

LIGHTSTAR

CATALOG Vol. 9



PRODUCTS

ANALOGUE METER

TRANSFORMER / SHUNT

DIGITAL METER

TRANSDUCER

TEST MEASURING EQUIPMENT

CHARGING DEVICE

SINCE 1979
(주)광성계측기

SAFETY INSTRUCTION

Warning

1. Do NOT work on cable or devices while energized.
Be aware of electrical shock.
2. Please check the input power specification, and the terminal number before cable connection.
Be aware of explosion and fire.
3. Do NOT disassemble the lithium battery, which was installed in products
4. Please avoid following severe conditions, such as high temperature, direct sunlight, chemical contaminated area, excessive vibration or excessive humidity.
5. Please use F.G(Field Ground) terminal alone with 1.25mm cable for grounding.
Be aware of electrical shock.
6. Please use DC power isolated with primary and secondary for DC power input device.
Be aware of electrical shock. (For Digital meter, Panel multi meter)
7. Do NOT put the fingers or materials in the opening of products.
Be aware of electrical shock.
8. Please use protection cover at all times.
9. Please use insulation tube to prevent cable to touch cover and terminal directly. (For analog meter 50,60,80,81 type)

General Instruction

1. If you are using our products in combination with other products, please check the required specifications, or regulations.
Also, please check the suitability of our products for your systems, machines and devices. If such confirmation is not made, the company shall not be liable for product warranty.
2. For the following purposes, please consider to apply redundant safety device
find safety measures such as safety circuits.
 - ① Using outdoors, potential chemical contamination, electro-magnetic affected area or other condition which was not intend to be installed following original design.
 - ② Nuclear control facilities, incineration facilities, railway, aviation, vehicle facilities, medical machinery, entertainment machinery, safety devices and facilities subject to regulations by administrative or individual industries
 - ③ System or mechanical device affect human safety or property
 - ④ Facilities requiring high reliability, such as gas, water, electricity supply system or 24-hour continuous operation system
 - ⑤ High levels of safety required place other than no. 1 to 4 above
3. Please understand and comply with all the warnings and precautions to prevent unforeseen damages to customers due to incorrect use of our products.

Caution

1. Please use within rating and performance range.
It may cause short life and fire.
2. Do Not exceed relay contact capacity.
It may cause poor insulation, contact fusion, poor contact, relay damage and fire.
3. Do not use water or solvents for cleaning. Please use dry towels without water.
Please be aware of electric shock and fire.
4. Please refrain from dust and cable debris into product inside.
It may cause fire and malfunction.
5. For DC input/output device, please check the terminal polarity before connection.
It may cause fire.
6. For potential transformer, please install over-current protection device.
7. Please segregate the aux power from condenser or frequent on/off motor system. Otherwise please apply surge killer.
Be aware of malfunction or damage from this condition.
8. Do not disassemble and modify the product. Please contact the head office for internal inspection or repair.
It may cause fire, electric shock and product damage.
9. Please tighten terminal bolt within the torque limit
Designed torque limit
M4 - 9.8 to 13.5 kgf.cm M5 - 28.4 to 37.2 kgf.cm
M6 - 47.1 - 63.7 kgf.cm M8 - 117-153 kgf.cm
M12 - 402-524 kgf.cm
Poor contact may cause fire.

Warranty policy

1. Warranty period
24 Month from the date of shipment or 12 Month from the date of installation, which is longer
2. Coverage
In the event of malfunction, we provide replacement or repair work for free within warranty period.
However, any other damages affected to other equipment will be voided from the warranty.
The following circumstance will void the warranty
 - ① Caused by other electrical connected device
 - ② Incorrect or improper modification work or maintenance
 - ③ Misuse or abusive use
 - ④ Adverse external conditions, such as thunderstorm, acts of god,

Other

Product specification and configuration are subject to change without notice.

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CEO GREETINGS

CEO Greetings



Thanks for choosing LIGHTSTAR.

Since 1979, we started to manufacture analog meter, and broaden our business model to current transformer, transducer and digital meter.

Also, by achieving international certificate such as CE, ABS, JIS and KS, we are now expanding our market internationally, including Japan and Vietnam.

Currently, we are focusing on the technology development and efficient work process for customer.

As always, we will continue to endeavor to satisfy customer needs and demands.

History

1979

10, 15 - Establishment of LIGHTSTAR

1989

03 - KS(Korean Standard) Approved for Analog meters
(KS C 1301, No.6720 by Korean Standard Association)

1997

08 - ISO 9001 approved

1999

09 - KS(Korean Standard) Approved for AC-DC transducer
(KS C 1708, No.99-858 by Korean Standard Association)
11 - Company research center approved
(No.992046 by Korean Industrial Technology Development Association)

2001

10 - KS(Korean Standard) Approved for Instrument Current Transformer
(KS C 1706, No.05-0458 by Korean Standard Association)
07 - JIS(Japan Industrial Standard) Approved for Analog meter
(JIS C 1102-2-5 by Japan Industrial Standard Committee)

2005

10 - KS(Korean Standard) Approved for Instrument Current Transformer
(KS C 1706, No.04-0458 by Korean Standard Association)

2006

01- INNO-BIZ Approved
(No.6021-068 by Small and Medium Business Administration)

2008

03 - KS(Korean Standard) Approved for Power metering Current Transformer
(KS C 1707, No.08-0124 by Korean Standard Association)

2009

06 - CE(Conformity European) Approved for Analog meter and Others

2010

09 - CE(Conformity European) Approved for Single-phase potential transformer
03 - KEPCO (Korea Electric Power Corporation) registered for
Load Shedding device(Demand Controller)

2011

06 - CE(Conformity European) Approved for Digital meter, Transducer and
Instrument current transformer

2012

06 - Patent registered (Error testing device and phase checking
device for energized 3P instrument current transformer.
No.10-1157362)

2013

12 - Patent registered (Power factor calculation method
and device for 3 phase balanced circuit, No.10-1311992)
09 - KEPCO (Korea Electric Power Corporation) registered
for Power metering Current Transformer

2014

07 - Exporting current transformer to TOYO KEIKI, JAPAN
03 - Korea Fire Institute approved for Earth Leakage Detector
01 - Korea Fire Institute approved for Zero Current Transformer

2016

08 - Relocated Head office and factory.
(Jangan Industrial Complex, Busan, South Korea)

Company introduction

Name	LIGHT STAR	Homepage	www.vaw.co.kr (Korean)
Establishment date	15th. Oct. 1979		www.lightstar.co.kr (English)
Tel	+82-51-723-3000		www.lightstar.co.jp (Japanese)
Fax	+82-505-115-3013		
Address	126, Jangansandan 8-ro, Jangan-eup, Gijang-gun, Busan, South Korea		

CE certification

CE stands for "Conformité Européene" and indicates conformity with health, safety, and environmental protection standards for products sold within the European Economic Area (EEA). Our CE certified products are complied to the requirements of EU Directives, relating to LVD (Low Voltage Directives) and EMC(Directive Electromagnetic Compatibility Directives). LIGHTSTAR achieved CE certificate for Analog meter, Current Transformer, Digital meter, Power meter and Transducers.

ANALOG METER**KS certification**

KS stands for Korean Standard and indicates conformity with Korean government required standards. LIGHTSTAR achieved KS certificate for Analog meter, Current Transformer and Transducers.

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50 Type Analog Meter

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68 Type Analog Meter

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72 Type Analog Meter

KA□-72

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80 Type Analog Meter

KA□-80

15



81 Type Analog Meter

KA□-81

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08 Type Analog Meter

KA□-08

17



08N Type Analog Meter

KA□-08N

18



11 Type Analog Meter

KA□-11

19



Ao·Vo Meter

KAM-□

19

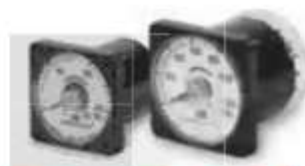
RMS Meter



KAK-□

20-21

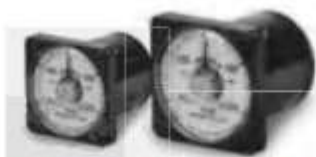
Watt Meter



KAG-□

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Var Meter



KAI-□

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Power Factor Meter



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08TY Connection Diagram

For cam switch

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Analog Meter Relay



KAR-□

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ELP(Electro-luminescent Panel)Meter KAJ-□



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Double Indicator Meter

KA□-□D□



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3P Selector Meter



KAS-□

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Connection Diagram

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Analog Meter scale table

Analog Meters Symbol and terms

Symbol

Measuring type	Symbol
Electrical circuit type	
Moving coil type	
Moving-iron type	
Rectifier-type	
Shunt type	

Install type

Type	Symbol
Vertical install	
Horizontal install	
Tilted install	

General

Type	Symbol
External Accessories	
Protective earth terminal	
Polar terminal	

Voltage test

Type	Symbol
Voltage test 500V	
Without test voltage	
Voltage test	
Voltage test over 500V Ex) 3kV	

Types of measurements

Types of operating principles	Symbol
Measuring component for DC	
Measuring component for AC	
1 Measuring component for 3 wire	3 ~ 1E
2 Measuring component for unbalanced 3 wire	3 ~ 2E
2 Measuring component for unbalanced 4 wire	3N ~ 3E

Terms

Accuracy class

Display value tolerances from maximum value, as per IEC 60051,

Numbers representing accuracy class

ex) 2.5 Class $\Rightarrow \pm 2.5\%$ of Full Scale(F.S)

1.5 Class $\Rightarrow \pm 1.5\%$ of Full Scale(F.S)

1.0 Class $\Rightarrow \pm 1.0\%$ of Full Scale(F.S)

Maximum indicated value

Maximum indicated value on analog meter

Auxiliary items

Items to be connected to analog meter for certain purpose

Measuring part

Activated by measuring value and affect driving part.

Driving part

Driving part affected by measuring part

Moving coil type

Wounded coil to be rotated within fixed magnet by the influence of induction.

Moving iron type

Iron vane to be rotated within fixed coil by the influence of excitation.

Rectifier type

Combination of rectifier and moving coil type for AC current or AC voltage

Common specifications

Operating temperature	23°C $\pm$ 10
Operating humidity	25~80%
Insulation resistance	10M Ω or higher
Withstand Voltage	3.32kV/1 min
Power consumption	1.0VA

45 Type Analog Meter

Certificates  



Model No

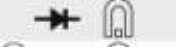
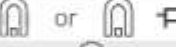
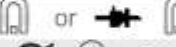
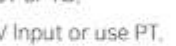
KA-45 Type
①

① Type

- | | |
|-----------------------|--------------------------|
| A AC Ammeter | D DC Voltmeter |
| B AC Voltmeter | E Signal meter |
| C DC Ammeter | F Frequency meter |

How to order) KAB-45 AC 150V

Technical Data

Type	Model No	Operation	Class	Max input	Min input	Note
AC Ammeter	KAA-45		2.5	5A	1A	①
AC Voltmeter	KAB-45		2.5	600V	10V	②
DC Ammeter	KAC-45	 or 	2.5	5A, 200mV	150μA, 50mV	③
DC Voltmeter	KAD-45		2.5	600V	1V	④
Signal meter	KAE-45	 or 	2.5	DC 4~20mA, DC 10V, AC 18V		⑤
Frequency meter	KAF-45		1.0	55~65Hz external converter		⑥

① Standard : 5A Input, or use CT or TD.

② Standard : 150V, 300V, 600V Input or use PT.

③ Standard : 50mV, 60mV input.

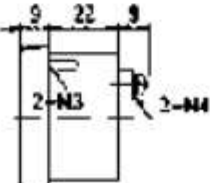
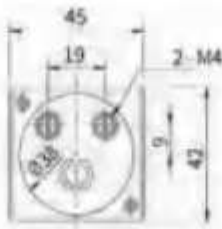
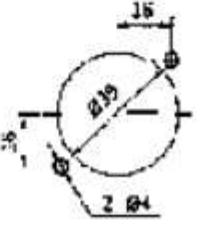
④ Standard : 15V, 30V, 50V, 100V, or 600V input, or use voltage divider.

⑤ Bezel design to be customized.

⑥ Standard: 110V, 220V (50/60Hz) input.

Drawing

Unit:mm

Type	Side	Rear	Panel cut	weight
Bolt fixed				40g

50 Type Analog Meter

Certificates  



Model No

KAB-50 Type

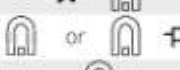
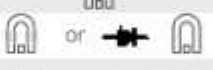
①

① Type

- | | |
|-----------------------|--------------------------|
| A AC Ammeter | D DC Voltmeter |
| B AC Voltmeter | E Signal meter |
| C DC Ammeter | F Frequency meter |

How to order) KAB-50 AC 150V

Technical Data

Type	Model No	Operation	Class	Max input	Min input	Note
AC Ammeter	KAA-50		2.5	5A	0.1A	1
AC Voltmeter	KAB-50		2.5	600V	10V	2
DC Ammeter	KAC-50	 or 	2.5	5A, 200mV	150μA, 50mV	3
DC Voltmeter	KAD-50		2.5	600V	1V	4
Signal meter	KAE-50	 or 	2.5	DC 4 ~ 20mA or DC 10V or AC 18V		5
Frequency meter	KAF-50	 or 	1.0	55 ~ 65Hz external converter, 45 ~ 65Hz internal converter		6

1. Standard : 5A Input, or use CT

2. Standard : 150V, 300V, 600V Input or use PT.

3. Standard : 50mV, 60mV input.

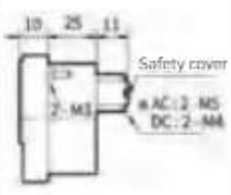
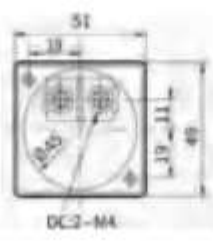
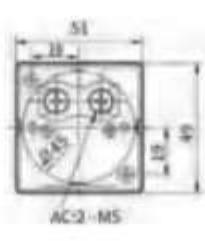
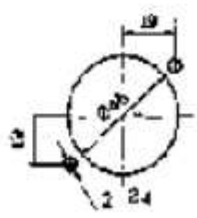
4. Standard : 15V, 30V, 50V, 100V, or 600V input, or use voltage divider.

5. Bezel design to be customized.

6. Standard: 110V, 220V (50/60Hz) input ..

Drawing

Unit:mm

Type	Side	Rear		Panel cut	weight
		KAB/KAC/KAD/KAE/KAF	KAA		
Bolt fixed					60g

60 Type Analog Meter

Certificates  



Model No

KA-60 Type

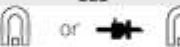
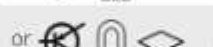
①

① Type

- | | |
|-----------------------|--------------------------|
| A AC Ammeter | D DC Voltmeter |
| B AC Voltmeter | E Signal meter |
| C DC Ammeter | F Frequency meter |

How to order) KAB-60 AC 600V

Technical Data

Type	Model No	Operation	Class	Max input	Min input	Note
AC Ammeter	KAA-60		2.5	5A	0.1A	①
AC Voltmeter	KAB-60		2.5	600V	10V	②
DC Ammeter	KAC-60	 or 	2.5	5A, 200mV	150μA, 50mV	③
DC Voltmeter	KAD-60		2.5	600V	1V	④
Signal meter	KAE-60	 or 	2.5	DC 4 ~ 20mA or DC 10V or AC 18V		⑤
Frequency meter	KAF-60	 or 	1.0	55 ~ 65Hz external converter, 45 ~ 65Hz internal converter		⑥

①. Standard : 5A Input, or use CT

②. Standard : 150V, 300V, 600V Input or use PT.

③. Standard : 50mV, 60mV input.

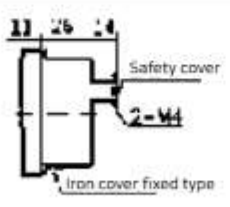
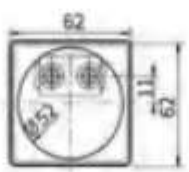
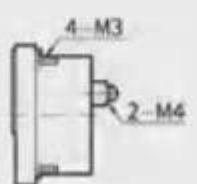
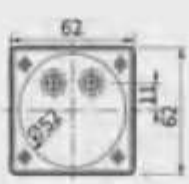
④. Standard : 15V, 30V, 50V, 100V, or 600V input, or use voltage divider.

⑤. Bezel design to be customized.

⑥. Standard: 110V, 220V (50/60Hz) input.

Drawing

Unit:mm

Type	Side	Rear	Panel cut	weight
Iron cover fixed type				80g
Bolt fixed				80g

68 Type Analog Meter

Certificates  



Model No

KA-68 Type
①

① Type

A AC Ammeter

B AC Voltmeter

C DC Ammeter

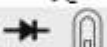
D DC Voltmeter

E Signal meter

F Frequency meter

How to order) KAB-68 AC 600V

Technical Data

Type	Model No	Operation	Class	Max input	Min input	Note
AC Ammeter	KAA-68		2.5	5A	0.1A	1
AC Voltmeter	KAB-68		2.5	600V	10V	2
DC Ammeter	KAC-68	 or 	2.5	5A, 200mV	150μA, 50mV	3
DC Voltmeter	KAD-68		2.5	600V	1V	4
Signal meter	KAE-68	 or 	2.5	DC 4 – 20mA or DC 10V or AC 18V		5
Frequency meter	KAF-68	 or 	1.0	55 – 65Hz external converter, 45 – 65Hz internal converter		6

1. Standard : 5A Input, or use CT

2. Standard : 150V, 300V, 600V Input or use PT.

3. Standard : 50mV, 60mV input.

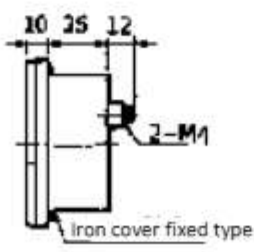
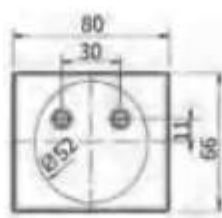
4. Standard : 15V, 30V, 50V, 100V, or 600V input, or use voltage divider.

5. Bezel design to be customized.

6. Standard: 110V, 220V (50/60Hz) input

Drawing

Unit:mm

Type	Side	Rear	Panel cut	Weight
Iron cover fixed type				130g

72 Type Analog Meter

Certificates



Model No

KA-72 Type

①

① Type

A AC Ammeter

B AC Voltmeter

C DC Ammeter

D DC Voltmeter

E Signal meter

F Frequency meter

How to order) KAC-72 DC 100A/50mV

Technical Data

Type	Model No	Operation	Class	Max input	Min input	Note
AC Ammeter	KAA-72		2.5	5A	0.1A	①
AC Voltmeter	KAB-72		2.5	600V	10V	②
DC Ammeter	KAC-72		2.5	5A, 200mV	150μA, 50mV	③
DC Voltmeter	KAD-72		2.5	600V	1V	④
Signal meter	KAE-72		2.5	DC 4 ~ 20mA or DC 10V or AC 18V		⑤
Frequency meter	KAF-72		1.0	55 ~ 65Hz external converter, 45 ~ 65Hz internal converter		⑥

① Standard : 5A Input, or use CT

② Standard : 150V, 300V, 600V Input or use PT.

③ Standard : 50mV, 60mV input.

④ Standard : 15V, 30V, 50V, 100V, or 600V input, or use voltage divider.

⑤ Bezel design to be customized.

⑥ Standard: 110V, 220V (50/60Hz) input

Drawing

Unit:mm

Type	Side	Rear	Panel cut	Weight
Iron cover fixed type				130g

80 Type Analog Meter

Certificates  

Model No

KA-80 Type

①

① Type

A AC Ammeter

B AC Voltmeter

C DC Ammeter

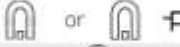
D DC Voltmeter

E Signal meter

F Frequency meter

How to order) KAC-80 DC 100A/50mV

Technical Data

Type	Model No	Operation	Class	Max input	Min input	Note
AC Ammeter	KAA-80		2.5	5A	0.1A	①
AC Voltmeter	KAB-80		2.5	600V	10V	②
DC Ammeter	KAC-80	 or 	2.5	5A, 200mV	150μA, 50mV	③
DC Voltmeter	KAD-80		2.5	600V	1V	④
Signal meter	KAE-80	 or 	2.5	DC 4 ~ 20mA or DC 10V or AC 18V		⑤
Frequency meter	KAF-80	 or 	1.0	55 ~ 65Hz external converter, 45 ~ 65Hz internal converter		⑥

① Standard : 5A Input, or use CT

② Standard : 150V, 300V, 600V Input or use PT.

③ Standard : 50mV, 60mV input.

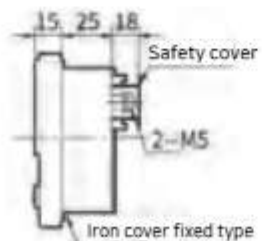
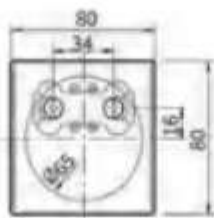
④ Standard : 15V, 30V, 50V, 100V, or 600V input, or use voltage divider.

⑤ Bezel design to be customized.

⑥ Standard: 110V, 220V (50/60Hz) input

Drawing

Unit:mm

Type	Side	Rear	Panel cut	Weight
Iron cover fixed type				130g

81 Type Analog Meter

Certificates 



Model No

KAA-81 Type
①

① Type

- A** AC Ammeter
- B** AC Voltmeter
- C** DC Ammeter

- D** DC Voltmeter
- E** Signal meter
- F** Frequency meter

How to order) KAC-81 DC 100A/50mV

Technical Data

Type	Model No.	Operation	Class	Max input	Min input	Note
AC Ammeter	KAA-81		1.5	5A	0.1A	①
AC Voltmeter	KAB-81		1.5	600V	10V	②
DC Ammeter	KAC-81	 or 	1.5	5A, 200mV	150μA, 50mV	③
DC Voltmeter	KAD-81		1.5	600V	1V	④
Signal meter	KAE-81	 or 	1.5	DC 4 ~ 20mA or DC 10V or AC 18V		⑤
Frequency meter	KAF-81	 or 	1.0	55 ~ 65Hz external converter, 45 ~ 65Hz internal converter		⑥

① Standard : 5A Input, or use CT

② Standard : 150V, 300V, 600V Input or use PT.

③ Standard : 50mV, 60mV input.

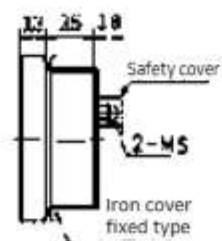
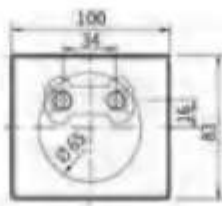
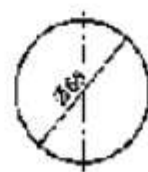
④ Standard : 15V, 30V, 50V, 100V, or 600V input, or use voltage divider.

⑤ Bezel design to be customized.

⑥ Standard: 110V, 220V (50/60Hz) input

Drawing

Unit:mm

Type	Side	Rear	Panel cut	Weight
Iron cover fixed type				140g

08 Type Analog Meter

Certificates



Model No

KA-08 Type

①

① Type

A AC Ammeter

B AC Voltmeter

C DC Ammeter

D DC Voltmeter

E Signal meter

F Frequency meter

How to order) KAC-08 DC 200μA

Technical Data

Type	Model No	Operation	Class	Max input	Min input	Note
AC Ammeter	KAA-08		1.5	5A	1A	①
AC Voltmeter	KAB-08		1.5	600V	10V	②
DC Ammeter	KAC-08		1.5	5A, 200mV	150μA, 50mV	③
DC Voltmeter	KAD-08		1.5	1000V	1V	④
Signal meter	KAE-08		1.5	DC 4 ~ 20mA or DC 10V or AC 18V		⑤
Frequency meter	KAF-08		1.0	45 ~ 65Hz, 45 ~ 55Hz, 55 ~ 65Hz		⑥

①. Standard : 5A input, or use CT

②. Standard : 150V, 300V, 600V Input or use PT.

③. Standard : 50mV, 60mV input.

④. Standard : 15V, 30V, 50V, 100V, or 600V input, or use voltage divider.

⑤. Bezel design to be customized.

⑥. Standard: 110V, 220V (50/60Hz) input

Drawing

Unit:mm

Type	Side	Rear	Panel cut	Weight
Bolt fixed				350g

KA-11 Type

①

A AC Ammeter

B AC Voltmeter

C DC Ammeter

How to order)KAD-11 DC 600V

D DC Voltmeter

E Signal meter

F Frequency meter

Type	Model No	Operation	Class	Max input	Min input	Note
AC Ammeter	KAA-11		1.5	5A	1A	1
AC Voltmeter	KAB-11		1.5	600V	10V	2
DC Ammeter	KAC-11	or	1.5	5A, 200mV	150μA, 50mV	3
DC Voltmeter	KAD-11		1.5	1000V	1V	4
Signal meter	KAE-11	or	1.5	DC 4 ~ 20mA or DC 10V or AC 18V		5
Frequency meter	KAF-11		1.0	45 ~ 65Hz, 45 ~ 55Hz ; 55 ~ 65Hz		6

1. Standard : 5A Input, or use CT
2. Standard : 150V, 300V, 600V Input or use PT.
3. Standard : 50mV ,60mV input.
4. Standard : 15V, 30V, 50V, 100V, or 600V input, or use voltage divider.
5. Bezel design to be customized.
6. Standard: 110V, 220V (50/60Hz) input

Unit:mm

18 LIGHTSTAR

Ao / Vo Meter

Certificates 



| Ao Meter KAM-11A |

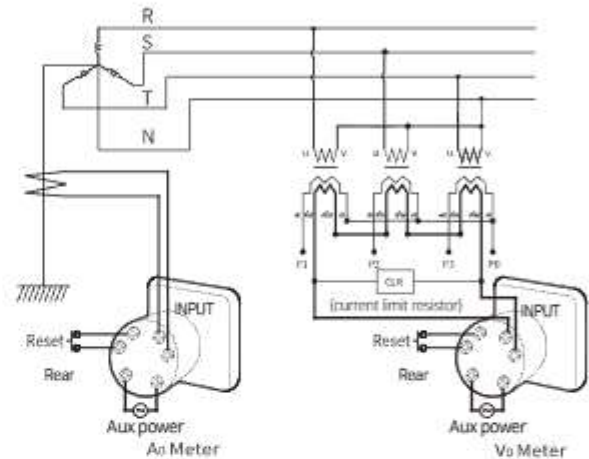


| Vo Meter KAM-11B |

Technical Data

Type	AO Meter (AC current Max)	VO Meter (AC voltage Max)
	KAM-11A	KAM-11B
Operation	 	
Class	1.5	
Input	1A, 5A	110V, 190/3V
Power Consumption	1.0 VA	
Holding time	1.0% / 12Hour	
Aux power	AC 100 ~ 240V(60Hz)	
Reset	Front : Push button Rear : Reset Terminal	
Weight	750g	

Connection Diagram



Refer to page 24 for dimensions and drawing

RMS Meter

Certificates 



| RMS KAK-11A/KAK-08A |



| RMS KAK-11B/KAK-08B |

Technical Data

Type	KAK-08A	KAK-11A
Operation	 	
Class	1.5	
Input	Direct	5A
	Usint CT	Primary current/5A
Power consumption	1.0VA	
Weight	350g	450g

Refer to page 24 for dimensions and Drawing

Technical Data

Type	KAK-08B	KAK-11B
Operation	 	
Class	1.5	
Input	Direct	150V, 300V, 600V,
	Usint CT	Primary Voltage/110V, 220V
Power consumption	1.0VA	
Weight	350g	450g

Watt Meter

Certificates  

Model No

KAG - 
①

① Dimension(WxHxDxΦ)

08 80x80x99x65

11 110x110x107x100

How to order) KAG-08 3P3W 440/110, 100/5A, 80kW

 Calculation method $1\Phi = V \times A \times \cos \theta$ $3\Phi = V \times A \times \cos \theta \times \sqrt{3}$

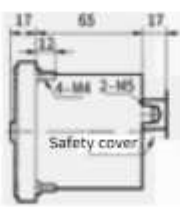
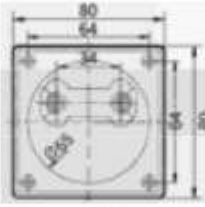
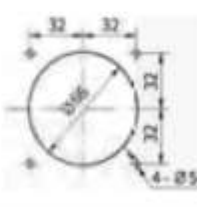
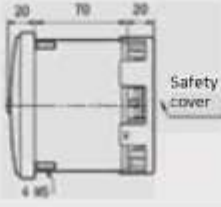
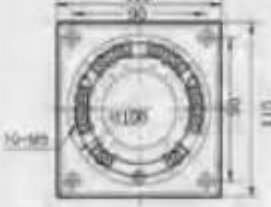
Technical Data

Type	KAG-11				KAG-08
Operation	 				  
Class	1.5				
	1P2W	1P3W	3P3W	3P4W	
Input	220V	220V/110V	220V, 380/110V, 440/110V 3300/100V, 6600/110V 22000/110V 154kV/110V	208/√3V, 380/√3V / 190/√3V 380/√3V 11400/√3V / 190/√3V 22900/√3V / 190/√3V	No direct connection (Use TD)
	1A or 5A				
Power Consumption	2VA				
Weight	740g				300g(Meter), 450g(TD)

 Refer to Connection Diagram 25-27. Customized product can be produced by order.

Drawing

Unit:mm

Type	Fixed method	Side	Rear	Panel cut
08Ty	Bolt fixed type			
11Ty	Bolt fixed type			

wattmeter chart

Unit: kW

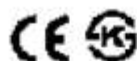
Circuit			1P2W	1P3W	3P3W							3P4W					
* Power constant			1,091	0,9091	1,05	1,216	1,05	1,05	1,05	1,05	1,008	1,05	1,110	1,216	1,216	1,216	1,008
Voltage ratio			220V	220/ 110	220	380/ 110	440/ 110	3300/ 110	6600/ 110	22000/ 110	22900/ 110	154kV/ 110	208/ √3	380/√3 190/√3	380/ √3	11400/√3 190/√3	22900/√3 190/√3
Maximum power			1,2 kW	1,0 kW	2,0 kW	1,158 kW	1,0 kW	1,0 kW	1,0 kW	1,0 kW	0,961 kW	1,0 kW	2,0 kW	2,0 kW	4,0 kW	1,660 kW	1,660 kW
Current ratio	1	5/5A	1,2	1	2	4	4	30	60	200	200	1400	2	4	4	100	200
	2	10/5A	2,4	2	4	8	8	60	120	400	400	2800	4	8	8	200	400
	3	15/5A	3,6	3	6	12	12	90	180	600	600	4200	6	12	12	300	600
	4	20/5A	4,8	4	8	16	16	120	240	800	800	5600	8	16	16	400	800
	5	25/5A	6,0	5	10	20	20	150	300	1000	1000	7000	10	20	20	500	1000
	6	30/5A	7,2	6	12	24	24	180	360	1200	1200	8400	12	24	24	600	1200
	7	40/5A	9,6	8	16	32	32	240	480	1600	1600	11,2MW	16	32	32	800	1600
	8	50/5A	12,0	10	20	40	40	300	600	2000	2000	14,0	20	40	40	1000	2000
	9	60/5A	14,4	12	24	48	48	360	720	2400	2400	16,8	24	48	48	1200	2400
	10	75/5A	18	15	30	60	60	450	900	3000	3000	21,0	30	60	60	1500	3000
	11	80/5A	19,2	16	32	64	64	480	960	3200	3200	22,4	32	64	64	1600	3200
	12	100/5A	24	20	40	80	80	600	1200	4000	4000	28,0	40	80	80	2000	4000
	13	120/5A	28,8	24	48	96	96	720	1440	4800	4800	33,6	48	96	96	2400	4800
	14	150/5A	36	30	60	120	120	900	1800	6000	6000	42,0	60	120	120	3000	6000
	15	200/5A	48	40	80	160	160	1200	2400	8000	8000	56,0	80	160	160	4000	8000
	16	250/5A	60	50	100	200	200	1500	3000	10MW	10MW	70,0	100	200	200	5000	10MW
	17	300/5A	72	60	120	240	240	1800	3600	12	12	84,0	120	240	240	6000	12
	18	400/5A	96	80	160	320	320	2400	4800	16	16	112	160	320	320	8000	16
	19	500/5A	120	100	200	400	400	3000	6000	20	20	140	200	400	400	10MW	20
	20	600/5A	144	120	240	480	480	3600	7200	24	24	168	240	480	480	12	24
	21	750/5A	180	150	300	600	600	4500	9000	30	30	210	300	600	600	15	30
	22	800/5A	192	160	320	640	640	4800	9600	32	32	224	320	640	640	16	32
	23	1000/5A	240	200	400	800	800	6000	12MW	40	40	280	400	800	800	20	40
	24	1200/5A	288	240	480	960	960	7200	14,4	48	48	336	480	960	960	24	48
	25	1500/5A	360	300	600	1200	1200	9000	18	60	60	420	600	1200	1200	30	60
	26	2000/5A	480	400	800	1600	1600	12MW	24	80	80	560	800	1600	1600	40	80
	27	2500/5A	600	500	1000	2000	2000	15	30	100	100	700	1000	2000	2000	50	100
	28	3000/5A	720	600	1200	2400	2400	18	36	120	120	840	1200	2400	2400	60	120
	29	4000/5A	960	800	1600	3200	3200	24	48	160	160	1120	1600	3200	3200	80	160
	30	5000/5A	1200	1000	2000	4000	4000	30	60	200	200	1400	2000	4000	4000	100	200

Reference

- ☐ For 1Φ2W, 220V and 10 / 5A, the maximum power meter reading design is 2,4kW
- ☐ For 3Φ3W, 154kV/110V and 100/5A the maximum power meter reading design is 28,0MW.
- ☐ For 3Φ4W, 22900/√3/190√3V and 100/5A the maximum power meter reading design is 4000kW.
- ☐ Power constant : Instrument display power value (max.) / Power value calculated for electric circuit.
- ☐ Bidirectional wattmeter [consumption/generation] is order made.

Var Meter

Certificates



Model No

KAI - 
①

① Type(WxHxDxΦ)

08 80x80x99x65

11 110x110x107x100

How to order)) KAI-08 3P3W 440/110, 100/5A, ±80kvar

 Calculation method $1\Phi = V \times A \times \sin \theta$ $3\Phi = V \times A \times \sin \theta \times \sqrt{3}$

Technical Data

Type	KAI-11				KAI-08
Operation					
Class	1.5				
	1P2W	1P3W	3P3W	3P4W	
Input	220V	220V/110V	220V, 380/110V, 440/110V 3300/100V, 6600/110V 22000/110V 154kV/110V	208/√3V, 380/√3V / 190/√3V 380/√3V 11400/√3V / 190/√3V 22900/√3V / 190/√3V	No direct connection (Use TD)
	1A or 5A				
Power Consumption	2VA				
weight	740g				300g(Meter), 450g(TD)

Refer to Connection Diagram 25-27. Customized product can be produced by order.

Drawing

Unit:mm

Type	Fixed method	Side	Rear	Panel dimensions
08Ty	Bolt fixed type			
11Ty	Bolt fixed type			

Reactive power meter chart

Unit:kvar

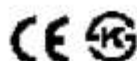
Circuit			1P2W	1P3W	3P3W							3P4W					
* Power constant			1,091	0,9091	1,05	1,216	1,05	1,05	1,05	1,05	1,008	1,05	1,110	1,216	1,216	1,216	1,008
Voltage ratio			220V	220/ 110	220	380/ 110	440/ 110	3300/ 110	6600/ 110	22000/ 110	22900/ 110	154kV/ 110	208/ √3	380/√3 190/√3	380/ √3	11400/√3 190/√3	22900/√3 190/√3
Maximum power			1,2 kvar	1,0 kvar	2,0 kvar	1,158 kvar	1,0 kvar	1,0 kvar	1,0 kvar	1,0 kvar	0,961 kvar	1,0 kvar	2,0 kvar	2,0 kvar	4,0 kvar	1,660 kvar	1,660 kvar
Current ratio	1	5/5A	1.2	1	2	4	4	30	60	200	200	1400	2	4	4	100	200
	2	10/5A	2.4	2	4	8	8	60	120	400	400	2800	4	8	8	200	400
	3	15/5A	3.6	3	6	12	12	90	180	600	600	4200	6	12	12	300	600
	4	20/5A	4.8	4	8	16	16	120	240	800	800	5600	8	16	16	400	800
	5	25/5A	6.0	5	10	20	20	150	300	1000	1000	7000	10	20	20	500	1000
	6	30/5A	7.2	6	12	24	24	180	360	1200	1200	8400	12	24	24	600	1200
	7	40/5A	9.6	8	16	32	32	240	480	1600	1600	112Mvar	16	32	32	800	1600
	8	50/5A	12.0	10	20	40	40	300	600	2000	2000	14.0	20	40	40	1000	2000
	9	60/5A	14.4	12	24	48	48	360	720	2400	2400	16.8	24	48	48	1200	2400
	10	75/5A	18	15	30	60	60	450	900	3000	3000	21.0	30	60	60	1500	3000
	11	80/5A	19.2	16	32	64	64	480	960	3200	3200	22.4	32	64	64	1600	3200
	12	100/5A	24	20	40	80	80	600	1200	4000	4000	28.0	40	80	80	2000	4000
	13	120/5A	28.8	24	48	96	96	720	1440	4800	4800	33.6	48	96	96	2400	4800
	14	150/5A	36	30	60	120	120	900	1800	6000	6000	42.0	60	120	120	3000	6000
	15	200/5A	48	40	80	160	160	1200	2400	8000	8000	56.0	80	160	160	4000	8000
	16	250/5A	60	50	100	200	200	1500	3000	10Mvar	10Mvar	70.0	100	200	200	5000	10Mvar
	17	300/5A	72	60	120	240	240	1800	3600	12	12	84.0	120	240	240	6000	12
	18	400/5A	96	80	160	320	320	2400	4800	16	16	112	160	320	320	8000	16
	19	500/5A	120	100	200	400	400	3000	6000	20	20	140	200	400	400	10Mvar	20
	20	600/5A	144	120	240	480	480	3600	7200	24	24	168	240	480	480	12	24
	21	750/5A	180	150	300	600	600	4500	9000	30	30	210	300	600	600	15	30
	22	800/5A	192	160	320	640	640	4800	9600	32	32	224	320	640	640	16	32
	23	1000/5A	240	200	400	800	800	6000	12Mvar	40	40	280	400	800	800	20	40
	24	1200/5A	288	240	480	960	960	7200	14.4	48	48	336	480	960	960	24	48
	25	1500/5A	360	300	600	1200	1200	9000	18	60	60	420	600	1200	1200	30	60
	26	2000/5A	480	400	800	1600	1600	12Mvar	24	80	80	560	800	1600	1600	40	80
	27	2500/5A	600	500	1000	2000	2000	15	30	100	100	700	1000	2000	2000	50	100
	28	3000/5A	720	600	1200	2400	2400	18	36	120	120	840	1200	2400	2400	60	120
	29	4000/5A	960	800	1600	3200	3200	24	48	160	160	1120	1600	3200	3200	80	160
	30	5000/5A	1200	1000	2000	4000	4000	30	60	200	200	1400	2000	4000	4000	100	200

Reference

- ☐ For 1Φ2W, 220V and 10 / 5A, the maximum power meter reading design is 2.4kW
- ☐ For 3Φ3W, 154kV/110V and 100/5A the maximum power meter reading design is 28.0Mvar
- ☐ For 3Φ4W, 22900/√3/190/√3V and 100/5A the maximum power meter reading design is 4000kW.
- ☐ Power constant : Instrument display power value (max.) / Power value calculated for electric circuit.
- ☐ Bidirectional wattmeter [consumption/generation] is order made.

Power Factor Meter

Certificates



Model No

KAH- 
 ① ②

① Dimension(WxHxDxΦ)

08 80x80x99x65 - Unbalanced(T/D External)

08 80x80x114x65 - Balanced(T/D Internal)

11 110x110x107x100

② Type

B Balanced

U Unbalanced

How to order) KAH-08B 1P2W 110V, 5A

Technical Data - Balance power factor meter

Type	KAH-11B	KAH-08B
Operation		
Class	3.0	
Input circuit	1P2W	1P3W 3P3W 3P4W
	110V or 220V	
	1A or 5A	
Power Consumption	2VA	
Weight	450g	380g

Refer to Connection Diagram 25-27.

Technical Data - Unbalanced power factor meter

Type	KAH-11U	KAH-08U
Operation		
Class	3.0	
Input circuit	1P3W	3P4W
	3P3W	No direct connection (Using a dedicated Transducer)
	110V or 220V	110V/√3V 190V/√3V 380V/√3V
Power Consumption	1A or 5A	
	2VA	
weight	800g	300g(Meter)+ 450g(Transducer)

Drawing

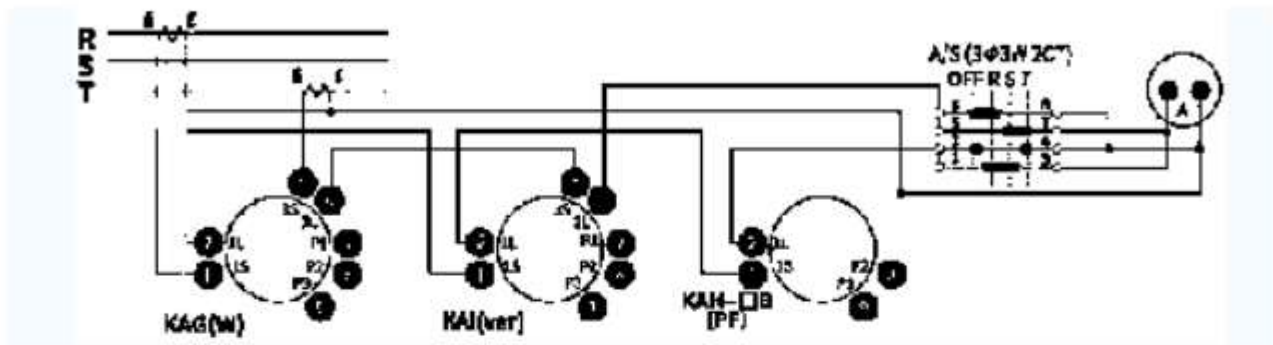
Unit:mm

Type	Side	Rear	Panel Cut
08 TY	RMS meter · Unbalanced power factor meter		
	Balanced Power factor meter		
11 TY	RMS meter		
	A0/V0 meter unbalanced/ Balance power factor meter		

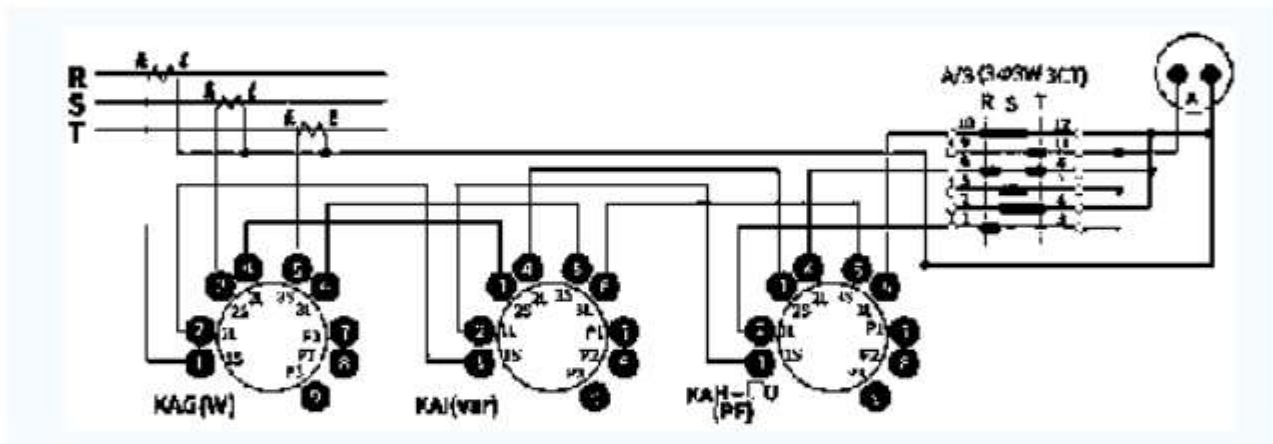
08TY Connection Diagram

For cam switch

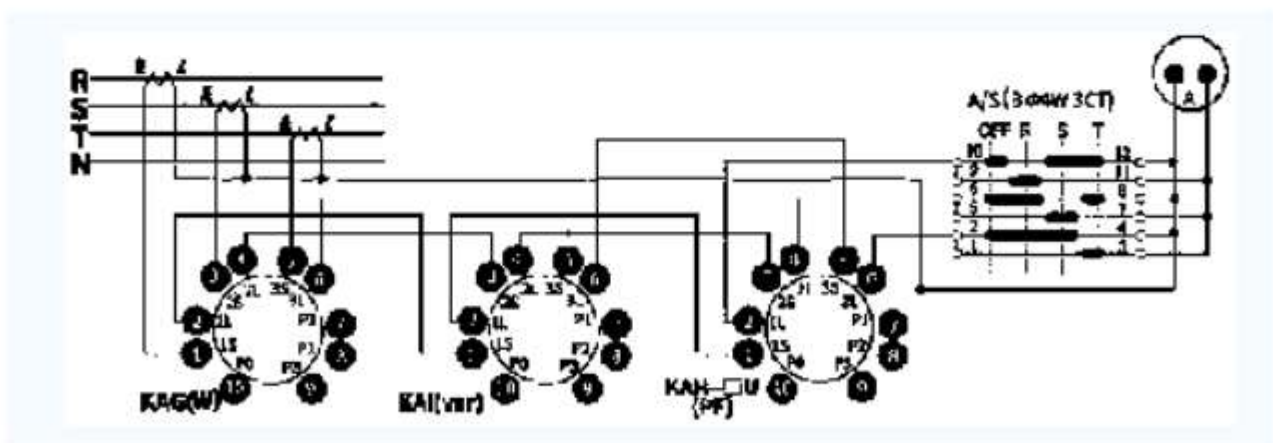
3P3W 2CT(Watt meter, Reactive power meter, Balanced power factor meter)



3P3W 3CT(Watt meter, Reactive power meter, Unbalanced power factor meter)



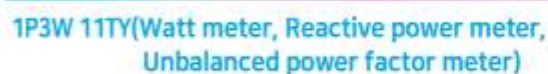
3P4W 3CT(Watt meter, Reactive power meter, Unbalanced power factor meter)



☐ The A / S (Cam Switch) is based on the koino product, Please check the manufacturer's terminal number.

☐ PT connection is not drawn.

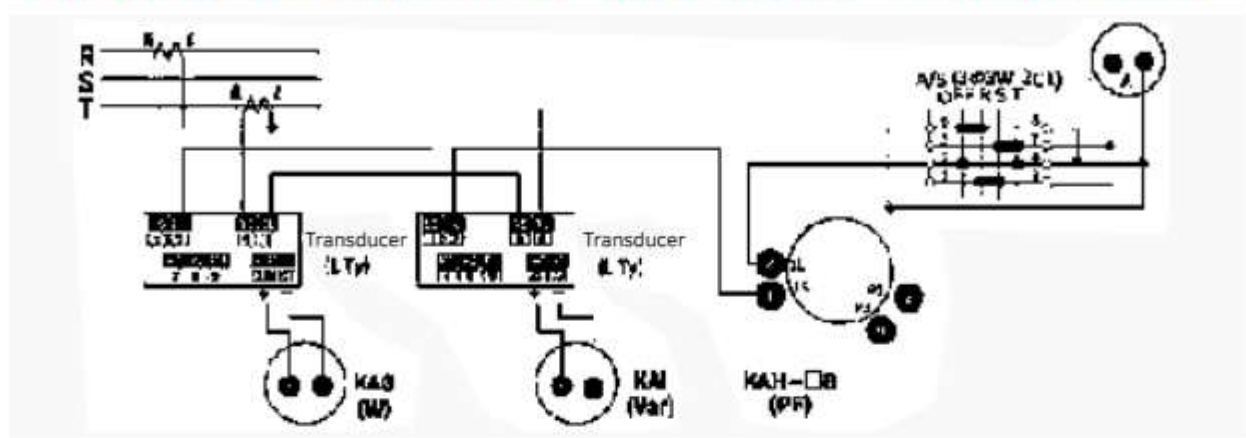
1P2W 11TY(Watt meter, Reactive power meter, Balanced power factor meter)



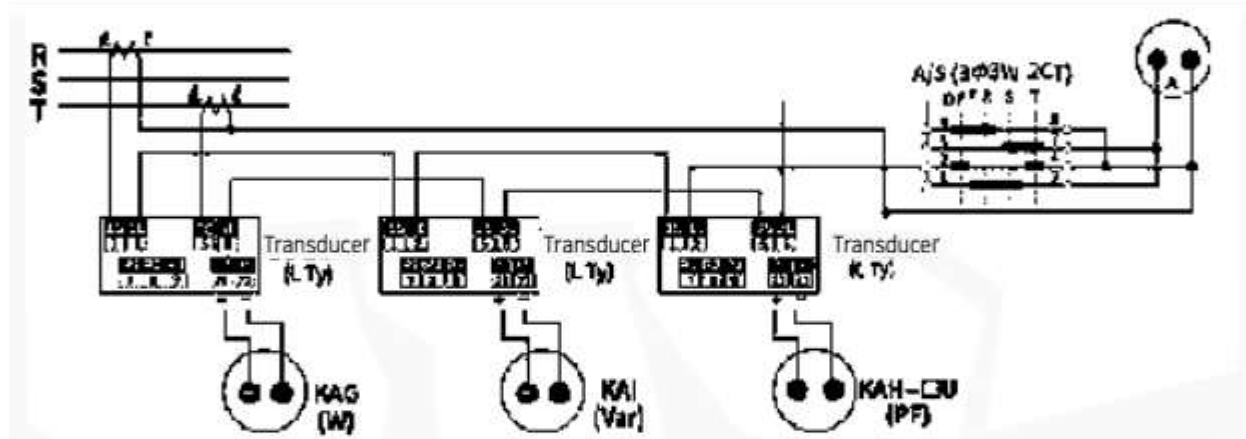
08TY Connection Diagram

For combined use

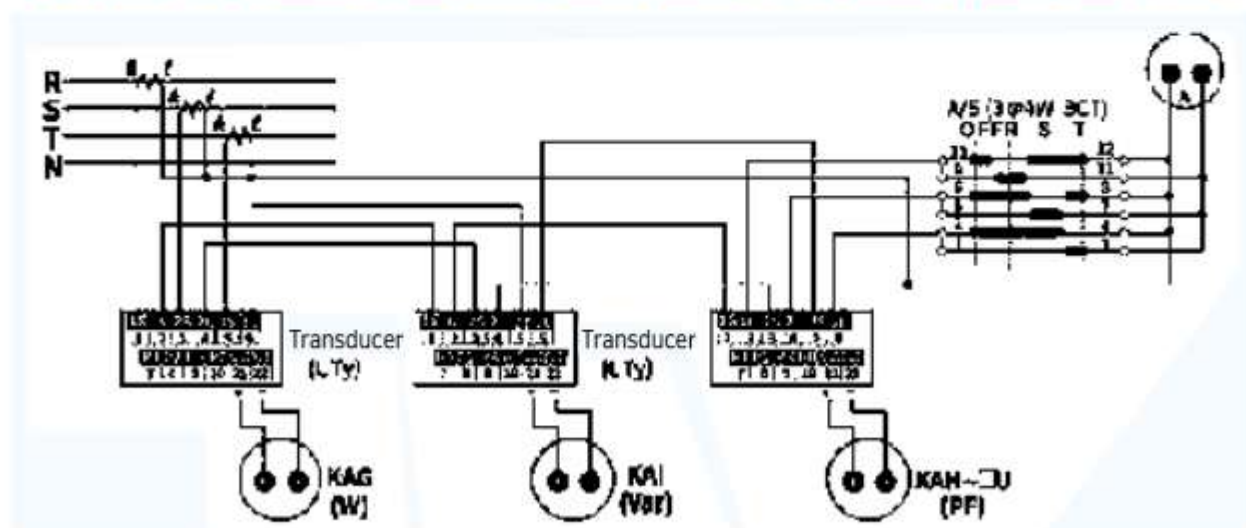
3P3W 2CT 08TY, Transducer ((Watt meter, Reactive power meter, Balanced power factor meter)



3P3W 2CT 08TY, Transducer (Watt meter, Reactive power meter, Unbalanced power factor meter)



3P4W 3CT 08TY, Transducer (Watt meter, Reactive power meter, Unbalanced power factor meter)



The A / S (Cam Switch) is based on the koino product. Please check the manufacturer's terminal number.

PT connection is not shown.

Analog Meter Relay

Certificates



Model No

KAR - 80

① ②

① Input		② Setting
A AC Ammeter	F Frequency meter	H Upper limit setting
B AC Voltmeter	G wattmeter	L Lower limit setting
C DC Ammeter	H Power factor meter	T Upper / lower limit setting
D DC Voltmeter	I Reactive power meter	
E Signal meter	N Thermometer	

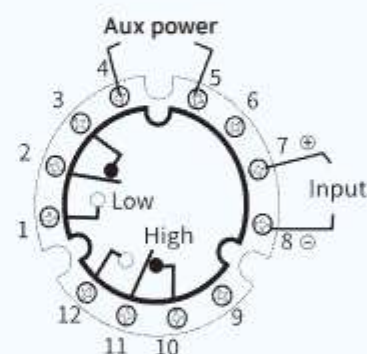
How to order) KAR-A80H AC 100/5A

- ☐ F,G,H,I,N(Frequency meter, Wattmeter, Power factor meter,Reactive power meter, Thermometers require the dedicated converter)
- ☐ The Signal meter requires an external sensor by input.
- ☐ Standard : Delaytime 3 seconds, relay output
- ☐ Option : Delay time instant, Open Collector output

Technical Data

Operating power	AC current / Voltage	 	
	DC current / Voltage	 or  	
	Signal meter	 or  	
	Frequency meter, power factor meter, Reactive power meter, Thermometer	  	
Accuracy Class	2.5% 1.0%(Frequency meter) 3.0%(Power factor meter)	Delay time	3 seconds(standard), Instant(optional)
Measuring range	Order-made	Contact method	Relay output(standard) Open Collector(Option)
Aux power		AC 100 ~240V(50/60Hz) DC 110 or DC 24V	
Weight		220g	

Connection Diagram



Contact point status by contact position and setting

Setting	a - c contact	b - c contact
High		
Low		
Twin		

- Operating range : High indicator (between 25 and 100%), Low indicator (between 0 and 75%)

Overview

The Meter Relay is composed of detection part, and indication part, amplification part, and relay part. This device is applied with contactless type by combining the light emitting diode and the photo transistor in the detection part. So, it is not affected by external vibration or shock, and can be operated in stable condition.

Feature

- High quality, high performance
- Built-in protection circuit, simplification of the sequence circuit, the front window is thin, and transparent, and resistant to shock by using PC material
- Available in a Aux power of 100 to 240 V
- Output contact capacity is AC 220V/1A, DC 30V/1A
- Protection circuit is applied in case of incorrect wiring for relay control power
- Application of Impulse Noise protection Circuit

Purpose

- Controls, alarm, and detection.

Operating principle

The detection part consists of GL (light emitting diode) and PT (phototransistor). PT is ON when the light is being received by the GL. If the light of the GL is blocked, the PT is turned off. This principle is applied to internal electronic circuits to activate two internal relays (AC 220/1A or DC 30V/1A).

Restrain relay activation

Normally, relay contact can be activated automatically at the power initiation(For 2 Sec). So, our product is designed to restrain relay activation from this condition.

DC surge protection circuit

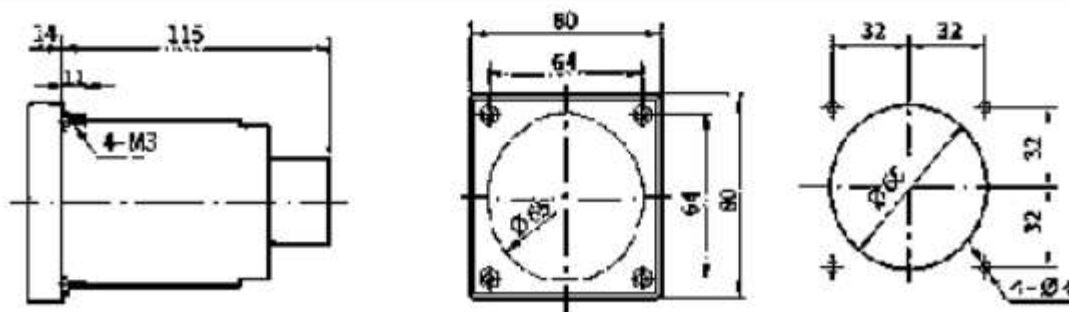
For the case of DC aux power, a protective circuit is applied to prevent the effect of the power surge and it needs to be considered over $\pm 10\%$ of designed voltage.

Protection circuit for mis-wiring

Protection circuit is applied to all models for direct current power supply to prevent damage due to polarity miswiring.

