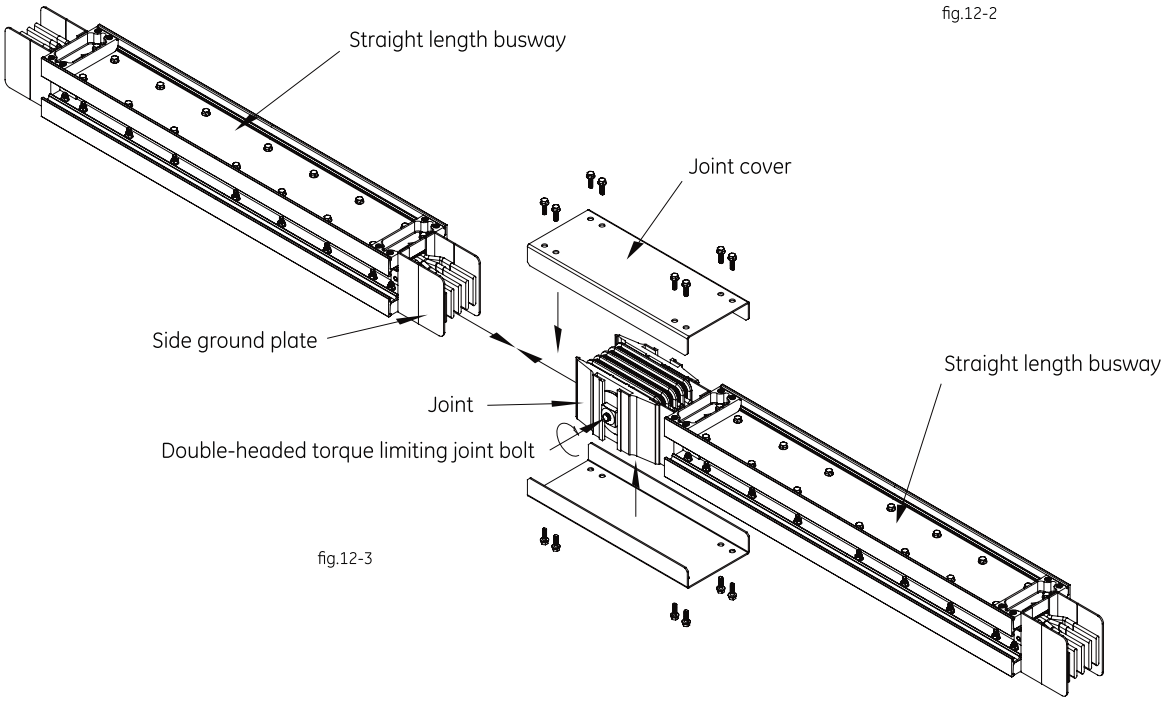


fig.12-3

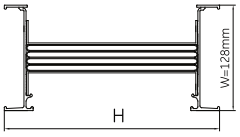


fig.13-1

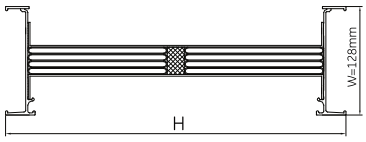


fig.13-2

Rated current (A)	Copper			Aluminum			fig.
	H (mm)	Approximate Weight (kg/m)		H (mm)	Approximate Weight (kg/m)		
		4 Wire	5 Wire		4 Wire	5 Wire	
250	89	13.4	14.4	89	8.8	9.2	13-1
400	89	13.4	14.4	99	9.9	10.3	
500	-	-	-	109	11	11.5	
630	94	14.8	15.9	119	12	12.7	
800	104	17.4	18.8	139	14.1	15	
1000	129	24.1	26.1	154	15.8	16.8	
1250	144	27.9	30.5	184	18.9	20.1	
1350	-	-	-	199	20.5	22	
1600	169	34.4	37.8	219	22.7	24.3	
2000	204	43.6	48.0	259	26.9	29	
2500	264	59.3	65.5	309	32.2	34.9	
3150	341	72.6	80.2	461	48	51.9	13-2
3800	391	85.7	94.8	551	57.9	62.8	
4000	411	91.0	100.6	591	62.3	67.6	
4500	501	114.6	126.9	-	-	-	
5000	541	125.1	138.6	-	-	-	

Note：The size and weight data for 100A-250A aluminum busway is the same.

table.13-1

Fittings

WavePro LT busway system has a complete family of fittings to meet virtually all layout requirements using the compact minimum sizes. Special turns such as flat angles greater than 90° and crosses are also available. Each piece of busway is labeled to maintain proper phasing. All housing width and depth dimensions are identical to straight lengths.

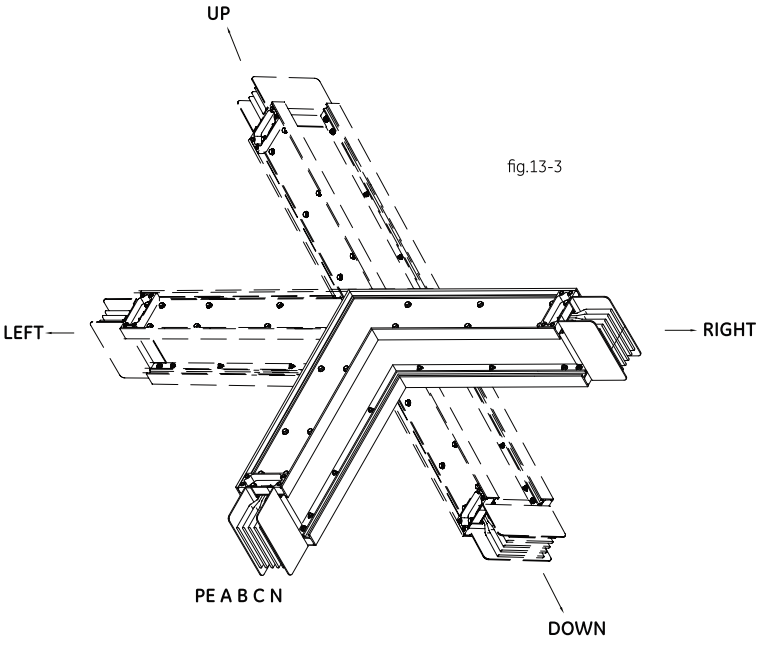


fig.13-3

Spectra Series™ Busway

imagination at work

Spectra Series™ Busway.
All the muscle without the weight.

GE engineers have broken the weight barrier with Spectra Series™ busway. Its computer-designed, all-aluminum housing is up to 50% lighter than comparable wire and conduit – and lighter than competitors' busway – while providing the current-carrying capacity (up to 5,000 amps) and short-circuit protection you've always counted on from GE busway.

Less weight means big labor savings.
Since Spectra Series busway is lighter than other busways, its easier to handle and hang. You save on labor and installation time (per NECA labor standards). This may lower your total installed cost by up to 75% versus wire and conduit.

Epoxy insulation protects your investment.
GE has applied more than three decades of experience with material coatings to bring advanced epoxy insulation technology to Spectra Series busway. Our special Class B 130°C Blue Coat™ epoxy insulation provides tougher, longer life (50 years expected) than mylar, PVC, and glass tape used by other manufacturers.

A load of extras.
Both plug-in and feeder configurations offer identical low voltage drop. In fact, it's one of the most efficient busway systems available.

Our exclusive adjustable joint connector allows quick ±1/2" busway length adjustment – right in the field.

This new level of flexibility makes it easy to cope with unexpected building variations during installation.

Spectra Series busway also includes our specially designed belleville spring washer that retains over 90% of its original contact pressure. So you get a more secure, reliable and virtually maintenance-free joint.

Our new busway can often be hung with a unique GE hanger that employs just a single drop rod. Plug-assist and plug-position locators make installation a snap (even on larger plugs). And 50% integral housing ground is standard. Internal ground is available for both aluminum and copper busway.

Plating options.
Copper busway: Tin plating is standard on all copper busway. Aluminum busway: Tin plating is standard for feeder lengths and silver plating is standard for plug-in lengths. A complete silver plating system is optional on both copper and aluminum busway.

Put the Busway Tool Kit to work for you!

GE's Busway Tool Kit is a collection of electronic tools that quickly and easily answers customers' questions, calculates costs savings for contractors, provides layout assistance to specifiers, and delivers value engineering to distributors.

Labor Calculator compares the labor costs of installing lighter GE busway versus Square D busway.

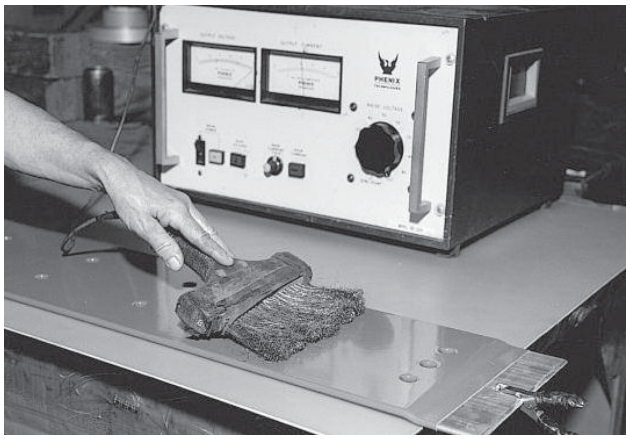
Cable Converter – calculates how busway costs to compare to pipe and wire.

Speculator answers busway-related electrical questions.

Autobus allows specifiers, electrical contractors and others to design and engineer busway in 3-D AutoCAD® format.

The Busway Toolkit is available on-line at www.geelectrical.com/elitenet or order the two-CD set (DEU-060) from GE.

State-of-the-Art Busway Systems

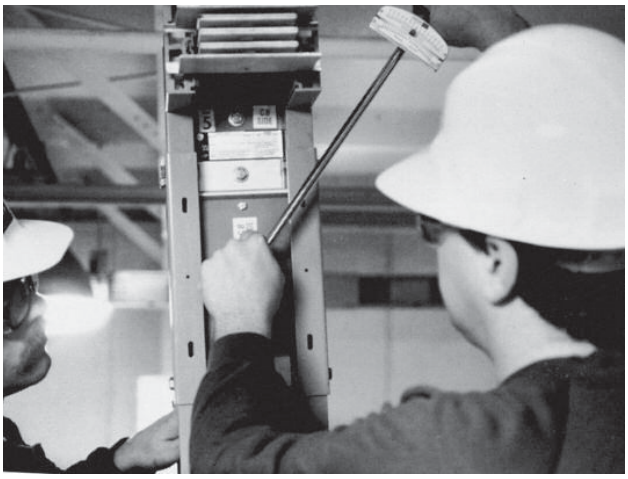


All Spectra Series™ bus bars are integrity-tested with 5000 Vac – for absolute performance confidence.

Automated process applies durable baked-enamel ANSI 61 finish (tough .09" thick aluminum 6061-T6 housings) – for consistent, repeatable quality and protection.

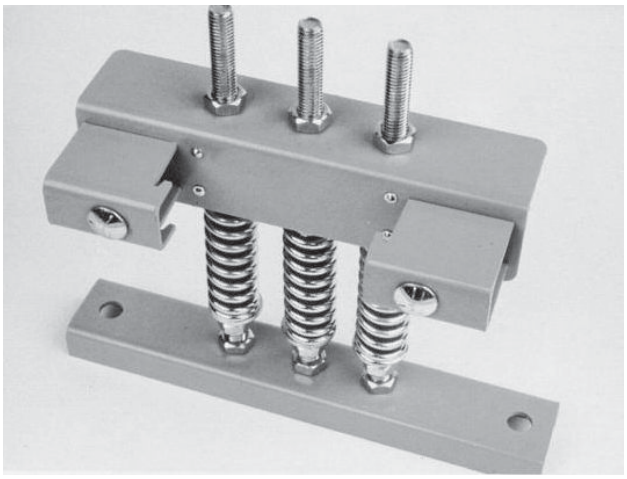
Our experts closely monitor production performance – to help protect your investment.

Easiest-to-Install Busway – Ever.



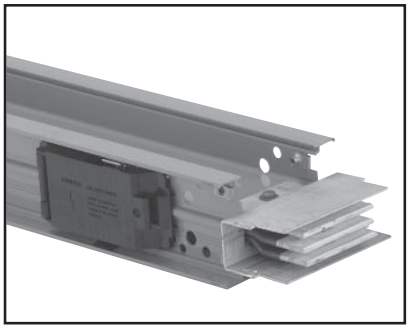
Spectra Series™ busway features an aluminum housing that cuts busway weight up to 50% – reducing installation costs. Single bolt joint with positive torque connection at 50 ft.-lbs. is standard. See the back cover for optional Joint Guard™ bolt.

Sections can be hung every 10 feet with just a single drop rod hanger standard up to 2000 amp aluminum or 1600 amp copper. Spectra bus is extremely light – enough to lighten ceiling loads up to 50%.



Easy-to-install, rugged vertical riser hanger supports simplify busway installation and adjustment.

Electrical Data



Spectra Series feeder busway

Integrated housing ground resistance

Spectra Series busway's all-aluminum housing provides an extremely low impedance ground path with less resistance (more continuous current capacity) than internal ground bus bars for both copper and aluminum systems.

Spectra Series busway's integrated housing ground resistance values exceed NEC 250-94 standards for minimum ground conductors.

Plug-in outlet grounding may be supplied with optional tin-plated copper tabs bolted to the aluminum housing for superior continuity through standard bus plug ground stabs. An internal ground bus bar (50% capacity, .125 inch thick) is also available to provide a complete system.

Table 5.1

Bar Width	DC Resistance Ohms x 10^{-3}/100 ft. @ 75° C		
	Aluminum Internal① 50% Ground Bus	Copper Internal 50% Ground Bus	Housing Ground
1.625	8.62	5.15	1.31
2.250	6.22	3.72	1.21
2.875	4.87	2.91	1.71
3.375	4.15	2.48	1.55
4.250	3.29	1.95	1.34
4.500	3.11	1.84	1.29
5.750	2.44	1.44	1.10
6.500	2.15	1.27	1.02
7.500	1.86	1.07	0.93
8.250	1.70	1.00	0.87

① The housing could satisfy 50% ground bus conductor requirements. An internal aluminum ground bar offers no electrical advantage and is not available in the Spectra II option.

Busway applications with harmonics

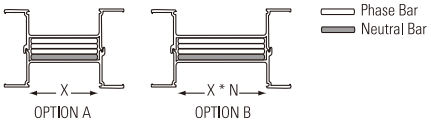
For busway applications where non-linear loads are present, first determine the specific non-linear load condition for the application. Once the non-linear load condition is established, Spectra Series busway should be derated in accordance with Option A; see Table 5.2 and Fig. 5.1 below.

Where full nameplate loading is required, Spectra Series busway should be sized in accordance with Option B; see Table 5.2 and Fig. 5.1 below. By increasing the width of both the phase and neutral bars equally, the busway will operate within UL heat rise limits at full nameplate rating, while also carrying up to twice the rated current in the neutral conductor.

Table 5.2

Non-linear Load (Neutral Harmonic Current / Total Phase Current)	Option A			Option B	
	Derating Factor	Phase Bar Width	Neutral Bar Width Width	Phase Bar Width	Neutral Bar Width
0.00	1.000	X	X	Not Required	
1.00	0.866	X	X	X * 1.15	X * 1.15
1.25	0.811	X	X	X * 1.23	X * 1.23
1.50	0.756	X	X	X * 1.32	X * 1.32
1.75	0.703	X	X	X * 1.42	X * 1.42
2.00	0.655	X	X	X * 1.53	X * 1.53

Figure 5.1



Note: Please contact your local GE Consumer & Industrial sales office for additional information on application of busway with non-linear loads.

Short-circuit ratings

The Spectra Series busway design provides predictable, consistent strength and high short-circuit ratings.

The ratings shown below are UL recognized rms symmetrical amps for both feeder and plug-in phase-to-phase and phase-to-ground. Tests were run at three cycles minimum per UL standards. Additional tests were run at six cycles. Spectra Series busway is third party certified by KEMA to be in compliance with IEC439-1 and -2 short circuit withstand test for 1 and 3 seconds.

The short-circuit rating of the busway system with protective devices that are part of the busway, such as power takeoffs and reducers, is equal to the lower of the short-circuit rating of the protective device or the busway with which the fitting is used. For example, a fusible power takeoff rated 200,000 amps with Class J fuses when installed on a busway rated 150,000 amps would have a rating of 150,000 amps.

Standard short-circuit busway ratings can be given a higher UL Listed short-circuit rating when protected by specific J, T, R and Class L fuses as shown below.

Table 6.1
Short-Circuit Ratings Plug-In and Feeder

Amp Rating	Aluminum (kA)			Copper (kA)		
	3 and 6 Cycles	1 Sec.	3 Secs.	3 and 6 Cycles	1 Sec.	3 Secs.
225①	30/50	11/24	6/14	30/50	17/40	10/21
400①	42/85	17/24	10/14	30/50	17/40	10/21
600①	50/85	28/24	16/14	42/85	25/40	15/21
800	100	42	24	85	40	21
1000	100	50	29	100	51	29
1200	125	62	36	100	65	37
1350	150	84	49	100	76	44
1600	150	95	55	125	95	55
2000	150	121	70	150	129	75
2500	200	132	76	150	150	107
3000	200	169	97	200	191	110
3200	200	169	97	200	191	110
4000	200	200	140	200	200	149
5000	–	–	–	200	200	200

① Use the first value when selecting Spectra Series II busway.

Table 6.2
Maximum Fuse Sized for Increased Short-Circuit Protection to either 100KA or 200KA

Amp Rating		Max "L" Fuse Sizes For Increased Short-Circuit Rating	
AL	CU	100KA	200KA
225	225	1200②	800①
400	400	1200②	800①
–	600	1200②	800①
600	800	2000②	1200②
–	1000	–	2000②
800	1200	–	2500②
1000	1350	–	2500②
1200	1600	–	3000②
1350	2000	–	4000②
1600	–	–	4000②
2000	2500	–	4000②

① Also 600J, 800T or 400R
② Also 600J, 800T or 600R

Example: A 225A (AL) short circuit rating will increase to 100KA with a 1200A (L) fuse installed on the line side of the busway, normally mounted in the gear.

Standards

Spectra Series busway conforms to the latest revisions of: NEMA BU-1; ANSI/UL857; federal spec W-B-811b; cUL. Can comply with IEC 439-1 and 2. Contact factory for details.

Electrical Data

Busway operation at other frequencies

Spectra Series busway continuous current ratings are for 50/60 Hz frequency. For 400 Hz operation, de-rate bus to 85% load.

Effect of ambient temperature on busway operation

Graph 7.1 illustrates the effect of various ambient temperature conditions on busway operating temperature. Spectra Series busway utilizes NEMA Class B 130°C insulation. This chart can be used to determine bus operating parameters in accordance with various standards.

Note: In addition to the standard illustrated on Graph 7.1, the Bluecoat™ epoxy insulation of Spectra Series busway has earned "Class B - 130°C UL recognition in accordance with UL 857." This superior insulation enables Spectra Series busway to operate satisfactorily at 50°C ambient with a 55°C heat rise, allowing 105°C maximum operating temperature. See Graph 7.1 for derating details.

Graph 7.1
Effect of ambient temperature on busway operation

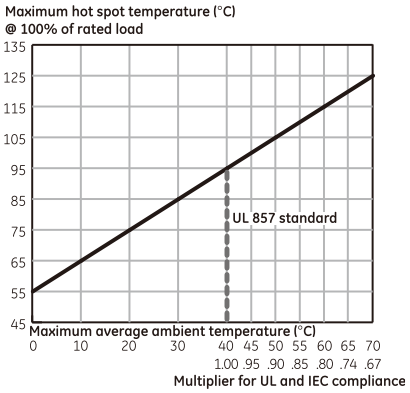
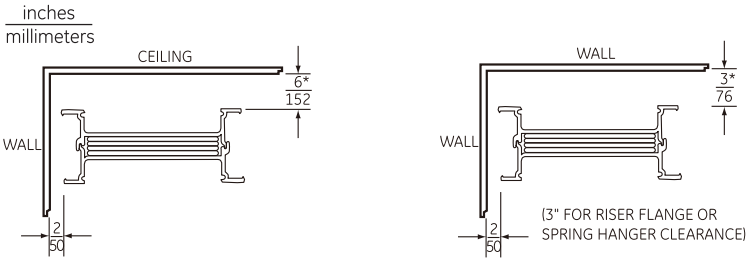
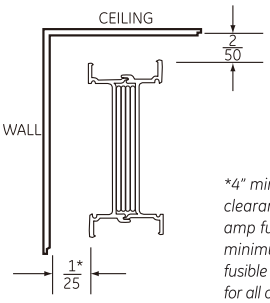


Fig. 7.1
Plug-In or Feeder, One or Two Stack



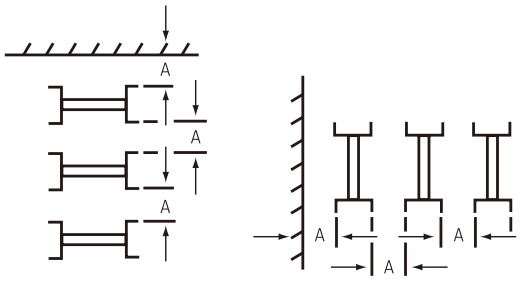


**4" minimum provides clearance for 30-100 amp fusible plugs. 7" minimum for 200 amp fusible plugs. 8" minimum for all other plugs.*

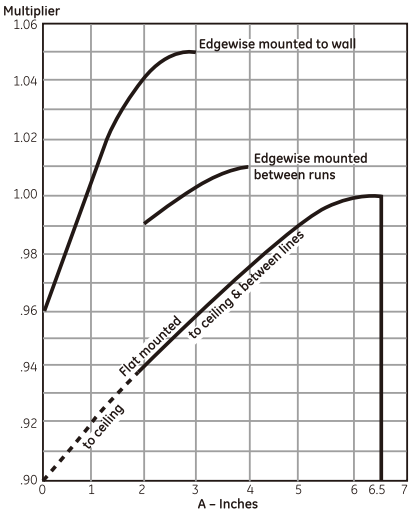
Proximity

Below is a drawing that shows the possible positions of busways relative to walls and to each other. Refer to Graph 7.2 for the proper multiplier required to maintain a 55°C rise in a 40°C ambient.

If horizontally mounted busways are three high, there is an additional multiplying factor of 0.95 for the top run and 0.975 for the center run. The average current hours per week the busway runs at full load will need to be taken into account to determine if the installation requires derating as shown in Graph 7.2.



Graph 7.2



Spectra Series™ Busway

Voltage drop: plug-in or feeder

Table 8.1

Spectra Series busway has excellent low-voltage-drop values. Minimum reactance (X) is due to very close bar spacings (sandwiched construction) and a non-magnetic housing. Values shown are identical for plug-in and feeder.

60 Hz values shown. For 50 Hz, multiply reactance (X) by 0.83 and resistance values do not change. For 400 Hz, multiply reactance by 3.9 and multiply resistance by 1.4. Calculate new voltage drop V_d = amps load X $\sqrt{3}$ (R cos Θ + X sin Θ) ft/100, where cos Θ = Power Factor. Contact your local GE representative for a free copy of the Busway Tool Kit (DEU-066) to help with electrical calculations.

		Rated Load Amps	Bar Width x 1/4" Thickness		Ohms x 10^{-3}/100 Ft. Line-to-Neutral			Voltage Drop – Concentrated Load① Line-to-Line/100 Ft. @ 100% Rated Load, 25°C Amb. Power Factor							
			IN	MM	R	X	Z	.3	.4	.5	.6	.7	.8	.9	1.0
Aluminum	Spectra Series II	225	0.750	19	9.11	3.75	9.85	2.46	2.76	3.04	3.30	3.53	3.72	3.83	3.55
		400	1.125	29	6.38	3.12	7.10	1.69	1.87	2.04	2.19	2.32	2.42	2.46	2.21
		600	1.750	44	4.32	2.35	4.92	3.68	4.03	4.36	4.65	4.89	5.06	5.11	4.49
	Spectra Series	225	1.625	41	4.09	1.28	4.29	.95	1.09	1.23	1.36	1.47	1.57	1.65	1.59
		400	1.625	41	4.20	1.28	4.39	1.72	1.98	2.22	2.46	2.67	2.86	3.01	2.91
		600	1.625	41	4.52	1.28	4.70	2.68	3.10	3.50	3.88	4.24	4.56	4.81	4.70
		800	2.875	73	2.48	.79	2.60	2.08	2.38	2.67	2.94	3.19	3.41	3.57	3.44
		1000	3.375	86	2.17	.68	2.27	2.25	2.58	2.90	3.20	3.47	3.71	3.90	3.76
		1200	4.25	108	1.73	.55	1.81	2.17	2.49	2.79	3.07	3.33	3.56	3.73	3.60
		1350	5.75	146	1.24	.41	1.31	1.78	2.04	2.28	2.51	2.71	2.89	3.03	2.90
		1600	6.50	165	1.12	.36	1.18	1.88	2.16	2.42	2.66	2.89	3.08	3.23	3.10
		2000	8.25	210	.89	.29	.94	1.88	2.15	2.41	2.65	2.88	3.07	3.21	3.08
		2500	(2)4.50	(2)114	.82	.26	.86	2.14	2.45	2.75	3.03	3.29	3.52	3.69	3.55
		3000	(2)5.75	(2)146	.64	.21	.67	2.04	2.33	2.61	2.87	3.11	3.32	3.47	3.33
		3200	(2)4.50	(2)114	.51	.25	.55	2.21	2.44	2.63	2.82	2.96	3.60	3.10	2.67
		4000	(2)8.25	(2)210	.45	.14	.47	1.86	2.14	2.40	2.65	2.88	3.08	3.23	3.12
Copper	Spectra Series II	225	0.750	19	5.10	3.75	6.33	1.99	2.13	2.26	2.36	2.43	2.47	2.43	1.99
		400	0.750	19	5.58	3.75	6.72	1.82	1.96	2.09	2.20	2.28	2.33	2.31	1.93
		600	1.125	29	3.86	3.12	4.96	2.15	2.29	2.41	2.50	2.56	2.58	2.51	2.01
	Spectra Series	225	1.625	41	2.33	1.28	2.66	.75	.82	.89	.94	.99	1.03	1.03	.91
		400	1.625	41	2.38	1.28	2.70	1.34	1.47	1.59	1.70	1.79	1.85	1.87	1.65
		600	1.625	41	2.48	1.28	2.79	2.04	2.25	2.44	2.61	2.75	2.86	2.90	2.58
		800	1.625	41	2.62	1.28	2.92	2.78	3.08	3.35	3.60	3.81	3.97	4.04	3.63
		1000	2.25	57	1.90	.98	2.14	2.61	2.87	3.12	3.33	3.52	3.65	3.70	3.29
		1200	2.875	73	1.49	.79	1.69	2.50	2.74	2.97	3.17	3.34	3.46	3.50	3.10
		1350	3.375	86	1.27	.68	1.44	2.41	2.65	2.86	3.05	3.21	3.33	3.37	2.97
		1600	4.25	108	1.00	.55	1.14	2.29	2.51	2.71	2.88	3.03	3.13	3.16	2.77
		2000	5.75	146	.73	.41	.84	2.11	2.31	2.49	2.65	2.78	2.88	2.90	2.53
		2500	7.50	191	.57	.32	.65	2.06	2.26	2.43	2.59	2.72	2.81	2.83	2.47
		3000	(2)4.00	(2)102	.53	.29	.58	2.26	2.48	2.68	2.86	3.00	3.11	3.14	2.73
		3200	(2)4.50	(2)114	.51	.25	.55	2.21	2.44	2.63	2.82	2.96	3.60	3.10	2.67
		4000	(2)5.75	(2)146	.37	.21	.42	2.16	2.36	2.54	2.70	2.83	2.92	2.94	2.56
		5000	(2)7.50	(2)191	.28	.16	.32	2.05	2.24	2.41	2.56	2.69	2.77	2.79	2.42

① For plug-in distributed loads divide by 2

$$\text{Actual voltage drop} = V_d \text{ (from Table)} \times \frac{\text{actual load}}{\text{rated load}} \times \frac{\text{actual distance (ft)}}{100 \text{ feet}}$$

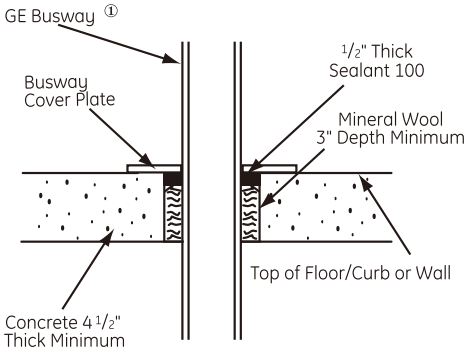
Physical Data

UL firestop system

UL Listed through-penetration firestop system is available for use with GE busway systems. The system is listed in the UL Fire Resistance Directory under XHEZ, System C-AJ-6003 with F rating = 3 hours and T rating = 1/2 hour for aluminum bars and T rating = 0 hours for copper bars.

The contractor installs a mineral wool batt (4 PCF Nominal) as shown below, on-site during the busway installation process. For riser applications, the system is used in combination with a standard GE spring hanger and floor flange. For horizontal applications, the system is used in combination with two wall flanges (one per side). See publication DEH-40087 for installation instructions.

Fig. 9.1



Note: Check with local NTL codes for curb required in riser applications.

① Spectra Series II busway requires feeder.

Table 9.1
Cubic Inches Required per Floor and Wall

Amperage	Sealant 100 Floor		Sealant 100 Wall	
	Al	Cu	Al	Cu
225-600	17	17	34	34
800	21	17	42	34
1000	22	18	44	42
1200	23	20	46	44
1350	27	22	54	46
1600	28	23	56	54
2000	33	27	66	56
2500	46	33	92	66
3000	53	44	106	92
3200	60	46	114	92
4000	66	53	132	106
5000	–	66	–	132

Sealant 100 standard tube equals 19 in^3

This information is provided as a guideline for typical fire-stop systems. If you have an annulus (or opening) greater than 1 inch beyond the busway enclosure, you will need to determine the proper amount of fire-stop material based on Fig. 9.1. Quantities are based on application of recommended amount of material; more may be required if over-application occurs.

