

能源管理系統

Energy Management System



Energy Management Systems

Allowing facility owners to shed some light on the unknowns of their power system, the fully integrated PMCS Energy Management System provides the tools to help control energy costs, minimize downtime and increase productivity.



Monitoring Power Quality Cost Allocation Control & Automation

Basic Advanced



WebSpace








SCADA Control **Historical Analysis** **Alarm** **KPI Monitoring** **Operation Report**

SCADA控制 歷史分析 報警回應 KPI監視 運行報表

LOCATIONS



-  : Headquarter
-  : Branch/Representative
-  : Factory
-  : R&D Center

INTRODUCTION

YATRON

YATRON its beginning is from Engineer Mr. Kenneth Chan, who established the YATRON Company in 2006.

The Company is a diversified organization covering Energy Management and Lighting Solutions. From energy, data center, lighting, water, transportation and health.

YATRON's technology comes from GE (General Electric) and is GE's Authorized Switchgear Panel Builder and Distributor. We integrate all systems and make the dream come true by intelligence.

We provide to customers, across various industries and buildings, turnkey service solutions that ensure the reliability and protection of the electrical infrastructure; from the power plant, substation, to a facility's critical equipment, and all the power technologies in between. TUV ISO 9001 and ERP system are always applied.



The offers of our Businesses are twofold

- ❑ **Manufacture**
 - ❑ LV Switchgear and Controlgear
 - ❑ Components and Software of Energy Management System
 - ❑ Lighting Fixture
 - ❑ Smart and Intelligence Air Compressor and System
- ❑ **Energy Consulting Service**
- ❑ **Energy Management System (EnMS), Industrial and Building automation integration, BAS, SCADA, PLC**
- ❑ **Renewable Energy | Wind and Solar System**
- ❑ **Lighting Solutions**
- ❑ **High quality and performance equipment and materials**
- ❑ **Engineering services for EPC and Turn-key projects**

SCOPE OF BUSINESSES



GE
Energy

 **YATRON**[®] 日騰
LV Distribution System | Automation System

 **KenerSys**

ENERGY MANAGEMENT

■ About Our Business



YATRON|GE Energy Management is **YATRON|GE's** electrification business. We make energy safer and more useful through our ability to transmit, distribute and convert electricity. We integrate leading products and technology to solve customer problems. Our electrical solutions allow utilities and energy-intensive industries such as commercial, healthcare, data center, oil & gas, marine, metals and mining to efficiently manage electricity from the point of generation to the point of consumption.

We offer a full range of electrical capabilities. Our global teams design industry leading technology to improve the transmission, distribution and conversion of electricity, and to help provide safe, efficient and reliable electrical power.

Global and Local

Serving the customer is our top priority. Around the globe we have established local and long-lasting relationships with customers to fulfill their needs.

Yes, our local teams can access our global operations to provide end-to-end electrical solutions to customers. Investment in people and a strong local presence helps our customers to view us as their business partner.



■ Explore & Interact

● Energy Management Systems

Energy Management Systems

Allowing facility owners to shed some light on the unknowns of their power system, the fully integrated PMCS Energy Management System provides the tools to help control energy costs, minimize downtime and increase productivity.

Monitoring
Power Quality
Cost Allocation
Control & Automation

← Basic
Advanced →

Featured Products

- Energy Management Systems**
Complete automation solution customized to your power management needs

[View Product Info](#)
- Advanced Power Quality Metering**
Revenue grade power quality capabilities and waveform recording

[View Product Info](#)
- Managed Ethernet Switches**
Industrial hardened networking solutions

[View Product Info](#)

● Total Efficiency Architecture

Total Efficiency™ Architecture

Power Electronics Total Efficiency™ Architecture
The Total Efficiency architecture addresses issues end-to-end based on our proven experience and expertise in batteries, power distribution, DC energy systems, AC-DC power supplies, and DC-DC board mounted power to deliver a solution that is reliable and energy efficient.

Featured Products

- Energy Systems**
DC energy systems designed for decades of reliable service.

[View Product Info](#)
- DC-DC Power Converters**
Designed to provide highly reliable DC-DC conversion solutions to a wide array of applications.

[View Product Info](#)
- AC-DC Power Supplies**
Custom, standard and modified standard AC-DC power supplies for the data center market.

[View Product Info](#)

Total Efficiency™ Data Center
Designed specifically to help you address the power, cooling and energy management challenges of datacenters. [Learn More](#)

■ Explore & Interact

● Safety and Protection

Safety and Protection

Arc flashes are rare but extremely destructive events that can seriously injure employees and take your electrical system down for days.

GE offers an integrated strategy that reduces the possibility of their occurrence, contain their explosive energy, and protect your personnel and your electrical system.

High Efficiency



Arc-flash hazards

Arc-flash by the numbers

- 8** Arc-flash explosions per day
- 1-2** Deaths per day related to incidents
- 5** Types of injuries: burns, temporary blindness, hearing loss, concussion & shrapnel wounds
- \$16M** Average costs for each incident

U.S. statistic cited by CapSchell, Inc. in a study for the Electric Power Research Institute, 1999

Featured Products

Arc Vault™ Protection System

A new approach to arc flash containment. It extinguishes the arcing fault in less than eight milliseconds.



Arc Flash Hazard Study

The first line of defense for your employees against an electrical arc is knowledge



Entellisys™ LV switchgear

Allows operators to stay out of the arc flash zone and lowers the incident energy of an arc flash.



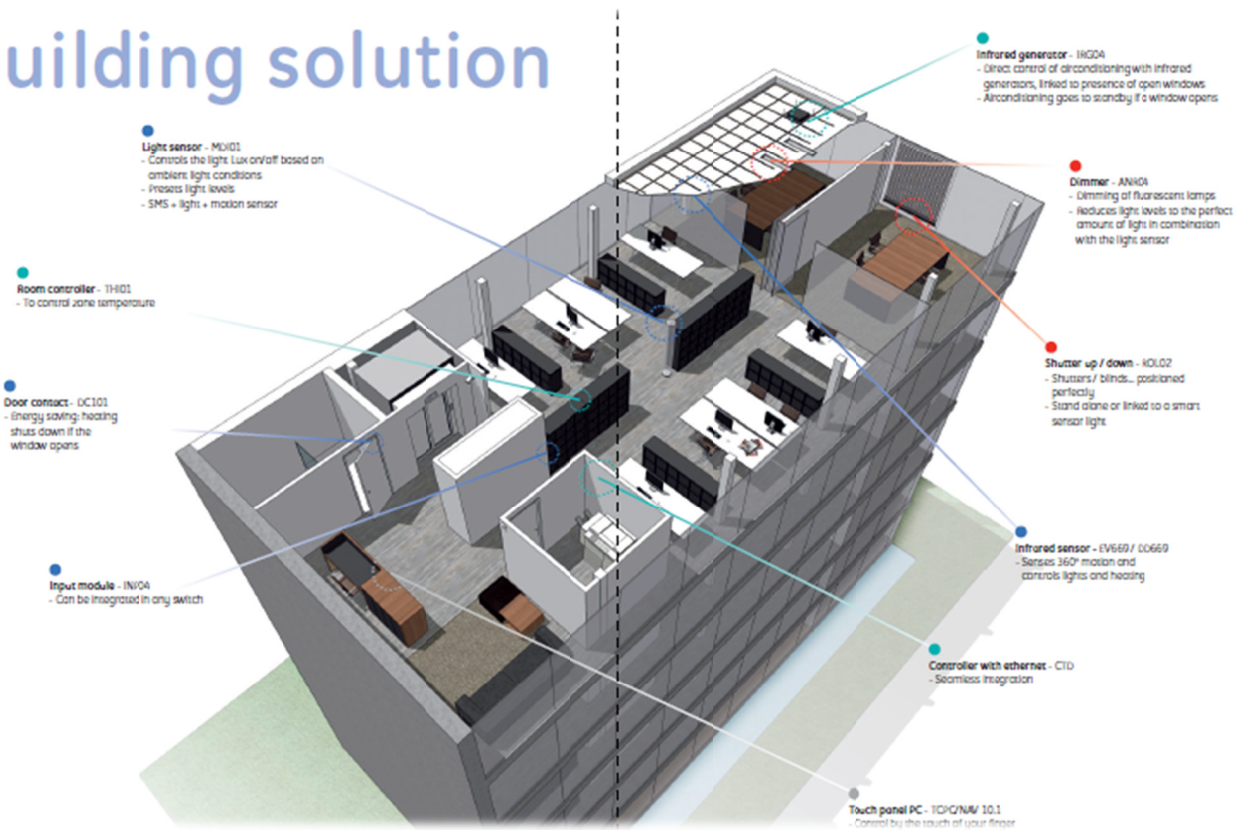
EntelliGuard™ TU Trip Unit

You never have to sacrifice selectivity for flash protection.

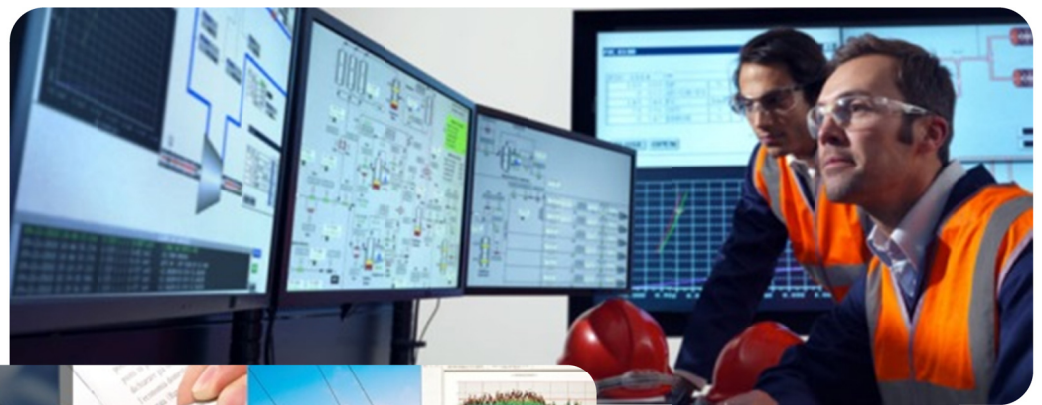
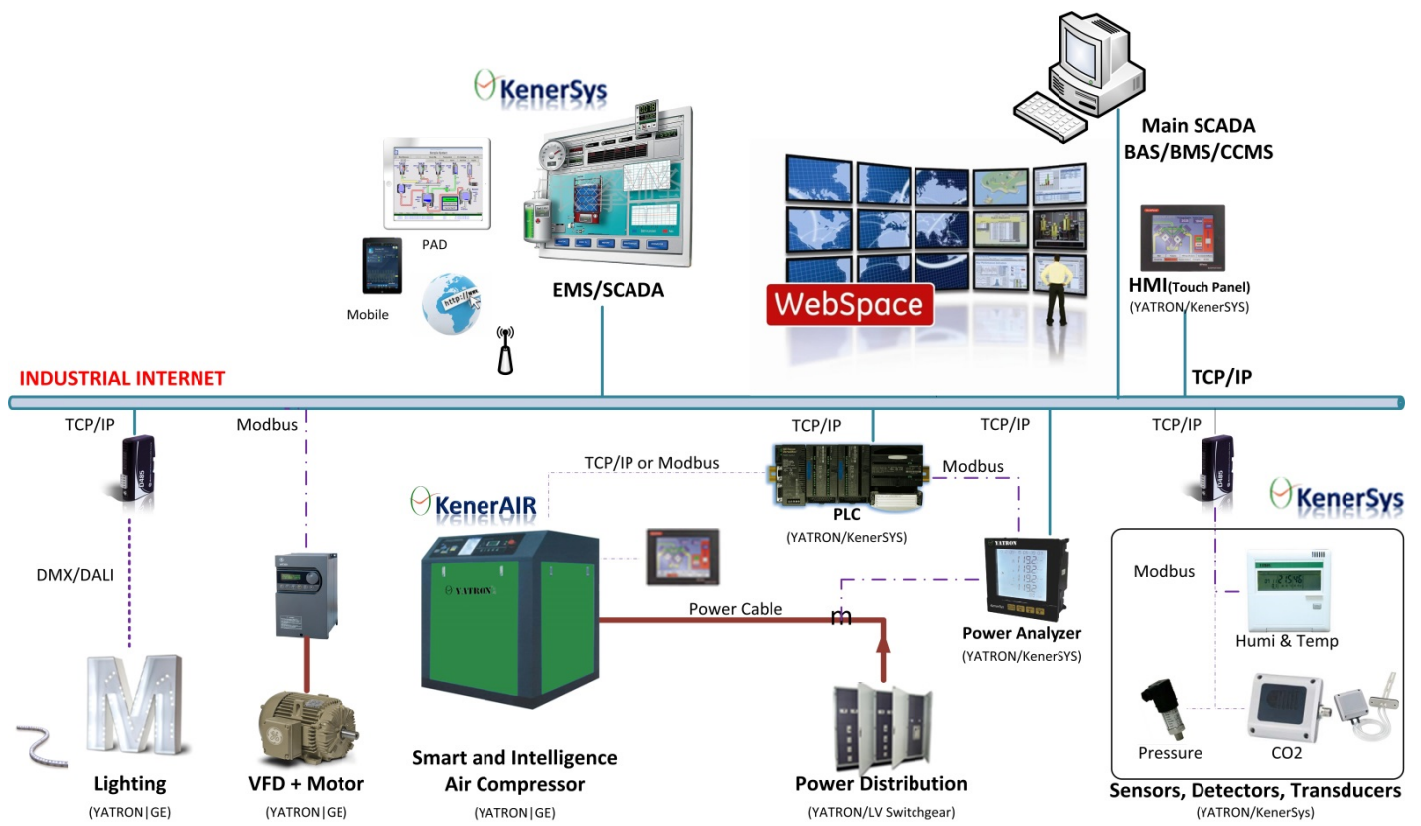