Drawing

Unit:mm

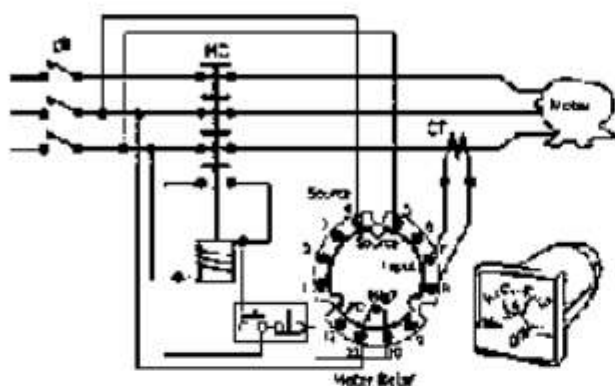


Analog Meter Relay

Certificates



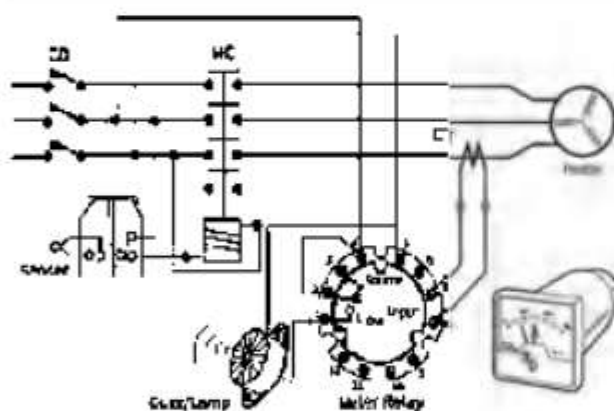
Motor overload protection circuit - High limit setting



It is designed to prevent machines and electric facilities from overload.

Input to be connected to secondary of Motor MC.

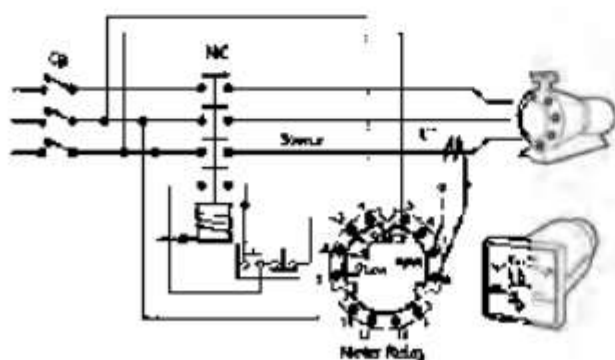
Electric heater open alarm circuit - Low limit setting



For normal operation with MC on, meter indicate current. But, buzzer or lamp can be activated with heater open circuit

Input to be connected to secondary of heater MC.

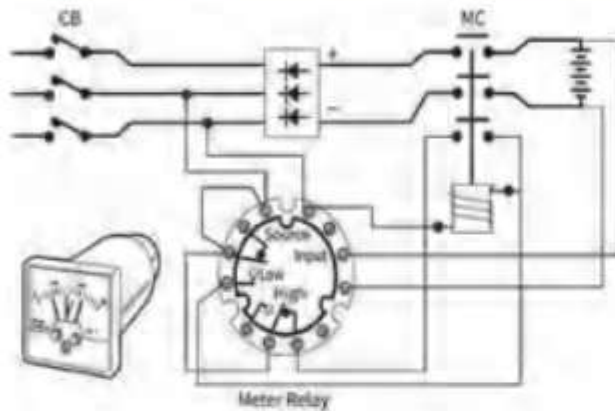
Motor idling protection circuit - Low limit setting



It is designed to prevent motor from continuous idling.

Input to be connected to secondary of Motor MC.

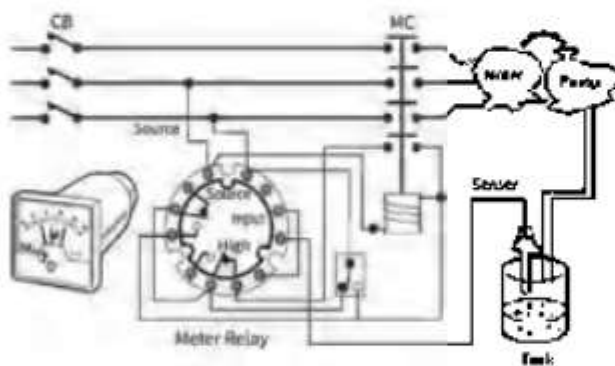
Battery charge control circuit - High/low limit setting



It is designed to provide stable DC power by controlling charge and discharge of the battery.

Input to be connected to battery directly.

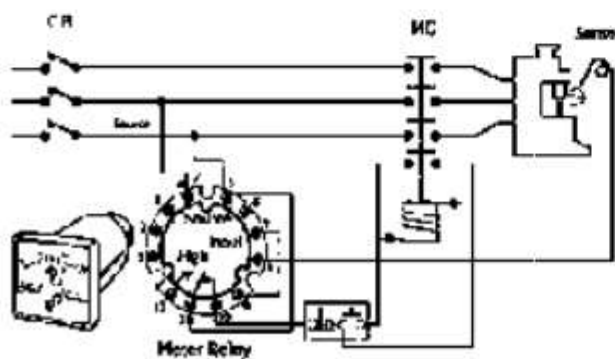
Level control circuit - High / Low limit setting.



It is designed to control liquid level.

Input to be connected to level sensor.

Electric Discharge machine temperature control circuit - High limit setting.

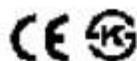


It is designed to control the temperature of electric discharge machine.

Input to be connected to temperature sensor.

ELP(Electro-luminescent Panel)Meter

Certificates



Model No.

KAJ-11

① ② ③

① Type	② Input (Signal meter)		③ Aux power
A AC Ammeter	1 0 ~ 50mV	6 0 ~ 1mA	A AC 110V or 220V ELP
B AC Voltmeter	2 ±50mV	7 0 ~ 10mA	C DC 24V ELP
C DC Ammeter	3 0 ~ 10V	8 0 ~ 20mA	L DC 24V LAMP
D DC Voltmeter	4 0 ~ 150V	0 Order-made	
E Signal meter	5 4 ~ 20mA		

Customized product can be produced by order.
How to order) KAI-11E1A 10kg/cm²/DC 4~20mA, AC 220V ELP

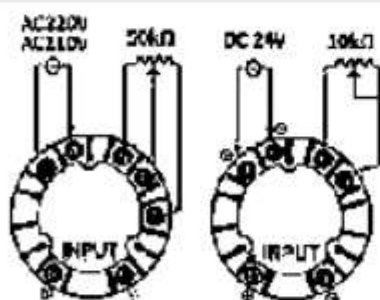
Technical Data

Type	KAJ-11□□A	KAJ-11□□C	KAJ-11□□L
Aux power	AC 110V or 220V 60Hz	DC 24V	DC 24V
Lighting type	ELP(Electro Luminescence Panel)	ELP(Electro Luminescence Panel)	LED LAMP
Class		1.5	
Variable resistance	50MΩ(2.0W)	10MΩ(2.0W)	-
Lighting color	Blue-green	Blue-green	Light purple

The color of the lighting may be changed without notice.

Connection Diagram

ELP type connection diagram



LAMP type connection diagram



Drawing

Unit:mm

Type	Side	Rear	Panel cut	Weight
Bolt fixed				400g

Double Indicator Meter

Certificates



Model No.

KA□-□□D□
① ② ③ ④

① Type		② Type		③ Pointer	④ Detail
A	AC Ammeter	F	Frequency meter	50 08	D Double Measuring range
B	AC Voltmeter	G	Watt meter	60 11	
C	DC Ammeter	H	Power Factor meter	68 08N	
D	DC Voltmeter	I	Var meter	80	
E	Signal meter	N	Thermometer	81	

How to order) KAA-08D AC 100/5A

How to order) KAA-08D AC 100/5A

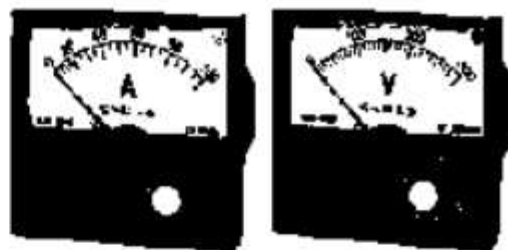
Overview

Easy to recognize normal operation status by rotating the guide indicator on the bezel.

Types of Double Indicator Meter

120° Type			240° Type		
KA□-50D		KA□-72D		KA□-08D	
KA□-60D		KA□-80D		KA□-08ND	
KA□-68D		KA□-81D		KA□-11D	

3P Selector Meter

Certificates 

Model No

KAS - 80 
① ②

① Type

- A** AC Ammeter(0 ~ 5A)
B AC Voltmeter(0 ~ 150V)
C AC Voltmeter(0 ~ 300V)

② Circuit

- 3** 3P3W
4 3P4W

How to order) KAS-80A3 AC 100/5A

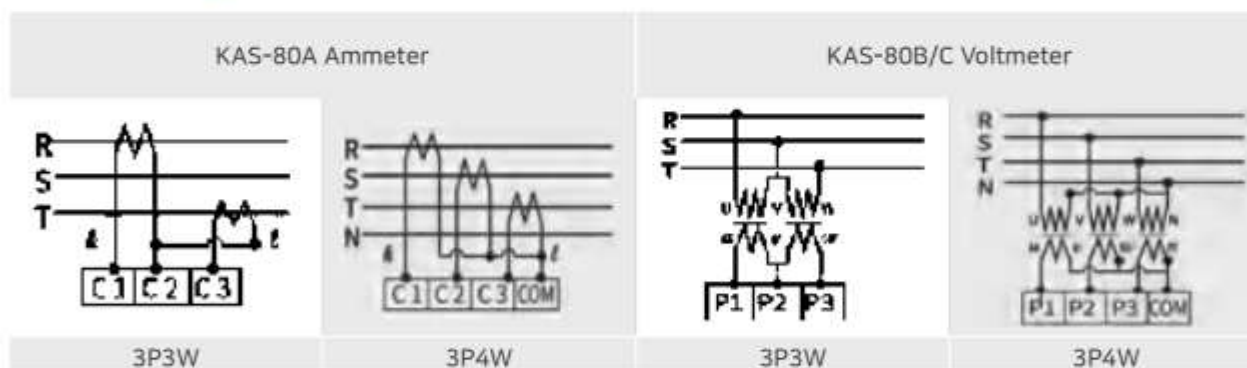
 Measure current or voltage by phase selecting switch Panel cut 75Φ

Technical Data

Type	Model No.	Operation	Class	Rated input	Max input	Note
AC Ammeter	KAS-80A		2.5	5A	15A(3sec)	 1
AC Voltmeter	KAS-80B/C		2.5	150/300V	300V(3sec)	 2

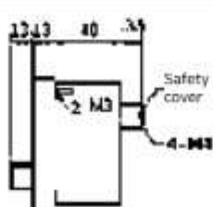
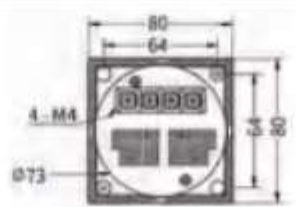
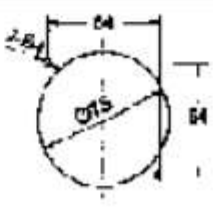
 1. Standard : 5A input or use CT 2. Standard 150V, 300 V Direct input or use PT

Connection Diagram



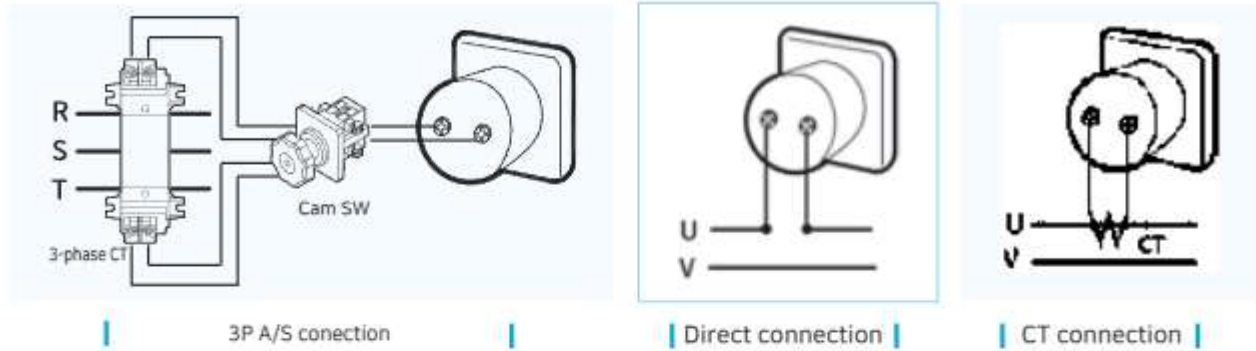
Drawing

Unit:mm

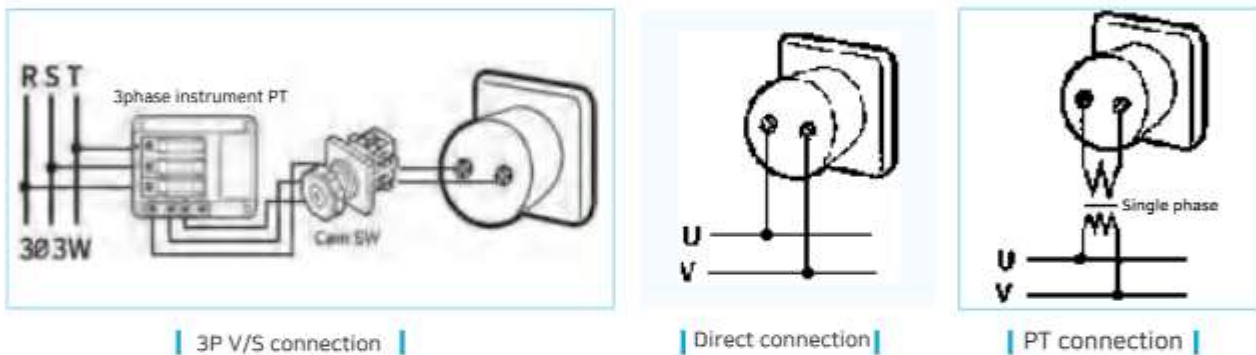
Type	Side	Rear	Panel cut	Weight
Bolt fixed				130g

Connection Diagram

AC Ammeter Connection Diagram



AC Voltmeter Connection Diagram



DC current meter connection diagram

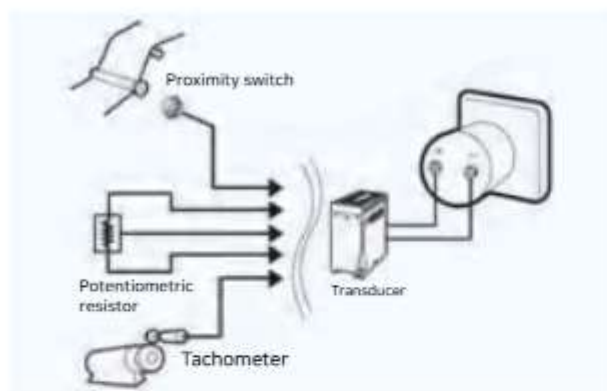


DC voltmeter connection diagram

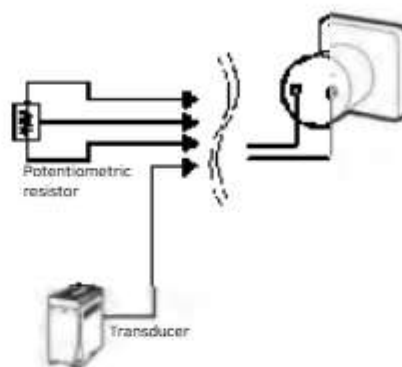


Connection Diagram

Signal meter Connection Diagram

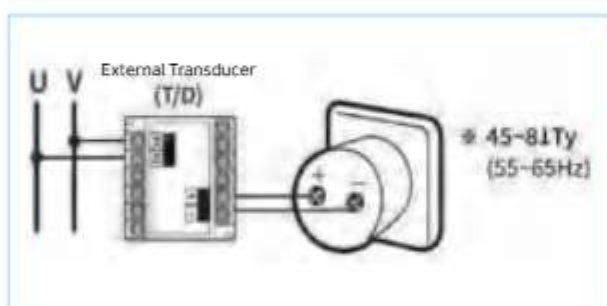


| With Transducer |

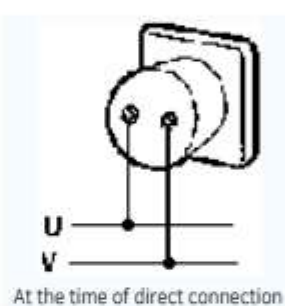


| With sensor or transducer |

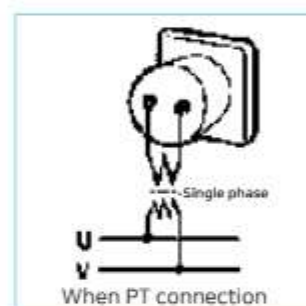
Frequency meter Connection Diagram



| With external Transducer |



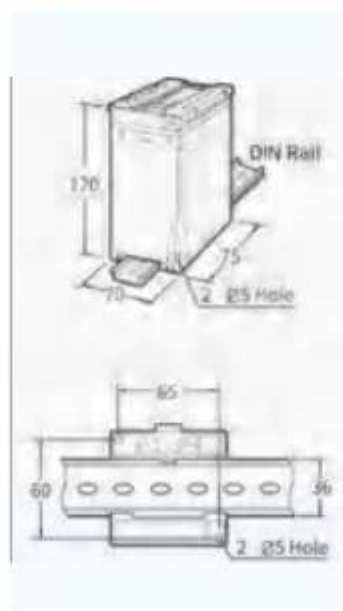
At the time of direct connection



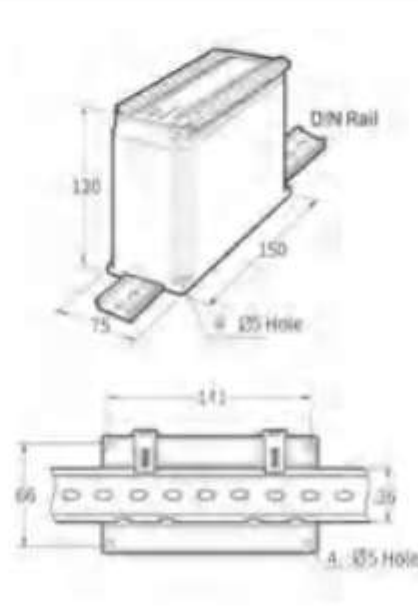
When PT connection

| With internal Transducer |

Drawing of voltage divider or transducer



| L Type(Unit : mm) |



| LL Type(Unit : mm) |

Analog Meter scale table

 Customized product can be produced by order.

45/50 Type Analog Meter

Max scale	Scale type	Numbers of scale	Value
1 1 10 100 1000	0 2 4 6 8 10 	20	0.05 0.5 5 50
2 1.5 15 150 1500	0 5 10 15 	15	0.1 1 10 100 1000
3 2 20 200 4 40 400	0 5 10 15 20 30 40 	20	0.1 1 10 100 0.2 2 20
4 2.5 25 250	0 10 20 30 40 	12.5	0.2 2 20
5 4.5 45 450 4500	0 1 2 3 4 4.5 	9	0.5 5 50 500
6 5 50 500	0 10 20 30 40 50 	10	0.5 5 50
7 6 60 600	0 1 2 3 4 5 6 	12	0.5 5 50
8 7.5 75 750	0 20 40 60 75 	15	0.5 5 50
9 9 90 900 9000	0 2 4 6 8 9 	18	0.5 5 50 500

60/68 Type Analog Meter

Max scale	Scale type	Numbers of scale	Value
1 1 10 100 1000	0 2 4 6 8 10 	20	0.05 0.5 5 50
2 1.5 15 150 1500	0 5 10 15 	15	0.1 1 10 100 0.2 2 20
3 2 20 200 4 40 400	0 5 10 15 20 30 40 	20	0.1 1 10 100 0.2 2 20
4 2.5 25 250	0 5 10 15 20 25 	25	0.1 1 10 0.2 2 20
5 4.5 45 450 4500	0 10 20 30 40 45 	22.5	0.2 2 20
6 6 60 600	0 1 2 3 4 5 6 	12	0.5 5 50
7 7.5 75 750	0 20 40 60 75 	15	0.5 5 50
8 9 90 900 9000	0 2 4 6 8 9 	18	0.5 5 50 500
9 1800 3600 (rpm)	0 500 1000 1500 1800 1000 2000 3000 3600 	18	100 200
10 7200 (rpm)	0 2000 4000 6000 7200 	15	500

80/81 Type Analog Meter

Max scale	Scale type	Numbers of scale	Value
1 1 10 100 1000	0 2 4 6 8 10 	20	0.05 0.5 5 50
2 1.5 15 150 1500	0 5 10 15 	30	0.5 5 50 500
3 2 20 200	0 5 10 15 20 	40	0.05 0.5 5
4 2.5 25 250 5 50 500	0 5 10 15 20 25 10 20 30 40 50 	25	0.1 1 10 0.2 2 20
5 3 30 300 6 60 600	0 10 20 30 2 4 6 	30	0.1 1 10 0.2 2 20
6 4 40 400	0 10 20 30 40 	40	0.1 1 10
7 4.5 45 450 4500	0 10 20 30 40 45 	22.5	0.2 2 20 200
8 7.5 75 750	0 20 40 60 75 	37.5	0.2 2 20
9 9 90 900 9000	0 2 4 6 8 9 	18	0.5 5 50
10 1800 3600 (rpm)	0 500 1000 1500 1800 1000 2000 3000 3600 	36	50 150
11 7200 (rpm)	0 2000 4000 6000 7200 	15	500

Analog Meter scale table

 Customized product can be produced by order.

08 Type Analog Meter

Max scale	Scale type	Numbers of scale	Value	Max scale	Scale type	Numbers of scale	Value
1 1 10 100 1000	0 2 4 6 8 10	20	0.05 0.5 5 50	9 4 40 400	0 10 20 30 40	40	0.1 1 10 100
2 1.5 15 150 1500	0 5 10 15	30	0.05 0.5 5 50	10 4.5 45 450 4500	0 10 20 30 40 45	45	0.1 1 10 100 1000
3 1.6 16 160	0 5 10 15 16	32	0.05 0.5 5	11 4.8 48 480	0 10 20 30 40 48	48	0.1 1 10 100
4 2 20 200	0 5 10 15 20	40	0.05 0.5 5	12 7.5 75 750	0 20 40 60 75	37.5	0.1 1 10 100
5 2.4 24 240	0 5 10 15 20 24	48	0.05 0.5 5	13 3.12 31.2 312	0 10 20 30 31.2	31.2	0.1 1 10 100
6 2.5 25 250 5 50 500	0 5 10 15 20 25	25	0.1 1 10 100 2 20	14 3600 7200 (rpm)	0 1000 2000 3000 3600 2000 4000 6000 7200	36	100 200
7 3 30 300 6 60 600	0 10 20 30	30	0.1 1 10 100 2 20	15 1800 (rpm)	0 500 1000 1500 1800	36	50
8 3.2 32 320 6.4 64 640	0 10 20 30 32	32	0.1 1 10 100 2 20				

11 Type Analog Meter

Max scale	Scale type	Numbers of scale	Value	Max scale	Scale type	Numbers of scale	Value
1 1 10 100 1000 5 50 500	0 5 10 15 20 25 10 20 30 40 50	50	0.02 0.2 2 20 0.1 1 10	10 4 45 450 4500 9 90 900 9000	0 10 20 30 40 45 2 4 6 8 9	45	0.1 1 10 100 0.2 2 20 200
2 1.5 15 150 1500	0 5 10 15	30	0.05 0.5 5 50	11 4.8 48 480	0 10 20 30 40 48	48	0.1 1 10
3 1.6 16 160	0 5 10 15 16	32	0.05 0.5 5	12 6 60 600	0 10 20 30 40 50 60	60	0.1 1 10
4 2 20 200	0 5 10 15 20	40	0.05 0.5 5	13 7.5 75 750	0 20 40 60 75	37.5	0.2 2 20
5 2.4 24 240	0 5 10 15 20 24	48	0.05 0.5 5	14 3.12 31.2 312	0 10 20 30 31.2	31.2	0.1 1 10
6 2.5 25 250	0 5 10 15 20 25	50	0.05 0.5 5	15 3600 7200 (rpm)	0 1000 2000 3000 3600 2000 4000 6000 7200	36	100 200
7 3 30 300	0 5 10 15 20 25 30	60	0.05 0.5 5	16 1800 (rpm)	0 500 1000 1500 1800	36	50
8 3.2 32 320 6.4 64 640	0 10 20 30 32 20 40 60 64	32	0.1 1 10 100 2 20				
9 4 40 400	0 10 20 30 40	40	0.1 1 10				

CE certification

CE stands for "Conformité Européene" and indicates conformity with health, safety, and environmental protection standards for products sold within the European Economic Area (EEA). Our CE certified products are complied to the requirements of EU Directives, relating to LVD (Low Voltage Directives) and EMC(Directive Electromagnetic Compatibility Directives). LIGHTSTAR achieved CE certificate for Analog meter, Current Transformer, Digital meter, Power meter and Transducers.

**CURRENT
TRANSFORMER****KS certification**

KS stands for Korean Standard and indicates conformity with Korean government required standards.

LIGHTSTAR achieved KS certificate for Analog meter, Current Transformer and Transducers.



CONTENTS

42-43 General Instruction

46-47  KBD-□□
3Phase Ring Type
Current Transformer

50-51  KBM-□□
Window Type Current Transformer

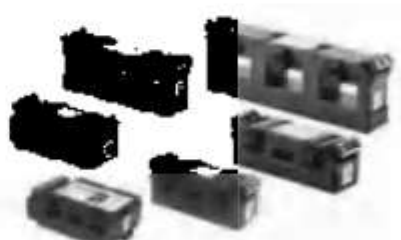
55  KBF-7□□
3Phase CT For ACB

59  KBC
Split-Type Current Transformer

44-45  KBJ-□□
Ring Type Current Transformer

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Window Type Current Transformer

52-54 Recommended CT per ACB type

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3Phase Window Type
Current Transformer

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Current Transformers
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Direct connect type
Current Transformer

KBK-□

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Wireless clamp CT

KBH

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Potential Transformer

KB□-□

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3Phase Potential Transformer

KBO-□

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Earthed Voltage Transformer

KBG-□□

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Shunt

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Condensor Discharging Coil

KBN

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Potential Transformer

KBT-□

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Voltage Divider for DC

KBV

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Current Limit Resister

KBL

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Bus bar rated current

Definition

- Burden** Impedence burdens for assuring capacity under designed condition
- Class** Accuracy tolerances for rated current or rate voltage under rated burden

		Ratio error(%)			Phase angle error (Arcmin)		
primary current A		0.05 In	0.2 In	1.0 In	0.05 In	0.2 In	1.0 In
class	0.5	±1.5%	±0.75%	±0.5%	±90'	±45'	±30'
	1.0	±3.0%	±1.5%	±1.0%	±180'	±90'	±60'
	3.0	0.5 In ~ 1.0 In ±3.0%			0.5 In ~ 1.0 In ±180'(1' = 1/60°)		

- NOTE: " In " indicates the rated primary current of the rated frequency.
- Phase angle error: difference between the primary current phase and the secondary current phase rotated by 180 °
- Ratio error: [(Calculated current ratio - Measured current ratio)/ Measured current ratio] X 100

- AF(Ampere Frame)** Capacity of circuit breaker including terminals, contact, trip devices and conductive materials.
- Choice of instrument CT (MCT):** Normally, in order to protect instrument from overcurrent, CT to be saturated over rated current (Overcurrent factor is not indicated)
- Choice of OCR CT (PCT) :** In case primary current is extreemly bigger than rated current, CT core to be saturated and OCR can not be operated properly. Please choose correct CT by considering overcurrent factor" (Max current / Rated primary current of CT) <overcurrent factor"
- IEC 60044** Standard for "instrument transformers" according to IEC (International Electrical Commission)
- JEC 1201** Standard for "Instrument transformers" according to JEC(Japanese Electrotechnical Committee)
- IEE(ANSI) C57.13.1-2006** Standard for "instrument transformers" according to ANSI(American National Standards Institute)
- BS 7627:1993** Standard for "instrument transformers" according to BS(British Standard institution)
- DIN EN VDE 0414** Standard for "instrument transformers" according to DIN(Deutsches Institut fur Normung)

Standard burden for instruments (For reference)

Secondary current	Burden (2.5 mm 2 cable)	Analog ammeter	Digital ammeter	Current transducer	Digital energy meter	EOCR
5A	Approx 0.18VA/m	2.0VA	1.0VA	1.0VA	1.0VA	1.0VA
1A	Approx 0.07VA/m	0.4VA	0.20VA	0.20VA	0.20VA	-

General Instruction.

Information for safe use.

- | Operating condition: ambient temperature - 20°C - 50°C, humidity less than 85%.
- | Torque limit for bus bar fixing bolt (Excess torque may cause bending and distortion) : M4 - 5~7 kgf · cm, M5 - 7~10kgf · cm
- | Torque to Tighten Terminal Bolts
 - M4 - 9.8~13.5 kgf · cm, M5 - 28.4~37.2kgf · cm
 - M6 - 47.1~63.7 kgf · cm, M8 - 117~153kgf · cm, M12 - 402~524kgf · cm
- | Control cable needs isolation.
- | Please be aware that bus bar fixing bolt for current transformer can be energized
- | For busbar fixing bolt insulation covers are recommended for safety

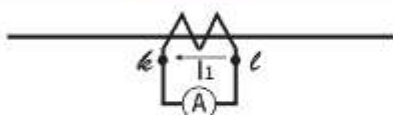
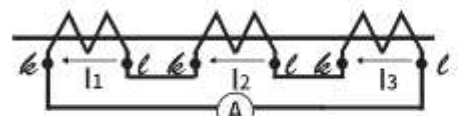
⚠ Caution

1. Do not use a three-phase Potential transformer as a single-phase.
2. Do not use a potential transformer on the secondary side of the inverter circuit or the thyristor circuit.

⚠ Warning

1. The removal of short copper wire shall be done only at the time of meter connection.
2. Do not open the secondary side of the current transformer.
3. The rated fuse must be used for the potential transformer.

Example of Accuracy and burden improvement.

Condition	Burden and class	KBJ-23 50/5A Picture
 One unit connected	5VA 3.0	
 Three units connected	10VA 1.0	

As shown in the figure, serial CT connection can improve class and burden.

Applied CT	KBJ-04 100/5A 5VA 1.0 Class	KBJ-04 200/5A 15VA 1.0 Class
ACTUAL CONDITION	1 Turn - 100/5A 5VA 1.0 Class	2 Turn - 100/5A 15VA 1.0 Class
Picture		

As shown in the figure, burden and class can be improved if the number of turns is increased at the same current condition.

Current transformers use for Inverter secondary

Under low frequency excitation current to be increased and error occurs due to harmonics from Inverter. Please choose burden of CTs with 10 times bigger than normal condition.
If the current is not in rated frequency(50 or 60 Hz), accuracy tolerance may be over rated range.

Ring Type Current Transformer

Certificates  



Model No

KBJ - 

① Size

See the table below

② Use

N/A For Meter (MCT)

R For OCR(PCT)

Selection table

Certl.	Size	For meter(MCT)					For OCR(PCT)			
		Current(A)				Class (%)	Current(A)			Class (IEC)
		2.5VA	5VA	15VA	40VA		2.5VA	5VA	15VA	
	15	40	50-75	-	-	3.0	-	-	-	5P10
		-	100-150	-	-	1.0	-	-	-	
	23	40	50-75	-	-	3.0	-	-	-	
		-	100-200	250-300	-	1.0	-	-	-	
	25	50-60	75	-	-	3.0	-	-	-	
		-	100-200	250-300	-	1.0	-	-	-	
	26	30	40	-	-	3.0	-	-	-	
		-	50-80	100-150	200-500	1.0	50-150	200-400	-	
	03	-	100-150	200-350	400-600	1.0	250-400	500-600	-	
	04	-	100-150	200-350	400-2000	1.0	200-350	400-800	1000-2000	
	06	-	100-200	250-400	500-3000	1.0	-	500-1000	1200-3000	
	10	-	-	300-500	600-6000	1.0	-	500-1000	1200-6000	

 **How to find** Example) KBJ-25 Type is manufactured at 5 VA 1.0 CL within the range from 100 to 200 AT, and in the range of 40AT in 2.5VA 3.0 class.

 **How to order** Example) KBJ-25 100/5, 5VA, 1.0%

 Customized product can be produced by order.

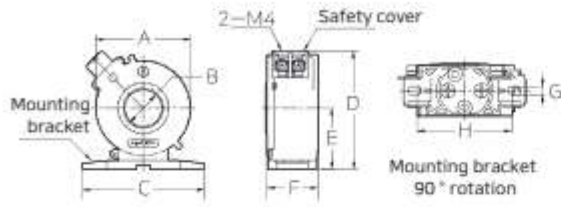
Specification

Secondary current	Overcurrent strength	Maximum voltage	Withstand voltage	Frequency
5A OR 1A	40times	1,15kV	4,0 kV / 1 min	50/60Hz

Drawing

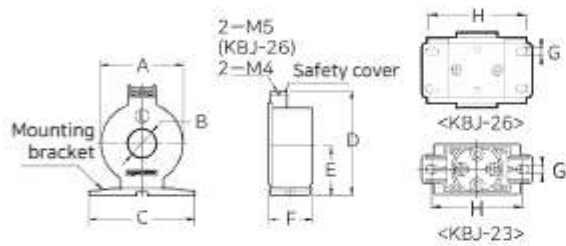
Unit:mm

KBJ-15/KBJ-25



TYPE	A	B	C	D	E	F	G	H	Weight
KBJ-15	66	Φ15	84	83	43	35	6	65	400g
KBJ-25	66	Φ25	84	83	43	35	6	65	320g

KBJ-23/KBJ-26



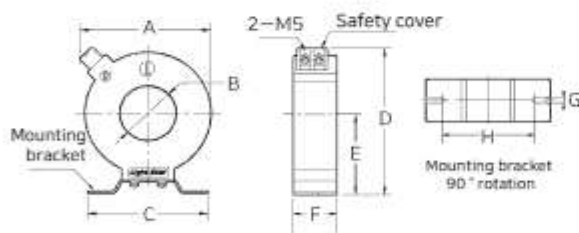
TYPE	A	B	C	D	E	F	G	H	Weight
KBJ-23	65	Φ23	84	89	42	38	6	72	320g
KBJ-26	90	Φ26	100	120	60	60	6	82	2.5kg

KBJ-03



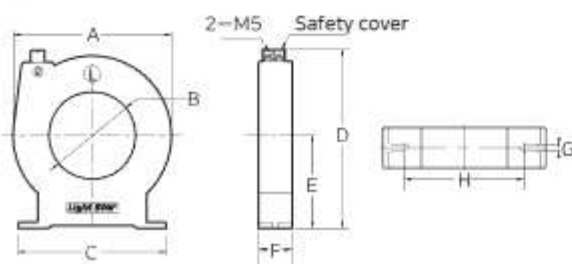
TYPE	A	B	C	D	E	F	G	H	Weight
KBJ-03	80	Φ30	100	100	45	40	6	78	550g

KBJ-04/KBJ-06



TYPE	A	B	C	D	E	F	G	H	Weight
KBJ-04	102	Φ40	95	117	64	40	5	70	800g
KBJ-06	125	Φ60	120	141	75	40	5	92	1100g

KBJ-10



TYPE	A	B	C	D	E	F	G	H	Weight
KBJ-10	182	Φ100	182	203	106	40	6	133	2100g

3Phase Ring Type Current Transformer

Optimized design for Circuit Breaker

Certificates  



Model No

KBD - 
① ②

① Size

See the table below

② Use

N/A For Meter(MCT)

E For EOCR(PCT)

Selection table

Type		Size	For meter(MCT)				For EOCR(PCT)			
			Current(A)			Class (%)	Current(A)			Class(1.0)
			2.5VA	5VA	15VA		1.5VA	2.5VA	5VA	Overcurrent constant
3Φ 3W (2CT)	100AF	12	50~100	120	-	3.0	150~200	-	-	5P5
			-	150~200	-	1.0				
		12S	40~75	80	-	3.0	50~60	-	-	5P5
			-	100~150	200	1.0	75~120	150~200	-	5P10
	250AF	22	60	75	-	3.0	100~300	-	-	5P5
			-	100~300	-	1.0				
	400AF	42	-	100~150	-	3.0	150~250	-	-	5P5
			-	200~300	400~500	1.0	300~400	500	-	5P10
600AF	62	-	200~250	300~1200	1.0	-	250~400	500~1000	5P10	
3Φ 4W (3CT)	100AF	13	50~100	120	-	3.0	150~200	-	-	5P5
			-	150~200	-	1.0				
		13S	40~75	80	-	3.0	50~60	-	-	5P5
			-	100~200	-	1.0	75~120	150~200	-	5P10
	250AF	21	60	75	-	3.0	100~200	-	-	5P5
			-	100~200	-	1.0				
		23	75~120	-	-	3.0	200~300	-	-	5P5
			-	150~300	-	1.0				
	400AF	43	-	100~150	-	3.0	150~250	-	-	5P5
			-	200~300	400~500	1.0	300~400	500	-	5P10
	600AF	63	-	200~250	300~1200	1.0	-	250~400	500~1000	5P10

 **How to find** Example) KBD-12 Type is manufactured at 5VA 1.0 class within the range from 150 to 200 AT

 **How to order** Example) KBD-22 100/5A, 5VA, 1.0%, KBD-43 250/5A, 5VA, 1.0%

 Customized product can be produced by order.

 Refer to page 43 for accuracy improvement.

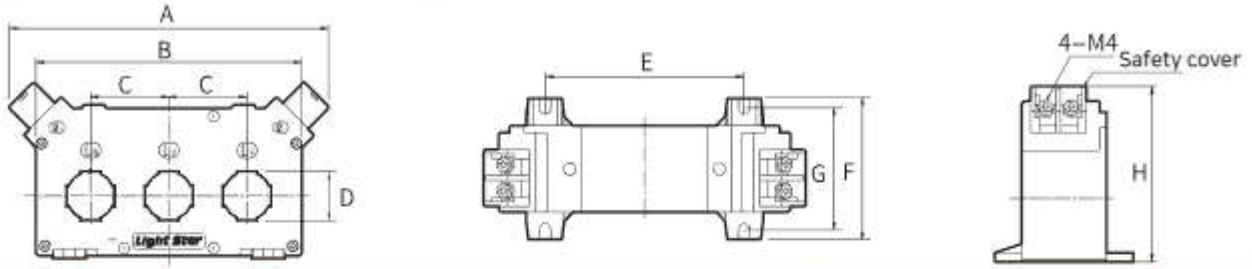
Specification

Secondary current	Overcurrent strength	Maximum voltage	Withstand voltage	Frequency
5A OR 1A	40times	1,15kV	4.0 kV / 1 min	50/60Hz

Outline drawing

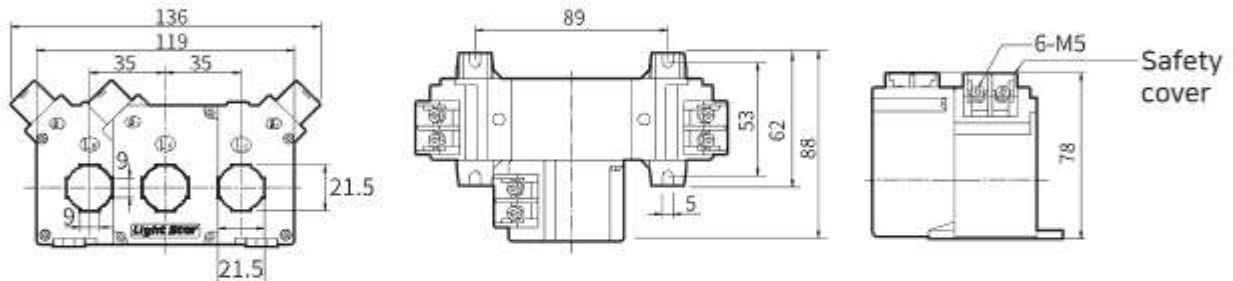
Unit:mm

KBD-12/13,12S/13S, 22/23, 42/43

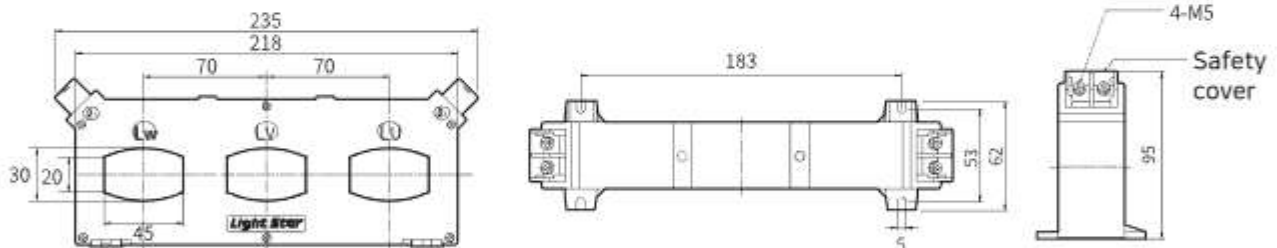


Size		A	B	C	D	E	F	G	H
Type	KBD-12/13	119	99	30	14	63	62	55	59
	KBD-12S/13S	119	99	30	14	63	75	61	59
	KBD-22/23	136	119	35	21.5	89	62	53	78
	KBD-42/43	170	149	44	27	117	62	53	93

KBD-21

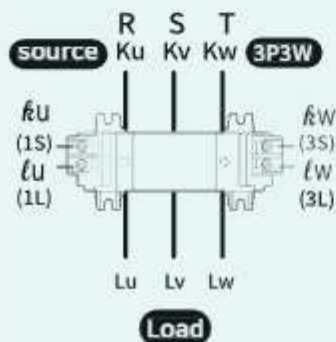


KBD-62/63

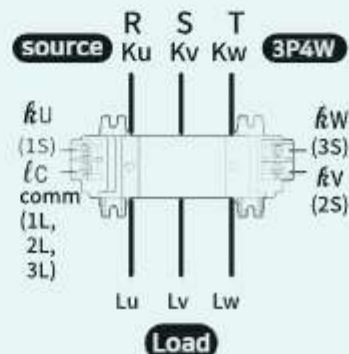


Terminal Connection

KBD-12,12S,22,42,62



KBD-13,13S,23,43,63



Window Type Current Transformer

Optimized design for circuit breaker

Certificates 



Model No

KBM - 
① ②

① Size

See the table below

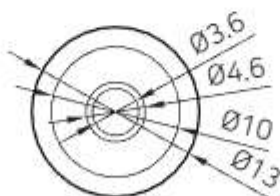
② Use

N/A	For meter(MCT)
R	For OCR(PCT)

Selection table

Type	Size	For meter(MCT)					For OCR(PCT)			
		Current(A)				Class (%)	Current(A)			Class (IEC)
		2.5VA	5VA	15VA	40VA		2.5VA	5VA	15 VA	
100AF	31	50~75	100	-	-	3.0	-	-		5P5
250AF	32	75~120	150	-	-	3.0	-	-		
		-	200~250	-	-	1.0	250~300			
400AF	34	-	100~150	200~400	-	1.0	350~400	-		5P10
600AF	36	-	100~150	200~300	400~1000	1.0	300~400	500~700	800~1000	5P10

- Customized product can be produced by order.
- Please avoid to contact busbar directly to prevent damage from heat
- Torque limit for bus bar fixing bolt : M4 - 5~7 kgf · cm, M5 - 7~10kgf · cm (Excess torque may cause bending and distortion)
- Please be aware that bus bar fixing bolt for current transformer can be energized
- Bolt insulation covers are recommended for safety(See the details below)
- Bolt insulation cover



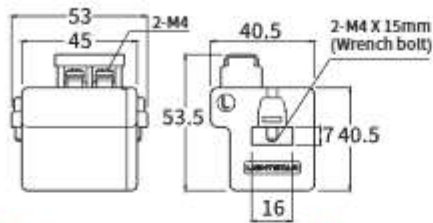
Design can be changed without notice

Specification

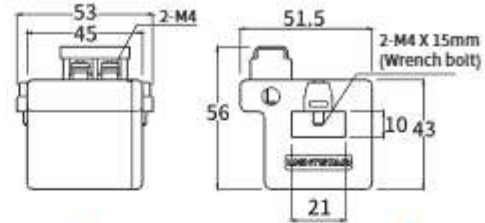
Secondary current	Overcurrent strength	Maximum voltage	Withstand voltage	Frequency
5A OR 1A	40times	1.15kV	4.0 kV / 1 min	50/60Hz

Drawing

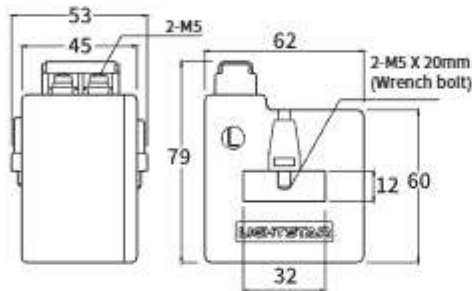
Unit:mm



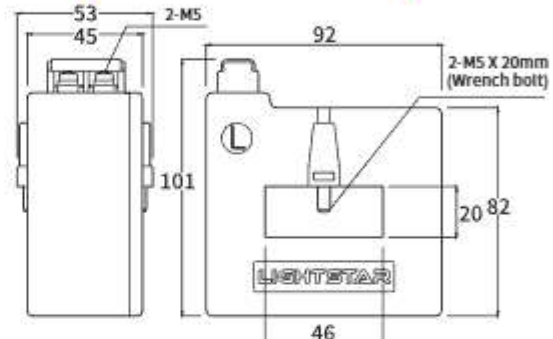
KBM-31[For 100AF]



KBM-32[For 250AF]



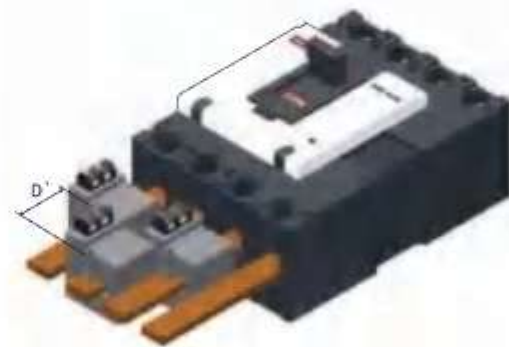
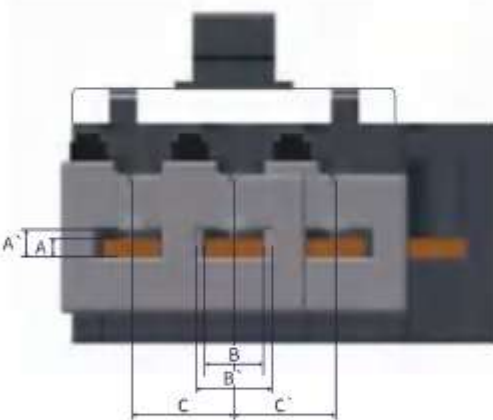
KBM-34[For 400AF]



KBM-36[For 600AF]

Recommended CT For CB design

Unit:mm



Circuit breaker

CB frame size	100AF	250AF	400AF	600AF/800AF	1000AF/1200AF	1000AF/1200AF (Double)
A	4	7	8	10	17	34
B	15	20	25		44	
C	30	35	44		70	
Recommended product	↓	↓	↓	↓	↓	↓
Type	KBM-31	KBM-32	KBM-34	KBM-36	KBM-05	
A'	7	10	12	20	40	
B'	16	21	32	46	61	
C'	30	35	44	70		
D'			53			118

20mm bus bar is recommended for 250AF circuit breaker, 25mm bus bar is recommended for 400AF circuit breaker.

Window Type Current Transformer

Optimized design for air circuit breaker

Certificates  



Model No

KBM - 

① Size

See the table below

② Use

N/A For meter(MCT)

R For OCR(PCT)

Selection table

Certi.	Size	For meter(MCT)				For OCR(PCT)			
		Current(A)			Class (%)	Current(A)			Class (IEC)
		5VA	15VA	40VA		5VA	15VA	40VA	
	25	100~150	200~350	-	1.0	400	-	-	5P10
	03	120~150	200~350	400~600	1.0	400~600	-	-	
	05	200~300	400~700	750~2000	1.0	1000~2000	-	-	
	08	100~200	250~400	500~2000	1.0	400~500	1000~2000	-	5P10
						600~800	-	-	5P20
	10	200~300	400~500	600~3200	1.0	350~600	1000~2000	3000~4000	5P10
						700~800	2500~4000	-	5P20
	12	300~400	500~750	800~3000	1.0	1200~3000	-	-	5P10
	14	-	400~500	600~6000	1.0	-	1000~2500	3000~4000	5P10
						-	3000~4000	-	5P20
	18	-	500~800	1000~8000	1.0	-	1200~2500	3000~5000	5P10
						-	3000~5000	-	5P20
	21	-	500~800	1000~12000	1.0	-	1200~2000	3000~5000	5P10
						-	2500~5000	6000~8000	5P20

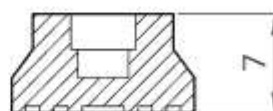
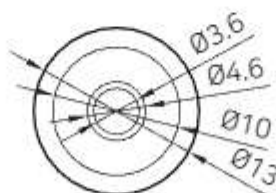
 Customized product can be produced by order.

 **How to find** Example) KBM-25 type is manufactured at 5 VA 1.0 class within the range of 100 to 150 AT.
KBM-08R type is manufactured at 15 VA 5P 10 within the range of 1000~2000 A

 **How to order** Example) KBM-25 100/5, 5VA, 1.0, KBM-08R 1000/5A, 15VA, 5P10

 Customized product can be produced by order.