Spectra Series™ busway seismic certification facts

General

The complete standard commercial offering of Spectra Series busway is certified to IBC-2006 and IEEE 693-2005, UBC Zone 4 seismic conditions.

Table 10.1

Maximum Acceptable Parameters	Vertical Riser Configuration	Horizontal Configuration
Acceptable Orientations	Edgewise & Flatwise	Edgewise & Flatwise
Maximum Ratings	5000A Max Copper / 4000A Max Aluminum	5000A Max Copper / 4000A Max Aluminum
Maximum Voltage	600 V Max	600 V Max
Service	3- & 4-Wire	3- & 4-Wire
Distribution	Plug-In & Feeder	Plug-In & Feeder
Hangers	Standard Floor Flange Kit with Seismic Spring Hanger Assembly	Standard and Seismic Hanger System using Trapeze Hangers & Clips
Maximum Hanger Spacing	16 feet (See Table 10.2)	10 feet
Full Threaded Drop Rod	Standard ½" Rod	Standard ½" Rod
Drop Rod Connection ①	Not Applicable	Must be **BOLTED** through Ceiling/Floor using standard hardware①
Distribution Equipment Connection (Pbd., Swbd, Swgr, MCC, etc.)	Standard Flanged-End Stub – Special Hardware & connections NOT Required	Standard Flanged-End Stub – Special Hardware & connections NOT Required.
Bus Plugs	All Types Acceptable	All Types Acceptable
Fittings	All Types Acceptable	All Types Acceptable
Cable Tap Boxes	All Types Acceptable	All Types Acceptable
End Boxes	All Types Acceptable	All Types Acceptable
Acceptable Applications & Constructions	Indoor, Drip-Proof & Outdoor	Indoor, Drip-Proof & Outdoor
Proximity To Walls	Standard ①	Standard ①

① Drop rod must be bolted through ceiling/floor and secured on both sides with standard washers and nuts.

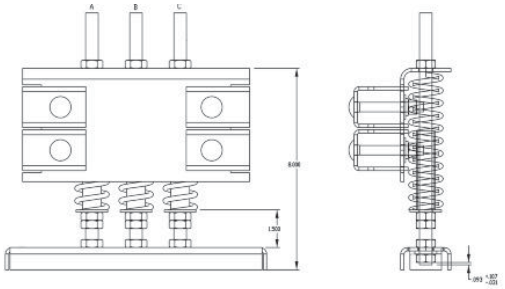
Table 10.2
Vertical Hanger Spacing

Max. Hanger Spacing	IBC-2006	IEEE-693-2005
12 feet	Ss=250%g, SDs=1.67g	High x 2.2
16 feet	Ss=200%g, SDs=1.33g	High x 1.7

Summary

These parameters for seismic conditions are identical to the complete standard commercial offering of Spectra Series busway. **Therefore, Spectra Series busway can be used in applications in above seismic conditions without restrictions, special bracing or connections except when seismic spring hangers are required (see hangers section).** Plus, Spectra Series busway can connect to equipment (panelboards, switchboards, motor control centers, switchgear, etc.) using standard flanged end stubs, cable tap boxes, and bus plugs.

Fig. 10.1
Seismic spring riser hanger (Cat. No. SBSR"X"). See page 29 for more details.

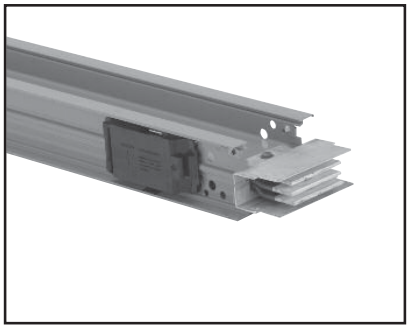


Catalog Number	Group Number	Spring Location	Load on Pair of Hangers (lbs.)
SBSR1	G723	B	0-600
SBSR2	G724	A & C	600-1200
SBSR3	G725	A, B & C	1200-1800

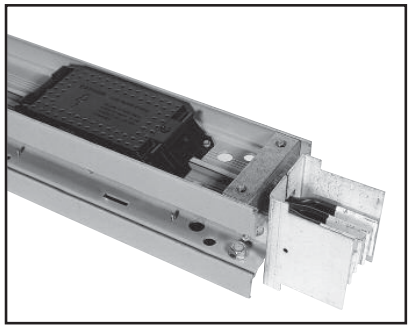
Physical Data

Straight lengths: dimensions and weights

inches
millimeters



Spectra Series II busway



Spectra Series plug-in busway

Fig. 11.1
One bar per phase

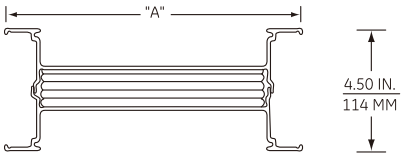


Fig. 11.2
Two bars per phase

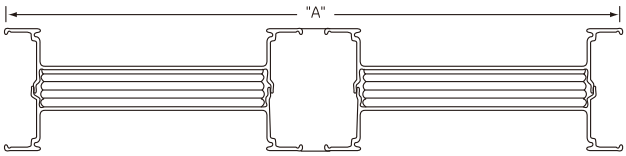


Fig. 11.3
One bar per phase plug-in and feeder

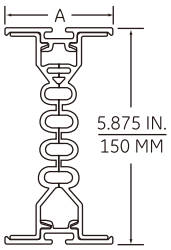


Table 11.1
Plug-in and Feeder, all bus UL Listed @600 Volts

		AC Ampere Rating	Fig. No.	Standard Bar				+1 Bar				DC Ampere Rating	Approximate Weight lbs./ft.	
				"A" Width		Bar Sizes Width x Thickness		"A" Width		Bar Size				
				Inches	MM	Inches	MM	Inches	MM	Inches	MM		3-Wire	4 Wire
Aluminum	Spectra Series II	225	11.3	3.00	76	.75 x .25	19 x 6	-	-	-	-	225	5	5
		400	11.3	3.38	86	1.13 x .25	29 x 6	-	-	-	-	600	6	6
		600	11.3	4.00	102	1.75 x .25	44 x 6	-	-	-	-	800	7	8
	Spectra Series	225	11.1	4.38	111	1.63 x.25	41 x 6	4.38	111	1.63	41	600	5	6
		400	11.1	4.38	111	1.63 x.25	41 x 6	4.38	111	1.63	41	—	5	6
		600	11.1	4.38	111	1.63 x.25	41 x 6	5.00	127	2.25	57	800/1000	5	6
		800	11.1	5.63	143	2.88 x.25	73 x 6	6.13	156	3.38	86	1350	6	7
		1000	11.1	6.13	156	3.38 x.25	86 x 6	7.00	178	4.25	108	1600	7	8
		1200	11.1	7.00	178	4.25 x.25	108 x 6	7.25	184	4.50	114	—	8	9
		1350	11.1	8.50	216	5.75 x.25	146 x 6	9.25	235	6.50	165	2500	9	10
		1600	11.1	9.25	235	6.50 x.25	165 x 6	11.00	279	8.25	210	—	10	12
		2000	11.1	11.00	279	8.25 x.25	210 x 6	15.00	381	(2)4.25	(2)108	3000	12	15
		2500	11.2	15.50	394	(2)4.50 x.25	(2)114 x 6	18.00	457	(2)5.75	(2)146	4000	17	20
		3000	11.2	18.00	457	(2)5.75 x.25	(2)146 x 6	19.50	495	(2)6.50	(2)165	—	19	23
		3200	11.2	19.5	495	(2)6.50 x.25	(2)165 x 6	-	-	-	-	5200	21	24
		4000	11.2	23.00	584	(2)8.25 x.25	(2)210 x 6	-	-	-	-	6000	25	30
Copper	Spectra Series II	225	11.3	3.00	76	.75 x .25	225	-	-	-	-	225	7	7
		400	11.3	3.00	76	.75 x .25	600	-	-	-	-	600	7	7
		600	11.3	3.38	86	1.13 x .25	800	-	-	-	-	800	8	9
	Spectra Series	225	11.1	4.38	111	1.63 x.25	41 x 6	4.38	111	1.63	41	800	8	9
		400	11.1	4.38	111	1.63 x.25	41 x 6	4.38	111	1.63	41	—	8	9
		600	11.1	4.38	111	1.63 x.25	41 x 6	4.38	111	1.63	41	—	8	9
		800	11.1	4.38	111	1.63 x.25	41 x 6	5.00	127	2.25	57	1000/1200	8	9
		1000	11.1	5.00	127	2.25 x.25	57 x 6	5.63	143	2.88	73	1350/1600	10	12
		1200	11.1	5.63	143	2 7/8 x.25	73 x 6	6.13	156	3.38	86	—	12	15
		1350	11.1	6.13	156	3.38 x.25	86 x 6	7.00	178	4.25	108	2000	14	17
		1600	11.1	7.00	178	4.25 x.25	108 x 6	7.25	184	4.50	114	2500	16	20
		2000	11.1	8.50	216	5.75 x.25	146 x 6	9.25	235	6.50	165	3000	21	26
		2500	11.1	10.25	260	7.50 x.25	191 x 6	11.00	279	8.25	210	4000	26	33
		3000	11.2	14.50	368	(2)4.00 x.25	(2)102 x 6	15.00	381	4.25	108	5000	32	40
		3200	11.2	15.50	394	(2)4.50 x.25	(2)114 x 6	-	-	-	-	5200	34	43
		4000	11.2	18.00	457	(2)5.75 x.25	(2)146 x 6	19.50	495	(2)6.50	(2)165	6000	42	52
		5000	11.2	21.50	546	(2)7.50 x.25	(2)191 x 6	23.00	584	(2)8.25	(2)210	8000	52	66

Physical Data

Spectra Series busway provides optimum performance in the most demanding applications. Through superior design and applied materials technology, it assures uptime and reliability, even in severe-duty weather environments.

Weather protection: features and benefits

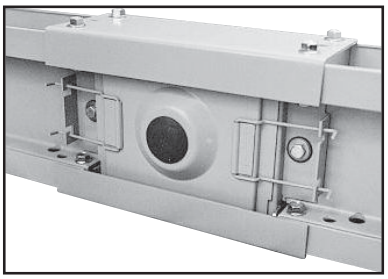
- Industry Exclusive WEATHERSHIELD™ Epoxy Joint Insulators designed for long life. Joint Bolt access via easily removable, UL listed/cUL certified Raintight Santoprene Plugs.
- Extra drainage channels through die cast housing spacers help eliminate standing water near joints.
- Gasketing materials rated for extreme temperatures, -40 to 250 degrees F.
- Internal sealants rated for use in extreme temperature environments of -40 to 200 degrees F.
- All Gaskets and Sealants tested to verify superior UV resistance and excellent stability when subjected to long term thermal aging.

Construction options

Table 13.1

Construction Type		IEC Degree of Protection	Joint Insulator
Indoor (NEMA 1)	Feeder, Plug-in, Riser	IP-40	Standard
Drip-proof①	Feeder, Plug-in, Riser	IP-43	Standard
Splash-proof①	Feeder, Plug-in, Riser	IP-54	Weathershield™
Outdoor (NEMA 3R)①	Feeder (Only)	IP-65/66	Weathershield™

① Excludes (2) stack flatwise elbow



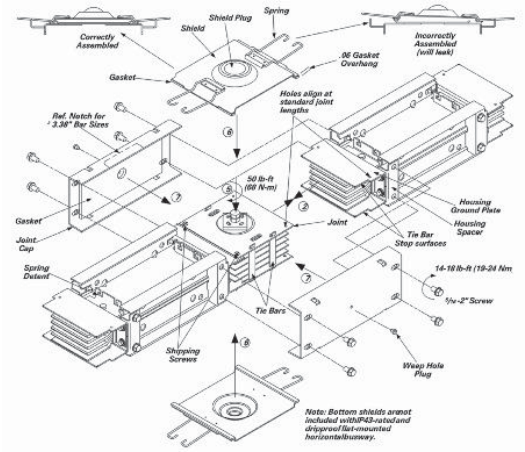
Innovative joint shield design provided with drip-proof, splash-proof, and outdoor bus.

The materials and processes used in these construction options are the result of an intensive Design for Six Sigma (DFSS) design and testing process. These products combine high reliability with new features that reduce assembly time by more than 50%. The joint shield, as shown in the photo below, uses an integral spring latch clamping system. This system provides optimum gasket compression at all joint connections, and eliminates the need for additional joint cover hardware.

The Splash-proof and Outdoor designs feature an industry-exclusive 100% epoxy insulation system throughout the bus and joints. This system includes GE Bluecoat™ epoxy on the bus bars and WEATHERSHIELD™ insulators in the joints.

Complete outdoor run of Spectra Series busway.

Fig. 13.1
Joint shield



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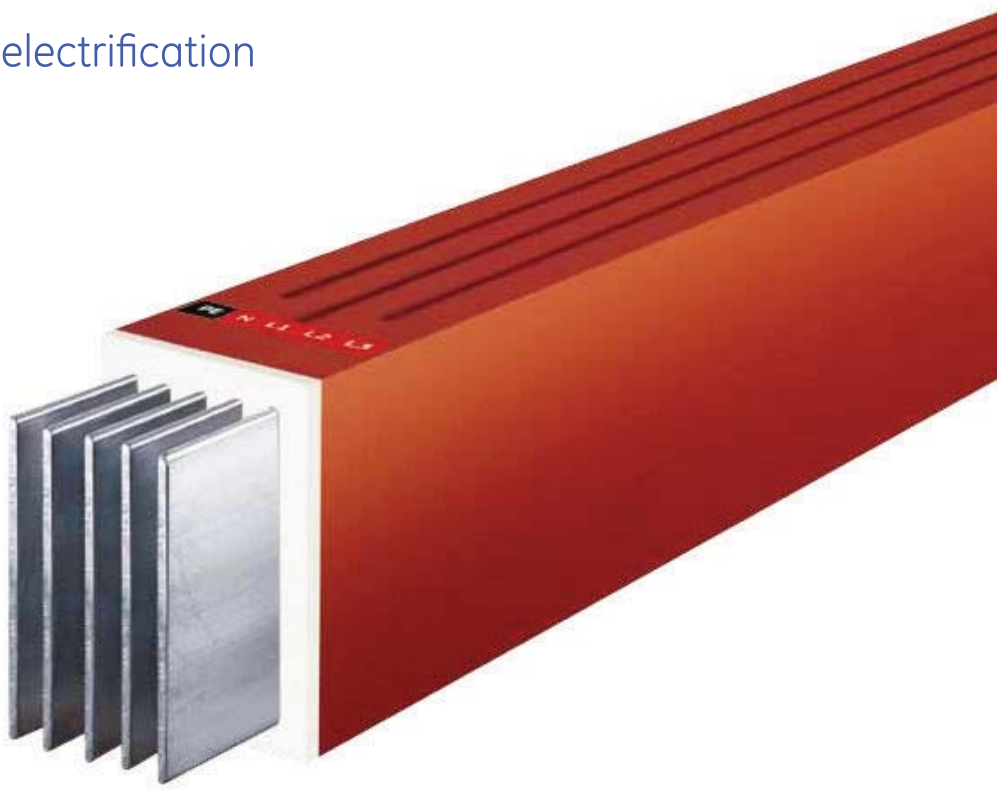
WORLDWIDE PARTNER

WavePro-F Busway

A New Generation of Fire Rated Busway

Leading the future of electrification



GE imagination at work

WavePro-F Busway

Designed to meet or exceed international GB and IEC standards, WavePro-F busway is a cast resin, new generation fire resistant busway that addresses the requirements of the global market.

WavePro-F busway uses an Automatic Pressure Gelatin (APG) process, resulting in a compact cast resin with low internal stress. The cast resin forms an external surface which provides a water tight barrier around the current carrying conductors. The connection of the busway to other electrical equipment is designed with outstanding levels of electrical insulation performance and waterproofing.

The leakage current of the busway system is near zero. This ensures safety of the system and extends the distance of the power transmission and distribution. With the new resin materials and fillers, no toxic gases will be released if the product is burnt.

WavePro-F busway features excellent fire resistant performance and up to IP68 protection level. It is especially suitable for emergency generator circuits of high-rise commercial buildings, shipyards, the chemical industry, and other demanding applications with high requirements on fireproofing, waterproofing and corrosion resistance.

Product Overview

Reference standards & certificates

Design standards:

IEC 61439-1 2011

IEC 61439-6 2012

IEC 60331-21 1999

BS 6387:1994

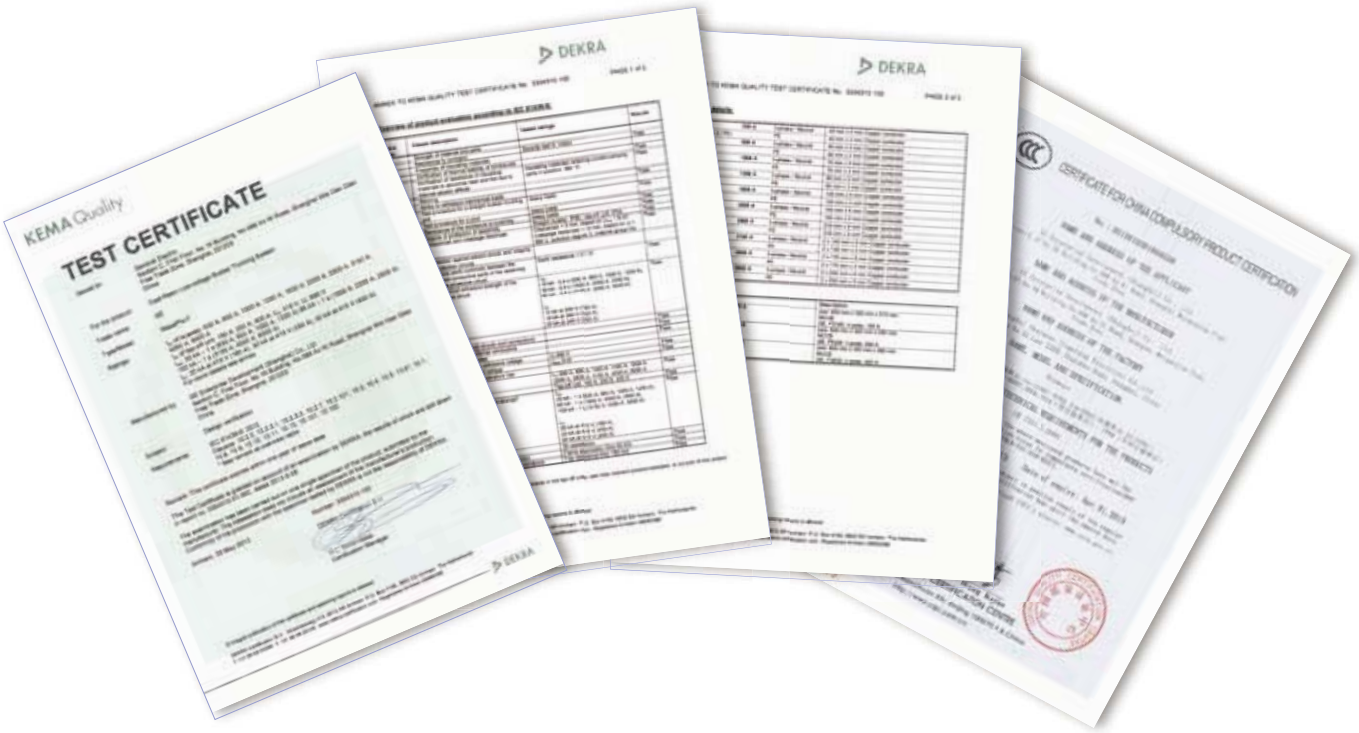
Product certificates and reports:

KEMA KEUR

IEC60331: 750°C(1382°F)/180min

BS6387: 950°C(1742°F)/180min

CCC Certificate



Product Features

Advanced cast process

WavePro-F is the first busway which uses an APG process and a unique formulation of epoxy resin that has been specially developed for WavePro-F busway. The resin is mixed in a sealed vacuum to ensure a consistent quality with even distribution of the mixture with no air voids. The epoxy resin mixture is injected into the APG mold using a pressurized pump and the temperature is raised to 140°C(284°F). Under controlled temperature and pressure conditions, the materials in the mold will set gradually. After curing, the result is an insulated busway that is compact, void-free, has low internal stress and a smooth outer surface.

With regard to mechanical strength, withstand voltage and insulation resistance, the APG busway is superior to common busway cast in the standard cold cast process.

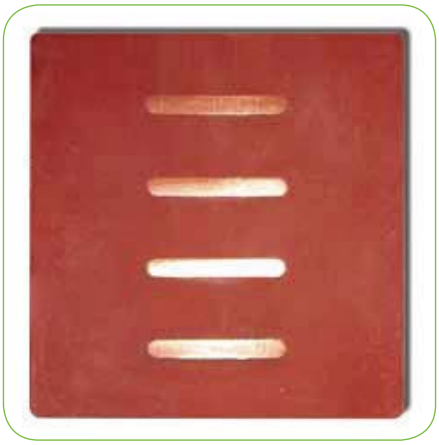


Figure 05-1. WavePro-F - APG formed

Performance		Busway APG cast	Busway Normal temp. and pressure cast
Impact strength	kJ/m^2	14~16	7~9
	kJ/ft^2	1.3~1.5	0.7~0.8
Power frequency withstand voltage	kV/mm	20	12~14
	kV/in	508	304.8~355.6
Insulation resistance	Ω·cm	10^{14}~10^{16}	10^{12}~10^{14}
	Ω·ft	10^{12}~10^{14}	10^{10}~10^{12}

Table 05-1

Figure 05-2. Normal temperature cast busway

Busway cast under normal temperature and pressure

The process of normal temperature cast busway is very basic, it adopts a labor intensive manual casting process without using specialized molding equipment. Compared with the APG busway, the normal temperature cast busway has many problems:

- Busway cured under normal temperature tends to develop air voids which can decrease the insulation performance and heat dissipation capability. This results in partial discharge, high temperature rise, inefficient energy consumption, and low current carrying capacity
- The normal temperature cast busway mixture contains lots of coarse particles, and there is no mechanical vacuum agitation and pressure injection during the cast process, so the internal texture is loose, thus significantly reducing the structural strength of the busway
- The normal temperature cast busway is cured in a uncontrolled and variable temperature mold, due to the different contraction ratio at different points in the cast, the appearance of the busway is crude and not smooth

Product Features

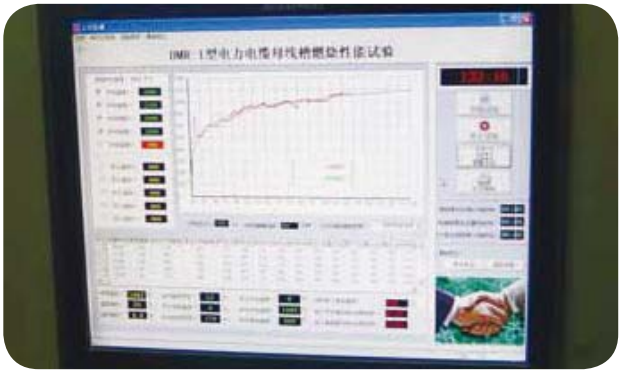
Excellent fireproof performance

- WavePro-F busway uses fireproof resin designed for the aerospace industry which incorporates flame retardant filler and a specially formulated composition of materials. The optimal component mix was determined based on extensive laboratory research and testing, and meets UL94 V-0 requirements
- WavePro-F busway has passed two fireproof tests, a 750°C(1382°F)/180min test as specified by IEC60331-21 standard and 950°C(1742°F)/180min test as specified by BS6387 standard
- Certified for resistance to flame propagation (IEC 61439-6, Clause 10.101) and fire resistance in wall penetrations [IEC 61439-6, Article 10.102, with fire resistance of 180 minutes and flame temperature up to 1056°C(1933°F)]

- Flame propagation test

- Wall penetration test

- Busway burn test



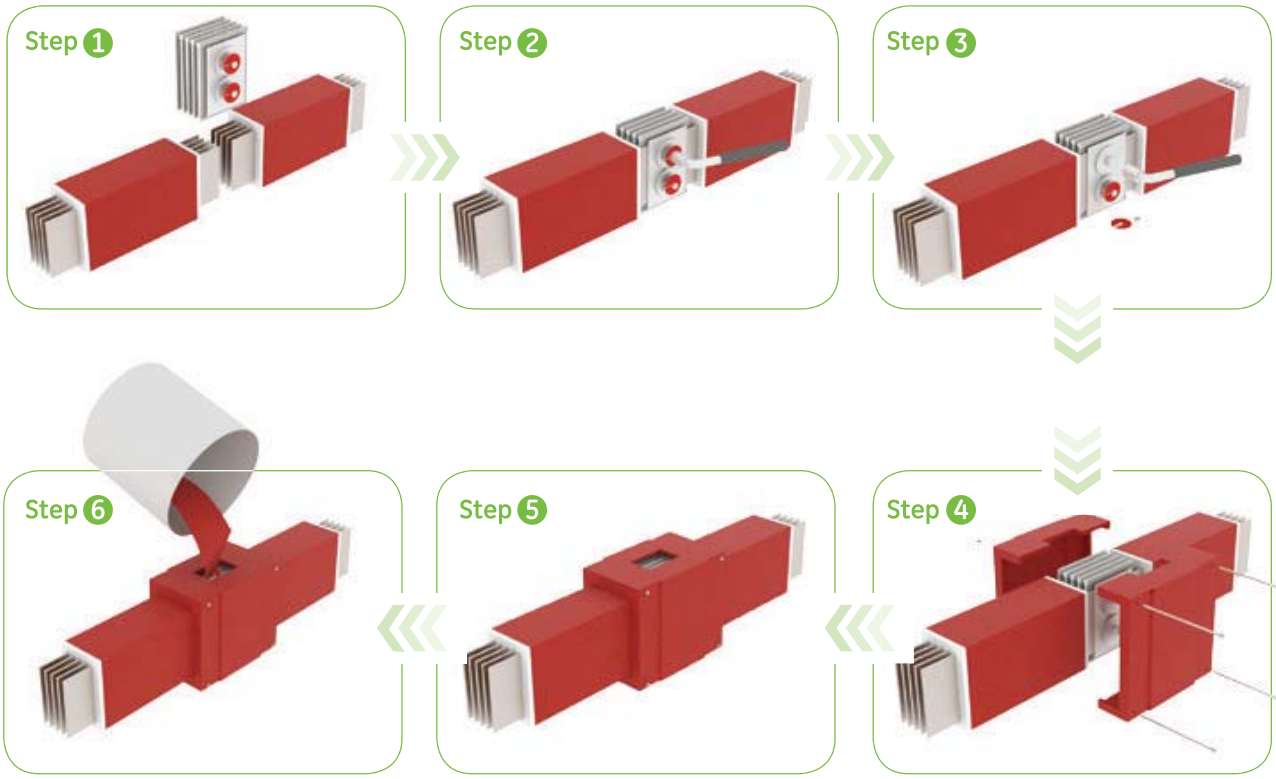
- Flame temperature curve

Quick and reliable joint connection

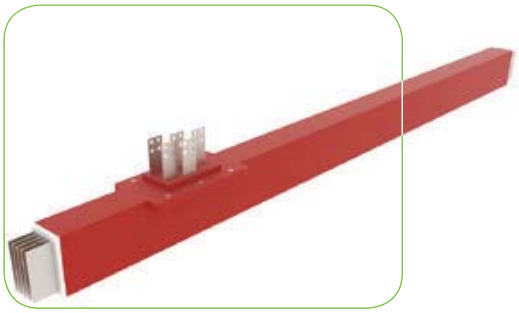
To connect joints of non fireproof busway, it is necessary to install a special casting mold at the connection points one by one during the time of installation. After curing, these molds need be disassembled and cleaned before they can be used for casting the next joint connection. Many molds are needed, and labor costs for repeated disassembly can be high. Casting quality on site is difficult to ensure and the joint appearance is poor.

WavePro-F busway uses an integrated connection process. While making connection points during field installation, the joint connection cover acts as the casting mold. After casting, the connection cover and joint become a single piece and there is no need to remove the cover. The connection cover is a prefabricated component, its material and production process are the same as the fire resistant busway and provides double protection for the connection points. The joint connections can be cast one by one, or several joints can be cast at the same time. The construction period is shortened and what is normally an installation bottleneck is eliminated.

Joint connection process



Product Features



Power take-off connection

The power take-off is an integral part of a cast straight length section. The tapered design ensures water will run off from the joint. The power take-off connection can be customized according to the site requirements.

GE circuit breakers

The standard configuration of WavePro-F power take-off boxes use GE's Record Plus™ circuit breakers to provide reliable protection for the circuit.
Record Plus™ circuit breakers have unique current limiting characteristics and an integrated protection device known as a trip unit. They meet the protection and isolation requirements of low-voltage power distribution products.

Protection level

The protection degree is up to IP68 for feeder busway, and IP54 for busway with power take-off boxes which comply with the requirements of IEC 60529 degrees of protection provided by enclosures. The IP68 designed product can work under water over a long period of time or be laid in cable conduit or directly buried.