● Factory and Building Automation

Building solution



SCHEMATIC OF SMART AND INTELLIGENCE CONTROL SYSTEM



Energy Consulting

driving the evolution of electric power systems with greater affordability, reliability, and efficiency

About Us

Sustainability

Real-Time Insight for Reducing Consumption

Features

- One framework for all types of sustainability measures, including water, energy, gas, steam, etc.
- Open architecture - Integrates with existing traditional metering, automation, smart meters and systems
- Ease of adoption - Based on tools commonly used in line side systems and by engineering, maintenance and continuous improvement teams
- Bottoms-up data collection - Drives insight at the machine or process level, while serving data for area, plant or enterprise views
- Flexibility – install as an independent system and/or embed tools right inline side systems
- Accessibility – Enable users to access over the web or from fixed terminals

Benefits

- Reduced usage of utility inputs such as electricity, gas or water
- Better decision making, based on detailed, actionable insight into resource consumption
- Faster response to unusual usage events or patterns
- Ability to immediately measure the effectiveness of improvement initiatives
- Simplified data consolidation – one platform for integrating manual and automatic data collection
- Ease of use, with one source for objective resource consumption data – accessible to all stakeholders

How Big Are Your Reduction Opportunities?

10% less energy. 20% less water. These are the kinds of reductions our customers achieve when they build a bottoms-up view of consumption and cost. Understanding and affecting the true drivers of energy and water usage takes a deep, detailed view of your operation.

GE|YATRON for Sustainability is a set of software solutions that unlocks data in existing automation and systems, as well as meters and sensors making it available to support both usage analysis and the process or equipment tuning that eliminates excessive usage.

Real-Time Insight Empowers Operators, Technicians, and Management

Reducing resource consumption is more than a matter of equipment troubleshooting and maintenance. Engaging operators to do their part to spot and correct problems requires giving them intuitive visibility into the areas they can directly control. Embedding that insight into their work environment makes a disciplined approach to managing energy and water usage a natural part of their responsibilities, and empowers them to drive savings as events occur.

A Foundation for Deeper Analytics Leveraging the Suite

As the savings from improved line side visibility and response take hold, the stage is set for additional stakeholders to drive further value recovery. Equipped with detailed, localized measurement data, as well as an understanding of the expected (or target) consumption for an area, asset or process, engineering and maintenance teams can quickly identify unusual events or patterns that indicate the need for asset or process troubleshooting.

When complex processes or equipment present analytical challenges, powerful software tools such as Troubleshooter can be applied to ensure an accurate understanding of the root causes of over consumption. Cause+ software can then leverage the results of analysis in Troubleshooter embedding preventative and or/corrective logic or guidance right into operator and supervisory consoles.

Easy Consolidation of Data From Disparate Sources and Systems

Consolidating all of your data sources into one central application, KenerSys for Sustainability enables easy data correlation for better and faster decision-making.

In addition, the user interface provides dynamic screens, interactive graphics, and powerful trending.

Identify opportunities to save energy, measure impact, and track ongoing progress

Single viewpoint for your Sustainability initiatives

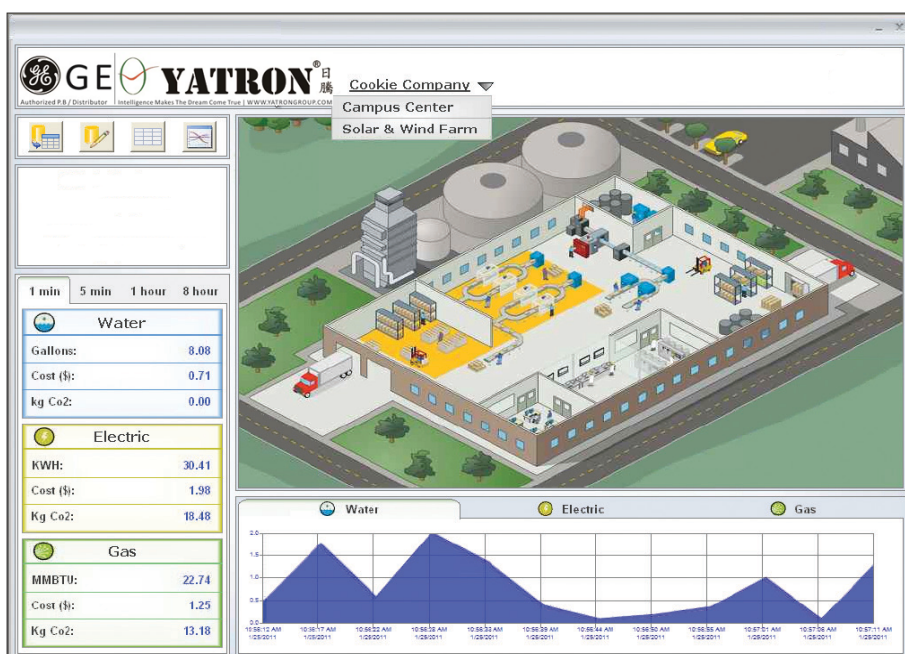
A complete view of energy, water and other utility consumption, at your fingertips.

Real-time vs. historical comparisons

Compare usage against targets for each critical input, so you can manage your usage in real time, instead of looking at utility bills after the fact.

Utilize on-the-fly analytics at the device or group levels

Easily "track back" through the data from a single area or meter to quickly spot unusual patterns that indicate needs to tune processes or equipment.



Leverage automatic and manual data collection methods

Contextualize raw data quickly

With a configuration wizard that includes CO2 conversion and/or cost conversion factors, you can immediately turn raw consumption figures into cost and emission figures that illustrate the value of reduction initiatives over time.

Use Proficy out of the box or build application-specific solutions

Many Inputs, Many Stakeholders – One Platform

A Solution Based on Proven Technologies

KenerSys for Sustainability is a cohesive solution that delivers focused capability in measuring and presenting data that is critical to understanding, then reducing your energy, water, and other resource usage. Our Open and Layered software approach means that you can take advantage of the core solution and easily extend and integrate its capabilities beyond the initial installation:

- Utilize an independent visualization server for web- and/or terminal services based clients
- Embed the graphical objects into live applications
- Add additional data points and calculations to screens to create additional key performance indicators or expose related trends
- Take advantage of our unparalleled connectivity to gather data from otherwise isolated systems

On-the-fly Historical Analysis

Users have the flexibility to switch from real-time to historical analysis mode on the fly. This provides great insight into the and enables users to see instantly how the results compare to previous timeframes.

In addition, alarms, warnings and messages can be set up to monitor the incoming data for you and enunciate it to multiple users.

A Familiar Framework

Sustainability initiatives shouldn't depend on major investments in isolated systems that serve only a limited number of stakeholders.

KenerSys for Sustainability builds on the tools commonly used by engineering, maintenance and continuous improvement teams that turn reduction goals into realities. Our approach reduces the time and cost of adoption, and easily takes advantage of the data held in other systems your teams manage. Additionally, the KenerSys solution avoids unnecessary investment in redundant systems, while delivering deep and rich data for troubleshooting and tuning, as well as "rolled-up" views that serve management and sustainability program stakeholders.

Maximize Your Access to Incentives

Many governments and utilities around the globe offer fiscal incentives for companies that make greenhouse gas and overall energy reductions. With an increasing emphasis on proof of improvements, it's more critical than ever to be able to provide objective, trustworthy data to external stakeholders. KenerSys for Sustainability supports faster, deeper comparison of consumption patterns during different periods—simplifying the reporting needed to win, and hold, incentives.

KSPA-20 Power Analyzer

KSPA-20

DESCRIPTION

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

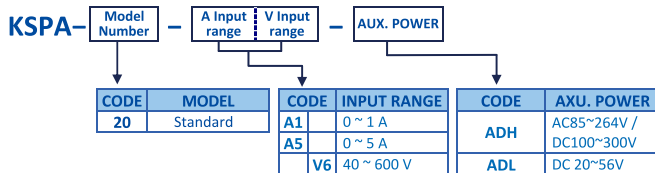
Provides electricity bill ratio (Cost) and carbon dioxide ratio (Co₂) set can show cumulative electricity bills and carbon emissions, and suitable for the installation in the power management of remote communication, such as the use of demand.