 Bolt Insulation Cover



Design can be changed without notice

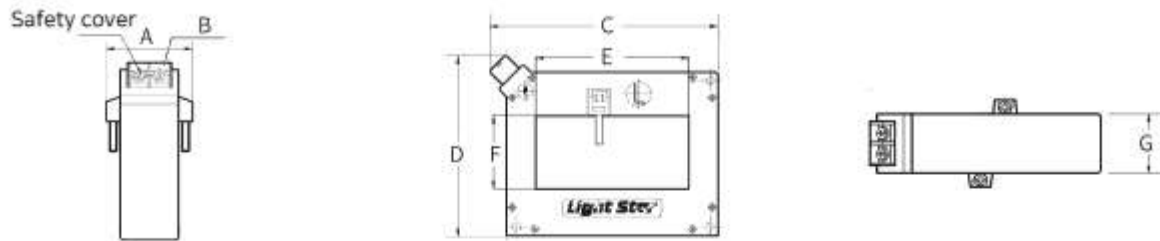
Specification

Secondary current	Overcurrent strength	Maximum voltage	Withstand voltage	Frequency
5A OR 1A	40times	1,15kV	4,0 kV / 1 min	50/60Hz

Drawing

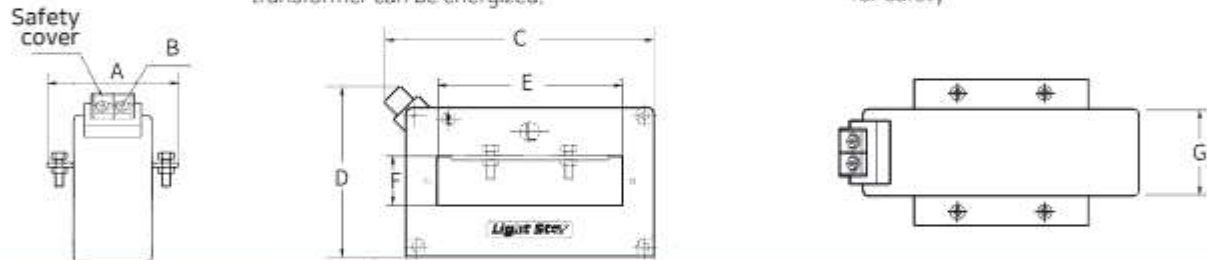
Unit:mm

KBM-25/03/05/08/10/12  Torque limit for bus bar fixing bolt : M4 - 5~7 kgf - cm, M5 - 7~10kgf - cm
(Excess torque may cause bending and distortion)



TYPE	A	B	C	D	E	F	G	Weight
KBM-25	74	2-M5	85	65	26	9	55	500g
KBM-03	74	2-M5	100	80	42	10	55	700g
KBM-05	59	2-M5	107	104	61	40	40	800g
KBM-08	74	2-M5	139	95	80	12	55	1000g
KBM-10	74	2-M5	165	120	105	30	55	1300g
KBM-12	59	2-M5	157	121	105	50	40	840g

KBM-14/18/21  Please be aware that bus bar fixing bolt for current transformer can be energized.  Bolt insulation covers are recommended for safety



TYPE	A	B	C	D	E	F	G	Weight
KBM-14	92	2-M5	186	116	130	34	55	2000g
KBM-18	92	2-M5	238	131	180	43	55	2700g
KBM-21	92	2-M5	280	179	210	85	55	3200g

1000 /1200AF Circuit breaker

Unit:mm

Circuit breaker

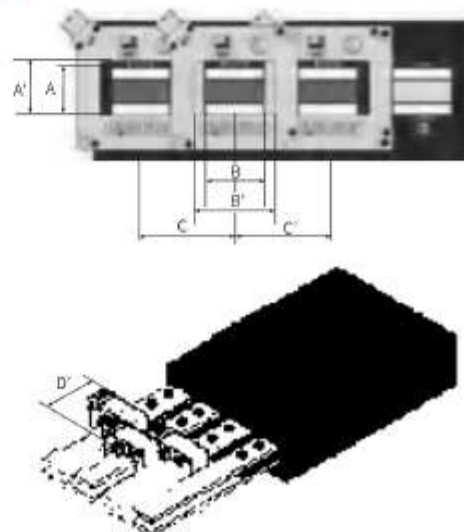
Standard	1000/1200AF
A	34
B	44
C	70

Recommended product

Type	KBM-05
A'	40
B'	61
C'	70
D'	118

 40VA is order made

Example



EASY SELECTION GUIDE FOR CURRENT TRANSFORMER

Current ratio		Model selection														
Pri. (A)	Sec. (A)	CABLE type														
		1P, MCT					1P, PCT					3P, MCT				
		Name	ID	OD	Burden	Accuracy	Name	ID	OD	Burden	Accuracy	Name	ID	OD	Burden	Accuracy
50	5	KBJ-15	Φ15	Φ66	5VA	3.0%						KBD-12/13	Φ14	30	2.5VA	3.00%
		KBJ-25	Φ25	Φ66	2.5VA	3.0%										
60	5	KBJ-15	Φ15	Φ66	5VA	3.0%						KBD-12/13	Φ14	30	2.5VA	3.00%
		KBJ-25	Φ25	Φ66	2.5VA	3.0%						KBD-21/22	Φ21.5	35	2.5VA	3.00%
75	5	KBJ-15	Φ15	Φ66	5VA	3.0%						KBD-12/13	Φ14	30	2.5VA	3.00%
		KBJ-25	Φ25	Φ66	5VA	3.0%						KBD-21/22	Φ21.5	35	5VA	3.00%
												KBD-23	Φ21.5	35	5VA	3.00%
		KBJ-15	Φ15	Φ66	5VA	1.0%						KBD-12/13	Φ14	30	2.5VA	3.00%
100	5	KBJ-25	Φ25	Φ66	5VA	1.0%						KBD-21/22	Φ21.5	35	5VA	1.00%
		KBJ-03	Φ30	Φ80	5VA	1.0%	KBJ-04R	Φ40	Φ102	2.5VA	5P10	KBD-23	Φ21.5	35	2.5VA	3.00%
120	5	KBJ-15	Φ15	Φ66	5VA	1.0%						KBD-12/13	Φ14	30	5VA	3.00%
		KBJ-25	Φ25	Φ66	5VA	1.0%	KBJ-03R	Φ30	Φ80	2.5VA	5P10	KBD-21/22	Φ21.5	35	5VA	1.00%
		KBJ-03	Φ30	Φ80	5VA	1.0%	KBJ-04R	Φ40	Φ102	2.5VA	5P10	KBD-23	Φ21.5	35	2.5VA	3.00%
150	5	KBJ-15	Φ15	Φ66	5VA	1.0%						KBD-12/13	Φ14	30	5VA	1.00%
		KBJ-25	Φ25	Φ66	5VA	1.0%	KBJ-03R	Φ30	Φ80	2.5VA	5P10	KBD-21/22	Φ21.5	35	5VA	1.00%
		KBJ-03	Φ30	Φ80	5VA	1.0%	KBJ-04R	Φ40	Φ102	2.5VA	5P10	KBD-23	Φ21.5	35	5VA	1.00%
200	5	KBJ-25	Φ25	Φ66	5VA	1.0%	KBJ-03R	Φ30	Φ80	2.5VA	5P10	KBD-12/13	Φ14	30	5VA	1.00%
		KBJ-03	Φ30	Φ80	15VA	1.0%	KBJ-04R	Φ40	Φ102	5VA	5P10	KBD-21/22	Φ21.5	35	5VA	1.00%
		KBJ-04	Φ40	Φ102	15VA	1.0%						KBD-23	Φ21.5	35	5VA	1.00%
250	5	KBJ-25	Φ25	Φ66	15VA	1.0%	KBJ-03R	Φ30	Φ80	5VA	5P10	KBD-23	Φ21.5	35	5VA	1.00%
		KBJ-03	Φ30	Φ80	15VA	1.0%	KBJ-04R	Φ40	Φ102	5VA	5P10	KBD-42/43	Φ27	44	5VA	1.00%
		KBJ-04	Φ40	Φ102	15VA	1.0%	KBJ-06R	Φ60	Φ125	5VA	5P10					
300	5	KBJ-25	Φ25	Φ66	15VA	1.0%	KBJ-03R	Φ30	Φ80	5VA	5P10	KBD-23	Φ21.5	35	5VA	1.00%
		KBJ-03	Φ30	Φ80	15VA	1.0%	KBJ-04R	Φ40	Φ102	5VA	5P10	KBD-42/43	Φ27	44	5VA	1.00%
		KBJ-04	Φ40	Φ102	15VA	1.0%	KBJ-06R	Φ60	Φ125	5VA	5P10					
400	5	KBJ-03	Φ30	Φ80	40VA	1.0%	KBJ-04R	Φ40	Φ102	5VA	5P10	KBD-42/43	Φ27	44	15VA	1.00%
		KBJ-04	Φ40	Φ102	40VA	1.0%	KBJ-06R	Φ60	Φ125	5VA	5P10	KBD-62/63	Φ30	70	15VA	1.00%
							KBJ-10R	Φ100	Φ182	5VA	5P10					
500	5	KBJ-03	Φ30	Φ80	40VA	1.0%	KBJ-04R	Φ40	Φ80	5VA	5P10	KBD-42/43	Φ27	44	15VA	1.00%
		KBJ-04	Φ40	Φ102	40VA	1.0%	KBJ-06R	Φ60	Φ125	5VA	5P10	KBD-62/63	Φ30	70	15VA	1.00%
		KBJ-06	Φ60	Φ125	40VA	1.0%	KBJ-10R	Φ100	Φ182	5VA	5P10					
600	5	KBJ-03	Φ30	Φ80	40VA	1.0%	KBJ-04R	Φ40	Φ102	15VA	5P10	KBD-62/63	Φ30	70	15VA	1.00%
		KBJ-04	Φ40	Φ102	40VA	1.0%	KBJ-06R	Φ60	Φ125	5VA	5P10					
		KBJ-06	Φ60	Φ125	40VA	1.0%	KBJ-10R	Φ100	Φ182	5VA	5P10					
750	5	KBJ-04	Φ40	Φ102	40VA	1.0%	KBJ-04R	Φ40	Φ102	15VA	5P10	KBD-62/63	Φ30	70	15VA	1.00%
		KBJ-06	Φ60	Φ125	40VA	1.0%	KBJ-06R	Φ60	Φ125	15VA	5P10					
		KBJ-10	Φ100	Φ182	40VA	1.0%	KBJ-10R	Φ100	Φ182	15VA	5P10					
800	5	KBJ-04	Φ40	Φ102	40VA	1.0%	KBJ-04R	Φ40	Φ102	15VA	5P10	KBD-62/63	Φ30	70	15VA	1.00%
		KBJ-06	Φ60	Φ125	40VA	1.0%	KBJ-06R	Φ60	Φ125	15VA	5P10					
		KBJ-10	Φ100	Φ182	40VA	1.0%	KBJ-10R	Φ100	Φ182	15VA	5P10					
1000	5	KBJ-04	Φ40	Φ102	40VA	1.0%	KBJ-06R	Φ60	Φ125	15VA	5P10	KBD-62/63	Φ30	70	15VA	1.00%
		KBJ-06	Φ60	Φ125	40VA	1.0%	KBJ-10R	Φ100	Φ182	15VA	5P10					
		KBJ-10	Φ100	Φ182	40VA	1.0%										
1200	5	KBJ-04	Φ40	Φ102	40VA	1.0%	KBJ-06R	Φ60	Φ125	15VA	5P10	KBD-62/63	Φ30	70	15VA	1.00%
		KBJ-06	Φ60	Φ125	40VA	1.0%	KBJ-10R	Φ100	Φ182	15VA	5P10					
		KBJ-10	Φ100	Φ182	40VA	1.0%										
1500 (1600)	5	KBJ-04	Φ40	Φ102	40VA	1.0%	KBJ-06R	Φ60	Φ125	15VA	5P10					
		KBJ-06	Φ60	Φ125	40VA	1.0%	KBJ-10R	Φ100	Φ182	15VA	5P10					
		KBJ-10	Φ100	Φ182	40VA	1.0%										
2000	5	KBJ-06	Φ60	Φ125	40VA	1.0%	KBJ-10R	Φ100	Φ182	15VA	5P10					
		KBJ-10	Φ100	Φ182	40VA	1.0%										
2500	5	KBJ-06	Φ60	Φ125	40VA	1.0%										
		KBJ-10	Φ100	Φ182	40VA	1.0%										
3000	5	KBJ-06	Φ60	Φ125	40VA	1.0%										
		KBJ-10	Φ100	Φ182	40VA	1.0%										
4000 over	5	KBJ-10	Φ100	Φ182	40VA	1.0%										

Current ratio		Model selection															
Pri. (A)	Sec. (A)	CABLE type															
		1P, MCT					1P, PCT					3P, MCT					
		Name	ID	OD	Burden	Accuracy	Name	ID	OD	Burden	Accuracy	Name	ID	OD	Burden	Accuracy	
50	5	KBM-31	16x7	40.5x40.5	2.5VA	3.0%							KBF-02/03	16x7	25	2.5VA	3.0%
													KBF-12/13	16x7	30	2.5VA	3.0%
60	5	KBM-31	16x7	40.5x40.5	2.5VA	3.0%							KBF-02/03	16x7	25	2.5VA	3.0%
													KBF-12/13	16x7	30	2.5VA	3.0%
75	5	KBM-31	16x7	40.5x40.5	2.5VA	3.0%							KBF-02/03	16x7	25	2.5VA	3.0%
		KBM-32	21x10	51.5x43	2.5VA	3.0%							KBF-12/13	16x7	30	2.5VA	3.0%
													KBF-22/23	21x10	35	2.5VA	3.0%
100	5	KBM-31	16x7	40.5x40.5	5VA	3.0%							KBF-02/03	16x7	25	2.5VA	3.0%
		KBM-32	21x10	51.5x43	2.5VA	3.0%							KBF-12/13	16x7	30	2.5VA	3.0%
		KBM-34	32x12	62x60	5VA	1.0%							KBF-22/23	21x10	35	2.5VA	3.0%
120	5	KBM-32	21x10	51.5x43	2.5VA	3.0%							KBF-02/03	16x7	25	5VA	3.0%
		KBM-34	32x12	62x60	5VA	1.0%							KBF-12/13	16x7	30	5VA	3.0%
		KBM-36	46x20	92x82	5VA	1.0%							KBF-22/23	21x10	35	5VA	3.0%
150	5	KBM-32	21x10	51.5x43	5VA	3.0%							KBF-02/03	16x7	25	5VA	1.0%
		KBM-34	32x12	62x60	5VA	1.0%							KBF-12/13	16x7	30	5VA	1.0%
		KBM-36	46x20	92x82	5VA	1.0%							KBF-22/23	21x10	35	5VA	3.0%
200	5	KBM-32	21x10	51.5x43	5VA	1.0%							KBF-02/03	16x7	25	5VA	1.0%
		KBM-34	32x12	62x60	15VA	1.0%							KBF-12/13	16x7	30	5VA	1.0%
		KBM-36	46x20	92x82	15VA	1.0%							KBF-22/23	21x10	35	5VA	1.0%
250	5	KBM-32	21x10	51.5x43	5VA	1.0%							KBF-22/23	21x10	35	5VA	1.0%
		KBM-34	32x12	62x60	15VA	1.0%							KBF-42/43	32x20	44	5VA	1.0%
		KBM-36	46x20	92x82	15VA	1.0%											
300	5	KBM-34	32x12	62x60	15VA	1.0%	KBM-34R	32x12	62x60	2.5VA	5P10	KBF-22/23	21x10	35	5VA	1.0%	
		KBM-36	46x20	92x82	15VA	1.0%	KBM-36R	46x20	92x82	2.5VA	5P10	KBF-42/43	32x20	44	5VA	1.0%	
		KBM-05	60x40	107x104	5VA	1.0%						KBF-62/63	46x25	70	5VA	1.0%	
400	5	KBM-34	32x12	62x60	15VA	1.0%	KBM-34R	32x12	62x60	2.5VA	5P10	KBF-42/43	32x20	44	5VA	1.0%	
		KBM-36	46x20	92x82	40VA	1.0%	KBM-36R	46x20	92x82	2.5VA	5P10	KBF-62/63	46x25	70	15VA	1.0%	
		KBM-05	60x40	107x104	15VA	1.0%						KBF-72/73	69x41	90.5	5VA	1.0%	
500	5	KBM-36	46x20	92x82	40VA	1.0%	KBM-36R	46x20	92x82	5VA	5P10	KBF-42/43	32x20	44	15VA	1.0%	
		KBM-05	60x40	107x104	15VA	1.0%						KBF-62/63	46x25	70	15VA	1.0%	
												KBF-72/73	69x41	90.5	15VA	1.0%	
600	5	KBM-36	46x20	92x82	40VA	1.0%	KBM-36R	46x20	92x82	2.5VA	5P10	KBF-62/63	46x25	70	15VA	1.0%	
		KBM-05	60x40	107x104	15VA	1.0%						KBF-72/73	69x41	90.5	15VA	1.0%	
750	5	KBM-36	46x20	92x82	40VA	1.0%	KBM-36R	46x20	92x82	5VA	5P10	KBF-62/63	46x25	70	15VA	1.0%	
		KBM-05	60x40	107x104	40VA	1.0%						KBF-72/73	69x41	90.5	15VA	1.0%	
		KBM-08	80x12	139x95	40VA	1.0%											
800	5	KBM-36	46x20	92x82	40VA	1.0%	KBM-36R	46x20	92x82	5VA	5P10	KBF-62/63	46x25	70	15VA	1.0%	
		KBM-05	60x40	107x104	40VA	1.0%						KBF-72/73	69x41	90.5	40VA	1.0%	
		KBM-08	80x12	139x95	40VA	1.0%											
1000	5	KBM-05	60x40	107x104	40VA	1.0%	KBM-05R	60x40	107x104	5VA	5P10	KBF-62/63	46x25	70	15VA	1.0%	
		KBM-08	80x12	139x95	40VA	1.0%	KBM-08R	80x12	139x95	15VA	5P10	KBF-72/73	69x41	90.5	40VA	1.0%	
		KBM-10	105x30	165x120	40VA	1.0%	KBM-10R	105x30	165x120	15VA	5P10						
1200	5	KBM-05	60x40	107x104	40VA	1.0%	KBM-05R	60x40	107x104	5VA	5P10	KBF-62/63	46x25	70	15VA	1.0%	
		KBM-08	80x12	139x95	40VA	1.0%	KBM-08R	80x12	139x95	15VA	5P10	KBF-72/73	69x41	90.5	40VA	1.0%	
		KBM-10	105x30	165x120	40VA	1.0%	KBM-10R	105x30	165x120	15VA	5P10						
1500 (1600)	5	KBM-05	60x40	107x104	40VA	1.0%	KBM-05R	60x40	107x104	5VA	5P10	KBF-72/73	69x41	90.5	40VA	1.0%	
		KBM-08	80x12	139x95	40VA	1.0%	KBM-08R	80x12	139x95	15VA	5P10						
		KBM-10	105x30	165x120	40VA	1.0%	KBM-10R	105x30	165x120	15VA	5P10						
2000	5	KBM-10	105x30	165x120	40VA	1.0%	KBM-10R	105x30	165x120	15VA	5P10	KBF-72/73	69x41	90.5	40VA	1.0%	
		KBM-12	105x50	157x121	40VA	1.0%	KBM-12R	105x50	157x121	2.5VA	5P10						
		KBM-14	130x34	186x116	40VA	1.0%	KBM-14R	130x34	186x116	15VA	5P10						
2500	5	KBM-12	105x50	157x121	40VA	1.0%	KBM-12R	105x50	157x121	2.5VA	5P10						
		KBM-14	130x34	186x116	40VA	1.0%	KBM-14R	130x34	186x116	15VA	5P10						
		KBM-18	180x43	238x131	40VA	1.0%	KBM-18R	180x43	238x131	15VA	5P10						
3000	5	KBM-12	105x50	157x121	40VA	1.0%	KBM-12R	105x50	157x121	2.5VA	5P10						
		KBM-14	130x34	186x116	40VA	1.0%	KBM-14R	130x34	186x116	15VA	5P20						
		KBM-18	180x43	238x131	40VA	1.0%	KBM-18R	180x43	238x131	40VA	5P10						
4000 over	5	KBM-14	130x34	186x116	40VA	1.0%	KBM-14R	130x34	186x116	15VA	5P20						
		KBM-18	180x43	238x131	40VA	1.0%	KBM-18R	180x43	238x131	40VA	5P10						
		KBM-21	210x85	280x179	40VA	1.0%	KBM-21R	210x85	280x179	40VA	5P10						

Recommended CT per ACB type

LSIS

Rated current	Frame ACB Terminal	Bus bar size	CT No.
200A	1600AF AN-D AS-D 15tX50X1EA	5tX50X1EA	KBM-05
400A		5tX50X2EA	
630A		10tX60X1EA	
800A		6tX50X2EA	
1000A		10tX60X1EA	
1250A		8tX50X2EA	①KBM-12
		6tX75X2EA	KBM-05
		8tX50X2EA	
		10tX50X2EA	
		6tX75X3EA	①KBM-12
1600A	2000AF AS-D 15tX50X1EA	10tX60X2EA	KBM-05
		8tX60X3EA	
		8tX75X3EA	KBM-12
2000A		10tX100X2EA	②KBM-12
630A	3200AF AN-E AS-E 20tX75X1EA	5tX50X2EA	KBM-05
800A		10tX60X1EA	
1000A		6tX50X2EA	
1250A		10tX60X1EA	
		8tX50X2EA	
		6tX75X2EA	KBM-12
		8tX60X2EA	
		10tX50X2EA	
1600A		6tX75X3EA	KBM-05
		10tX60X2EA	
2000A	4000AF AS-E 10tX100X3EA	8tX60X3EA	KBM-12
		8tX75X3EA	
2500A		10tX100X2EA	KBM-12
		10tX75X3EA	
3200A		8tX75X4EA	①KBM-21
		10tX100X3EA	②KBM-12
		10tX75X4EA	①KBM-21
4000A		10tX100X4EA	KBM-18
		10tX75X5EA	
4000A	5000AF AS-D 20tX125X2EA	10tX100X4EA	
5000A		10tX125X4EA	
4000A	6300AF AS-G 20tX125X2EA	10tX100X4EA	
5000A		10tX125X4EA	
6300A	20tX150X2EA	10tX150X4EA	

① Busbar bent is recommended for 3P4W

② Busbar bent is recommended

HHI

Rated current	Frame ACB Terminal	Bus bar size	CT No.
200A	A Frame UAS/UAN 06-16 15tX50X1EA	5tX50X1EA	KBM-05
400A		5tX50X2EA	
630A		10tX60X1EA	
800A		6tX50X2EA	
1000A		10tX60X1EA	
1250A		8tX50X2EA	①KBM-12
		6tX75X2EA	KBM-05
		8tX60X2EA	
		10tX50X2EA	
		6tX75X3EA	①KBM-12
1600A	A Frame UAN20 15tX75X1EA	10tX60X2EA	KBM-05
		8tX60X3EA	
		8tX75X3EA	KBM-12
2000A		10tX100X2EA	②KBM-12
630A	B Frame UAS/UAN 06-25 20tX75X1EA	5tX50X2EA	KBM-05
800A		10tX60X1EA	
1000A		6tX50X2EA	
1250A		10tX60X1EA	
		8tX50X2EA	
		6tX75X2EA	KBM-12
		8tX60X2EA	
		10tX50X2EA	
1600A		6tX75X3EA	KBM-05
		10tX60X2EA	
2000A	B Frame UAN32 20tX90X1EA	8tX60X3EA	KBM-12
		8tX75X3EA	
2500A		10tX100X2EA	②KBM-12
		10tX75X3EA	KBM-12
3200A		8tX75X4EA	①KBM-21
		10tX100X3EA	②KBM-12
		10tX75X4EA	①KBM-21
4000A	B Frame UAN40 15tX100X1EA	10tX100X4EA	KBM-18
		10tX125X3EA	
4000A		10tX100X4EA	
4000A	B Frame UAN40 15tX125X1EA	10tX100X3EA	
5000A		10tX125X3EA	
3200A	C Frame UAN32-50 20tX90X1EA	10tX100X4EA	
4000A		10tX125X4EA	
5000A	C Frame UAN32-50 20tX90X1EA	10tX100X4EA	
6300A		10tX125X4EA	

3Phase CT For ACB

Certificates 



Model No.

Model No.	① For ACB	② Circuit	③ Terminal	④ Use
KBF-7 				
① ② ③ ④		2 3P2W(2CT)	0 Current transformer	N/A For meter
		3 3P4W(3CT)	1 Voltage detector + current transformer	R OCR Type
			2 Temperature sensor + current transformer	
			3 Temperature sensor + voltage detector + current transformer	

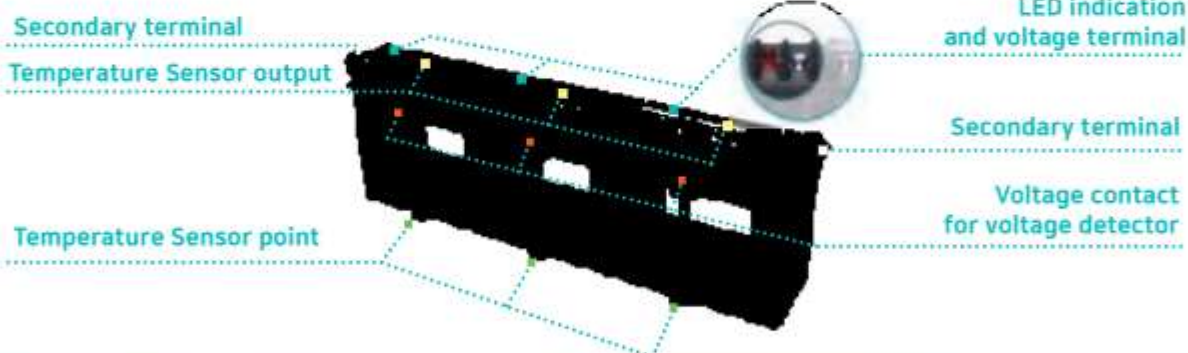
Feature

- Suitable design for various ACB type (200-1600A)
- Temperature sensor for bus bar temperature(option)/Voltage detector for checking energization (option)

Specification

Classification	Secondary current	Overcurrent strength	Maximum voltage	Withstand voltage	Rated frequency
Contents	5A or 1A	40In	1.15kV	4 kV / 1 min	50/60Hz
Remarks	Secondary output 1A can be ordered for 1000A over only				
Use	For Measure (1.0 CL, MCT)			For OCR(PCT)	
Burden	5VA	15VA	40VA	2.5VA	5VA
Primary current	200~400A	500~750A	800~2000A	250~600A	750~1000A

Description

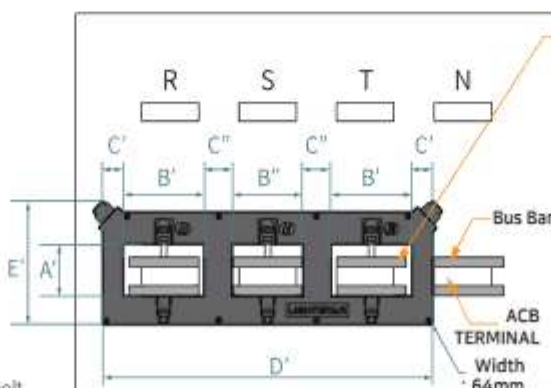


Dimension

Dimensions (Unit: mm)

KBF-7□	
A'	41
B'	69
B''	61
C'	19
C''	25.5
D'	288
E'	105

-  Torque limit
for current transformer fixing bolt
: M4 - 5~7 kgf · cm,
M5 - 7~10kgf · cm



- LS, Hyundai, KI Sung, Gyeong-dong
If using 60mm bus for ACB terminals,
place R on the left side of the section,
T and N on the right side of the terminal
and assemble it.
- D-Sung Electric Machinery if using
a 60mm bus bar on the ACB terminal,
place it in the center of the terminal
and assemble it.
- Vitzro- If using 1 60mm busbar on
ACB terminal, place R
on the right side of the terminal
and T phase is placed on the left side of
the terminal and assembled.

3Phase Window Type Current Transformer

OPTIMIZED DESIGN FOR CIRCUIT BREAKER

Certificates  



Model No.

KBF - 

① Size

See the table below

② Use

N/A For meter(MCT)

E For EOCR(PCT)

Selection table

Circuit	Type	Size	For meter(MCT)				For EOCR(PCT)			
			Current(A)			Class (%)	Current(A)			Class(1.0) Overcurrent constant
			2.5VA	5VA	15VA		1.5VA	2.0VA	2.5VA	
3P 3W (2CT)	100AF	02	50~75	100	-	3.0	150~200	-	-	5P5
			-	120~200	-	1.0	-	-	-	-
		12	50~75	100	-	3.0	150~200	-	-	5P5
			-	120~200	-	1.0	-	-	-	-
	250AF	12S	50~75	80	-	3.0	100~150	-	-	5P5
			-	100~200	-	1.0	200	-	-	5P10
		22	75~120	150	-	3.0	150~350	-	-	5P5
			-	200~300	-	1.0	-	-	-	-
	400AF	42	-	200~400	500	1.0	200~400	-	-	5P5
			-	-	-	-	-	-	-	5P10
3P 4W (3CT)	100AF	03	50~100	120	-	3.0	150~200	-	-	5P5
			-	150~200	-	1.0	-	-	-	-
		13	50~100	120	-	3.0	150~200	-	-	5P5
			-	150~200	-	1.0	-	-	-	-
	250AF	13S	50~75	80	-	3.0	100~150	-	-	5P5
			-	100~200	-	1.0	200	-	-	5P10
		23	75~120	150	-	3.0	150~250	-	-	5P5
			-	200~300	-	1.0	-	-	-	-
	400AF	43	-	200~400	500	1.0	200~400	-	-	5P5
			-	-	-	-	-	-	-	5P10
	600AF 800AF 1000AF 1200AF	63	-	300	400~1200	1.0	300	350~500	600~1000	5P10

 **How to order** Example) KBF-12 100/5 A, 5 VA, 3.0 class, KBF-43 600/5 A, 15 VA, 1.0 class

 Customized product can be produced by order.

 These products are designed for standard circuit breakers

Specification

Secondary current	Overcurrent strength	Maximum voltage	Withstand voltage	Frequency
5A OR 1A	40times	1,15kV	4,0 kV / 1 min	50/60Hz

3P3W, 3P4W Recommended CT per CB frame size(For Meter)

Circuit breaker	50AF		100AF				250AF		400AF		600/800 1000/1200AF	
Circuit	3P3W (2CT)	3P4W (3CT)	3P3W (2CT)	3P4W (3CT)	3P3W (2CT)	3P4W (3CT)	3P3W (2CT)	3P4W (3CT)	3P3W (2CT)	3P4W (3CT)	3P3W (2CT)	3P4W (3CT)
Type	KBF -02	KBF -03	KBF -12	KBF -13	KBF -12S	KBF -13S	KBF -22	KBF -23	KBF -42	KBF -43	KBF -62	KBF -63
2.5VA 3.0	50 - 75A	50 - 100A	50 - 75A	50 - 100A	50 - 75A	50 - 75A	75 - 120A	75 - 120A	-	-	-	-
5VA 3.0	100A	120A	100A	120A	80A	80A	150A	150A	-	-	-	-
5VA 1.0	120 - 200A	150 - 200A	120 - 200A	150 - 200A	100 - 200A	100 - 200A	200 - 300A	200 - 300A	200 - 400A	200 - 400A	300A	300A
15VA 1.0	-	-	-	-	-	-	-	-	500A	500A	400 - 1200A	400 - 1200A

- Torque limit for bus bar fixing bolt : M4 - 5~7 kgf - cm, M5 - 7~10kgf - cm (Excess torque may cause bending and distortion)
- Please be aware that bus bar fixing bolt for current transformer can be energized .
- Bolt insulation covers are recommended for safety.

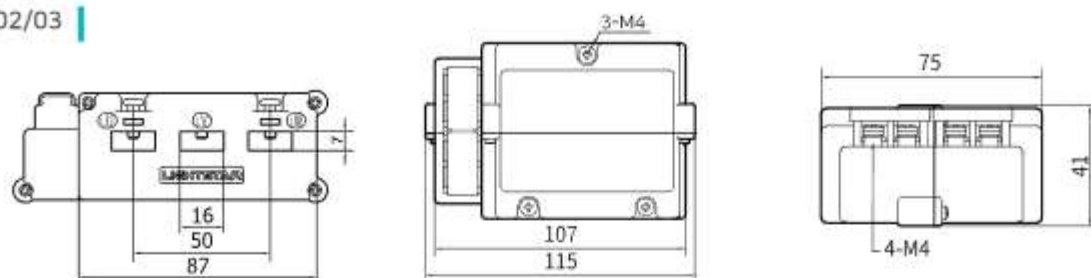
3P3W, 3P4W Recommended CT per CB frame size(For EOCR)

Circuit breaker	50AF		100AF				250AF		400AF		600/800 1000/1200AF	
Circuit	3P3W (2CT)	3P4W (3CT)	3P3W (2CT)	3P4W (3CT)	3P3W (2CT)	3P4W (3CT)	3P3W (2CT)	3P4W (3CT)	3P3W (2CT)	3P4W (3CT)	3P3W (2CT)	3P4W (3CT)
Type	KBF -02E	KBF -03E	KBF -12E	KBF -13E	KBF -12SE	KBF -13SE	KBF -22E	KBF -23E	KBF -42E	KBF -43E	KBF -62E	KBF -63E
1.5VA 1.0 [5P5]	150 - 200A	150 - 200A	150 - 200A	150 - 200A	100 - 200A	100 - 200A	150 - 350A	150 - 250A	200 - 400A	200 - 400A		-
1.5VA 1.0 [5P10]	-	-	-	-	-	-	-	-	-	-	300A	300A
2.0VA 1.0 [5P10]	-	-	-	-	-	-	-	-	-	-	350 - 500A	350 - 500A
2.5VA 1.0 [5P10]	-	-	-	-	-	-	-	-	-	-	600 - 1000A	600 - 1000A

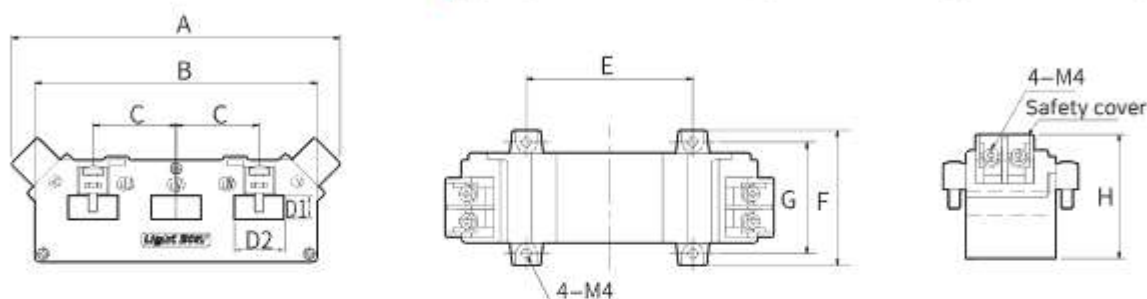
Drawing

Unit:mm

KBF-02/03



KBF-12/13,12S/13S,22/23/42/43,62/63 Torque limit for bus bar fixing bolt : M4 - 5-7 kgf - cm, M5 - 7-10kgf - cm

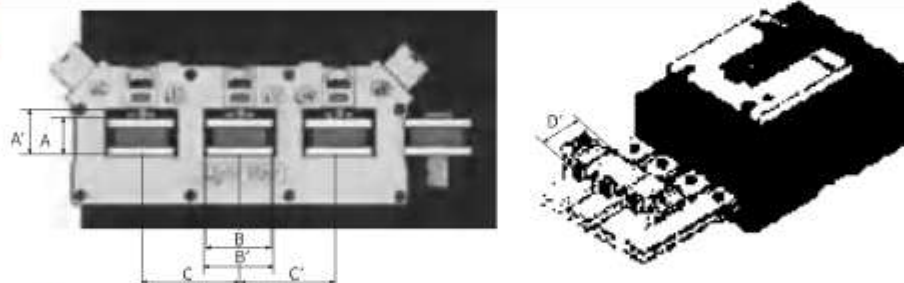


Dimension		A	B	C	D1XD2	E	F	G	H
TYPE	KBF-12/13	122	102	30	7 X 16	60	59	49	52
	KBF-12S/13S	122	102	30	7 X 16	60	69	59	52
	KBF-22/23	139	119	35	10 x 21	70	57	47	52
	KBF-42/43	168	149	44	20 x 30	88	57	47	70
	KBF-62/63	237	218	70	25 X 46	140	57	47	85

Recommended CT per CB frame size

Unit:mm

Example



Circuit breaker

CB frame size	50AF	100AF	250AF	400AF	600AF	800AF	1000AF	1200AF
A	4	4	7	16	14	20	25	25
B	17	15	*25	30	44	44	44	44
C	50	30	35	44	70	70	70	70

Recommend

Type	KBF-02 KBF-03	KBF-12/12S KBF-13/13S	KBF-22/23	KBF-42/43	KBF-62/63
A'	7	7	10	20	25
B'	16	16	*21	30	46
C'	50	30	35	44	70
D'	75	59/69 (12S,13S)	57	57	57

250 AF breaker terminal is 25mm(B), and B' is 21. Only if bus bar size is 20mm, KBF-23/23 can be fit.

Split-Type Current Transformer

Certificates 



Model No.

KBC-

① Size

See the table below

② Mounting bracket

N/A None

S Mounting bracket included(Optional)

Selection table

Size	For meter(50/60Hz)				For OCR(50/60Hz)			Size	For meter(50/60Hz)			For OCR(50/60Hz)		
	Current(AT)			Class (%)	Current(AT)		Class (IEC)		Current(AT)		Class (%)	Current(AT)		Class (IEC)
	2,5VA	5VA	15VA		2,5VA	5VA			5VA	15VA		2,5VA	5VA	
03	100 150	100 150	-	3.0	100 150	-	5P5	05	150	-	3.0	100 150	-	5P5
	-	200 300	350 600	1.0	200 300	350 600	5P10		200 350	400 600	1.0	200 300	350 600	5P10
06	-	400 600	750 1500	1.0	400 600	750 1500	5P10	12	400 600	750 1500	1.0	400 600	750 1500	5P10

 **How to order** Example) KBC-03 200/5 A, 5 VA, 1.0%, KBC-06 S 600/5 A, 5 VA, 1.0 %

Specification

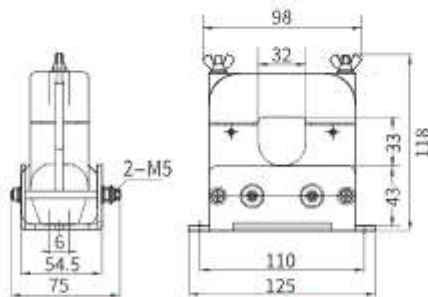
Maximum voltage	Overcurrent strenght	Withstand voltage	Frequency	Body material	Weight
1,15kV	40Times	4,0 kV / 1 min	50/60Hz	Flame retardant case and polyester flame retardant resin filling	KBC-03(1100g) KBC-06(1800g)

 Customized product can be produced by order.

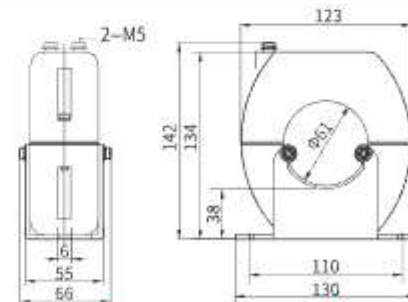
 Current transformer bolt torque : Refer to page 43

Drawing

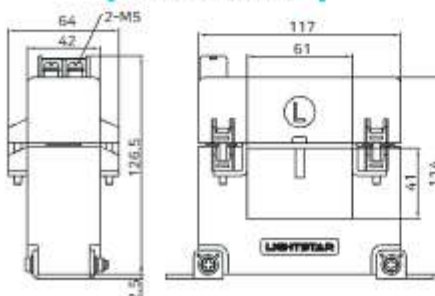
Unit:mm



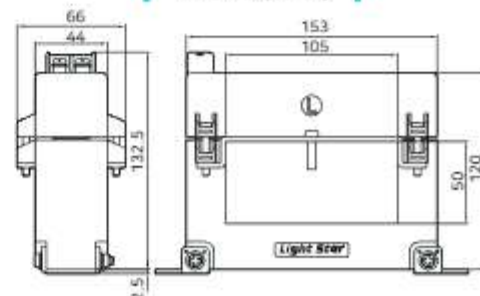
KBC-03S(Cable)



KBC-06S(Cable)



KBC-05(Busbar)



KBC-12(Busbar)

Current transformer for Energy meter

Certificates  KEPCO (standard item) Bid Approved Item
(KERI test completed)



Model No.

KBK- 08

①

① Use

N/A Electricity utility meter

R For OCR

Size	For meter(50/60Hz)		For OCR(50/60Hz)	
	Primary current(AT)	Class (%)	Primary current(AT)	Class (%)
	15VA		5VA	
08	75~1000	0.5W	150~1000	5P10

Feature

- Easy cable installation with single bolt
- Decrease electrical loss by using sectional spacious rod.
- Minimize cable install space.

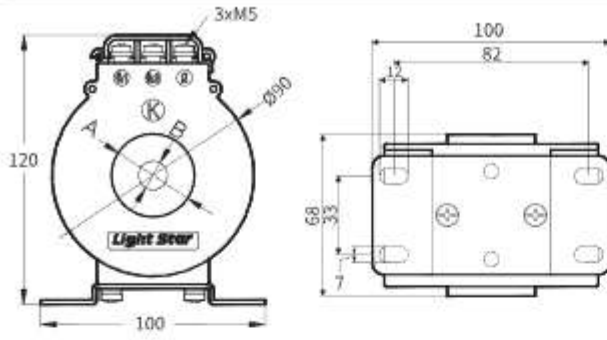
Specification

Double ratio			Single ratio			
Primary current	Contact section	Conductive section	Primary current		Contact section	Conductive section
150~75A 300~150A 400~200A 500~250A	180mm	280mm	150A 250A 400A	200A 300A 500A	180mm	280mm
1000~600A	940mm	1120mm	750A 1000A	600A 800A	940mm	1120mm

Secondary current	Maximum voltage	Rating burden	Polarity	Body material	Rated frequency	Class	Rated overcurrent strength	Weight
5A	230V (1150V)	15VA (PF 0.8)	Subtractive polarity	Flame retardant ABS Resin	50/60Hz	0.5W	40In	2.5kg

Drawing

Unit:mm

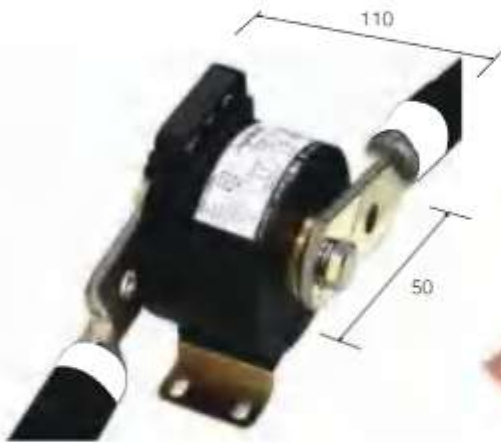


Primary current	A	B
75~150	$\phi 20$	$\phi 9$
300~600	$\phi 20$	$\phi 13$
750~1000	$\phi 37$	$\phi 13$

Examples

Unit:mm

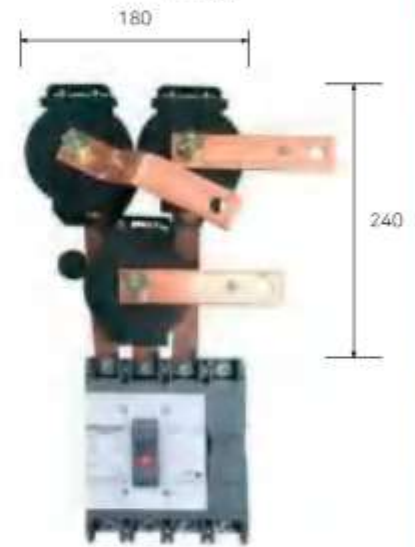
Single installation Type 1
H:120



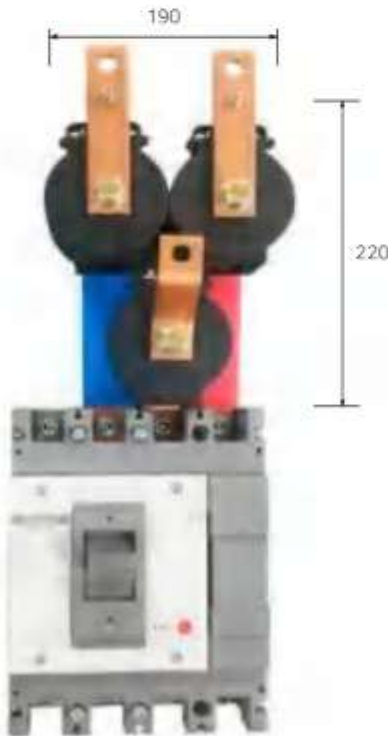
Single installation Type 2
H:120



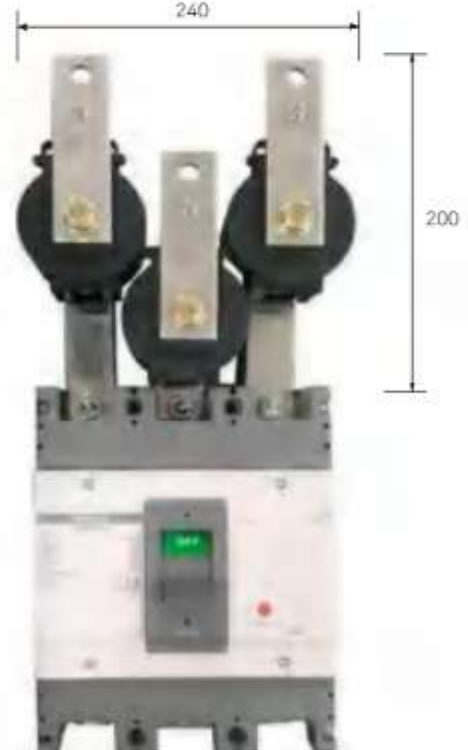
200AF
H:120



400AF
H:120



600AF
H:120



Direct connect type Current Transformer

Certificates 



| 01 |

| 03/06 |

| 33 |

| 23 |

Model No.

KBK-
①

① Size

See the table below

Selection table

Size	For meter(50/60Hz)		Weight(g)	Size	For meter(50/60Hz)		Weight(g)	
	Current(AT)				Class (%)	Current(AT)		
	5VA	15VA				5VA		15VA
01	-	1~30	1.0	1020	23	1~30	-	300
03	-	1~150		700	33	-	1~30	500
06	-	200~750		750				

How to order Example) KBK-01 15/5A 15VA 1.0%, KBK-03 100/5A 15VA 1.0%, KBK-06 500/5A 15VA 1.0%, KBK-23 10/5A 5VA 1.0%, KBK-33 30/5A 15VA 1.0%

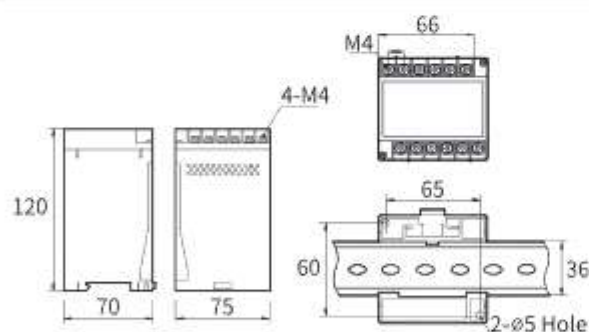
Primary current less than 1A or burden 40 VA is an order made. Customized product can be produced by order

Specification

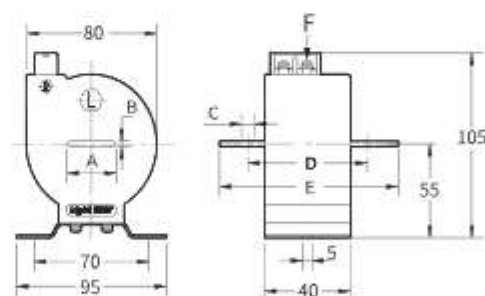
Maximum voltage	Overcurrent strenght	Withstand voltage	Frequency	Body material	Weight
1.15kV	40Times	4.0 kV / 1 min	50/60Hz	Flame retardant case and polyester flame retardant resin filling	KS C 1706, IEC 60044-1

Drawing

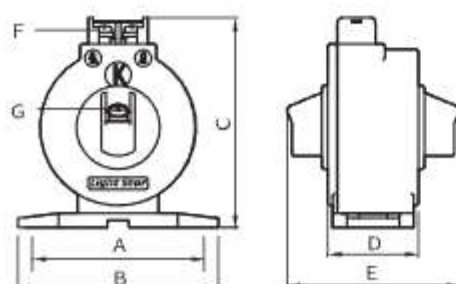
Unit:mm



| KBK-01 |



| KBK-03/06 |



| KBK-23/33 |

Type	A	B	C	D	E	F	G
KBK-03	25	4	8	75	100	2-M5	-
KBK-06	40	8	12	80	120	2-M5	-
KBK-23	72	84	88	38	72.5	2-M4	2-M5
KBK-33	70	95	105	40	77	2-M5	2-M5

Rogowski Coil CT



Model No.

KBA-30

①

① Size (diameter Φ 30)

☞ KBA-30 Rogoski coil

Overview

Because the welding current flows a large current (about 100 A - 50 KA) for a short time (0.001 sec - 0.5sec) and its waveform is complicate, it is impossible to measure with a normal meter and current transformer.

The Rogowski coil can measure large current without electric saturation.

For power and power factor, the phase shift is necessary (90° to 0°) by the integrator (OP-AMP)

Feature

± 3% accuracy at any position inside coil.

Easy to use in small area, Minimize noise affect with shield cable.

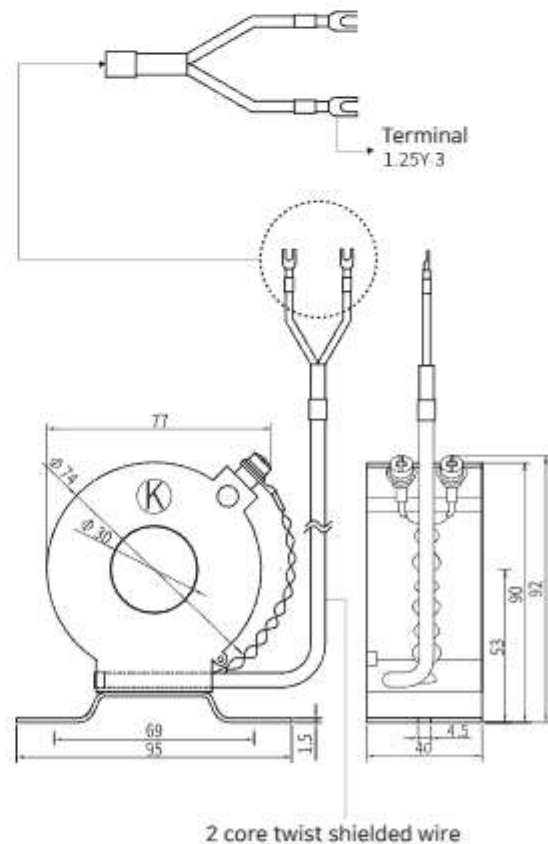
Easy to measure overcurrent peak value or welding peak value (from 4000 A to 10000 A)

Specification

Current range	30A~4000A(Linearity $\pm$ 1%)
Rated output voltage	4000A/2.26V[0.6mV/A] External connection resistance(at 6k Ω)
Withstand voltage	Conductive part and mounting -2.5 kV 1 minute
Secondary wire specification	Secondary shielded wire [2x0.5mm]1.5m
Outer case material	Flame retardant case Internal : unsaturated polyester resin molding
Temperature range	-25℃~+55℃

Drawing

Unit:mm



Wireless clamp CT



Model No.

KBH - 
①

① Range of measurement

01 4/40/200A

02 1/10/100/500A

 Example of order) KBH clamp CT

Overview

- To measure the current of special high voltage live state.
- This is a device that measures the current value of the primary current of MOF (Metering Out Fit) and transmits it to the main body wirelessly.
- The main body measures secondary current of MOF and compare primary and secondary.

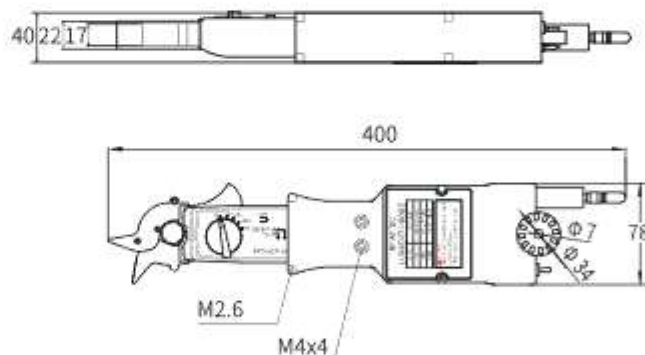
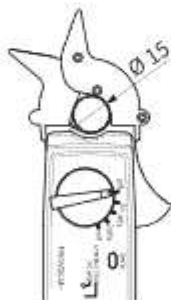
Feature

- To transmit the current value to main body wirelessly.
- Various measuring range as per the size of current. [KBH-01 (3 steps): 4 A / 40 A / 200 A, KBH-02 (4 steps): 1 A / 10 A / 100 A / 500 A]
- Clamp is designed to fit high voltage cable.
- Insulated extension rod can be supplied as option.

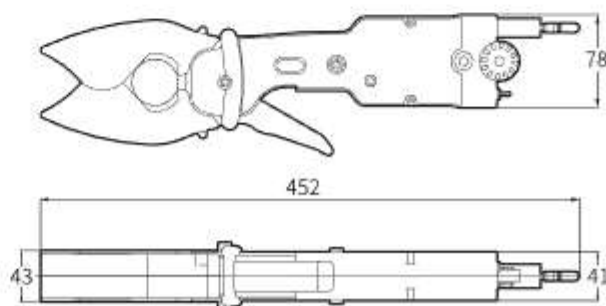
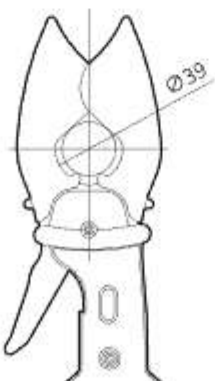
Outline drawing

Unit:mm

KBH-01



KBH-02



Condensor Discharging Coil



Model No.

KBN

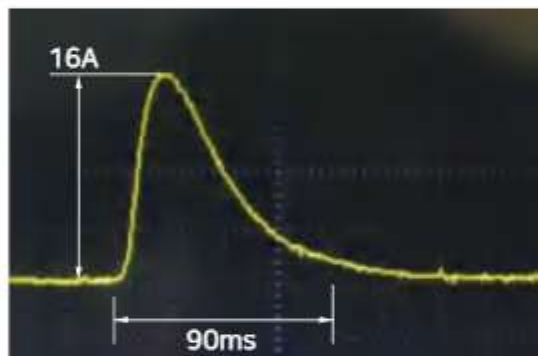
Overview

Connected parallel with condenser(Capacitor), which used for Power factor controller.
To protect electrical devices from frequent turn ON/OFF by reducing electric charge collision.

Specification

Insulation resistance	over 10MΩ	Rated Voltage	380V
Discharging capacity	100kVA	Circuit	3 phase
Operating voltage	1.1Vn(Average)	Withstand voltage	2 kV / 1 min , 2Vn/120Hz 60sec
Temperature rise	50deg		

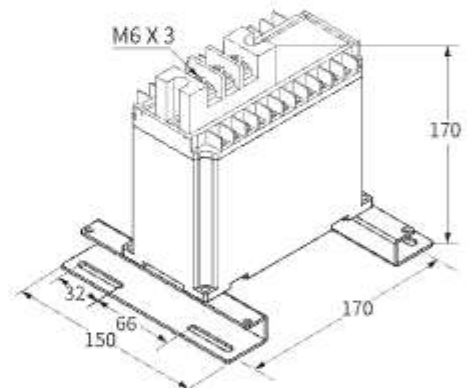
Discharge characteristic graph(AC 380V, 100kVar)



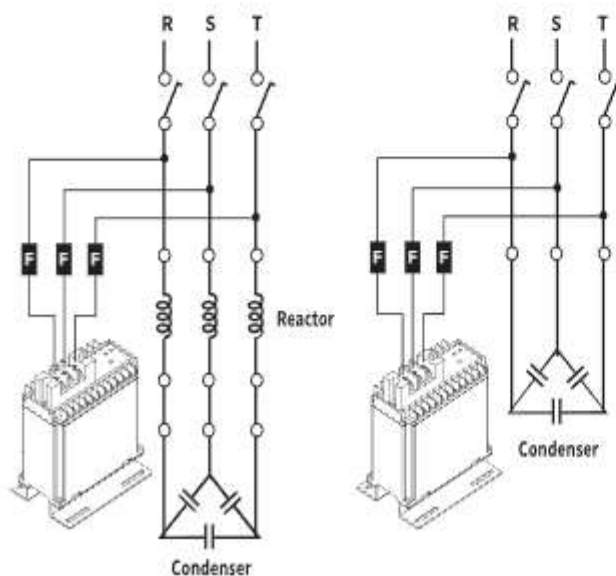
Drawing

Unit:mm

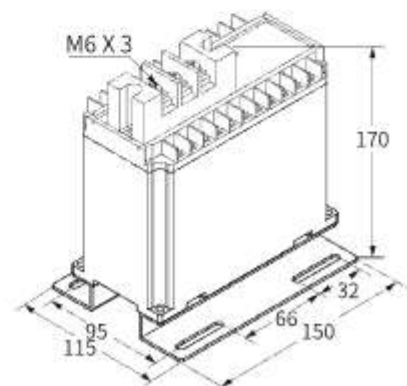
Case 1



Connection diagram



Case 2



Single Phase Potential Transformer

Certificates 

| KBQ |



| KBR |



| KBS |

Model No.

KB-
① ② ③

① Type	② Voltage	③ Rated burden
Q	1 220V/110V	1 15VA(KBS)
R	2 380V/110V	2 50VA(KBQ, KBR)
S	3 440V/110V	3 100VA(KBR)
	4 460V/115V	4 Order-made

Order-made

 How to order Example)KBQ-1 220/110V

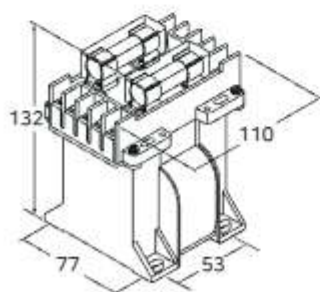
Specification

Type	Burden	Class	Weight	Body material
KBQ	50VA	1.0	2.0kg	Flame retardant case
KBR	50VA	1.0	3.5kg	Flame retardant case and polyester flame retardant resin filling
	100VA		5.0kg	
KBS	15VA	3.0	1.2kg	

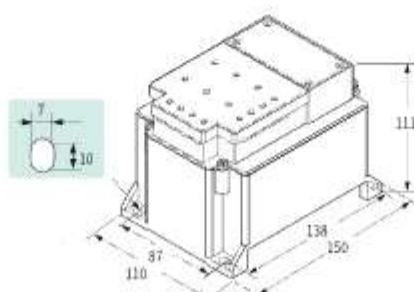
Specification	
Frequency	60Hz(Standard), 50Hz(order)
Overvoltage factor	1.1 Vn Continuous/1.9Vn 30s
Induced withstand voltage	120HZ, 2 times of rated voltage 1 min
Rated fuse	500V, 2A

Drawing

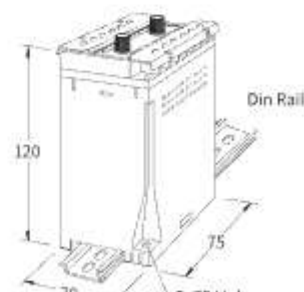
Unit:mm



| KBQ |



| KBR |



| KBS |

Single Phase Potential Transformer (ship)

Certificates  



Model No.

KBT-
① ②

 **Example of order)**
KBT-11 220/110V 15VA

 Customized product can be produced by order.

① Voltage

	Primary voltage	Secondary voltage
1	220V	110V
2	380V	110V
3	440V	110V
4	460V	115V
0	Order-made	

② Rated burden

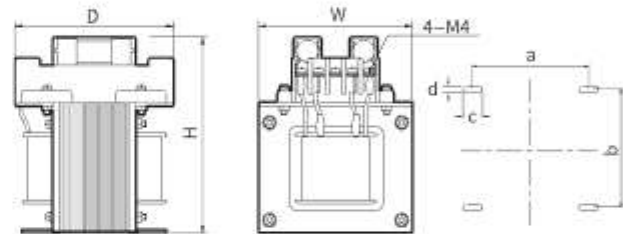
1	15VA
2	50VA
3	100VA
0	Order-made

Specification

Class	1.0
Rated burden	Follow the configuration.
Rated voltage	Follow voltage classification
Rated frequency	60 Hz (Standard), 50 Hz (order)
Overvoltage factor	1.1 Vn Continuous
Instantaneous rating	1.9Vn 30s
Withstand voltage	3 kV / 1 min
Induced withstand voltage	120HZ, 2 times of rated voltage 1 min
Rated fuse	500V, 2A
Body material	Flame retardant case

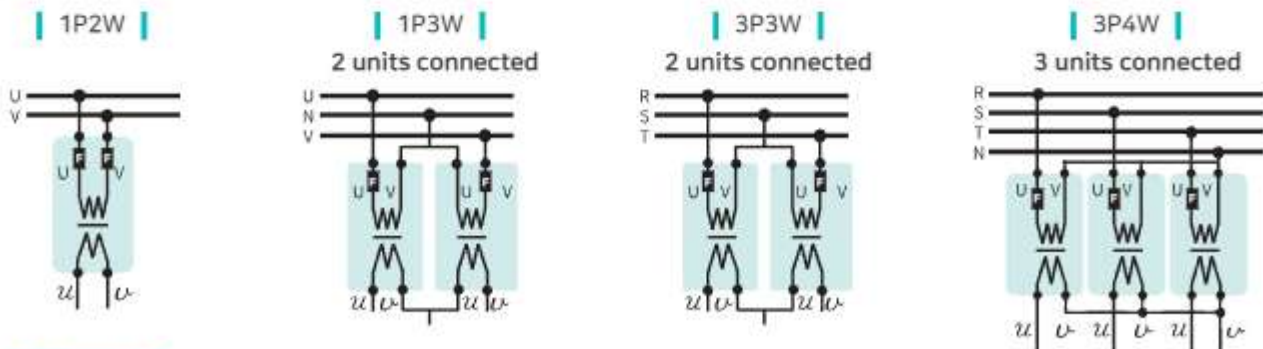
Drawing

Unit:mm



		Burden			
Size		15VA	50VA	100VA	200VA
	H	122	138	145	164
	W	90	111	120	137
	D	109	109	109	109
	a	68±1	68±1	93±1	88
	b	74±1	93±1	102±1	120
	c	15	10	18	18
	d	5	5	5	5
	Weight	2.5kg	3.5kg	5kg	7.8kg

Connection diagram



information

In order to prevent transformer damage, we highly recommend not to connect groundings with PT.

3Phase Potential Transformer

Certificates  



Model No.

KBO- 
① ②

How to order

KBO-22
3P3W 380/110V
KBO-31 3P4W 380√3/190√3V

Note

3P4W 380√3/190√3V

Customized product can be produced by order.

① Circuit

1 1P3W

2 3P3W

3 3P4W

② Voltage

Primary voltage Secondary voltage

1 220V 110V

1 220V 110V

2 380V 110V

3 380V 220V

4 440V 110V

5 440V 220V

0 Order-made

1 380/√3V 190/√3V

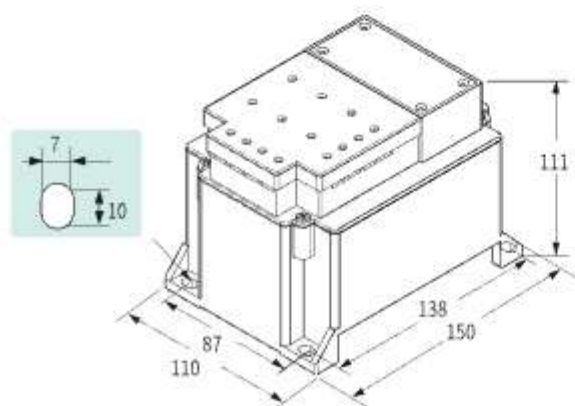
0 Order-made

Specification

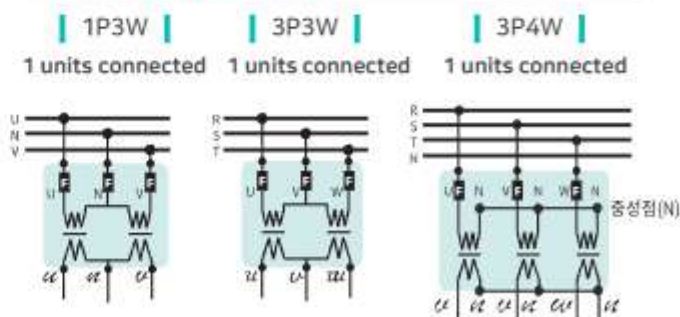
Class	1.0	Withstand voltage	3 kV / 1 min
Rated burden	3P4W, 50VA(17VA X 3) 3P3W, 50VA(25VA X 2)	Induced withstand voltage	120HZ, 2 times of rated voltage 1 min
Rated voltage	Follow voltage classification	Rated fuse	500V, 2A
Rated frequency	60 Hz (basic), 50 Hz (order)	Body material	Flame retardant case and polyester flame retardant resin filling
Overvoltage factor	1.1 Vn Continuous/1.9Vn 30s		

Drawing

Unit:mm



Connection diagram



Information

In order to prevent transformer damage, we highly recommend not to connect groundings with PT.