Electrical Characteristics

WavePro-F cast resin busway is a Class II insulation device with two standard configurations:

- 4P (L1, L2, L3, 100%PEN)
- 5P (L1, L2, L3, 100%N, 60%PE)

Grounding resistance

3L+N+PE grounding resistance [60% independent ground wire @20°C(68°F)]

No.	Rated Current (A)	Resistance (10^{-6}Ω/m)	Resistance (10^{-3}Ω/100ft)
1	630	145.8	4.4
2	800	110.7	3.4
3	1000	86.5	2.6
4	1250	67.2	2.0
5	1600	50.2	1.5
6	2000	38.8	1.2
7	2500	28.5	0.9
8	3150	22.3	0.7
9	4000	17.2	0.5
10	5000	13.0	0.4

Table 09-1

Resistance/Reactance/Impedance and voltage drop

Rated Current (1)	Rated short-time withstand current (Icw)	Rated peak withstand current (Ipk)	20°C(68°F)		Full load/stable state (50Hz)					
			Resistance		Resistance		Reactance		Impedance	
A	kA	kA	(10^{-6}Ω/m)	(10^{-3}Ω/100ft)	(10^{-6}Ω/m)	(10^{-3}Ω/100ft)	(10^{-6}Ω/m)	(10^{-3}Ω/100ft)	(10^{-6}Ω/m)	(10^{-3}Ω/100ft)
630	30	63	87.5	2.7	107.7	3.3	92	2.8	141.6	4.3
800	30	63	66.4	2.0	81.7	2.5	70.4	2.1	107.9	3.3
1000	30	63	51.9	1.6	63.9	1.9	55.5	1.7	84.7	2.6
1250	30	63	40.3	1.2	49.6	1.5	43.4	1.3	65.8	2.0
1600	65	143	30.1	0.9	37.1	1.1	32.7	1.0	49.4	1.5
2000	65	143	23.3	0.7	28.6	0.9	25.5	0.8	38.4	1.2
2500	65	143	17.1	0.5	21.1	0.6	19.1	0.6	28.4	0.9
3150	100	220	13.4	0.4	16.5	0.5	14.6	0.4	22	0.7
4000	100	220	10.3	0.3	12.7	0.4	11.4	0.3	17	0.5
5000	100	220	7.8	0.2	9.6	0.3	8.7	0.3	13	0.4

Table 09-2

Full load/stable state (50Hz) Line to line voltage drop - Concentrated load									
cosϕ=0.6		cosϕ=0.7		cosϕ=0.8		cosϕ=0.9		cosϕ=1.0	
(V/m)	(V/100ft)	(V/m)	(V/100ft)	(V/m)	(V/100ft)	(V/m)	(V/100ft)	(V/m)	(V/100ft)
0.151	4.604	0.154	4.695	0.154	4.695	0.15	4.573	0.118	3.598
0.146	4.451	0.149	4.543	0.149	4.543	0.145	4.421	0.113	3.445
0.143	4.360	0.146	4.451	0.146	4.451	0.142	4.329	0.111	3.384
0.14	4.268	0.142	4.329	0.142	4.329	0.138	4.207	0.107	3.262
0.134	4.085	0.137	4.177	0.137	4.177	0.132	4.024	0.103	3.140
0.13	3.963	0.133	4.055	0.132	4.024	0.128	3.902	0.099	3.018
0.121	3.689	0.123	3.750	0.123	3.750	0.119	3.628	0.091	2.774
0.118	3.598	0.12	3.659	0.12	3.659	0.116	3.537	0.09	2.744
0.116	3.537	0.118	3.598	0.117	3.567	0.114	3.476	0.088	2.683
0.111	3.384	0.112	3.415	0.112	3.415	0.108	3.293	0.083	2.530

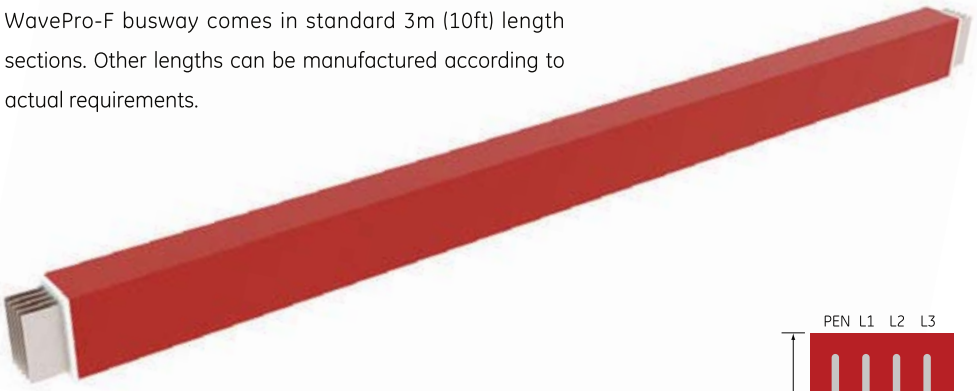
Table 09-3

Note:
(1). For 60Hz application the 1000A, 1600A, 2000A, 2500A, 3150A and 4000A busway current rating shall be reduced to 95% of the rated current.

Product Data

Feeder straight length

WavePro-F busway comes in standard 3m (10ft) length sections. Other lengths can be manufactured according to actual requirements.



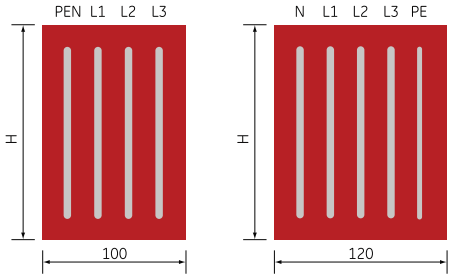


Figure 10-1

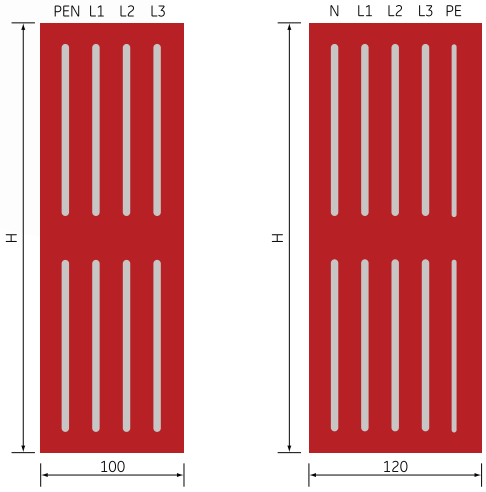


Figure 10-2

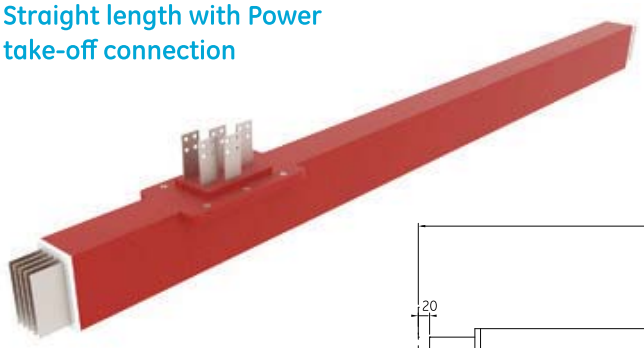
Busway Weight

Rated Current	H		Straight length 3L+PEN		Joint 3L+PEN		Straight length 3L+N+PE		Joint 3L+N+PE		Figures
A	mm	in	kg/m	lb/ft	kg/EA	lb/EA	kg/m	lb/ft	kg/EA	lb/EA	
630	75	3.0	27.3	18.3	18.2	40.0	32.6	21.9	18.5	40.7	Figure 10-1
800	85	3.3	31.9	21.4	20.1	44.2	37.9	25.4	20.4	44.9	
1000	100	3.9	38.1	25.6	23.7	52.1	45.3	30.4	24.2	53.2	
1250	120	4.7	46.5	31.2	27.3	60.1	55.3	37.1	27.9	61.4	
1600	150	5.9	59	39.6	33.7	74.1	70.1	47.0	34.5	75.9	
2000	185	7.3	73.7	49.4	39.8	87.6	87.5	58.7	40.8	89.8	
2500	240	9.5	96.7	64.9	48.1	105.8	114.8	77.0	49.5	108.9	
3150	330	13.0	130.6	87.6	57.9	127.4	155.2	104.1	59.8	131.6	Figure 10-2
4000	410	16.2	164	110.0	76.9	169.2	194.8	130.7	79.5	174.9	
5000	520	20.5	210	140.9	93.1	204.8	249.3	167.2	96.3	211.9	

Table 10-1

Note: the length of busway is the distance between the centers of two adjacent joints.

Straight length with Power take-off connection



Power take-off typical dimensions

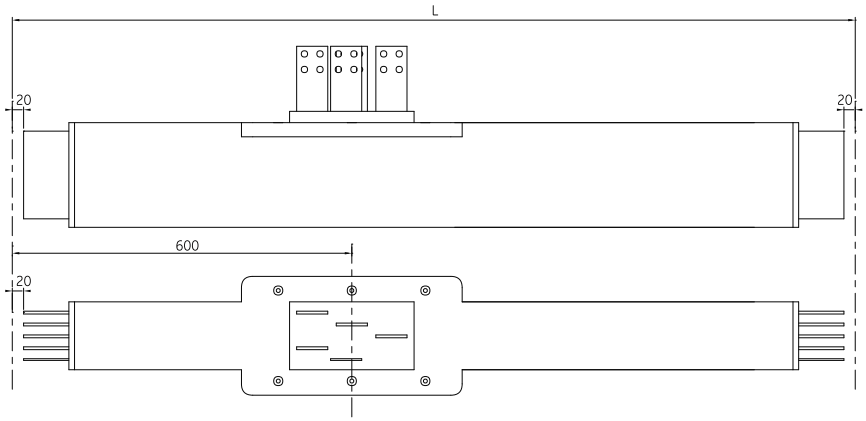
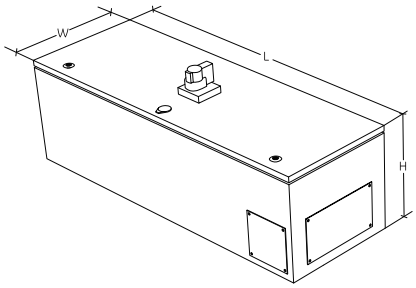
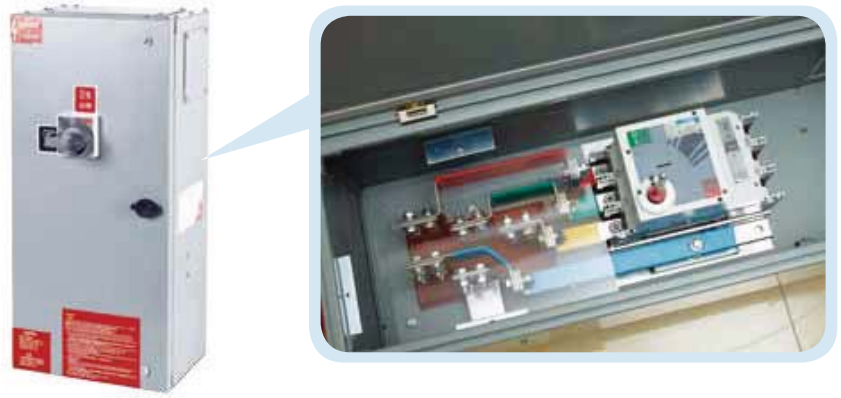


Diagram 11-1

Power take-offs





Specification of distribution box	Outline dimensions of distribution box						Weight	
	L		W		H			
	mm	in	mm	in	mm	in	kg/EA	lb/EA
FD160	650	25.6	304	12.0	210	8.3	18.1	39.8
FE160/FE250	800	31.5	324	12.8	230	9.1	24.8	54.6
FG400	900	35.5	324	12.8	280	11.0	38.1	83.8

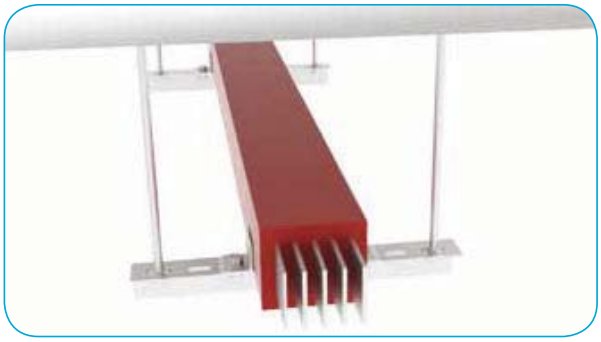
Table 11-1

Note: due to the construction of the WavePro-F cast resin busway, the power take-off box and the corresponding busway section are assembled as a set in the factory and delivered together.

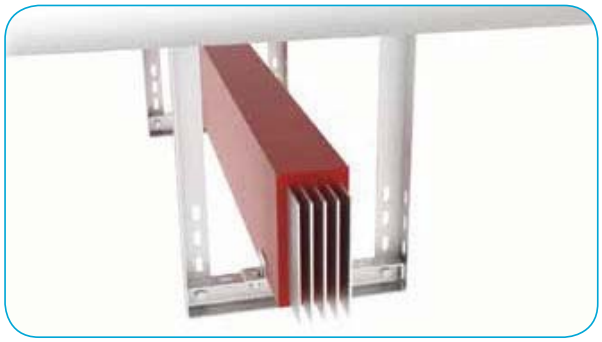
Busway installation

WavePro-F can support a number of different installation arrangements.
Generally, the space between horizontal installation hanging brackets of busway is recommended to be 1m, the space between the vertical installation hanging brackets is 2.5m.

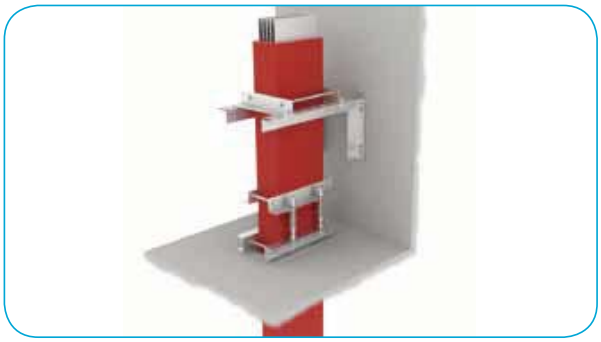
- Horizontal back-to-wall installation



- Horizontal hanging bracket installation - for 630A-1250A



- Horizontal hanging bracket installation - for 1600A-5000A



- Vertical installation

Note: There are special angle requirements for WavePro-F busway installation, please refer to Busway installation manual.

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WORLDWIDE PARTNER

WavePro LTG

Lighting Busway

GE imagination at work

System Overview

WavePro LTG is a modularised busway to distribute electric power for lighting system by simply plugging connection, which is able to provide sufficient power branches as necessary and protection as well as to mechanically support the weight load of lighting fixture neath.

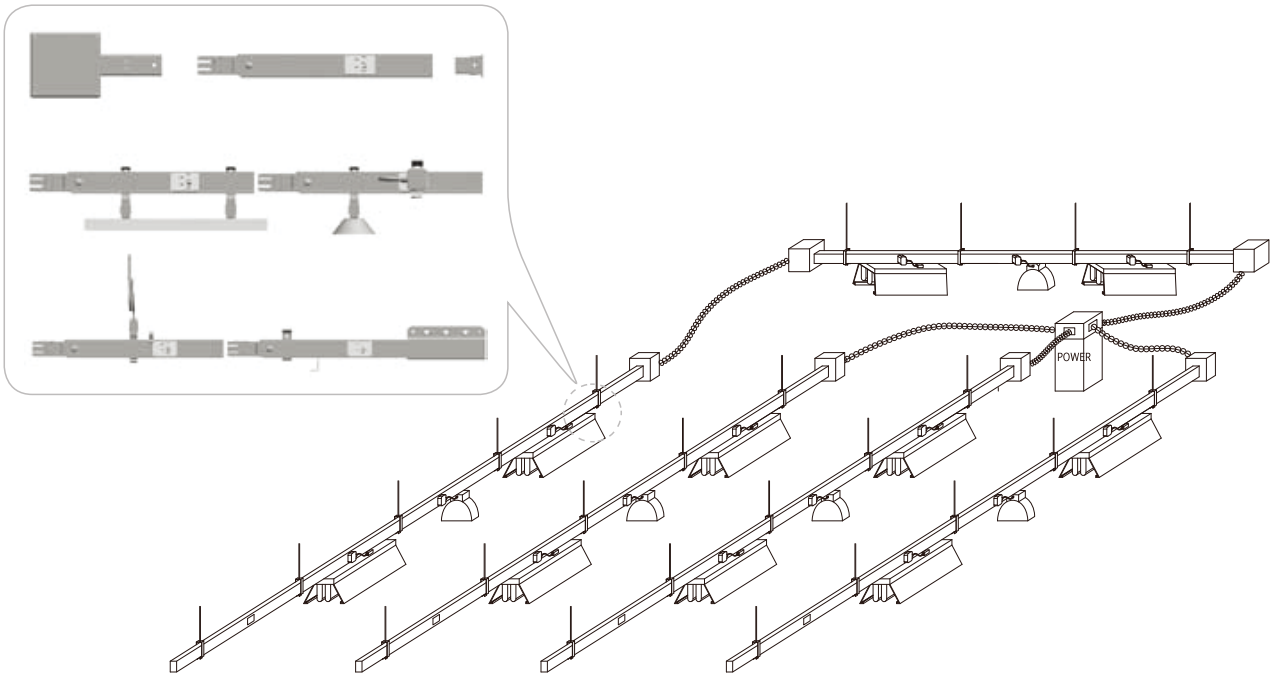
WavePro LTG is constructed with a high-quality extruded aluminum alloy housing with characteristics of light weight, compact size, high mechanical strength. WavePro LTG utilizes high-quality copper as bus conductors and Al housing to ground; copper conductors are enclosed with a environmental friendly low-smoke, halogen-free and flame retardant insulation.

WavePro LTG can be customized with multi-number of outlets per actual application, which is flexible for installation and power distribution to be adapted any complex situations.

WavePro LTG can be installed vertically as well as horizontally onto the truss, ceiling, wall and floor, which is very popular to energize such middle to large commercial lighting and low load situations as: airports, subway stations, workshops, exhibition halls, warehouses, shopping malls.

WavePro LTG mainly consists of straight lengths, feed units, terminal units, flexible elbows, tap-off units and accessories such as cable clamps, various fix brackets. All units and accessories are standardized and modularized during designing and producing in order to achieve installation and application easiness.

WavePro LTG



Features & Advantages

Compact and flexible

- WavePro LTG lighting busway will save space due to compact housing with size of 48 × 32mm compared with cables
- Various functional units can be applied to any corner, bypass obstacles, as well as change its height by using flexible elbows, which makes flexible to be adapt to any construction space

Safe and reliable plug unit

- WavePro LTG plug unit uses flame-retarded ABS plastic body with compact design, light weight, high strength, long life and excellent insulation
- The silver-plated spring stabs provide reliable electrical connection; longer grounding pin design makes contact first but leave last compared with phases pins to avoid shocking
- The clamps beside the plug unit can lock onto busway trunk and ensure reliable electrical contact and higher protective degree

Aluminum alloy housing

- WavePro LTG uses full aluminum alloy housing, lightweight, high strength, with up to protection degree of IP54
- WavePro LTG housing has excellent anti-corrosion, both electrical and thermal conductivity and housing has at least 50% equivalent grounding capacity
- WavePro LTG uses weak magnetic materials which minimizes magnetic hysteresis loss, enhance energy transferring efficiency and reduce the voltage drop of the system

Safe insulating material

- WavePro LTG Lighting busway uses environmental-friendly and halogen-free flame retardant materials, with low-smoke
- Supportive insulating parts are able to withstand pressure of glow wire at 960℃; Non-supportive insulating parts are able to withstand the pressure of glow wire at 650℃

Easy installation

- Each other connection between trunk units, feed units, terminal units, flexible elbows, joints just need "insertion" action to achieve the correct installation, electrically and mechanically
- There is a feature to prevent wrong insertion ensuring right connection with each other

Certification


KEMA
CERTIFICATE


KEMA


KEMA

Electrical Characteristics

Basic Electrical Characteristics

Rated Current (A)	Rated Voltage (V AC)	Rated Insulation Voltage (V AC)	Frequency (Hz)	Short Cicuit Withstand Current (t=1s) (kA)	Degree of Protection	Number of Wire	Material of Conductor	Cross Section of Conductor (L1, L2, L3, N) (mm^2)
25	415	690	50/60	0.69	IP40 / IP42 / IP43 / IP54	4	Cu	4
40	415	690	50/60	0.94		4	Cu	6
2 × 25	415	690	50/60	0.69		4	Cu	2 × 4
2 × 40	415	690	50/60	0.94		4	Cu	2 × 6

Tab. 4-1

Conduct Electrical Characteristics

Degree of Current	Single Phase Conductor	Protective Conductor	Voltage Drop				
	Mean resistance at an ambient temperature of 20℃ (R20)	Mean resistance at an ambient temperature of 20℃	Voltage drop of single phase (The three-phases network voltage drop is obtained by multiplying 0.866)				
A	$10^{-6}\Omega$/m	$10^{-6}\Omega$/m	V/100m/A				
			Power factor CosΦ=0.6	Power factor CosΦ=0.7	Power factor CosΦ=0.8	Power factor CosΦ=0.9	Power factor CosΦ=1.0
25	4609.3	301.3	0.50	0.58	0.66	0.73	0.80
40	3072.8	301.3	0.34	0.39	0.44	0.49	0.53

Tab. 4-2

Application Effect of Ambient Temperature

Ambient Temperature (℃)	Factor
35	1
40	0.95
45	0.90
50	0.85
55	0.80
60	0.75

Tab. 4-3

Within the ambient temperature of 35℃ , WavePro LTG Lighting busway can continuously operate at rated current while the maximum housing temperature rise will not exceed 55K.
If the busway is continuously operated at higher ambient temperature, it should be derated first, i.e. the busway current-carrying capacity=rated current × de-rating factor. (As shown in Tab. 4-3).

Weight of Busway

Type	Weight (kg/m)
25A	0.9
40 A	1.0
25 A +40 A	1.2
25 A ×2	1.1
40 A ×2	1.3

Tab. 4-4

Components Features

Straight Length

Fig. 5-1

Straight Length are basic for lighting busway and they are functional with just direct insertion "head" to "tail" simply.

- Aluminum alloy housing (size of 48 × 32mm), acting as PE, has good mechanical strength but lighter weight and highly aesthetic appearance
- Standard straight trunk is as long as 2m or 3m, while outlets' spacing is 0.5m or 1 meter. Non-standard lengths can be customized
- Protection degree up to IP54
- Fire retarded insulations are in line with the performance of GB and IEC standards (IEC 60695-2-1)
  -Supportive insulating parts are able to withstand the pressure of glow wire at 960℃
  -Non-supportive insulating parts are able to withstand the pressure of glow wire at 650℃

Span of Installation (m)	Concentrated Load (kg)	Average Load (kg)
2.0	18	27
2.5	14	24
3.0	12	18

Tab. 5-1

Feed Unit

Fig. 5-2

Feed unit is start unit for power supply to the lighting busway; the installation between a feed unit and a straight length is similar to two straight lengths connection each other, inserting joint into housing and pressing buttons in position to lock.

End Cover

Fig. 5-3

End cover (or terminal unit) completes the end of the lighting busway. The installation is similar to straight length.

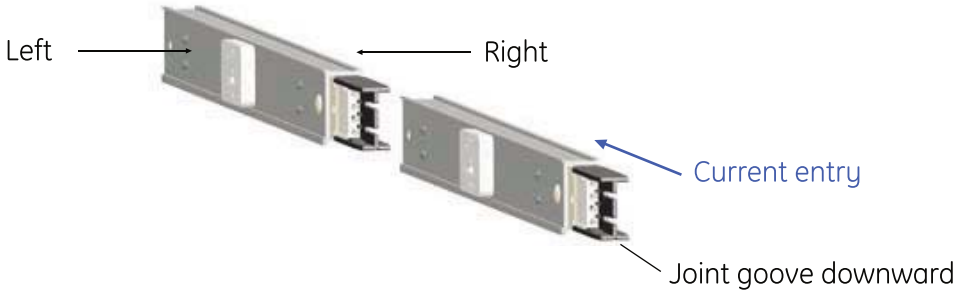
Flexible Elbow

Fig. 5-4

Flexible elbow consists of two feed units which are connected through a flexible tube. you can change the direction or height of the busway, or bypassing an obstacle by using the flexible length, the installation method is the same as joining two straight length. There are 0.5m, 1m in two standard lengths, while the non-standard lengths can be customized.

Specifications & Data

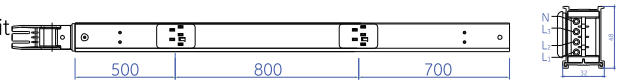
Straight Length



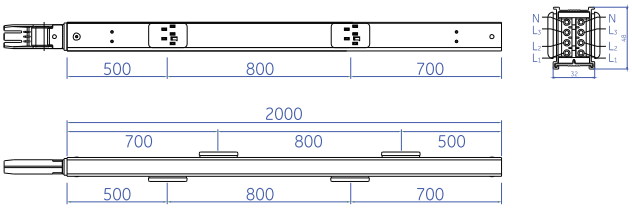
2m Single-circuit, dual-circuit dimension & layout of sockets

Unit: mm

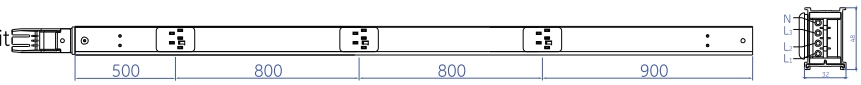
1 2m Single-circuit



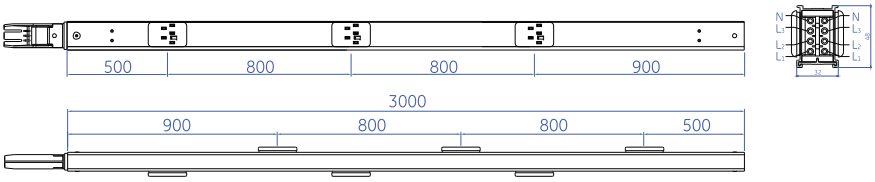
2 2m Dual-circuit



3 3m Single-circuit



4 3m Dual-circuit



Straigt length

- For the single-cuircuit busway, the unit with standard length of 2m has maximum 2 sockets, while the 3m has maximum 3 sockets
- For the dual-circuit busway, the unit with standard length of 2m has maximum 4 (2 for each side) sockets, while the 3m has maximum 6 sockets (3 for each side)
- More sockets are available for customized applications

Num	Cat. #	Number of Outlet	Rated Current (A)	Degree of Protection	Measures (m)
1	WPLTGBT2E0IP54-20	Left 2	25	IP54	2
2	WPLTGBF2F1IP54-20	Left2Right1	40 × 2		2
3	WPLTGBT3E0IP54-30	Left3	25		3
4	WPLTGBT3T3IP54-30	Left3Right3	25 × 2		3

Tab. 6-1

Please refer to Catalogue Numbering System for more.

Feed Unit

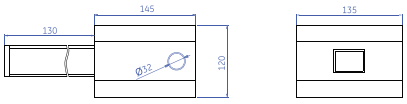
- Feed unit has insulation shield (dual-circuit line busway has separate two circuits)
- Three sides of the feed unit have sockets and drop-out holes which is in the right and left and the end sides
- Special sealed connector is selected to connect the flexible length
- Used to connect 2.5mm² -10mm² cable

Cat. #	Type	Rated Current (A)	Degree of Protection	Pipe length (m)
WPLTGFF0E0IP54-20	Feed Unit	40	IP54	2
WPLTGFF0F0IP54-20	Feed Unit	40 × 2		2
WPLTGFT0E0IP54-30	Feed Unit	25		3
WPLTGFT0T0IP54-30	Feed Unit	25 × 2		3

Tab. 7-1

Please refer to Catalogue Numbering System for more.

Unit: mm



Tap-off Unit (Plug)

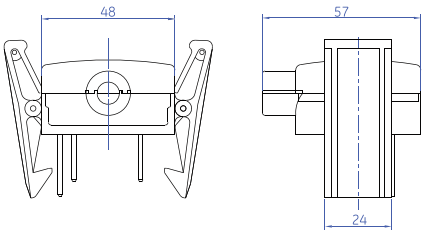
- Tap-off unit has 3 wires. It can be converted into L1, N, PE or L2, N, PE or L3, N, PE
- Flammability property meeting IEC60332-1
- Cable length and type can be nominated by the purchaser

Cat.#	Type	Degree of Current (A)	Phase	Degree of Protection	Cable length (m)
WPLTGP10L1IP54-10	Plug	10	L1	IP54	1
WPLTGP16L2IP54-20	Plug	16	L2		2

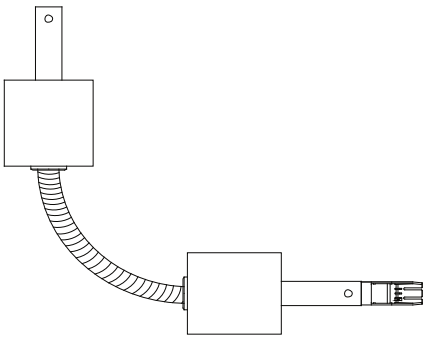
Tab. 7-2

Please refer to Catalogue Numbering System for more.

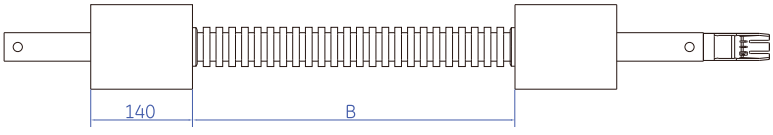
Unit: mm



Flexible Elbow



Unit: mm



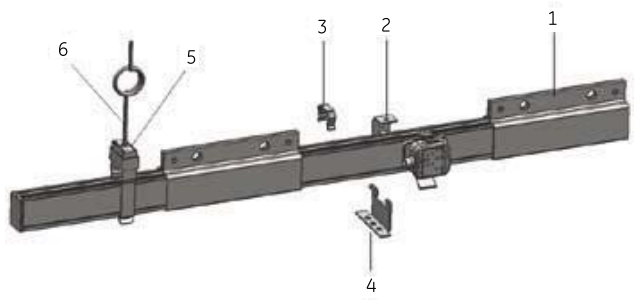
B is 0.5m typically.