APPLICATION

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



ORDERING INFORMATION



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 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
 Voltage : <0.2VA ; Current : <0.1VA

Input burden: 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

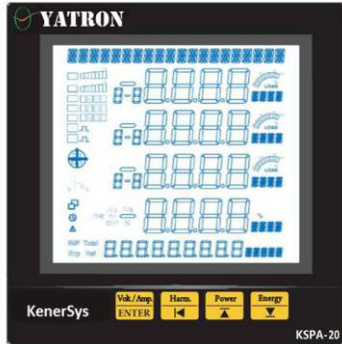
Power supply: AC 85~265V / DC 100~300V
Power consumption: AC:≤ 10W / DC:≤ 3W @ 230V
Back up memory: By EEPROM
Dimension: 96mm(W) x 96mm(H) x 71mm(D)
Panel cutout: 90mm(W) x 90mm(H)

Case material:

Black PC (non-flammable)

Installation: Panel mounting
Wiring terminal: Screw terminal, Plastic NYLON 66 (UL 94V-0)
 Current/Voltage input(#1~#10): 1.5~2.5mm²(AWG15~10)
 Other terminal: 0.5~1.3mm²(AWG22~16)
Weight: Around 400g

Front Panel



Display: LCD 65(W)x58(H)mm ; White backlight ; Blue wording
Visible under direct sunlight
Backlight on time1~15Min ("0" is always light)
LCD LED: Upper row 20 digits: Display date, time
Reading: 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

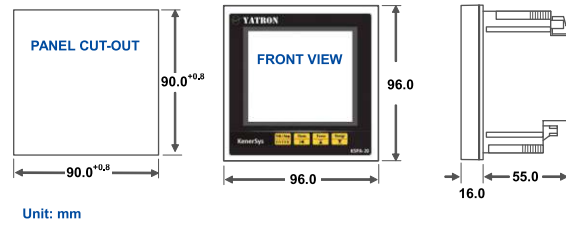
Load status indication:
 IND :On when load is inductive
 CAP :On when load is capacitive
 LOAD% :Display load percentage
 ↗ :Display load quadrant

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

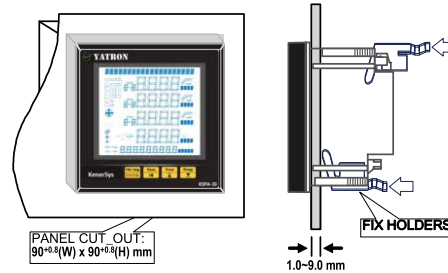
Display value update: 0.5 sec
Control button: 4 control buttons
 Enter Key / Voltage /Current display page
 Shift Key / Main electric parameters display page
 Up Key / Electric parameters display page
 Down Key / Energy parameters display page

Passwords: 4 digits passwords ; Range : 0000~9999 (Default 1000)

Dimensions

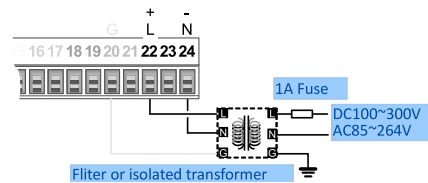


Installation



Connection diagram

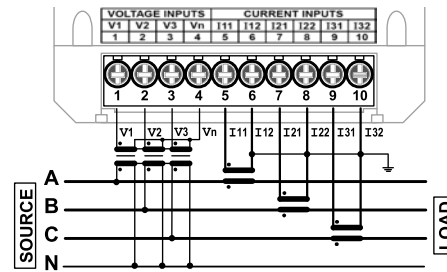
Aux Power (Terminal Block 2)



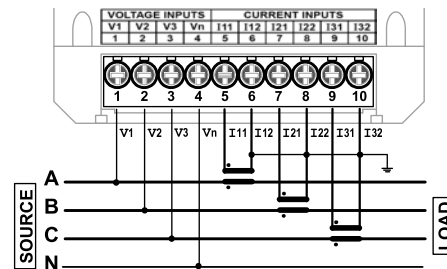
Voltage and Current input (Terminal block1)

Voltage wire: AWG16~12(1.3~2.0mm²)
 Current wire: AWG15~10(1.5~2.5mm²)

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



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



KSPA-20

電力分析儀

■ 產品介紹

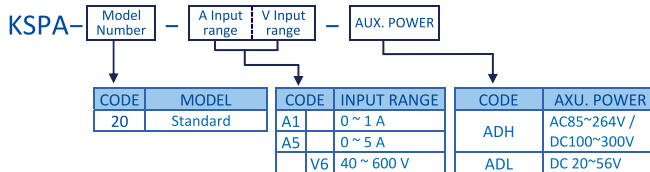
KSPA-20 電力分析儀提供多樣單相、三相電量參數 (電壓、電流、有效功率、無效功率、視在功率、功率因數、頻率、有效電能)的高精度測量，顯示和遠端 RS485 通訊(Modbus RTU Mode)功能，更提供了電費比率(Cost)與二氧化碳比率(Co₂)設定，可以顯示累積電費與碳排放量，適合裝置在電量管理遠端通信等的運用需求。

■ 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



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 _{LN})
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 usec. 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

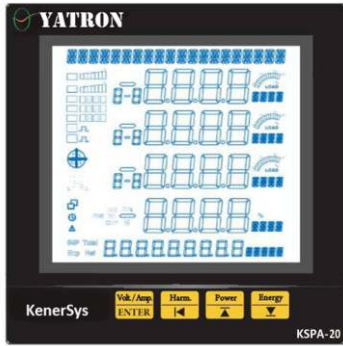
工作電源

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): 1.5~2.5mm²(AWG15~10)
 其他端子: 0.5~1.3mm²(AWG22~16)
 重量: 小於 400g

■ 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 · 錶示通訊正常

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 · 錶示量測視窗顯示值為 線-線(Line-Line)
a, b, c :點亮時 · 錶示量測視窗顯示值為 相(Phase)
N :點亮時 · 錶示量測視窗顯示值為 中性線
Total :點亮時 · 錶示量測視窗顯示值為 加總值
Avg :點亮時 · 錶示量測視窗顯示值為 平均值
MAX MIN :點亮時 · 錶示量測視窗顯示值為 最大(小)值
THD :點亮時 · 錶示量測視窗顯示值為 總諧波失真率
[V] [M] [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

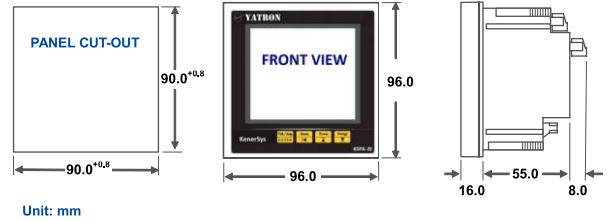
操作按鍵:

4 個按鍵操作
[ENTER] Enter Key / 電壓/電流 快速翻頁鍵
[SHIFT] Shift Key / 綜合電力參數 快速翻頁鍵
[UP] Up Key / 電力參數 快速翻頁鍵
[DOWN] Down Key / 電能參數 快速翻頁鍵

安全密碼:

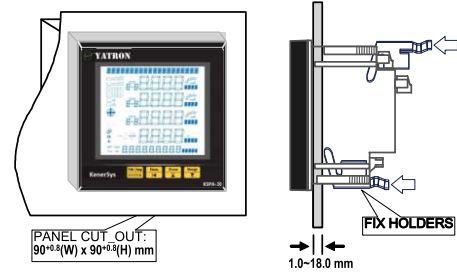
4 位數密碼; 設定範圍: 0000~9999

■ 外觀尺寸及盤面開孔



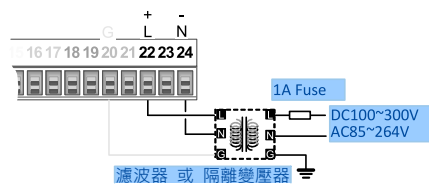
Unit: mm

■ 安裝方式



■ 接線方式

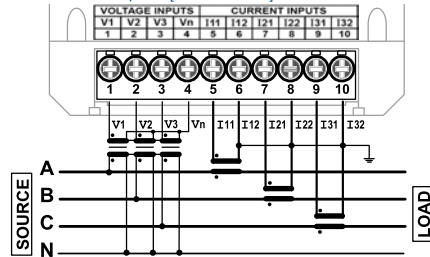
輔助電源(端子台 2)



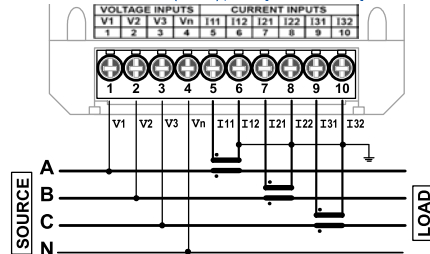
電壓與電流輸入(端子台 1)

電壓線徑: AWG16~12(1.3~2.0mm²)
電流線徑: AWG15~10(1.5~2.5mm²)

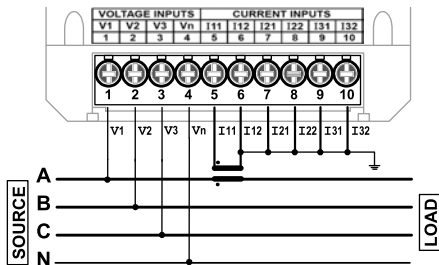
● 3 相 4 線 - 3PT / 3CT [設定: 3P4W]



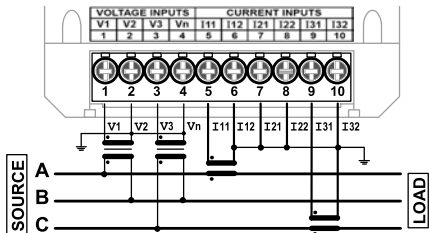
● 3 相 4 線 - 電壓直入(無 PT) / 3CT [設定: 3P4W]



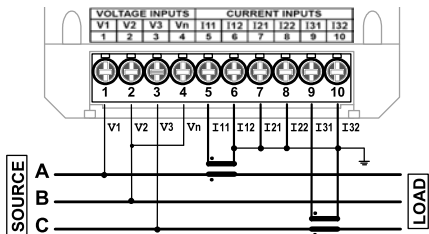
- 3 Phase 4 Wire(Balanced load) – Direct Voltage(No PT) / 1CT [Set: 3P4Wb]



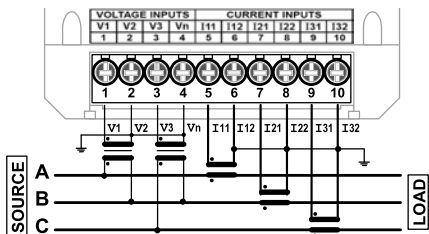
- 3 Phase 3 Wire – 2PT / 2CT [Set: 3P3W]



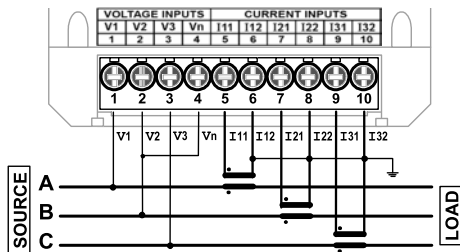
- 3 Phase 3 Wire – Direct voltage(No PT) / 2CT [Set: 3P3W3]



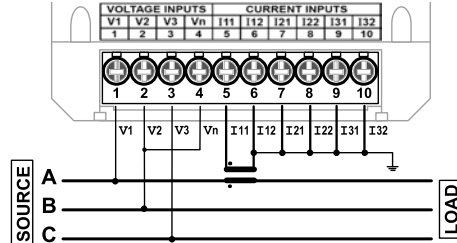
- 3 Phase 3 Wire 3CT – 2PT / 3CT [Set: 3P3W3]



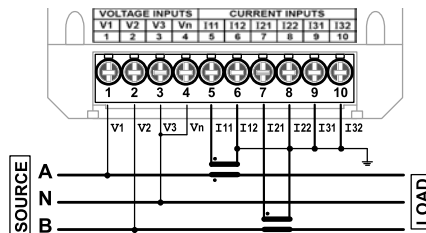
- 3 Phase 3 Wire 3CT – Direct voltage (No PT) / 3CT [Set: 3P3Wb]



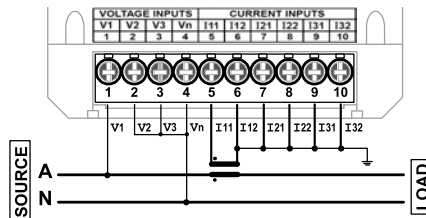
- 3 Phase 3Wire(Balanced load) – Direct Voltage (No PT) / 1CT [Set: 3P3Wb]



- 1 Phase 3 Wire – [Set: 1P3W]

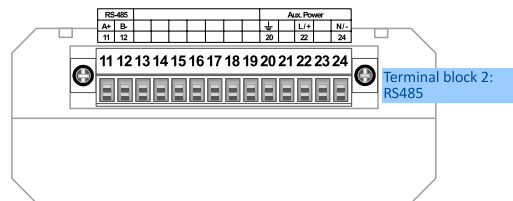


- 1 Phase 2 Wire – [Set: 1P2W]

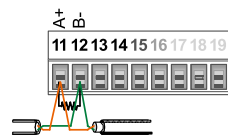


RS485 / (Terminal Block 2)