Voltage Divider for DC



Model No.

KBV-1

① Voltage (input)

1 Less than 300V~1000V **2** 1000V~2000V **3** 2000V~3000V

This device is consisted of normal resistances, and input-output insulation is not applied.

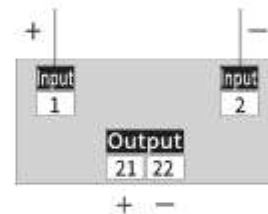
Specification

Class	1.0%	Insulation resistance	More than 10MΩ (Terminal and exterior box)
Operating temperature	-10~55℃	Withstand voltage	AC 2kV/1min (Terminal and exterior box)
Operating humidity	20~80%	Weight	160g(LTy)

Input /Output

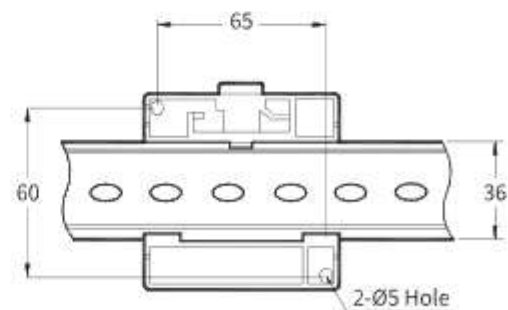
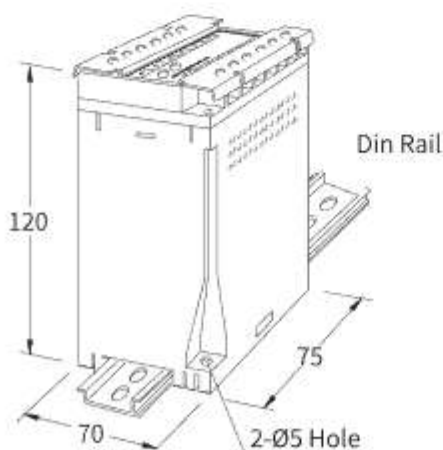
Input	Output	Accuracy
300V~1000V	DC 1mA	0.5% (Less than 5kΩ)
1000V~2000V		1.0% (Less than 10kΩ)
2000V~3000V		

Connection diagram



Drawing

Unit:mm



Ground Potential Transformer

Certificates



Model No.

KBG-
 ① ② ③

① Primary voltage	② Secondary voltage	③ Tertiary voltage
1 380 /√3V	1 110 /√3V	1 190 /3V
2 440 /√3V	2 190 /√3V	2 110/3V
0 Order-made	0 Order-made	0 Order-made

How to order

Example) KBG-111 380/√3V/110/√3V/190/3V

Customized product can be produced by order.

Overview

To detect zero phase voltage for the case of un-grounded electrical system,

This item can be used with 3 sets together. Connection will be Y cabling for primary and secondary, and open-delta for Tertiary. Secondary will be used for measuring and Tertiary used for zero phase voltage detection.

Also tertiary can be used for earth leakage lamp, CLR, SGR and DGR.

Specification

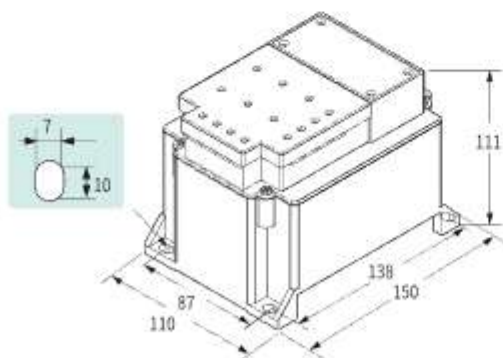
Primary voltage	Secondary voltage	Tertiary voltage	Burden	Class	Freq.	Over Voltage Factor
220/√3V	110/√3V	110/3V	secondary 50VA	KS C 1706 1.0	Standard 60Hz	1.1Vn Continuous/ 1.9Vn 30s
-	or	or	Tertiary	IEC 60044-2 1.0/3P	Option 50Hz	
750/√3V	190/√3V	190/3V	100VA (1min)	JEC 1201 1P/3G		

Body material : Iron case

Weight : 5kg

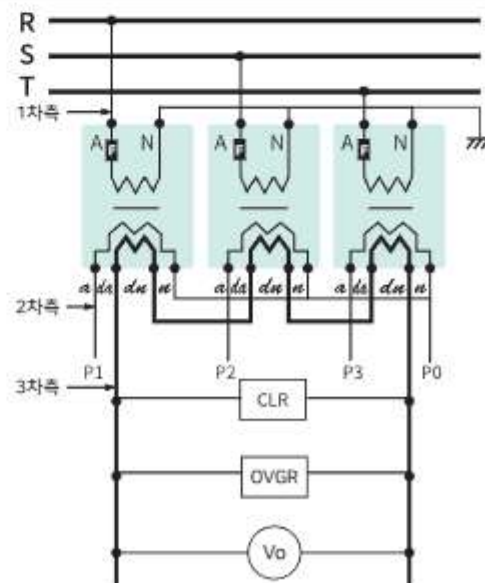
Drawing

Unit:mm



Connection diagram

3 units connected



Current Limit Resister



Model No.

KBL-
① ②

① GPT Primary voltage

1	220/√3	5	480/√3
2	380/√3	6	3300/√3
3	440/√3	7	6600/√3
4	460/√3	0	Order-made

② GPT Tertiary voltage

1	110/3
2	190/3

How to order

Example) KBL-31 440/√3V, 110/3

Customized product can be produced by order.

Overview

Used to operate SGR(Selective Ground Relay) or DGR(Directional Ground Relay) and installed at Tertiary of GPT. This item can absorb 3rd harmonics, and restrain the neutral point error in un-grounded circuit and maintain stability of neutral point.

Specification

Primary voltage [V],E1	Tertiary voltage [V]	n (Pri/Ter)	CLR Value [Ω]	CLR capacity [W]	Allowable current [A]	Primary voltage [V],E1	Tertiary voltage [V]	n (Pri/Ter)	CLR Value [Ω]	CLR capacity [W]	Allowable current [A]
220/√3	190/3	2.0	748	1)48	0.22	220/√3	110/3	3.5	251	1)48	0.44
380/√3		3.5	433	1)83	0.44	380/√3		6.0	145	1)83	0.76
440/√3		4.0	374	1)97	0.51	440/√3		6.9	125	1)97	0.88
460/√3		4.2	358	1)101	0.53	460/√3		7.2	120	1)101	0.92
480/√3		4.4	343	1)105	0.55	480/√3		7.6	115	1)105	0.96
3300/√3	190/3	30.1	50	2)724	3.81	3300/√3	110/3	52.0	17	2)724	6.58
6600/√3		60.2	25	2)1448	7.62	6600/√3		103.9	8	2)1448	13.16

Body material : Iron case

Weight : 1300g

1) Continuous

2) Instantaneous : 1min

CLR resistance formula

$$R = E_1 \times \frac{9}{n^2 \times I_g}$$

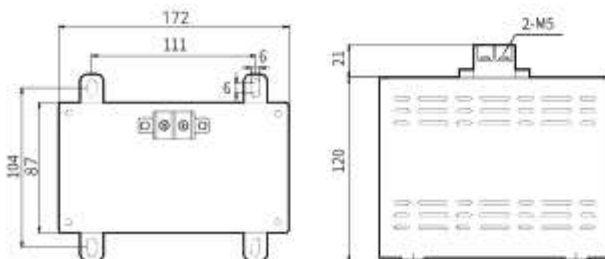
- E₁ : Primary voltage
- n : GPT Primary voltage ÷ Tertiary voltage
- I_g : 0.38

Ex) Primary 6600/√3, Tertiary 190/3 Ex) Primary 440/√3, Tertiary 190/3

$$R = \frac{6600}{\sqrt{3}} \times \frac{9}{(60.2)^2 \times 0.38} \approx 25[\Omega] \quad R = \frac{440}{\sqrt{3}} \times \frac{9}{4^2 \times 0.38} \approx 374[\Omega]$$

Drawing

Unit:mm



Connection diagram

Refer to page 70

Shunt



Model No.

KBY - ①

① Size

- | | |
|-------------|----------------|
| 1 1A~50A | 4 400A~1500A |
| 2 60A~150A | 5 2000A~4000A |
| 3 200A~300A | 6 5000A~10000A |



How to order

Example) KBY-1 30A/50mV 1.0
KBY-3 300A/50mV 1.0



Customized product can be produced by order.

Specification

Type	Primary current	Weight(kg)	Rated voltage drop (Output)	Class	Insulation resistance	Withstand voltage
KBY-1	1A - 50A	100g	50,0mV or 60,0mV	1.0 0.5	10MΩ	2kV/1 min
KBY-2	60A - 150A	0,18kg				
KBY-3	200A - 300A	0,20kg				
KBY-4	400A - 600A	0,48kg			N/A	N/A
	750A - 1000A	0,80kg				
KBY-5	1200A - 1500A	1,20kg				
	2000A	1,66kg				
	2500A	2,20kg				
	3000A	2,80kg				
KBY-6	4000A	3,40kg				
	5000A	7,50kg				
	6000A	9,00kg				
	7000A	10,5kg				
	8000A	12,0kg				
	9000A	13,5kg				
	10000A	15,0kg				

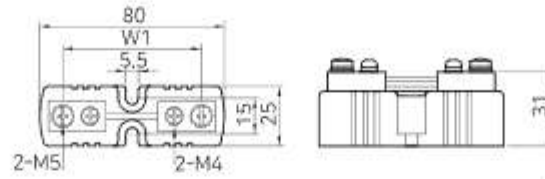
Drawing

Unit:mm

TYPE

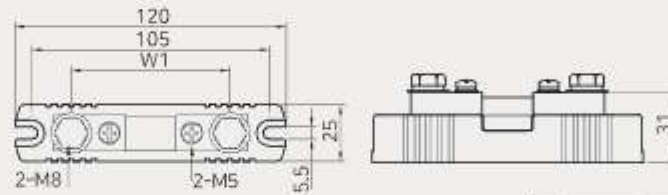
Dimension

KBY-1



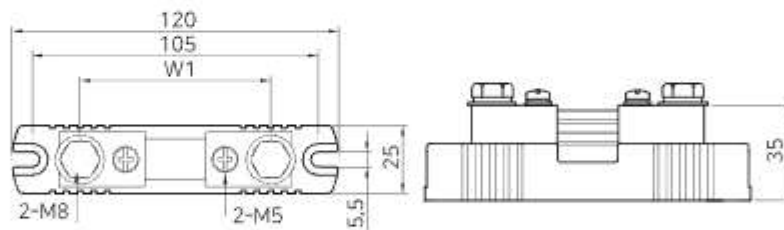
	50mV	60mV
W1	60±1.0	64.5±1.0

KBY-2



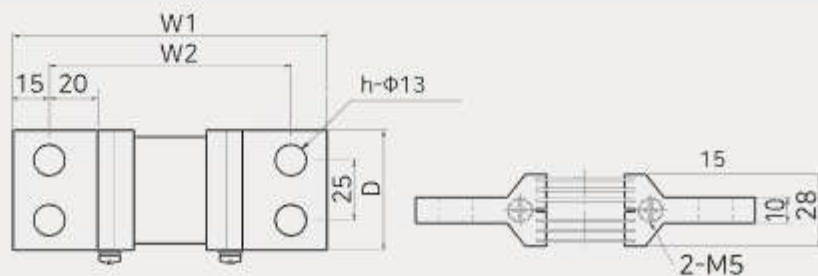
	50mV	60mV
W1	70±1.0	74.5±1.0

KBY-3



	50mV	60mV
W1	70±1.0	74.5±1.0

KBY-4



	50mV	60mV		400A~600A	750A~1000A	1200A~1500A
W1	130±1.5	136±1.5	D	30	50	75
W2	100±1.5	106±1.5	h	2-Φ13	4-Φ13	6-Φ13

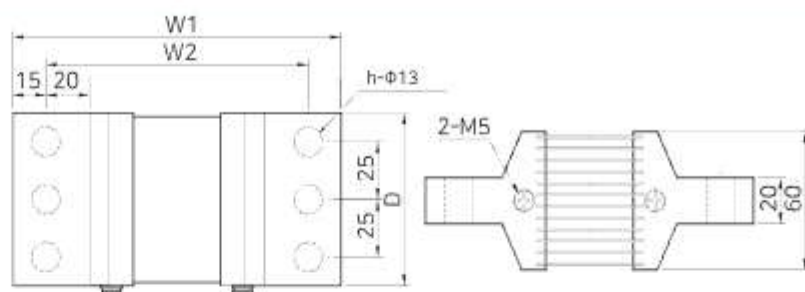
Drawing

Unit:mm

TYPE

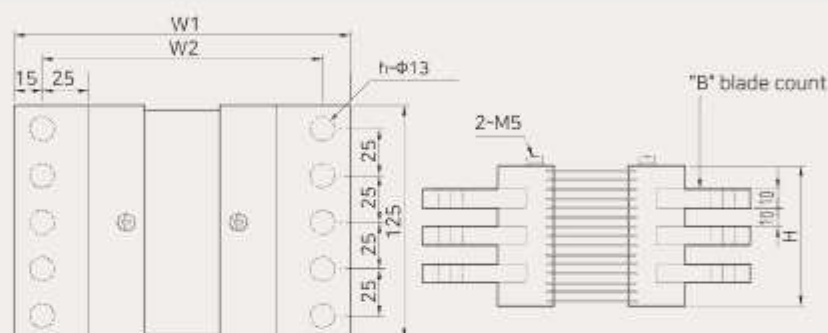
Dimension

KBY-5



	50mV	60mV		2000A	2500A	3000A	4000A
W1	150±1.5	158±1.5	D	75	100	100	125
W2	120±1.5	128±1.5	h	6-φ13	8-φ13	8-φ13	10-φ13

KBY-6



	50mV	60mV		5000A	6000A	7000A	8000A	9000A	10000A
W1	180±2	188±2	H	70	85	100	115	125	140
W2	150±2	158±2	B	3	3	4	5	5	6
			h	30-φ13	30-φ13	40-φ13	50-φ13	50-φ13	60-φ13

Voltage drop table for 100 meter length(Unit: V)

Current(A) Sectional area(mm)	100	200	300	400	500	600	700	800	900
100	1.83	3.66	5.49	7.32	9.15	11.0	12.8	14.6	16.5
200	0.92	1.83	2.75	3.66	4.58	5.49	6.41	7.32	8.24
300	0.61	1.22	1.83	2.44	3.05	3.66	4.27	4.88	5.49
400	0.46	0.92	1.37	1.83	2.29	2.75	3.20	3.66	4.12
500	0.37	0.73	1.10	1.46	1.83	2.20	2.56	2.93	3.29
600	0.31	0.61	0.92	1.22	1.53	1.83	2.14	2.44	2.75
700	0.26	0.52	0.78	1.05	1.31	1.57	1.83	2.09	2.35
800	0.22	0.46	0.69	0.92	1.14	1.37	1.60	1.83	2.06
900	0.20	0.41	0.61	0.81	1.02	1.22	1.42	1.63	1.83

Usage guide

Shunt to be connected in parallel with the DC measuring instrument, and marked with rated current, rated voltage drop, grade, serial number and manufacturer name.

The rated current means the measured maximum current. The rated drop is the voltage drop across the output terminal when the maximum current is passed. And the rated current varies depending on the measuring instrument with 50mV or 60mV or mainly.

The class of Shunt is classified at 0.5 or 1.0% at an allowable limit value through 80% of the rated current for 15 minutes.

Design standard

Temperature rise

Shunt generates heat proportional to the square value of the current.

For example, if the product is 1000 A / 50 mV, it generates 50 W when 1000 A is energized and 12.5W when the current used is 500A.

In order to protect other equipments from heat, it is recommended to apart from devices and use a ventilator.

Rated current and actual usage

Shunt was designed to be used at 2/3 of rated current, or will be over the error limit.

If the temperature of Shunt exceeds 150 °C, the resistance value is over the error limit.

In order to improve Shunt's accuracy and stability, the rated current and voltage drop value are indicated, and the temperature coefficient is $\pm 0.0001\%$ between 40 and 60°C.

Operating time

Please select Shunt higher than the rated current under continuous current, and lower shunt can be selected under incontinuous current.

If you use Shunt to measure the current of a surge or pulse waveform, please contact us.

Installation

Appropriate Shunt by instrument class

Instrument class	Shunt class	Instrument class	Shunt class
0.2	0.1	1.5	0.5~1.0
0.5	0.2	2.5	1.0
1.0	0.5		

If Shunt is used for 600 V or more, it is recommended to use insulator.

The terminal part of the shunt is brass, the voltage drop part is a manganese alloy, and the connecting material is a lead alloy.

When connecting the terminal part to the bus bar, tighten it with the specified bolt and do not apply force such as twisting, compression, expansion and contraction to the connection part.

Shunt to be installed by considering air flow to cool shunt generated heat, and If natural air cooling is impossible, the air circulation device is necessary.

Bus bar section area to be designed by considering voltage drop and heat.

Shunt protection equipment is required for electric short circuit.

Torque to Tighten Shunt Terminal Bolts : M4 - 9.8~13.5 kgf · cm, M5 - 28.4~37.2kgf · cm, M6 - 47.1~63.7kgf · cm, M12 - 402~524kgf · cm

Bus bar rated current

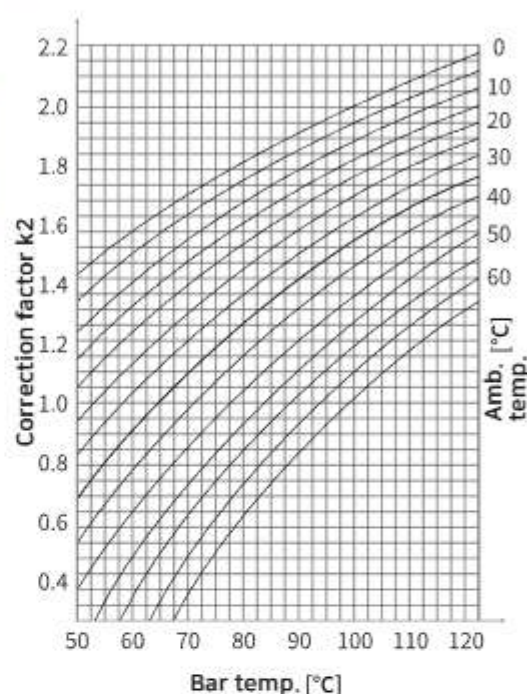
Rated current of bar E-Cu(DIN 43 671)

Continuous current for bus bar

E-Cu material, indoor air temperature 35 °C, bar temperature 65 °C,
Vertical or horizontal position of bar. (Emissivity 0.4)

Width x Thickness (mm)	Sectional area (mm ²)	Weight (1)	Material cotton (2)	Continuous current			
				Less than AC 60Hz		DC + AC 16Hz	
				Normal	Coated	Normal	Coated
12 X 2	23.5	0.209		108	123	108	123
15 X 2	29.5	0.262		128	148	128	148
15 X 3	44.5	0.396		162	187	162	187
20 X 2	39.5	0.351		162	189	162	189
20 X 3	59.5	0.529		204	237	204	237
20 X 5	99.1	0.882		274	319	274	320
20 X 10	199.0	1.770		427	497	428	499
25 X 3	74.5	0.663		245	287	245	287
25 X 5	124.0	1.110		327	384	327	384
30 X 3	89.5	0.796		285	337	286	337
30 X 5	149.0	1.330		379	447	380	448
30 X 10	299.0	2.660	E-Cu F30	573	676	579	683
40 X 3	119.0	1.060		366	435	367	436
40 X 5	199.0	1.770		482	573	484	576
40 X 10	399.0	3.550		715	850	728	865
50 X 5	249.0	2.220		583	697	588	703
50 X 10	499.0	4.440		852	1020	875	1050
60 X 5	299.0	2.660		688	826	696	836
60 X 10	599.0	5.330		985	1180	1020	1230
80 X 5	399.0	3.550		885	1070	902	1090
80 X 10	799.0	7.110		1240	1500	1310	1590

Correction ratio chart (as per DIN43671)



- 1) Density 8.9 kg / dm³
2) Reference for continuous current value
(AS per DIN 43 671)

Continuous current for bus bar

1. To operate safely, keep the bus bar temperature at 85 °C maximum
2. The temperature of the bus bar and bus bar system shall not exceed 40 °C (Average 35 °C recommended).
3. Emissivity shown in the above table. Values correspond to oxidized copper bars
4. Lower emissivity can be expected for IP 54 or higher.
5. If the emissivity is lower, the continuous current may be higher than the value of DIN 43 671 regardless air temperature and bus bar temperature.

Note 1) Emissivity: Effectiveness in emitting energy as thermal radiation.

Example: For 30 X 10 mm (E - Cu F30) the rated current is $I_{N65} = 573$ A.
When the air temperature is 20 °C and the bar temperature is 65 °C, the correction factor is $k_2 = 1.29$

References: RITTAL Catalog

$$I_{N85} = I_{N65} \times k_2$$

$$= 573A \times 1.29 = 740A$$

CE certification

CE stands for "Conformité Européene" and indicates conformity with health, safety, and environmental protection standards for products sold within the European Economic Area (EEA). Our CE certified products are complied to the requirements of EU Directives, relating to LVD (Low Voltage Directives) and EMC (Electro Magnetic Compatibility Directives). LIGHTSTAR achieved CE certificate for Analog meter, Current Transformer, Digital meter, Power meter and Transducers.

DIGITAL METER

KS certification

KS stands for Korean Standard and indicates conformity with Korean government required standards.

LIGHTSTAR achieved KS certificate for Analog meter, Current Transformer and Transducers.



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KDP-A□



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AC Voltage Meter

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DC Current Meter

KDP-C□



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DC Voltage Meter

KDP-D□



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Customized
Indicating Meter

KDE-□□□



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Frequency Meter

KDF-□



88

Temperature Meter

KDN-□□



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Integrator Meter

KDJ-□□



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3Phase AC Current Meter KDA-3P



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3Phase AC Voltage Meter KDB-3P



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Single Phase
AC Watt/Hour Meter

KDL-□□



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Push Button
Digital Meter Relay

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Relay Meter

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3P AC Watt Meter

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AC Watt·Wathour Meter KDW-□



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Digital Leakage
Current Meter

KDS-10



LIGHTSTAR



104

Digital Leakage
Current Meter

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Harmonic Meter Relay KDQ-HMR



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Demand Controller

KCD-MX



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Auto PF Controller

KCP-03S/06S



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KDQ-100



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122-123

Panel Power Meter

KDX-300



124

AC 3P V-A Meter

KDO-100



125

AC 3P V-A Meter

KDO-20□



126

V-Hz Relay Meter

KDU-100



127

V-Hz Relay Meter

KDU-20□



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Energy Management Device KCM-100



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Advanced Panel Power Meter KDQ-□

Product structure and dimensions

Model No.

KD() () () ()
① ② ③ ④

① LIGHTSTAR PRODUCT

② Digital Meter

③ Function

P-A AC Current Meter	G 3Φ AC Watt Meter	O AC 3Φ V-A Meter	W AC Watt ,Watt-hour Meter
P-B AC Voltage Meter	H Power Factor Meter	P-□R Push Button Digital Meter Relay	X Panel Power Meter
P-C DC Current Meter	J Integrator Meter	Q Power Quality Meter	Y Panel Power Meter
P-D DC VoltageMeter	L Single Phase AC Watt Meter	R Switch Digital Relay Meter	S Digital Leakage Current Meter
E Customized Indicating Meter	M DC Watt Meter	U V-Hz Relay Meter	
F Frequency Meter	N Temperature Meter	V Rectifier base digital instrument	

④ Others

Drawing

Unit : mm

Type	Front	Side	Panel cut
A-1			
A-2			
B			
C			
D			
E			

Term

3 1/2 line (1999)

3: Numbers(0~9) can be displayed at 3 digits from the right

1/2 : Numbers(0 or 1) can be displayed at the first digit from the left

4 1/2 line (19999)

Numbers(0~9) can be displayed at 4 digits from the right

Numbers(0 or 1) can be displayed at the first digit from the left

3 3/4 line (3999)

Numbers(0~9) can be displayed at 3 digits from the right

Numbers(0 ~ 3) can be displayed at the first digit from the left

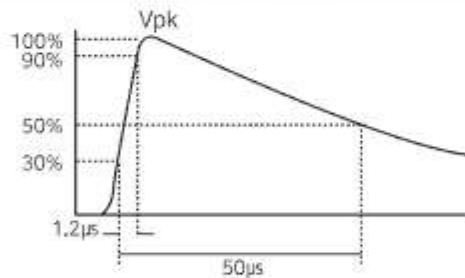
RMS value

$$V_{rms} = \frac{V_{peak}}{\sqrt{2}} \quad \begin{array}{l} * V_{rms} : \text{RMS value} \\ * V_{peak} : \text{Peak value} \end{array}$$

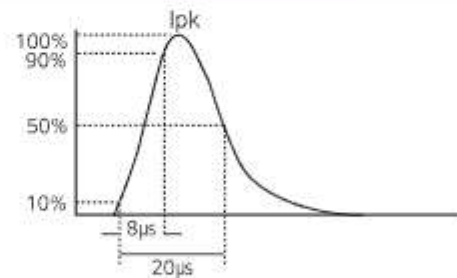
In case DC and AC to be connected same circuit and the power consumption is same
DC value is the RMS value of sinusoidal wave.

Surge impulse test

Test intended for the lightening surge conditions, and to be performed with voltage(1.2μs, 50μs) and current (8μs, 20μs) on source power by tester.

Voltage waveform

- Increase : 30%~90%, of Vpk 1.2μs
- Decrease : By 50% of Vpk 50μs

Current waveform

- Increase : 10%~90%, of Vpk 8μs
- Decrease : By 50% of Vpk 20μs

Insulation Resistance test

Test with DC voltage more than 500V between input and output, input and human contacted area, input and source, caused by switching capacitive burden or Inductive burden

Fast transient/Burst immunity test

Test with bursts and fast transients, caused by switching capacitive burden or Inductive burden.

Measuring interval

Calculating time from the measured value of circuit.

Average value

The value obtained by averaging the AC voltage for one period.

$$V_{av} = \frac{2V_{peak}}{\pi} \quad \begin{array}{l} * V_{av} : \text{Average value} \\ * V_{peak} : \text{Peak value} \end{array}$$

Accuracy

As the limit of the error specified by the manufacturer, It is indicated by rdg or FS error rate.

rdg(reading)

$$\left(\frac{\text{Test meter reading value}}{\text{Standard meter reading value}} - 1 \right) \times 100(\%)$$

Error rate

$$\frac{\left(\frac{\text{Standard meter reading Value}}{\text{Test meter reading Value}} - 1 \right)}{\text{Maximum value of meter}} \times 100(\%)$$

± 2 digit

The lowest digit of measured value have tolerances up to ±2

AC Current Meter

Certificates 



Model No.

KDP - A  AC current meter(AC A)

① **① Communication(Optional)**

C RS-485

NA None

 Customized product can be produced by order.

 CT Ratio can be set manually.

Specification

Aux. power	AC 90 ~ 260V(50/60Hz) / DC110V
Operating temperature	-10~50℃
Operating humidity	20~85%
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)
Burst	Level 4(IEC 61000-4-4)
Withstand voltage	AC 2kV/1 minute
Maximum input	Approximately 110%
Weight	180g

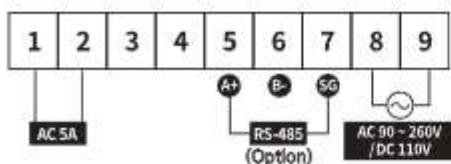
Input

Range	0.05~6.0A(rated CT : 5A)
Accuracy	±(0.3% of rdg + 0.2% of F.S)

Setting

- | **Rd-t** (A/D Type) : **rms** (RMS value), **Avg** (Average value)
- | **CT** (C.T) : CT Ratio
- | **Freq** (frequency) : 50/60Hz
- | **Id** (Communication address)
- | **bAud** (communication speed) : 9600/19200bps

Terminal connection



Display

Text height (LED)	20.5(0.8")mm Red
Measuring interval	1Times / sec
Max display value	9999

Display range

No.	Setting	Display	No.	Setting	Display
1	5	5.000	30	400	400.0
2	10	10.00	31	450	450.0
3	15	15.00	32	500	500.0
4	20	20.00	33	600	600
5	25	25.00	34	700	700
6	30	30.00	35	750	750
7	40	40.00	36	800	800
8	50	50.00	37	900	900
9	60	60.0	38	1000	1000
10	70	70.0	39	1200	1200
11	75	75.0	40	1250	1250
12	80	80.0	41	1300	1300
13	90	90.0	42	1400	1400
14	100	100.0	43	1500	1500
15	120	120.0	44	1600	1600
16	125	125.0	45	1700	1700
17	130	130.0	46	1750	1750
18	140	140.0	47	1800	1800
19	150	150.0	48	2000	2000
20	160	160.0	49	2500	2500
21	170	170.0	50	3000	3000
22	175	175.0	51	3200	3200
23	180	180.0	52	3500	3500
24	200	200.0	53	3600	3600
25	225	225.0	54	4000	4000
26	240	240.0	55	4500	4500
27	250	250.0	56	5000	5000
28	300	300.0	57	6000	6000
29	350	350.0			

Drawing

 Refer to page 80 type A-2

AC Voltage Meter

Certificates 



Model No.

KDP - B	AC Voltage Meter(AC V)
①	① Communication(Optional)
C	RS-485
NA	None
	PT ratio can be set manually.

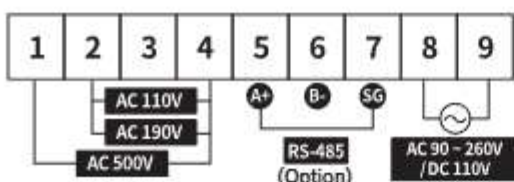
Specification

Aux. power	AC 90 ~ 260V(50/60Hz) / DC110V
Operating temperature	-10~50°C
Operating humidity	20~85%
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)
Burst	Level 4(IEC 61000-4-4)
Withstand voltage	AC 2kV/1 minute
Maximum input	Approximately 110% of each
Weight	180g

Input

Range	30~500V(rated PT:100 or 190V)
Accuracy	±(0.3 of rdg + 0.2% of F.S)

Terminal connection



Setting

- | Rd-t (A/D Type) : rñ5 (RMS value),
RUG (Average value)
- | In : (INPUT), Input value(500/190/110V)
- | Pt(P.T) : PT primary voltage
- | Freq (frequency) : 50/60Hz
- | Id (Communication address)
- | bAud (Communication speed) : 9600/19200bps

Display

Text height (LED)	20.5(0.8")mm Red
Measuring interval	1Times / sec
Max display value	9999

Display range

No.	Setting	Apply / Displayed	Unit
1	220	220.0	V
2	380	380.0	
3	440	440.0	
4	460	460.0	
5	480	480.0	
6	3300	3300	kV
7	6600	6.60	
8	7200	7.20	
9	11000	11.00	
10	11400	11.40	
11	22000	22.00	
12	22900	22.90	
13	66000	66.0	
14	154000	154.0	

 In case of special order, primary and secondary voltages can be set manually other than the table above.

Drawing

Unit :mm

 Refer to page 80 Type A-2

DC Current Meter

Certificates 



Model No.

KDP - C DC Current Meter (DC A)

① Communication(Optional)

C RS-485

NA None

 Customized product can be produced by order.

 Shunt ratio can be set manually.

Specification

Aux. power	AC 90 ~ 260V(50/60Hz) / DC110V
Operating temperature	-10~50℃
Operating humidity	20~85%
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)
Burst	Level 4(IEC 61000-4-4)
Withstand voltage	AC 2kV/1 minute
Maximum input	Approximately 110% of each measurement input
Weight	180g

Input

Range	-60~+60mV (Rated Shunt : 50 or 60mV)
Accuracy	±(0.3% of rdg + 0.2% of F.S)

Setting

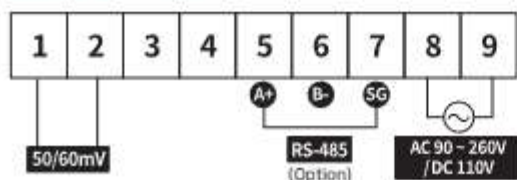
I_n : Input value(50/60mV)

I_{Shunt} (SHUNT) : CT Ratio

I_{Id} (Communication address)

I_{bAud} (Communication speed) : 9600/19200bps

Terminal connection



Display

Text height (LED)	20.5(0.8")mm Red
Measuring interval	2Times / sec
Max display value	9999

Display range

No.	setting	Display	No.	setting	Display
1	5	5.000	30	400	400.0
2	10	10.00	31	450	450.0
3	15	15.00	32	500	500.0
4	20	20.00	33	600	600
5	25	25.00	34	700	700
6	30	30.00	35	750	750
7	40	40.00	36	800	800
8	50	50.00	37	900	900
9	60	60.0	38	1000	1000
10	70	70.0	39	1200	1200
11	75	75.0	40	1250	1250
12	80	80.0	41	1300	1300
13	90	90.0	42	1400	1400
14	100	100.0	43	1500	1500
15	120	120.0	44	1600	1600
16	125	125.0	45	1700	1700
17	130	130.0	46	1750	1750
18	140	140.0	47	1800	1800
19	150	150.0	48	2000	2000
20	160	160.0	49	2500	2500
21	170	170.0	50	3000	3000
22	175	175.0	51	3200	3200
23	180	180.0	52	3500	3500
24	200	200.0	53	3600	3600
25	225	225.0	54	4000	4000
26	240	240.0	55	4500	4500
27	250	250.0	56	5000	5000
28	300	300.0	57	6000	6000
29	350	350.0			

Drawing

 Refer to page 80 type A-2

DC Voltage Meter

Certificates 



Model No.

KDP - D DC Voltage Meter(DC V)

①

① Communication(Optional)

C RS-485

NA None

-  Customized product can be produced by order.
-  The voltage divider primary can be set manually.

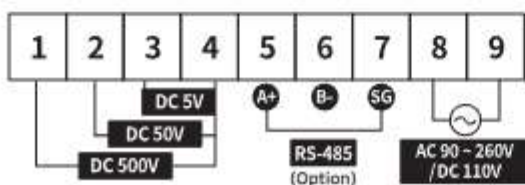
Specification

Aux. power	AC 90 ~ 260V(50/60Hz) / DC110V
Operating temperature	-10~50℃
Operating humidity	20~85%
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)
Burst	Level 4(IEC 61000-4-4)
Withstand voltage	AC 2kV/1 minute
Maximum input	Approximately 110% of each measurement input
Weight	180g

Input

Range	2.0~500V
	0.2~50V
	0.02~5V
Accuracy	±(0.3% of rdg + 0.2% of F.S)

Terminal connection



Setting

- I n** : Input value(5/50/500V)
- I d** (Communication address)
- I bRud** (Communication speed) : 9600/19200bps

Display

Text height (LED)	20.5(0.8")mm Red
Measuring interval	2Times / sec
Max display value	9999

Display range

No.	Setting	Display
1	500	500.0
2	50	50.00
3	5	5.000

Drawing

 Refer to page 80 Type A-2

Customized Indicating Meter

Certificates 



Model No.

KDE - 
① ② ③

① Input	② Input	③ Unit
A AC current	1 0~50mV	0 Order made
B AC voltage	2 ±50mV	1 kW Power
C DC current	3 0~10V	2 °C Temperature
D DC voltage	4 0~150V	3 V Voltage
	5 4~20mA	4 A Current
	6 0~1mA	5 Hz Frequency
	7 0~10mA	6 m Distance
	8 0~20mA	7 kg/cm ² Pressure
	0 Order made	8 % Ratio or percentage (power factor)
		9 m/sec Speed
		10 g Weight
		11 rpm Rotation speed

How to order
KDE-D311 DC voltage/1800rpm/ DC 0~10V

Customized product can be produced by order.

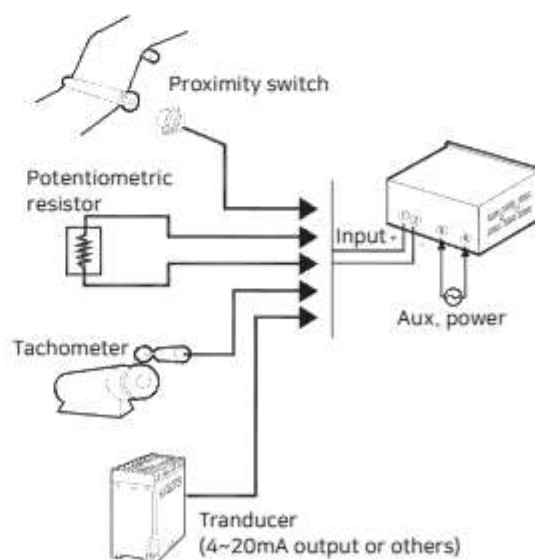
Specification

Aux. power	AC 90 ~ 260V(50/60Hz) / DC 110V DC 24V±10%(Option)
Operating temperature	-10~50°C
Operating humidity	20~85%
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/ 50μs, 5kV) Current(8μs/ 20μs)
Withstand voltage	AC 2kV/1 minute
Maximum input	150% 10seconds
Weight	250g

Display

Text height (LED)	20.5(0.8")mm Red
Measuring interval	2.5Times / sec
Max display value	9999

Connection diagram



Input

Range	DC current	0~1mA, 4~20mA, 0~10mA, 0~20mA
	DC voltage	0~50mV, ±50mV, 0~10V, 0~150V
Accuracy		±(0.3% of rdg + 0.2% of F.S)

Drawing

Refer to page 80 Type A-2

Frequency Meter

Certificates 



Model No.

KDF - 

① ②

① Input

Voltage	Input	Range
AC 50~260V	100Hz	30.00~99.99
AC 10V	1kHz	30.0~999.9
AC 10V	100Hz	30.00~99.99

② Communication (Option)

-  RS-485 NA None
-  How to order KDF 99.99 / AC 50~260V KDF 999.9 / AC 10V
-  Standard : AC 50~60V, 100Hz
-  Customized product can be produced by order.

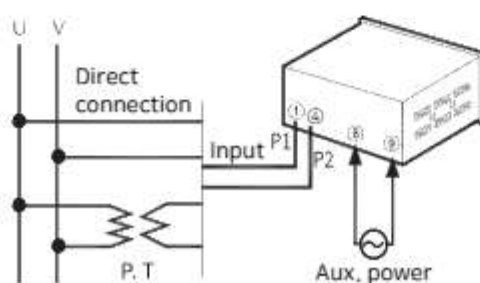
Specification

Aux. power	AC 90 ~ 260V(50/60Hz) / DC110V
Operating temperature	-10~50°C
Operating humidity	20~85%
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)
Withstand voltage	AC 2kV/1 minute
Maximum input	150% seconds
Weight	250g

Display

Text height (LED)	20.5(0.8")mm Red
Measuring interval	2.5Times / sec
Max display value	9999

Connection diagram



Input

Range	AC voltage	
	AC 50 ~ 260V	30.00 ~ 99.99Hz
	AC 10V	30.0 ~ 999.9Hz
	AC 10V	30.00 ~ 99.99Hz
Accuracy		±(0.1 of rdg + 1 digit)

Drawing

 Refer to page 80 Type A-2

Temperature Meter



Model No.

KDN - 

① Range

1 0~199.9℃, PT 100Ω

2 0~400℃, CA

3 0~1200℃, CA

4 -50.0~100.0℃, PT 100Ω

0 Order made

 How to order KDN-3K 0~1200℃ CA KDN-1PT 0~199.9℃ PT 100Ω

 Customized product can be produced by order.

② Sensor Type

K CA (Chromel Alumel)

Pt PT 100Ω (Platinum Thermometer)

Specification

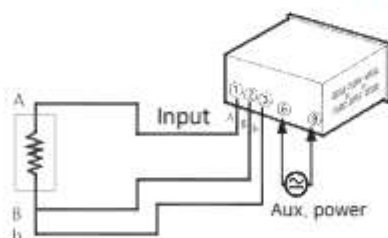
Aux. power	AC 90 ~ 260V(50/60Hz) / DC110V
Operating temperature	-10~50℃
Operating humidity	20~85%
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)
Withstand voltage	AC 2kV/1 minute
Weight	250g

Input

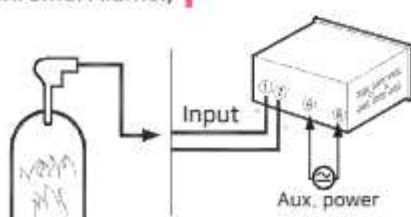
Range	Thermocouple	K, CA 0~1200℃
	RTD (Resistance Temperature Detector)	0~199.9℃ / PT 100Ω
Accuracy		±(0.3% of rdg + 0.2% of F.S)

Connection diagram

RTD(Resistance Temperature Detector)



CA (Chromel Alumel)



Display

Text height (LED)	14.2(0.56")mm Red
Measuring interval	2.5Times / sec
Max display value	9999

Drawing

 Refer to page 80 Type A-1

Integrator Meter



Model No.

KDJ -

1	2
---	---

① Type	② Display by input signal		
	Input	Number of signals	Display and unit
1 Relay			
2 Open Collector	1	1	1Wh,1kWh,1MWh
	2	10	1Wh,1kWh,1MWh
	3	100	1Wh,1kWh,1MWh

- How to order KDJ-21 O/C 1/1 Wh KDJ-13 Relay 100/1 Wh
- Customized product can be produced by order.

Specification

Aux. power	AC 90 ~ 260V(50/60Hz) / DC110V
Operating temperature	-10~50℃
Operating humidity	20~85%
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)
Withstand voltage	AC 2kV/1 minute
Weight	250g

Input

Range	Relay	0~1Times / sec
	Open Collector	0~10Times / sec
Accuracy		±(0.3% of rdg + 0.2% of F.S)

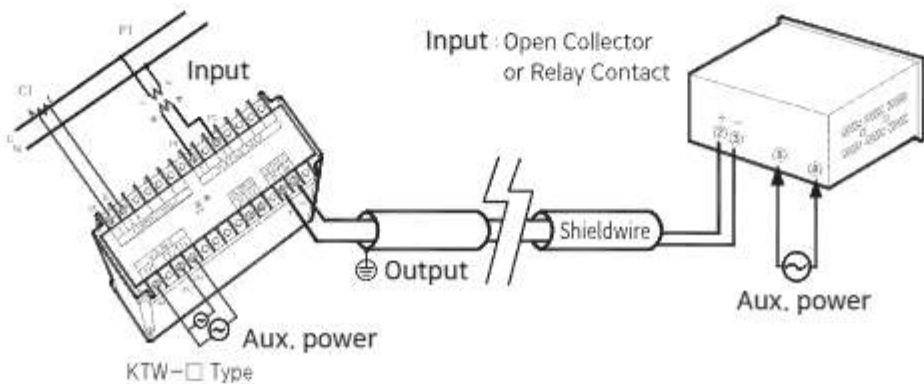
Display

Text height (LED)	10.2(0.39")mm Red
Max display value	999999(6digit)

Drawing

- Refer to page 80 Type A-1

Connection diagram



3Phase AC Current Meter

Certificates 



Model No.

KDA-3P

①

① Communication (Option)

C RS-485

N/A None

How to order KDA-3P

R, S, T are switched by the select button

Specification

Aux. power	AC 90 ~ 260V(50/60Hz) / DC 110V
Operating temperature	-10~50℃
Operating humidity	20~85%
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/ 50μs, 5kV) Current(8μs/ 20μs)
Burst	Level 4(IEC 61000-4-4)
Withstand voltage	AC 2kV/1 minute
Maximum input	Approximately 110% of each measurement input
Weight	270g

Input

Range	0.05~6A (rated CT : 5A)
Accuracy	±(0.3% of rdg + 0.2% of F.S)

Display

Text height (LED)	20.5(0.8")mm Red
Measuring interval	1 Times / sec

Drawing

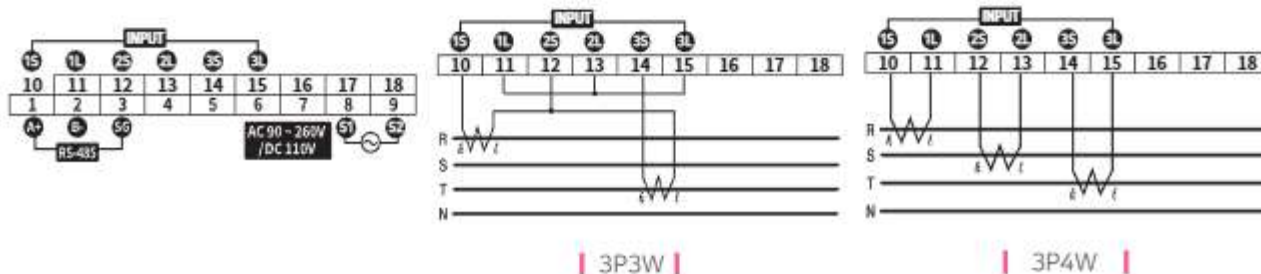
Refer to page 80 Type A-2

Primary current selection

5→10→15→20→25→30→40→50→60→70→75→80→90→100→120→125→130→140→150→160→170→175→180→200→225→240→250→300→400→450→500→600→700→750→800→900→1000→1200→1250→1300→1400→1500→1600→1700→1750→1800→2000→2500→3000→3200→3500→3600→4000→4500→5000→6000

For direct connection, see connection diagram 101Page

Connection diagram



3Phase AC Voltage Meter

Certificates 



Model No.

KDB-3P

①

① Communication (Option)

 RS-485

 How to order KDB-3P

N/A None

 RN, SN, TN, RS, ST, RT are switched by the select button

Specification

Aux. power	AC 90 ~ 260V(50/60Hz) / DC 110V
Operating temperature	-10~50℃
Operating humidity	20~85%
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/ 50μs, 5kV) Current(8μs/ 20μs)
Burst	Level 4(IEC 61000-4-4)
Withstand voltage	AC 2kV/1 minute
Maximum input	Approximately 110% of each measurement input
Weight	250g

Input

Range	30~500V(PT ratio)
Accuracy	±(0.3 of rdg + 0.2% of F.S)

Display

Text height (LED)	20.5(0.8")mm Red
Measuring interval	1Times / sec

Display range

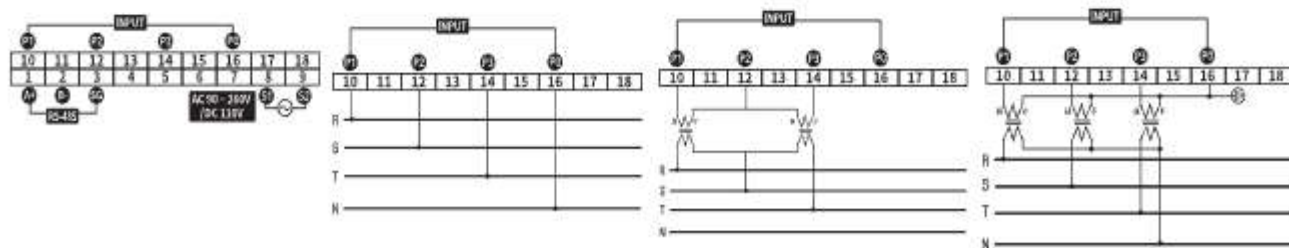
Order	Setting	Display	Display value
1	220	220.0	V
2	380	380.0	
3	440	440.0	
4	460	460.0	
5	480	480.0	
6	3300	3300	kV
7	6600	6.60	
8	7200	7.20	
9	11000	11.00	
10	11400	11.40	
11	22000	22.00	
12	22900	22.90	
13	66000	66.0	
14	154000	154.0	

 PT ratio can be changed for order-made customized product

Drawing

 Refer to page 80 type A-2

Connection diagram



| Direct connection |

| 3P3W |

| 3P4W |

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91

Single Phase AC Watt / Hour Meter

Certificates 



Model No.

KDL - 
① ②

① Input

W W,Wh(6digit)
G V,A,W

② Communication (Option)

C RS-485
NA None

-  Customized product can be produced by order.
-  How to order KDL-HC : Watt hour meter with communication
KDL : Wattmeter without communication
-  KDL-W only indicates W and $\pm$ Wh.

Specification

Aux. power	AC 90 ~ 260V(50/60Hz) / DC110V
Operating temperature	-10~50℃
Operating humidity	20~85%
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)
Burst	Level 4(IEC 61000-4-4)
Withstand voltage	AC 2kV/1 minute
Maximum input	A-200% 10 seconds, 120% continuous V-150% 10 seconds, 120%continuous
Weight	250g

Input

Range	AC voltage	30~300V
	AC current	0.05~5.5A(rated CT : 5A)
Accuracy	V/A/W	$\pm(0.3\% \text{ of rdg} + 0.2 \text{ of F.S})$
	Wh	$\pm(\text{Watt accuracy} + 0.1 \text{ count/h})$

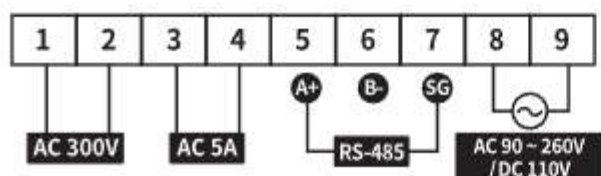
Display

Text height (LED)	20.5(0.8")mm Red
V/A/W Selection method	Front button SW
Measuring interval	1Times / sec
Voltage max display	300.0V
Current max display	5.000~6000
Power max display	9999
Energy max display	999999(6digit)

Primary current selection

5→10→15→20→25→30→40→50→60→70→75→80→90→100→120→125→130→140→150→160→170→175→180→200→225→240→250→300→400→450→500→600→700→750→800→900→1000→1200→1250→1300→1400→1500→1600→1700→1750→1800→2000→2500→3000→3200→3500→3600→4000→4500→5000→6000

Connection diagram



Drawing

-  Refer to page 80 type A-2

DC Watt / Hour Meter

Certificates 



Model No.

KDM-
① ②

① Input	② Communication (Option)
W W,Wh(6digit)	C RS-485
G V,A,W	NA None

-  Customized product can be produced by order.
-  How to order KDL-WC : Watt hour meter with communication
KDM-G : Wattmeter without communication
-  KDM-W only indicates W and $\pm$ Wh.

Specification

Aux. power	AC 90 ~ 260V(50/60Hz) / DC110V
Operating temperature	-10~50°C
Operating humidity	20~85%
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)
Burst	Level 4(IEC 61000-4-4)
Withstand voltage	AC 2kV/1 minute
Maximum input	A-200% 10 seconds, 120% continuous V-150% 10 seconds, 120%continuous
Weight	250g

Input

Range	AC voltage	-500~+500V
	AC current	-60~+60mV (Rated Shunt : 50 or 60mV)
Accuracy	V/A/W	$\pm$ (0.3% of rdg + 0.2 of F.S)
	Wh	$\pm$ (Watt accuracy + 0.1 count/h)

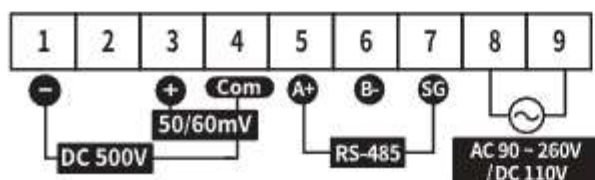
Display

Text height (LED)	20.5(0.8")mm Red
V/A/W Selection method	Front button
Measuring interval	1Times / sec
Voltage max display	500.0V
Current max display	5.000~6000
Power max display	9999
Energy max display	999999(6digit)

Primary current selection

5→10→15→20→25→30→40→50→60→70→75→80→90→100→120→125→130→140→150→160→170→175→180→200→225→240→250→300→400→450→500→600→700→750→800→900→1000→1200→1250→1300→1400→1500→1600→1700→1750→1800→2000→2500→3000→3200→3500→3600→4000→4500→5000→6000

Connection diagram



Drawing

-  Refer to page 80 type A-2

Push Button Digital Meter Relay

Certificates 



Model No.

KDP-  R
①

① Input

A AC currentmeter(AC A)	5A
B AC voltmeter(AC V)	110V/190V/500V
C DC ammeter(DC A)	50mV/60mV/200mV
D DC voltmeter(DC V)	5V/50V/500V

-  How to order KDP-AR(AC current meter)
-  Customized product can be produced by order.
-  Limit setting can be done by the front button(SET, ▲, ▼).

Specification

Aux. power	AC 90 ~ 260V(50/60Hz) / DC110V
Operating temperature	-10~50℃
Operating humidity	20~85%
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)
Burst	Level 4(IEC 61000-4-4)
Relay rated capacity	AC 250V, 2A DC 30V, 2A Use contact only A
Withstand voltage	AC 2kV/1 minute
Maximum input	Approximately 110% of each input
Weight	250g

Setting

- | KDP-AR(AC current) : *Rd-t* (A/D Type: RMS/AVG Choice)
Ct (Primary value setting)
- | KDP-BR(AC voltage) : *Rd-t* (A/D Type: RMS/AVG Choice)
In (Input specification: 500/190/110V)
Pt (PT), Primary value setting
- | KDP-CR(DC current) : *In* (Input specification: 50/60/200mV)
Shun
(SHUNT : Shunt Primary value setting)
- | KDP-DR(DC voltage) : *In* (Input specification: 500/50/5V)

Operation

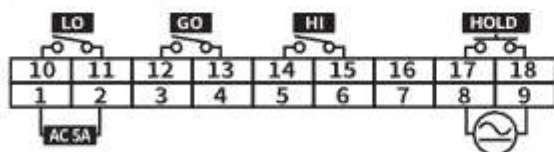
- | Refer to 95 Page of "Switch digital relay meter"

Drawing

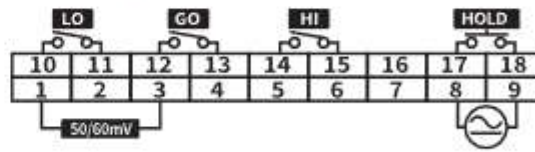
-  Refer to page 80 type A-1

Connection diagram

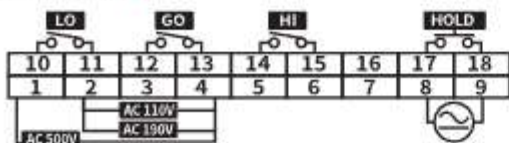
| KDP-AR(AC A) |



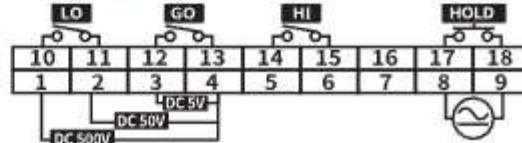
| KDP-BR(AC V) |



| KDP-CR(AC A) |



| KDP-DR(AC V) |



Switch Digital Relay Meter



Model No.

KDR - 
① ② ③

① Input	② Setting	③ Input signal/Analog
A AC ammeter	H Upper limit setting	Order made
B AC voltmeter	T Upper / lower limit setting	
C DC ammeter	How to order KDR-AT 0 ~ 100.0/5A KDR-BT 22.90/110V	
D DC voltmeter	Customized product can be produced by order.	
E Signal meter	Limit setting can be done by the front button	

Specification

Aux. power	AC 110 or 220V $\pm 10\%$
Operating temperature	-10~50°C
Operating humidity	20~85%
Insulation resistance	More than 10M Ω
Surge impulse	Voltage(1.2 μ s/ 50 μ s, 5kV) Current(8 μ s/ 20 μ s)
Burst	Level 4(IEC 61000-4-4)
Relay rated capacity	AC 250V, 2A DC 30V, 2A Use contacts A,B
Withstand voltage	AC 2kV/1 minute
Maximum input	Approximately 110% of each input
Weight	450g

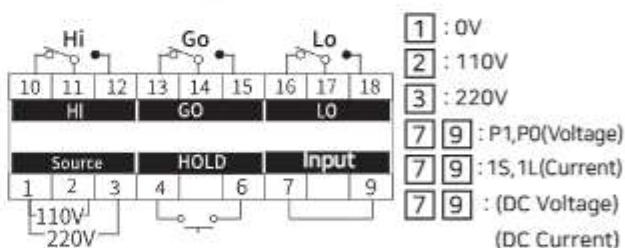
Input

Range	AC current	0~5.5A(Rated CT : 1 or 5A)
	AC voltage	0~150V
	DC current	0~60mV(Rated Shunt : 50 or 60mV)
	DC voltage	0~150V
	Indication	4~20mA
Accuracy	$\pm(0.3\% \text{ of rdg} + 0.2 \text{ of F.S})$	

Drawing

Refer to page 80 Type B.