Cat.#	Number of Outlets	Rated Current (A)	Degree of Protection	Pipe length (m)
WPLTGEE0T0IP54-05	0	25	IP54	0.5
WPLTGET0E0IP54-10	0	25		1
WPLTGEE0F0IP54-05	0	40		0.5
WPLTGEF0E0IP54-10	0	40		1

Tab. 7-3

Please refer to Catalogue Numbering System for more .

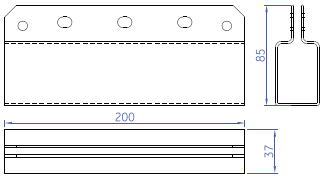
Accessories



Code	Description
1	Fixing Bracket
2	Snap Clamp
3	Cable Clamp
4	Fixing Clamp
5	Suspension Bracket
6	Mouse Hook

1 Fixing Bracket

Fixing bracket is used to suspend the lighting busway and fixtures wire cable or chain, it can also be used to support the joint area to improve mechanical strength.

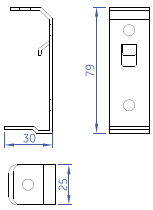


Unit: mm

Cat.#: WPLTGAHGB

2 Snap Clamp

Snap clamp is used to suspend the straight length or for the installation of the lighting fixtures (balanced load). It can be used to fix the selected straight length.

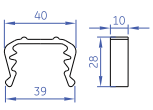


Unit: mm

Cat.#: WPLTGACLP

3 Cable Clamp

Cable can be fixed on a straight length by using cable clamp to simplify the line strike and save space.

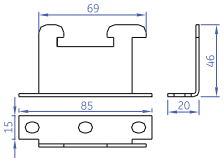


Unit: mm

Cat.#: WPLTGACBC

4 Fixing Clamp

Fixing clamp is used to fix and support the busway when the lighting busway is installed under the floor.

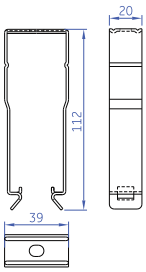


Unit: mm

Cat.#: WPLTGAFXS

5 Suspension Bracket

Suspension bracket is used to suspend and fix the busway when the lighting busway is installed under the ceiling.

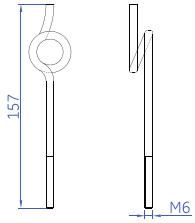


Unit: mm

Cat.#: WPLTGAFXB

6 Mouse Hook

Mouse hook is used in conjunction with the fix bracket to fix the lighting busway on the buildings.



Unit: mm

Cat.#: WPLTGAMHK

Application & Installation

Straight Length & Feed Unit

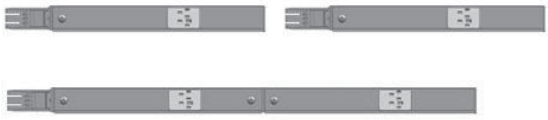


Fig. 9-1

The installation of two straight lengths is illustrated as below. Each length of the system plugs into the adjacent length with just a push, fitting the electrical and mechanical joint together. Ensure the joint is pushed fully together leaving no gap.

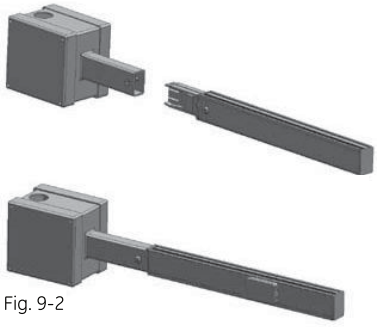


Fig. 9-2

The installation of the feed unit and straight length is the same as the installation of two straight lengths. The Feed unit plugs into the adjacent length with a push, fitting the electrical and mechanical joint together. Ensure the joint is pushed fully together leaving no gap.

Lighting Busway Typical Installation

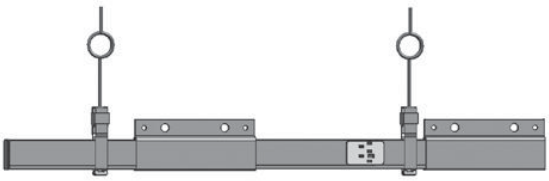


Fig. 9-3

The lighting busway will be fixed on the construction. Appropriate support accessories are to be selected for the installation. Fig. 9-3 shows the lighting busway's installation on the beam.

Other Installation Examples

1. Suspension Installation

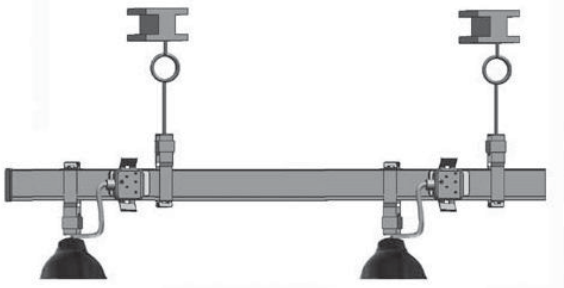


Fig. 9-4

2. Side Installation

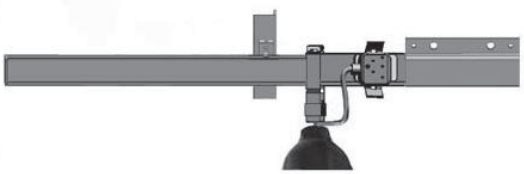


Fig. 9-5

Please refer to the installation instructions for details of the installatior

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WORLDWIDE PARTNER

SecoVac SecoGear

40.5kV Vacuum Circuit Breaker & Medium Voltage Metal-Clad Switchgear

GE imagination at work

More Than 80 Years of Interrupter Experience

GE pioneered experimental vacuum interrupters in the 1920's. Refined it and introduced the world's first vacuum interrupter distribution breaker in the 1960's. To date, this interrupter design has been the world leader in vacuum technology and has accumulated over 45 years of reliable field service.

World Class Quality

Manufactured, assembled and tested all in the same sophisticated facility, SecoVac is the product of state of the art manufacturing processes assured by ISO 9001:2000 and ISO14001 certification. Precision tooled parts, computer aided design and advanced production techniques, as well as the protection of the "E Coat" (cathodic electrocoating) paint process have resulted in a standard of excellence unmatched in the industry.

Universal Applications

SecoVac is designed, assembled and tested to meet or exceed applicable IEC, GB and DL standards. It is suitable for applications in all major industries including T & D, Oil & Gas, Automotive, Processing Plants, Iron and Steel mill, Mining, Commercial Buildings, etc.

It provides protection for all types of applications: cable, overhead lines, motors, capacitors, transformers, busbar sections, etc.

Environment Conscious

Selecting low environmental impact technologies has become increasingly important to engineers tasked with choosing equipment for an application. With commitment to environment protection, the solid insulation of epoxy resin is used for SecoVac series MV embedded pole vacuum circuit breaker instead of SF6 gas.

GE imagination at work

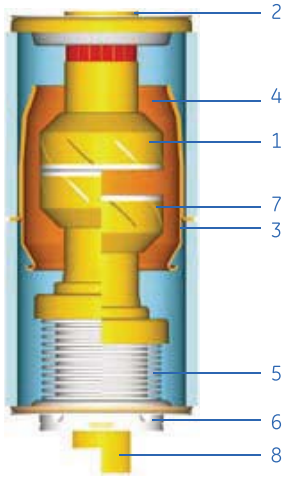
Predominant Vacuum Technology

Vacuum interrupting technology is nowadays the dominant switching principle in medium voltage. Innovative developments are leading to a continuously increasing market growth, based on the fundamental advantages such as reliability, availability, compactness and, last but not least, the environmental responsibility of the vacuum as a switching medium.

Vacuum Interrupter

The switching element of the vacuum circuit-breaker is the vacuum interrupter. It consists of an arc chamber, which is located between two ceramic insulators. Terminal studs connect the contacts to the external terminals. One contact is fixed within the housing, the other one is moveable. The metal bellows enable the contact movement and provide a hermetic connection to the interrupter housing. The contact stroke is only a few millimeters. The internal pressure in the vacuum interrupter is less than 10^{-7} bar. The vacuum circuit-breaker has no arc-quenching medium. The properties of the contact material and the contact geometry define the switching behavior and the switching capacity.

After contact separation, the resultant arc evaporates contact material from the contact surfaces. The arc current thus flows throw a material vapour plasma until the next current zero. Near the current zero, the arc is extinguished, and the metal vapour looses its conductivity within a few microseconds as a consequence of the recombination of the charge carrier ions. In this way, the contact gap is de-ionized and the dielectric strength restored very fast. The metal vapour condenses on the contact surfaces. Only a very small portion condenses on the arc chamber wall. The arc chamber wall has the function of a vapour shield, to prevent condensation of the metallic vapour onto the insulators.



1 Fixed contact piece
2 Connection disc
3 Ceramic insulator
4 Arc chamber
5 Metal bellows
6 Guide
7 Moving contact piece
8 Moving contact piece terminal

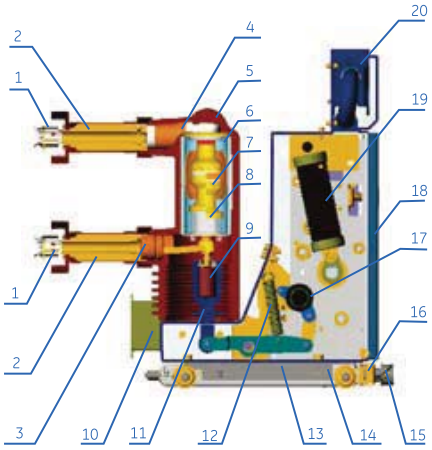
Unique and Proven Embedded Pole Technology

SecoVac series MV embedded pole vacuum circuit breaker uses the latest and mature technology of Automatic Pressure Gelation (APG) to embed the vacuum interrupter and connection terminals within epoxy resin. The vacuum interrupter is cast in the epoxy resin, without screw fixation which can cause the concentrated harsh electrical field and result in decrease of the electrical insulation strength of the pole. Thanks to the embedded pole technology, the assembly of the pole is simplified, and the assembly accuracy as well as quality of the embedded pole is easily to be controlled by the state of the art production process. The embedded pole technology will also improve the environmental resistant capability of the breaker, as the primary circuit of the breaker is completely embedded inside the epoxy resin, the risk of insulation fault caused by adverse operating environment such as dust, humidity, vermin, polluted ambient and high altitude operating site are eliminated thoroughly.

The key know how of the embedded pole technology is the buffering layer between epoxy resin and ceramic housing of vacuum interrupter, where the material and processing of the buffering layer is essential to ensure the integrity of epoxy resin of the embedded pole provide adequate adhesion between each other in any circumstance. Our patented LSR (Liquid Silicon Rubber) buffering layer and double APG (Auto Pressure Gelation) process adopted in the producing of the embedded pole thoroughly eliminates the cracking of the epoxy resin caused by the large difference of thermal expansion coefficient between epoxy resin and ceramic in case of rapid changing of the ambient temperature. APG process for LSR buffering layer ensures that there will not be any air gap or bubble between the buffering layer and ceramic housing, hence, the high electrical insulation strength of the embedded pole of SecoVac series MV embedded pole vacuum circuit breaker is guaranteed.

The partial discharge value of embedded pole manufactured by our patented LSR (Liquid Silicon Rubber) buffering layer and double APG (Auto Pressure Gelation) process is below 5pc with an applied testing voltage of 1.2Um.

Product Performance Features



1. Tulip Contact
2. Contact Arm
3. Lower Contact Terminal
4. Upper Contact Terminal
5. Embedded Pole
6. Vacuum Interrupter
7. Moving contact pieces
8. Metal Bellows
9. Disc Spring for Contact Pressure
10. Shutter Driving Plate
11. Insulated Coupling Rod
12. Opening Spring
13. Earthing Contact of Cart
14. Classis of Cart
15. Hole for Driving Screw
16. Locking Piece
17. Operating Shaft
18. Operation Cover
19. Closing Spring
20. Secondary Plug

Brilliant VCB and Switchgear

Modular Operation Mechanism

SecoVac series MV embedded pole vacuum circuit breaker is equipped with modularized, standardized and simplified operating mechanism, the mechanism consists of separated closing and opening modules, all the mechanical parts of the mechanism are integrated into these two modules . The closing and opening modules are universal to whole series of SecoVac embedded pole vacuum circuit breaker regardless of ratings. It means there is only one kind of closing and opening module for the whole SecoVac products family, thanks to such a design, the maintenance time and cost for the mechanism is low, and the replacement of modules can be easily carried out on site. There is no impact on the original dynamic characteristic of the breaker after the replacement of modules. After replacement of modules, the test should be applied.

Another feature of the operating mechanism of SecoVac series MV embedded pole vacuum circuit breaker is that the total number of parts of the mechanism is reduced compared with the traditionally designed mechanism, so that the reliability of the mechanism is enhanced significantly.

The opening damper of the mechanism plays a very important role to ensure reliable performance and high mechanical endurance of SecoVac series MV embedded pole vacuum circuit breaker. By adoption of the opening damper, the overtravel and re-bounce of moving contacts of vacuum interrupters during the opening of this VCB is reduced to a minimum. The lower overtravel of the moving contacts means lower mechanical stress to the bellow of the vacuum interrupter, so the designed mechanical endurance of the vacuum interrupter is guaranteed. The lower re-bounce of the contact ensures low arc re-striking probability during the breaking of capacitive current, so the occurrence rate of operating overvoltage is reduced.

Integrity, Flexibility and Reliability

SecoGear is designed, assembled and tested to meet or exceed applicable IEC standard. It incorporates the compartment concept with grounded metal barriers that segregate primary functions so that no live parts are exposed. Safety interlocks are standard, as are closed door racking and storage, breaker position indicator, and positively actuated safety shutters. SecoGear reliability is based on the usage of proven components. All components including the advanced SecoVac embedded pole vacuum circuit breaker, insulating materials, disconnect bushings, inter-unit bushing and instrument transformers have been strictly selected and have been qualified for 40 years lifetime through accelerated thermal aging tests. Combining the time-honored advantages of General Electric metal-clad switchgear - flexibility, quality and economy - with vacuum interruption's longer life, design simplicity, smaller size and weight, and reduced maintenance, SecoGear has built its own tradition of superiority.

The State of the Art Processing and Advanced Quality Control

The high quality of the embedded pole is achieved by using the latest APG (Auto Pressure Gelation) technology and advanced vacuum mixing and degassing technology that are carried out by the equipment. The Vogel clamping machine is an essential piece of equipment to ensure the mechanical and insulating strength of the embedded pole of SecoVac series MV embedded pole vacuum circuit breaker.

As well as the processing facilities, the testing facilities are also very important to the quality control of the breaker. In the manufacturing process of SecoVac VCB, from incoming material quality control to the final inspection and testing, every step is strictly calibrated and tested by means of testing facilities.

Breaker Features

Front Panel

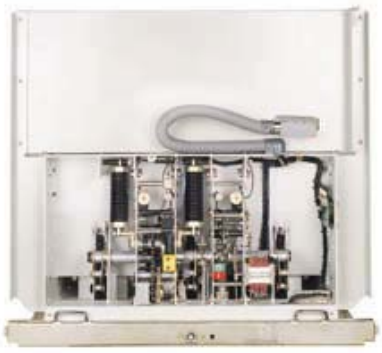
This front panel fits into a collar-frame in the equipment when the breaker is in the CONNECT position. It provides a metal barrier between the breaker compartment and the secondary device compartment. Well marked and easy-to-read operating controls and indicators include TRIP button, CLOSE button, OPEN/CLOSE indicator, CHARGE/DISCHRGE indicator, OPERATIONS counter and provision for manual charging the breaker.

Primary Disconnect

The primary disconnect finger set is rugged and easy to inspect., designed for optimum contact, built of silver-plated copper and tested for continuous and short time current. Cycloid design is more convenient to connect and expand wider contact area than flat design. These disconnects provide proper contact integrity throughout the life of the gear for the critical primary disconnect function.

Breaker Mechanism

All the mechanical parts of the mechanism are integrated into opening and closing modules individually. The closing and opening modules are universal to whole series of SecoVac embedded pole vacuum circuit breaker in spite of the ratings. Such design assures no mechanical readjustment after the replacement, thereby not only shortens lead-time but also reduces operation and maintenance cost.



Interlock System

For personnel safety, SecoVac is designed with a number of mechanical and electrical interlocks. For example, breaker contacts must be open before the breaker can be moved to or from the CONNECT position. A positive mechanical stop is provided when the breaker reaches the CONNECT or TEST/DISCONNECT positions. Mechanical interlocks are provided to permit only the insertion of properly rated breakers into any specific compartment. These and other necessary interlocks provide a comprehensive protection system. Furthermore, springs automatically discharge when the breaker is withdrawn from the CONNECT position and breakers cannot be inserted in the closed position.

Panel Features

LV Compartment

Located right above the cabinet, the compartment is equipped with component installation lattice inside to facilitate the installation of the relays. Wiring terminals and small busbar terminals can be installed at the bottom of the compartment. On the right and left side plate, there are holes at the place corresponding to the terminals for the coupling of small busbars between the cabinets. On the door of the compartment, there are electronic analog indicators for the main circuit to indicate the actual positions and status of the breaker, truck and earthing switches. Comprehensive protections and other control and operation devices can also be installed on the door to realize the function such as remote control, remote monitor and remote communication and local monitor.

CB Compartment

Located in the front of the cabinet, the compartment is equipped with pressurerelief on the top and six transformer-contact box module apparatus on the back. Inside the compartment, there is metal foldable protection movable door that opens or closes by driving the chain wheel with the chain. When the truck is moving from the test position toward the working position, the movement of the truck can be observed from the glass window on the front door. The position of the truck is to be indicated on the position switch. On the right upper part, there is an auxiliary socket with 64 cores, which is connected with the secondary plug of the breaker and controlled by mechanical interlock. When the breaker is at the working positions, the secondary plug can not be pulled out. On both sides of the compartment, there is secondary cable passage leading directly to the instrument compartment. There are openings on the door of the compartment for closing the door, emergent breaking and the crank of the truck to ensure the safety of the operators.

Cable Compartment

Located at the lower rear part of the cabinet, the compartment has separate pressure-relief passage. At the bottom of it, there are cable clips and covers for passing and fixing the primary cables. The cable connection terminal can be up 680mm from the ground. The rubber cable bushing at the bottom of the compartment can be bored according to the diameter of the actually passed cables to ensure the partition of the compartment from the cable chutes. Normally, 180mm^2 single core cross-linked cables can be installed, 4 pieces for each phase and 12 pieces in total as well as 400mm^2 single core cross-linked cables, 2 pieces for each phase and 6 pieces in total. Based on the requirement, earthing switches and zinc oxide arrestors can be installed in the compartment with reliable mechanical interlock between the earthing switches and the rear cover plate.

Busbar Compartment

Located at the upper rear part of the cabinet, the compartment is equipped with a pressure-relief window on the top. Between the neighboring cabinets, there are metal diaphragms as well as epoxy wall penetration bushing and rubber gaskets for passing the main busbar.
Tube busbar is selected for SecoGear. The main busbar current capacity is more than other traditional rectangle busbar. Thanks for this unique design, the skin effect is weaker thus we avoid more power loss while operating; this tube busbar also help SecoGear realize larger creepage distance than IEC required, which assure more safety and reliability.

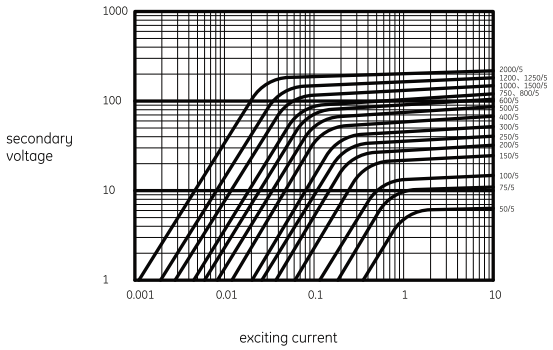
Panel Features

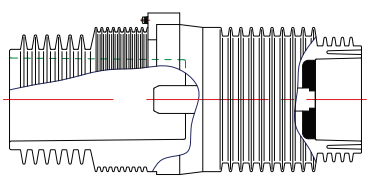
Reliable Interlock System

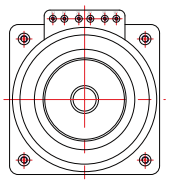
For personnel safety, SecoGear is designed with a number of comprehensive electrical and mechanical interlocks, which is declared as but not limited to:
a) When the earthing switch is under closing condition, the truck is unable to move from the off/test position toward the working position.
b) Only when the truck is at the off/test or test/disconnect position, can the earthing switch be closed.
c) Only when the breaker is under opening condition, can the truck be moved in and out; when the truck is at the transition between the test and working positions inside the cabinet, the breaker is unable to be closed.
d) When the truck is at the any position between the working position and the test position, the auxiliary circuit plug is unable to be pulled out. When the earthing switch is under opening condition, the cover plate on the back of the cabinet can't be opened. If the cover plate is not completely in place, the earthing switch can't be opened. When the cabinet door is closed, the truck can be moved in and out manually and the breaker as well the earthing switch can be opened and closed.

Integrated CT with Static Contact Box

For compact design concern, GE has worked out this current transformer-contact seat module apparatus that has obtained China patent right. (Seperate CT is also available as customer's requirement.)
The integral current transformer for this partition contact box has a penetration construction, is composed of the iron core, primary coil and secondary coil and cast in the way of epoxy encapsulation to form the main insulation and external insulation at the same time.
The transformer can either hold two windings respectively for measurement and protection or only act as the partition insulation bushing with no secondary windings. The product is small in size, light in weight and strong in adaptability.

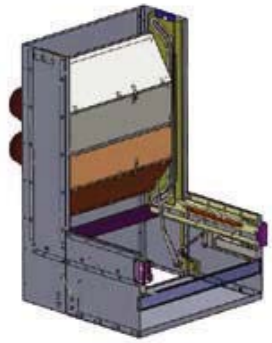


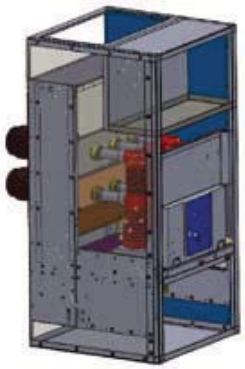




Unique & Considerate Design - L-Frame

Considering easier assembly for panel, GE offers L-Frame option for VCB application. L-Frame panel kits are manufactured to meet current medium voltage industry standards. The designs are certified, providing a modular building block approach for installation into new and existing switchgear configurations. For any special application, please contact GE for further solution.





Technical Data

Technical Data of SecoVac

Description	Unit	Data
Rated voltage	kV	33/36/38/40.5
Rated current	A	1250/1600/2000/2500
Rated frequency	Hz	50/60
Rated power frequency withstand voltage (1min)	kV	95
Rated lightning impulse withstand voltage (peak value)	kV	185
Rated short circuit breaking current	kA	25/31.5
Rated short time withstand current (3S)	kA	25/31.5
Rated peak withstand current	kA	63/80
Rated peak making current	kA	63/80
Electrical endurance	No. of times	E2 IEC 62271-100:2006
Mechanical endurance	No. of times	M1
Operating sequence	-	O-0.3s-CO-180s-CO O-180s-CO-180s-CO
Rated auxiliary control voltage*	V	AC 110/220; DC110/220
Opening time	ms	＜40
Closing time	ms	＜80

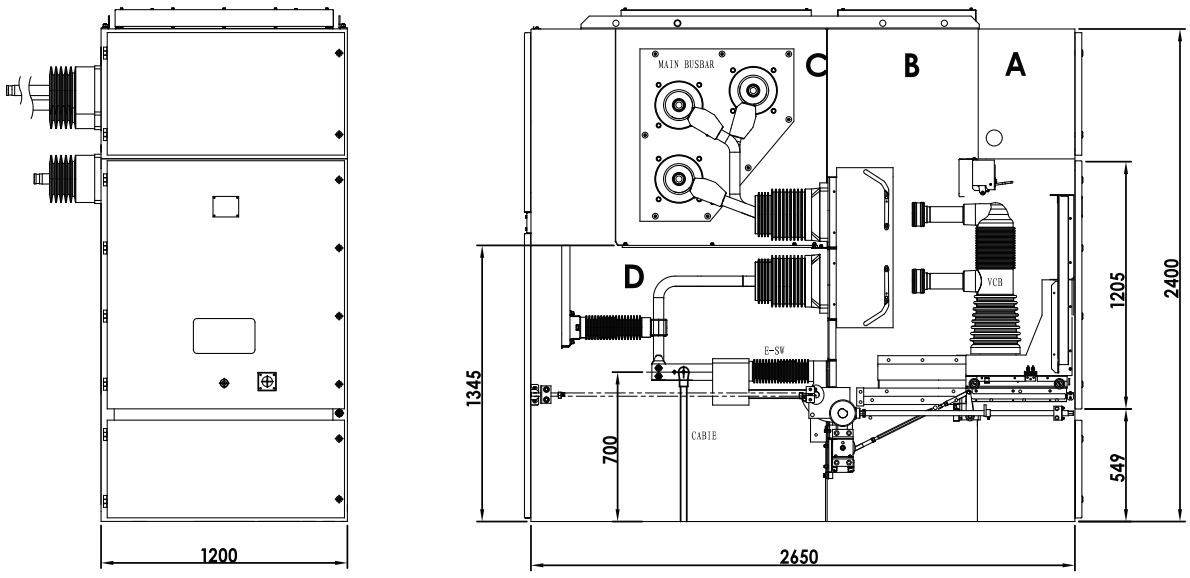
*Other voltages are available on request.

Technical Data

Technical Data of SecoGear Switchgear

Description		Unit	Data
Rated voltage		kV	33/36/38/40.5
Rated frequency		Hz	50/60
Rated insulation voltage	Rated power frequency withstand voltage/1 minute	kV	95
	Lightning impulse withstand voltage (peak value)	kV	185
Rated current of busbar		A	1250/1600/2000/2500
Rated current of T-off busbar		A	1250/1600/2000/2500
Rated short time withstand current (3s)		kA	25/31.5
Rated peak withstand current (peak value)		kA	63/80
Ingress protection			Panel IP4X, Compartment IP2X

*Direct current resistance of current transformer



SecoGear cross section view

Normal Service Conditions:

Ambient temperature: the temperature of the ambient air shall not be higher than +40°C and not lower than -15°C and the mean value measured within 24h shall not exceed +35°C.

Ambient humidity:
The average of relative humidity measured in 24h shall not be more than 95% and the monthly average not more than 90%.

Height above the sea level shall not be more than 1000m.

Seismic intensity is not more than 8 degree.

The asperity under the operation condition free of flammable gas and fire, danger of explosion, condensation and dirt: in accordance with the specification in level 1 in IEC62271-200: 2003.

Note: when the relative humidity is above 70%, the heater shall be switched on to prevent condensation.
When the normal service condition is different from the above mentioned, please consult the manufacturer.

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WORLDWIDE PARTNER

SecoRMU

12kV-24kV New Compact Gas Insulated Ring Main Unit

Leading the future of electrification

GE imagination at wo

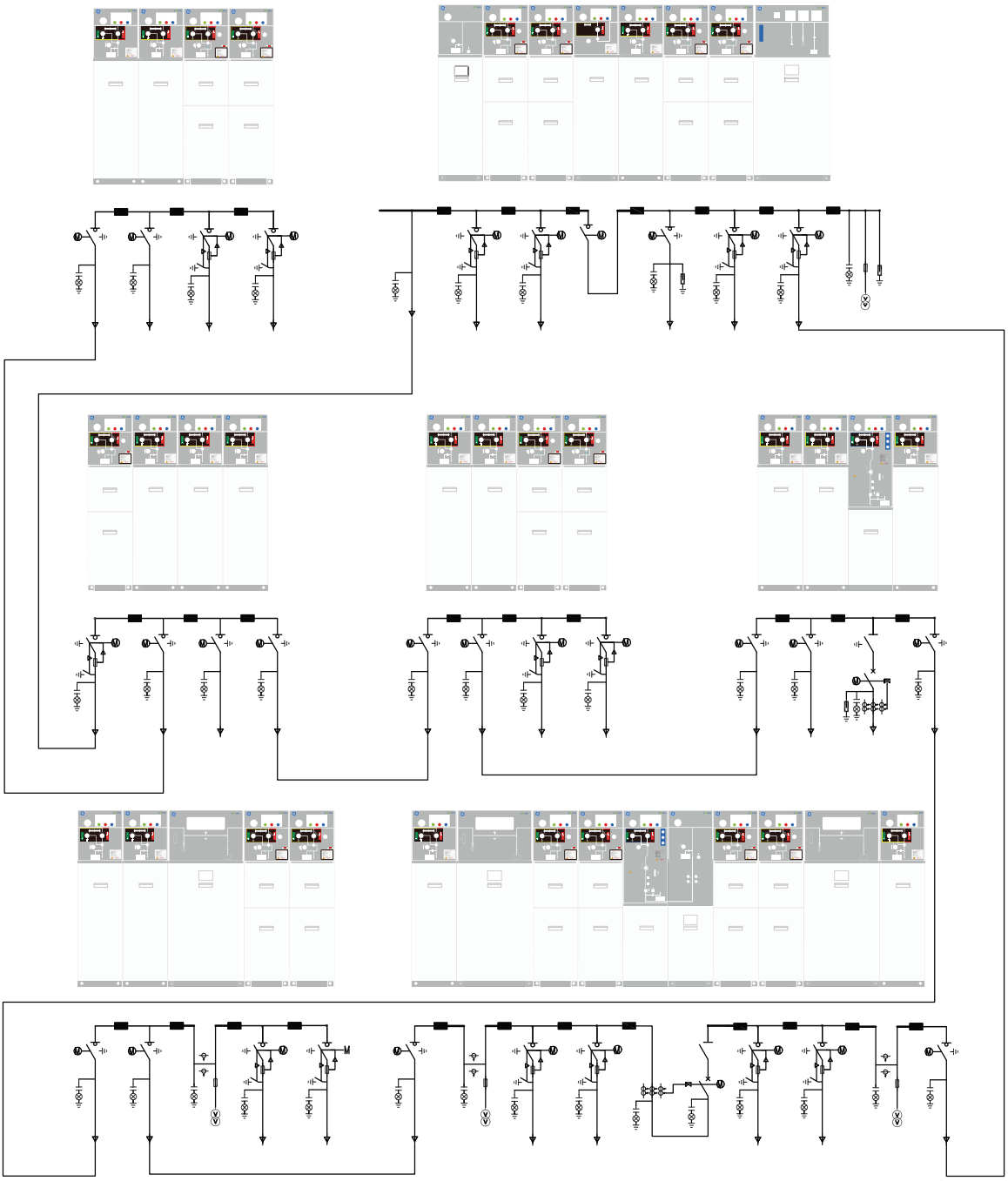
SecoRMU

12kV/17.5kV/24kV New Compact Gas Insulated Ring Main Unit

Applications

The traditional 12kV/17.5kV/24kV primary distribution network is mainly arranged as a radial network, or arranged as a combination of radial and tree network. Since many users are connected in "T" form to a power line, any maintenance or fault on the power line will make all the users connected suffering power off. Power supply system is not reliable enough. Today, ring power supply systems are helping to improve reliability and widely used in secondary distribution networks.