Wire diameter: AWG22~16(0.5~1.3mm²)

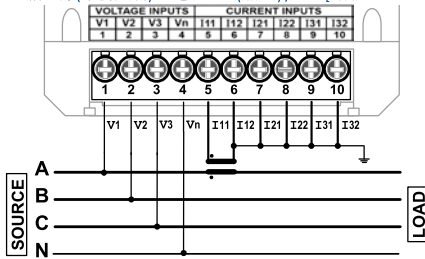


RS485 Port

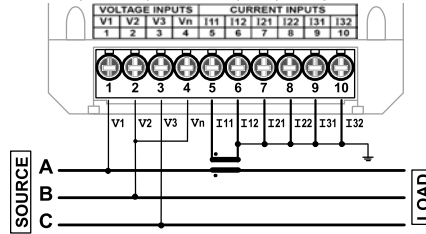


Distance Max.: 1200M
Terminator: 120~300Ω / 0.25W
(Standard: 150Ω)

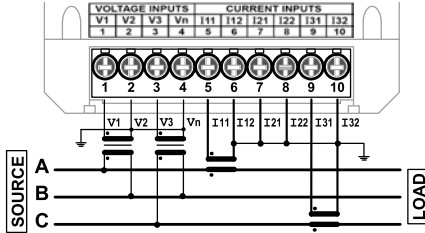
- 3相4線(平衡負載) – 電壓直入(無 PT) / 1CT [設定: 3P4W.b]



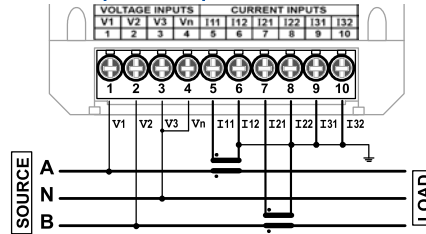
- 3相3線(平衡負載) – 電壓直入(無 PT) / 1CT [設定: 3P3W.b]



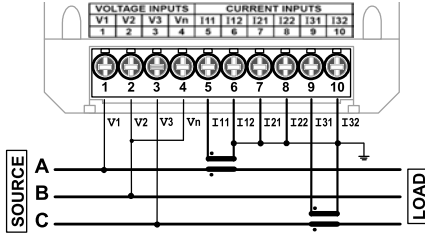
- 3相3線 – 2PT / 2CT [設定: 3P3W]



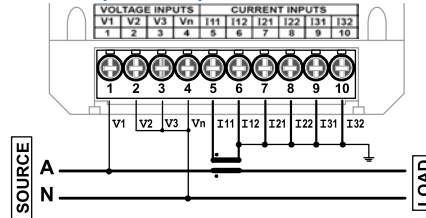
- 單相3線 – [設定: 1P3W]



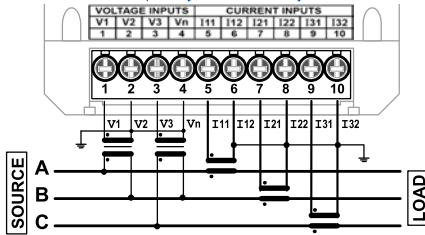
- 3相3線 – 電壓直入(無 PT) / 2CT [設定: 3P3W]



- 單相2線 – [設定: 1P2W]

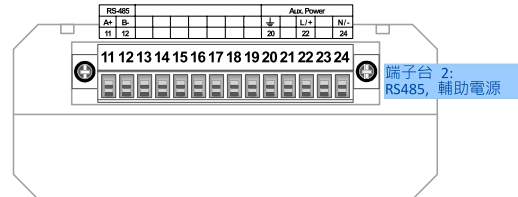


- 3相3線 3CT – 2PT / 3CT [設定: 3P3W.3]

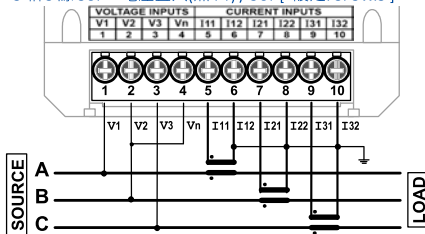


RS485 / 輔助電源 (端子台 2)

線徑: AWG22~16(0.5~1.3mm²)



- 3相3線 3CT – 電壓直入(無 PT) / 3CT [設定: 3P3W.3]



RS485 通訊埠



■ 產品介紹

KSPA-70 多功能電力分析表，提供多種單相及三相的高精度電力參數測量，並具有 4 組數位輸入和 2 組繼電器輸出及 RS485 通訊(Modbus RTU Mode)等齊全的介面與功能。

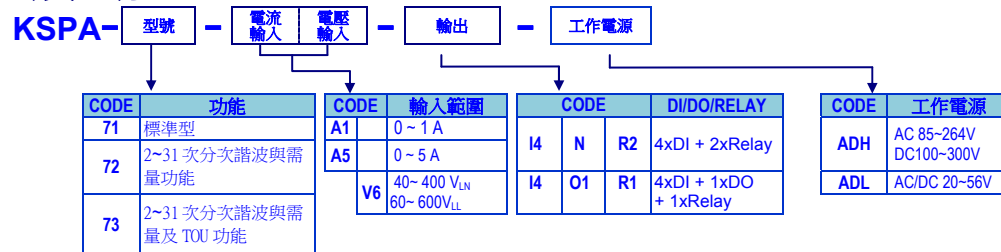
可量測電壓及電流的 2~31 次分次諧波含量，並可顯示累積電費與 CO₂ 碳排放量，適合使用在電量監測、管理及用電品質分析等場合的需求。另具備 TOU(分時計費)功能與 2MB Flash 的記錄容量，可供使用者長時間做資料記錄。

■ 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



		71	72	73
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	四象限 P ₁ P ₂ P ₃ ΣP	●	●	●
無效功率	四象限 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	kWh Imp kWh Exp kWh Total kWh Net	●	●	●
視在電能	VAh	●	●	●
電壓總諧波失真率	THD _{V12} THD _{V23} THD _{V31} THD _{V,Avg}	●	●	●
電流總諧波失真率	THD _{I1} THD _{I2} THD _{I3} THD _{I,Avg}	●	●	●
分次諧波含量	2nd~31st 諧波		●	●
需量	電流、功率需量		●	●
最大需量記錄	電流、功率最大需量及發生時間		●	●
最大(小)值記錄	各參數最小值、最大值及發生時間	●	●	●
外部控制輸入	ECI1 ECI2 ECI3 ECI4	●	●	●
脈衝輸出	DO1	●	●	●
繼電器輸出	RO1 RO2	●	●	●
TOU(分時計費)	4 個時區, 8 個時段			●
日期時間	年, 月, 日, 時, 分, 秒.	●	●	●

輸入範圍:

電壓: 40~400 V_{LN}; 60~600V_{LL}
 PT 一次側 設定範圍: 100~1200000V
 PT 二次側 設定範圍: 50~600V
電流: 0~5A, (Optional:0~1A)
 CT 一次側 設定範圍: 5~9999A
頻率: 45~65Hz
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~31st 的諧波含量

繼電器功能(RO)

繼電器輸出接點: 2 組 SPDT(1a): 5A/250Vac; 5A/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 34 種電量及需量參數
 脈衝輸出模式: 第二組 RO 設定為脈衝輸出模式時, 最高頻率為 50Hz

外部控制輸入(ECI)

輸入模式: 4 組外部控制輸入點; 開關接點或開集極(O.C.)輸入
 功能設定: 可設定為 需量清除 / 最大需量清除 / 電能值清除 / 最大最小值清除 / 繼電器復歸 / DI
 可設定 0~99 (x 8ms)

防彈跳時間:

脈衝輸出(DO)
 輸出電氣規格: 1 組開集極(O.C.)輸出: 30Vdc, 30mA(max)
 輸出頻率: 1000Hz(max)
 脈衝除頻功能: 1~9999 (1 Pulse= 0.1kWh; 設定 100, 1 Pulse= 10.0kWh)
 脈衝寬度: 0~5000(x 4ms), 0 表示 duty cycle 50%
 校驗脈衝輸出: 3200 Pulse/1kWh, Duty cycle 50%

需量

計算方式: 固定區塊 / 滑動區塊算法

分時計費功能(TOU)

四個時區: 每年可設定 1~4 時區
 八個時段: 每個時區可設定 1~8 時段
 每個時段可指定所屬的尖、峰、谷、平
 輸入有功電能、輸出有功電能、輸入無功電能、輸出無功電能、總有功電能、總無功電能、視在電能、總視在電能
 特殊日設定: 可個別設定五年的特殊日時段與費率或是五年同一個特殊日設定

數據記錄

資料記錄: 可依設定的間隔時間記錄預設資料或是指定資料, 間隔時間可設定 1~32767, 間隔時間單位可設定 日、時、分、秒

參數資料儲存:

2MB Flash ROM

■ 精確度 & 解析度

量測顯示參數	精確度	解析度	量測範圍
電壓	0.2%	0.1V	40.0~400.0Vac(V _{LN})
電流	0.2%	0.001A	1%~120% CT 額定電流
中性線電流	1.0%	0.001A	1%~120% CT 額定電流
有效功率	0.5%	1W	0~99999999~999999999W
無效功率	0.5%	1Var	-999999999~999999999Var
視在功率	0.5%	1VA	0~999999999VA
功率因數	0.5%	0.001	±1.000
頻率	0.1%	0.01Hz	45.00~65.00Hz
有效電能	0.5%	0.1kWh	0~99999999.9kWh
無效電能	0.5%	0.1kVarh	0~99999999.9kVarh
視在電能	0.5%	0.1kVAh	0~99999999.9kVAh
總諧波失真率	1.0%	0.1%	0~100.0%
分次諧波含量	1.0%	0.1%	0~100.0%
三相不平衡度	0.5%	0.1%	0~300.0%

■ 技術規格

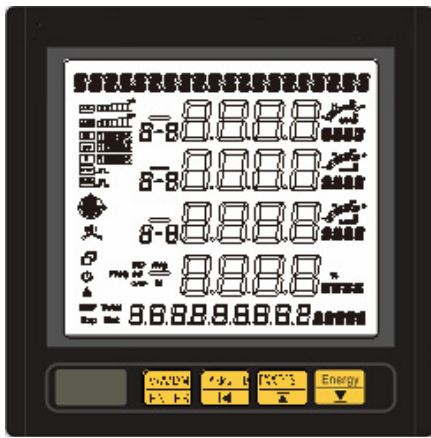
輸入

量測方式: True RMS (真有效值量測)
 取樣速度: 128 points / cycle
 相線系統: 1P2W、1P3W、3P3W(1、2、3CT)、3P4W(1、3CT)
 平衡/不平衡系統: 可由盤面按鍵規劃

通訊
 通訊協定: RS485 Modbus RTU mode
 通訊地址: 1~247
 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)
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

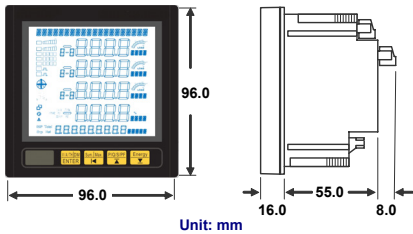
工作電源
 工作電源: ADH : AC 85~264V / DC 100~300V
 ADL : AC/DC 20~56V
 AC : ≤ 10VA @ 230V / DC : ≤ 3W
外觀
 外觀尺寸: 96mm(寬) x 96mm(高) x 63mm(深)
 開孔尺寸: 90mm(寬) x 90mm(高)
 外殼材質: 黑色 ABS (添加阻燃)
 安裝方式: 盤面安裝
 重量: 小於 450g
 接線端子: 螺絲端子, Plastic NYLON 66 (UL 94V-0)
 電壓/電流輸入端子: 1.2~2.5mm²(AWG15~10)
 其它端子: 0.5~1.3mm²(AWG22~16)
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
 絕緣阻抗: ≥100MΩ @ 500V_{dc}
 EMC: EN 61326:2006
 Safety(LVD): EN 61010-1:2010