Connection diagram



Display

Text height (LED)	10.2(0.39")mm Red
Measuring interval	2.5Times / sec.
Max display value	9999

Operation

Depends on setting and condition, output will be 3 types as below.

- HI output: If the input is higher than the HI setting, activate HI Relay and turn on the HI LED ON.
- GO output: If the input is not higher than HI setting and not lower than Lo setting, activate Go relay and GO LED ON.
- LO output: If the input is lower than LO setting, activate LO relay and LO LED ON.

Condition	HI Output		GO Output		LO Output	
	Relay	LED	Relay	LED	Relay	LED
HI Setting < Display	ON	ON	OFF	OFF	OFF	OFF
Lo Setting > Display	OFF	OFF	OFF	OFF	ON	ON
Lo $\leq$ Display $\leq$ HI	OFF	OFF	ON	ON	OFF	OFF
Error	It does not work when the Lo Setting is higher than the HI Setting. Error (----) will be displayed.					

Power Factor Meter



Model No.

KDH -
① ② ③

① Circuit ② Voltage / current ③ Communication(Optional)

1 1P2W 1 110V/5A C RS-485

2 1P3W 2 220V/5A N/A None

3 3P3W 3 $380\sqrt{3}$ / $190\sqrt{3}$ V / 5A

4 3P4W 4 $22900/\sqrt{3}$ / $190\sqrt{3}$ V / 5A

5 $380\sqrt{3}$ V / 5A

How to order KDH-43 3Φ4W, $380\sqrt{3}/190\sqrt{3}$ V/5A

Customized product can be produced by order.

Specification

Aux. power	AC 90 – 260V(50/60Hz) / DC110V
Operating temperature	-10~50℃
Operating humidity	20~85%
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)
Burst	Level 4(IEC 61000-4-4)
Withstand voltage	AC 2kV/1 minute
Weight	450g

Input

Range	Voltage	30~300V(Rated PT 110 or 190V)
	Current	0.05~6A(Rated CT 5A)
	Accuracy	±(1.0% + 1 digit)

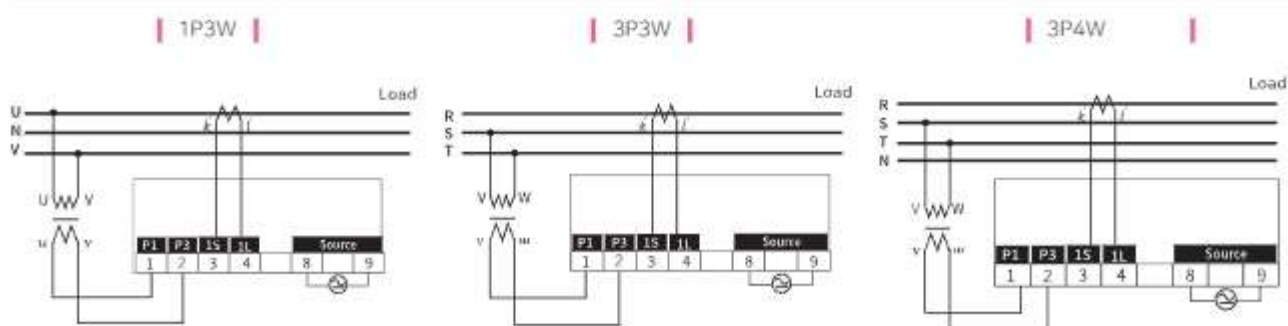
Display

Text height (LED)	20.5(0.8")mm Red
Measuring interval	2.0Times / sec
Max display value	100

Drawing

Refer to page 80 Type A-2.

Connection diagram



3P AC Watt Meter



Model No.

KDG - 
①

① Input

Phase, line to line, voltage, current, maximum indication value

- How to order KDG 3P4W, 22900/√3/190√3V, 40/5A, 1600kW
KDG 3P3W, 220V, 100/5A, 40.0kW
- Calculation $3P = V \times A \times \cos\theta \times \sqrt{3}$.
- Customized product can be produced by order.

Specification

Aux. power	AC 110/220V±10%
Operating temperature	-10~50℃
Operating humidity	20~85%
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)
Burst	Level 4(IEC 61000-4-4)
Withstand voltage	AC 2kV/1 minute
Maximum input	A-200% 10 seconds, 120%continuous V-150% 10 seconds, 120%continuous
Weight	450g

Drawing

Refer to page 80 Type B

Input

Range	Voltage	3P3W - 110V(1000/1158/961W) 220V(2000W) 3P4W - 208√3V(2000W) 380√3V/190√3V(2000W) 22900√3V/190√3V(1660W) 380√3V(4000W)
	Current	5A
Accuracy		±(0.3% of rdg + 0.2 of F.S)

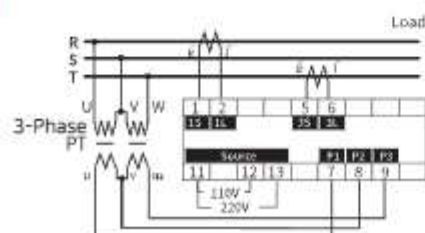
Display

Text height (LED)	14.2(0.56")mm Red
Measuring interval	2.0Times / sec
Max display value	1999

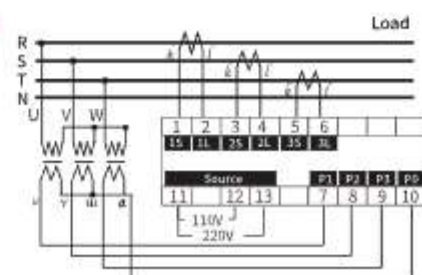
The max display is "1999" with kW / MW

Connection diagram

| 3P3W |



| 3P4W |



Power Chart for Voltage Ratio and Current Ratio

Circuit			1P2W	1P3W	3P3W							3P4W				
* Power constant			1,091	0,9091	1,05	1,216	1,05	1,05	1,05	1,05	1,008	1,05	1,110	1,216	1,216	1,008
Voltage ratio			220V	220/ 110	220	380/ 110	440/ 110	3300/ 110	6600/ 110	22000/ 110	22900/ 110	154kV/ 110	208/ √3	380/√3 190/√3	380/ √3	22900/√3 190/√3
Max power			1,2 kW	1,0 kW	2,0 kW	1,158 kW	1,0 kW	1,0 kW	1,0 kW	1,0 kW	0,961 kW	1,0 kW	2,0 kW	2,0 kW	4,0 kW	1,660 kW
Current ratio	1	5/5A	1,20	1000W	2,00	4,00	4,00	30,0	60,0	199,9	199,9	1400	2,00	4,00	4,00	199,9
	2	10/5A	2,40	2,00	4,00	8,00	8,00	60,0	120,0	400	400	280MW	4,00	8,00	8,00	400
	3	15/5A	3,60	3,00	6,00	12,00	12,00	90,0	180,0	600	600	4,20	6,00	12,00	12,00	600
	4	20/5A	4,80	4,00	8,00	16,00	16,00	120,0	240	800	800	5,60	8,00	16,00	16,00	800
	5	25/5A	6,00	5,00	10,00	19,99	19,99	150,0	300	1000	1000	7,00	10,00	19,99	19,99	1000
	6	30/5A	7,20	6,00	12,00	24,0	24,0	180,0	360	1200	1200	8,40	12,00	24,0	24,0	1200
	7	40/5A	9,60	8,00	16,00	32,0	32,0	240	480	1600	1600	11,20	16,00	32,0	32,0	1600
	8	50/5A	12,00	10,00	19,99	40,0	40,0	300	600	1999	1999	14,00	19,99	40,0	40,0	1999
	9	60/5A	14,40	12,00	24,0	48,0	48,0	360	720	240MW	240MW	16,80	24,0	48,0	48,0	240MW
	10	75/5A	18,00	15,00	30,0	60,0	60,0	450	900	3,00	3,00	21,0	30,0	60,0	60,0	3,00
	11	80/5A	19,20	16,00	32,0	64,0	64,0	480	960	3,20	3,20	22,4	32,0	64,0	64,0	3,20
	12	100/5A	24,0	19,99	40,0	80,0	80,0	600	1200	4,00	4,00	28,0	40,0	80,0	80,0	4,00
	13	120/5A	28,8	24,0	48,0	96,0	96,0	720	1440	4,80	4,80	33,6	48,0	96,0	96,0	4,80
	14	150/5A	36,0	30,0	60,0	120,0	120,0	900	1800	6,00	6,00	42,0	60,0	120,0	120,0	6,00
	15	200/5A	48,0	40,0	80,0	160,0	160,0	1200	240MW	8,00	8,00	56,0	80,0	16,0	16,0	8,00
	16	250/5A	60,0	50,0	100,0	199,9	199,9	1500	3,00	10,00	10,00	70,0	100,0	199,9	199,9	10,00
	17	300/5A	72,0	60,0	120,0	240	240	1800	3,60	12,00	12,00	84,0	120,0	240	240	12,00
	18	400/5A	96,0	80,0	160,0	320	320	240MW	4,80	16,00	16,00	112,0	160,0	320	320	16,00
	19	500/5A	120,0	100,0	199,9	400	400	3,00	6,00	19,99	19,99	140,0	199,9	400	400	19,99
	20	600/5A	144,0	120,0	240	480	480	3,60	7,20	24,0	24,0	168,0	240	480	480	24,0
	21	750/5A	180,0	150,0	300	600	600	4,50	9,00	30,0	30,0	210	300	600	600	30,0
	22	800/5A	192,0	160,0	320	640	640	4,80	9,60	32,0	32,0	224	320	640	640	32,0
	23	1000/5A	240	200	400	800	800	6,00	12,00	40,0	40,0	280	400	800	800	40,0
	24	1200/5A	288	240	480	960	960	7,20	14,40	48,0	48,0	336	480	960	960	48,0
	25	1500/5A	360	300	600	1200	1200	9,00	18,00	60,0	60,0	420	600	1200	1200	60,0
	26	2000/5A	480	400	800	1600	1600	12,00	24,0	80,0	80,0	560	800	1600	1600	80,0
	27	2500/5A	600	500	1000	1999	1999	15,00	30,0	100,0	100,0	700	1000	1999	1999	100,0
	28	3000/5A	720	600	1200	240MW	240MW	18,00	36,0	120,0	120,0	840	1200	240MW	240MW	120,0
	29	4000/5A	960	800	1600	3,20	3,20	24,0	48,0	160,0	160,0	1120	1600	3,20	3,20	160,0
	30	5000/5A	1200	1000	1999	4,00	4,00	30,0	60,0	199,9	199,9	1400	1999	4,00	4,00	199,9

Reference

1. For 1Φ2W, 220V, 10 / 5A, the maximum power meter reading design is 2.4kW
 2. For 3Φ3W, 154kV/110V, 100/5A, the maximum power meter reading design is 28.0MW
 3. For 3Φ4W, 22900/√3/190√3V, 100/5A, the maximum power meter reading design is 4.00MW
- Power constant : Instrument display power value (max.) / Calculated power value

AC Watt , Watthour Meter



Model No.

KDW - 1

① Input

Phase, line to line, voltage, current, maximum indication value

How to order KDW 3ø3W, 220V, 100/5A, 40.0kW/kWh 40.0kW/kWh

Calculation $1P=V \times A \times \cos\theta$ $3P=V \times A \times \cos\theta \times \sqrt{3}$ Customized product can be produced by order.

Output signal

NPN Open Collector: 1 Count/Wh Display 1Digit

Specification

Aux. power	AC 90 ~ 260V(50/60Hz) / DC110V
Operating temperature	-10~50°C
Operating humidity	20~85%
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)
Burst	Level 4(IEC 61000-4-4)
Withstand voltage	AC 2kV/1 minute
Maximum input	A-200% 10 seconds, continuous 120% V-150% 10 seconds, continuous 120%
Reset method	Front- Push Button (kW/kWh and kwh can be reset) Rear - Terminal, Reset
Weight	450g

Drawing

Refer to page 80 Type B

Input

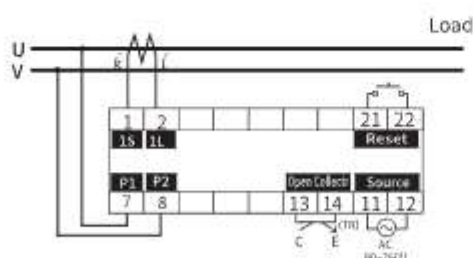
Range	Voltage	1P2W - 110V(600W) 220V(1200W) 1P3W - 220V/110V(1000W) 3P3W - 110V(1000/1158/961W) 220V(2000W) 3P4W - 208√3V(2000W) 380√3V/190√3V(2000W) 22900√3V/190√3V(1660W) 380√3V(4000W)
		Current 0.05~6A
Accuracy	W	±(0.3% of rdg + 0.2 of F.S)
	Wh	± (Watt accuracy+0.1 count/h)

Display

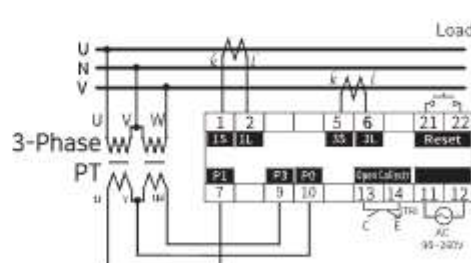
Text height (LED)	14.2(0.56")mm Red
Measuring interval	2.0Times / sec
Power max display	4800
Energy max display	999999

Connection diagram

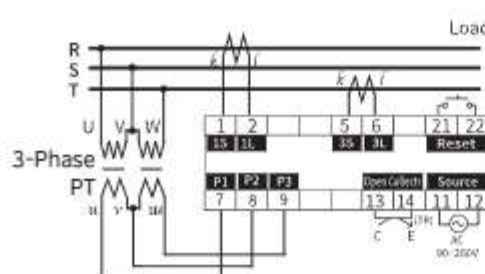
1P2W



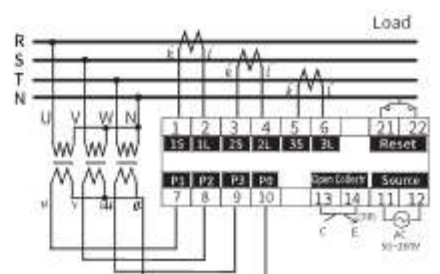
1P3W



3P3W



3P4W



Energy chart for voltage ratio and current ratio

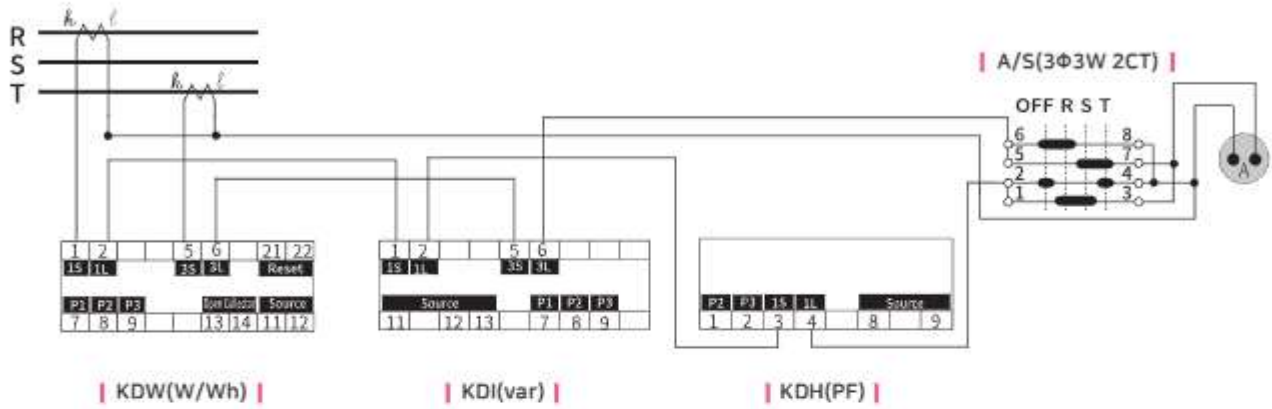
Circuit			1P2W	1P3W	3P3W							3P4W				
* Power constant			1,091	0,9091	1,05	1,216	1,05	1,05	1,05	1,05	1,008	1,05	1,110	1,216	1,216	1,008
Voltage ratio			220V	220/ 110	220	380/ 110	440/ 110	3300/ 110	6600/ 110	22000/ 110	22900/ 110	154kV/ 110	208/ √3	380/√3 190/√3	380/ √3	22900/√3 190/√3
Max power			1,2 kW	1,0 kW	2,0 kW	1,158 kW	1,0 kW	1,0 kW	1,0 kW	1,0 kW	0,961 kW	1,0 kW	2,0 kW	2,0 kW	4,0 kW	1,660 kW
Current ratio	1	5/5A	1,20	1,00	2,00	4,00	4,00	30,0	60,0	200	200	1,40MWh	2,00	4,00	4,00	200
	2	10/5A	2,40	2,00	4,00	8,00	8,00	60,0	120,0	400	400	2,80	4,00	8,00	8,00	400
	3	15/5A	3,60	3,00	6,00	12,00	12,00	90,0	180,0	0,60MWh	0,60MWh	4,20	6,00	12,00	12,00	0,60MWh
	4	20/5A	4,80	4,00	8,00	16,00	16,00	120,0	240	0,80	0,80	5,60	8,00	16,00	16,00	0,80
	5	25/5A	6,00	5,00	10,00	20,0	20,0	150,0	300	1,00	1,00	7,00	10,00	20,0	20,0	1,00
	6	30/5A	7,20	6,00	12,00	24,0	24,0	180,0	360	1,20	1,20	8,40	12,00	24,0	24,0	1,20
	7	40/5A	9,60	8,00	16,00	32,0	32,0	240	480	1,60	1,60	11,20	16,00	32,0	32,0	1,60
	8	50/5A	12,00	10,00	19,99	40,0	40,0	300	0,60MWh	2,00	2,00	14,00	20,0	40,0	40,0	2,00
	9	60/5A	14,40	12,00	24,0	48,0	48,0	360	0,72	2,40	2,40	16,80	24,0	48,0	48,0	2,40
	10	75/5A	18,00	15,00	30,0	60,0	60,0	450	0,90	3,00	3,00	21,0	30,0	60,0	60,0	3,00
	11	80/5A	19,20	16,00	32,0	64,0	64,0	480	0,96	3,20	3,20	22,4	32,0	64,0	64,0	3,20
	12	100/5A	24,0	20,00	40,0	80,0	80,0	0,60MWh	1,20	4,00	4,00	28,0	40,0	80,0	80,0	4,00
	13	120/5A	28,8	24,0	48,0	96,0	96,0	0,72	1,44	4,80	4,80	33,6	48,0	96,0	96,0	4,80
	14	150/5A	36,0	30,0	60,0	120,0	120,0	0,90	1,80	6,00	6,00	42,0	60,0	120,0	120,0	6,00
	15	200/5A	48,0	40,0	80,0	160,0	160,0	1,20	2,40	8,00	8,00	56,0	80,0	160,0	160,0	8,00
	16	250/5A	60,0	50,0	100,0	200	200	1,50	3,00	10,00	10,00	70,0	100,0	200	200	10,00
	17	300/5A	72,0	60,0	120,0	240	240	1,80	3,60	12,00	12,00	84,0	120,0	240	240	12,00
	18	400/5A	96,0	80,0	160,0	320	320	2,40	4,80	16,00	16,00	112,0	160,0	320	320	16,00
	19	500/5A	120,0	100,0	200	400	400	3,00	6,00	20,0	20,0	140,0	200	400	400	20,0
	20	600/5A	144,0	120,0	240	480	480	3,60	7,20	24,0	24,0	168,0	240	480	480	24,0
	21	750/5A	180,0	150,0	300	0,60MWh	0,60MWh	4,50	9,00	30,0	30,0	210	300	0,60MWh	0,60MWh	30,0
	22	800/5A	192,0	160,0	320	0,64	0,64	4,80	9,60	32,0	32,0	224	320	0,64	0,64	32,0
	23	1000/5A	240	200	400	0,80	0,80	6,00	12,00	40,0	40,0	280	400	0,80	0,80	40,0
	24	1200/5A	288	240	480	0,96	0,96	7,20	14,40	48,0	48,0	336	480	0,96	0,96	48,0
	25	1500/5A	0,36MWh	0,30MWh	0,60MWh	1,20	1,20	9,00	18,00	60,0	60,0	420	0,60MWh	1,20	1,20	60,0
	26	2000/5A	0,48	0,40	0,80	1,60	1,60	12,00	24,0	80,0	80,0	560	0,80	1,60	1,60	80,0
	27	2500/5A	0,60	0,50	1,00	2,00	2,00	15,00	30,0	100,0	100,0	700	1,00	2,00	2,00	100,0
	28	3000/5A	0,72	0,60	1,20	2,40	2,40	18,00	36,0	120,0	120,0	840	1,20	2,40	2,40	120,0
	29	4000/5A	0,96	0,80	1,60	3,20	3,20	24,0	48,0	160,0	160,0	1,12GWh	1,60	3,20	3,20	160,0
	30	5000/5A	1,20	1,00	2,00	4,00	4,00	30,0	60,0	200	200	1,40GWh	2,00	4,00	4,00	200

Reference

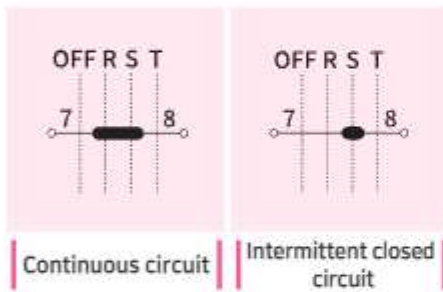
1. For 1Φ2W, 220V, 10 / 5A, the maximum power meter reading design is 2,40kW
2. For 3Φ3W, 154kV/110V, 100/5A, the maximum power meter reading design is 28,0MW
3. For 3Φ4W, 22900/√3/190/√3V, 100/5A, the maximum power meter reading design is 4,00MW
- Power constant: Instrument display power value (maximum) / Calculated power value

Wiring diagram(For group use)

3P3W 2CT(Wattmeter / Watt-hour meter, Balanced power factor meter)



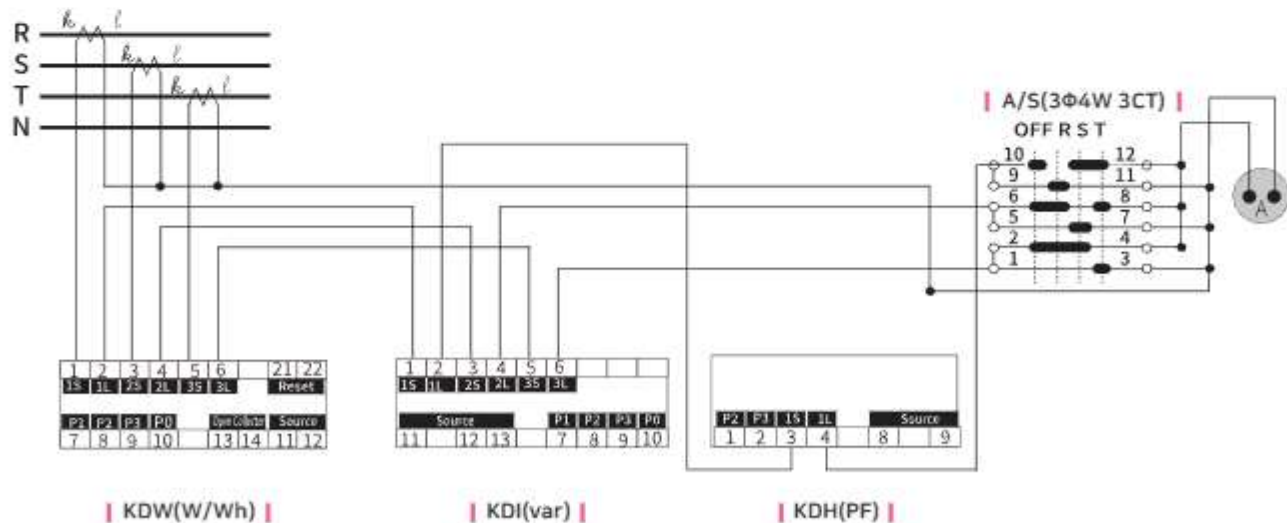
Contact symbols



Reference

Terminal	6-8	5-7	2-4	1-3
OFF	On	Off	On	Off
R	On	Off	Off	On
S	Off	On	Off	On
T	Off	On	On	Off

3P4W 3CT(Wattmeter / Watt-hour meter, Balanced power factor meter)

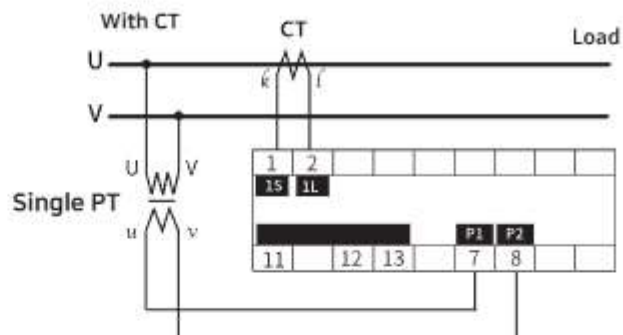
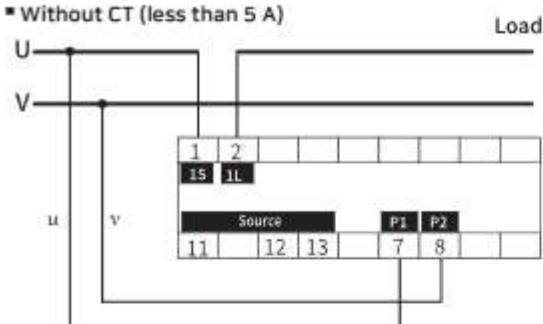


- The A / S (Cam Switch) is based on the koino product. Please check the manufacturer's terminal number.
- PT connection is not shown

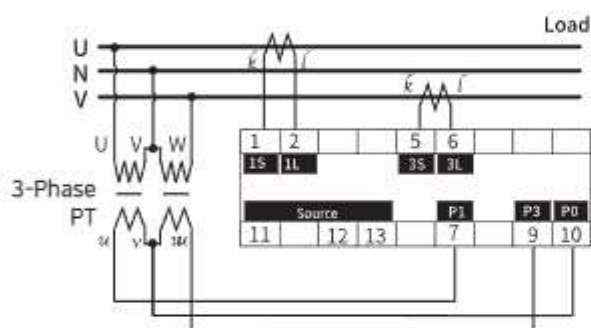
Connection diagram (single use)

1P2W(Watt meter)

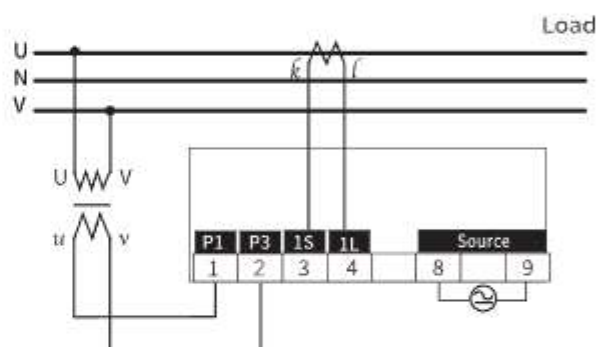
■ Without CT (less than 5 A)



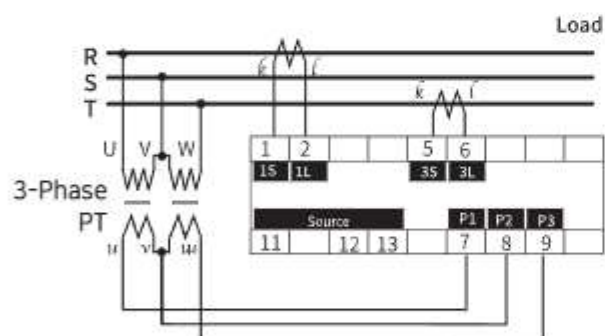
1P3W(Watt meter)



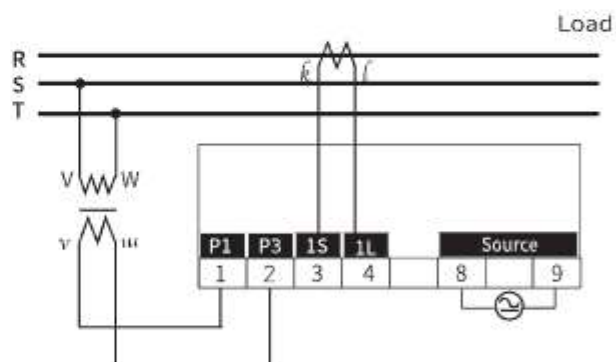
1P3W(Power factor meter)



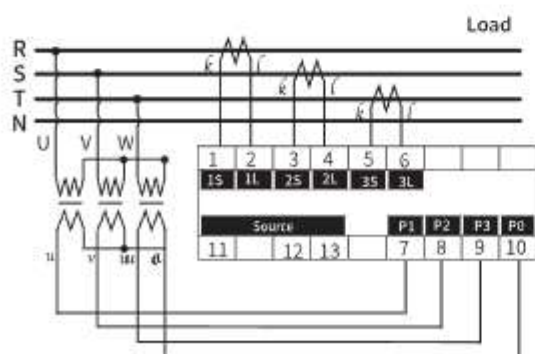
3P3W(Watt meter)



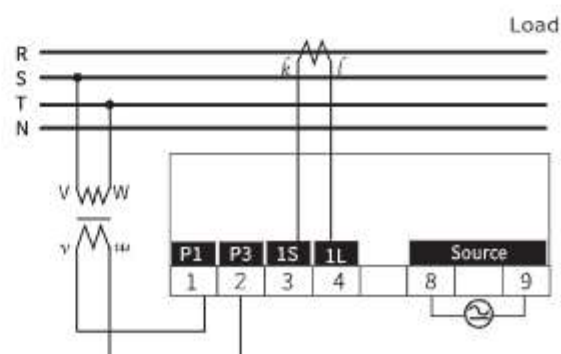
3P3W(Power factor meter)



3P4W(Watt meter)



3P4W(Power factor meter)



Digital Leakage Current Meter



Model No.

KDS-10

Digital leakage current limit meter.

Overview

Monitoring the leakage current of grounding cable, which is connected to potential transformer secondary. If the output is over setting value, alarm and relay contact will be activated.

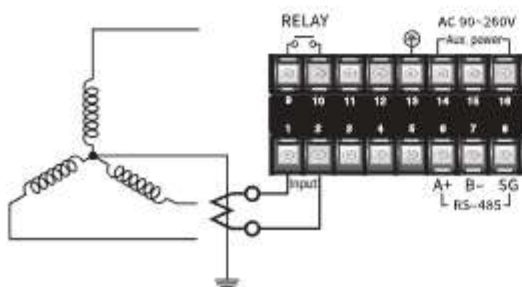
Feature

- Economical price
- RS-485 communication

Specification

Aux. power	AC 90~260V or DC 110V
Operating temperature	-10~50℃
Operating humidity	20~85%
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)
Burst	Level 4(IEC 61000-4-4)
Withstand voltage	AC 2kV/1 minute
Maximum input	300% 10 seconds
Setting	Current value, delay time, communication address
communication	RS-485/Modbus RTU Protocol, 9600bps
Relay capacity	250V, 2A
Current transformer	KBJ-26L required (Separate purchase)
Weight	250g

Connection diagram



Input

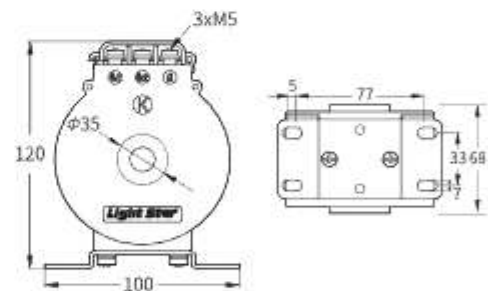
Range	KBJ-26L 0.05~30mA KBJ-06L 0.1~50mA
Accuracy	±(0.3% of rdg + 0.2 of F.S)
Max display value	30.0A

Drawing

Unit :mm

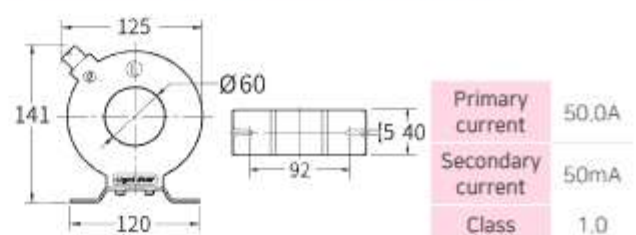
Refer to page 80 type A-1

Dedicated current transformer(KBJ-26L) Unit :mm



Primary current	0.03~30.0A
Secondary current	0.05~50mA
Class	1.0
Burden	500Ω Less than 500Ω

Dedicated current transformer(KBJ-06L) Unit :mm



Primary current	50.0A
Secondary current	50mA
Class	1.0

Digital Leakage Current Meter

Certificates 



Model No.

KDS-20

Digital leakage current limit meter.

Overview

Monitoring the leakage current of grounding cable, which is connected to potential transformer secondary. If the output is over setting value, alarm and relay contact will be activated.

Specification

Waveform display	128 Point x 2 cycles
Harmonic	1-15 Harmonic
Measure Igr	Ig, Igr, Igc
Aux. power	AC 90-260V or DC 110V
Operating temperature	-10~50°C
Operating humidity	20~85%
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/ 50μs, 5kV) Current(8μs/ 20μs)
Burst	Level 4(IEC 61000-4-4)
Withstand voltage	AC 2kV/1 minute
Maximum input	300% 10 seconds
Setting	Current value, delay time, communication address
communication	RS-485
Relay capacity	250V, 2A
Current transformer	KBJ-06L required (Separate purchase)
Weight	800g

Display

Voltage	25~300V
Current	0.1~30 (KBJ-06L) 0.030~30,000A (KBJ-26L)

Feature

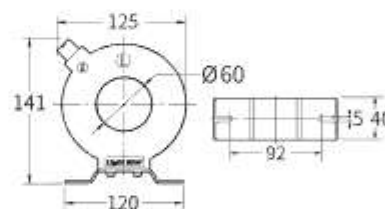
- Displayed as waveform and vector
- Ig, Igr, Igc Current measurement
- Checking Leakage phase
- RS-485 Communication

Input

Range	Voltage	25~300V
	Current	0.1~50mA (KBJ-26L or KBJ-06L) 1000:1
Accuracy	Voltage	±(0.5% of rdg + 0.2 of F.S)
	Leakage current	±(0.5% of rdg + 0.2 of F.S)

Dedicated current transformer

Unit : mm



Primary current	50.0A
Secondary current	50mA
Class	1.0

Drawing

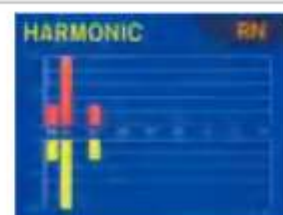
Unit : mm

 Refer to page 80 Type E

Connection diagram

 Refer to page 100

KDS-20 Display [Color LCD 320X240]



Harmonic Meter Relay



Model No.

KDQ - HMR

①

① Harmonic Meter Relay

Overview

Monitoring the harmonics and saving the monitored data. If the output is over setting value, alarm and relay contact will be activated.

Specification

Aux. power	AC 90/260V(50/60Hz), DC 110V
Operating temperature	-10~50°C
Operating humidity	20~85%(Over dew point)
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)
Burst	Level 4(IEC 61000-4-4)
Withstand voltage	AC 2kV/1 minute
Harmonic display	1~15 Harmonic,THD(0.0~100.0%)
Input loss	Less than V - 0.1VA, Less than A - 0.2VA
Weight	800g

Connection diagram

Refer to 101Page

Communication specification

Interface	RS-485(2Wire)(A+, B-, Com)
Transmission rate	9600, 19200bps
Transmission distance	Maximum 1.2km
Protocol	Modbus RTU(Basic)

Input

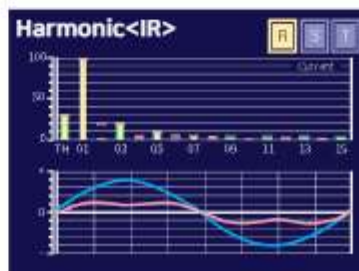
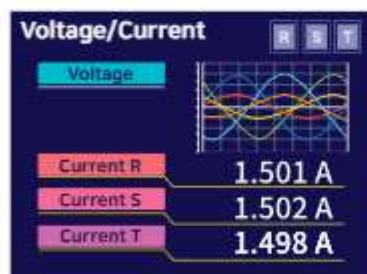
Range	Line voltage	40~500V (rated PT:110 or 190V)
	Current	0.1~5.5A(rated CT:5A)
	Frequency	45~65Hz
Accuracy	Voltage	±(0.3% of rdg + 0.2 of F.S)
	Current	±(0.3% of rdg + 0.2 of F.S)
	Harmonic	±(0.1%)
	Phase	±(1.0°)

Drawing

Refer to page 80 type D

Display[Color LCD 320X240]

The harmonic generation rate is displayed, as below.



Demand Controller



Model No.

KCD - MX

①

① Demand Controller

Overview

Minimizing the electricity tariff by setting working day and checking date

If the consumption is exceed the setting value, alarm and relay contact will be activated.

Function

- Measuring active power and calculate active energy per hour/day/month.
- Monitor and control energy consumption.
- Transmitting data by RS-485 and monitoring in remote place.
- Based on target energy consumption, daily consumption can be controlled.

Specification

Aux. power	AC 90~260V(50/60Hz)/DC 110V
Input	A contact relay, Capacity AC 220V / 2A 3 pieces (2 load control, 1 alarm)
Alarm	Piezo informing buzzer used
Indicator	128x64dot Matrix Graphic LCD, Indicate LED : Red 3ø 5 pieces
Weight	800g

Communication

Interface	RS-485, Multi-drop 2Wire
Protocol	Modbus(RTU mode)
Data format	1Start bit, 8 Data bits, 1 Stop bits None Parity
Communication speed	9600bps

Input

Range	Rated input	3 phase 3 wire AC 440/110V, 5A 3 phase 4 wire AC 380V/3V, 5A
Accuracy	Instant power	±(1.0%)
	Accumulated Energy	±(2.0%+0.03%/day)

Drawing

Refer to page 80 type D

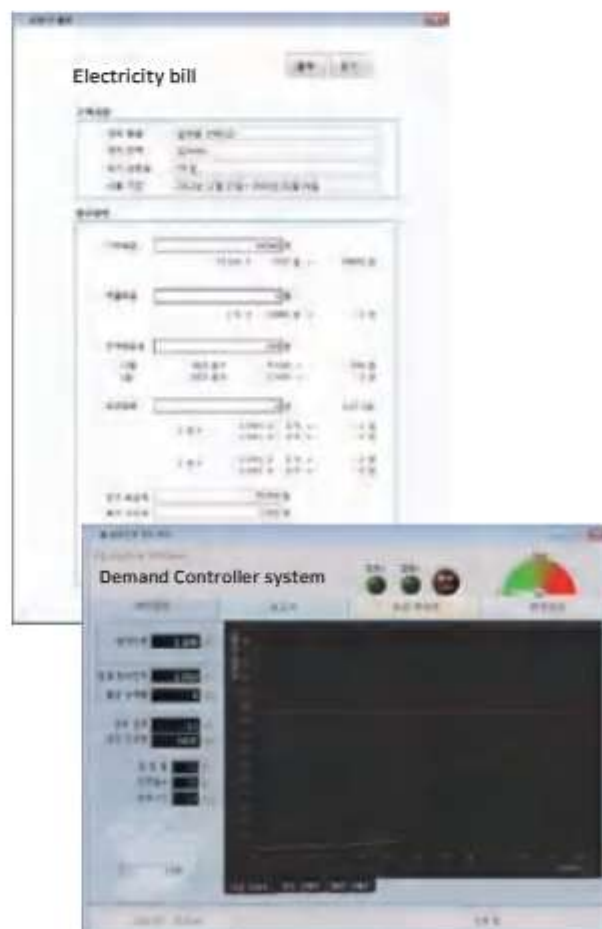
Setting items

Setting	Range	Unit	Remarks
Contract power	1~300	kW	
Reading date	1~31	Day	
Working days	1~31	Day	
Alarm buzzer	ON/OFF		Alarm applicable
DO1/DO2	AUTO/ON/OFF- /REMOTE		Automatic / Manual
Delay time	1~200	sec	

Connection diagram

Refer to page 109

HMI(Human Machine Interface)



Rectifier Switch Board Digital Meter



Model No.

KDV-

①

① AC voltage input specification

1 20~250V Direct connection

2 380/110V PT use

Overview

Monitoring AC voltage(input), DC voltage and DC current(output) for Battery charger (or Rectifier), with RS-485 communication.

Function

- Measure DC voltage, DC current (Rectifier output and battery output) and the Max value.
- Shunt ratio can be set.
- RS-485 Serial Communication.

Specification

Aux. power	AC 90/260V(50/60Hz), DC 110V
Operating temperature	-10~50℃
Operating humidity	20~85%(Over dew point)
Insulation resistance	More than 10MΩ (DC 500V) Between external terminal and case
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)
Burst	Level 4(IEC 61000-4-4)
Withstand voltage	AC 2kV/1 minute
Weight	800g

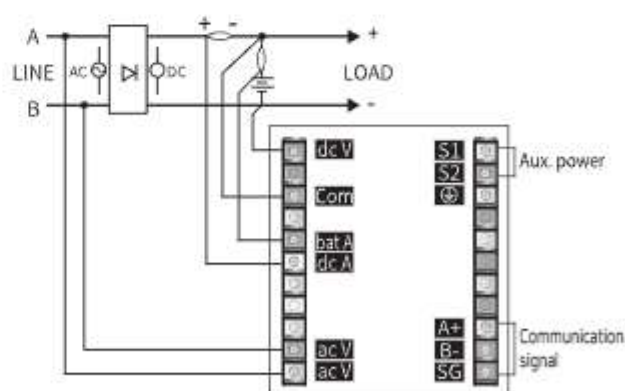
Display items

Item	Display	Indicate LED
AC V	AC voltage	VAC
	AC voltage Max	MAX VAC
DC V	DC voltage	VDC
	DC voltage Max	MAX VDC
DC A	Direct current	IDC
	DC current Max	MAX IDC
	Battery current	IBAT
	Battery current Max	MAX IBAT

Communication specification

Interface	RS-485, Multi-drop 2Wire
Protocol	Modbus(RTU mode)
Transmission distance	Max 1,2km
Transmission rate	9600bps

Connection diagram



Input

Item		Range	Accuracy (%)
AC voltage	KDV-1	20~250V	± (0.5% of rdg + 1 digit)
	KDV-2	380/110V	
DC voltage	Common	20~270V	± (0.3% of rdg + 1 digit)
DC current		0.5~50mA	± (0.3% of rdg + 1 digit)

Drawing

Refer to 80Page type D

Panel Power Meter

Certificates 



Model No.

KDX - 

① Digital meter	② Panel meter	③ Measurement	④ Communication
		A 3P V, 3P A, W, PF, var, Hz, Wh, varh	C RS-485
		B 3P V, 3P A, W, PF, var, Hz	N/A None
		C 3P V, 3P A, W, PF, var, Hz, wh, varh (No communication)	

CAUTION If the power is turn off, the accumulated value for 30 minutes can be deleted.

 How to order Example) KDX-AC
KDX-B

 Customized product can be produced by order.

Overview

Digital meter which can display 3 Ø A, 3 Ø V, W, PF, var, Hz, Wh, varh and remote power monitoring by RS - 485 communication.

Input

	Division	A/B	C
Range	Line voltage	40~500V	50~500V (Rated PT :110 or 190V)
	Current input	0.1~6A	0.5~6A (Rated CT:5A)
Accuracy	V,A	± (0.3% of rdg + 0.2% of F.S)	1.5 times of A / B
	W var	± (1.0% of rdg + 0.2% of F.S) at PF=1	
	PF	± (1.0% of rdg + 1.0°)	
	Wh varh	± (W Accuracy + 0.1 count/h)	

Communication

Interface	RS-485, Multi-drop 2Wire
Protocol	Modbus RTU(Basic)/Melsec(option)
Address setting	0~255
Transmission distance	Maximum 1.2km
Transmission rate	9600bps

Function

3-phase voltage, 3 phase current, W, PF, var, Hz, Wh, etc. and others are displayed with three windows.

CT, PT, primary value can be set.

RS-485 Serial Communication

Up to 500V, direct connection is possible without PT.

Specification

Item	Description
Aux. power	KDX-A/B: AC 90V ~ 260V(50/60Hz) /DC110V KDX-C: AC 220V(60 Hz)Only
Display method	14,2 LED(0.56inch, Red) Update speed : 1000ms
Communication	RS-485 multi-drop 2wire, 9600bps, 0~255, Maximum 1.2km, Modbus RTU
Withstand voltage	AC 2kV/1 minute
Surge impulse	1.2/50µs 4kV, 8/20µs 2kA
Burst	Level 4(IEC 61000-4-4)
Input loss	- V : Less than 0.1VA - A : Less than 0.2VA
Operating temperature / humidity	-10°C ~ 50°C / 20~85%
Insulation resistance	More than 10MΩ (500VDC)
Weight	KDX-A/B: 800g KDX-C: 1kg

Detailed Function

Function keys

- Circuit method selection
- PT primary voltage selection
- CT primary current selection
- Communication address setting (0 to 255)
- Wh, varh Reset

AS Button

- A1, A2, A3, CT Primary current selection
- CT Primary current selection

Setting Mode (SET + AS Key)

→ Setting(▼, ▲ Key) → save

(AS Key)

C.T Primary current value selection

5→10→15→20→25→30→40→50→60→70→75→80→90
→100→120→125→130→140→150→160→170→175→
180→200→225→240→250→300→400→450→500→600
→700→750→800→900→1000→1200→1250→1300→
1400→1500→1600→1700→1750→1800→2000→2500→
3000→3200→3500→3600→4000→5000→6000

VS Button

- V1, V2, V3, PT Primary current selection
- Wiring method/P.T Primary current selection

Setting Mode (SET + VS Key) → Wiring

method(▼, ▲ Key) → Save(VS key)→

P.T ratio(▼, ▲ Key) → save(VS Key)

Primary voltage value selection (Choose 500 for direct connection)

3P3W

500→380→440→3,30→6,60→7,20
→11,0→11,4→22,0→22,9→66,0→154

3P4W

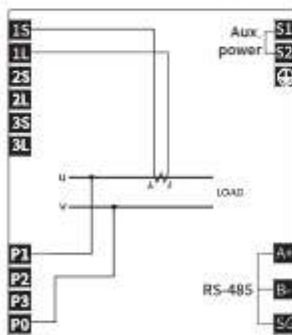
500→380→11,4→22,9

FS Button

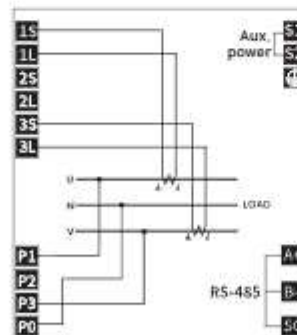
Select: W-PF-var-Hz-Wh-varh, Communication address selection



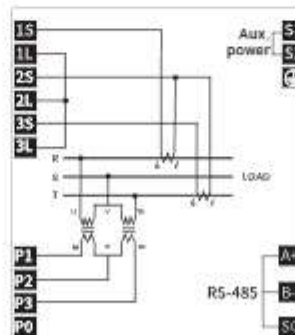
Connection diagram



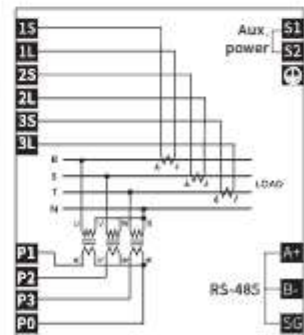
1P2W



1P3W



3P3W



3P4W

Drawing

Refer to page 80 type D

Panel Power Meter

Certificates 



Model No.

KDY - A

① ② ③ ④

① Digital Meter

② Panel meter

③ Measurement

④ Communication

How to order
KDY-AC (With communication),
KDY-A (Without communication)

A 3PV, 3PA, W, PF, var, Hz, Wh, varh

C RS-485 N/A None

Customized product can be produced by order.

Overview

Instrument which can display the power distribution boards 3 $\emptyset$ A, 3 $\emptyset$ V, W, PF, var, Hz, Wh, varh and remote power monitoring by RS-485 communication.

Specification

Aux. power	AC 110/220V $\pm$ 10%(50/60Hz), DC 110V
Operating temperature	-10~50°C
Operating humidity	20~85%
Insulation resistance	More than 10M Ω
Surge impulse	Voltage(1.2 μ s/ 50 μ s,5kV) Current(8 μ s/ 20 μ s)
Burst	Level 4(IEC 61000-4-4)
Withstand voltage	AC 2kV/1 minute
Maximum input	Less than A-0.2VA, Less than V-0.1VA
Weight	800g

Function

- 3-phase voltage, 3 phase current, W, PF, var, Hz, Wh, etc. and others are displayed with three windows.
- CT, PT, and primary value can be set.
- RS-485 Serial Communication.

Input

Range	Line voltage	40~500V
	Current input	0.1~6A
	Frequency	45~65Hz 1P2W, 1P3W, 3P3W, 3P4W Shared
Accuracy	Refer to page 111p	

Display

LED	14.2(0.56")mm Red
Display update speed	1000ms

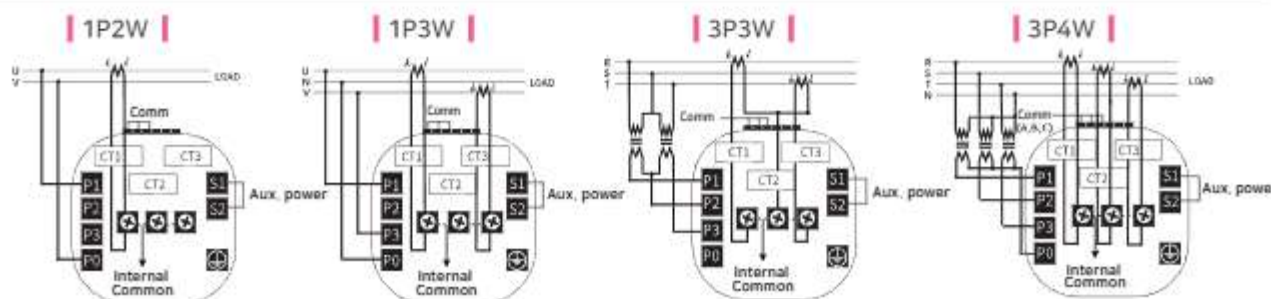
Communication specification

Interface	RS-485, Multi-drop 2Wire
Protocol	Modbus RTU(Basic) Melsec(Optional)
Address setting	0~255
Transmission distance	maximum 1.2km within
Transmission rate	9600bps

Setting order and method

- Connection method setting (▲▼ KEY) & save(SET KEY)
- P. T Primary voltage selection(▲▼ KEY) & Save(SET KEY)
- C. T 1st current selection (▲▼ KEY) & save(SET KEY)
- Communication address setting
 - ones digit setting (▲▼ KEY) & Save(SET KEY)
 - Tens digit setting (▲▼ KEY) & Save(SET KEY)
 - Hundreds digit setting (▲▼ KEY) & Save(SET KEY)
- PT/CT ratio need to be checked on installation.

Connection diagram



Detailed Function

Indicate LED

Indicate the data shown in displays.

Display window

4 Digit Display item can be varied
by select button window
Using UP / DOWN KEY
Measurement values can be selectively viewed

Select button

Circuit, current, voltage, communication
Energy reset,
Select indication value

Communication LED



A1, A2, A3 C .T Primary current selection

C.T Primary current value selection.

5→10→15→20→25→30→40→50→60→70→75→
80→90→100→120→125→130→140→150→160→
170→175→180→200→225→240→250→300→4
00→450→500→600→700→750→800→900→
1000→1200→1250→1300→1400→1500→1600→
1700→1750→1800→2000→2500→3000→3200→3
500→3600→4000→5000→6000

V1, V2, V3, P . T Primary voltage selection

Primary voltage value selection range (Select 500 for direct connection)

3P3W : 500→220→380→440→3.30→6.60→7.20→
11.0→11.4→22.0→22.9→66.0→154
3P4W : 500→380→11.4→22.9

▲ Note

If the power is off, the accumulated value
for 30 minutes can be deleted.

Display sequence	1	2	3	4	5	6	7
Display A	Σ V	R phase V	RS V	A1	PF	Hz	A0
Display B	Σ A	S Phase V	ST V	A2	var	Wh	Varh
Display C	W	T Phase V	TR V	A3	W	Wh	Varh

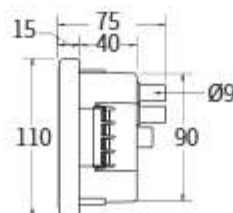
Accuracy

V, A		W, var	
± (0.3% of rdg + 0.2% of F.S)		± (1.0% of rdg + 0.2% of F.S)	
PF	Hz	Wh, varh	
± (1.0% of rdg + 0.1°)	± 0.1Hz	± (W Accuracy + 1 count/h)	

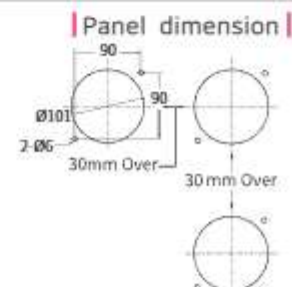
at 45~65Hz, at COS Ø ± 0.8~1.0, 23°C

Drawing

Unit : mm



The inner diameter of rear-located CT is Ø 9.



Panel Power Meter

Certificates  



Model No.

KDY - 200

① Digital meter

② Panel Power Meter

③ Model series

①② ③

Display : 3PV, 3PA, W, PF, var, Hz, Wh, varh, VA

Communication : RS-485

Overview

Monitoring electrical data (such as voltage, current, active power, reactive power, surface power, PF, frequency, active energy, reactive energy)

Communication function with RS-485 or LAN.

Function

Remote power quality monitoring With RS - 485 communication

Easy to use.

⚠ **Caution** Wh, V arh is saved in every 30 min.
And if the power is off, the accumulated value for 30 min can be deleted.

Specification

Item	Contents
Aux. power	AC 90V ~ 260V(50/60Hz)/DC110V
Display method	Custom LCD
Communication	RS-485 communication
Insulation resistance	More than 10MΩ (500VDC Mega standard) between external terminal and case
Withstand voltage	AC 2kV/1 minute
Burst	Level 4 (IEC 61000-4-4)
Electrostatic discharge	± 8kV (Air), ± 4kV (Contact) (IEC 61000-4-2)
Surge impulse	1.2/50μs, 2kV (IEC 61000-4-5)
Electromagnetic interference	CE : 0.15~0.5MHz : 79(66)dBuV, 0.5~30MHz : 73(60)dBuV, (KN22) RE : 30~230MHz : 40dBuV/m, 230~1000MHz : 47dBuV/m, (KN22)
Radio frequency radiation immunity	RS:10V/m (IEC 61000-4-3)
Operating temperature/humidity	-10°C ~ 50°C / 20~85%
Weight	600g

Input

Range	Line voltage	40~500V
	Current input	0.1~6A
	Frequency	45~65Hz

Accuracy

Voltage	± (0.2% of rdg + 0.02% of FS)	Power factor	± (0.5% of rdg + 0.5°)
Current	± (0.2% of rdg + 0.02% of FS)	Frequency	± (0.02Hz)
Active Power	Class 0.5 as per IEC 62053-22 ± (0.5% of rdg + 0.01% of FS)	Active energy	Class 0.5 as per IEC 62053-22 ± (watt accuracy + 0.1 count/h)
Reactive Power	Class 1.0 as per IEC 62053-24 ± (1.0% of rdg + 0.01% of FS)	Reactive energy	Class 1.0 as per IEC 62053-24 ± (var accuracy + 0.1 count/h)

Configuration

Power indicator LED

Phase

Current usage rate

Communication state RX/TX

Σ : TOTAL / Ln : n phase



Screen page

Lead, Lag, Minus

Unit of measurement

Integrated energy

Setting button



Max value
Auto saving



Energy generation
Energy consumption



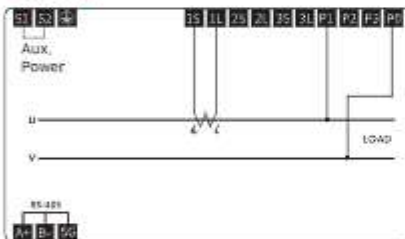
RS-485
communication



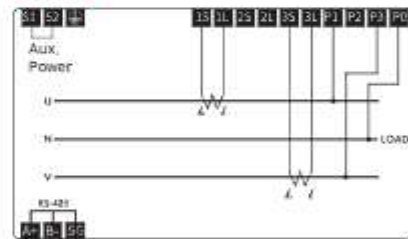
Clear view

Connection diagram

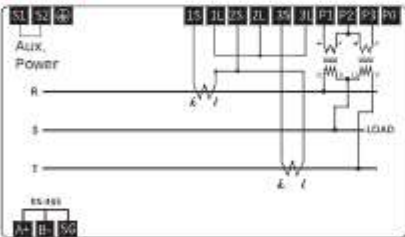
1 ϕ 2W



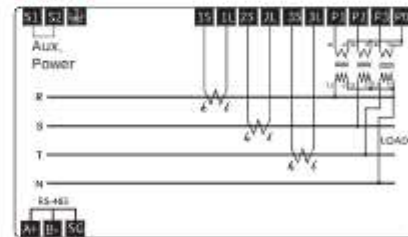
1 ϕ 3W



3 ϕ 3W

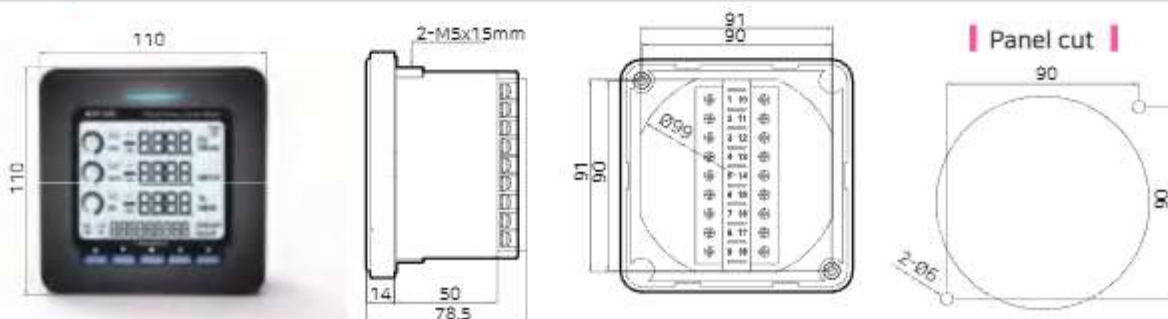


3 ϕ 4W



Drawing

Unit : mm



Auto PF Controller

Certificates 



Model No.