SecoRMU is such a kind of medium voltage switchgear used in ring power supply network. With the features of completely sealed, modular design, flexible combination and extension, SecoRMU provides integrated solutions for most switching applications in urban-rural power cable upscale, power distribution network, wind farm, industry, O&G, underground installation, as well as municipal construction, commercial buildings, residential and other construction field.



Operating conditions

Normal operating conditions

The switchgears are fundamentally designed for the normal service conditions for indoor switchgears to IEC 60694.

- Ambient temperature
  - -Maximum: + 40°C
  - -Minimum: -25°C
- Humidity
  - -Max daily average relative humidity: 95%
  - -Max monthly average relative humidity: 90%
- The maximum site altitude is 1000m above sea level

Special operating conditions

4000m high altitude RMU is avaiable. Special operating conditions, please contact GE.

In accrodance with IEC60694, the manufacturer and end-user must agree about special operating conditions which deviate from operation under normal conditions. The manufacturer/supplier must be consulted in advance if especially severe operating conditions are involved.

SecoRMU is designed for use in the following applications:

- Power Grid
- Industrial Power Supply
- Compact secondary substations
- Wind power plants
- Commercial buildings
- Mining applications
- Airports
- Railway systems
- Underground installations

Features & Benefits

Modular, Professional, High performance

SecoRMU gas insulated ring main unit is a compact, modularized, extendable or fixed gas insulated ring main unit with all the primary conductive system sealed in a stainless SF_6 gas tank, providing customers a safe, reliable, high-performance and free maintenance product.

Small and Compact

SecoRMU uses vacuum circuit breaker and adopts SF_6 gas as the insulated medium in the gas tank. SF_6 has strong electronegativity and excellent dielectric insulating performance. Its insulating strength is about 2-3 times of air in uniform electric field. The excellent insulating performance of SF_6 gas helps SecoRMU to realize small and compact structure, as well as safety and reliability.

Fully Modular Design/ Free Extendable

The basic functional module unitsK, T, V, B,C have uniform dimensions: 350×800×1380mm (width×depth×height). Convenient for system design, and realize flexible replacement and upgrading.
Each unit can extend to the left or right freely. Special designed busbar connectors make the combination and extension of SecoRMU switchgear simple, safe and reliable.
Big cable compartment also ensures convenient cable installation and connection.

Safe and Reliable

Both the gas tank and the cable compartment is internal arc classified (up to 20kA-1s), in order to ensure maximum personal safety.
Three position switch for natural interlocking.

Environment Independent

SecoRMU is environment independent because its primary conductive system is fully sealed in an SF_6 gas tank and will not be influenced by the outside world. 3mm high quality stainless steel, ensures the gas tank strong strength .
The gas tank passes water immersed test, reaching IP67 protection grade.
Fuse compartment is inside the gas tank and independent to environmental conditions.
SecoRMU realizes no clearance splicing for installing an extension, which is independent of the impact of dew, dust, salt fog, small animals, chemical substances, etc., and can be used in various severe conditions.

Advanced and Integrated Solutions

Adopting international advanced design, manufacturing and testing process, SecoRMU series ring main units have simple structures, flexible operations and reliable interlocks.
With the advanced sensor technology and up-to-date microcomputer protection relay, SecoRMU provide integrated solutions to meet different requirements of the users.

Maintenance Free

The gas tank is filled with SF_6 and sealed for life after filling. Its sealing is systematically checked by automatic helium leakage detection process at the factory, ensuring less than 0.02% annual leakage rate, gives the switchgear an expected lifetime of 30 years. No maintenance of live parts is necessary after the SecoRMU's breaking, which make the power distribution system more reliable.

Standards

SecoRMU is manufactured and tested in accordance with the latest version of:

IEC62271-200	High-voltage switchgear and controlgear – Part 200: AC metal-enclosed switchgear and controlgear for rated voltages above 1kV and up to and including 52 kV
IEC60265-1	High-voltage switches – Part1: Switches for rated voltages above 1 kV and less than 52 kV
IEC62271-100	High-voltage switchgear and controlgear – Part 100: High-voltage alternating-current circuit-breakers
IEC62271-105	High-voltage switchgear and controlgear – Part 105: Alternating current switch-fuse combinations
IEC60282-1	High Voltage Fuses –Part 1 Current limiting fuses
IEC62271-102	High-voltage switchgear and controlgear – Part 102: Alternating-current disconnectors and earthing switches
IEC62271-1	The Common specifications for high-voltage switchgear and control gear standards
IEC376-1971	Specification and acceptance of new Sulfur Hexafluoride
IEC 60529	Degrees of protection provided by enclosures (IP code)
IEC 60694	Common specifications for high voltage switchgear and controlgear standards

Product Type

SER -□-□/□□□□

Cable's entrance or exit mode
L: left entrance-exit R: right entrance-exit
LR: both sides entrance-exit NA: non entrance-exit

Extension mode
I: left extendible D: right extendible
ID: both sides extendible NA: not extendible

Rated current
630: 630A rated current

Rated voltage
12: 12kV rated voltage 17: 17.5kV rated voltage 24: 24kV rated voltage

Type of ring main unit
K: load switch unit T: load switch-fuse combined unit
V: vacuum circuit breaker unit B: bus tie unit C1/C2: bus bar lift unit*
M: measurement unit* PT: PT unit* P: Power supply unit
(Common-tank ring main unit is combined freely by individual module units. For example, KT denotes a two-unit common-tank ring main unit made of one load switch unit and one load switch-fuse combined unit.)

Product type

For example:

SER-V-12/630ID is a vacuum circuit breaker unit with 12kV rated voltage and 630A rated current, both sides extendible.

SecoRMU-KKT-12/630 is a three-unit common-tank ring main unit, made of two load switch units and one load switch-fuse combined unit, with 12kV rated voltage and 630A rated current, not extendible.

*Note: C1/M/PT Air insulated
C2 SF_6 gas insulated

Main Technical Data

12/17.5/24kV SecoRMU Rating and electrical performance

ITEM		Unit	Load Break Switch Unit	Switch Fuse Unit	Vacuum Circuit Breaker Unit	Bus Tie Unit
Rated Voltage		kV	12/17.5/24	12/17.5/24	12/17.5/24	12/17.5/24
Rated Current		A	630	(1)*	630	630
Rated Frequency		Hz	50 /60	50/60	50/60	50 /60
Rated power Freq withstand voltage (1 min)		kV	28/38/50	28/38/50	28/38/50	28/38/50
Rated lightening impulse withstand voltage (peak)		kV	75/95/125	75/95/125	75/95/125	75/95/125
Rated short-circuit making current		kA (peak)	52	82	52	52
Rated short time withstand current (main circuit)		kA	20 – 3s	-	20 - 3s	20 – 3s
Rated short-circuit breaking current		kA	-	31.5	20	-
Rated peak value withstand current		kA (peak)	52	-	52	52
Operating Sequence		-	-	-	O-0.3s-CO-180s-CO O-0.3s-CO-15s-CO	-
Electrical Endurance Capability class		-	E2 for load switch	E2 for load switch	E2 for breaker	E2 for load switch
Transfer Current		A	-	1400	-	-
Rated mainly active load-breaking current		A	630	(1)*	-	630
Rated closed-loop breaking current		A	630	-	-	630
Rated cable-charging breaking current		A	16	-	31.5	16
Rated earth fault breaking current		A	10	-	-	-
Rated cable- and line-charging breaking current under earth fault conditions		A	45	-	-	45
Mechanical Endurance		times	5000	5000	10000	5000
Dimension (W × D × H)		mm	350 × 800 × 1380	350 × 800 × 1380	350 × 800 × 1380	350 × 800 × 1380
Weight		kg	160	180	200	160
Internal arc degree	Cable compartment		20kA 1s			
	Gas tank		20kA 1s			
IP Degree	Enclosure		IP3X			
	Gas tank		IP67			
SF_6 Gas pressure at 20℃			0. 03Mpa-relative			
SF_6 Gas Annual Leakage Rate			<0.1%			
Thickness of stainless steel gas tank			3.0mm			
Electric operation control voltage			24/48/110/220V DC 110/220V AC			

(1)* Depending on the current rating of the fuse-link. Please refer to transformer-fuse selection table in page 32.

GE Energy
Industrial Solutions

WORLDWIDE PARTNER

Wave Cast

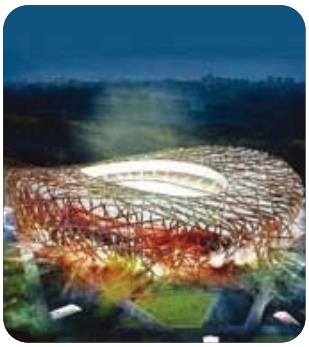
Dry-type Power Transformers

GE imagination at work

Wave Cast Transformers

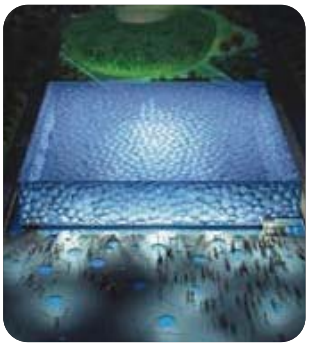
Reliability, flexibility, efficiency and safety

Wave Cast coil transformers from GE are characterized by proven technology, application flexibility, lower installation cost, operating efficiency and environmental acceptability. Advanced design of the winding assembly establishes superior performance to meet today’ s exacting needs. Indoors or out, they are designed for use in the most demanding and diverse environments and in all applications requiring reliable electrical power.



Typical applications of cast coil transformers include:

- Steel mills
- Industrial critical power solutions
- Windmills
- Offshore drilling platforms
- Pulp & paper mills
- Chemical plants
- Cement & mining operations
- Automotive industry
- High rise building & water-side installations



Cast coil transformers boast several advantages over alternative transformer technologies.

- Mechanical strength. Because of the strong protection provided by the vacuum cast epoxy encapsulated coils, Wave Cast transformers are stronger than either liquid or ventilated dry-type transformers. Short circuit tests have proven this strength well beyond IEC and ANSI requirements. GE designs and manufactures its cast coils to be among the strongest in the industry. The strength of Wave Cast transformers makes them ideal for such applications as impact loading, mobile machinery and transit systems.
- Impervious to adverse atmospheric conditions. Unlike ventilated dry-type transformers and in a manner similar to liquid filled transformers, GE Cast Coil transformers are optimal for application in harsh environments. The epoxy casting is extremely inert and renders the windings impervious to moisture, dirt and most corrosive elements.
- Suitability for simple indoor installations. Unlike the case with liquid filled transformers, indoor installations do not require an automatic fire extinguishing system or fire vault, oil checking or replacing, or a liquid confinement area.
- Extended ratings. GE cast coil transformers can be provided with the highest self-cooled and fan-cooled extended ratings of any transformers in their size class.
- High efficiency and environmental safety. Wave Cast coil transformers have several distinct advantages over dry and liquid filled transformer. The main advantage of a cast coil transformer is that the polyester glass and epoxy resin provides excellent mechanical strength and eliminates conductor movement since both the primary and secondary windings are completely capsulated in the epoxy resin. As with other dry transformer, the electromagnetic force under short circuit conditions tends to push the secondary winding into the core, while driving the primary winding away from the core. In addition to using the strength of the conductor material and winding geometry, the cast coil design incorporates the concrete-like epoxy-conductor matrix. Wedging sticks are placed between the secondary windings and the core legs to center the coils on the core legs. The primary winding is completely embedded in a block of epoxy, which prevents any winding movement.

  The epoxy resin essentially makes the cast coil transformer impervious to harsh environments and has no potential adverse affects on the environment. Thus it can be used virtually in any application. Another advantage is that the cast coil transformer has a higher efficiency rating than liquid or dry transformer.

Vacuum cast windings

Tough epoxy provides the strength.

Wave Cast vacuum cast windings are highly engineered components, requiring specific expertise in electrical, material, thermal and mechanical engineering. The process of measuring, mixing, heating and vacuum casting materials into the windings is equally critical.

Cast coils are solid vacuum cast with epoxy resin compound. The epoxy is applied under vacuum to hermetically seal the windings in a highly durable epoxy. Quartz filler is included, which provides increased viscosity to the resin, better impregnation and increased capability to withstand short circuits. The epoxy mixture is carefully designed to provide maximum strength and environmental protection and yet minimize the temperature differential through the coil thickness. Process control ensures that the coils are void-free and prevents partial discharges within the resin material or cracking of the epoxy over a wide range of ambient and operating temperatures

The principal advantage of solid vacuum cast construction is that the cast coils seal out harmful fumes, air and moisture, preventing them from entering the windings. The solid cast transformer achieves a maximum degree of resin impregnation during the casting process.

Other advantages of vacuum cast construction include:

- Dielectric strength - Windings are corona-free at twice the rated voltage.
- Mechanical strength - Short circuit capability meets and exceeds the requirements of IEC60076-11:2004 and IEEE standard C57.12.91-2001.
- Thermal strength - Withstands fluctuating operating temperatures ranging from -40℃ to 180℃ without damage to the epoxy insulation.
- Insulation system - Tested to ANSI/NEMA and IEC standards, turn-turn and layer-layer electrical insulation components (polyimide film) are recognized at 180℃.

Winding assembly

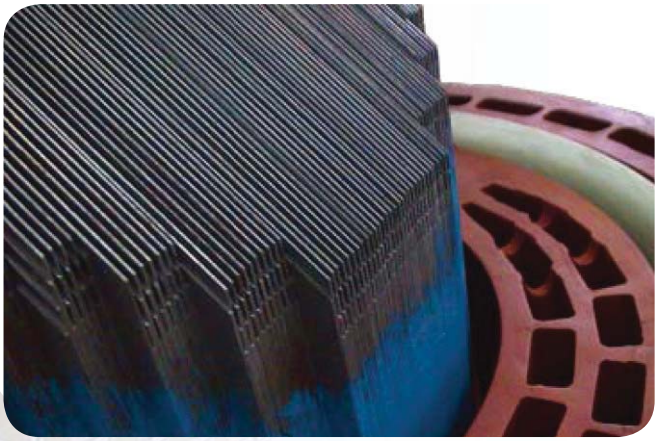
High and low voltage windings are vacuum cast in metal molds as separate concentric cylinders.

High voltage windings are wound using strip foil technology. Multiple layers of polyimide film (180˚C system) provide turn insulation. Individual coil sections are wound directly onto the HV winding form and then connected in series by welding. Molds are assembled around the completed high voltage coils and placed in a vacuum chamber. Coils are pre-heated under high vacuum to remove trapped moisture. A special mixture of epoxy resin and quartz powder flows into the mold through an opening in the molding assembly. After pouring, the molds are cured in a time-temperature process controlled oven. The result is a reliable, vacuum cast winding with an unusually high-strength essentially void free assembly capable of withstanding high electrical stress.

Low voltage windings use sheet conductor construction. A fiberglass mesh provides support for the inside of the winding. Full-width sheet conductor and SCC layer insulation is wound onto the cylinder. Start and finish lead bars are TIG welded to the sheet conductor. Low voltage windings are also vacuum cast in a metal mold using the same technique as the high voltage windings.

Why strip foil windings?

- High power frequency and impulse-voltage strength
- Virtual absence of partial discharges
- High short-circuit strength
- Low noise levels
- Low hotspot temperature rise differential



Cores

Construction ensures optimal performance.

Transformer cores utilize mitered step-lap technology to optimize performance and minimize sound levels. Cores are constructed of non-aging, high permeability, grain-oriented silicon steel laminations without punched holes offering high magnetic permeability.

Core laminations are free of burrs and stacked without gaps, resulting in the lowest possible losses from magnetic hysteresis and eddy currents. The core clamping brackets are designed to provide an even distribution of clamping forces to the core yokes and legs and are rigidly braced to reduce sound levels and losses.

Other core construction benefits include:

- Magnetic flux densities, kept well below saturation point
- Surfaces of the core, clamps and tie rods are all treated against corrosion

Enclosures

Withstands the harshest indoor and outdoor environments.

Enclosures are suitable for lifting, jacking, rolling or skidding with provisions for lifting the transformer from its base. The standard indoor enclosures are IP20, IP30 and NEMA 1, Category C construction.

While core and coil technologies have been enhanced to combat caustic and humid environments, Wave Cast transformers are further protected by properly designed enclosures. GE enclosures are custom fabricated using heavy gauge sheet steel. Optional aluminum and stainless steel enclosures are available.

Additional protection against harsh outdoor or indoor environments is provided through electrostatically deposited dry powder paint baked onto a phosphate treated surface. The paint finish is neat, clean and highly resistant to corrosion.

A variety of optional enclosures is available: drip proof roofs, supplemental filters, screens, hinged panels and special hardware. Other modifications can also be made to extend the enclosure, add bottom plates, add end sheets and/or include special cutouts for specific applications.

Accessories

Temperature monitor/fan controller

The controller can display the operating temperature of windings, control fans and provide temperature alarm, ensuring effective monitoring and protection of the transformer.

The PT100 sensors are inserted into each LV winding to send the temperature signal, which can be displayed on the panel.

Controller Panel

Main function:

- Setting alarm temperature level
- Record the maximum temperature in non-volatile memory,
- Send fault signal and alarm
- Send audible over-temperature alarm, alarm signal and trip signal
- Start and stop fans automatically or manually (optional)
- Provide communication interface (optional)

Cross flow fan

The low noise cross flow fan can reduce the winding temperature, enhance the overload ability, and prolong the service life of transformer.

The rated power of transformer can be increased by 25-40% when forced air-cooling is used.

Cross flow Fan

Roller

4 rollers can be equipped under a transformer or enclosure to facilitate moving in two directions.

Technical specifications

Standard products

		IEC	ANSI / IEEE
Phases		3	
Conductors		Copper or Aluminum	
Frequency (Hz)		50	60
Primary Voltages (kV)		Up to 35	
Secondary Voltages (kV)		Up to 10	
Power (kVA)		160 - 10,000	
Off-load tapping range		±2×2.5%, ±5% *	
Insulation class		F (155℃) or H (180℃)	150℃or 180℃
Ambient temperature (℃)	Max	≤40	
	Min	≥-5 (indoor), ≥-25 (outdoor)	≥-30
Altitude (m)		≤1,000	
Connection		Dyn5, Dyn11, YNd11, Yyn0 and others	
Cooling		AN, AN/AF, AF	AA, AA/FA, AFA

* Other taps are available on request.

Accessories / options

- Enclosures: IP20, IP21, IP23, NEMA 1, NEMA 3R and others
- Space heaters
- Thermostat for space heaters
- 120/240V fans for forced-air cooling ratings
- Temperature monitor/fan controller
- Rollers

Special design or application

- Larger power
- Higher secondary Voltage
- Special ambient
- Special altitude
- On-load tap changing
- High overload capacity
- Low loss
- Special short-circuit impedance
- Special usage

Applicable standards

- IEC 60076-11:2004

Dry-type transformers

- IEEE C57.12.01-2005

General requirements for dry-type distribution and power transformers including those with solid-cast and/or resin-encapsulated windings.

Technical specifications

Phase number	Frequency	Service condition	Tapping range of HV winding	Connection symbol	Insulation class	Temperature rise limit
3	50 Hz	Normal condition according to IEC60076-11: 2004	±2×2.5% or ±5%	Dyn, Yyn, Yd, YNd	F	100K

Copper windings, distribution transformers

HV Um=12kV LV Um≤1.1kV

Rated Power	kVA	200	315	400	500	630	800	1000	1250	1600	2000	2500	3150
No-load Loss	W	700	1000	1080	1250	1300	1550	1800	2000	2600	3400	4000	5000
Load Loss 75℃	W	2280	2990	3520	4100	5300	6500	7210	8570	10700	12800	15400	20000
Load Loss 120℃	W	2600	3400	4000	4650	6000	7350	8100	9600	12000	14400	17000	22000
Short-circuit Impedance	%	4	4	4	4	6	6	6	6	6	6	6	6
Noise LPA	dB	46	46	46	48	48	50	50	50	52	54	56	58
Length	mm	1170	1230	1260	1310	1410	1470	1500	1580	1700	1890	2010	1970
Width	mm	750	750	750	750	750	920	920	920	920	920	1170	1270
Height	mm	930	1040	1110	1160	1170	1280	1400	1440	1570	1570	1620	1960
Weight	kg	1040	1330	1500	1750	2010	2310	2710	3190	3920	4930	5730	6400
Distance Between Rollers	mm	660	660	660	660	660	820	820	820	820	820	1070	1070

HV Um=24kV LV Um≤1.1kV

Rated Power	kVA		315	400	500	630	800	1000	1250	1600	2000	2500	3150
No-load Loss	W		1100	1200	1400	1500	1800	2100	2400	2600	3500	4300	5000
Load Loss 75℃	W		2990	4050	4920	6020	6500	7470	9440	10700	12800	15400	20000
Load Loss 120℃	W		3400	4600	5600	6800	7350	8400	10600	12000	14400	17000	22000
Short-circuit Impedance	%		6	6	6	6	6	6	6	6	6	6	6
Noise LPA	dB		48	48	50	50	52	52	52	54	56	58	60
Length	mm		1380	1370	1400	1530	1590	1650	1710	1850	2010	2100	2130
Width	mm		750	750	750	750	920	920	920	920	1170	1170	1270
Height	mm		1220	1290	1360	1360	1400	1500	1650	1760	1800	1830	2060
Weight	kg		1520	1620	1850	2080	2550	3050	3570	4500	5450	6070	7050
Distance Between Rollers	mm		660	660	660	660	820	820	820	820	1070	1070	1070

HV Um=40.5kV LV Um≤1.1kV

Rated Power	kVA					630	800	1000	1250	1600	2000	2500	3150
No-load Loss	W					1840	2100	2450	2800	3200	3900	4600	5500
Load Loss 75℃	W					6020	7100	8000	11600	12900	13900	17500	21500
Load Loss 120℃	W					6800	8000	9000	13000	14500	14600	20000	23500
Short-circuit Impedance	%					6	6	6	6	6	6	6	6
Noise LPA	dB					54	56	58	60	60	62	62	62
Length	mm					1670	1680	1770	1800	1890	1950	2100	2280
Width	mm					920	920	920	920	1270	1270	1270	1270
Height	mm					1560	1580	1620	1900	1960	2180	2180	2180
Weight	kg					2600	2800	3500	3900	4600	5700	6700	7700
Distance Between Rollers	mm					820	820	820	820	1070	1070	1070	1070

Other powers and voltages are available on request.

Technical specifications

Aluminum windings, distribution transformers

HV Um=12kV LV Um≤1.1kV												
Rated Power	kVA	315	400	500	630	800	1000	1250	1600	2000	2500	3150
No-load Loss	W	900	1000	1200	1300	1600	1800	2150	2600	3300	4000	5000
Load Loss 75℃	W	3100	3500	4200	5380	6600	7100	8400	10800	12800	14500	19500
Load Loss 120℃	W	3500	4000	4800	6100	7500	8100	9600	11600	14000	16000	21000
Short-circuit Impedance	%	4	4	4	6	6	6	6	6	6	6	6
Noise LPA	dB	46	46	48	48	50	50	50	52	54	56	58
Length	mm	1310	1320	1350	1520	1560	1610	1680	1740	1860	2070	2130
Width	mm	750	750	750	750	920	920	920	920	920	1170	1170
Height	mm	1090	1200	1300	1310	1410	1550	1640	1800	1840	1890	2050
Weight	kg	1300	1500	1700	1880	2200	2580	3060	3760	4300	5500	6400
Distance Between Rollers	mm	660	660	660	660	820	820	820	820	820	1070	1070

HV Um=24kV LV Um≤1.1kV												
Rated Power	kVA	315	400	500	630	800	1000	1250	1600	2000	2500	3150
No-load Loss	W	1200	1300	1500	1600	1700	2000	2400	3000	3500	4000	5000
Load Loss 75℃	W	3100	3500	4300	6350	7700	7400	9300	11200	12800	14500	19500
Load Loss 120℃	W	3500	4000	4900	7300	8700	8400	10600	12500	14400	16000	21000
Short-circuit Impedance	%	6	6	6	6	6	6	6	6	6	6	6
Noise LPA	dB	48	48	50	50	52	52	52	54	56	58	60
Length	mm	1470	1470	1490	1590	1620	1780	1770	1890	1980	2130	2210
Width	mm	750	750	750	920	920	920	920	920	1170	1170	1170
Height	mm	1350	1390	1410	1420	1520	1650	1770	1930	1960	2040	2180
Weight	kg	1550	1650	1900	2000	2150	2650	3300	4060	4850	5800	6900
Distance Between Rollers	mm	660	660	660	820	820	820	820	820	1070	1070	1070

Other powers and voltages are available on request.

Copper windings, power transformers

HV Um=40.5kV LV Um>1.1kV													
Rated Power	kVA	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500
No-load Loss	W	2700	3200	3600	4300	4500	5400	6500	8300	9000	11000	12800	14500
Load Loss 75℃	W	8500	10600	11200	13500	16000	21000	25000	3000	34000	40000	46000	55000
Load Loss 120℃	W	9600	12000	12800	15000	18000	24000	28000	34000	38000	47000	55000	62000
Short-circuit Impedance	%	6	6	6	7	7	8	8	8	8	9	9	9
Noise LPA	dB	58	60	60	61	61	62	62	63	63	65	65	67
Length	mm	1950	2010	2070	2150	2100	2430	2500	2760	2780	3000	3150	3300
Width	mm	920	920	920	1270	1270	1270	1270	1675	1675	1675	1675	1675
Height	mm	1700	1800	1880	1960	2180	2130	2260	2300	2370	2660	2750	2950
Weight	kg	3700	4500	5100	6150	6650	7850	9250	11500	13200	15300	18100	22500
Distance Between Rollers	mm	820	820	820	1070	1070	1070	1475	1475 (W) 2040 (L)	1475 (W) 2040 (L)	1475 (W) 2040 (L)	1475 (W) 2040 (L)	1475 (W) 2040 (L)

Other powers and voltages are available on request. Aluminum windings are available as well.

IP23 outdoor enclosure

IP30 enclosure

Technical specifications

Enclosures

Rated power (kVA)	Nominal Outline Dimension																			
	Length (mm)									Width (mm)					Height (mm)				
	1600	1800	2000	2200	2400	2600	2800	3000	3200	1200	1400	1600	1800	2000	1800	2000	2200	2400	2800
315	①	②	②							①②					①②				
400	①		②							①②					①②				
500	①		②							①②					①	②			
630		①	②	②	③					①	①②	③			①	①②	③		
800		①	①	②	③						①②	③			①	①	②③		
1000		①	①	②	②	③	③				①②	③				①	①②③		
1250			①	②	②	③	③				①②	③				①	①②	③	
1600			①	①	②	③	③	③			①②	③					①	①②③	
2000				①	①	②	③	③			①	①	②③	③			①	①②	③
2500				①	①	②	③	③	③			①	②③	③			①	①②	③
3150					①	②	②	③	③			①	②③	③				①	①②③

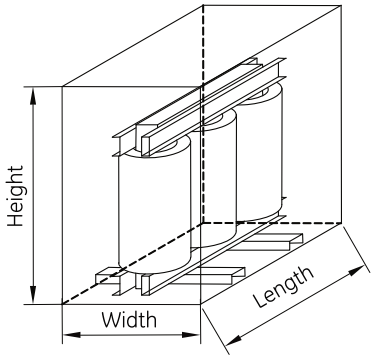
Notes: ① – HV Um=12kV, ② – HV. Um=24kV, ③ – HV Um=40.5kV;

Outline dimensions of enclosure are related with not only rated power and primary voltage of transformer, but also conductor material used. Please contact us for your specific application.

Available connecting method

- Cable top in-coming or out-going
- Cable bottom in-coming or out-going
- Busbar top out-going
- Busbar lower side out-going
- Busbar upper side out-going

Other connecting methods, Please contact us.



Standard enclosure type

- IP23, NEMA 3R for outdoor installation
- IP20, IP21, IP30, NEMA 1 for indoor installation

Tests

Tests are performed in accordance with IEC60076-11:2004 or IEEE C57.12.91-2001.

Routine tests

Each cast coil transformer is submitted to a complete set of routine tests for ensuring transformer reliable.