■ 面板說明

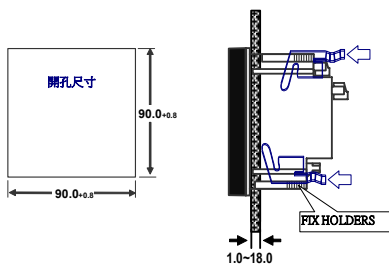


顯示視窗: LCD 65(W)x61(H)mm ; 白色高亮度背光 ; 藍色字體
 即使在陽光直接照射下依然清晰可見
 螢幕保護功能: 背光時間可設定 1~15 分鐘
量測值顯示:
 上排 20 碼: 顯示頁面資訊
 8888.4 位數 x 4 行, 顯示讀值
 88888888.8:9 位數 x 1 行, 顯示電能參數
 □:RS485 通訊狀態顯示 ; 由二個方形
 分別代表資料發送與接收的狀態

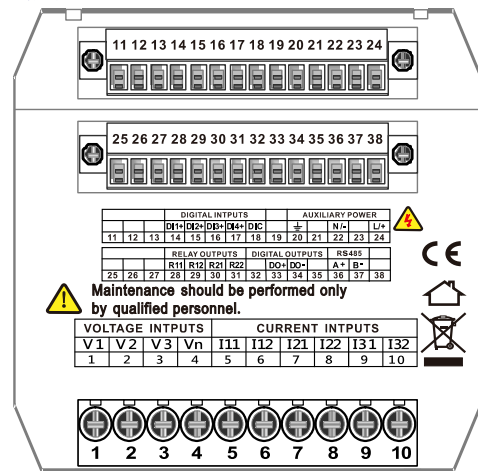
■ 外觀尺寸



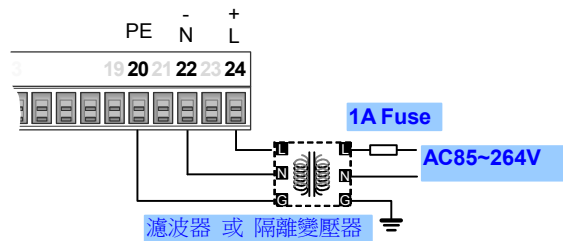
■ 安裝方式及盤面開孔



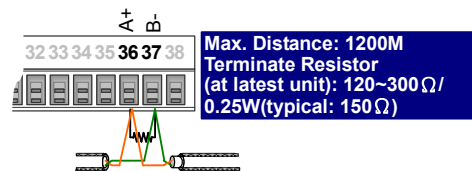
■ 端子接腳圖



■ 工作電源接線方式



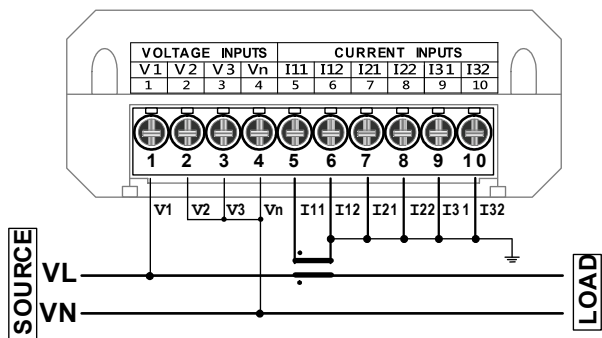
■ RS485 通訊輸出



電壓與電流接線方式

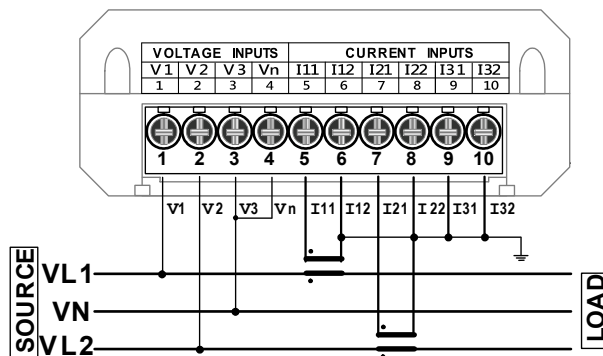
單相兩線

無 PT/1CT



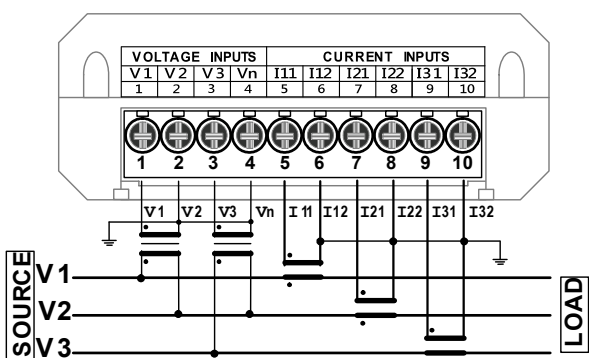
單相三線

無 PT/2CT

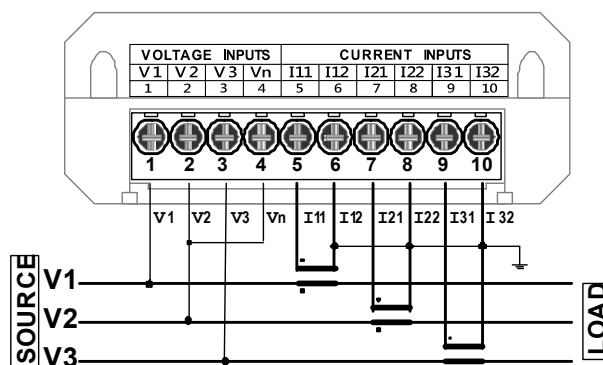


三相三線

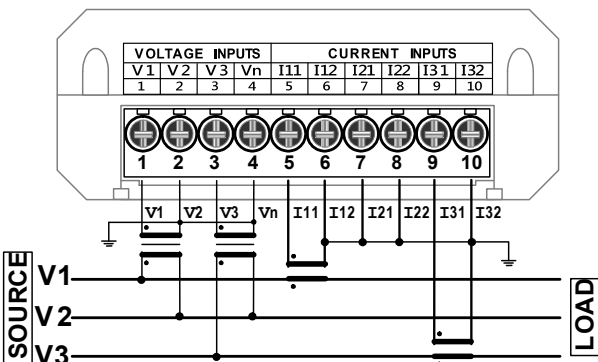
2PT/3CT



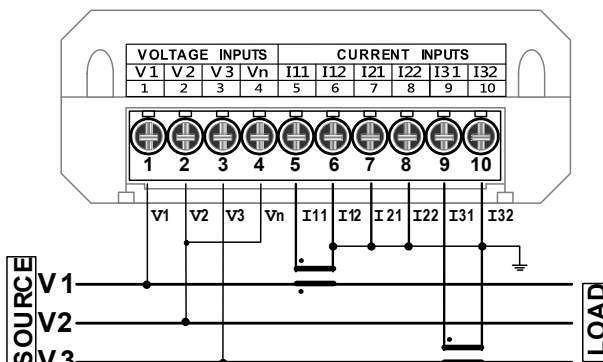
無 PT/3CT



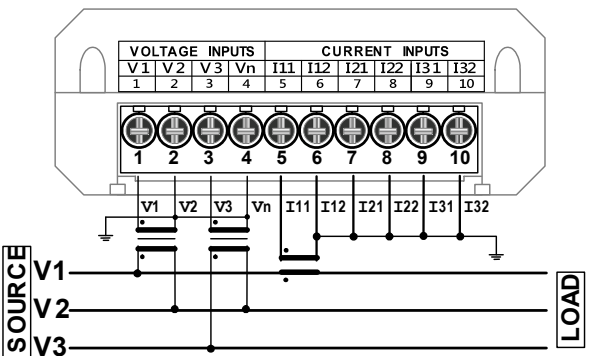
2PT/2CT



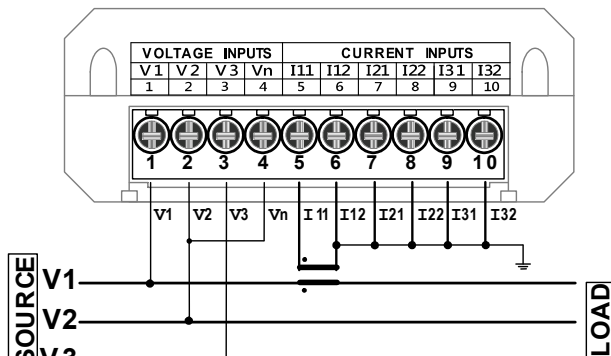
無 PT/2CT



2PT/1CT

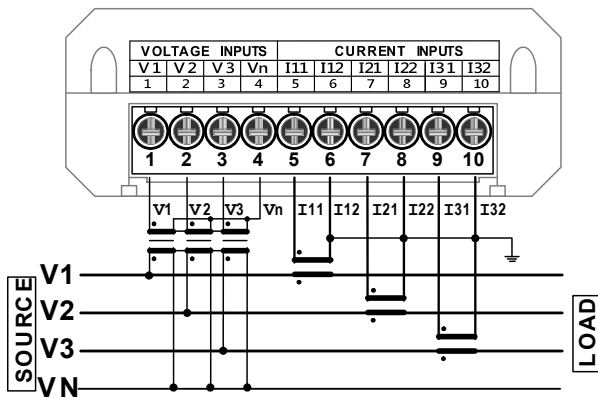


無 PT/1CT

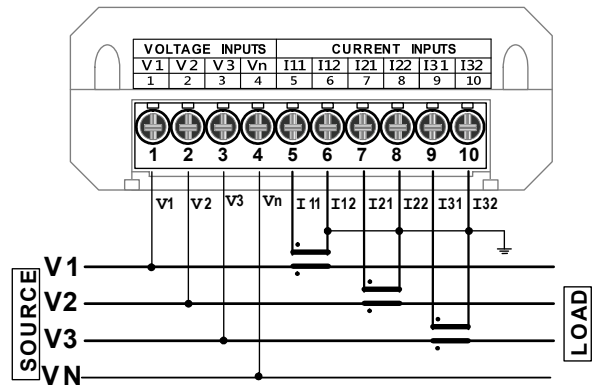


三相四線

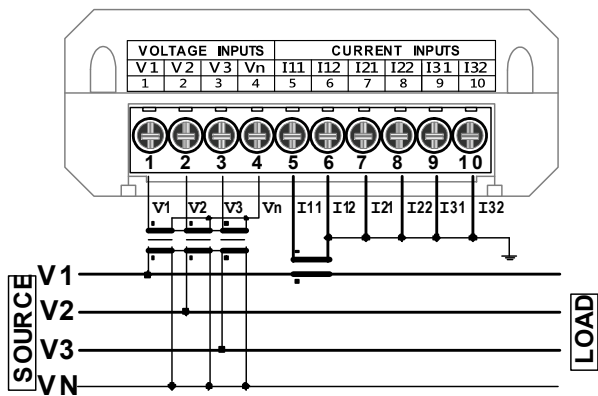
3PT/3CT



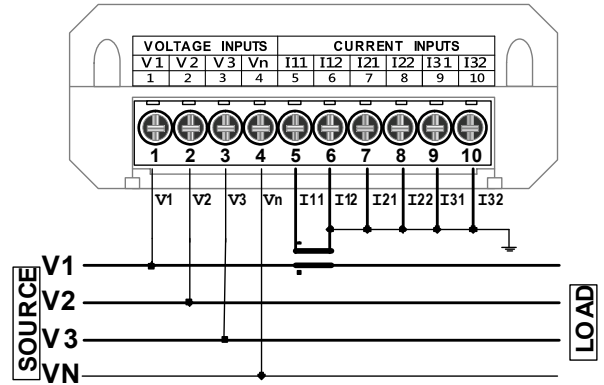
無 PT/3CT



3PT/1CT

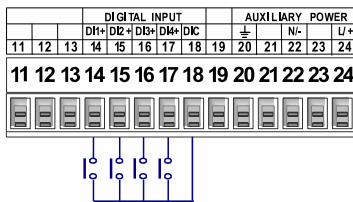


無 PT/1CT



外部控制輸入(ECI)

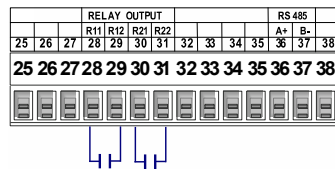
線徑: AWG22~16(0.5~1.3mm²)



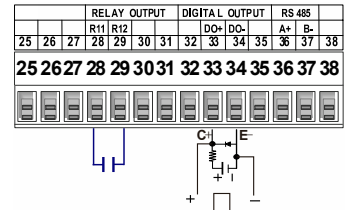
繼電器輸出(RO)/ 脈衝輸出(DO)

線徑: AWG22~16(0.5~1.3mm²)

2xRelay



1xRelay+1xDO



KSPA-80 Power Analyzer

KSPA-80

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 CO₂ 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.