KCP -  

① Display type and number of circuits

06 LED 6 Circuit

12 LED 12 Circuit

SM LCD 6 Circuit

② Communication

C Communication function

N/A None

Overview

Measuring the electrical data and control the external capacitor(condenser) in order to compensate Power factor (Balanced type)

Recommendation

Please be advised that 1st relay to be used for PF compensation of low load PT.
And the last relay to be used for spare to compensate PF.

Characteristics

- Automatic phase finding function
- Easy setting and easy operation with dip switch
- Setting active power / reactive power for potential transformer, and control the PF in night time.
- Setting low load condition and restrain the relay operation.
- Over / under voltage, target PF with Day/night setting, Setting condenser capacity. (KCP-SM)
- Monitoring PF trend, and condenser input time (For KCP-SM)

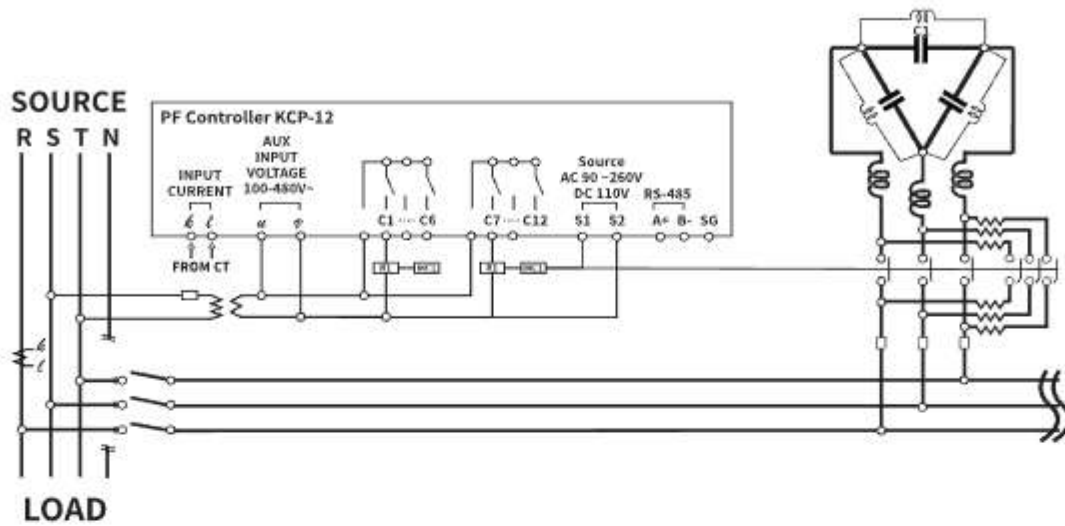
Specification

	KCP-06	KCP-12	KCP-SM
Output	Number of circuits : 6 point (1Common)	Number of circuits : 12 point (2Common)	Number of circuits : 6 point (1Common)
Setting	- PT Ratio - 500(Direct connection), 380/110, 380√3/190√3, 440/110, 3300/110, 6600/110, 22900/110, 22900√3/190√3 - CT Ratio - 5/5 - 6000/5A - Target power factor - LAG (+) 80~100 - Control method - 1 (sequential)/2(Circulation) - Low power range - 0 - 999(kW/MW) - Input / delay time - 5~1800 second		- Basic setting - voltage / current ratio, daytime target, nighttime target, voltage range, delay time, clock setting, communication address - Control method - sequential, circulation, intelligent - OFFSET - Active power OFFSET Reactive power OFFSET - Wiring correction - Automatic, Manual
Display	Power factor, voltage, current, active power, reactive power		Power factor, voltage, current, active power, reactive power Power factor trend, condenser input time
Common	- Aux. power - AC 90~260V(50/60Hz), DC 110V - Operating temperature / humidity - 10~50°C/20~85% - Insulation resistance - More than 10MΩ - Withstand voltage - AC 2kV / 1min - Contact capacity - Relay AC 250V, 2A / DC 30V, 2A - Communication Interface ▶ RS-485 Multi-Drop 2Wire Protocol ▶ Modbus RTU		- Surge impulse - Voltage(1.2μs/ 50μs, 5kV), current(8μs, 20μs) - Burst - Level 4(IEC 61000-4-4) - Input - Voltage ▶ line voltage(S-T), AC 500V Current ▶ Current R phase current input, AC 5A - Data - Refer to page 114 Transmission rate ▶ 9600bps

Input

Range	Voltage	S-T line AC 50~ 500V	Accuracy	Voltage	± (0.3% of rdg + 0.2% of FS)
	Current	R phase AC 0.05~ 6.0A		Current	± (1.0% of rdg + 0.2% of FS)
				Power Factor	± (3.0% of rdg + 1.0%)

Connection diagram



Drawing

Refer to page 80 Type D

KCP-06/12 Display

KCP-06/12 Normal Display



- A power factor 100% is displayed on the A window, and power 500 kW is displayed on the B window.
- You can switch the measured value by pressing the button.

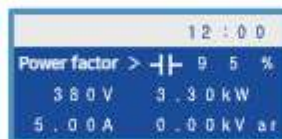
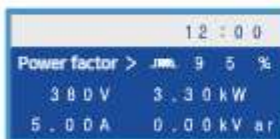
KCP-06/12 Setting Display



- PF is displayed on the A window and the setting value is displayed on in the B window.
- You can change setting value by pressing the button.
- Within the range of 80 to 100, it is controlled by the set power factor target value.

KCP-SM Setting Display

KCP-SM Normal Display



Press "▲" / "▼" button to select the modes.

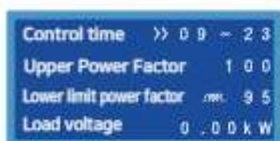
Symbol of lag - and lead -

KCP-SM Setting Display



Setting item selection(▲ / ▼)→Start(ENT)→Change
(▲ / ▼)→Save(ENT)→End setting & previous menu(SET)

KCP-SM PF setting display



- ① Press ▲ / ▼ button, and ">>" will be located at setting item.
- ② Press ENT button to change setting with ▲ and ▼ button.
- ③ Change remaining items, and press ENT button to finish.

Auto PF Controller



Model No.

KCP - 03 06 S
① ②

① Number of circuits

03 3Circuit
06 6Circuit

② Communication

N/A None

Overview

Measuring the electrical data and control the external capacitor(condenser) in order to compensate Power factor (Balanced type)

Characteristics

- Select control range and setting by day or night
- OFFSET can be set on the device to compensate power factor errors in each region.
- Automatic phase finding function (Patented Technology)

Specification

	KCP-03S	KCP-06S
Output	Number of circuits : 3 point (1 common)	Number of circuits : 6 point (1 common)
Aux. power	Contact capacity: Relay AC 250V, 2A / DC 30V, 2A	
	AC 90 ~ 260V (50~60Hz), DC 110V	
Communication	Protocol : Modbus RTU	
	Interface: RS-485 2Wire Multi drop	
	Transmission rate : 9600/19200 bps	
	Data : Start 1bit, Data 8bit, Parity none, Stop 1bit	
Others	Operating temperature / humidity : -10~50°C / 20~85%	
	Withstand voltage : AC 2kV / 1min	
	Insulation resistance - More than 10MΩ	
	Surge impulse - 1.2μs/ 50μs, 5kV	
	Burst immunity test : Level 4(IEC 61000-4-4)	

Input

Range	Voltage	S-T line voltage AC 50~ 500V	Accuracy	Voltage	± (0.3% of rdg + 0.2% of FS)
	Current	R phase AC 0.05~ 6.0A		Current	± (1.0% of rdg + 0.2% of FS)
				Power Factor	± (3.0% of rdg + 1.0°)

Configuration

Power indicator LED

Additional setting items

Setting item

- Normal mode ; Power factor is displayed , and V,A,W and Var also can be checked by switch button.
- Setting mode ; Setting item is displayed

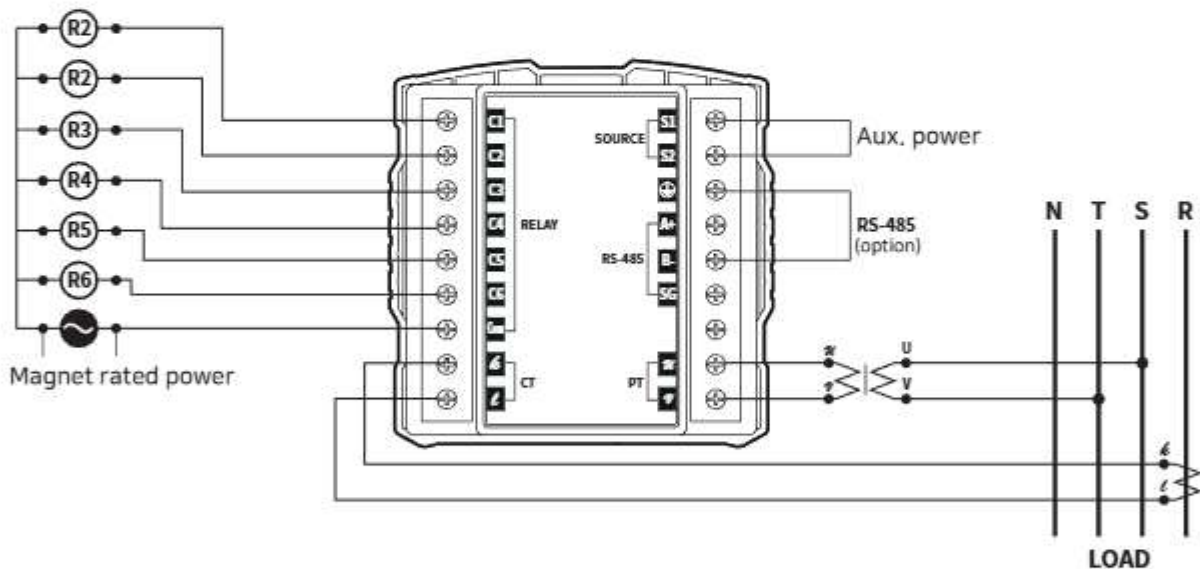
- Normal mode ; Target power factor is displayed
- Setting mode ; Target PF setting is displayed

Setting button

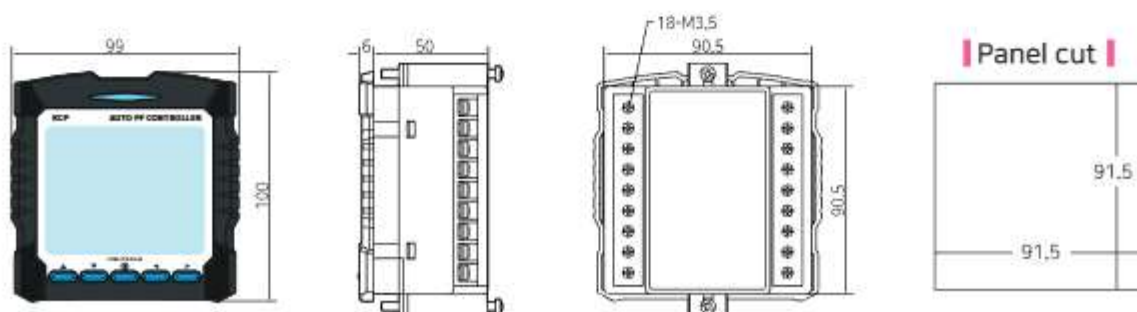
Set the contact status and control method (manual / automatic)



Connection diagram



Drawing



Power Quality Meter



Model No.

KDQ -100

①

① Power Quality Meter

Overview

Measuring electrical data (Voltage, Current, power, Power factor, Frequency, Energy, Demand) and display Harmonics, Waveform, Phase angle in order to analyze power quality.

Communication

Interface	RS-485 (2Wire)(A+,B-,Com)
Protocol	Modbus RTU
Transmission distance	Max 1,2km
Transmission rate	9600,19200,38400 bps

Specification

Aux. power	AC 110/220V±10%(50/60Hz), DC 110V
Operating temperature	-10~50°C
Operating humidity	20~85%
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)
Burst	Level 4(IEC 61000-4-4)
Withstand voltage	AC 2kV/1 minute
Maximum input	Less than A-0.2VA, Less than V-0.1VA
Weight	1500g

Input

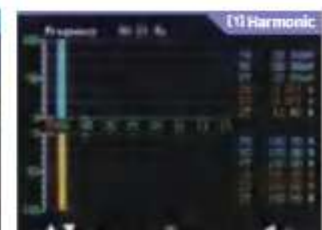
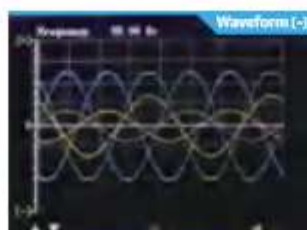
Range	Line Voltage	40~ 500V
	Current	0.1~ 6A
	Frequency	45~65Hz
Accuracy	Voltage	± (0.3% of rdg + 0.2% of FS)
	Current	± (1.0% of rdg + 0.2% of FS)
	Frequency	± (0.02Hz)
	Active Power	± (1.0% of rdg + 0.2% of FS) at PF=1
	Reactive Power	± (1.0% of rdg + 0.2% of FS) at PF=1
	Power Factor	± (1.0% of rdg + 0.2% of F.S)
	Active energy	± (watt accuracy + 0.1 count/h)
	Reactive energy	± (var accuracy + 0.1 count/h)

Drawing

Unit : mm

144(W)X144(H)X140(D)

Display[Color LCD 320X240]



Digital power meter KDX-200 selection guide

Comparison table



Type		KDX-200	KDX-210	KDX-220	KDX-230	KDX-240
Feature	Size	144x144mm				
	Display	LCD(Back Light : White)				
	Installation	Panel front				
Function	Communication	RS 485 or Ethernet(Optional)				
	V,A,W,PF,var,h	V	V	V	V	V
	Wh, varh	V	V	V	V	V
	DI	-	4	-	4	4
	DO	-	2	-	2	2
	Temperature	-	-	2	2	-
	Max Min((V,A,W,H)	V	V	V	V	V
	Limit setting	-	V	-	V	V
	Leakage current	-	-	-	-	V

Panel Power Meter

Certificates  



Model No.

KDX-2    

① Digital meter

② Panel Power Meter

③ Measurement

④ communication

0 Basic

0 No communication

1 Basic + DOx2 + DIx4

1 RS-485

2 Basic + TEMPx2

2 Ethernet

3 Basic + DOx2 + DIx4 + TEMPx2

4 Basic + DOx2 + DIx4 + Leakage current x1

Caution Wh, Varh is saved in every 30 min. And if the power is off, the accumulated value for 30 min can be deleted.

 How to order Example)
KDX-210
KDX-211

 Basic : 3PV, 3PA, W, PF, var, Hz, Wh, varh, VA
 Customized product can be produced by order.

Overview

Monitoring electrical data(such as voltage, current, active power, reactive power, surface power, PF, frequency, active energy, reactive energy), and DI/DO/Temperature/Leakage current.

Communication function with RS-485 or LAN.

Function

- Remote power quality monitoring With RS - 485 communication and Ethernet communication.
- I / O information can be checked in real time, and output can be controlled directly / indirectly.
- The temperature monitoring of 2 channels.
- Leakage current monitoring .
- Easy to use.

Specification

Item	Contents	Item	Contents
Aux. power	AC 90V - 260V(50/60Hz)/DC110V	Electrostatic discharge	± 8kV(Air), ± 4kV(Contact) (IEC 61000-4-2)
Display method	Custom LCD	Surge impulse	1.2/50μs, 2kV (IEC 61000-4-5)
Communication	RS-485 Communication	Electromagnetic interference	CE : 0.15~0.5MHz : 79(66)dBuV, 0.5~30MHz : 73(60)dBuV, (KN22) RE : 30~230MHz : 40dBuV/m, 230~1000MHz : 47dBuV/m, (KN22)
Insulation resistance	More than 10MΩ(500VDC) between external terminal and case	Radio frequency radiation immunity	RS:10V/m (IEC 61000-4-3)
Withstand voltage	AC 2kV/1 minute	Operating temperature / humidity	-10℃ ~ 50℃ / 20~85%
Burst	Level 4(IEC 61000-4-4)	Weight	800g

Input

Input Range Voltage 40V~500V Current 0.1~6A Frequency 45~65Hz

Accuracy	Voltage	± (0.5% of rdg + 0.1% of FS)	Power Factor	± (1.0% of rdg + 1.0°)
	Current	± (0.2% of rdg + 0.1% of FS)	Frequency	± (0.05Hz+0.1% of FS)
	Active Power	± (1.0% of rdg + 0.1% of FS)	Active energy	± (1.0% of rdg + 0.1 count/h)
	Reactive Power	± (1.0% of rdg + 0.1% of FS)	Reactive energy	± (2.0% of rdg + 0.1 count/h)

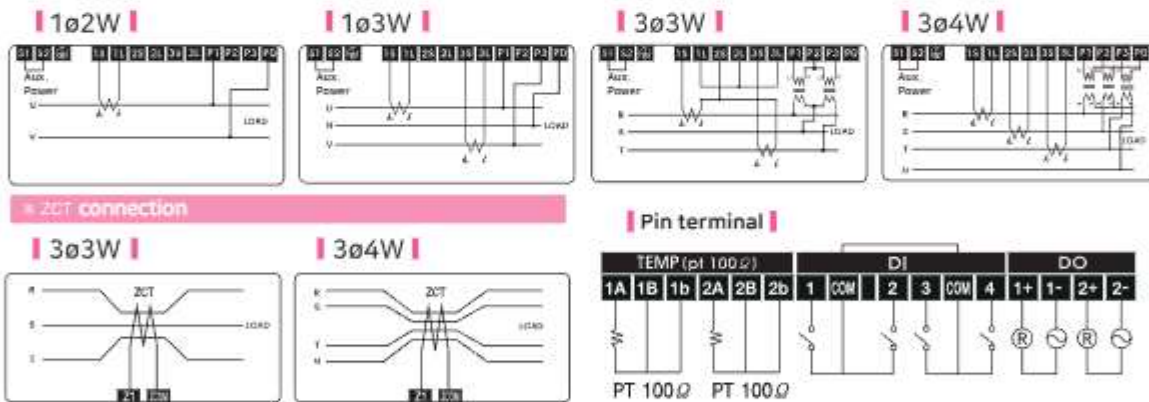
Configuration

Phase	Symbol
Current usage rate	Unit of measurement
Σ : TOTAL Ln : n phase	Digital input / output state
Communication state(Rx.Tx)	Page number
Local / Remote	Firmware Upgrade Connector
POWER LED	Input button



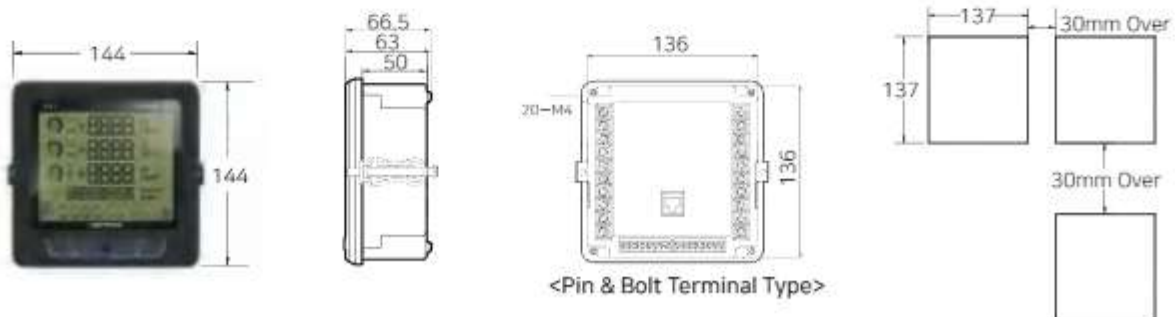
Digital input / output	Temperature measurement or Leakage current	Limit setting Contact output Voltage current Power, temperature	Max value Auto saving	Eney generation Eney consumption	RS-485 or Ethernet communication	Clear view

Connection diagram



Drawing

Unit : mm



Panel Power Meter

Certificates  



Model No.

KDX - 300

① ②

③

① Digital meter

② Panel Power Meter

③ Model series

Display : 3PV, 3PA, W, PF, var, Hz, Wh, varh, VA

Communication: RS-485

Overview

Monitoring electrical data(such as voltage, current, active power, reactive power, surface power, PF, frequency, active energy, reactive energy)

Communication function with RS-485 or LAN.

Function

- Remote power quality monitoring With RS - 485 communication
- Easy to use.

▲ Caution) Wh, Varh is saved in every 30 min.
And if the power is off, the accumulated value for 30 min can be deleted.

Specification

Item	Contents	Item	Contents
Aux. power	AC 90V ~ 260V(50/60Hz)/DC110V	Electrostatic discharge	± 8kV(Air), ± 4kV(Contact)(IEC 61000-4-2)
Display method	Custom LCD	Surge impulse	1.2/50μs, 2kV (IEC 61000-4-5)
Communication	RS-485 communication	Electromagnetic interference	CE : 0.15~0.5MHz : 79(66)dBuV, 0.5~30MHz : 73(60)dBuV, (KN22) RE : 30~230MHz : 40dBuV/m, 230~1000MHz : 47dBuV/m, (KN22)
Insulation resistance	More than 10MΩ (500VDC mega standard)) between external terminal and case	Radio frequency radiation immunity	RS:10V/m (IEC 61000-4-3)
Withstand voltage	AC 2kV/1 minute	Operating temperature / humidity	-10℃ ~ 50℃ / 20~85%
Burst	Level 4(IEC 61000-4-4)	Weight	600g

Input

Range	Line voltage	40~500V
	Current input	0.1~6A
	Frequency	45~65Hz

Accuracy

Voltage	± (0.2% of rdg + 0.02% of FS)	Power Factor	± (0.5% of rdg + 0.5 °)
Current	± (0.2% of rdg + 0.02% of FS)	Frequency	± (0.02Hz)
Active power	Class 0.5 as per IEC 62053-22 ± (0.5% of rdg + 0.01% of FS)	Active energy	Class 0.5 as per IEC 62053-22 ± (watt accuracy + 0.1 count/h)
Reactive power	Class 1.0 as per IEC 62053-24 ± (1.0% of rdg + 0.01% of FS)	Reactive energy	Class 1.0 as per IEC 62053-24 ± (var accuracy + 0.1 count/h)

Configuration

Power indicator LED

Phase

Current usage rate

Communication state RX/TX

Σ : TOTAL / Ln : n phase



Display page

Lead, Lag, Minus

Unit of measurement

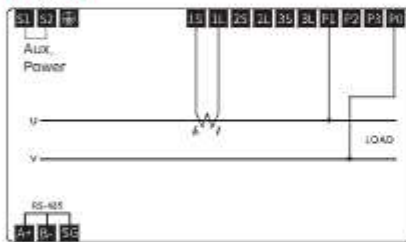
Integrated energy

Setting button

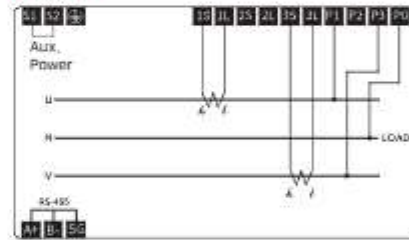


Connection diagram

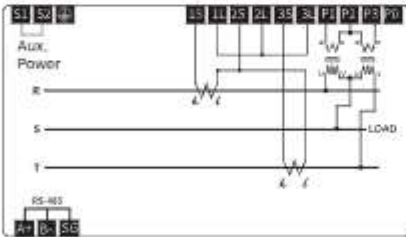
1ø2W



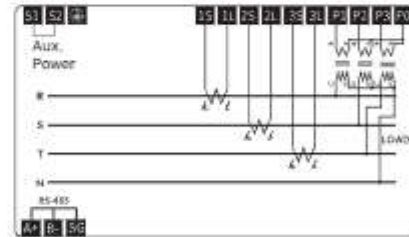
1ø3W



3ø3W

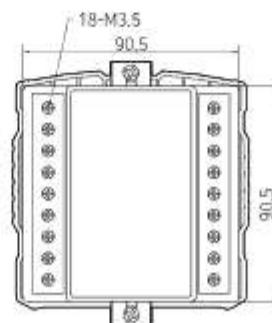
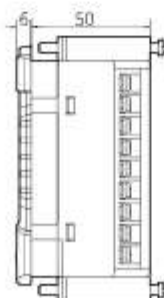


3ø4W

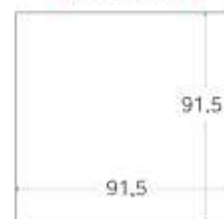


Drawing

Unit : mm



Panel cut



AC 3P V · A Meter

Certificates  

Model No.

KDO - 100

① ② ③

- ① Digital meter
- ② 3-phase voltage / current
- ③ Basic specification



Overview

Monitoring 3 phase voltage and current with 2 sets of LED display.

Up to 500V, direct connection is possible without PT.

Specification

Item	Contents	Item	Contents
Aux. power	AC 90V ~ 260V(50/60Hz)	Burst	Level 4(IEC 61000-4-4)
Display method	7Segment LED(0.56 in. Red.)	Operating temperature	-10℃ ~ 50℃(Without frost)
Withstand voltage	2000VAC 1 minute (between external terminal and case)	Insulation resistance	More than 10MΩ (500VDC)
Surge impulse	1.2/50μs, 2kV (IEC 61000-4-5)	Weight	300g
Setting	Voltage ratio : 220/110V, 380/110V, 380√3/190√3V, 440/110V Current ratio : 5/5~1000/5A(Total 38 EA)		

Electrostatic discharge, Surge impulse, electromagnetic interference, radio frequency immunity are the same as KDX-200.

Input

Range	Line voltage	AC 50~ 500V	Accuracy	± (0.3% of rdg + 0.2% of FS)
	Current	AC 0.1~ 6.0A		

Configuration

Voltage Display

Line voltage, Phase voltage
(3Ø3W: total 3EA, 3Ø4W: total 6EA)

Indicate LED

Measuring phase indication
Instructions)

VRS : R/S Led ON

VRN : R Led ON

AR : R Led ON

Current Display

Each phase current indication



VS Button

Voltage indication and voltage ratio setting

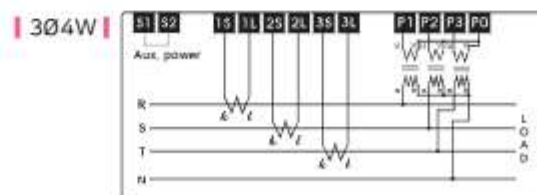
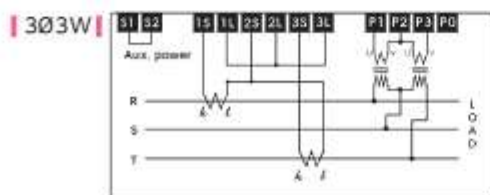
- 3P3W : RS > ST > TR

- 3P4W : RS > ST > TR > RN > SN > TN

AS Button

Currents indication R>S>T
and current ratio setting.

Connection diagram



Drawing

Refer to page 80 type C

AC 3P V · A Meter



Model No.

KDO - 20

①②

③ Digital meter	③ Communication
② 3-phase voltage / current	① RS-485
	② None

Overview

Monitoring 3 phase voltage, current, frequency, power and power factor with 2 sets of LED display.

Up to 500V, direct connection is possible without PT.

Specification

Item	Contents	Item	Contents
Aux. power	AC 90V ~ 260V(50/60Hz)	Burst	Level 4(IEC 61000-4-4)
Display method	7Segment LED(0.56Inch, red))	Operating temperature	-10℃ ~ 50℃(Without frost)
Withstand voltage	2000VAC 1 minute (between external terminal and case)	Insulation resistance	More than 10MΩ (500VDC)
Surge impulse	1.2/50μs 4kV, 8/20μs 2kA	Weight	300g
Communication	Interface RS-485 Multi Drop 2Wire	Protocol	Modbus RTU
Setting	Voltage ratio 220/110V, 380/110V, 380V/3/190V/3V,440/110V	Transmission rate	9600bps
		Communication ID	0~255
		Current ratio	5/5~1000/5A(total 38 EA)

Input

Range	Line voltage	AC 50~ 500V	Accuracy	± (0.3% of rdg + 0.2% of FS)
	Current	AC 0.1~ 6.0A		

Configuration

Voltage Display

Line voltage, Phase voltage
(3Ø3W: total 3EA, 3Ø4W : total 6EA)

Indicate LED

Phase indication of each display window
Example)

VRN : Red Led ON

IR : Red Led ON

Hz : Blue Led ON



VS Button

Voltage indication and voltage ratio setting for each appliance

- 3P3W : RS > ST > TR

- 3P4W : RS > ST > TR > RN > SN > TN

AS Button

Current and other data indication

R>S>T>Hz>W>PF,

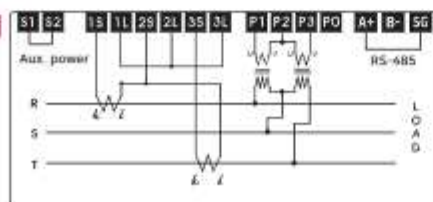
and current ratio setting.

Current Display

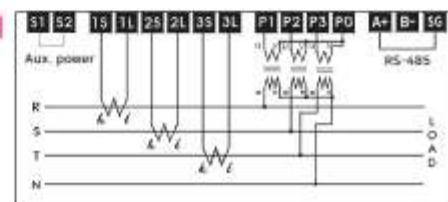
Each phase current, frequency, power, power factor indication

Connection diagram

3Ø3W



3Ø4W



Drawing

Refer to page 80 type C

V · Hz Relay Meter



Model No.

KDU - 100

① ② ③

① Digital meter

② V · Hz Relay Meter

③ Basic specifications

Overview

Up to 500V, direct connection is possible without PT

Monitoring voltage and frequency, and relay contact will be activated if exceed setting range

Specification

Item	Contents	Item	Contents
Aux. power	AC 90V ~ 260V(50/60Hz)	Burst	Level 4(IEC 61000-4-4)
Display method	7Segment LED(0.56inch, Red)	Operating temperature	-10℃ ~ 50℃(Without frost)
Withstand voltage	2000VAC 1 minute (between external terminal and case)	Insulation resistance	More than 10MΩ (500VDC)
Surge impulse	1.2/50μs 4kV, 8/20μs 2kA	Weight	270g
Setting	- Upper / lower limit voltage:500~100V - Alarm HOLD : ON/OFF - Upper / lower limit frequency:65~45Hz - Delay time: 0.16~3.0 sec - No input alarm:ON/OFF		

Input

Range	Voltage	AC 50~ 500V	Accuracy	Voltage	± (0.3% of rdg + 0.2% of FS)
	Frequency	45~ 65Hz		Frequency	± (0.1Hz)

Configuration

Voltage display

Voltage indication
- Setting item display

Indicate LED

LED ON if exceed setting range.

Frequency display

Frequency indication
- Set value display



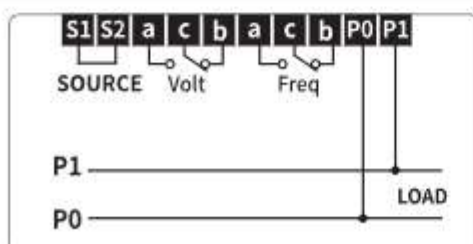
SET Button

Setting start.

▲ Button

Setting value change.

Connection diagram



Drawing

Refer to page 80 type C

V / A · Hz Relay Meter



Model No.

KDU-20

①②

③

① Digital
meter

② 3 Phase
V · Hz Relay Meter

③ Communication

I RS-485

O None

Overview

Up to 500V, direct connection is possible without PT

Monitoring voltage, current and frequency, and relay contact will be activated if exceed setting range.

Specification

Item	Contents	Item	Contents
Aux. power	AC 90V ~ 260V(50/60Hz)	Burst	Level 4(IEC 61000-4-4)
Display method	7Segment LED(0.56Inch, Red)	Operating temperature	-10°C ~ 50°C(without frost)
Withstand voltage	2000VAC 1 minute (between external terminal and case)	Insulation resistance	More than 10MΩ (500VDC)
Surge impulse	1,2/50μs 4kV, 8/20μs 2kA	Weight	270g
Communication	- Interface: RS-485 - Transmission rate : 9600bps - Protocol : Modbus RTU		
Setting	- Upper / lower limit voltage:500~100V - Upper / lower limit frequency:65~45Hz - Delay time: 0.16~5.0 sec - CT ratio : 5/5 ~ 6000/ 5A - Communication address:0~255 - Alarm HOLD : ON/OFF - No input alarm:ON/OFF		

Input

Range	Voltage	AC 50~ 500V	Current	0.1~6A	Accuracy	Voltage	± (0.3% of rdg + 0.2% of FS)
	Frequency	45~ 65Hz				Frequency	± (0.1Hz)

Configuration

V, A display

Voltage and current indication,

Indicate LED

LED ON if exceed setting range

- High : Red LED
- Low : Blue LED

Frequency Display

Frequency indication

- Set value display



SET Button

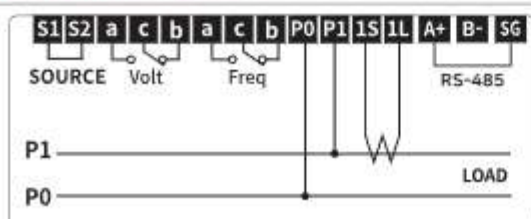
Setting start

- V / A Display: Select voltage or current indication

▲ Button

Setting value change
The alarm release,

Connection diagram



Drawing

Refer to page 80 type C

Energy Management Device

Certificates 



Model No.

KCM - 100

① ②

① **Energy Management Device**

② **Basic specifications**

WP/EOI : Open Collector(Input/Output)

Feature

- Expected power and energy display depends on user request time (1 minute, 5 minutes, 10 minutes, 15 minutes, 30 minutes, 60 minutes)
- EMS device can be connected without KEPCO approval.
- Remote monitoring using RS - 485 communication, (MODBUS - RTU)

Overview

Retransmitting WP(Watt Pulse) and EOI(End Of Interrupt) signal from energy meter.

Specification

Item	Contents	Item	Contents
Aux. power	AC 220V(60Hz)	Operating temperature/humidity	-10℃ ~ 50℃(Without frost) 20~85% RH(Over dew point)
Setting	- Equipment address (0~255) - Communication speed 9600/19200bps - PT ratio(1~2000), CT ratio(1~2000) - Meter constant(1~50000)/kWh - Signal input method PULSE/TOGGLE - User demand time (1/5/10/15/30/60 minute)	Display	- FND : 9,14(0.36")mm Red(6digit) - Measurement value display (fixed to two decimal places) • Expected power(KW/MW)(KW/MW) • Cumulative energy (KWh/MWh)(KWh/MWh)
Insulation resistance	More than 10MΩ	Communication	PC Communication : RS-485 multi-drop 2wire(MODBUS RTU), 9600/19200bps
Surge impulse	1.2/50μs, 2kV(IEC 61000-4-5)	Radio frequency radiation immunity	10 V/m(IEC 61000-4-3)
Electromagnetic interference(RE)	30~230MHz : 40dBuV/m, 230~1000 MHz : 47dBuV/m(RE, KN16)	Withstand voltage	AC 2kV/1 minute
Burst	Level 4(IEC 61000-4-4)	Electromagnetic interference(CE)	0.15~0.5 MHz : 79(66) dBuV, 0.5~30 MHz : 73(60) dBuV(CE, KN16)
		Electrostatic tolerance	±8kV(Air), ±4kV(Contact)(IEC 61000-4-2)

Configuration

Power / Enegy LED

W Power Wh Energy

Signal LED

WP : Watt pulse

EOI : End Of Interval status

COMM : 485 Transmission status

SET Key Hold 3 sec to enter setting mode



FND Display

- 6Digit - Power Energy
- Display setting value in setting mode

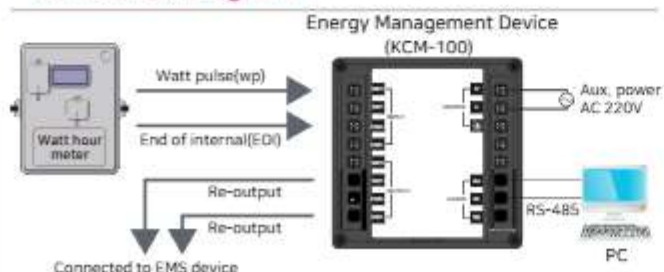
Unit LED

kW, kWh/MW, MWh

Direction key

- Change display item
- W : Power / Wh : Energy
- Change setting value

Connection diagram



Drawing

Refer to page 80 type C

Advanced Panel Power Meter

Model No.

KDQ - 
① ②

① Advanced Panel Power Meter

② Function

- 200** Power Meter + CB Open/Close + TEMP X 2 + Leakage X 1 + DI X 8 + DO X 8
- 310** Power Meter + CB Open/Close + TEMP X 1 + DO X 2 + Earth leakage Detector (16 channels)
- 400** Power Meter + CB Open/Close + TEMP X 2 + Leakage X 1 + DO X 12 + Power factor controller (12 channels)
- 500** Power Meter + CB Open/Close + TEMP X 2 + Leakage X 1 + DI X 2 + DO X 7 + Demand control
- 600** Power Meter + CB Open/Close + TEMP X 2 + Leakage X 1 + DO X 7 + Monthly demand

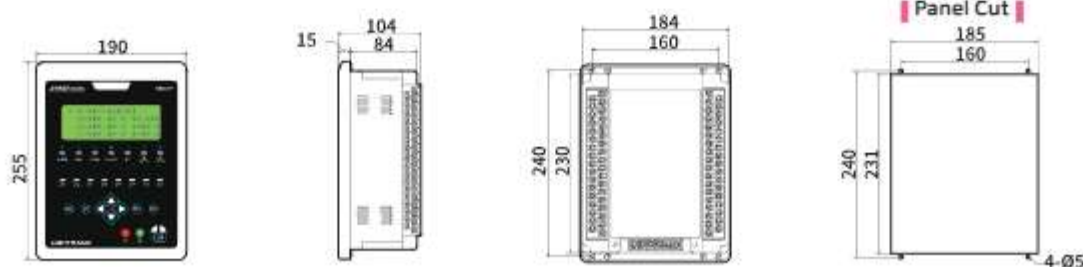
Specification

Item	Contents	Item	Contents
Aux. power	AC 90V ~ 260V(50/60Hz)/DC110V	Electrostatic tolerance	± 8kV(Air), ± 4kV(Contact) (IEC 61000-4-2)
Display method	4x20 Character LCD / 7 segment FND	Surge impulse	1.2/50μs, 2kV (IEC 61000-4-5)
Communication	RS-485 Communication	Electromagnetic interference	CE : 0.15~0.5MHz : 79(66)dBuV, 0.5~30MHz : 73(60)dBuV, (KN22) RE : 30~230MHz : 40dBuV/m, 230~1000MHz : 47dBuV/m, (KN22)
Insulation resistance	More than 10MΩ (500VDC) between external terminal and case	Radio frequency radiation immunity	RS:10V/m (IEC 61000-4-3)
Withstand voltage	AC 2kV/1 minute	Operating temperature/humidity	-10℃ ~ 50℃ / 20~85%
Burst	Burst, Level 4(IEC 61000-4-4)	Weight	1800g

Input

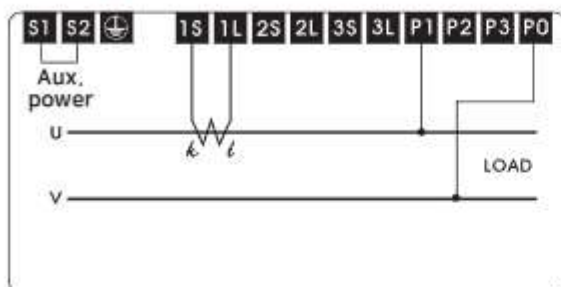
Range	Voltage 40V~500V	Current 0.1~6A	Frequency 45~65Hz
Accuracy	at 45~65Hz, at COS Ø ± 0.8~1.0, 23℃		
V	±(0.3% of rdg+0.2% of FS)	Wh	±(watt accuracy+ 0.1 count/h)
A	±(0.3% of rdg+0.2% of FS)	varh	±(var accuracy+ 0.1 count/h)
W	±(1.0% of rdg+0.2% of FS) at PF=1	Phase	±(1% of rdg + 1°)
var	±(1.0% of rdg+0.2% of FS)	Harmonic	±(1% of rdg + 1%)
PF	±(1% of rdg + 1°)	Leakage current	±(0.5% of rdg + 0.2% of FS)
Hz	±(0.1% of rdg + 0.02Hz)	Temperature	±(1℃)

Drawing

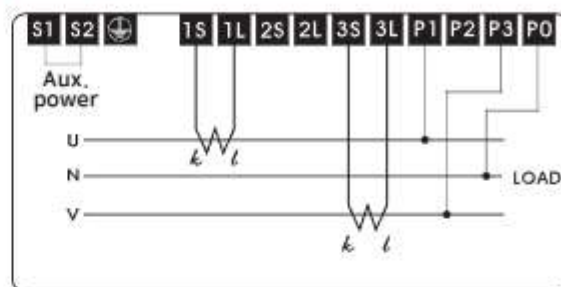


Connection diagram

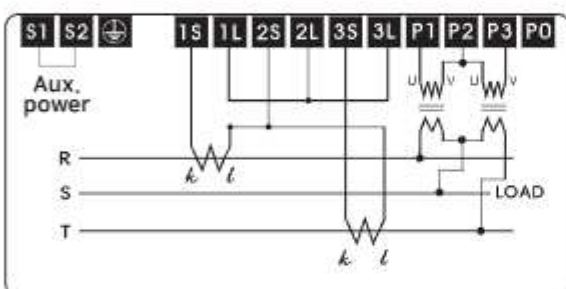
1P2W



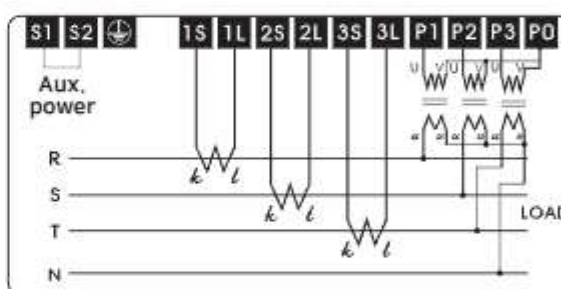
1P3W



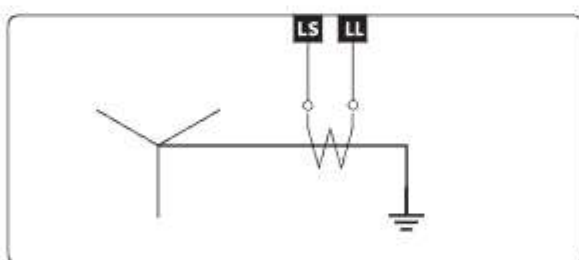
3P3W



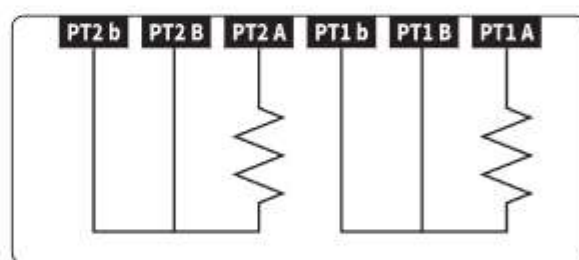
3P4W



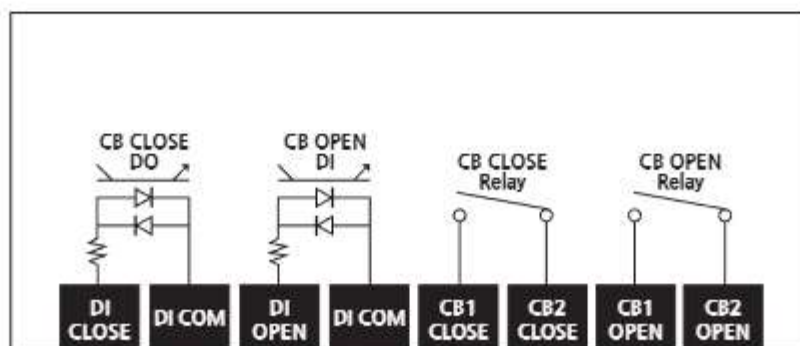
Leakage current



PT-100Ω



Circuit breaker



Power Quality Advanced Panel Power Meter

Model No.

KDQ - 200

Overview

- **Bluetooth connection with mobile devices**
Measured data can be displayed and saved in mobile devices by using bluetooth
- **Measuring fuctions**
Voltage, current, leakage current, active/reactive/surface power, PF, frequency, energy, temperature, phase can be displayed.
- **Circuit breaker control function.**
The status of circuit breaker can be displayed by contact input, and circuit breaker can be controlled by relay output.

Specification

Power quality	
Communication with smart devices	BLUETOOTH communication, available distance 5 meter
Setting	Circuit, current range, communication address by smart device
Display	Power quality related data such as waveform, harmonics and phase in smart device
Input	DI 8 channels

Refer to page 129 for specifications related to KDQ basic functions.

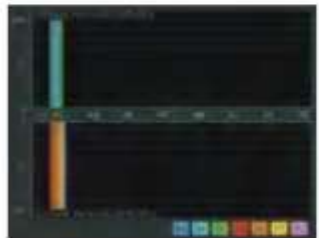
Android App(KDQ-200 Option)



Waveform



Phase

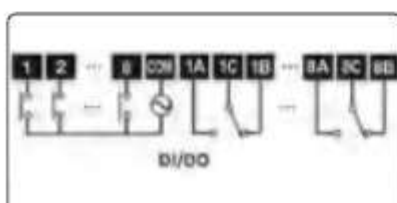


Harmonic



Measured value

Connection diagram



Configuration(KDQ-200)



A1

Display

A1	LED display	Power supply, communication, alarm, error BLUETOOTH (● - red), CB CLOSE (● - red), OPEN (● - green), DI (● - green)
----	-------------	---

Earth Leakage Detector Advanced Panel Power Meter

Model No.

KDQ-310

Overview

- Earth leakage detector function

This device is detecting earth leakage by zero phase current transformers, which can be connected up to 16 sets. Alarm and buzzer to be activated if measured current from ZCT is exceed setting value.

- Measuring functions

Voltage, current, leakage current, active/reactive/surface power, PF, frequency, energy, temperature, phase can be displayed.

- Circuit breaker control function.

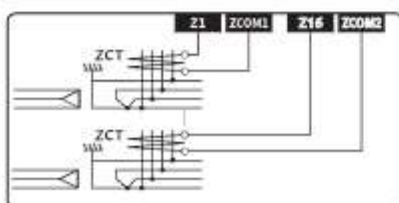
The status of circuit breaker can be displayed by contact input, and circuit breaker can be controlled by relay output.

Specification

Earth leakage detecting	
Input	Current 16Ch (200mA, 100mV, ZCT output)
Output	Earth leakage alarm relay 1Ch, communication: RS-485
Setting	Leakage current sensitivity, buzzer on/off, test, reset
Display	Measurement value of leakage current, 16 circuit status, number of displayed circuit

Refer to page 129 for KDQ series related specifications

Connection diagram



Configuration(KDQ-310)



Earth leakage detecting

A1	LED display	Earth leakage alarm (●-Red)	A8	Buzzer button	Buzzer on/ off selection
A2	FND Display	Leakage current	A9	LED display	Alarm status Automatic (●-Yellow) Manual (●-Green)
A3	FND Display	Circuit number	A10	Alarm button	Alarm setting automatic/manual
A4	Setting button	Setting mode	A11	Circuit button	Select circuit
A5	Confirm button	Save setting	A12	Reset button	Reset the status
A6	Direction button (▲▼)	change circuit number and setting	A13	Test button	Energizing /Alarm test
A7	LED display	Buzzer on (●-Yellow) Off status (●-Green)	A14	LED display	Energizing test status (●-Green)

Auto Power Factor Control Advanced Panel Power Meter

Model No.

KDQ - 400

Overview

- Power factor controller function

Measuring the electrical data and control the external capacitor(condenser) in order to compensate Power factor

- Measuring fuctions

Voltage, current, leakage current, active/reactive/surface power, PF, frequency, energy, temperature, phase can be displayed.

- Circuit breaker control function.

The status of circuit breaker can be displayed by contact input, and circuit breaker can be controlled by relay output.

Specification

Power Factor	
Input	Same as KDQ-200 (Refer to page 129)
Output	Control relay 2Ch, communication: RS-485
Setting	12Ch passive control, control method, OFFSET, wire connection correction
Display	Capacitor status, Lead/Lag, Day/Night
Refer to page 129 for KDQ series related specifications	

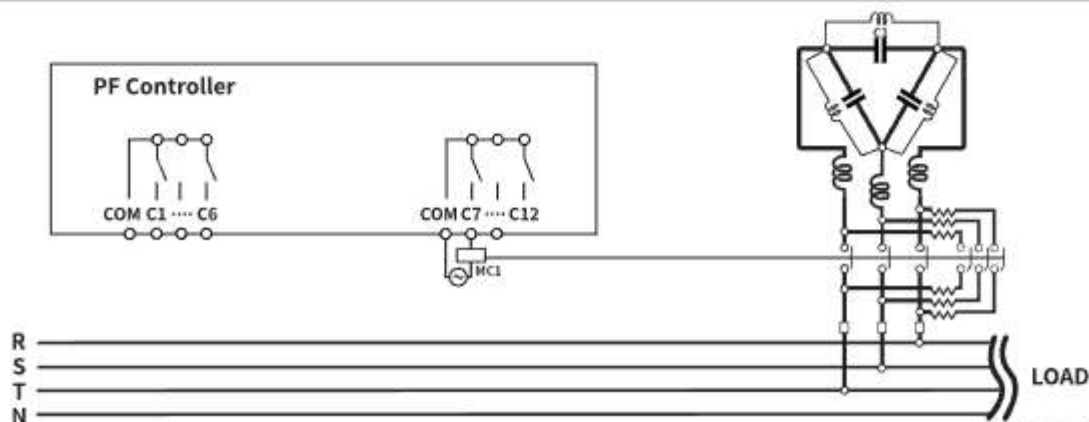
Configuration(KDQ-400)

Power factor control

A1	LED Display	Power factor / Error(●-Red)
A2	FND Display	Power factor / Error, PF trend
A3	LED Display	Capacitor status(●-Red)
A4	Setting button	Setting mode
A5	ENT button	Save setting and shift digit
A6	Direction button(▲▼)	Change setting value
A7	FND display	Var/W, PF trend time
A8	LED display	k/M(●-Red)
A9	LED display	Var/W(●-Red)
A10	Dip switch	Capacitor On/Off/Auto
A11	LED display	Night control status (●-Yellow)
A12	LED display	Day control status (●-Red)



Connection diagram



Demand Advanced Panel Power Meter

Model No.

KDQ - 500

Overview

- Load shedding control function

In order to minimize electric cost, this device can control and shedding electric load by the signal from KEPCO approved billing meter.

- Measuring functions

Voltage, current, leakage current, active/reactive/surface power, PF, frequency, energy, temperature, phase can be displayed.

- Circuit breaker control function.

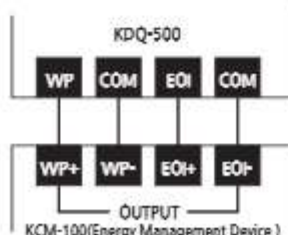
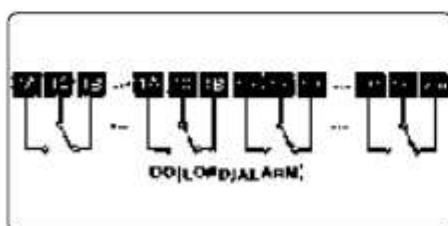
The status of circuit breaker can be displayed by contact input, and circuit breaker can be controlled by relay output.

Specification

Demand Controller	
Input	Watt Pulse(WP), End Of Interval (EOI)
Output	Control relay 4Ch, alarm 3Ch, communication: RS-485
Setting	Meter constant, PCT ratio, 1PULSE / wh, target power, demand time limit, control time, load control method
Display	Present power, target power, expected power, standard power, demand time list Power before 15 min, Daily/Monthly energy consumption

Refer to page 129 for KDQ series related specifications

Connection diagram



Configuration(KDQ-500)



Maximum demand power

A1	LED Display	Present power, (●-Red) Expected power (●-Red)
A2	FND Display	Present power, Expected power
A3	LED Display	WP/EOI (●-Green), Alarm (●-Red)
A4	Setting button	Setting mode, Shift digit
A5	ENT button	Select setting menu, Save setting
A6	Direction button (▲▼)	change setting value
A7	FND Display	Target power, Standard power, Setting value
A8	LED Display	Target power (●-Red), Standard power (●-Red)
A9	LED Display	Load (●-Yellow)

Monthly Demand Advanced Panel Power Meter

Model No.

KDQ-600

Overview

- Monthly power management function

In order to minimize electric cost, this device can calculate target energy and control load by working day and time.

- Measuring functions

Voltage, current, leakage current, active/reactive/surface power, PF, frequency, energy, temperature, phase can be displayed.

- Circuit breaker control function

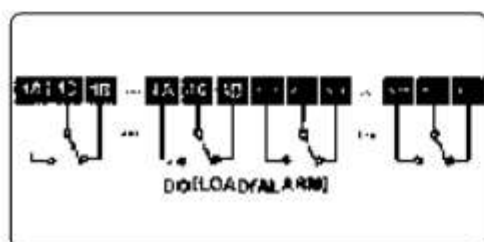
The status of circuit breaker can be displayed by contact input, and circuit breaker can be controlled by relay output.

Specification

Month power control	
Input	Same as KDQ-200 (Refer to page 129)
Output	Control relay 8Ch, alarm 3Ch, communication: RS-485
Setting	Contract power, Checking date, Holiday setting, Work start time, Work finish time, Control cycle
Display	Target energy, Present energy, Expected energy, Standard energy, Checking date, working day/hour

Refer to page 129 for KDQ series related specifications

Connection diagram



Configuration(KDQ-600)



■ Month power control

A1	LED Display	Target energy / Standard energy(●-Red)
A2	FND Display	Target energy/ Standard energy
A3	LED Display	kW/MW(●-Red)
A4	LED Display	Load(●-Yellow)
A5	FND Display	Present energy / energy consumption
A6	LED Display	kW/MW(●-Red)
A7	LED Display	present energy / energy consumption(●-Red)
A8	LED Display	Alarm(●-Red)
A9	Setting button	Change display, setting mode, Shift digit
A10	Enter button	Save setting
A11	Direction key(▲▼)	Change setting value

MEMO



CE certification

CE stands for "Conformité Européene" and indicates conformity with health, safety, and environmental protection standards for products sold within the European Economic Area (EEA). Our CE certified products are complied to the requirements of EU Directives, relating to LVD (Low Voltage Directives) and EMC(Directive Electromagnetic Compatibility Directives). LIGHTSTAR achieved CE certificate for Analog meter, Current Transformer, Digital meter, Power meter and Transducers.

EARTH LEAKAGE DETECTOR

**KS certification**

KS stands for Korean Standard and indicates conformity with Korean government required standards. LIGHTSTAR achieved KS certificate for Analog meter, Current Transformer and Transducers.

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Earth Leakage Detector(Relay)



KGC-□□□

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Zero Phase Current Transformer for Cable



KGC-□



144-145

Zero Phase Current Transformer for Busbar

KGB-□



146

Zero Phase Current Transformer for SGR(SELECTIVE GROUND RELAY)

KG□-□S

LIGHTSTAR

Earth Leakage Detector(Relay)

Certificates Korea Fire Institute approved 



Model No.

KG  -   

①

②

③

④

① Type

D Digital Type

② Number of circuits

08 08 circuit

10 10 circuit

12 12 circuit

16 16 circuit

③ Communication

C RS-485

NA None

 If relay option(R) chosen, separated relay (KGR) to be supplied compatible with KGD.