- Measurements of winding resistance
- Measurement of voltage ratio and check of phase displacement
- Measurement of insulation resistance
- Measurement of short circuit impedance and load losses
- Measurement of no-load losses and current
- Separate-source AC voltage withstand voltage test
- Induced AC withstand voltage test
- Measurement of partial discharge

Type tests

Type test is performed in case of new design or important design modification in order to confirm that the quality of transformer is compliance to related standard. They can be carried out according to custom request.

- Temperature-rise test
- Lightning impulse test

Special tests

Can be performed upon request

- Sound level test
- Short-circuit test

Wave Cast had pass the following tests:

- Short-circuit test at KEMA USA on one 2.5MVA transformer
- All the routine, type and special tests at CTQC witnessed by KEMA on both one 1600kVA 11/0.4kV copper winding transformer and one 2000kVA 20/0.4kV aluminium winding transformer. (KEMA report)
- All the routine, type and special tests at CTQC (China Transformer Quality Center) on one 2MVA distribution transformer
- All the routine, type and special tests at CTQC on one 10MVA power transformer
- The C2 climatic class, E2 environmental class, F1 fire behaviour class tests at CTQC
- Vibration test withstand the acceleration a_g of the horizontal 0.6g and vertical 0.3g at Tongji University

Standard insulation level

IEC

Highest Voltage for equipment Um (r.m.s) (kV)	Rated short duration separate source AC withstand voltage (r.m.s) (kV)	Rated lightning impulse withstand voltage (peak value) (kV)
≤1.1	3	-
3.6	10	40
7.2	20	60
12	28	75
17.5	38	95
24	50	125
36	70	170

ANSI/IEEE

Nominal Voltage (kV)	Low-frequency voltage insulation levels (r.m.s) (kV)	Basic lightning impulse insulation level (crest) (kV)
1.2	4	10
2.5	10	20
5	12	30
8.7	19	45
15	31	60
25	37	110
34.5	50	150

ANSI/IEEE standard sound leveL

Rated power (kVA)	Self cooled (db)	Fan cooled (db)
300	55	67
500	60	67
800	64	67
1000	64	67
1600	66	68
2000	66	69
2500	68	71
3150	70	71
5000	71	73

Certificates

ISO 9001:2000 Certification awarded by Bureau Veritas Certification (BVQI) Hongkong

2.5MVA 12.47kV power transformer short-circuit test report at KEMA USA

1600kVA 11kVCopper winding transformer test report of KEMA

2000kVA 20kV Aluminium winding transformer test report of KEMA

10MVA 35kV power transformer test report at CTQC

Vibration test report at Tongji University

Typical Solutions& Installation Guide

Outdoor Switching Substation

The outdoor ring main unit substation adopts metal-enclosed prefabricated structure, with excellent mechanical strength. Its protection degree can reach IP33, which protect the machine against the harmful effects due to the ingress of water and solid foreign objects (like small animals).

Ventilation

The shutters can be opened symmetrically on the left and right, up and down. The panes are lined with removable good-quality thin net plates.

Thermal Insulation

The roof is lined with double-layer high-quality heat insulation foam.

Anti-condensation

The slope of the roof is designed more than 3°. The big roof cover, combined with good ventilation, prevent the switching substation from condensation.

Typical combination	Dimension (Width × Depth × Height mm)
3-way unit	1350 × 1200 × 1750
4-way unit	1700 × 1200 × 1750
5-way unit	2050 × 1200 × 1750
6-way unit	2400 × 1200 × 1750
Metering unit + 4-way unit	2300 × 1200 × 1750
Metering unit + 5-way unit	2650 × 1200 × 1750
4-way unit + metering unit + 2-way unit	3000 × 1200 × 1750

GE
Lighting

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WORLDWIDE PARTNER

2013/2014
LED Catalogue

Immagination at work

GE Innovation History

Nowadays, GE lighting has become one
of the biggest lighting system supplier in the world

About GE Lighting

GE Lighting invents with the vigor of its founder Thomas Edison to develop energy-efficient solutions that change the way people light their world in commercial, industrial, municipal and residential settings. The business employs over 16,000 people in more than 100 countries, and sells products under the Reveal and Energy Smart consumer brands, and Evolve, GTx, Immersion, Infusion, Lumination and Tetra commercial brands, all trademarks of GE. General Electric (NYSE: GE) works on things that matter to build a world that works better. For more information, visit http://www.gelighting.com/LightingWeb/apac/.

FORTUNE 2012 WORLD'S MOST ADMIRED COMPANIES
Industry Champion
2012 Amenico's and Warld's Most Admired Companies

BusinessWeek
Business week
2010 World's most innavative companies

BusinessWeek
Business week
2012 Best Globat Brand

BARRON'S
《BARRON'S》
2012 Most Respected Global Company

BusinessWeek
Ranked#1
2010 Company for Leaders

World's Best R&D COMPANIES
《R&D》
2007 World's Best R&D Companies

As a London 2012 Sustainability Partner and a Global Olympic 2012 sponsor, GE Lighting has worked alongside the London Organising Committee of the Olympic Games (LOCOG) to deliver a series of lighting projects.

To mark the Olympic Games and Paralympic Games GE Lighting has transformed London's iconic Tower Bridge with a new state of-the-art lighting system – designed to enhance its architectural features and replace static lights with bulbs that can vary in intensity and colour, while at the same time cutting energy consumption considerably. The famous landmark will also feature giant suspended Olympic Rings and Paralympic Agitos for the 45 days of the Games. GE will be illuminating the rings, as well as smaller versions in Belfast, Edinburgh and Cardiff using its powerful LED Floodlights and working in conjunction with all the major cities' councils to ensure that once again, the installations can be reused after the Olympic Games come to a close.

GE Lighting also has provided energy efficient, low impact lighting solutions for permanent as well as temporary lighting installations that will either continue to deliver energy savings for years to come or allow lamps to be re-used in projects around the city after the Olympic & Paralympic Games end in September 2012.

Case introduction

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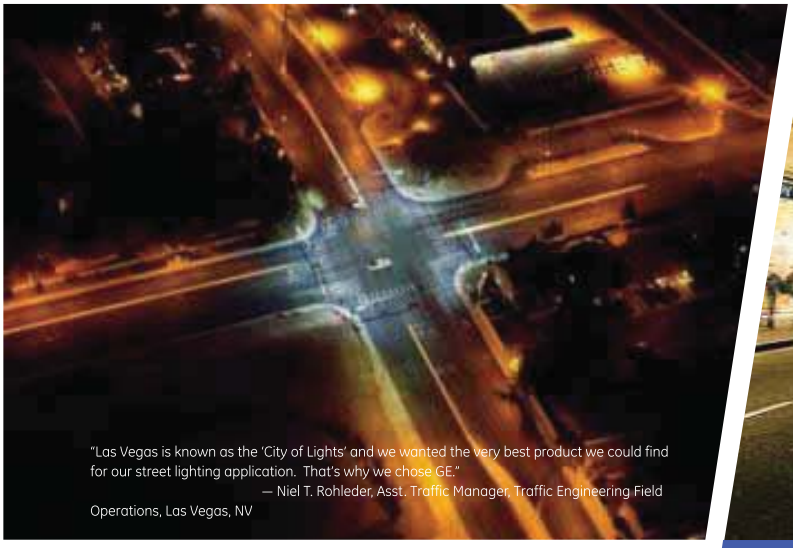
Las Vegas, NV



"Las Vegas is known as the 'City of Lights' and we wanted the very best product we could find for our street lighting application. That's why we chose GE."
— Niel T. Rohleder, Asst. Traffic Manager, Traffic Engineering Field Operations, Las Vegas, NV

Situation:

Las Vegas was looking for an efficient street lighting solution to reduce their annual energy consumption, as well as their annual maintenance expenses.

GE Lighting Solution:

The city is replacing nearly 41,600 mercury vapor and high-pressure sodium (HPS) lights on arterial streets and residential thoroughfares throughout Las Vegas with efficient GE Evolve LED Roadway Cobrahead fixtures.

Operating Impact

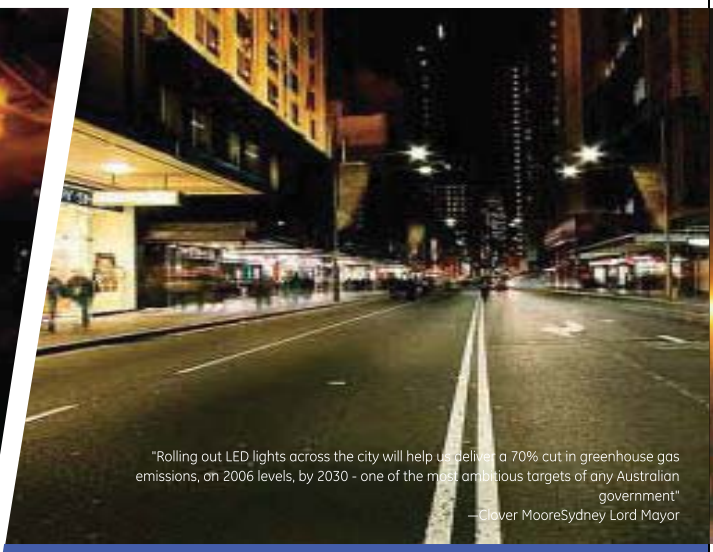
Energy savings of up $1.7 million annually
Reduction of 20 million kWh per year
Maintenance savings of $1 million annually

Environmental Impact

12,000 metric tons CO2 emissions eliminated per year
= >2,300 cars off the road OR = >3,200 acres of new trees

City of Sydney Australia

SYDNEY



"Rolling out LED lights across the city will help us deliver a 70% cut in greenhouse gas emissions, on 2006 levels, by 2030 - one of the most ambitious targets of any Australian government"
—Clover MooreSydney Lord Mayor

Situation:

In order to meet 2030 City's vision to make Sydney Green & global, City of Sydney are planning to replace lamps in Smartpole lighting, Park Lighting and other public domain lightings. All Locations and all 6448 fittings are currently using HID lamp technology, among which 87% are metal halide and 13% are Mercury Vapor. It aims to reduce in electricity consumption & green house gas emissions by a minimum of 40%.

GE Lighting Solution:

To meet customer's needs, GE lighting provides LED R250, Iberia and Duna to replace the current systems. LED lamps offer much longer lifespan. At the same time, the white light makes eyes more comfortable when people are driving.so it guarantees more safety. This lighting solution also saves much maintenance cost.

Operating Impact

USD509,502 energy savings per year
lifetime: current system 14,000 hrs Vs LED solution 50,000 hrs
much lower maintenance cost

Environmental Impact

4,359,076 lbs per yr CO2 emissions eliminated
= 378 cars off the road OR = 540 acres of new trees

Xi'an Mingguang Road, China

"GE products are of good quality. We are satisfied with the excellent energy saving and stable operation benefits."
— Bai Tao, Project Director, Construction Department, Xi'an Economic & Technological Development Zone

Situation:

This is the application of GE LED R150 at Xi'an (ETDZ) Economic and Technological Development Zone. Customer required high-quality and energy-saving lighting solutions. They chose GE LED R150, which awarded US NGL2009 Best Performance.

GE Lighting Solution:

Considering excellent light distribution, GE recommended LED road fixture R150. The length of main road is ca. 5000m, and width 24-27m. After simulated calculation, we provided professional lighting solution: 530 pcs of LED R150 157W road fixtures arranged on both sides of the road, with 35m interval, 11m height, which achieved 18.5 lux ave. and 0.6 uniformity.

Operating Impact

$25,984 energy savings per year
9.7 Year simple project payback
0% fewer lamps replaced

Environmental Impact

0.33MM lbs per yr Co2 emissions eliminated
=29 Cars off the road OR=41.4 acres of new trees

Spicy Stores， Brazil

"In addition to improving product presentation, the newly adopted efficient technology reduces operational costs in each of our units and contributes to our expansion plans."
— Leandro Mourão Ianes, Spicy marketing supervisor.

Situation:

The first Spicy Store opened in 1996 at a time specialized retail started to flourish in Brazil. With 33 stores already open across the country and an expansion plan in place, Spicy turned to efficient lighting for energy consumption and operational costs reduction.

GE Lighting Solution:

Spicy decided to change 2 thousand 50 watt halogen lamps in all of its 33 stores for GE's Energy Star 10 watt LED PAR 30 lamps, saving the retail chain 80% in energy consumption and 58% in maintenance costs over the life of the systems. In addition the LED solution prevents discoloration of the products and furniture.

Operating Impact

80% energy savings
58% maintenance savings
11 months ROI

Environmental Impact

404,142 lbs of CO2 reduced annually
=75 cars off the road OR=107 acres of new trees

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National Auto Museum

Situation:

Retrofit of >600 90W PAR38 halogen lamps utilized to illuminate more than 200 vintage automobiles (including The Harrah Collection) on display at the National Automobile Museum in Reno, NV.

GE Lighting Solution:

GE's energy smart 17-watt LED PAR38 lamp was initially desired for energy and maintenance savings, but was ultimately selected due to it's high color rendering index (CRI) value and lens design.
The visual comfort lens provided an evenly diffused light and prevented distracting indirect glare from individual LED dots reflecting off of the automobiles' paint.

Operating Impact

$28K in total operating savings annually
$18K in annual energy savings
<1 year simple payback period

Environmental Impact

260K lbs. per year CO2 emissions eliminated
= 23 cars off the road OR= 32 acres of new trees

*: 1 USD= 6.30633 RMB

Grand Hyatt Hotel, Indonesia

Situation:

Grand Hyatt Hotel Jakarta is located in Plaza Indonesia which is one of the most sophisticated commercial superblocks. The hotel has been using Hal 35/50W for its bedrooms and bathrooms, which were not energy efficient. The customer want an green lighting solution.

GE Lighting Solution:

GE Offered LED 4.5W GU10 and LED 9W E27 to light up the newly upgraded hotel bedrooms and bathrooms. Customer satisfied with this lighting solution because it saved energy and reduced maintenance cost dramatically. It is up to 94% energy saving and No IR, which can decrease the consumption of Air-conditioning systems.

Operating Impact

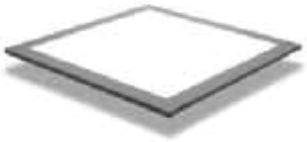
$194.000 energy savings per year
0.85 year simple project payback
1250% fewer lamps replaced

Environmental Impact

2,987,600 lbs per yr CO2 emissions eliminated
= 259.2 cars off the road OR= 370.4 acres of new trees

GE YATRON 日騰
Authorized P.B / Distributor | Intelligence Makes The Dream Come True | WWW.YATRON.COM.CN

Thomas Cook



Situation:

As part of its commitment to reduce its environmental impact high street travel agent Thomas Cook is looking to reduce energy consumption across its 900 retail stores. Thomas Cook is trialing a new lighting scheme developed by GE Lighting.

GE Lighting Solution:

Throughout the ambient areas of the store, GE Lighting used Lumination, an industry leading 600sq LED panel. Within the accent applications, GE Lighting has used its LED Infusion Module embodied into a Compact Lighting Downlight.

Operating Impact

Compared to fluorescent technology. Lumination achieves energy savings of up to 70%, eliminates maintenance costs for over 10 years.

Environmental Impact

Carbon footprint and energy reduction.

Cirebon Super Block Mall, Indonesia

Situation:

Cirebon Superblock is a new world-class shopping mall located at Cirebon, West Java. The customer was looking for energy-saving lighting solutions with high quality products which could conform to their brand image.

GE Lighting Solution:

GE Proposed a full energy saving lighting solution, which including LED Tetra Series, LED and CMH Lamp. We offered CMH 70 & 35W , LED 20W PAR38 lamps for indoor use; Biax DBX 26W, 18W, Tetra AL10 systems, Tetra PowerMAX and miniMAX for indoor column, ceiling, cove and outdoor/ facade. Only consider Tetra AL10, it realized more than 78 thousand wattages annual energy saving, which provide good visual experience by better illumination, CRI and uniformity.

Operating Impact

Lower electricity cost
Longer service life and reduced maintenance cost

Environmental Impact

162,206 lbs per yr CO2 emissions eliminated
= 14 cars off the road OR= 20 acres of new trees

Holiday Inn

"It only makes sense to use the greenest signage solution possible."
— Angela Brav, Chief Executive, InterContinental Hotel Group

Situation:

Replace 9,300 signs that will impact operating costs by impacting energy and maintenance savings, while increasing reliability. This project builds brand consistency and helps to foster their brand relaunch.

GE Lighting Solution:

By recommending GE Tetra Lumination products, GE was able to deliver an efficient solution on tight deadlines. While increasing energy efficiency, GE Tetra signage products will dramatically reduce energy costs and maintenance costs.

Operating Impact

$4.4 MM total operating savings annually
$1.4MM in energy savings annually
$3 MM in maintenance savings annually

Environmental Impact

19.1 MM lbs. per yr. CO2 emissions eliminated
Equivalent to planting 2,300 acres of new trees

Tune Hotel Ipoh, Malaysia

"The lighting design is compact and pleasing to the eyes. It also enhances the comfort of the guest as it produces little heat and is not glaring to the eyes."
— Andy Loh, Project Manager, Project Team, Tune Hotel Regional Services Sdn Bhd

Situation:

Tune Hotel will open 30 new hotels in Southeast Asia and UK in 2012 and intends to invest RM60 to 90 Million in cost saving technology for them as well as an upgrade to current operational hotels. They aimed to reduce its energy costs by 30%-40% via green technology and be the first branded budget chain in Asia to be certified to the standards of Malaysia's GBI.

GE Lighting Solution:

GE proposed the Tetra miniMAX LED system for the outdoor signage which proves to be outstanding and bright during nightfall. We have also proposed LED Batten for indoor lighting such as ceiling lights. After installation, the lighting level reached a good result in 100lux with 0.5 uniformity and the project achieved 42% energy saving.

Operating Impact

USD 63000 energy savings per year
1.6 year simple project payback

Environmental Impact

824999 lbs per yr CO2 emissions eliminated
= 71.6 cars off the road OR= 102.3acres of new trees

GE imagination at work

Contents

Any update of data in this catalogue will not be informed. Please contact GE Lighting for detailed information.

LED Indoor

LED Lamp

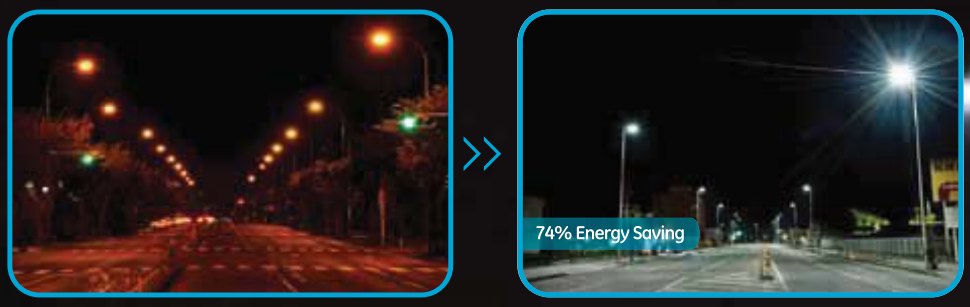
LED Fixture

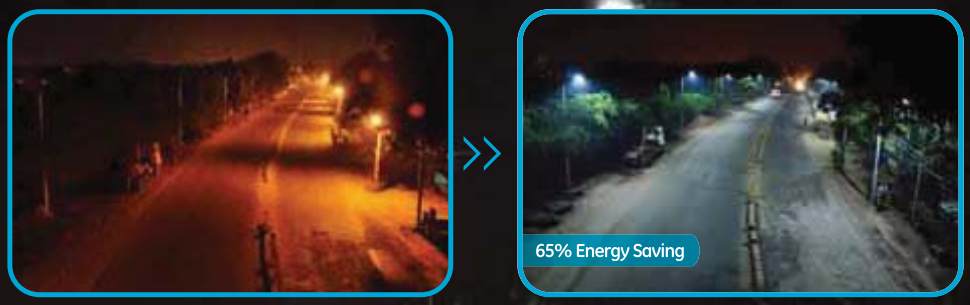
LED Module

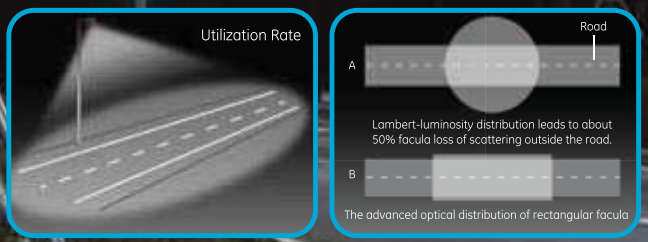
LED Specialty

	Problems of LED Outdoor products	GE solution
1	Undesirable secondary light distribution result in dark space/zebra crossing	Professional secondary light distribution and optical design achieve maximum homogeneity and usage
2	Serious lumens depreciation and high device fault rate in a short period	50,000 hours 80LM is guaranteed with strict testing and quality control
3	Glare is strong or local illumination is unable to achieve the minimum standards	Comfortable lighting,consider the light distribution and minimum illumination from the view of eyes comfort and reach the light standard
4	The illuminated area is without control , obvious light pollution	The most efficient light casting to the specific angle

Before and after use LED Roadway lighting







LED Outdoor

Roadway

Tunnel

Parking

Park/walk

Building

Roadway

With the upgrading of LED and the introduction of new technology, GE will provide more competitive and reliable products, which will better satisfy customers' demands and help customers to realize more energy-saving, environment-friendly and reliable solutions of LED.

R150 Pro

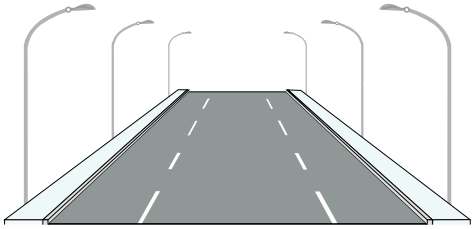
R250

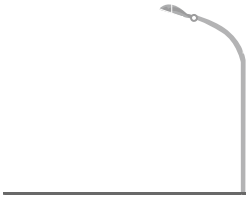
R250 Pro

ERS

Definitions of Roadway Lighting

- Lav (cd/m^2): Luminance of the road surface averaged overthe carriageway
- LPD (W/m^2): Light Power Density
- Eav (lux): Horizontal illuminance averaged over a road area
- Uo: Ratio of the minimum to average luminance over a defined area of the road surface viewed from a specified observer position (Uo=Lmin/Lav)
- Ul:Ratio of the minimum to maximum luminance along a longitudinal line through the observed position on the carriageway (Ul=Lmin/Lmax)
- TI: Measure of the loss of visibility caused by the disability glare of the luminaires of a road lighting installation
- SR: Average illuminance of strips just outside the edges of the carriageway in proportion to the average illuminance on strips just inside the edges





H : Mounting height(m)
L : Luminaire spacing (m)
W: Road width (m)
δ : Tilting Angle (°)
U : Arm length (m)

Roadway

R250 Pro

R250 Pro is a new generation LED module roadway product based on R250 product base, applying latest efficiency LED spot and energy, further advancing the heat dissipation and also providing stability. With the upgrading of LED technology,we can improve energy-saving efficiency and provide more connector to realize better control function.

Features

- System wattage from 37W ~ 216W
- System lumen output from 3400 ~21600 lumen with 3 modules
- System LPW from 83 ~ 105
- CCT 4300K/5700k, option 4000K / 6000K
- Self-clean heat sink design
- 120V ~277V can fit most region standard
- 1~10V Dimming provide more energy saving
- CLO(consistent lumen output) option provide extend long life*
- Robust Paint option allow to install at beach without salt fog concern

Advantage

- Significant energy saving
- Easy maintenance & upgrade during long life time
- Modular design for complete roadway application LED solution platform
- Unique optical design maximum utilized LED multiple light source feature and glare control for traffic safety
- Activated breather in light engine and gear box for thermal dissipation, reduce mist on front glass while working at low temperature

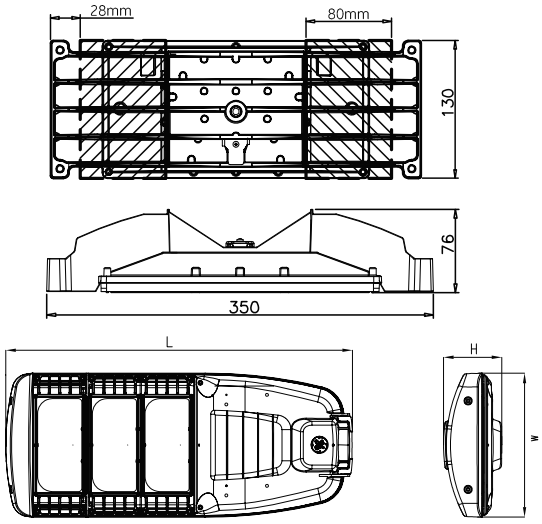
Applications

- Highways and main road
- Local roads and pedestrian walkway
- Car parks and shopping precincts

*CLO Option need contact GE for further application discuss.

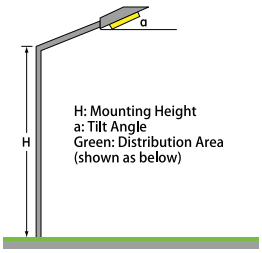
Dimensions

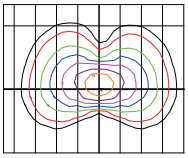
Unit: mm



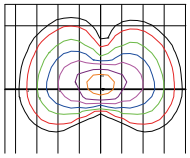
Max. Surface Area exposed to wind force	1.module-0.214m² 2.modules-0.260m² 3.modules-0.309m²
Effective Projected Area	1.module-0.122m² 2.modules-0.148m² 3.modules-0.176 m²
Weight and Dimensions (L x W x H)	1.module-9.1kg 597X358X144mm 2.modules-11.6kg 726X358X144mm 3.modules-15.5kg 862X358X144mm

Photometric Data

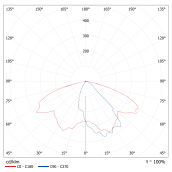




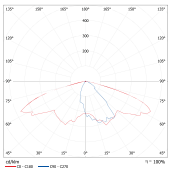
Asymmetric Medium-S2
(Suitable for R3 road surface)



Asymmetric Wide-S3
(Suitable for R2 road surface)



Asymmetric Medium



Asymmetric Wide

Order Logic

ERMS / U / S2 / C / 110W / C / WH / AT5

PRODUCT ID
E= LED Product
R=Roadway
M=Module
S= Light Engine

VOLTAGE
U=120-277V (50-60Hz)

DISTRIBUTION
S=Short
2=Type II
3=type III

LED COLOR TEMPERATURE
C=5700K/6000K
N=4000/4300K

SYS WATTAGE
56 W
75 W
106 W
125 W
142 W
180 W
198 W
216 W (Economic version with drive current)
72 W
138 W
210 W

LPW
A=lm/W (75-85)
B=lm/W (85-90)
C=lm/W (90-95)
D=1lm/W (95-100)
E=1lm/W (100-105)
F=1lm/W (105-110)
G=1lm/W (110-115)

FINISHING COLOR
SG=RAL 9007
LG=RAL 7001
WH=RAL 8019
DB=RAL 5010 (TBD)

OPTION
AT05=Mounting Arm Titter 5 degrees
AT10=Mounting Arm Titter 10 degrees
XXXX=Specical Option

* Typical lumen output value is based on 6000K asymmetric medium (S2) light distribution.
Information provided is subject to change without notice. All volues are design or typical values when measured under laboratory conditions.

Tunnel

Tunnel

- Tunnel is defined as a structure over a roadway that restricts the normal daytime illumination such that the drivers visibility is substantially diminished.
- Durability and precise light distribution are two essential characteristics of tunnel luminaires.
- GE LED tunnel fixture uses a high efficient optical system which provides high uniformity and excellent vertical light distribution with reduced glare.

T250

Through the unique reflex optical design, fully comply with biological optical comfortable lighting standards. Through the effective control of the glare,greatly guarantee the tunnel traffic safety. The modularization led tunnel light solutions, ensure led long life characteristics and convenience of maintenance.