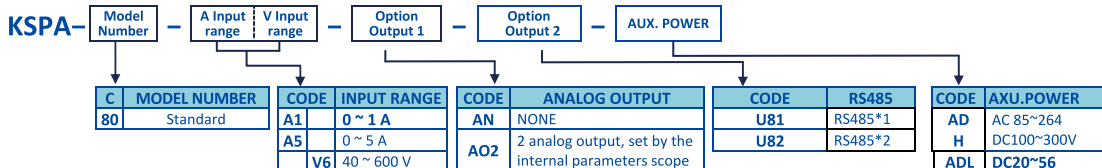


APPLICATIONS

Power Monitoring of Motor Control Switchboard
Energy Management and Electricity Cost Allocation System

Distribution Power Monitoring
Power Quality Analysis

ORDERING INFORMATION



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 2 nd 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 _{1-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%

TECHNICAL SPECIFICATION

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) ;

Input Range:

Balance/Unbalance System
Programmed by front keys (must be the same with rea
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)

Analogue Output:

(Option)

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
Settable range 5 ~255 x (8m seconds)

Debouncing time:

Pulse output (PO)

Output mode:

2 Open collect (O.C.)outputs: 5~30Vdc, 30mA(max)

Reaction time:

≤ 300ms

Isolation:

2500Vac

RS485 communication

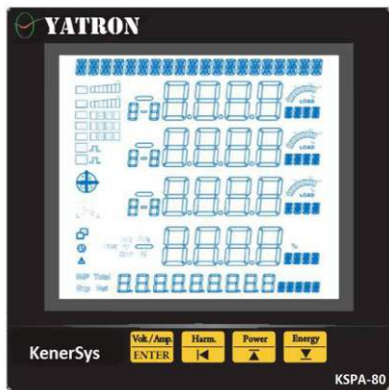
(The second set of features is optional)

- 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
3KV, 1.2 x 50 μsec. Common mode & differential mode
- Surge test:** ≥100M ohm, DC 500V
- Insulating Resistance:** Between Input / Output / Power /
- Isolation:** 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
- Standard:**
- 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

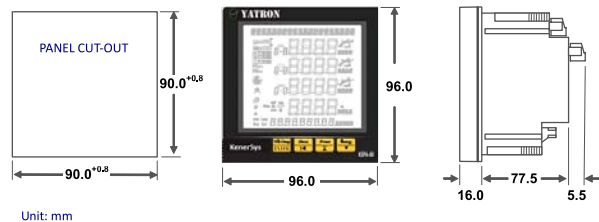
FRONT PANEL



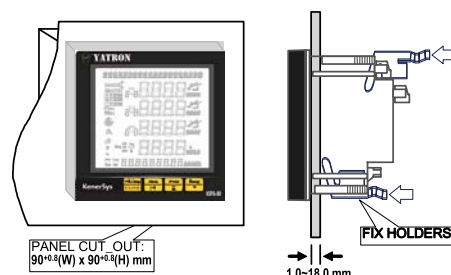
- Display:** LCD 65(W)x58(H)mm, blue character with white back light
LCD protection function: the period time of back light on can be set from 0~15 minutes ("0" stands forever bright)
- Reading:** Upper row 20 digits: Display date, time
4 digital x 4 line, 10.0mm high for V, A, Power, Hz, PF, THD,..
88888888 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
- 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
- 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** 0.5 sec

- Display value update:** 0.5 sec
- Control button:** 4 control buttons
- ENTER** Enter Key / Voltage /Current display page
- SHIFT** Shift Key / Main electric parameters display page
- UP** Up Key / Electric parameters display page
- DOWN** Down Key / Energy parameters display page
- Passworts:** 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 kVA into / out of load
 - Under power factor, true or displacement
 - OverTHD
 - Over demand, current or power
 - Phase reversal
 - Voltage or current sag / swell

Dimensions



Installation



KSPA-80

多功能電力分析儀

產品介紹

KSPA-80 多功能電力分析儀，提供多樣單相、三相電量參數 (電壓、電流、有效功率、無效功率、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 CO₂ 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)的功能具備2M bytes 的記錄容量，可供使用者長時間資料記錄。

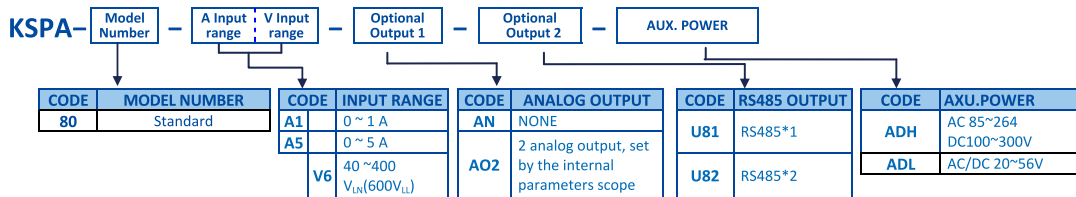
另具有相序調整功能，減輕現場查線工作。

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



量測顯示參數	
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 _{LN})
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

技術規格

輸入

量測方式:

取樣速度:

相線系統:

四種費率

分時電量參數

結算

自動結算

RS485 電腦連線

輸出組數:

通訊協定:

通訊地址:

波特率:

同位元檢查:

資料位元:

停止位元:

接線長度:

終端電阻:

Ethernet 連線

網路介面:

通訊協定:

ZigBee 連線

輸入範圍:

True rms measurement (均方根值量測)

256 point/Cycle

1P2W、1P3W、3P3W(1、2、3CT)、3P4W(1、3CT) ;

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 and 無功電量、淨無功電量、

視在功電量

可依設定日期結算或是一自然月底，進行結算

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

(第二組為選購功能)

2 埠設計，可滿足現場人機介面與中央監控連線需求

Modbus RTU mode

1~255

1200/2400/4800/9600/19200/38400

None / Even / Odd

8 bits

1 or 2

1200M max,

120~300Ω/0.25W(typical: 150Ω)

(選購功能)

10M/100M BASE-T, RJ-45 連接

TCP/IP · UDP · DHCP Client · HTTP · Modbus/TCP

(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)

電壓：40~400 V_{LN} ; 60~600V_{LL}

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)

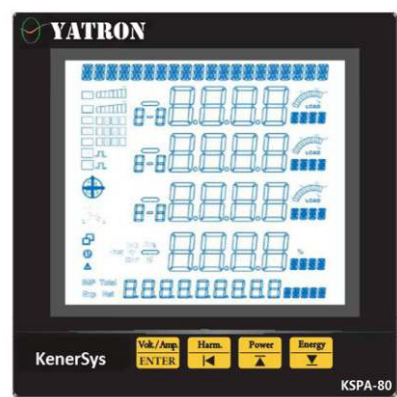
CT 一次測 設定範圍：5~9999A

頻率：45~65Hz

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)	
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: ≤530mA
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)
	可設定 5 ~ 255 x (8ms.)
輸入確認時間:	
脈衝輸出(DO)	
輸出電氣規格:	2 組開極集(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)kW / 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 每個時區可設定 1~8 時段 · 可指定是否啟用該時段
八個時段	
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:	≥100M ohm, DC 500V
絕緣電阻:	輸入/輸出/電源 之間
隔離:	EN 61326:2003
EMC:	EN 61010-1:2001
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~P12): 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) 小於 600g
重量:	

■ 面板說明



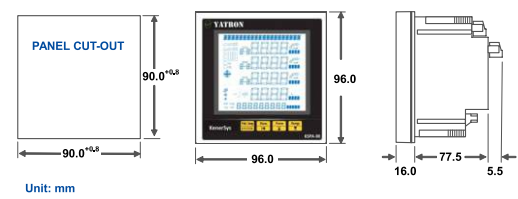
顯示視窗:	3.5" TFT LCD 即使在陽光直接照射下依然清晰可見, 螢幕保護功能: 背光時間可設定 1~15 分鐘 (0 分鐘代表永遠亮)
量測值顯示:	上排 20 碼 畫面信息顯示 :4 位數 x 4 行, 顯示 V, A, Power, Hz, PF, THD, ... :9 位數 x 1 行, 顯示電能參數(kWh、kVarh)
負載狀態顯示:	☐ :RS485 通訊狀態顯示 ; 通訊狀態由二個方形 來顯示 Master 與 Slave 通訊狀態 ; 若二個方形都 被點亮 · 表示通訊正常
	IND :負載為電感性負載時點亮 CAP :負載為電容性負載時點亮 :顯示負載百分比 ⚡ :負載的象限顯示
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 Σ :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

- 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 / 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: 多功能電力分析儀提供日期和時間戳記的事件日誌。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

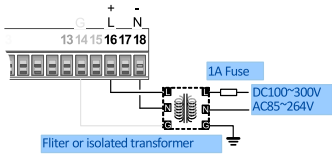
■ 外觀尺寸及盤面開孔



KSPA-80

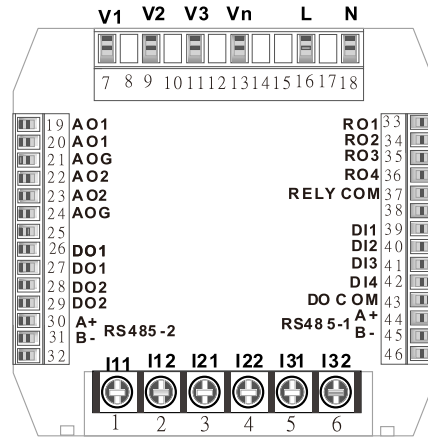
■ Connection diagram

Aux Power(Terminal Block 2)



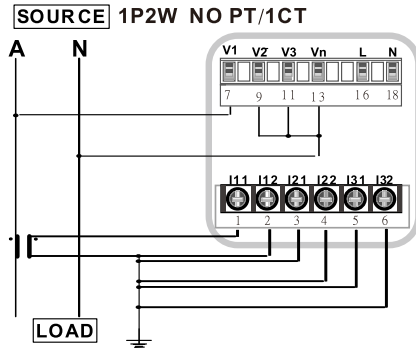
Voltage and Current wire diameter

Voltage: P1~P12 AWG28~12(0.2~2.5mm²)
 Current: P13~P18 AWG22~12(0.5~2.5mm²)
 Signal: P19~46 AWG22~16(0.5~1.3mm²)