④ USE

R Relay

NA None

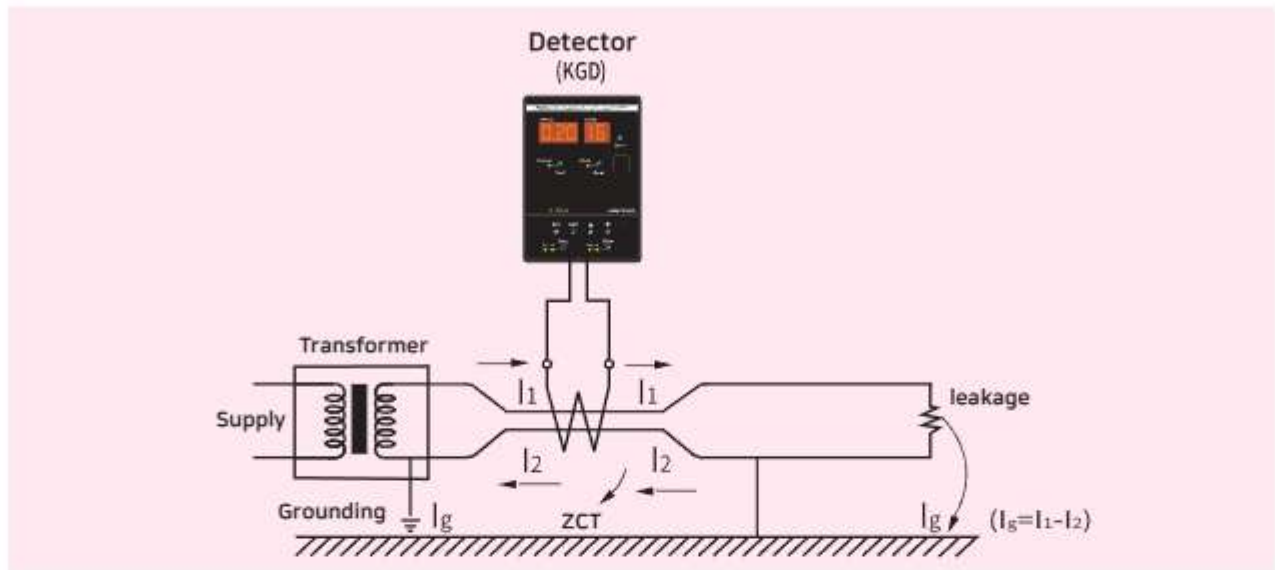
Overview

This device can be used for detecting earth leakage for low voltage(<AC600V). Alarm and buzzer to be activated if measured current from ZCT is exceed setting value.

Specification

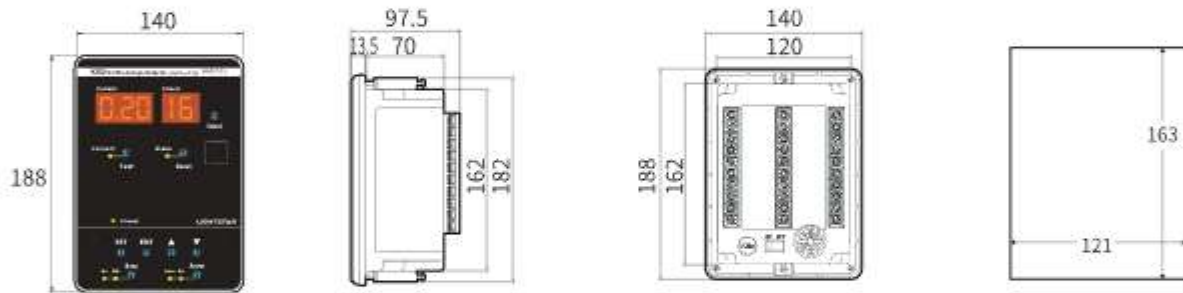
Item	KGD			
Number of circuits	8circuit	10circuit	12circuit	16circuit
Terminal connection	Bolt Type			
Input	ZCT output (KGB, KGC)			
Display	- Leakage : 7-segment LED 3Digit - Status LED: Green(Normal), Yellow(Test), Red(Alarm) - Circuit: 7-segment LED 2Digit			
Aux. power	AC110 ~ 220V 50/60 Hz, DC 110V		Insulation resistance	More than 5MΩ
Contact capacity	AC 250V / 1A 0.3sec, DC24V / 2A		Withstand voltage	AC 2.2kV(60Hz) / 1 minute
Sensitivity setting	0.2A~1.0A(0.1A Unit Setting)		Surge impulse	1.2μs x 50μs,6kV
Operating	Within 1 second when 75% or more of setting value		Burst	Level 4 (IEC 61000-4-4)
Inoperative	Inoperative when less than 52% of setting current continues 30 sec and more.		Electrostatic discharge	±8kV(Air), ±4kV(Contact) (IEC 61000-4-2)
Power	Operating 10VA, Inoperative less than 6VA		Radio frequency Conduction resistance	0.15~80MHz 10V (IEC 61000-4-6)
Buzzer volume	More than 70dB		Radio frequency Radiation resistance	80~1000MHz 10V/m (IEC 61000-4-3)
Communication (option)	RS-485 2Wire, Modbus RTU communication		Impact Test	50gf, 5times
Operating temperature	-10℃~50℃		Internal Impedance	2kΩ
Operating Humidity	45~85% RH(Over dew point)			
Vibration	Frequency: 10 to 150 Hz Number of axes: 3 Acceleration amplitude: 0.981 m / s ² , Sweep speed: 1 octave / min, Sweep cycles: 1 time per axis			

Operating principle



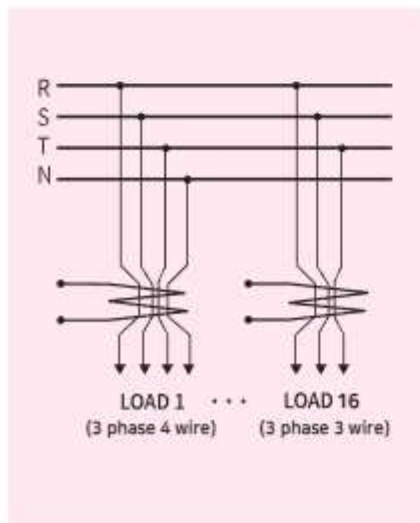
Drawing

Unit : mm



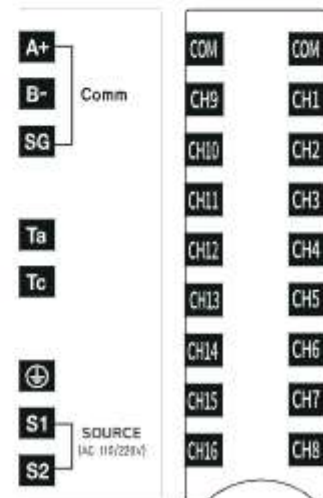
[Panel cut]

Connection diagram



Terminal configuration

- | S1, S2 : Aux. power
(AC 110V/220V 50/60Hz
DC 110V)
- | $\oplus$: Earth(Grounding terminal)
- | Ta, Tc : Non-voltage contact
- | A+, B-, SG : RS-485 Communication (option)
- | COM : ZCT Common
- | CH1~CH16 : ZCT input for each circuit



Zero Phase Current Transformer for Cable



Certificates Korea Fire Institute approved

Model No.

KGC-
①

① Size

Type	Rated primary current	Dimensions(Unit:mm)	
		Inside	
		Width	Height
30	150A	37	29
50	400A	62	48
75	600A	80	70
100	1000A	113	90
150	1500A	160	134

Overview

ZCT(Zero Phase current Transformer) is measuring the leakage current by vector sum of whole electric system.
The output(secondary) of ZCT is used for ELD input.

Feature

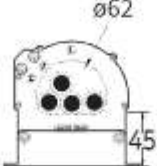
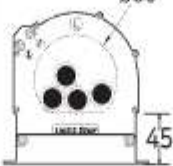
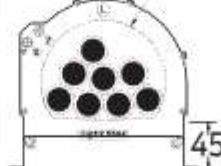
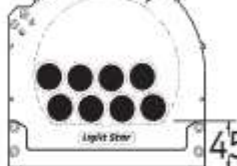
In order to minimized cable bending radius, bottom of ZCT hole is designed as wide and flat.
And considering cable duct height(40mm), the bottom of ZCT hole is 45mm height.

Specification

Type	KGC-30	KGC-50	KGC-75	KGC-100	KGC-150
Circuit breaker size	Less than 100AF	225AF	400AF	600AF	1000AF
Rated primary current	150A	400A	600A	1000A	1500A
Maximum voltage / frequency	Less than AC 600V / 60Hz (or 50Hz)				
Leakage current input / output	AC 200mA / 100mV (2kΩ)				
Operating temperature	-10℃ ~ + 50℃				
Weight	150g	200g	300g	1000g	1500g
Case material	ABS				
Leakage current maximum	Max 60A input for 30V output				

☞ The rated primary current is the current for official test. Test terminal is not included.

Drawing

Type	KGC-30	KGC-50	KGC-75	KGC-100	KGC-150
Circuit breaker size	100AF	225AF	400AF	600AF	1000AF
Example					
Cable spec	35SQ(Φ13)X4P	120SQ(Φ20)X4P	185SQ(Φ24)X4P	240SQ(Φ27)X8P	400SQ(Φ34)X8P

Allowable current for cable spec

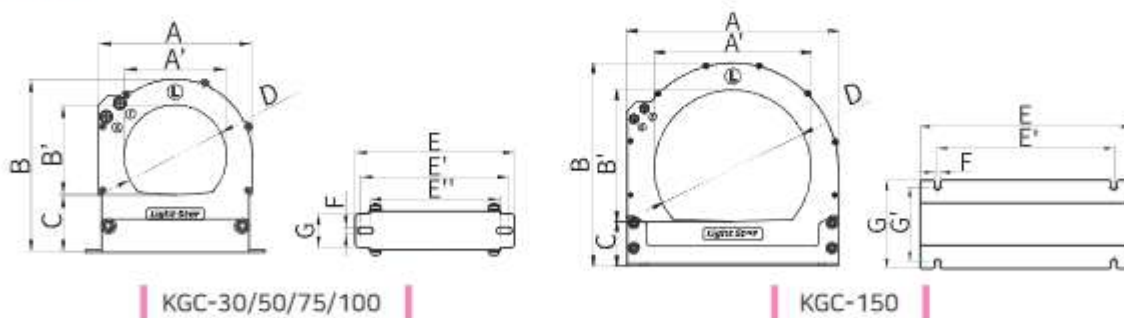
35SQ	185A	120SQ	410A	185SQ	542A	240SQ	641A	400SQ	940A
------	------	-------	------	-------	------	-------	------	-------	------

Caution

1. If the N phase does not pass through the ZCT, a leakage alarm will be generated.
2. It is recommended to use 2 core shield cable or twist pair cable for secondary cable, in order to prevent electrostatic induction and electronic induction.
3. At the time of wire penetration, locate cables evenly and maintain magnetic equilibrium as possible. Otherwise, unbalanced induction will cause error at secondary output.

Drawing

Unit : mm



Type	A	A'	B	B'	C	D	E	E'	E''	F	G	G'
KGC-30	72	37	87.5	29	Standard 45	Φ37	90	80	70	6	30	-
KGC-50	100	62	102.5	48		Φ62	120	110	100	6	30	-
KGC-75	120	80	135	70		Φ80	140	130	114	6	30	-
KGC-100	150	113	155	90		Φ113	170	160	150	6	40	-
KGC-150	215	160	210	134		Φ160	215	180	-	6	50	76

Zero Phase Current Transformer for Busbar

Certificates Korea Fire Institute approved



Model No.

KGB- 

① Size			
Type	Rated primary current	Dimensions(Unit:mm)	
		Inside	
		Width	Height
01	100A	92	10
02	150A	108	10
03	300A	132	11
05	400A	163	30
07	600A	210	30
11	1000A	260	30

Feature

- According to the dimension of circuit breaker, the dimension of CT is optimized and minimized.
- In order to minimized thermal deformation, ZCT is designed not to be touched on busbar surface directly.

Specification

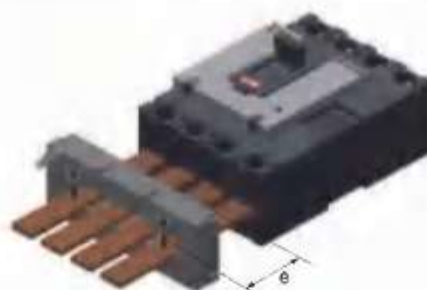
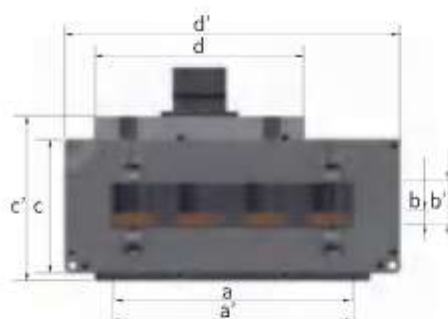
Type	KGB-01	KGB-02	KGB-03	KGB-05	KGB-07		KGB-11		
Circuit breaker	100AF	125AF	225AF	400AF	400AF	600AF	600AF	800AF	1000AF
	3P3W 3P4W	3P3W 3P4W	3P3W 3P4W	3P3W 3P4W	3P4W	3P3W	3P4W	3P3W 3P4W	3P3W 3P4W
Rated primary current	100A	150A	300A	400A	600A		1000A		
Maximum voltage / frequency	Less than AC 600V/60Hz(or 50Hz)								
Leakage current input / output	AC 200mA/100mV(2kΩ)								
Operating temperature	-10℃ ~ +50℃								
Weight	170g	190g	220g	220g	880g		1400g		
Case material	ABS								
Leakage current maximum	Max 60A input for 30V output								

 The rated primary current is the current for official test. Test terminal is not included.

Caution

Due to the structural limit, magnetic equilibrium between the busbar is not easy to achieve. Please consider this limit in design

Drawing

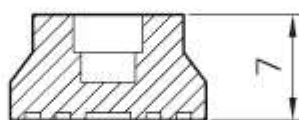
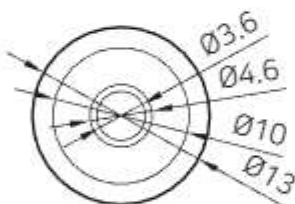


Dimension

Unit:mm

Type	Size								
	a	a'	b	b'	c	c'	d	d'	e
KGB-01	90	92	8	10	54	60	100	111	39
KGB-02	106	108	8	10	54	60	120	135	39
KGB-03	130	132	8	11	54	60	140	153	39
KGB-05	162	163	8	30	90	95	184	225	52
KGB-07	184	210	8	30	90	95	184	270	52
KGB-11	259	260	17	30	100	103	290	330	56

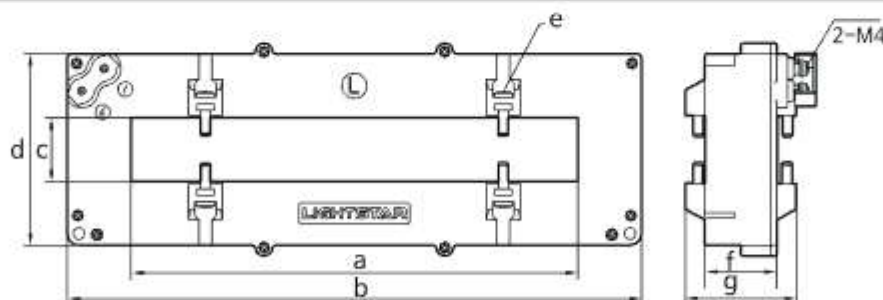
- Please prevent direct contact with busbar, which may cause CT deformation and damage.
- Torque limit for bus bar fixing bolt(Excess torque may cause bending and distortion) : M4 - 5~7 kgf · cm, M5 - 7~10kgf · cm
- Please be aware that bus bar fixing bolt for current transformer can be energized
- Bolt insulation covers are recommended for safety



Design can be changed without notice

Drawing

Unit:mm



Type	Size						
	a	b	c	d	e	f	g
KGB-01	92	111	10	54	4-M4X15mm	22	39
KGB-02	108	135	10	54	4-M4X15mm	22	39
KGB-03	132	150	11	54	4-M4X15mm	22	39
KGB-05	163	225	30	90	8-M5X15mm	34	52
KGB-07	210	270	30	90	8-M5X15mm	34	52
KGB-11	260	330	30	100	16-M5X20mm	38	56

Zero Phase Current Transformer for SGR (SELECTIVE GROUND RELAY)



For cable



For bus bar

Model No.

KG- S
① ② ③

① Type

② Size

③ Use

C Cable Type

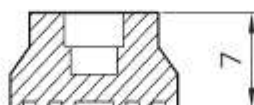
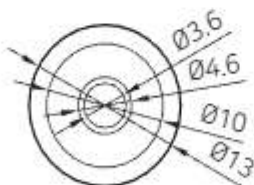
B Busbar Type

S for SGR

- This item is not suitable for DGR (Directional Ground fault Relay) and GOCR (Ground Over Current Relay)
- Refer to P143 & P145 for dimension and drawing

Size	Cable Type	Primary current	Size (Unit:mm)	
			Inside	
			W	H
30	Less than 100AF	150A	37	29
50	Less than 225AF	400A	62	48
75	Less than 400AF	600A	80	70
100	Less than 600AF	1000A	113	90
150	Less than 1000AF	1500A	160	134
Size	Busbar Type	Primary current	Size (Unit:mm)	
			Inside	
			W	H
05	400AF 3P3W	400A	163	30
07	400AF 3P4W, 600AF 3P3W	600A	210	30
11	600AF 3P4W	1000A	260	30
	800AF 3P3W, 3P4W 1000AF 3P3W, 3P4W			

- Please prevent direct contact with busbar, which may cause CT deformation and damage.
- Torque limit for bus bar fixing bolt (Excess torque may cause bending and distortion) : M4 - 5~7 kgf · cm, M5 - 7~10kgf · cm
- Please be aware that bus bar fixing bolt for current transformer can be energized
- Bolt insulation covers are recommended for safety



Design can be changed without notice

Specification

Maximum voltage / frequency	Less than AC 600V / 60Hz (or 50Hz)
Input / Output	AC 200mA / 1.5mA
Accuracy	H Class (±15% at 200mA~500mA)
Insulation resistance	Secondary terminal - External support : DC 500V / 100kΩ
Dielectric strength	Secondary terminal - External support : AC 1500V / 1min
Operating temperature	-10°C ~ +50°C

CE certification

CE stands for "Conformité Européene" and indicates conformity with health, safety, and environmental protection standards for products sold within the European Economic Area (EEA). Our CE certified products are complied to the requirements of EU Directives, relating to LVD (Low Voltage Directives) and EMC(Directive Electromagnetic Compatibility Directives). LIGHTSTAR achieved CE certificate for Analog meter, Current Transformer, Digital meter, Power meter and Transducers.

TRANSUDUCER



KS certification

KS stands for Korean Standard and indicates conformity with Korean government required standards. LIGHTSTAR achieved KS certificate for Analog meter, Current Transformer and Transducers.

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AC Voltage Transducer

KTB



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KTF



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KTW



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Pulse-Analog Transducer

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AC Current Transducer

KTA



153

DC Isolated Transducer

KTD



155

Watt Transducer

KTG



158

Power Factor Transducer

KTH



160

VAR & VAR hour Transducer

KTU



164

Potential Transducer

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RTD Transducer

KTP

167

AC Current Socket Transducer



KSA

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AC Voltage Socket Transducer



KSB

169

DC Isolated Socket Transducer



KSD

170

Frequency Socket Transducer



KSF

171

Potential Socket Transducer



KSL

172

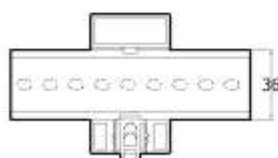
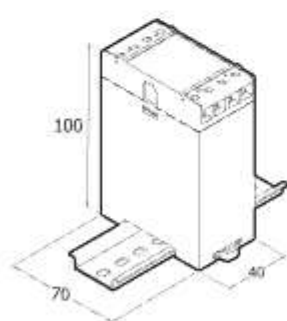
RTD Socket Transducer



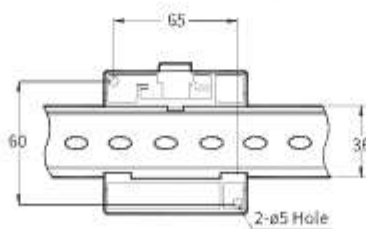
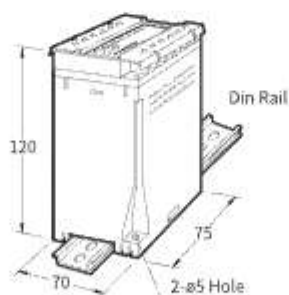
KSP

Drawing

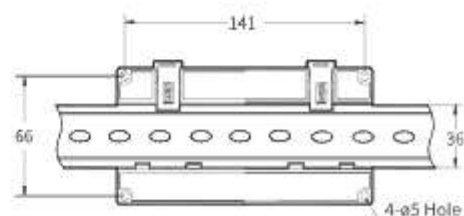
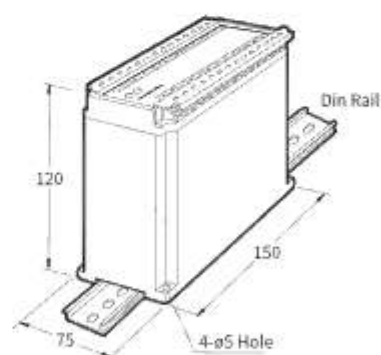
Unit : mm



| M Type |



| L Type |



| LL Type |

Definition

Class

K S C 1708 Accuracy tolerances for transducer as per base value.

example) 0.1 Class = Tolerance to base value $\pm 0,1\%$	0.2Class = Tolerance to base value $\pm 0,2\%$
0.25 Class = Tolerance to base value $\pm 0,25\%$	0.5 Class = Tolerance to base value $\pm 0,5\%$
1.0 Class = Tolerance to base value $\pm 1,0\%$	3.0Class = Tolerance to base value $\pm 3,0\%$

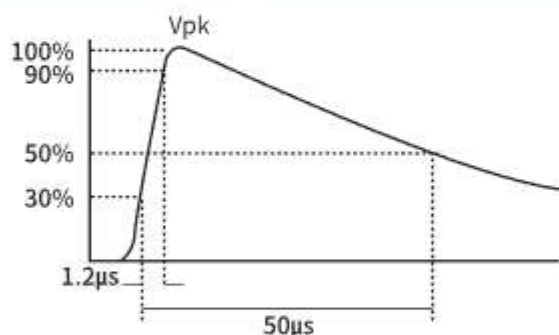
Base value

Numerical differences from max output to min output.

Surge impulse test

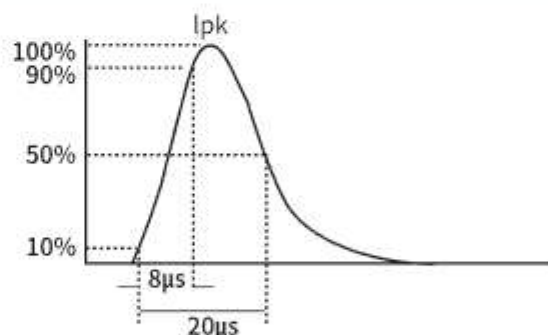
Test intended for the lightening surge conditions, and to be performed with voltage(1.2.....50...) and current (8...20...) on aux power by tester.

Voltage waveform



- Increase : 30%~90%, of Vpk 1.2µs
- Decrease : By 50% of Vpk 50µs

Current waveform



- Increase : 10%~90%, of Vpk 8µs
- Decrease : By 50% of Vpk 20µs

Withstanding voltage

Test with AC voltage more than 1 min between input and output, input and human contacted area , input and source, source and output, source and human contacted area

Insulation resistance test

Test with DC voltage more than 500V between input and output, input and human contacted area , input and source, source and output, source and human contacted area.

AC Current Transducer

Certificates 



Model No.

KTA- 

How to order) KTA-163A1S
1A/4~20mA/3P3W
/Average/AC 110/220V

How to order) KTA-283A1S
5A/1~5V/3P3W/Average
/AC 110/220V

Customized product can be
produced by order.

① AC Current Input	② DC Output	③ Circuit
1 0 ~ 1A	6 4 ~ 20mA	1 1P2W(LTy)
2 0 ~ 5A	7 0 ~ 1mA	2 1P3W(LLTy)
	8 1 ~ 5V	3 3P3W(LLTy)
	9 0 ~ 10V	4 3P4W(LLTy)
	0 Order-made	5 1P2W(MTy)
④ Type	⑤ Aux. power	⑥ Number of outputs
A Average value	1 AC 110/220V (Except 2 Output)	S 1 Output(M, L ty) for Single phase
R RMS value	2 AC 90~260V, DC110V, 220V (Except RMS)	3 Output(LL ty) for 3 phase
	3 DC 24V (Except RMS, 2 Output)	T 2 Output for Single phase
	1 AC 110/220V (Except 2 Output)	

Specification

Class	Average value(0.2): Rms value(0.5)	Withstand voltage	AC 2kV / 1 min
Aux. power	Refer to the table above	Surge impulse	Voltage(1.2μs/ 50μs, 5kV) Current(8μs/20μs)
Operating temperature	-10~50℃	Max allowable current	A-200% 10sec, 120% Continuous
Operating humidity	20 ~ 85%	Weight	200g(MTy), 500g(L Ty) 1140g(LL Ty)
Insulation resistance	More than 10MΩ		

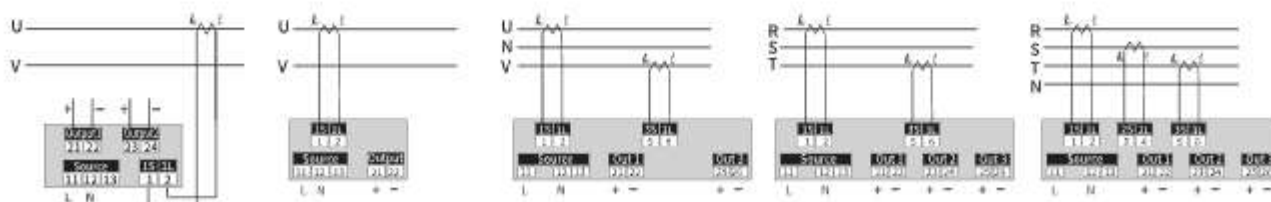
Input

AC Current	0 ~ 1A(50/60Hz) 0 ~ 5A(50/60Hz)
------------	------------------------------------

Load resistance by output

DC	Load resistance
4~20mA	0~500Ω
0~1mA	0~10kΩ
1~5V	More than 200Ω
0~10V	More than 500Ω

Connection diagram



1P2W(LTy)-2Output | 1P2W(L,MTy)-1Output | 1P3W(LLTy) | 3P3W(LLTy) | 3P4W(LLTy) |

AC Voltage Transducer

Certificates 



Model No.

KTB-



How to order) KTB-161A1S
150V/4~20mA/1P2W

/Average value/AC 110/220V

How to order) KTB-263R1S
300V/4~20mA/3P3W

/RMS value/AC 110/220V

Customized product can be produced by order.

① AC Voltage input	② DC Output	③ Circuit
1 0 ~ 150V	6 4 ~ 20mA	1 1P2W(LTy)
2 0 ~ 300V	7 0 ~ 1mA	2 1P3W(LLTy)
0 Order-made	8 1 ~ 5V	3 3P3W(LLTy)
Less than Three-phase	9 0 ~ 10V	4 3P4W(LLTy)
Single phase less than 420V	0 Order-made	5 1P2W(MTy)
④ Type	⑤ Aux. power	⑥ Number of outputs
A Average value	1 AC 110/220V (Except 2 Output)	S 1 Output(M, L ty) for Single phase
R RMS value	2 AC 90~260V, DC110V, 220V (Except RMS)	3 Output(LL ty) for 3 phase
	3 DC 24V (Except RMS, 2 Output)	T 2 Output for Single phase
	1 AC 110/220V (Except 2 Output)	

Specification

Class	Average value(0.2): Rms value(0.5)	Withstand voltage	AC 2kV /1 min
Aux. power	Refer to the table above	Surge impulse	Voltage(1.2μs/ 50μs, 5kV) Current(8μs/20μs)
Operating temperature	-10~50℃	Max allowable Voltage	V-150% 10sec, 120% continuous
Operating humidity	20 ~ 85%	Weight	200g(MTy), 500g(L Ty) 1140g(LL Ty)
Insulation resistance	More than 10MΩ		

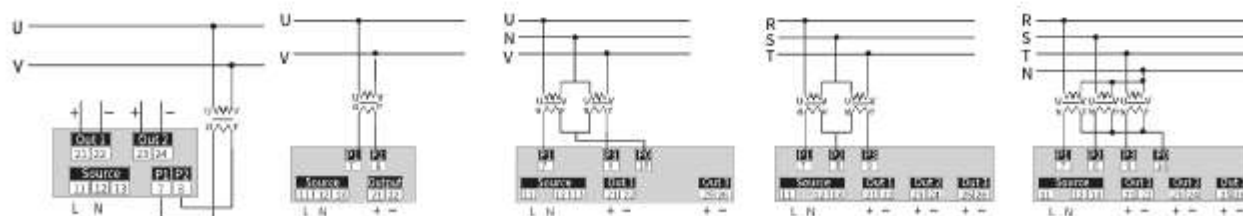
Input

AC Voltage	0 ~ 150V(50/60Hz)
	0 ~ 300V(50/60Hz)

Load resistance by output

DC	Load resistance
4~20mA	0~500Ω
0~1mA	0~10kΩ
1~5V	More than 200Ω
0~10V	More than 500Ω

Connection diagram



1P2W(LTy)-2Output

1P2W(L,MTy)

1P3W(LLTy)

3P3W(LLTy)

3P4W(LLTy)

DC Isolated Transducer

Certificates 



Model No.

KTD- ①②③④	① DC Input	② DC Output	③ Aux. power	④ Number of outputs
	1 0 ~ 50mV 2 ±50mV 3 0 ~ 10V 4 0 ~ 150V 5 4 ~ 20mA 6 0 ~ 1mA 7 0 ~ 10mA 8 0 ~ 20mA 9 Order-made	6 4 ~ 20mA 7 0 ~ 1mA 8 1 ~ 5V 9 0 ~ 10V 0 Order-made	1 AC 110/220V (Except 2 Output) 2 AC 90~260V, DC110V, 220V 3 DC 24V (Except 2 Output)	S 1 Output T 2 Output
How to order) KTD-161S 0~50mV / 4~20mA / AC 110/220V				
How to order) KTD-472T 0~150V / 0~1mA / AC 90~260V				
Customized product can be produced by order.				

Specification

Class	0.2	Withstand voltage	AC 2kV / 1 min
Aux. power	Refer to the table above	Surge impulse	Voltage(1.2μs/ 50μs, 5kV) Current(8μs/20μs)
Operating temperature	-10~50℃	Max allowable current	A-200% 10sec, 120% continuous
Operating humidity	20 ~ 85%	Max allowable Voltage	V-150% 10sec, 120% continuous
Insulation resistance	More than 10MΩ	Weight	500g(L Ty)

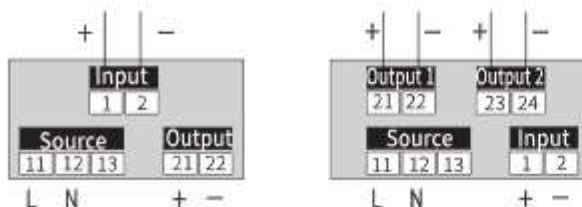
Input

DC Voltage	DC Current
0~50mV	4~20mA
±50mV	0~1mA
0~10V	0~10mA
0~150V	0~20mA

Load resistance by output

DC	Load resistance
4~20mA	0~500Ω
0~1mA	0~10kΩ
1~5V	More than 200Ω
0~10V	More than 500Ω

Connection diagram



| 1Output |

| 2Output |

Frequency Transducer

Certificates 



Model No.

KTF- 


- How to order) KTF-181S
 0~120Hz/1~5V/AC
 110/220V/1Output
- Customized product can be produced by order.

① AC input	② DC Output	③ Aux. power	④ Number of outputs
1 90 ~ 240V(0~120Hz)	6 4 ~ 20mA	1 AC 110/220V (Except 2 Output)	S 1 Output
0 Order-made	7 0 ~ 1mA	2 AC 90/260V, DC 110V, 220V	T 2 Output
	8 1 ~ 5V		
	9 0 ~ 10V		
	0 Order-made		

Specification

Class	0.1(0~120Hz) 0.5	Withstand voltage	AC 2kV / 1 min
Aux. power	Refer to the table above	Surge impulse	Voltage(1.2μs/ 50μs, 5kV) Current(8μs/20μs)
Operating temperature	-10~50℃	Max allowable Voltage	V-150% 10sec, 120% continuous
Operating humidity	20 ~ 85%	Weight	500g(L Ty)
Insulation resistance	More than 10MΩ		

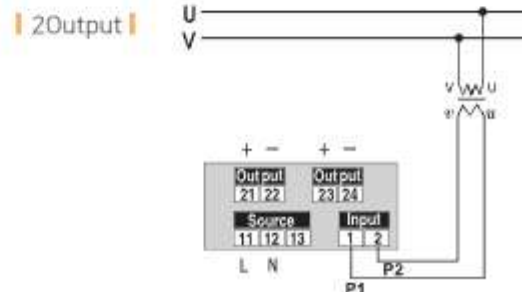
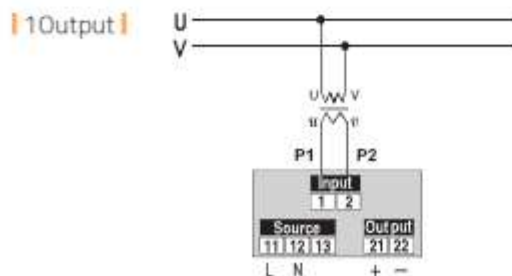
Input

0~120Hz : AC 90~240V

Load resistance by output

DC	Load resistance
4~20mA	0~500Ω
0~1mA	0~10kΩ
1~5V	More than 200Ω
0~10V	More than 500Ω

Connection diagram



Watt Transducer

Certificates 



Model No.

KTG - 

How to order) KTG-4362S
3P4W/380/ $\sqrt{3}$ V/5A/4~20mA/
AC 90~260V/1Output

① Circuit	② AC input	Input value	③ DC Output
1 1P2W	1 110V/5A	600W	6 4 ~ 20mA
	2 220V/5A	1200W	7 0 ~ 1mA
	0 Order-made		8 1 ~ 5V
2 1P3W	1 220/110V/5A	1000W	9 0 ~ 10V
	1 110V/5A	1000W	0 Order-made
	2 220V/5A	2000W	④ Aux. power
3 3P3W	0 Order-made		2 AC 90~260V, DC 110V
	1 (208/ $\sqrt{3}$)V / 5 A	2000W	⑤ Number of outputs
	2 (380/ $\sqrt{3}$)/(190/ $\sqrt{3}$)V / 5 A	2000W	S 1 Output
4 3P4W	3 (380/ $\sqrt{3}$)V / 5A	4000W	T 2 Output
	4 (11400/ $\sqrt{3}$)/(190/ $\sqrt{3}$)V / 5A	1660W	
	5 (22900/ $\sqrt{3}$)/(190/ $\sqrt{3}$)V / 5A	1660W	
	0 Order-made		

Specification

Class	0.2	Withstand voltage	AC 2kV / 1 min
Aux. power	Refer to the table above	Surge impulse	Voltage(1.2 μ s/ 50 μ s, 5kV) Current(8 μ s/20 μ s)
Operating temperature	-10~50°C	Max allowable current	A-200% 10sec, 120% continuous
Operating humidity	20 ~ 85%	Max allowable Voltage	V-150% 10sec, 120% continuous
Insulation resistance	More than 10M Ω	Weight	1140g(LL Ty)

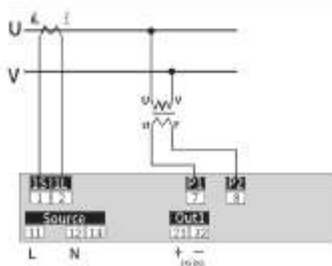
Input

Circuit type	1P2W, 1P3W, 3P3W, 3P4W
Power	600, 1000, 1660, 2000, 4000W

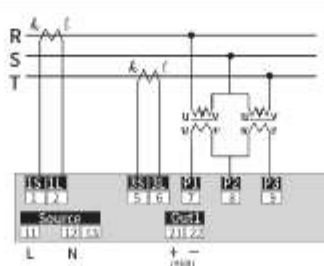
Load resistance by output

DC	Load resistance
4~20mA	0~500 Ω
0~1mA	0~10k Ω
1~5V	More than 200 Ω
0~10V	More than 500 Ω

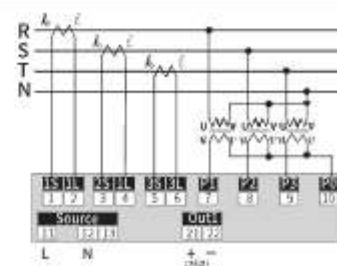
Connection diagram



1P2W(LLType)



3P3W(LLType)



3P4W(LLType)

Watt ,Watthour Transducer

Certificates



Model No.

KTW- 1 1 1 1 1 1 1 1
① ② ③ ④ ⑤ ⑥

① Circuit	② AC input	Input value	③ DC Output	⑤ Aux. power
1 1P2W	1 110V/5A	600W	6 4 ~ 20mA	2 AC 90~260V, DC 110V
	2 220V/5A	1200W	7 0 ~ 1mA	⑥ Number of outputs
	0 Order-made		8 1 ~ 5V	S 1 Output
2 1P3W	1 220/110V/5A	1000W	9 0 ~ 10V	
	0 Order-made		0 Order-made	
3 3P3W	1 110V/5A	1000W	④ Count(energy)	
	2 220V/5A	2000W	A Contact relay	
	0 Order-made		(10,000count/1 hour rated energy)	
4 3P4W	1 (208/√3)V / 5 A	2000W	B Contactless point Open collector	
	2 (380/√3)/(190/√3)V / 5 A	2000W	(10,000count/1 hour rated energy)	
	3 (380/√3)V / 5A	4000W	C Potential signal 5V Pulse	
	4 (11400/√3)/(190/√3)V / 5A	1660W		
	5 (22900/√3)/(190/√3)V / 5A	1660W		
	0 Order-made			

How to order Example) KTW-116A2S

1P2W/110, 5A/4~20mA/Electrical contact
/ DC 110V/10Output

Specification

Class	Voltage (0.2), Energy (0.5)	Withstand voltage	AC 2kV / 1 min
Aux. power	Refer to the table above	Surge impulse	Voltage(1.2μs/ 50μs, 5kV) Current(8μs/20μs)
Operating temperature	-10~50℃	Max allowable current	A-200% 10sec, 120% continuous
Operating humidity	20 ~ 85%	Max allowable Voltage	V-150% 10sec, 120% continuous
Insulation resistance	More than 10MΩ	Weight	1140g(LL Ty)

Input

Range	-0.5~1~0.5(LEAD~LAG)
Circuit	1P2W, 1P3W, 3P3W, 3P4W
Voltage	110, 220, 190/√3, 208/√3, 380/√3V
Current	5A

Load resistance by output

DC	Load resistance
4~20mA	0~500Ω
0~1mA	0~10kΩ
1~5V	More than 200Ω
0~10V	More than 500Ω

Connection diagram

Refer to page 161~162

Electricity meter reference table Pulse / kWh

Circuit		1P2W	1P3W	3P3W							3P4W					
* Power constant		1,091	0,9091	1,05	1,216	1,05	1,05	1,05	1,05	1,008	1,05	1,110	1,216	1,216	1,008	
Voltage ratio		220V	220/ 110	220	380/ 110	440/ 110	3300/ 110	6600/ 110	22000/ 110	22900/ 110	154kV/ 110	208/ √3	380/ 190√3	380/ √3	22900/ 190√3	
Current ratio		Pulse Value / kWh														
Current ratio	1	5/5A	1200	1000	2000	4000	4000	3000	6000	2000	2000	1400	2000	4000	4000	2000
	2	10/5A	2400	2000	4000	8000	8000	6000	1200	4000	4000	2800	4000	8000	8000	4000
	3	15/5A	3600	3000	6000	1200	1200	9000	1800	6000	6000	4200	6000	1200	1200	6000
	4	20/5A	4800	4000	8000	1600	1600	1200	2400	8000	8000	5600	8000	1600	1600	8000
	5	25/5A	6000	5000	1000	2000	2000	1500	3000	1000	1000	7000	1000	2000	2000	1000
	6	30/5A	7200	6000	1200	2400	2400	1800	3600	1200	1200	8400	1200	2400	2400	1200
	7	40/5A	9600	8000	1600	3200	3200	2400	4800	1600	1600	1120	1600	3200	3200	1600
	8	50/5A	1200	1000	2000	4000	4000	3000	6000	2000	2000	1400	2000	4000	4000	2000
	9	60/5A	1440	1200	2400	4800	4800	3600	7200	2400	2400	1680	2400	4800	4800	2400
	10	75/5A	1800	1500	3000	6000	6000	4500	9000	3000	3000	2100	3000	6000	6000	3000
	11	80/5A	1920	1600	3200	6400	6400	4800	9600	3200	3200	2240	3200	6400	6400	3200
	12	100/5A	2400	2000	4000	8000	8000	6000	1200	4000	4000	2800	4000	8000	8000	4000
	13	120/5A	2880	2400	4800	9600	9600	7200	1440	4800	4800	3360	4800	9600	9600	4800
	14	150/5A	3600	3000	6000	1200	1200	9000	1800	6000	6000	4200	6000	1200	1200	6000
	15	200/5A	4800	4000	8000	1600	1600	1200	2400	8000	8000	5600	8000	1600	1600	8000
	16	250/5A	6000	5000	1000	2000	2000	1500	3000	1000	1000	7000	1000	2000	2000	1000
	17	300/5A	7200	6000	1200	2400	2400	1800	3600	1200	1200	8400	1200	2400	2400	1200
	18	400/5A	9600	8000	1600	3200	3200	2400	4800	1600	1600	1120	1600	3200	3200	1600
	19	500/5A	1200	1000	2000	4000	4000	3000	6000	2000	2000	1400	2000	4000	4000	2000
	20	600/5A	1440	1200	2400	4800	4800	3600	7200	2400	2400	1680	2400	4800	4800	2400
	21	750/5A	1800	1500	3000	6000	6000	4500	9000	3000	3000	2100	3000	6000	6000	3000
	22	800/5A	1920	1600	3200	6400	6400	4800	9600	3200	3200	2240	3200	6400	6400	3200
	23	1000/5A	2400	2000	4000	8000	8000	6000	1200	4000	4000	2800	4000	8000	8000	4000
	24	1200/5A	2880	2400	4800	9600	9600	7200	1440	4800	4800	3360	4800	9600	9600	4800
	25	1500/5A	3600	3000	6000	1200	1200	9000	1800	6000	6000	4200	6000	1200	1200	6000
	26	2000/5A	4800	4000	8000	1600	1600	1200	2400	8000	8000	5600	8000	1600	1600	8000
	27	2500/5A	6000	5000	1000	2000	2000	1500	3000	1000	1000	7000	1000	2000	2000	1000
	28	3000/5A	7200	6000	1200	2400	2400	1800	3600	1200	1200	8400	1200	2400	2400	1200
	29	4000/5A	9600	8000	1600	3200	3200	2400	4800	1600	1600	1120	1600	3200	3200	1600
	30	5000/5A	1200	1000	2000	4000	4000	3000	6000	2000	2000	1400	2000	4000	4000	2000

For items with 1 kWh to 799 kWh and over 10 000 kWh, please order TD with a applicable digital meter.

Reference

- 1. 2,40kw is recommended for 1Ø2W, 220V, 10 / 5A
- 2. 2,40kw is recommended for 3Ø3W, 154kV / 110V and 100 / 5A
- 3. 2,40kw is recommended for 3Ø4W, 22900 / √3 / 190√3V and 100 / 5A
- Power constant: meter display power (maximum) / Calculated power

1 Pulse/1Wh	1 Pulse/0,01MWh
1 Pulse/0,01kWh	1 Pulse/0,1MWh
1 Pulse/0,1kWh	1 Pulse/1MWh
1 Pulse/1kWh	

Power Factor Transducer

Certificates 



Model No.

KTH - 

 **How to order) KTH-B4361S**
3P4W / 380/ $\sqrt{3}$ V 5A/ 4-20mA/
AC 90-260V/1Output

 **How to order) KTH-U1261S**
1P2W/220V 5A/4-20mA/AC
90-60V/1Output

① Classification

- B Balance
- U Unbalance

② AC input

Circuit	① Voltage	Current
1 1P2W	1 110V/5A	2 220V/5A
2 1P3W	1 220/110V/5A	0 Order-made
3 3P3W	1 110V/5A	2 220V/5A
	0 Order-made	1 (190/ $\sqrt{3}$)V/5A
	2 (208/ $\sqrt{3}$)V/5A	3 (380/ $\sqrt{3}$)V/5A
4 3P4W	0 Order-made	

④ DC Output(LEAD~LAG)

- 6 4-12-20mA
- 7 0-0.5-1mA
- 8 -5-0-+5V
- 9 -1-0-+1V
- 0 Order-made

⑤ Aux. power

- 2 AC 90-260V, DC 110V

⑥ Number of outputs

- S 1 Output
- T 2 Output(unbalance only)

Specification

Class	Unbalance (0.5), balance (3.0)	Withstand voltage	AC 2kV / 1 min
Aux. power	Refer to the table above	Surge impulse	Voltage(1.2 μ s/ 50 μ s, 5kV) Current(8 μ s/20 μ s)
Operating temperature	-10~50°C	Max allowable current	A-200% 10sec, 120% continuous
Operating humidity	20 ~ 85%	Max allowable Voltage	V-150% 10sec, 120% continuous
Insulation resistance	More than 10M Ω	Weight	1140g(LL Ty)

Input

Range	-0.5~1~0.5(LEAD~LAG)
Circuit	1P2W, 1P3W, 3P3W, 3P4W
Voltage	110, 220, 190/ $\sqrt{3}$, 208/ $\sqrt{3}$, 380/ $\sqrt{3}$ V
Current	5A

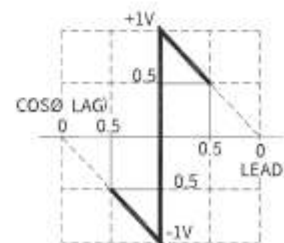
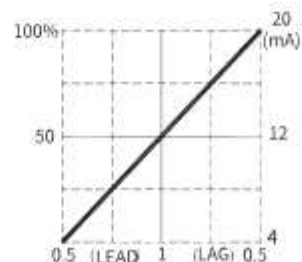
Load resistance by output

DC	Load resistance
4-12-20mA	0-500 Ω
0-0.5-1mA	0-10k Ω
-5-0-+5V	More than 200 Ω
-1-0-+1V	More than 500 Ω

Connection diagram

Refer to page 161-162

Input/Output signal



VAR Transducer

Certificates 



Model No.

KTI - 

 How to order) KTI-4362S
3P4W/380/√3V/5A/4~20mA/
AC 90~260V/10Output

① Circuit	② AC Input	Input value	③ DC Output
1 1P2W	1 110V/5A	±600var	6 4~12~20mA
	2 220V/5A	±1200var	7 0~0.5~1mA
	0 Order-made		8 -5~0~+5V
2 1P3W	1 220/110V/5A	±1000var	9 -1~0~+1V
	1 110V/5A	±1000var	0 Order-made
	2 220V/5A	±2000var	④ Aux. power
3 3P3W	0 Order-made		2 AC 90~260V, DC 110V
	1 (208/√3)V / 5 A	±2000var	⑤ Number of outputs
	2 (380/√3)/(190/√3)V / 5 A	±2000var	S 1Output
4 3P4W	3 (380/√3)V / 5A	±4000var	T 2Output
	4 (11400/√3)/(190/√3)V / 5A	±1660var	
	5 (22900/√3)/(190/√3)V / 5A	±1660var	
	0 Order-made		

Specification

Class	0.2	Withstand voltage	AC 2kV / 1 min
Aux. power	Refer to the table above	Surge impulse	Voltage(1.2μs/ 50μs, 5kV) Current(8μs/20μs)
Operating temperature	-10~55℃	Max allowable current	A-200% 10sec, 120% continuous
Operating humidity	20 ~ 85%	Max allowable Voltage	V-150% 10sec, 120% continuous
Insulation resistance	More than 10MΩ	Weight	1140g(LL Ty)

Input

Range	-0.5~1~0.5(LEAD-LAG)
Circuit	1P2W, 1P3W, 3P3W, 3P4W
Voltage	110, 220, 190/√3, 208/√3, 380/√3V
Current	5A

Load resistance by output

DC	Load resistance
4~12~20mA	0~500Ω
0~0.5~1mA	0~10kΩ
-5~0~+5V	More than 200Ω
-1~0~+1V	More than 500Ω

Connection diagram

Refer to161-162page

VAR & VAR hour Transducer

Certificates



Model No.

KTU - 1 2 3 4 5 6

① Circuit	② AC input	Input value	③ DC Output	⑤ Aux. power
	1 110V/5A	±600var	6 4~12~20mA	2 AC 90~260V, DC 110V
1 1P2W	2 220V/5A	±1200var	7 0~0.5~1mA	⑥ Number of outputs
	0 Order-made		8 -5~0~+5V	S 1 Output
2 1P3W	1 220/110V/5A	±1000var	9 -1~0~+1V	
	1 110V/5A	±1000var	0 Order-made	
3 3P3W	2 220V/5A	±2000var	④ Count(Energy)	
	0 Order-made		A Relay	
	1 (208/√3)V / 5 A	±2000var	(10,000count/1 hour rated energy)	
	2 (380/√3)/(190/√3)V / 5 A	±2000var	B Contactless Open Collector	
	3 (380/√3)V / 5 A	±4000var	(10,000count/1 hour rated energy)	
4 3P4W	4 (11400/√3)/(190/√3)V / 5 A	±1660var	C Potential signal 5V Pulse	
	5 (22900/√3)/(190/√3)V / 5 A	±1660var	How to order) KTU-436A2S	
	0 Order-made		3P4W/380/√3V/5A/4~20mA/AC 90~260V/1Output	

Specification

Class	Reactive power(0.2) Reactive energy(0.5)	Withstand voltage	AC 2kV /1 min
Aux. power	Refer to the table above	Surge impulse	Voltage(1.2μs/ 50μs, 5kV) Current(8μs/20μs)
Operating temperature	-10~55℃	Max allowable current	A-200% 10sec, 120% continuous
Operating humidity	20 ~ 85%	Max allowable Voltage	V-150% 10sec, 120% continuous
Insulation resistance	More than 10MΩ	Weight	1140g(LL Ty)

Load resistance by output

DC	Load resistance
4~12~20mA	0~500Ω
0~0.5~1mA	0~10kΩ
-5~0~+5V	More than 200Ω
-1~0~+1V	More than 500Ω

Energy Output Specification

Contact (Replay)	10,000count/1 hour rated energy
Contactless (Open Collector)	10,000count/1 hour rated energy

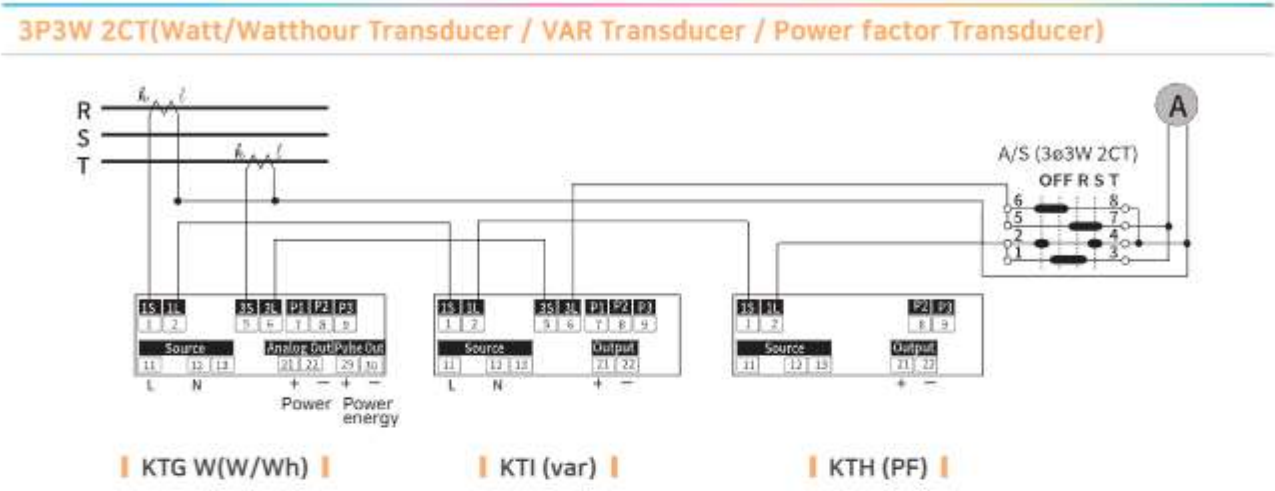
Input

Measurement range	-0.5~+0.5(LEAD-LAG)
Circuit	1P2W, 1P3W, 3P3W, 3P4W
Voltage	110, 220, 190/√3, 208/√3, 380/√3V
Current	5A

Connection diagram

Refer to 161-162page

Connection diagram (Cam Switch)



Contact symbols

OFF R S T

7 8

OFF R S T

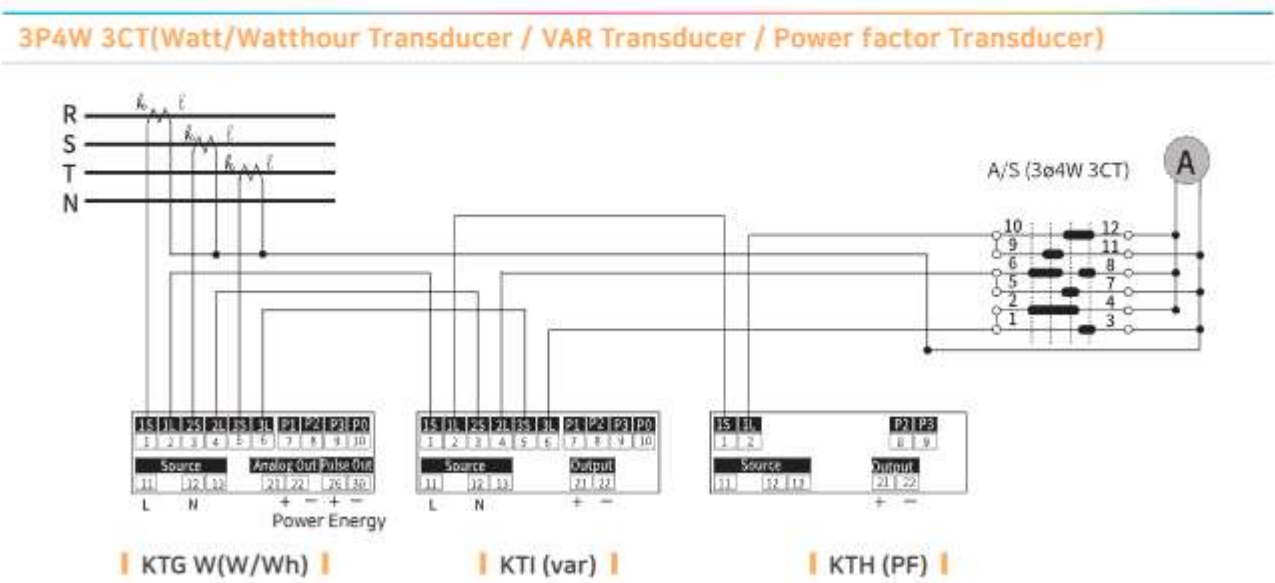
7 8

Continuous closed circuit

Intermittent closed circuit

Reference(3P3W 2CT A/S)

Terminal No.	6-8	5-7	2-4	1-3
OFF	On	Off	On	OFF
R	On	Off	Off	On
S	Off	On	Off	On
T	Off	On	On	Off

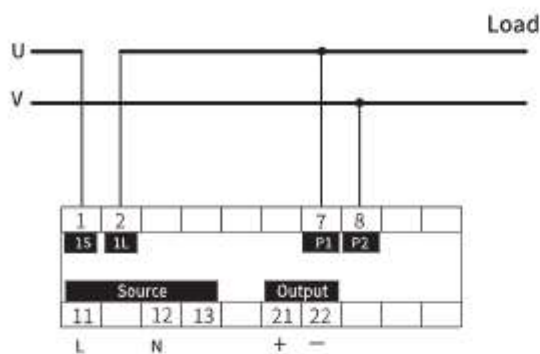


The A / S (Cam Switch) is based on the koino product. Please check the manufacturer's terminal number.

PT connection is not shown

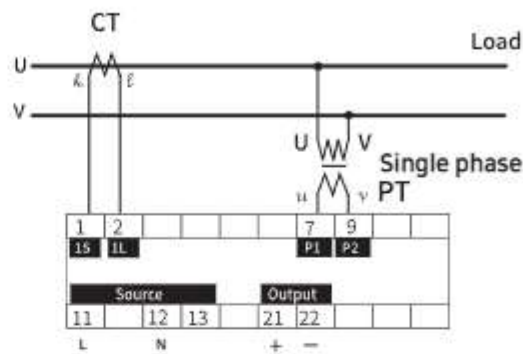
Connection diagram

1P2W(Watt/Watthour Transducer / VAR Transducer)

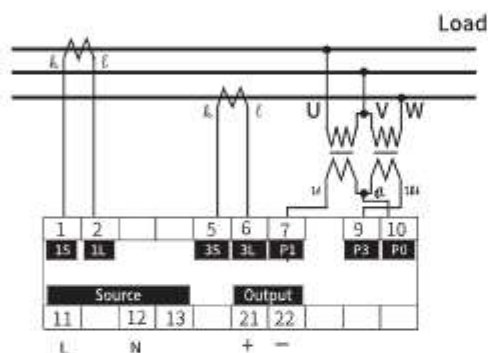


When connecting directly without CT.