Specification Features

- System rating is 50,000 hours @ L80 (80% lumen aintenance)
- Optimized optical design based on international road tunnel and underpass lighting regulations (JTJ 026.1-1999, CIE 88:2004)
- Utilizes High Brightness LEDs, 70CRI @ 6000K/4300K
- 200-240V input voltage available with electronic driver, PF>0.9, IP66 rated, suitable for wet location
- Meets ANSI 2G vibration standards
- Ideal mounting height 4m-8m
- Optimal operation temperature: -25℃~40℃

IP66 IP66 IK07 7.5~11KG

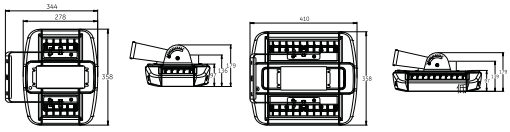
Applications

- Road tunnels
- underpass lighting

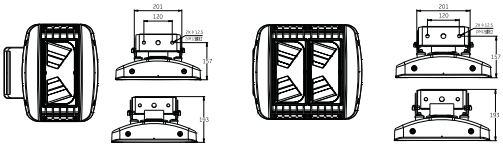
Dimensions

Unit: mm

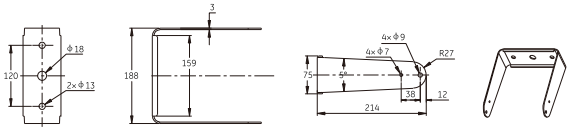
1-Module Configuration (With Bracket)



2-Module Configuration (With Bracket)

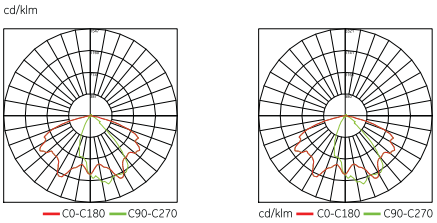


Bracket



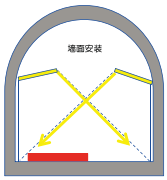
Photometric Data

1. Polar Chart



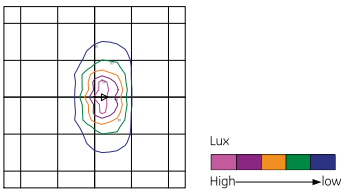
40W 60W

2.Light distribution



Red: Photometric distribution with single fixture on road (refer to the right)

(For H=5.5m grid dimension=5.5m)



Order Logic

ETMS	/	2	/	S2	/	60	/	A1	/	G	/	SG	/	C
Product ID		Voltage		Distribution		LED CCT		Lumen Output		Fixture Lens Type		Finishing Color		Option
E=Evolve T=Tunnel M=Modular S=Systems		2 = 200V-240V (50/60Hz)		S2=Asymmetric Medium		60 = 6000K 43 = 4300K		A1= 3420Lm A2= 5130Lm A3= 6840Lm A4= 10260Lm		G = Tempered Glass		SG=Silver Grey		C=CQC certified

Ordering Description

SKU	SKU Description	Configuration	Distribution	CCT	Wattage (W)	Lumen (Lm)	Color	Remark
64710	ETMS2S260A1GSGC	1	Asymmetric Medium	6000K	40	3400	Silver Grey	No Bracket
69966	ETMS2S243A2GSG	1	Asymmetric Medium	4300K	60	4700	Silver Grey	No Bracket
64711	ETMS2S260A2GSGC	1	Asymmetric Medium	6000K	60	5100	Silver Grey	No Bracket
64712	ETMS2S260A3GSGC	2	Asymmetric Medium	6000K	80	6800	Silver Grey	No Bracket
66523	ETMS2S260A5GSGC	2	Asymmetric Medium	6000K	100	8500	Silver Grey	No Bracket
69419	ETMS2S240A4GSGE-S	2	Symmetric Medium	6000K	120	9600	Silver Grey	No Bracket
64713	ETMS2S260A4GSGC	2	Asymmetric Medium	6000K	120	10300	Silver Grey	No Bracket
65851	ETMSBKSG	-	-	-	-	-	Silver Grey	Bracket

Parking

GE outdoor area site lighters are designed to effectively throw light where it is intended. The result is effective light distribution without hot spots or dark spots while reducing operating costs.


Area Light


Module Area Light


Wall Pack & Egress


Scalable Wall Pack

Why use the Evolve LED Area Light ?

• Save Energy

Less site wattage due to uniformity
Instant re-strike
Lower LPD (better utilization)

• Reduce Maintenance

Fewer lamps to replace & dispose

• Be a Good Neighbor

Less light trespass with reduced Shielding
No uplight
Reduce wasted light

• Improve Visual Acuity

Smoother visual transition due to uniformity
Better vertical illuminance

• Environmentally Conscientious

Reduce hazardous waste
Reduce energy consumption

Evolve Area Light featuring an advanced LED optical system provides improved horizontal and vertical uniformity, reduced glare and improved spill control enabling up to a 60% reduction in site energy and 10+ years service life while adhering to security light levels and tightening ordinances.

Specification Features

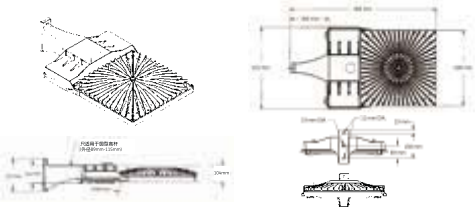
- Die-cast aluminum housing. Slim architectural design incorporates a heat sink directly into the housing ensuring maximum heat dissipation which ensures the long LED life
- Utilizes High Brightness LEDs, 70CRI at 6000K
- System rating is 50,000 hours @ L70 (70% lumen maintenance)
- UL/cUL listed, suitable for wet location
- IP65 rated for both optical assembly and driver compartment
- Meets ANSI 2G vibration standards
- 120V~277V voltage available with electronic driver, PF>0.9, Class I
- Three mounting options are available for easy installations

IP65 IP65 IK05 23~26KG CE

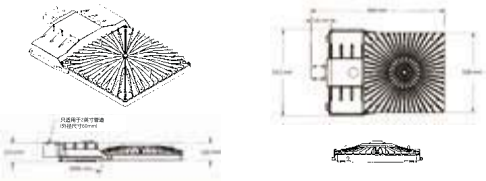
Dimensions

Unit: mm

Mounting option B: 10 inch mounting arm for round pole
EPA: 0.13sqM, Weight: 23-26kg



Mounting option C: 10 inch mounting arm for round pole
EPA: 0.11sqM, Weight: 23-26kg



Applications

- Site lighting, parking lots, walkways, driveways, malls and shopping centers
- Commercial and industrial complexes, residential areas and parkway lighting

Ordering Description

SKU	SKU Description	Product Description	Light Distribution Type (III, IV, V)	Wattage (W)	Color
188403	EAMTXS5N60A1BBLCK005	120-277V, Sym, 6000K, round pole arm, BLK	Type V, Symmetric Square	210	Black
188744	EAMTXS5N60A1CBLCK005	120-277V, Sym, 6000K, slipfitter, BLK	Type V, Symmetric Square	210	Black
188405	EAMTXW3F60A1BBLCK005	120-277V, AsymW, Front, 6000K, round pole arm, BLK	Type III, Asymmetric Wide	132	Black
188239	EAMTXW3F60A1CBLCK005	120-277V, AsymW, Front, 6000K, slipfitter, BLK	Type III, Asymmetric Wide	132	Black
188404	EAMTXF4F60A1BBLCK005	120-277V, AsymF, Front, 6000K, round pole arm, BLK	Type IV, Asymmetric Forward	94	Black
188742	EAMTXF4F60A1CBLCK005	120-277V, AsymF, Front, 6000K, slipfitter, BLK	Type IV, Asymmetric Forward	94	Black

Parking

Module Area Light

Site, area, and general lighting utilizing new generation LED system providing excellent lighting environment with scalable lumen package, optimized light distribution and warm color option.

1-Module Configuration

2-Module Configuration

Specification Features

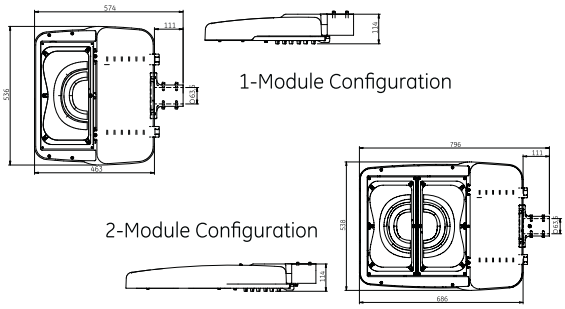
- System rating is 50,000 hours @ L80
- Scalable lumen package from 3130m to 14800Lm
- Module system allows for upgrade and replacement
- Utilizes High Brightness LEDs, both 4000K & 5700K are available
- IP65 rated
- CE listed, suitable for wet location
- Meets ANSI 2G vibration standards
- Ideal mounting height 4~12m
- Ambient temperature -40℃~50℃

Applications

- Area, site and square lighting
- Large and small parking areas
- Security lighting
- Commercial and industrial complex

Dimensions

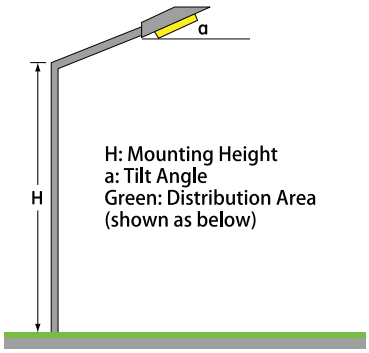
Unit: mm

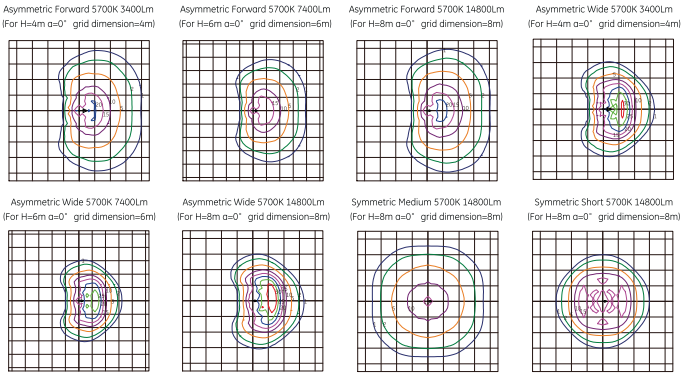


1-Module Configuration

2-Module Configuration

Photometric Data





Ordering Description

SKU	SKU Description	Photometry Distribution Type (III, IV, V)	Wattage (W)	Color	Module Quantity
EAMM0A5N40A1CBLCK	120-277V, Sym, 4000K, Slipfitter, BLK	Type V, Symmetric Medium	100	Black	2
EAMM0A5N57A1CBLCK	120-277V, Sym, 5700K, Slipfitter, BLK	Type V, Symmetric Medium	100	Black	2
EAMM0B5N40A1CBLCK	120-277V, Sym, 4000K, Slipfitter, BLK	Type V, Symmetric Medium	126	Black	2
EAMM0B5N57A1CBLCK	120-277V, Sym, 5700K, Slipfitter, BLK	Type V, Symmetric Medium	126	Black	2
EAMM0C5N40A1CBLCK	120-277V, Sym, 4000K, Slipfitter, BLK	Type V, Symmetric Medium	152	Black	2
EAMM0C5N57A1CBLCK	120-277V, Sym, 5700K, Slipfitter, BLK	Type V, Symmetric Medium	152	Black	2
EAMM0D5N40A1CBLCK	120-277V, Sym, 4000K, Slipfitter, BLK	Type V, Symmetric Medium	178	Black	2
EAMM0D5N57A1CBLCK	120-277V, Sym, 5700K, Slipfitter, BLK	Type V, Symmetric Medium	178	Black	2
EAMM0E5N40A1CBLCK	120-277V, Sym, 4000K, Slipfitter, BLK	Type V, Symmetric Medium	202	Black	2
EAMM0E5N57A1CBLCK	120-277V, Sym, 5700K, Slipfitter, BLK	Type V, Symmetric Medium	202	Black	2
EAMM0F3F40A1CBLCK	120-277V, AsymW, Front, 4000K, Slipfitter, BLK	Type III, Asymmetric Wide	126	Black	2
EAMM0F3F57A1CBLCK	120-277V, AsymW, Front, 5700K, Slipfitter, BLK	Type III, Asymmetric Wide	126	Black	2
EAMM0F4F40A1CBLCK	120-277V, AsymF, Front, 4000K, Slipfitter, BLK	Type IV, Asymmetric Forward	126	Black	2
EAMM0F4F57A1CBLCK	120-277V, AsymF, Front, 5700K, Slipfitter, BLK	Type IV, Asymmetric Forward	126	Black	2
EAMM0G3F40A1CBLCK	120-277V, AsymW, Front, 4000K, Slipfitter, BLK	Type III, Asymmetric Wide	139	Black	2
EAMM0G3F57A1CBLCK	120-277V, AsymW, Front, 5700K, Slipfitter, BLK	Type III, Asymmetric Wide	139	Black	2
EAMM0G4F40A1CBLCK	120-277V, AsymF, Front, 4000K, Slipfitter, BLK	Type IV, Asymmetric Forward	139	Black	2
EAMM0G4F57A1CBLCK	120-277V, AsymF, Front, 5700K, Slipfitter, BLK	Type IV, Asymmetric Forward	139	Black	2
EAMM0H3F40A1CBLCK	120-277V, AsymW, Front, 4000K, Slipfitter, BLK	Type III, Asymmetric Wide	152	Black	2
EAMM0H3F57A1CBLCK	120-277V, AsymW, Front, 5700K, Slipfitter, BLK	Type III, Asymmetric Wide	152	Black	2
EAMM0H4F40A1CBLCK	120-277V, AsymF, Front, 4000K, Slipfitter, BLK	Type IV, Asymmetric Forward	152	Black	2
EAMM0H4F57A1CBLCK	120-277V, AsymF, Front, 5700K, Slipfitter, BLK	Type IV, Asymmetric Forward	152	Black	2
EAMM0J3F40A1CBLCK	120-277V, AsymW, Front, 4000K, Slipfitter, BLK	Type III, Asymmetric Wide	165	Black	2
EAMM0J3F57A1CBLCK	120-277V, AsymW, Front, 5700K, Slipfitter, BLK	Type III, Asymmetric Wide	165	Black	2
EAMM0J4F40A1CBLCK	120-277V, AsymF, Front, 4000K, Slipfitter, BLK	Type IV, Asymmetric Forward	165	Black	2
EAMM0J4F57A1CBLCK	120-277V, AsymF, Front, 5700K, Slipfitter, BLK	Type IV, Asymmetric Forward	165	Black	2
EAMM0K3F40A1CBLCK	120-277V, AsymW, Front, 4000K, Slipfitter, BLK	Type III, Asymmetric Wide	178	Black	2
EAMM0K3F57A1CBLCK	120-277V, AsymW, Front, 5700K, Slipfitter, BLK	Type III, Asymmetric Wide	178	Black	2
EAMM0K4F40A1CBLCK	120-277V, AsymF, Front, 4000K, Slipfitter, BLK	Type IV, Asymmetric Forward	178	Black	2
EAMM0K4F57A1CBLCK	120-277V, AsymF, Front, 5700K, Slipfitter, BLK	Type IV, Asymmetric Forward	178	Black	2
EAMM0K5N40A1CBLCK	120-277V, Sym, 4000K, Slipfitter, BLK	Type V, Symmetric Short	100	Black	2
EAMM0K5N57A1CBLCK	120-277V, Sym, 5700K, Slipfitter, BLK	Type V, Symmetric Short	100	Black	2
EAMM0L3F40A1CBLCK	120-277V, AsymW, Front, 4000K, Slipfitter, BLK	Type III, Asymmetric Wide	190	Black	2
EAMM0L3F57A1CBLCK	120-277V, AsymW, Front, 5700K, Slipfitter, BLK	Type III, Asymmetric Wide	190	Black	2
EAMM0L4F40A1CBLCK	120-277V, AsymF, Front, 4000K, Slipfitter, BLK	Type IV, Asymmetric Forward	190	Black	2
EAMM0L4F57A1CBLCK	120-277V, AsymF, Front, 5700K, Slipfitter, BLK	Type IV, Asymmetric Forward	190	Black	2
EAMM0L5N40A1CBLCK	120-277V, Sym, 4000K, Slipfitter, BLK	Type V, Symmetric Short	126	Black	2
EAMM0L5N57A1CBLCK	120-277V, Sym, 5700K, Slipfitter, BLK	Type V, Symmetric Short	126	Black	2
EAMM0M3F40A1CBLCK	120-277V, AsymW, Front, 4000K, Slipfitter, BLK	Type III, Asymmetric Wide	202	Black	2
EAMM0M3F57A1CBLCK	120-277V, AsymW, Front, 5700K, Slipfitter, BLK	Type III, Asymmetric Wide	202	Black	2
EAMM0M4F40A1CBLCK	120-277V, AsymF, Front, 4000K, Slipfitter, BLK	Type IV, Asymmetric Forward	202	Black	2
EAMM0M4F57A1CBLCK	120-277V, AsymF, Front, 5700K, Slipfitter, BLK	Type IV, Asymmetric Forward	202	Black	2
EAMM0M5N40A1CBLCK	120-277V, Sym, 4000K, Slipfitter, BLK	Type V, Symmetric Short	152	Black	2
EAMM0M5N57A1CBLCK	120-277V, Sym, 5700K, Slipfitter, BLK	Type V, Symmetric Short	152	Black	2
EAMM0N5N40A1CBLCK	120-277V, Sym, 4000K, Slipfitter, BLK	Type V, Symmetric Short	178	Black	2
EAMM0N5N57A1CBLCK	120-277V, Sym, 5700K, Slipfitter, BLK	Type V, Symmetric Short	178	Black	2
EAMM0P5N40A1CBLCK	120-277V, Sym, 4000K, Slipfitter, BLK	Type V, Symmetric Short	202	Black	2
EAMM0P5N57A1CBLCK	120-277V, Sym, 5700K, Slipfitter, BLK	Type V, Symmetric Short	202	Black	2
EASM0A3F40A1CBLCK	120-277V, AsymW, Front, 4000K, Slipfitter, BLK	Type III, Asymmetric Wide	50	Black	1
EASM0A3F57A1CBLCK	120-277V, AsymW, Front, 5700K, Slipfitter, BLK	Type III, Asymmetric Wide	50	Black	1
EASM0A4F40A1CBLCK	120-277V, AsymF, Front, 4000K, Slipfitter, BLK	Type IV, Asymmetric Forward	50	Black	1
EASM0A4F57A1CBLCK	120-277V, AsymF, Front, 5700K, Slipfitter, BLK	Type IV, Asymmetric Forward	50	Black	1
EASM0B3F40A1CBLCK	120-277V, AsymW, Front, 4000K, Slipfitter, BLK	Type III, Asymmetric Wide	63	Black	1
EASM0B3F57A1CBLCK	120-277V, AsymW, Front, 5700K, Slipfitter, BLK	Type III, Asymmetric Wide	63	Black	1
EASM0B4F40A1CBLCK	120-277V, AsymF, Front, 4000K, Slipfitter, BLK	Type IV, Asymmetric Forward	63	Black	1
EASM0B4F57A1CBLCK	120-277V, AsymF, Front, 5700K, Slipfitter, BLK	Type IV, Asymmetric Forward	63	Black	1
EASM0C3F40A1CBLCK	120-277V, AsymW, Front, 4000K, Slipfitter, BLK	Type III, Asymmetric Wide	76	Black	1
EASM0C3F57A1CBLCK	120-277V, AsymW, Front, 5700K, Slipfitter, BLK	Type III, Asymmetric Wide	76	Black	1
EASM0C4F40A1CBLCK	120-277V, AsymF, Front, 4000K, Slipfitter, BLK	Type IV, Asymmetric Forward	76	Black	1
EASM0C4F57A1CBLCK	120-277V, AsymF, Front, 5700K, Slipfitter, BLK	Type IV, Asymmetric Forward	76	Black	1
EASM0D3F40A1CBLCK	120-277V, AsymW, Front, 4000K, Slipfitter, BLK	Type III, Asymmetric Wide	89	Black	1
EASM0D3F57A1CBLCK	120-277V, AsymW, Front, 5700K, Slipfitter, BLK	Type III, Asymmetric Wide	89	Black	1
EASM0D4F40A1CBLCK	120-277V, AsymF, Front, 4000K, Slipfitter, BLK	Type IV, Asymmetric Forward	89	Black	1
EASM0D4F57A1CBLCK	120-277V, AsymF, Front, 5700K, Slipfitter, BLK	Type IV, Asymmetric Forward	89	Black	1
EASM0E3F40A1CBLCK	120-277V, AsymW, Front, 4000K, Slipfitter, BLK	Type III, Asymmetric Wide	101	Black	1
EASM0E3F57A1CBLCK	120-277V, AsymW, Front, 5700K, Slipfitter, BLK	Type III, Asymmetric Wide	101	Black	1
EASM0E4F40A1CBLCK	120-277V, AsymF, Front, 4000K, Slipfitter, BLK	Type IV, Asymmetric Forward	101	Black	1
EASM0E4F57A1CBLCK	120-277V, AsymF, Front, 5700K, Slipfitter, BLK	Type IV, Asymmetric Forward	101	Black	1

Evolve LED Wall Pack & Egress

Product Features

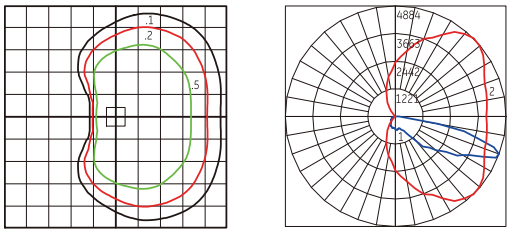
The GE Evolve LED Area Light also offers a wall pack that delivers the same outstanding performance as the modular area light solution. Using the same light engines as the "single module" area light, the wall pack offers identical photometrics, which allows lighting designers to capitalize on the same features without compromise. In keeping with a sleek design strategy, this product offers a modern "wedge" look, balancing the need for photometric scalability with reliable workhorse performance. The wall pack provides 10 photometric combinations, available in two color temperatures, to meet a wide range of application needs. The same wedge platform also offers an egress option to compliment the family, and providing a complete and consistent look for all area lighting applications.

Applications

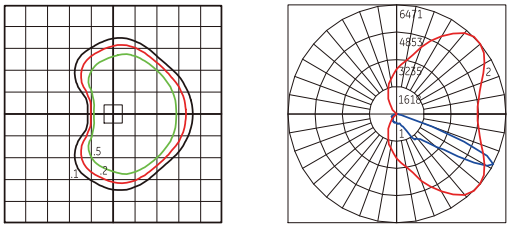
Wall mounted, single module site, area, and general lighting utilizing advanced LED optical system providing high uniformity, excellent vertical light distribution, reduced offsite visibility, reduced on-site glare and effective security light levels.

Photometrics

EWSW Type IV - Asymmetric Forward (E4)
7,400 Lumens, 5700K (GE454407.ies)

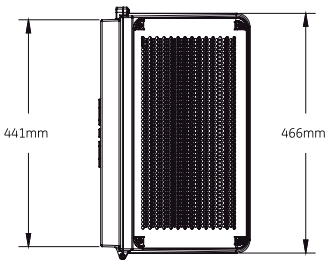


EWSW Type III - Asymmetric Wide (E3)
7,400 Lumens, 5700K (GE454434.ies)



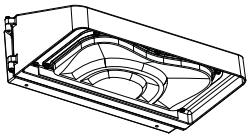
Dimensions

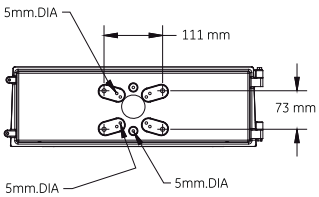
Unit: mm



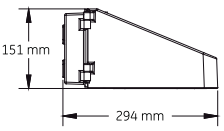
TOP VIEW

FRONT VIEW





BACK VIEW



SIDE VIEW

Ordering Number Logic

EWSW _ _ _ _ - _ - _ _ - N - _ _ - A - 1 - N - _ _ _ _ - _

PROD. ID
E = Evolve
W = Wallpack
S = Small
W = Wedge

VOLTAGE
0 = 120 - 277
1 = 120*
2 = 208*
3 = 240*
4 = 277*
5 = 480*
D = 347*
*Specify single voltage if fuse option is selected

OPTICAL CODE

DISTRIBUTION ORIENTATION
N =Not applicable

LED COLOR TEMP
40 = 4000K
57 = 5700K

LENS TYPE
A = Acrylic

PE FUNCTION
1 = NONE

MOUNTING ARM
N=Not Applicable

COLOR
BLCK = Black
DKBZ = Dark Bronze
Contact factory for other colors

OPTIONS
D= Dimmable (0-10 Volt Input)*
F= Fusing
XXX= Special Options
*Contact factory for availability.

Optical Code	Type	Typical Initial Lumens		Typical System Wattage		Distribution Orientation Available	Bug Ratings 4000K			Bug Ratings 5700K			IES File Number	
		4000K	5700K	120-277V	347-480V		B	U	G	B	U	G	4000K	5700K
A4	Asymmetric Forward	3130	3400	50	53		1	2	1	1	2	1	454394	454395
B4	Asymmetric Forward	4050	4400	63	66	N	1	2	2	1	2	2	454397	454398
C4	Asymmetric Forward	4970	5400	76	80	N	1	2	2	1	2	2	454400	454401
D4	Asymmetric Forward	5890	6400	89	94	N	1	2	2	1	3	2	454403	454404
E4	Asymmetric Forward	6810	7400	101	106	N	1	3	2	2	3	2	454406	454407
A3	Asymmetric Forward	3130	3400	50	53	N	1	1	1	1	1	1	454421	454422
B3	Asymmetric Wide	4050	4400	63	66	N	1	1	1	1	1	1	454424	454425
C3	Asymmetric Wide	4970	5400	76	80	N	1	1	1	1	1	2	454427	454428
D3	Asymmetric Wide	5890	6400	89	94	N	1	1	2	1	1	2	454430	454431
E3	Asymmetric Wide	6810	3400	101	106	N	1	1	2	1	1	2	454433	454434

EESW _ _ _ _ - _ - _ _ - N - _ _ - A - 1 - N - _ _ _ _ - _

PROD. ID
E = Evolve
E = Egress
S = Small
W = Wedge

VOLTAGE
0 = 120 - 277
1 = 120*
2 = 208*
3 = 240*
4 = 277*
*Specify single voltage if fuse option is selected

OPTICAL CODE

DISTRIBUTION ORIENTATION
N =Not applicable

LED COLOR TEMP
40 = 4000K
57 = 5700K

LENS TYPE
A = Acrylic

PE FUNCTION
1 = NONE

MOUNTING ARM
N=Not Applicable

COLOR
BLCK = Black
DKBZ = Dark Bronze
Contact factory for other colors

OPTIONS
F= Fusing
XXX= Special Options

Optical Code	Type	Typical Initial Lumens		Typical System Wattage		Distribution Orientation Available	Bug Ratings 4000K			Bug Ratings 5700K			IES File Number	
		4000K	5700K	120-277V	347-480V		B	U	G	B	U	G	4000K	5700K
WE	Egress - Asymmetric Wide	1290	1400	20	N/A	N	0	0	0	0	0	0	454576	454575

Parking

Evolve LED Scalable Wall Pack

Product Features

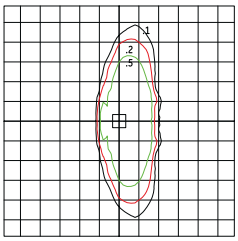
The GE Evolve LED Scalable Wall Pack is optimized for customers looking for an efficient and reliable LED solution for wall mounted, site, area and general lighting applications. Depending on the application, Evolve LED Scalable Wall Pack can yield up to a 75% reduction in system energy consumption compared with standard HID systems. This reliable system operates well in cold temperatures and offers more than 11 years of service life to reduce maintenance frequency and expense, based on a 50,000 hour rated life and 12 hours of operation per day. Containing no mercury or lead, this environmentally responsible product is

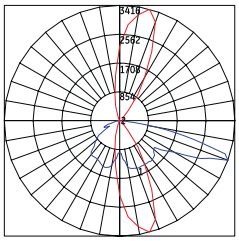
Applications

Wall mounted, site, area and general lighting utilizing an advanced LED optical system providing uniformity, vertical light distribution, reduced offsite visibility, reduced on-site glare and effective security light levels.

Photometrics

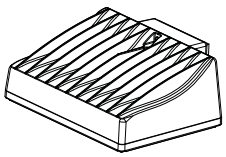
EWS1 - Asymmetric Medium (CE)
5,200 Lumens, 5700K (GE455038.ies)



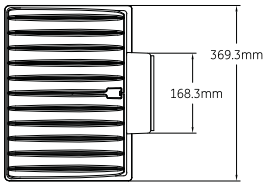


Dimensions

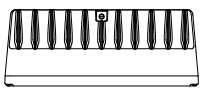
Unit: mm



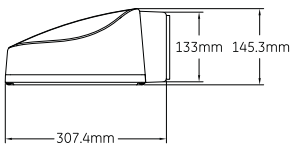
Top/Side View



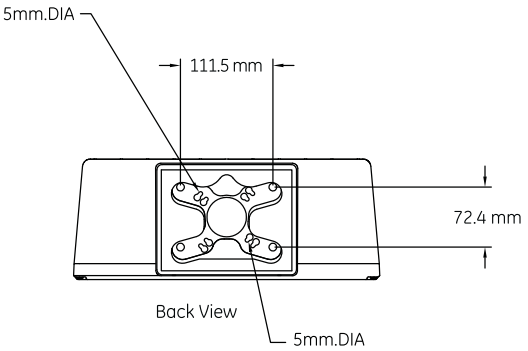
Top View



Front View



Side View



Ordering Number Logic

EWS1 _ _ _ _ - _ _ - _ _ - **E** - **5** - _ _ - **G** - **1** - **N** - _ _ _ _ - _ _ _

PROD. ID	VOLTAGE	OPTICAL CODE	PHOTOMETRIC Type	DRIVE CURRENT	LED COLOR TEMP	LENS TYPE	PE FUNCTION	MOUNTING ARM	COLOR	OPTIONS
E = Evolve **W** = Wallpack **S** = Scalable **1** = Optical Assembly	**0** = 120 - 277 **H** = 347 - 480 **1** = 120* **2** = 208* **3** = 240* **4** = 277* **5** = 480* **D** = 347* *Specify single voltage if fuse option is selected		**E** =Asymmetric Medium	**5** = 525mA	**40** = 4000K **57** = 5700K	**G** = Glass	**1** = NONE	**N**=Not Applicable	**BLCK** = Black **DKBZ** = Dark Bronze Contact factory for other colors	**F**= Fusing **XXX**= Special Options

Optical Code	Photometric Type	Typical Initial Lumens		Typical System Wattage		IES File Number	
		4000K	5700K	120-277V	347-480V	4000K	5700K
A4		2900	3200	43	47	455027	455030
B4	E	4000	4300	54	59	455028	455037
C4		4900	5200	67	74	455029	455038

Pack/Walk

LED Iberia

With a wide range of different options, Iberia LED is a versatile luminarie suitable for architectural and urban environments. Iberia LED is a decorative LED luminarie. In wattages up to 90W, it is available with symmetrical and asymmetrical distribution. The fexibility of the different options that are available means it is suitable for all applications in amenity lighting, pedestrian and squares.