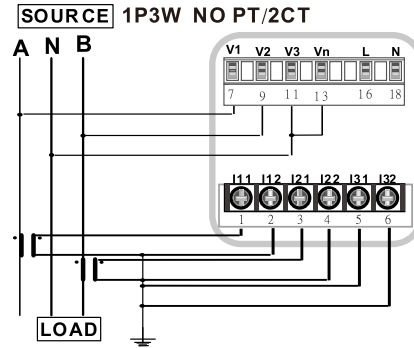


■ WIRING

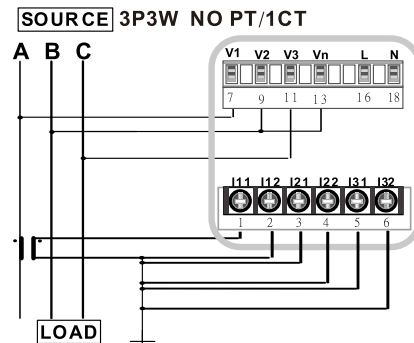
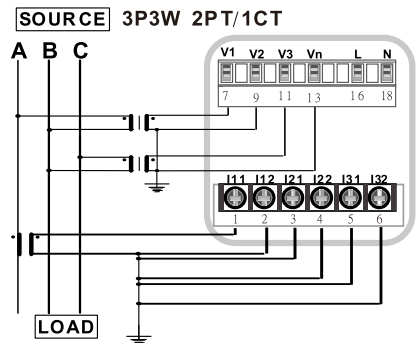
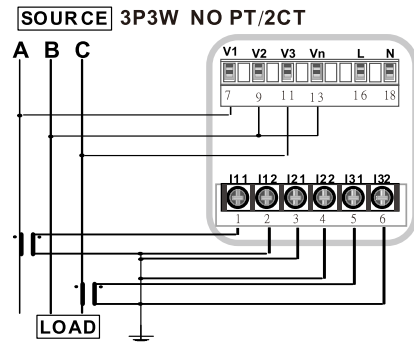
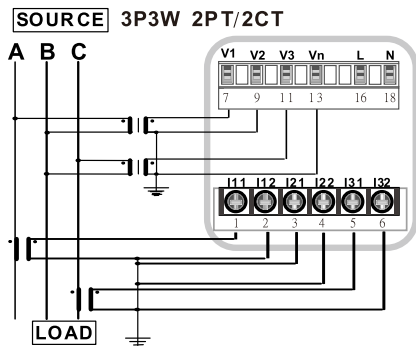
1Phase 2Wire



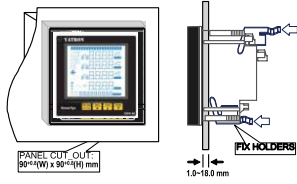
1Phase 3Wire



3Phase 3Wire

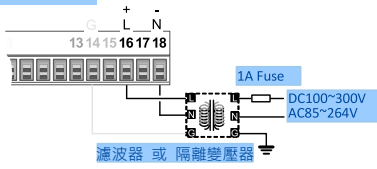


■ 安裝方式



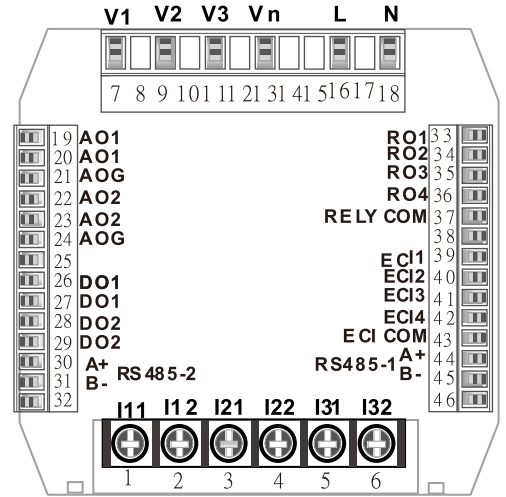
■ 接線方式

助電源(端子台)

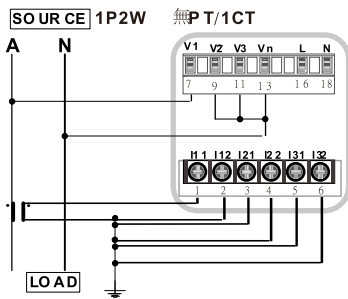


電壓與電流輸入

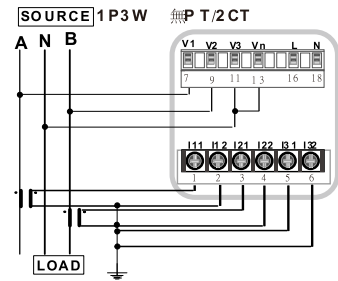
- 電壓線徑: P1~P12 AWG28 ~ 12 (0.2~2.5mm²)
- 電流線徑: P13~P18 AWG22 ~ 12 (0.5~2.5mm²)
- 訊號線徑: P19~P46 AWG22 ~ 16 (0.5~1.3mm²)



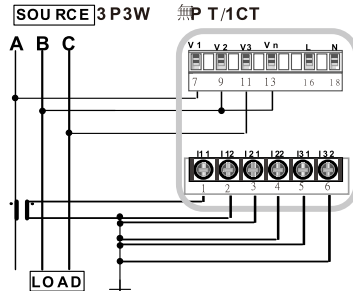
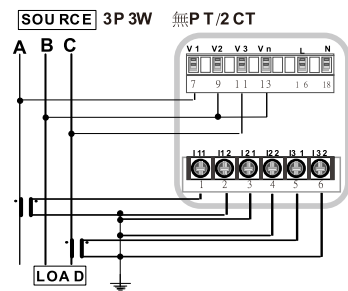
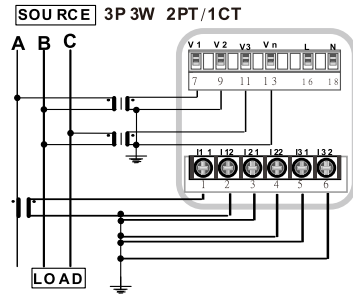
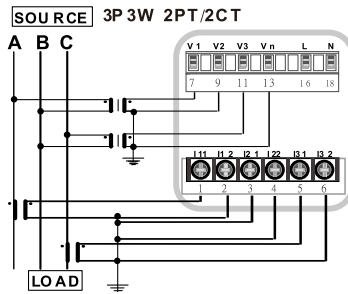
單相兩線



單相三線

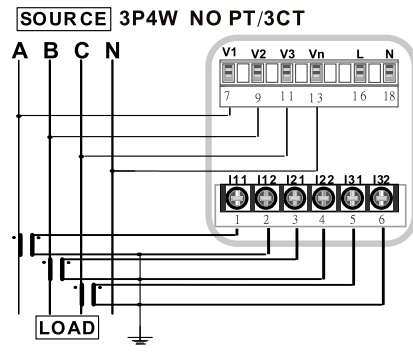
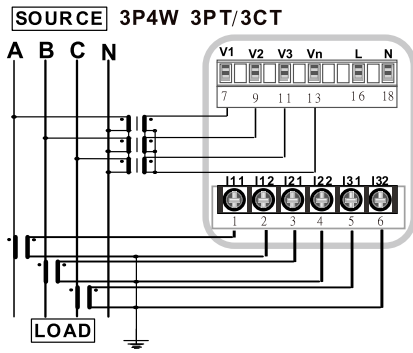


三相三線

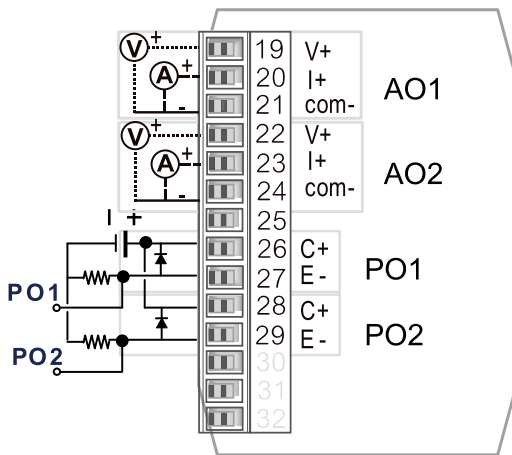


3Phase 4Wire

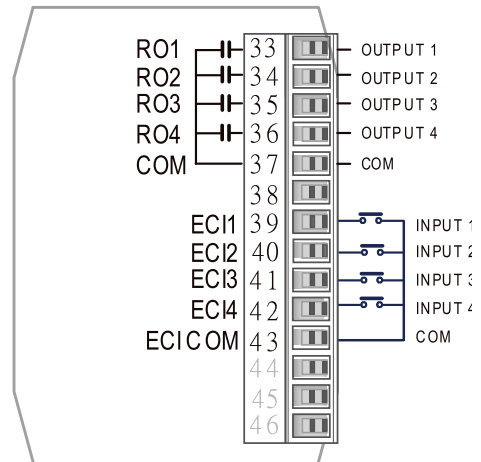
KSPA-80



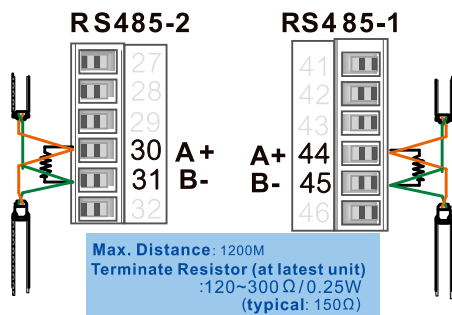
Analogue output / Digital (pulse) signal output



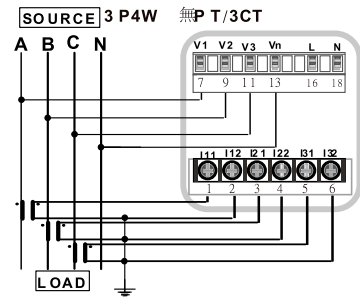
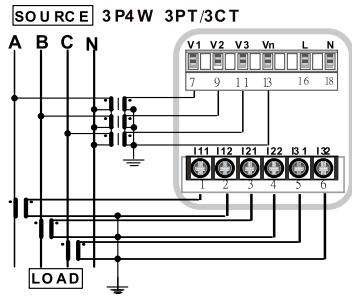
Relay output / Digital signal input



RS485 communication output

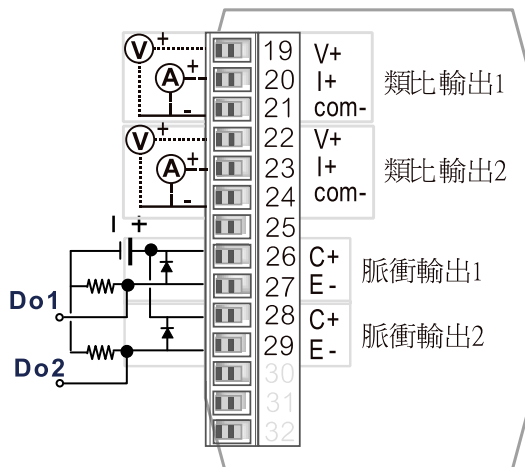


三相四線

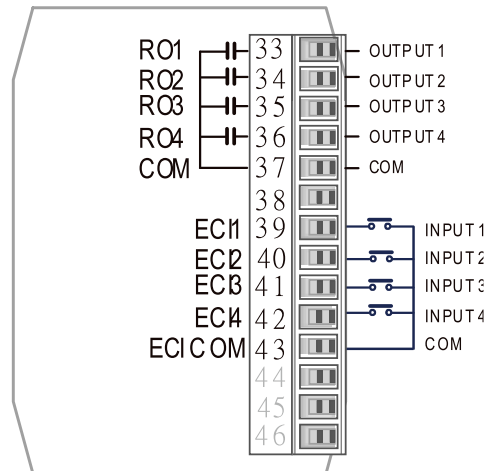


KSPA-80

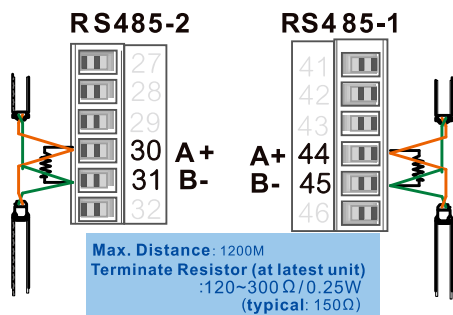
類比訊號輸出(AO)/脈衝訊號輸出(DO)