Specification Features

- Die-cast aluminum housing. Decorative luminaire of truncated cone design using LED technology with symmetric and asymmetric light distribution
- Utilizes High Brightness LEDs, both 5600K & 4100K are available
- System rating is 50,000 hours @ L85 (85% lumen maintenance)
- CE listed, suitable for wet location
- IP65 rated for optical assembly
- Meets ANSI 2G vibration standards

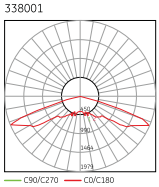
IP65 IP45 IK10 10.6KG

Applications

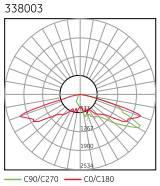
- Parks, gardens, commercial centers, squares, architectural lighting
- Residential areas and pedestrian walkway lighting

Photometric Data

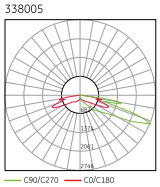
338001



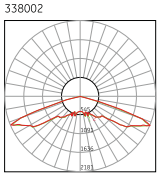
338003



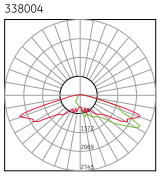
338005



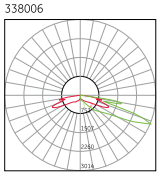
338002



338004

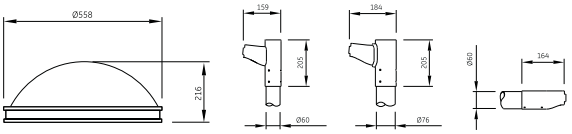


338006



Dimensions

Unit: mm



Ordering Description

SKU	SKU Description	Accessory Name	CCT	Lumen (Lm)	Photometry Distribution	Wattage (W)
Standard Iberia Fixture						
338001	|IBERIA/E/LED SYM5/41 |GRIS 150 SABLE	-	4100K	4900	Symmetric	90
338002	IBERIA/E/LED SYM5/57 |GRIS 150 SABLE	-	5600K	5400	Symmetric	90
338003	IBERIA/E/LED ASY3/41 |GRIS 150 SABLE	-	4100K	4800	Asymmetric Wide	90
338004	IBERIA/E/LED ASY3/57 |GRIS 150 SABLE	-	5600K	5200	Asymmetric Wide	90
338005	IBERIA/E/LED ASY4/41 |GRIS 150 SABLE	-	4100K	3100	Asymmetric Forward	63
338006	|IBERIA/E/LED ASY4/57 |GRIS 150 SABLE	-	5600K	3400	Asymmetric Forward	63
Accessory for Standard Iberia Fixture						
321082	ACOP SP6 IBERIA GRIS 150 SABLE	SP6	-	-	-	-
321086	ACOP DP6 IBERIA GRIS 150 SABLE	DP6	-	-	-	-
321087	ACOP TP6 IBERIA GRIS 150 SABLE	TP6	-	-	-	-
321088	ACOP SP7 IBERIA GRIS 150 SABLE	SP7	-	-	-	-
321089	ACOP DP7 IBERIA GRIS 150 SABLE	DP7	-	-	-	-
321090	ACOP TP7 IBERIA GRIS 150 SABLE	TP7	-	-	-	-
321091	ACOP AT IBERIA GRIS 150 SABLE	AT	-	-	-	-
321092	ACOP WM IBERIA GRIS 150 SABLE	WM	-	-	-	-
Yoke Iberia Fixture						
338018	IBERIA/E/LED/L ASY4/41 |GRIS 150 SABLE	Yoke Iberia w/ Hooks	4100K	3100	Asymmetric Forward	63
338016	IBERIA/E/LED/L SYM5/41 |GRIS 150 SABLE	Yoke Iberia w/ Hooks	4100K	4900	Symmetric	90
338022	IBERIA/E/LED/L ASY3/41 |GRIS 150 SABLE	Yoke Iberia w/ Hooks	4100K	4800	Asymmetric Wide	90
338025	IBERIA/E/LED/L ASY4/57 |GRIS 150 SABLE	Yoke Iberia w/ Hooks	5600K	3400	Asymmetric Forward	63
338026	IBERIA/E/LED/L SYM5/57 |GRIS 150 SABLE	Yoke Iberia w/ Hooks	5600K	5400	Symmetric	90
338024	IBERIA/E/LED/L ASY3/57 |GRIS 150 SABLE	Yoke Iberia w/ Hooks	5600K	5200	Asymmetric Wide	90
Accessory for Yoke Iberia Fixture						
321131	ACOP L IBERIA GRIS 150 SABLE	Yoke	-	-	-	-

Pack/Walk

Duna

Duna LED is a decorative luminaire of truncated cone design using LED technology up to 88W withsymmetrical and asymmetrical distribution.

Specification Features

- Die-cast aluminum housing
- Utilizes high brightness LEDs, both 5600K & 4100K are available
- CE certificate, suitable for wet location
- IP65 rated for optical assembly
- Meets ANSI 2G vibration standards
- Ideal mounting height 4~8m
- System rating is 50,000 hours @ L85
- Designed to operate -40~40℃

IP65 IP65 IK10 14KG

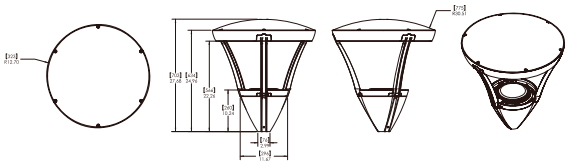
CE

Applications

- Parks, gardens squaze lighting
- Residential and pedestrian walking lighting

Dimensions

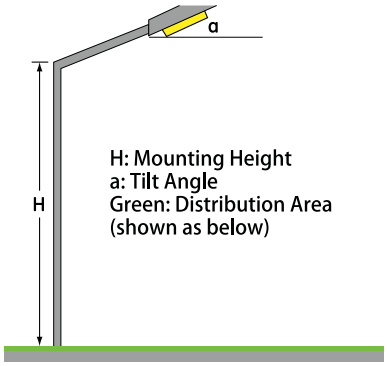
Unit: mm



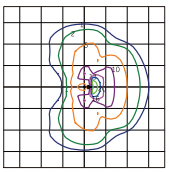
Post top mounting O.D. 60mm held in place with three hex head set screws

Photometric Data

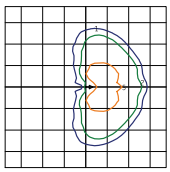
(For H=6m α=0° grid dimension=6m)



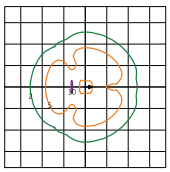
Asymmetric Wide 4100K



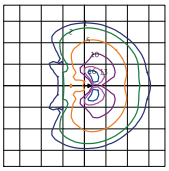
Asymmetric Forward 4100K



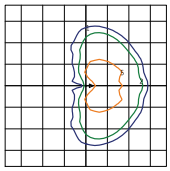
Symmetric 4100K



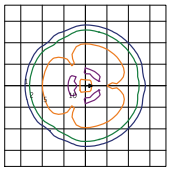
Asymmetric Wide 5600K



Asymmetric Forward 5600K



Symmetric 5600K



Ordering Description

SKU	SKU Description	CCT	Lumen (Lm)	Photometry Distribution	Wattage (W)	Color	Weight (kg)	Package Weight (kg)	Certificate
339003	DUNA LED ASY3/41	4100K	4000	Asymmetric Wide	88	GRIS OXYDON	14.1	17.9	CE
339004	DUNA LED ASY3/57	5600K	4400	Asymmetric Wide	88	GRIS OXYDON	14.1	17.9	CE
339005	DUNA LED ASY4/41	4100K	2000	Asymmetric Forward	63	GRIS OXYDON	14.1	17.9	CE
339006	DUNA LED ASY4/57	5600K	2200	Asymmetric Forward	63	GRIS OXYDON	14.1	17.9	CE
339001	DUNA LED SYM5/41	4100K	4000	Symmetric	88	GRIS OXYDON	14.1	17.9	CE
339002	DUNA LED SYM5/57	5600K	4400	Symmetric	88	GRIS OXYDON	14.1	17.9	CE

Avery

Product Features

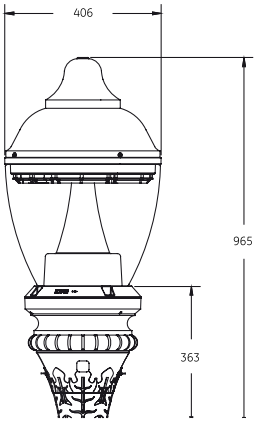
The new Evolve LED Avery StreetDreams Post Top offers energy efficiency and quality of light in a classic, traditional style. The advanced LED optical system provides improved horizontal and vertical uniformity, reduced glare and improved lighting control. GE's unique optical ring technology effectively aims the light where you need it, while eliminating the unsightly shadow circles commonly seen under other LED post top fixtures.
The Avery post top can yield up to a 60-percent reduction in system energy compared with standard HID systems, depending on applications. This reliable system operates well in cold temperatures and offers more than 11 years of service life to reduce maintenance frequency and expense, based on a 50,000 hour life and 12 hours of operation per day. Containing no mercury or lead, this environmentally responsible product is RoHS compliant.

Applications

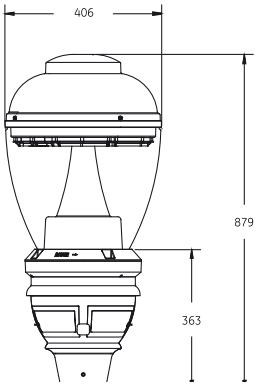
Roadway, site, area, and general lighting utilizing advanced LED optical system providing high uniformity, excellent vertical illuminance, reduced offsite visibility, and reduced on-site glare.

Dimensions

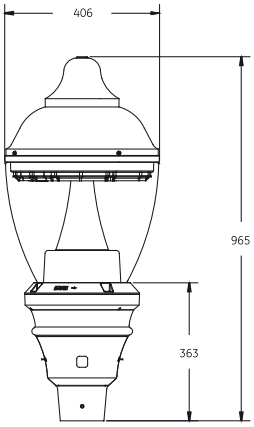
Unit: mm



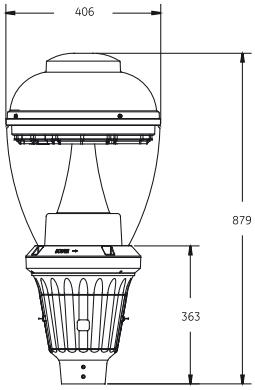
POD A
WITH COLONY
TOP



POD B
WITH SCROLL
TOP



POD C
WITH COLONY
TOP



POD D
WITH SCROLL
TOP

Pack/Walk

Fixture Styles

Pods

POD A

POD B

POD C

POD D

Tops

COLONY TOP

SCROLL TOP

- Approximate Net Weight: 43 lbs (20 kgs)
- Suggested Mounting Height: 8-16 ft max (2.5-5 m)
- Effective Projected Area (EPA): 1.4 sq ft max (0.13 sq m)

Optional Accessories

Crowns & Ribs

SCROLL CROWN & RIBS

MEDALIAN CROWN & RIBS

Finials

FNLBL -ACN
ACORN

FNLBL -BLS
BLOSSOM

FNLBL-FOL
FlEUR-DE-LIS

FNLBL -FIL
FILAGREE

FNLBL -SIL
SILHOUETTE

FNLBL -SPK
SPIKE

FNLBL -OAK
OAK

FNLBL -STP
STEEPLE

FNLBL -GTH
GOTHIC

Ordering Number Logic

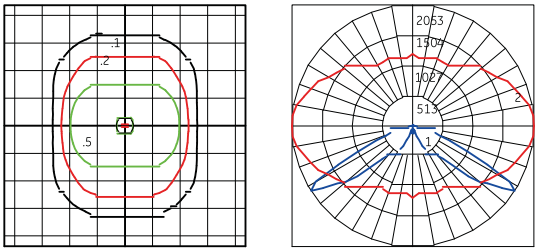
EPAS _ _ _ _ - _ - _ _ - _ - 4 1 - _ _ - _ _ - _ _ _ _ - _

PRODUCT ID	VOLTAGE	OPTICAL CODE	POD TYPE	LED COLOR TEMP	CAGE SELECTION	PE FUNCTION	FINIAL	COLOR	OPTIONS
E=Envolve **P**=post top **A**=Avery **S**=Street Dreams	**0** =120-277 **H**=347-480 **1**=120* **2**=208* **3**=240* **4**=277* **5**=480* **D**=347* *Specify single voltage only if fuse option is selected		**A** **B*** **C** **D*** *Contact factory for lead time	**41 =** 4000K	A = Clear Acrylic w/Colony Top B = Clear Acrylic w/Colony Top, Medalion C&R C = Clear Acrylic w/ Colony Top, Scroll C&R* D = Clear Acrylic w/Scroll Top E = Clear Acrylic w/ Scroll Top, Medalion C&R F = Clear Acrylic w/ Scroll Top, Scroll C&R *Contact factory for lead time	**1**=None **2**=PE Rec. **4**=PE Rec. with Shorting Cap **5** =PE Rec. with Control PE control not available for 347-480V. Must be a discrete voltage.	**A**=Silhouette **b**=Acorn **C**=Fluer-De-Lis **D**=Filagree* **E**=Blosson* **F**=Spike **g**=Oak* **h**=Steeple **J**=Gothic **X**=No Final *Contact factory for lead time	**BLCK** = Black **DKBZ**=Dark Bronze **FGRN**=Forest Green **XXXX**=Special Contact factory for other colors	**D**=Dimmable (0-10 Volt Input)* **F**=Fusing **T**=Extra Surge Protection* **XXX**= Special Options *Contact factory for availability

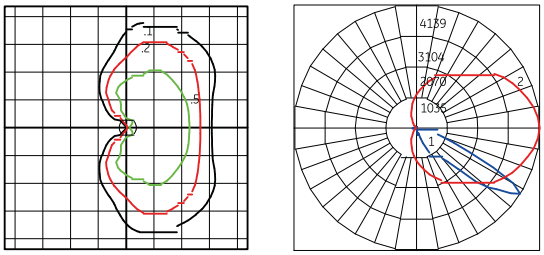
Optical Code	Type	Typical Initial Lumens 4100K	Typical System Wattage 120-277V	347-480V	Pole Spacing 2-4 lAnES	Bug Ratings 4100K B	U	G	IES File Number 4100k
B5	Symmetric	4630	86	94	5:1	N/A	2	1	454608
D5	Symmetric	2380	49	55	5:1	N/A	2	1	454610
B3	Asymmetric Wide	4630	86	94	5:1	2	2	2	454609
D3	Asymmetric Wide	2380	49	55	5:1	2	2	2	454611

Photometrics

EPAS Type V - Symmetric (B5)
4,630 Lumens, 4100K (GE454608.ies)



EPAS Type III - Asymmetric Wide (B3)
4,630 Lumens, 4100K (GE454609.ies)



Pack/Walk

Twin

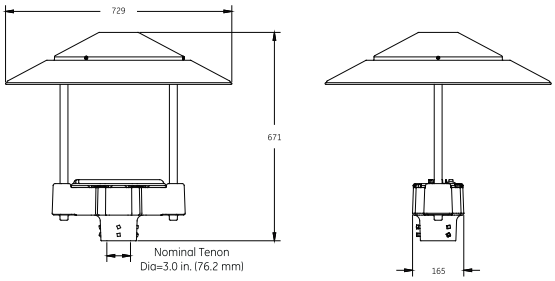
Product Features

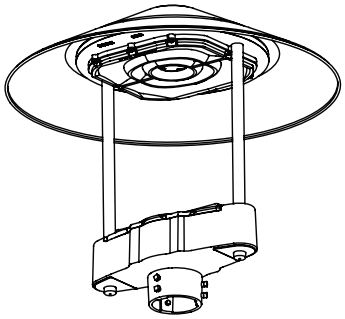
The new Evolve LED Contemporary Twin Support Post Top (EPTC) offers energy efficiency and quality of light in your choice of two distinct, modern styles. The advanced LED optical system provides improved horizontal and vertical uniformity, reduced glare and improved lighting control. GE's unique optical ring technology effectively aims the light where you need it, while eliminating the unsightly shadow circles commonly seen under other LED post top fixtures.
The EPTC can yield up to a 60-percent reduction in system energy compared with standard HID systems, depending on applications. This reliable system operates well in cold temperatures and offers more than 11 years of service life to reduce maintenance frequency and expense, based on a 50,000 hour life at 12 hours of operation per day (L85 Rating).

Applications

Roadway, site, area, and general lighting utilizing advanced LED optical system providing high uniformity, excellent vertical illuminance, reduced offsite visibility, and reduced on-site glare.

Tiered Cone Top Housing



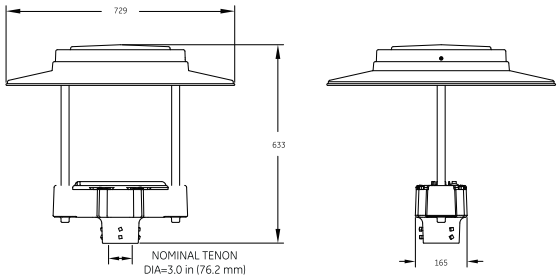


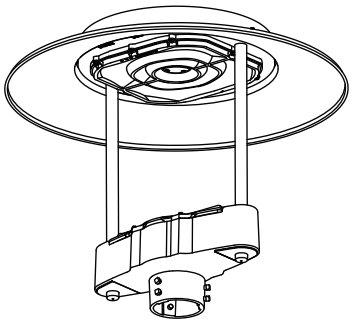
- Approximate Net Weight: <32 lbs. (<14.51 kgs.)
- Suggested Mounting Height: 8-16 ft. (2.5-5 m)
- Effective Projected Area (EPA): 1.12 sq. ft. max (0.10 sq. m)

Dimensions

Unit: mm

Tiered Circular Top Housing





Ordering Number Logic

EPTC _ _ _ _ _ _ _ _ **4 1** _ **P** _ **L** _ _ _ _ _ _ _ _ _ _ _ _ _ _

PROD. ID
E=Envolve
P=Post Top
T=Twin Support
C=Contemporary

VOLTAGE
0 =120-277
H=347-480
1=120*
2=208*
3=240*
4=277*
5=480*
D=347*
*Specify single voltage only if fuse option is selected

OPTICAL CODE

LED COLOR TEMP
41 = 4000K

LENS
P= Polycarbonate

ORIENTATION
L

PE FUNCTION
1=None
2=PE Rec.
3=Button PE*
4=PE Rec with Shorting Cap
5 =PE Rec with Control
PE control not available for 347-480V. Must be a discrete voltage.

TOP HOUSING
A=Tiered Circular
B=Tiered Cone

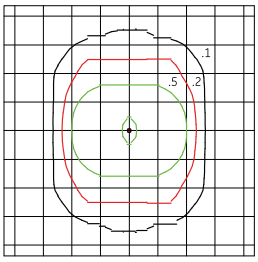
COLOR
BLCK = Black
DKBZ=Dark Bronze
GRAY=Gray
Contact manufacturer for other colors.

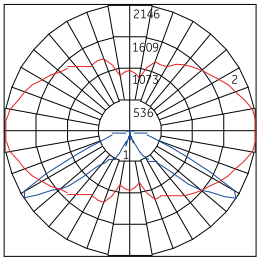
OPTIONS
D=Dimmable (0-10 Volt Input)*
F=Fusing
P=Prewire with 6" of 14/3 cable
XXX= Special Options
*Not available at time of launch. Contact manufacturer for details and availability (only available in 120-277V).

Optical Code	Type	Typical Initial Lumens 4100K	Typical System Wattage 120-277V	347-480V	Pole Spacing 2-4 IAnES	Bug Ratings 4100k B	U	G	IES File Numbers 4100k
B5	Symmetric	4630	86	93	5:1	N/A	1	1	454690
D5	Symmetric	2380	49	52	5:1	N/A	1	0	454689
B3	Asymmetric Wide	4630	86	93	5:1	1	2	1	454692
D3	Asymmetric Wide	2380	49	52	5:1	0	2	1	454691

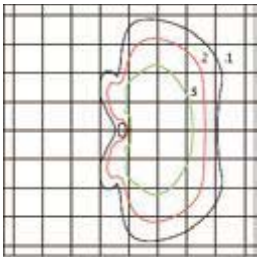
Photometrics

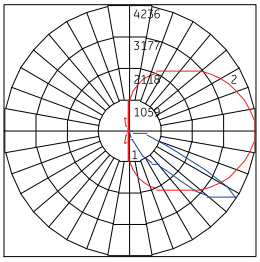
EPTC Type V - Symmetric (B5)
4,630 Lumens, 4100K (GE454690.ies)





EPTC Type III - Asymmetric (B3)
4,630 Lumens, 4100K (GE454692.ies)





Building

LED architectural lighting is mainly used for decoration and highlight in extension building frame, landscape lighting for gardens, parks, pools and fountains by offering colorful changing and magic environment.

- Wall wash lights
- Floodlights
- Strip lights
- Accent lights
- Cove lights
- Festoon and Rope lights
- Path lights

F150

Architectural lighting Can be Separated Into:

Dynamic lighting
RGB color changing

The architectural lighting must use full cut-off or directionally shielded lighting fixtures that are aimed and controlled so that the directed light is substantially confined to the object intended to be illuminated.

F150

LED F150 has high-pressure cast aluminium electrical box painted electroplating both inside and outside, stainless steel or plating chromium fittings, making the installation flexible and convenient. Scuba patent technology making the optical system precision and efficiency. LED high efficiency and long life, not only provides a bright, diversity, lasting and innovative lighting environment, but also greatly reduce the purchase system and maintenance costs.

Specification Features

- Die-cast aluminum housing and corrosion resistant polyester powder painted
- Optimized optical design including 5 different light distribution (Narrow Spot / Medium Flood / Wide Flood / Poster* / Bulletin*)
- *Note: Poster & Bulletin are specifically designed for sign lighting applications. Illuminating face is in the vertical plane of the signs.
- Utilizes High Brightness LEDs; 6000K, 4300K and 3000K are available
- System rating is 50,000 hours @ L70 (70% lumen maintenance)
- CQC, CE listed, suitable for wet location
- 200V~277V Voltage available with electronic driver, PF>0.9, Class I
- Meets ANSI 2G vibration standards
- IP65 Rated

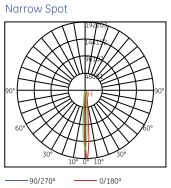
IP65 IP65 F IK08 13KG

Applications

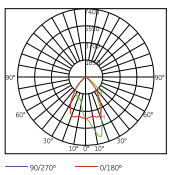
- Architectural, building security and spotlighting
- Parking lots, site, residential areas and pedestrian walkway lighting
- Sign lighting, recreational, facade (ground, structure or wall mounted) lighting

Photometric Data

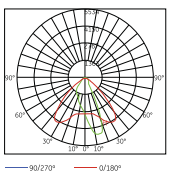
Narrow Spot



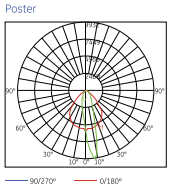
Medium Flood



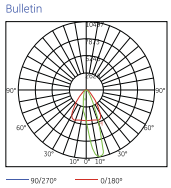
Wide Flood



Poster

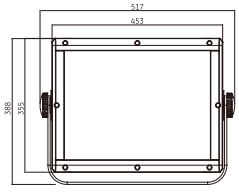


Bulletin



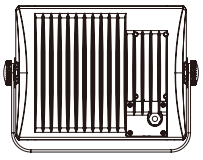
Dimensions

Unit: mm



Front View

Side View

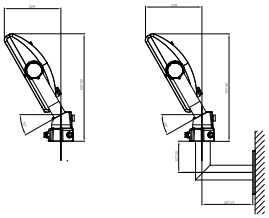


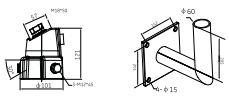
Back View

Bottom View

Top View

Mounting Accessory





Ordering Number Logic

ELMF / 1 / NS / F / 6 / G / 0 / T / SG / E

- **Product ID** — **ELMF=**LED Medium Flood
- **Voltage** — **1=**200-277V (50/60Hz)
- **Optical Code** — **NS=**Narrow Spot, **MF=**Medium Flood, **WF=**Wide Flood, **BU=**Bulletin, **PO=**Poster
- **Distribution** — **F=**Forward Throw Distribution
- **LED CCT** — **60=**6000K, **43=**4300K, **30=**3000K
- **Fixture LENS Type** — **G=**Tempered Glass
- **PE Function** — **0=**None
- **Mounting** — **T=**Trunnion Mount
- **Housing Color** — **SG=**Silver Gray, **Bk=**Black, **WH=**White
- **OPTION** — **E=**CE Ce

Ordering Description

SKU	SKU Description	Input Voltage (V)	Optical Code	CCT	Color	Weight (kg)
61649	ELMF1NSF60G0TSGC	200-277	Narrow Spot	6000K	Silver Grey	12.8
61650	ELMF1NSF60G0TWHC	200-277	Narrow Spot	6000K	Silver Grey	12.8
61651	ELMF1NSF60G0TBLC	200-277	Narrow Spot	6000K	Black	12.8
61652	ELMF1NSF43G0TSGC	200-277	Narrow Spot	4300K	Silver Grey	12.8
61653	ELMF1NSF43G0TWHC	200-277	Narrow Spot	4300K	Silver Grey	12.8
61654	ELMF1NSF43G0TBLC	200-277	Narrow Spot	4300K	Black	12.8
61655	ELMF1NSF30G0TSGC	200-277	Narrow Spot	3000K	Silver Grey	12.8
61656	ELMF1NSF30G0TWHC	200-277	Narrow Spot	3000K	Silver Grey	12.8
61657	ELMF1NSF30G0TBLC	200-277	Narrow Spot	3000K	Black	12.8
61658	ELMF1MFF60G0TSGC	200-277	Medium Flood	6000K	Silver Grey	12.8
61659	ELMF1MFF60G0TWHC	200-277	Medium Flood	6000K	Silver Grey	12.8
61660	ELMF1MFF60G0TBLC	200-277	Medium Flood	6000K	Black	12.8
61661	ELMF1MFF43G0TSGC	200-277	Medium Flood	4300K	Silver Grey	12.8
61662	ELMF1MFF43G0TWHC	200-277	Medium Flood	4300K	Silver Grey	12.8
61663	ELMF1MFF43G0TBLC	200-277	Medium Flood	4300K	Black	12.8
61889	ELMF1MFF30G0TSGC	200-277	Medium Flood	3000K	Silver Grey	12.8
61665	ELMF1MFF30G0TWHC	200-277	Medium Flood	3000K	Silver Grey	12.8
61666	ELMF1MFF30G0TBLC	200-277	Medium Flood	3000K	Black	12.8
61667	ELMF1WFF60G0TSGC	200-277	Wide Flood	6000K	Silver Grey	12.8
61668	ELMF1WFF60G0TWHC	200-277	Wide Flood	6000K	Silver Grey	12.8
61669	ELMF1WFF60G0TBLC	200-277	Wide Flood	6000K	Black	12.8
61670	ELMF1WFF43G0TSGC	200-277	Wide Flood	4300K	Silver Grey	12.8
61671	ELMF1WFF43G0TWHC	200-277	Wide Flood	4300K	Silver Grey	12.8
61672	ELMF1WFF43G0TBLC	200-277	Wide Flood	4300K	Black	12.8
61673	ELMF1WFF30G0TSGC	200-277	Wide Flood	3000K	Silver Grey	12.8
61674	ELMF1WFF30G0TWHC	200-277	Wide Flood	3000K	Silver Grey	12.8
61675	ELMF1WFF30G0TBLC	200-277	Wide Flood	3000K	Black	12.8
61676	ELMF1BUF60G0TSGC	200-277	Bulletin	6000K	Silver Grey	12.8
61677	ELMF1BUF60G0TWHC	200-277	Bulletin	6000K	Silver Grey	12.8
61678	ELMF1BUF60G0TBLC	200-277	Bulletin	6000K	Black	12.8
61679	ELMF1BUF43G0TSGC	200-277	Bulletin	4300K	Silver Grey	12.8
61680	ELMF1BUF43G0TWHC	200-277	Bulletin	4300K	Silver Grey	12.8
61681	ELMF1BUF43G0TBLC	200-277	Bulletin	4300K	Black	12.8
61682	ELMF1BUF30G0TSGC	200-277	Bulletin	3000K	Silver Grey	12.8

Ordering Description

SKU	SKU Description	Input Voltage ((V)	Optical Code	CCT	Color	Weight (kg)
61682	ELMF1BUF30G0TSGC	200-277	Bulletin	3000K	Silver Grey	12.8
61683	ELMF1BUF30G0TWHC	200-277	Bulletin	3000K	White	12.8
61684	ELMF1BUF30G0TBLC	200-277	Bulletin	3000K	Black	12.8
61685	ELMF1POF60G0TSGC	200-277	Poster	6000K	Silver Grey	12.8
61686	ELMF1POF60G0TWHC	200-277	Poster	6000K	White	12.8
61687	ELMF1POF60G0TBLC	200-277	Poster	6000K	Black	12.8
61688	ELMF1POF43G0TSGC	200-277	Poster	4300K	Silver Grey	12.8
61689	ELMF1POF43G0TWHC	200-277	Poster	4300K	White	12.8
61690	ELMF1POF43G0TBLC	200-277	Poster	4300K	Black	12.8
61691	ELMF1POF30G0TSGC	200-277	Poster	3000K	Silver Grey	12.8
61692	ELMF1POF30G0TWHC	200-277	Poster	3000K	White	12.8
61693	ELMF1POF30G0TBLC	200-277	Poster	3000K	Black	12.8
61740	ELMFS-SG	-	Poster	-	Silver Grey	0.64
61741	ELMFW-SG	-	Poster	-	Silver Grey	4.58
62464	ELMFS-BL	-	Poster	-	Black	0.64
62465	ELMFW-BL	-	Poster	-	Black	4.58
62466	ELMFS-WH	-	Poster	-	White	0.64
62467	ELMFW-WH	-	Poster	-	White	4.58

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2018 / 10 / 05