繼電器輸出(RO)/外部控制訊號輸入(ECI)



RS485 通訊輸出



KSVA 4 位數可程式電錶

■ 產品說明

KSVA 為一經濟簡單型可程式顯示表，其具備 20.0mm 大 LED 顯示、可按鍵設定顯示範圍 及其抗干擾設計，品質可靠，安裝操作簡單，可滿足電壓、電流的一般量測需求。

本儀錶也具備了 2 組繼電器輸出、1 組類比輸出或 1 組 RS485(Modbus RTU mode) 通訊 功能三選一(詳細功能請參考後頁說明)。操作按鍵內藏設計，更可避免人為無操作，尤其適合各種機械使用。



■ 特點

- 可指定量測交/直流電壓 0~50.00mV/~600.0V、交/直流電流 0~1.999mA/~10A
- 可附加三選一選購 2 組繼電器輸出、1 組類比輸出 或 1 組 RS485(Modbus RTU mode)通訊功能
- 操作按鍵內藏(於前面板內)，可根據現場需求任意設定顯示範圍；端子直入設計，無接觸不良問題；安裝深度只有 72mm

■ 應用

- 高低壓動力盤 / 馬達控制盤-過載保護 / 機械設備電壓電流顯示 / 測試設備...
- 馬達控制盤、機械設備、開關箱... 等 電壓電流量測顯示

■ 規格選擇表

K SVA- 交/直流 輸入範圍		- 附加功能輸出		- 工作電源			
CODE	電壓輸入	CODE	電流輸入	CODE	附加功能輸出	CODE	工作電源
D	直流輸入	D	直流輸入	N	None	A	AC 115/230V
A	交流輸入	A	交流輸入	R2	2 Relay	A2	AC 230V
T	有效值輸入	T	有效值輸入	I	A/O: (0)4~20mA 0~10mA		
V1	0~199.9 mV	A2	0~1.999 mA	V	A/O: 0~10V (0)1~5V		
V2	0~1.999 V	A3	0~19.99 mA	8	RS485(Modbus RTU)		
V3	0~19.99 V	A4	0~199.9 mA		繼電器、類比輸出 或 RS485		
V4	0~199.9 V	A5	0~1.999 A		三種功能中只能選擇一種功能輸出		
V5	0~300.0 V	A6	0~1.000 A				
V6	0~600.0 V	A7	0~5.000 A				
VA	0~50 mV	A8	0~10.00 A				
VB	0~60 mV	AO	指定輸入範圍				
VC	0~100 mV						
VO	指定輸入範圍						

■ 技術規格

輸入規格

輸入範圍 DC / AC	輸入阻抗	輸入範圍 DC / AC	輸入阻抗
電壓 0~50/~100 mV	≥5M ohm	電流 0~1.999 mA	100 ohm
0~199.9 mV	≥5M ohm	0~19.99 mA	10 ohm
0~1.999 V	≥1M ohm	0~199.9 mA	1 ohm
0~19.99 V	≥1M ohm	0~1.999 A	0.05 ohm
0~199.9 V	≥1M ohm	0~5.000 A	0.02 ohm
0~300.0 V	≥2M ohm	0~10.00 A	0.01 ohm
0~600.0 V	≥2M ohm		

校正方式: 根據校正程序由按鍵操作
A/D 轉換: 12 bits A/D 轉換器
精確度: 直流: $\leq \pm 0.1\%$ of FS $\pm 1C$
 交流: $\leq \pm 0.2\%$ of FS $\pm 1C$
取樣速度: 15 次/秒
反應速度: ≤ 100 毫秒.(當 avg = "1")

顯示與功能

數字顯示: 4 位數, 0.8"(20.0mm)字高, 高亮度 LED
顯示範圍: -1999~+9999
顯示範圍設定: l0sc: 顯示低值設定 -1999~+9999
 hlsc: 顯示低值設定 -1999~+9999
 可設定 0 /) 0 /) 00 /) 000
小數點設定: ovfl: 當輸入訊號超過輸入上限的 110%
超高溢位顯示: -ovfl: 當輸入訊號低過輸入上限的 -0%
超低溢位顯示: 記錄開機期間所發生的最大值及最小值
最大值/最小值紀錄: l0cut: 可設定範圍 -1999~9999
低值遮蔽功能:

顯示值穩定功能

平均值顯示: avg: 可設定範圍 1~99 次
移動平均值顯示: Mavg: 可設定範圍 1~99 times
數位濾波: Dfilt: 可設定範圍 1~99 times

控制功能(選購)

繼電器: 2 組繼電器
 2 組 FORM-C, 5A/230Vac, 10A/115V
 Hi / Lo / Hi.HLd / Lo.HLd 功能
 每個繼電器皆可設定個別的 繼電器動作&復歸延遲及 動作間隙
繼電器動作模式: [rYsb] 啟動不動作帶: 0~9999counts
繼電器動作功能: [rYsd] 啟動時間延遲: 0.00.0~9(分鐘):59.9(秒)
 [rYrd] 動作時間延遲: 0.00.0~9(分鐘):59.9(秒)
 [rYfd] 復歸時間延遲: 0.00.0~9(分鐘):59.9(秒)
 [rYhy] 動作間隙: 0~5000 counts

類比輸出(選購)

精確度: $\leq \pm 0.2\%$ of F.S.; 12 bits DA converter
漣波率: $\leq \pm 0.1\%$ of F.S.
反應速度: ≤ 100 msec. (10~90% 額定輸出)
隔離度: AC 2.0 KV between input and output
輸出範圍: 電壓輸出 或 電流輸出(請於規格選擇表中選定)
 電壓輸出: 0~5V / 0~10V / 1~5V 可按鍵設定
 電流輸出: 0~10mA / 0~20mA / 4~20mA 可按鍵設定

輸出推動能力:

功能: 電壓輸出: 0~10V: $\geq 1000\Omega$;
 電流輸出: 4(0)~20mA: $\leq 600\Omega$ max
[a0ls] 輸出訊號下限所對應的顯示低值設定
 可設定範圍 -1999~9999
[a0hs] 輸出訊號上限所對應的顯示高值設定
 可設定範圍 -1999~9999

輸出訊號調整:

[a0zro] 輸出訊號下限微調: -1999~9999
[a0spn] 輸出訊號上限微調: -1999~9999

RS 485 通信(選購)

通訊協議:	Modbus RTU 模式
串列傳輸速率:	1200/2400/4800/9600/19200/38400 可設定
波特率:	8 位元
同位元檢查:	奇、偶 or none (with 1 or 2 stop bit) 可設定
通訊地址:	1 ~ 255 可設定
接線距離:	1200M max
終端電阻:	150Ω.

電源

工作電源:	AC115/230V±15%,50/60Hz;
耗電量:	小於 3.0VA
記憶儲存:	EEPROM

電氣特性

介電強度:	AC 2.0 KV, 1 分鐘, 電源 / 輸入 / 輸出 / 外殼 之間
絕緣電阻:	≥100M ohm at 500Vdc, 電源 / 輸入 / 輸出 之間
隔離:	電源 / 輸入 / 輸出 之間
EMC:	EN 55011:2002; EN 61326:2003
安全規範(LVD):	EN 61010-1:2001

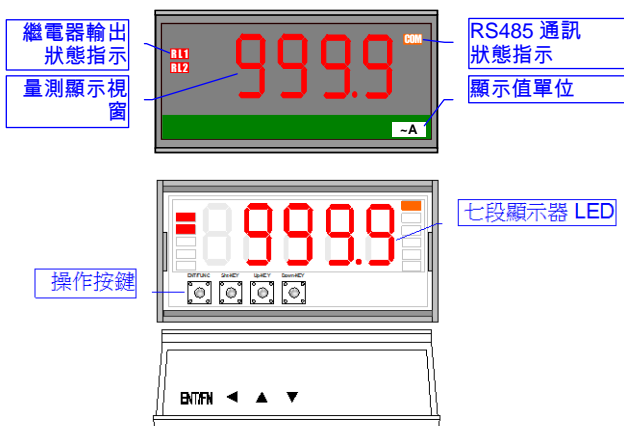
工作環境

工作溫度:	0~60 °C
工作濕度(%RH):	20~95 %RH, 無結露
溫度係數:	≤ 100 PPM/°C
儲存溫度:	-10~70 °C
防護等級:	前面板: IEC 529 (IP52); 本體: IP20
震動測試:	1~800Hz, 3.175g ² /Hz

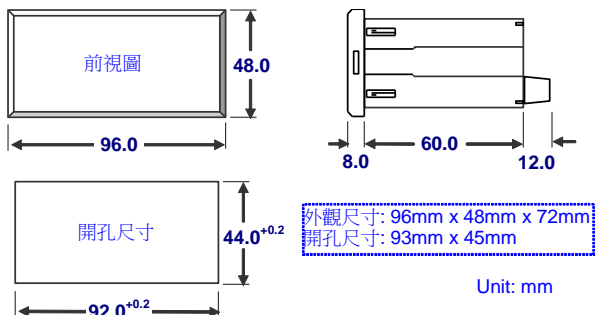
機構尺寸

外觀尺寸:	96mm(寬) x 48mm(高) x 72mm(深)
開孔尺寸:	93mm(寬) x 45mm(高)
外殼材質:	ABS 防火材料 (UL 94V-0)
安裝方式:	盤面安裝
接線端子:	Plastic NYLON 66 (UL 94V-0); 20A/300Vac, M3.5, 1.3mm ² ~3.5mm ² (22~12AWG)
重量:	310g

前面板說明

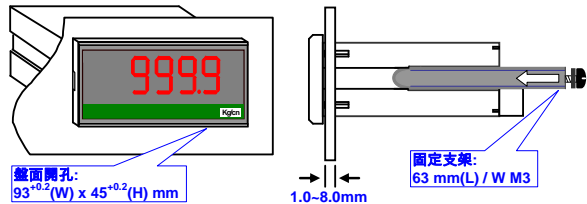


外觀尺寸



安裝方式

本表請安裝在不超過最大操作溫度和溼度的環境下。



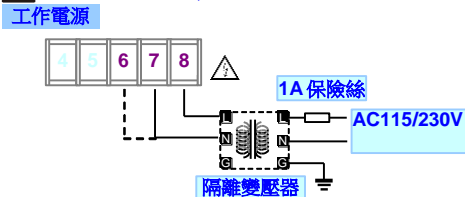
接線圖

接線端子:
20A/300Vac, M3.5, 1.3~3.5mm² (22~12AWG)

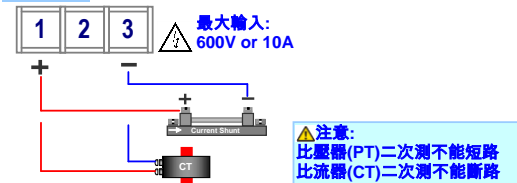


接線時, 請務必確認電源電壓是否正確並接入正確端子編號。為設備及儀表安全, 建議在儀表前安裝保險絲(Fuse) 或 斷路器(Breaker)。

⚠ 接線有可能變更, 請依照儀表上的接線圖接線。



輸入接線

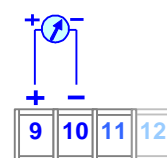


輸出(繼電器、類比輸出 或 RS485 三種功能中只能選擇一種功能輸出)

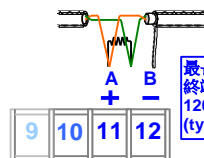
繼電器輸出



類比再傳送輸出



RS485 通訊接口



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