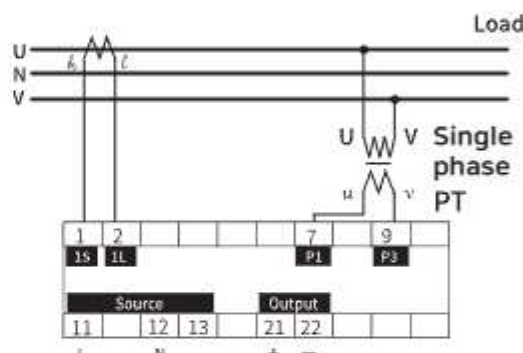
1P2W(Balanced Power factor Transducer)



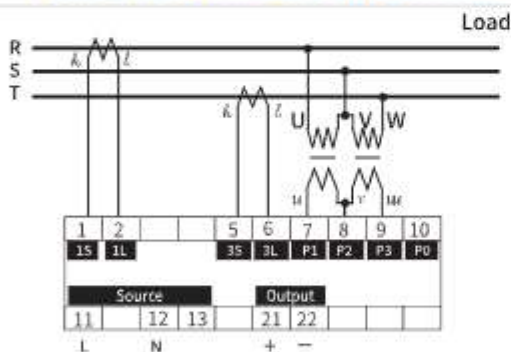
1P3W(Watt/Watthour Transducer / VAR Transducer)



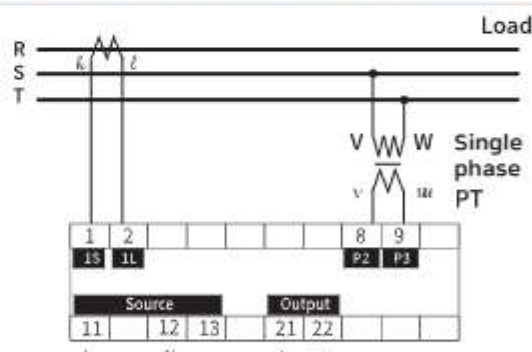
1P3W(Balanced Power factor Transducer)



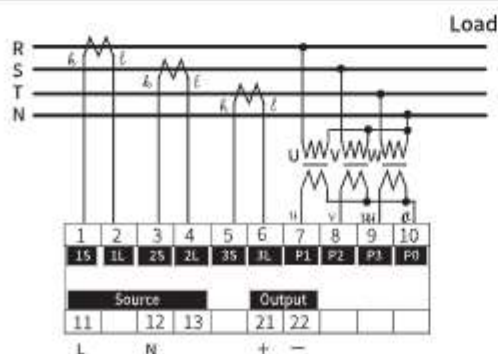
3P3W(Watt/Watthour Transducer / VAR Transducer / Unbalanced Power factor Transducer)



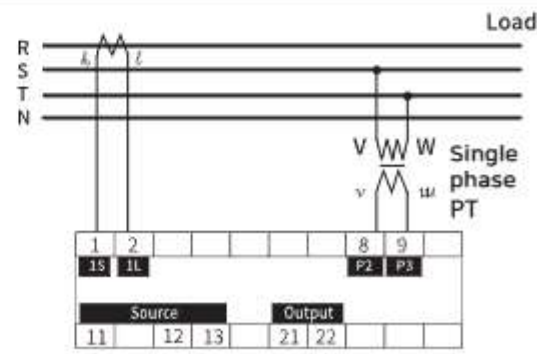
3P3W(Balanced Power factor Transducer)



3P4W(Watt/Watthour Transducer / VAR Transducer / Unbalanced Power factor Transducer)



3P4W(Balance power power Transducer)



Pulse . Analog Transducer



Model No.

KTK-



How to order) KTK-1161S

Open collector
signal/120Hz/4~20
mA/AC 110/220V

① Input	② Input Range	③ DC Output
1 Open collector	1 0~120Hz	6 4 ~ 20mA
2 Voltage pulse	2 0~1kHz	7 0 ~ 1mA
	3 0~5kHz	8 1 ~ 5V
	0 Order-made	9 0 ~ 10V
		0 Order-made
④ Aux. power	⑤ Number of outputs	
1 AC 110/220V	S 1 Output	
2 AC 90~260V, DC 110V, 220V	T 2 Output(AC 90~260V only)	

Specification

Class	0.5	Withstand voltage	AC 2kV /1 min
Aux. power	Refer to the table above	Surge impulse	Voltage(1.2μs/ 50μs, 5kV) Current(8μs/20μs)
Operating temperature	-10~50℃	Insulation resistance	More than 10MΩ
Operating humidity	20 ~ 85%	Weight	500g(L Ty)

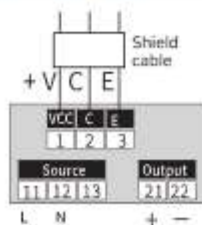
Input

open collector	Input detection voltage / current : DC 15V 1mA Detection level : ON(Less than 5Ω),OFF(More than Less 100Ω)
Voltage pulse	Waveform: Square wave, sine wave, similar sine wave Detection level: Lo 2 V or less, Hi 10 to 30 V Input impedance: 10 kΩ or more

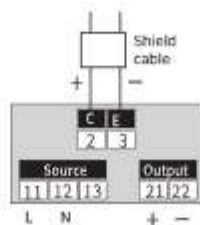
Load resistance by output

DC	Load resistance
4~20mA	0~500Ω
0~1mA	0~10kΩ
1~5V	More than 200Ω
0~10V	More than 500Ω

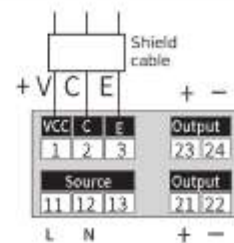
Connection diagram



Input (Open collector)



Input (voltage / pulse signal)



Input (Open collector)
-2 output

Potential Transducer



Model No.

KTL- 

- How to order) KTL-161S
0Ω~10kΩ/4~20mA/AC
110/220V/1Output
Customized product can
be produced by order.

① Input	② DC Output	③ Aux. power	④ Number of outputs
1 0Ω~10kΩ	6 4~20mA	1 AC 110/220V	5 1 Output
0 Order-made	7 0~1mA	2 DC 24V	
	8 1~5V		
	9 0~10V		
	0 Order-made		

Specification

Class	0.5	Withstand voltage	AC 2kV /1 min
Aux. power	Refer to the table above	Surge impulse	Voltage(1.2μs/ 50μs, 5kV) Current(8μs/20μs)
Operating temperature	-10~50℃	Insulation resistance	More than 10MΩ
Operating humidity	20~85%	Weight	500g(L Ty)

Input

Resistance	0Ω~10kΩ
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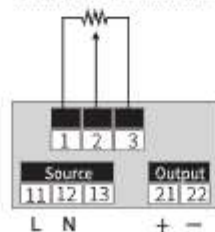
Load resistance by output

DC	Load resistance
4~20mA	0~500Ω
0~1mA	0~10kΩ
1~5V	More than 200Ω
0~10V	More than 500Ω

Connection diagram

| Output |

Variable resistance



DC Watt Transducer



Model No.

KTM- 
① ②

How to order) KTM-1A(50V,50mV)

Customized product can be produced by order.

① DC Voltage Input

- 1 50V
- 2 200V
- 3 500V
- 4 800V

② DC Current Input

- A 50mV
- B 60mV

Specification

Class	0.5	Withstand voltage	AC 2kV / 1 min
Aux. power	Refer to the table above	Surge impulse	Voltage(1.2μs/ 50μs, 5kV) Current(8μs/20μs)
Operating temperature	-10~50℃	Max allowable current	A-200% 10sec, 120% continuous
Operating humidity	20 ~ 85%	Max allowable Voltage	V-150% 10sec, 120% continuous
Insulation resistance	More than 10MΩ	Weight	410g(Ltype)

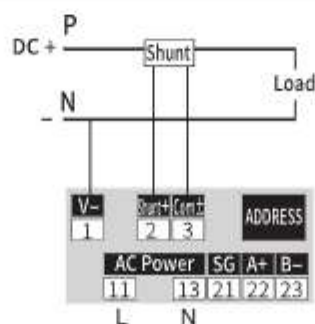
Input

DC Voltage	50V, 200V, 500V
DC Current	0~50mV (-50~0~50mV)
(Shunt)	0~60mV (-60~0~60mV)

Communication

Communication data	Voltage, Current, Power
Interface	RS-485 Multi-Drop 2Wire
Transmission speed	9600bps 2Wire
Connection	PC connection with RS-485(Ethernet) Converter
Address setting	0~63
Transmission distance	Maximum 1.2km
Protocol	Modbus(RTU)

Connection diagram



RTD Transducer

Certificates 



Model No.

KTP-



- How to order) KTP-1161S
PT 100Ω/PT 0~200℃/
4~20mA/AC
110/220V/1Output
Customized product can
be produced by order.

① Input

- 1 PT 100Ω
2 PT 50Ω
0 Order-made

② Temperature range

- 1 0~200℃
0 Order-made

③ DC Output

- 6 4~20mA
7 0~1mA
8 1~5V
9 0~10V
0 Order-made

④ Aux. power

- 1 AC 110/220V
2 DC 24V

⑤ Number of outputs

- 5 1 Output

Specification

Class	0.5	Withstand voltage	AC 2kV / 1 min
Aux. power	Refer to the table above	Surge impulse	Voltage(1.2μs/ 50μs, 5kV) Current(8μs/20μs)
Operating temperature	-10~50℃	Insulation resistance	More than 10MΩ
Operating humidity	20 ~ 85%	Weight	500g(L Ty)

Input

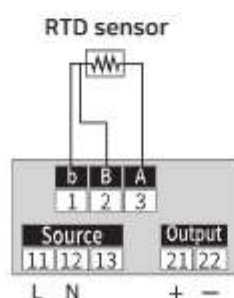
PT(JIS)	100Ω
Sensor 3Wire	50Ω
	Order made

Load resistance by output

DC	Load resistance
4~20mA	0~500Ω
0~1mA	0~10kΩ
1~5V	More than 200Ω
0~10V	More than 500Ω

Connection diagram

1 Output



AC Current Socket Transducer



Model No.

KSA-

① ② ③

How to order) KSA-261 5A
4~20mA/AC 220V

Customized product can
be produced by order.

① AC input

1 0~1A

2 0~5A

0 Order-made

② DC Output

6 4 ~ 20mA

7 0 ~ 1mA

8 1 ~ 5V

9 0 ~ 10V

0 Order-made

③ Aux. power

1 AC 220V(standard)

2 AC 110V

Specification

Class	0.3	Withstand voltage	AC 2kV /1 min
Aux. power	Refer to the table above	Surge impulse	Voltage(1.2μs/ 50μs, 5kV) Current(8μs/20μs)
Operating temperature	-10~50℃	Max allowable current	A-200% 10sec, 120% continuous
Operating humidity	20 ~ 85%	Measurement range	0~5A
Insulation resistance	More than 10MΩ	Weight	400g

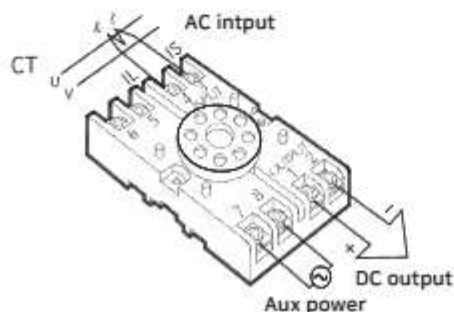
Input

AC Current	0~1A(50/60Hz) 0~5A(50/60Hz) Order made
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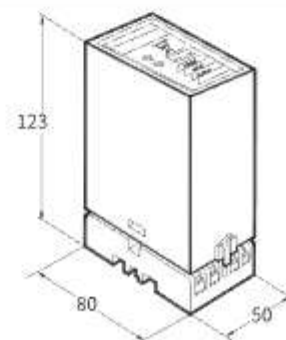
Load resistance by output

DC	Load resistance
4~20mA	0~500Ω
0~1mA	0~10kΩ
1~5V	More than 200Ω
0~10V	More than 500Ω

Connection diagram



Drawing



AC Voltage Socket Transducer



Model No.

KSB- 

How to order) KSB-161
150V/4~20mA/AC 220V

Customized product can
be produced by order.

① AC input

- 1 0~150V
- 2 0~300V
- 0 Order-made
(Less than AC 300V)

② DC Output

- 6 4 ~ 20mA
- 7 0 ~ 1mA
- 8 1 ~ 5V
- 9 0 ~ 10V
- 0 Order-made

③ Aux. power

- 1 AC 220V(standard)
- 2 AC 110V

Specification

Class	0.3	Withstand voltage	AC 2kV /1 min
Aux. power	Refer to the table above	Surge impulse	Voltage(1.2μs/ 50μs, 5kV), Current(8μs/20μs)
Operating temperature	-10~50℃	Max allowable Voltage	D-150% 10sec, 120% continuous
Operating humidity	20 ~ 85%	Measurement range	0~300V
Insulation resistance	More than 10MΩ	Weight	400g

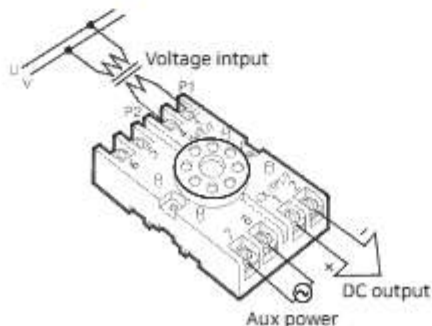
Input

AC Voltage	0~150V(50/60Hz)
	0~300V(50/60Hz)
	Order made
	* Up to AC 300V

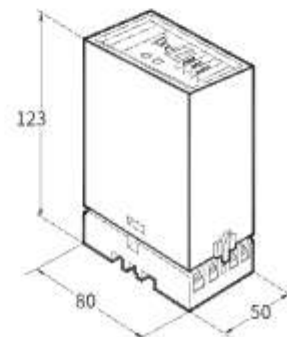
Load resistance by output

DC	Load resistance
4~20mA	0~500Ω
0~1mA	0~10kΩ
1~5V	More than 200Ω
0~10V	More than 500Ω

Connection diagram



Drawing



DC Isolated Socket Transducer



Model No.

KSD- 
 ① ② ③ ④

How to order) KSD-361S
 10V/4~20mA/AC 220V
 /1Output

Customized product can
 be produced by order.

① Input	② DC Output	③ Aux. power	④ Number of outputs
1 0~50mV	6 4~20mA	1 AC 220V	S 1 Output
2 0~60mV	7 0~1mA	2 AC 110V	T 2 Output(AC90~260V only)
3 0~10V	8 1~5V	3 AC 90~260V, DC110V/220V	
4 1~5V	9 0~10V		
5 4~20mA	0 Order-made		
6 0~1mA			
7 0~10mA			
8 0~20mA			
0 Order-made			

Specification

Class	0.25	Withstand voltage	AC 2kV / 1 min
Aux. power	Refer to the table above.	Surge impulse	Voltage(1.2μs/ 50μs, 5kV), Current(8μs/20μs)
Operating temperature	-10~50°C	Max allowable Voltage	V-150% 10sec, 120% continuous
Operating humidity	20 ~ 85%	Measurement range	0~100%
Insulation resistance	More than 10MΩ	Weight	400g

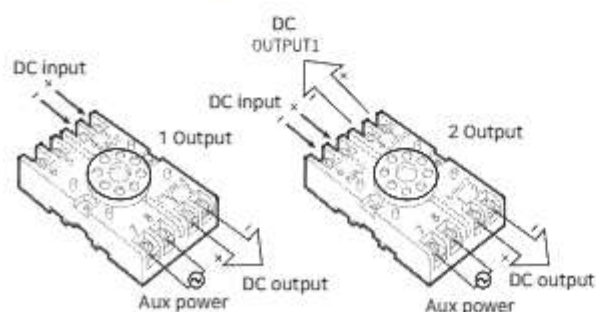
Input

DC Voltage	0~50mV/0~60mV/0~10V/1~5V
DC Current	4~20mA/0~1mA/0~10mA/0~20mA

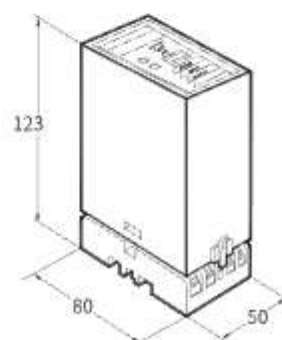
Load resistance by output

DC	Load resistance
4~20mA	0~500Ω
0~1mA	0~10kΩ
1~5V	More than 200Ω
0~10V	More than 500Ω

Connection diagram



Drawing



Frequency Socket Transducer



Model No.

KSF- 

- How to order) KSF-161
AC 90~240V(0~120Hz)/
4~20mA/ AC 220V
- Customized product can
be produced by order.

① AC input	② DC Output	③ Aux. power
1 AC 90~240V(0~120Hz)	6 4 ~ 20mA	1 AC 220V(Standard)
0 Order-made	7 0 ~ 1mA	2 AC 110V
	8 1 ~ 5V	
	9 0 ~ 10V	
	0 Order-made	

Specification

Class	0.25(0~120Hz), 0.5(45~65Hz)	Withstand voltage	AC 2kV /1 min
Aux. power	Refer to the table above	Surge impulse	Voltage(1.2μs/ 50μs, 5kV), Current(8μs/20μs)
Operating temperature	-10~50℃	Max allowable Voltage	D-150% 10sec, 120% continuous
Operating humidity	20 ~ 85%	Measurement range	0~120Hz
Insulation resistance	More than 10MΩ	Weight	400g

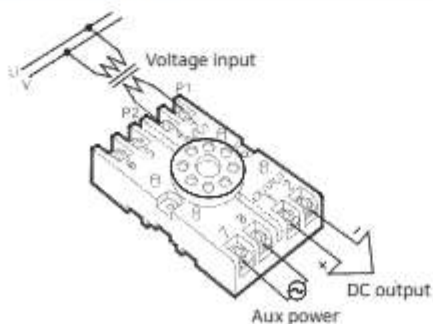
Input

AC voltage
0~120Hz
AC 90~240V

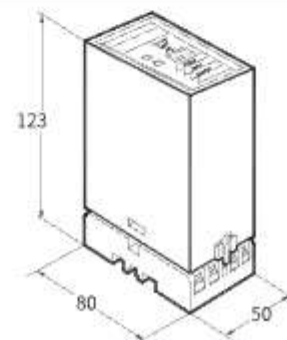
Load resistance by output

DC	Load resistance
4~20mA	0~500Ω
0~1mA	0~10kΩ
1~5V	More than 200Ω
0~10V	More than 500Ω

Connection diagram



Drawing



Potential Socket Transducer



Model No.

KSL- 
① ② ③

How to order) KSL-181
500Ω / 1-5V / AC 220V

Customized product can
be produced by order.

① Input

1 0~500Ω

2 0~1kΩ

3 0~10kΩ

0 Order-made

② DC Output

6 4 ~ 20mA

7 0 ~ 1mA

8 1 ~ 5V

9 0 ~ 10V

0 Order-made

③ Aux. power

1 AC 220V(Standard)

2 AC 110V

Specification

Class	0.5	Withstand voltage	AC 2kV / 1 min
Aux. power	Refer to the table above	Surge impulse	Voltage(1.2μs/ 50μs, 5kV) Current(8μs/20μs)
Operating temperature	-10~50℃	Measurement range	0~500Ω, 0~1kΩ, 0~10kΩ
Operating humidity	20 ~ 85%	Weight	400g
Insulation resistance	More than 10MΩ		

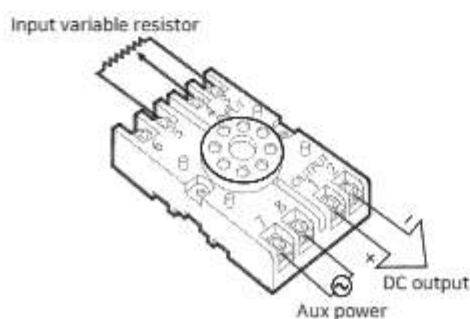
Input

Resistance	0~500Ω
	0~1kΩ
	0~10kΩ
	Order-made

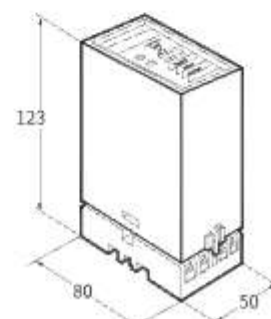
Load resistance by output

DC	Load resistance
4~20mA	0~500Ω
0~1mA	0~10kΩ
1~5V	More than 200Ω
0~10V	More than 500Ω

Connection diagram



Drawing



RTD Socket Transducer



Model No.

KSP- 

- How to order) KSP-1161
PT 100Ω/0 ~ 200℃/
4~20mA/AC 220V
- Customized product can
be produced by order.

① Input	② Temperature input	③ DC Output	④ Aux. power
1 PT 100Ω	1 0 ~ 200℃	6 4 ~ 20mA	1 AC 220V(Standard)
2 PT 50Ω	0 Order-made	7 0 ~ 1mA	2 AC 110V
0 Order-made		8 1 ~ 5V	
		9 0 ~ 10V	
		0 Order-made	

Specification

Class	0.5	Withstand voltage	AC 2kV / 1 min
Aux. power	Refer to the table above	Surge impulse	Voltage(1.2μs/ 50μs, 5kV) Current(8μs/20μs)
Operating temperature	-10~50℃	Measurement range	According to input specification
Operating humidity	20 ~ 85%	Weight	400g
Insulation resistance	More than 10MΩ		

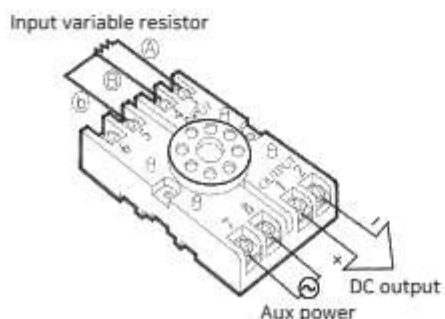
Input

PT Sensor	PT 100Ω
3wire	PT 50Ω
	Order-made

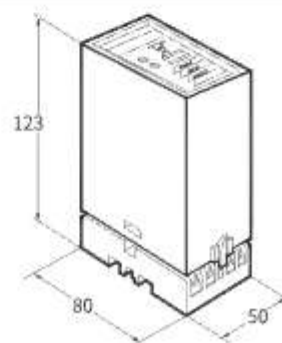
Load resistance by output

DC	Load resistance
4~20mA	0~500Ω
0~1mA	0~10kΩ
1~5V	More than 200Ω
0~10V	More than 500Ω

Connection diagram



Drawing



CE certification

CE stands for "Conformité Européene" and indicates conformity with health, safety, and environmental protection standards for products sold within the European Economic Area (EEA). Our CE certified products are complied to the requirements of EU Directives, relating to LVD (Low Voltage Directives) and EMC(Directive Electromagnetic Compatibility Directives). LIGHTSTAR achieved CE certificate for Analog meter, Current Transformer, Digital meter, Power meter and Transducers.

TEST MEASURING EQUIPMENT

KS certification

KS stands for Korean Standard and indicates conformity with Korean government required standards. LIGHTSTAR achieved KS certificate for Analog meter, Current Transformer and Transducers.



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KZP-3



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MOF Current Ratio Error Testor

KST-B

Portable power quality meter

Model No.

KSM-1

①

②

① Portable power quality meter

② Size

00 52Φ Clamp

Overview

Portable power quality meter measuring electrical data and showing wave form, phase and harmonics.
All related data to be shown in bluetooth connected tablet PC, which is inclusive as one package.

Feature

- Easy to measure 3-phase voltage and current, power and power factor (Current can be measured with one clamp, phase by phase)
- High resolution waveform, phase, harmonic analysis data transmitted to android tablet PC.
- Applied with lithium ion battery used for 5 hours.
- Easy to carry as portable type.
- Trend recording, automatic report printing function.

Specification

Contents	Main body + tablet PC	Input range	Voltage	AC 25V~500V
Aux. power	Lithium ion battery 3.7 V		Current	0.050A~500.0A
Operating temperature	-10~50℃		Power Factor	±0.000~1.000
Operating Humidity	20~85%			(+ : lag, - : lead)
Place of use	Less than 2000 meter above sea level Free from vibration and impact.	Bluetooth		V2.0 + EDR compatible
Wiring method	1Ø2W, 3Ø3W, 3Ø4W			Operating distance: Max 5M

Accuracy

V	±(0.5% of rdg + 0.1% of FS)	Harmonic	±(1.0% of rdg + 1.0%)
A	5A : ±(1.0% of rdg + 0.5% of Range)	Phase	±(1.0% of rdg + 1 °)
	50A : ±(0.5% of rdg + 0.5% of Range)	W	5A : ±(1.0% of rdg + 0.2% of Range) at PF=1
	500A : ±(0.5% of rdg + 0.5% of Range)		50A : ±(0.5% of rdg + 0.2% of Range) at PF=1
kWh	±(watt accuracy + 0.1 count/h)		500A : ±(0.5% of rdg + 0.2% of Range) at PF=1
Varh	±(var accuracy + 0.1 count/h)	Var	5A : ±(2.0% of rdg + 0.3% of Range)
PF	±(1.0% of rdg + 1 °)		50A : ±(1.0% of rdg + 0.3% of Range)
Hz	±(0.1% of Range + 0.02Hz)		500A : ±(1.0% of rdg + 0.3% of Range)

Function

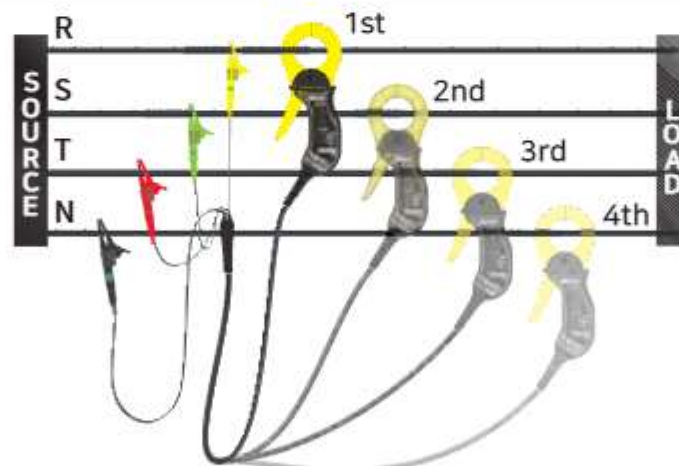
Body(KSM-100/110)



Display(Android)



Example



CT Tester

Model No.

KZA-**0000**

① ②

① Types

- 2 Current transformer testing device
- 3 Potential Transformer testing device

② Output

- 04 Current 0~400A
- 08 Current 0~800A
- 32 Current 0~3200A
- 70 Voltage 0~720V

Overview

Testing device for transformer error test and phase test. Included with standard CT, testing burden, error meter and testing software to be connected with computer.

Feature

- Inspection data transmitted to PC by communication.
- Standard CT (5 A, 1 A) and burden box (PF 0.8, 5 A, 1 A) included.
- Integrated type, easy installation, minimize inspection time.
- Safety device included: Current relay for short circuit and overload protection

Configuration

ERROR METER

Ratio error, phase angle measurement

TEST BURDEN SWITCH

Burden selection

TEST RATIO SWITCH

Primary current selection

Communication button

Test data transmission

Primary current terminal

Primary current ON / OFF button

Secondary current terminal



Primary current display

POWER SWITCH

POWER ON/OFF

Secondary current display

Current OUTPUT Switch

150A / 300A Choice

SEC RATIO Switch

Secondary current 5 A - 1 A selection

ADJUST Dial

Primary current adjustment

Specification

Type	KZA-204	KZA-208	KZA-232
Current output	0~450A / 1kVA	0~800A / 1kVA	0~3200A / 3kVA
Test CT ratio (Standard CT included)	40A-50A-60A 75A-100A-120A 150A-200A-250A 300A-350A-400A / 5A-1A	100A-120A-150A 200A-250A-300A 350A-400A-500A 600A-700A-750A / 5A-1A	100A-120A-150A-200A-250A -300A-350A-400A-500A-600A / 5A-1A 700A-750A-800A-1000A -1200A-1500A-1600A-2000A 2500A-3000A-3200A / 5A-1A
Burden(PF 0.8)	2.5VA / 5VA / 15VA	5VA / 15VA / 40VA	5VA / 15VA / 40VA
Size(mm)	500(W)X400(D)X400(H)	600(W)X500(D)X400(H)	1000(W)X1000(D)X2000(H)
Weight	60kg	80kg	150kg
Common	(1) Standard CT class: 5 A 0.1 class, 1A class 0.2 grade (2) Aux power : 220 V AC (3) Communication: ERROR METER (RS-485 communication) (4) Safety device: current relay for short-circuit and overload		

Customized product can be produced by order.

Transformer Error Meter

Model No.

KZA- 1

① ②

① ERROR METER

② Type

00 For current transformer

10 For Potential transformer

Overview

Meter for transformer error test and phase test.

Feature

- Standard CT / PT ratio error (%) and phase angle (min) error offset function
- Transmission of inspection data to PC using communication program

Configuration

SET Button

Setting the offset value
(ratio-error, phase angle)

Ratio error display

Phase angle error display



Percentage (%) Display

Selection button

- Select display value
- "ST": standard CT (or PT) Secondary value
- "TEST": test CT (or PT) Secondary value

COMM. START / STOP Button

Test status transmission

Transmission button

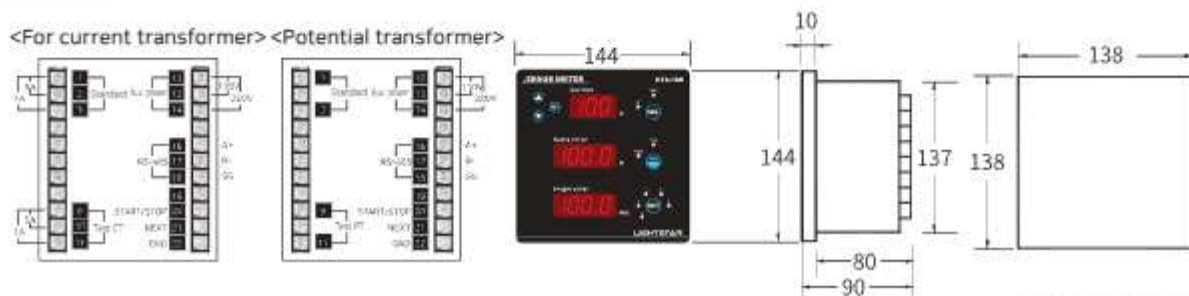
Test data transmission

Specification

Type	KZA-100(CT TEST)	KZA-110(PT TEST)
Input	5A, 1A	110/√3, 110V, 220V
Range	2%~130%(0.1A~6A, 0.02A~1,12A)	20V ~ 280V
Ratio error display	Max. ±19.99%	Max. ±19.99%
Ratio error accuracy(Error)	More than 20% ±(0.2% of rdg + 2digit) Less than 20% ±(0.5% of rdg + 2digit)	More than 20% ±(0.2% of rdg + 2digit)
Phase angle display	MAX, ±199.9min	MAX, ±199.9min
Phase angle accuracy (Angle Error)	More than 20% (±1min rdg + 2digit) Less than 20% (±2min rdg + 2digit)	More than 20% (±1min rdg + 2digit)
Ratio error, phase angle correction setting(Offset)	- 5 stages (5/10/20/100/120%), - Setting range: 0.00 to ± 0.99% / 0.0 to ± 9.9 min	- One stage - Setting range: 0.00~±0.99% / 0.0~±9.9min
Communication	RS-485	RS-485

Drawing

Unit:mm



Access Probe For Test



Model No.

KZB- 
①

① Function

10 IP1X Applied test probe	Diameter : 50 ±0,05mm Pushing force : 50 N ±10%(5KG)
20 IP2X Applied test probe	Diameter : 12,0 ±0,05mm Pushing force : 10 N ±10%(1KG)
30 IP3X Applied test probe	Diameter : 2,5 ±0,05mm Pushing force : 3 N ±10%(0.3KG)
40 IP4X Applied test probe	Diameter : 1,0 ±0,05mm Pushing force : 1,0 N ±10%(0.1KG)

Purpose

Testing the gap size by this device in order to protect from external dust or human contact

Feature

Push-rod with handle

Test method

Push the probe on checking spot with designed force.

External dust acceptable criteria

A probe of a defined size shall Not pass through the gap.

Human body protection acceptable criteria

Shall not be energized(DC 40 V test device) between the probe and the internal hazardous part.

Additional device for human body protection test



TYPE	KZB-PO
INPUT	AC 220V
OUTPUT	DC 40V
Response	BUZZER and LAMP

Potable Power Tester



Model No.

KZT-1

① Current input range

- | | |
|----------------|----------------|
| 1 2.00~20.00A | 3 0.200~2.00A |
| 2 0.500~5.000A | 4 50.0~999.9mA |

Overview

Testing device for single phase electric equipment.
3 sets of display to show voltage, current, power and PF
Alarm or relay contact to be activated with limit setting switch.

Communication

- Interface : RS-232C
- Transmission character : ASCII BCD
- Transmission speed: fixed : 9600bps
- Transmission format : Start 1bit, Data 8bit, Parity None Stop 1bit

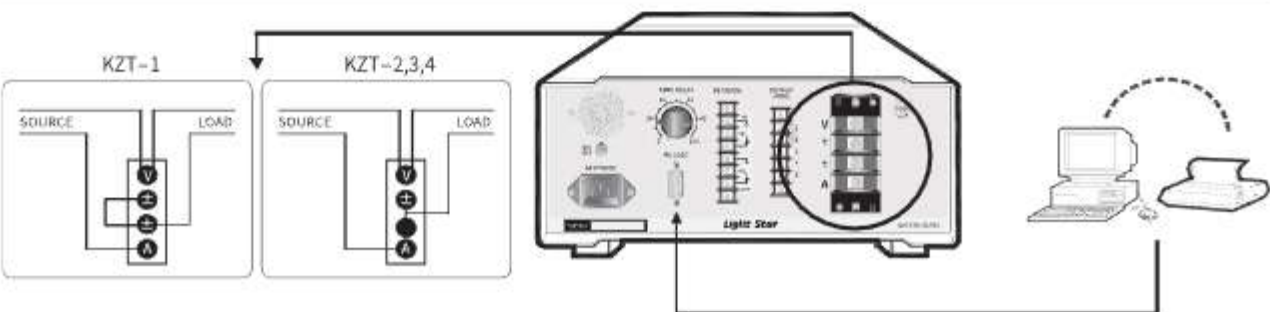
Feature

- Built-in FUSE to prevent damage from excessive current (except for KZT-1)
- Adjustable reaction time
- RMS measurement
- Alarm and relay contact to be activated according to setting value.
- V, A, W / PF are displayed.
- Easy to recognize with alarm and contact.
- Measured data can be transmitted to PC and saved

Specification

		Input			
Type		Voltage	Current	Power	Power Factor
KZT - 1		30.0~300.0V	2.00~20.00A	125~5000W	50.0~100.0
KZT - 2			0.500~5.000A	25.0~750.0W	
KZT - 3			0.200~2.000A	10.0~500.0W	
KZT - 4			50.0~999.9mA	2.50~99.99W	
Accuracy	10Hz	±1% of range			
	45~65Hz	±(0.2% of rdg + 0.1% of FS) at 45~65Hz			
	2kHz	±1% of range			
	20kHz	±2% of range		±3% of range	
Aux. power		AC 90~260V(50/60Hz), DC 110V		Weight	2.5kg

Connection diagram



Potable Power Meter



Model No.

KZM-A

Overview

Testing device for single phase electric equipment.
3 sets of display to show voltage, current, power, PF, active power, surface power, energy and cumulative current.
Measuring range can be chosen to enhance measuring accuracy.

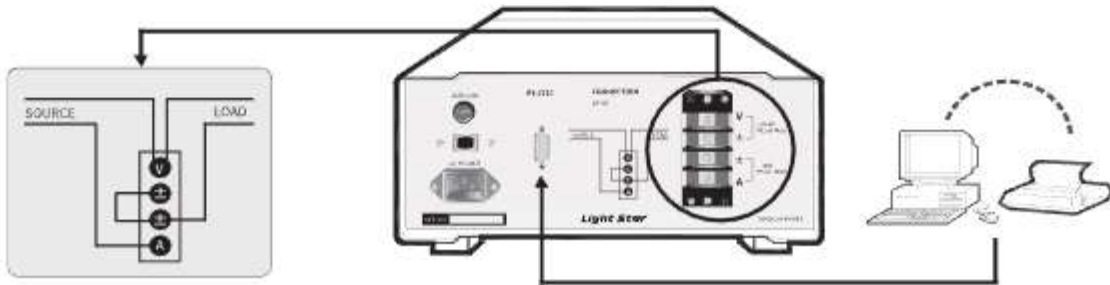
Communication

- Interface : RS-232C
- Transmission character: ASCII BCD
- Transmission speed: 9600bps
- Transmission format : Start 1bit, Data 8bit, Parity None Stop 1bit

Specification

Type	Input		
	Voltage	Current	Power
Circuit configuration	5range RMS by LOG-anti LOG	7range RMS by LOG-anti LOG	Time division, pulse interval, transformation method
Range	0~50, 0~100, 0~150 0~200, 0~300	0~0.3, 0~0.5, 0~1 0~2, 0~5, 0~10, 0~20	1.5~6000W
Max crest factor (maximum value / effective value)	2.0	3.0	-
Accuracy	45~65Hz $\pm(0.2\% \text{ of rdg} + 0.1\% \text{ of range})$	45~65Hz $\pm(0.1\% \text{ of rdg} + 0.2\% \text{ of range})$	At $\cos\Phi=1$ $\pm(0.2\% \text{ of rdg} + 0.2\% \text{ of range})$
Power Factor(PF)	Calculation : $\frac{W}{V \times A}$ Range of measurement : 0.100~1.000 Accuracy : $\pm(0.2\% \text{ of rdg} + 2.0\% \text{ of range})$		
Apparent power(VA)	V x A Range of measurement : 1.50~6000VA Accuracy : $\pm(0.2\% \text{ of rdg} + 0.5\% \text{ of range})$		
Reactive power(Var)	Range of measurement : $\sqrt{(V \times A)^2 - W^2}$ Range of measurement : 15~6000var Accuracy : $\pm(0.5\% \text{ of rdg} + 1.0\% \text{ of range})$		
Energy(Wh)	$\pm(0.5\% \text{ of rdg} + 1.0\% \text{ of range})$		
Cumulated current(Ah)	$\pm(0.2\% \text{ of rdg} + 1.0\% \text{ of range})$		
Temperature coefficient 5 to 20 °C	Less than $\pm 0.03\% \text{ of range}/^\circ\text{C}$		
Accuracy	10Hz	$\pm 1\% \text{ of range}$	
	45~65Hz	Refer to above	
	2kHz	$\pm 1\% \text{ of range}$	
	20kHz	$\pm 2\% \text{ of range}$	$\pm 3\% \text{ of range}$
Aux. power	AC 110V/220V		Weight 3.0kg

Connection diagram



Potable Power Meter



Model No.

KZM-


① Current input range

1	2.00~20.00A	3	0.200~2.00A
2	0.500~5.000A	4	50.0~999.9mA

Overview

Testing device for single phase electric equipment.
3 sets of display to show voltage, current and PF

Feature

- We provide application programs to be provided.
- Simple and robust design / economical price

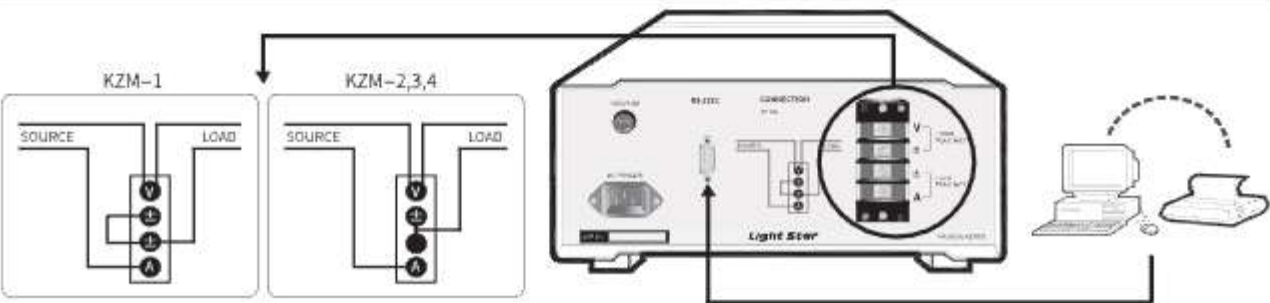
Communication

- Interface : RS-232C
- Transmission character:: ASCII BCD
- Transmission speed: 9600bps
- Transmission format : Start 1bit, Data 8bit, Parity None Stop 1bit

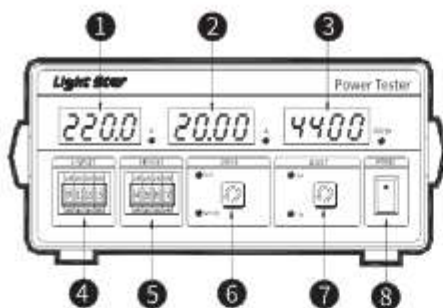
Specification

		Input			
Type		Voltage	Current	Power	Power Factor
KZM - 1		30,0~300,0V	2,00~20,00A	125~5000W	50,0~100,0
KZM - 2			0,500~5,000A	25,0~750,0W	
KZM - 3			0,200~2,000A	10,0~500,0W	
KZM - 4			50,0~999,9mA	2,50~99,99W	
Accuracy	10Hz	±1% of range			
	45~65Hz	±(0,2% of rdg + 0,1% of FS)at 45~65Hz			
	2kHz	±1% of range			
	20kHz	±2% of range		±3% of range	
Aux. power		AC 90~260V(50/60Hz), DC 110V		Weight	2.5kg

Connection diagram

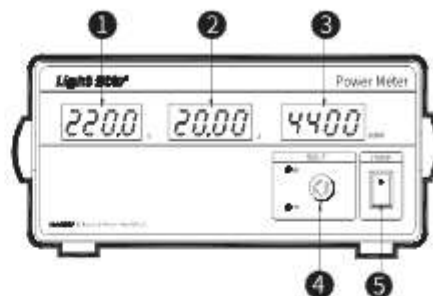


KZT-1,2,3,4



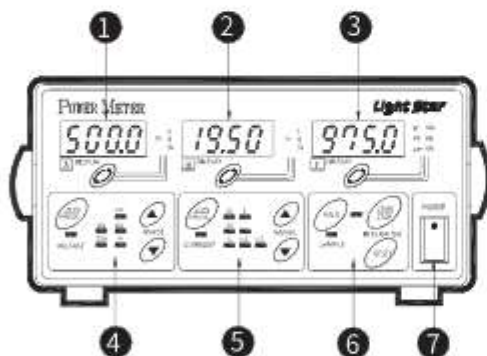
- ① Voltage display
- ② Current display
- ③ Power / Power Factor display
- ④ Low limit setting switch
- ⑤ High limit setting switch
- ⑥ Setting select button (V/A/PF/W)
- ⑦ Select button (PF/W)
- ⑧ Power switch

KZM-1,2,3,4



- ① Voltage display
- ② Current display
- ③ Power / Power Factor display
- ④ Select button (PF/W)
- ⑤ Power switch

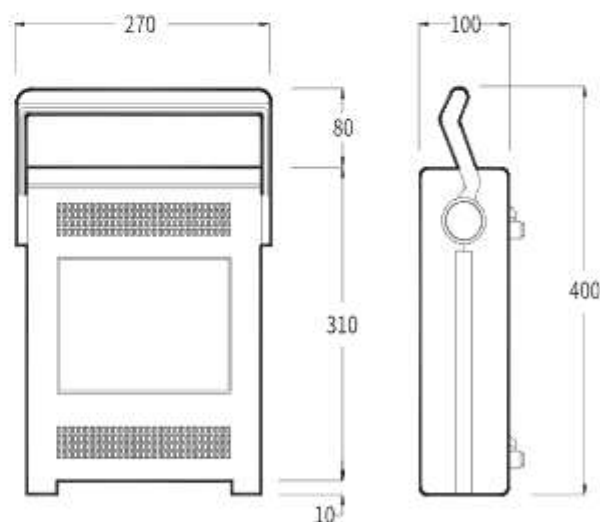
KZM-A



- ① Display A (V, A, W)
- ② Display B (V, A, W)
- ③ Display C (W, PF, Var, VA, Ah, Wh)
- ④ Voltage range setting button
- ⑤ Current range setting button
- ⑥ Hold and Integrator button
- ⑦ Power switch

Drawing

Unit:mm



AC Calibrator



Model No.

KZP-1

Overview

Accurate ($\pm 0.1\%$) calibrating device which can generate AC voltage (3~720V) or AC current (5mA~60A) with 60VA capacity.

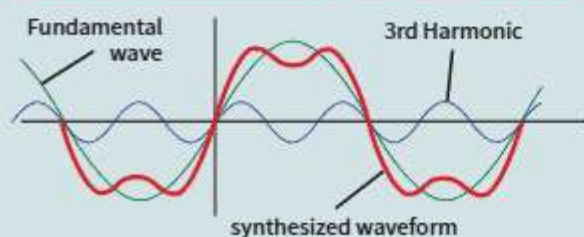
Can be used for electrical meter production line or academic demonstration

This device can be controlled by remote PC(MMI) and scheduled control can be done also

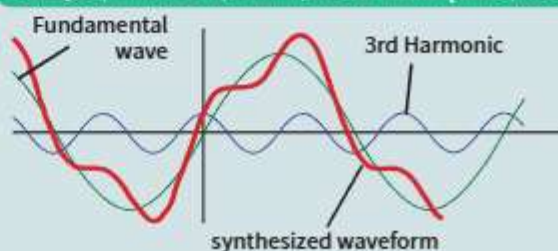
Function

- Accuracy:** AC voltage, current (50/60 Hz) Accuracy $\pm 0.1\%$
- Wide range:** AC voltage: 3 V to 720 V (3 Range), AC current: 50 mA to 60 A (4 Range)
- Frequency:** 50, 60 Hz, and 44 ~ 70 Hz (continuously variable by 0.01Hz).
- Output dividing function:** Easy to divide output step by step by using output dial (by 20 division)
- Deviation reading:** Test error percentage can be displayed comparing to max value.
- Sweep:** 0 to 120% of the set output value can be continuously varied at a constant speed, (12 seconds to set output value)
- 3rd harmonic output:** 3rd harmonic content is controlled from 0 to 30% (1 step) with one dial, And 3rd harmonic phase angle can be shifted from 0 to ± 180 (30° step).

Example) THD : 30%, SHIFT (3rd harmonic phase): 0



Example) THD : 30%, SHIFT (3rd harmonic phase): +90



Specification

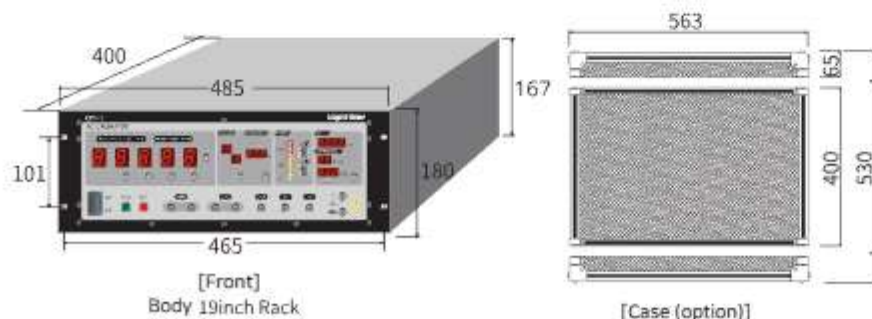
Distortion rate	Voltage output: 0.07%, Current output: 0.18% at range 40 to 120%				
Output	Setting	Range	Resolution	Max output	Accuracy: 50/60Hz
	150V	3V~180V	10mV	333mA	0.1% of setting value + 0.015% of Range) ± 0.1% of range, output in under 20% of range. (Range ±0.1%)
	300V	5V~360V	100mV	166mA	
	600V	10V~720V	100mV	83mA	
	1A	5mA~1.2A	100μA	50V	
	5A	10mA~6A	1mA	10V	
	15A	50mA~18A	10mA	4.6V	
	50A	100mA~60A	10mA	1V	
If setting is 1% or less of Range, the output is "0".					
Output setting and display	4 Dial setting / voltage (V) - 3 LED / current (A) - 4 LED				
Output dividing	(Output) = (setting)X n/m m : 1,2,3,.....,20, n : 1,2,3,.....,20				
Deviation setting	1 Dial setting				
Deviation display	3 LED display, maximum display 10.0% (0.05 to 10.0%)				
Response time	Approximately 1 sec (0 to 1005) of the setting value (Full scale)				
Insulation resistance	1000Ω or more with 500 V DC between power supply and case between power supply and output terminal				
Withstand voltage	1 minute with 1500 V AC between power supply and output terminal, with power supply and case				
Sweep speed	Approximately 120% to set			Output frequency	44~70Hz Continuous variable(0.01step)
Output terminal	5M×7EA			Aux. power	AC 220 ±10%, 50Hz or 60Hz
Operating temperature and humidity	-10~50℃, 20~85% RH			Power consumption	Less than 500VA
Accessories	Power cord 1 set, instruction manual 1 set				
Option	General control, schedule control with RS-232C communication.				

Model with AC110v aux power is order-made

Drawing

Unit:mm

Recommended terminal wiring



- 50A→10SQ
- 15A→6SQ
- 5A→2.5SQ
- 1A→1.5SQ

AC Calibrator (KZP-1 HMI control)

Overview

KZP-1 HMI can control KZP-1 with every function from PC by RS-232 communication. Also this software can visualize the data with graph.

HMI(Human Machine Interface)

Human-machine interface (HMI) is a component of certain devices that are capable of handling human-machine interactions. The interface consists of hardware and software that allow user inputs to be translated as signals for machines that, in turn, provide the required result to the user. Human-machine interface technology has been used in different industries like electronics, entertainment, military, medical, etc. Human-machine interfaces help in integrating humans into complex technological systems.

Configuration

General control



Checking and controlling the voltage / current magnitude division, deviation, step, frequency and 3rd harmonic content and phase visually.

Schedule control



User can arrange values by schedule(sequence) of voltage, current, division, deviation, step, frequency and 3rd Harmonic. Max 99 scheduled (sequence) input, Holding time to be varied from 1 to 3600 sec.

3Phase Power Calibrator



Model No.

KZP-3

Overview

3 phase output (voltage, current) with single phase power 220V. Used for transducer calibration, relay function test or academic demonstration.

Feature

- Three phase power (A, V, W, Hz, PF) Generation with single phase power
- Automatic holding function in case of misconnection
- PC remote control
- 3 phase angle individual adjustment
- Using the keypad and encoder to change the output value instantaneously.

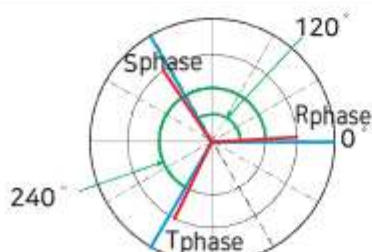
Output control specification

- 4x20 Character LCD 27 Key

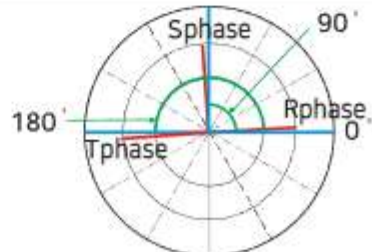
Specification

Aux. power	AC 220V $\pm$ 10%, 50/60Hz	Frequency	- Output Range : 45Hz ~ 65Hz - Resolution : 0.01Hz - Rate of change : $\pm$0.01Hz
Output method	3 phase 4 wire : Van/Vbn/Vcn Ia / Ib / Ic (P1, P2, P3, P0 / 1S-1L, 2S-2L, 3S-3L)	Phase to phase angle	- Phase Setting : R-S Phase, R-T Phase - Input Range : 0° ~ 360° - Resolution : 1° - Accuracy : $\pm$0.35°
Voltage Output	- Output Range : 0~300.00V (Line-N)Between phases 0~519.00V (Line-Line)Line to line - Resolution : 0.01V - Maximum load : 15VA (300V) - Accuracy : $\pm$0.1% of rdg (320~50VL-N)	Display	20 characters (W) x 4 columns (H) - LCD Backlight (yellow green) - Display size : 98(W) x 60(H) x 13.5(T)mm - Character size : 2.95(W) x 4.755(H)mm
Current Output	- Output Range : 0 ~ 6.000A - Resolution : 0.001A - Maximum load : 15VA (6A) - Accuracy : 6A~1A($\pm$0.1% of rdg) 1A~0.5A($\pm$0.5% of rdg) 0.5A~0.1A($\pm$1.0% of rdg)	Communication	- Interface: RS-232C - Transmission protocol : Modbus - Transmission speed : fixed at 9600 bps - Transmission distance : within 5M
Power Factor	3-phase setting or each phase. - Input Range : -1.000 ~ 0.000 ~ +1.000 (Power Factor) - Resolution : 0.001(Power Factor) - Accuracy : $\pm$0.35° (Phase angle)		

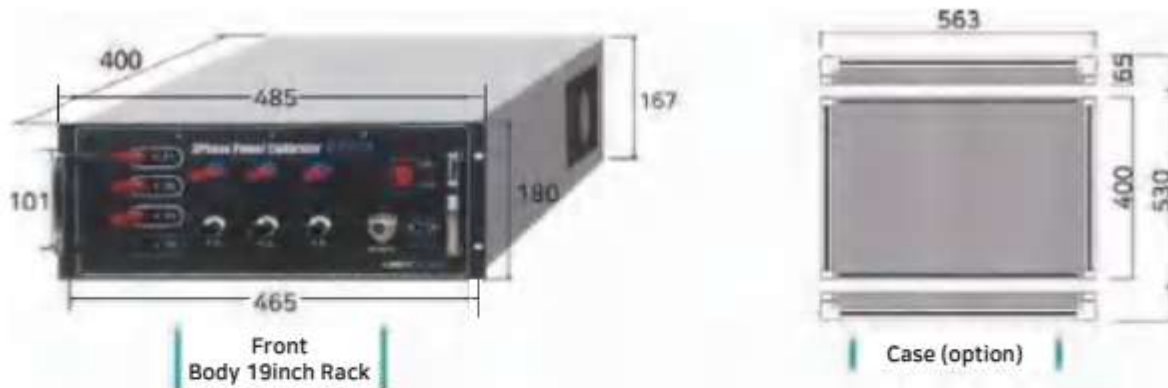
Vector



Example) Basic setting S-phase : 120° T-phase : 240°



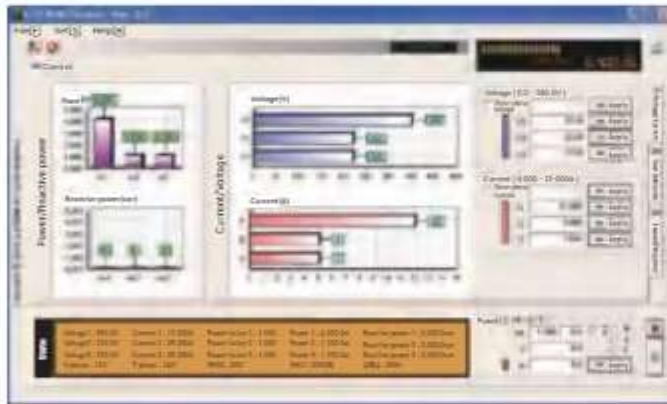
Example) Basic setting S-phase : 90° T-phase : 180°



HMI Control

HMI can control KZP-1 with every function from PC by RS-232 communication. Also this software can visualize the data with graph.

Voltage / current setting and display



Checking the magnitude of voltage / current visually (graph).

If KZP-3 is connected, you can check the applied value and graph.

Power factor / phase setting and display



The power factor / phase angle can be controlled.

The controlled value is shown as a bar graph, and the power factor and phase angle of the three phases are shown as a vector diagram, and setting condition can be easily shown.

MOF Current Ratio Error Tester



Model No.

KZE-MOF

Overview

This device is used for measuring ratio error primary and secondary current. Can minimize testing time with phase comparing function.

Feature

Primary current detector

Wirelessly transmit the current value of primary wire (special high voltage). According to the magnitude of the current, the range of 4 A / 40 A / 200 A can be selected to minimize error.

Secondary current detector

A device for transmitting current to the main body with wire, the measuring range is always set to 4 A, R (yellow), S (brown), T (black) can be connected at the same time.

Main Body

Collecting data from Primary/Secondary detector, calculating and display various data including CT ratio and ratio error. Also data can be save up to 10EA.

General specification

Primary current detector

Setting	Range	Accuracy	Temperature
4A	AC 0.25 ~ 5A	±1.0% FS±2digit	-10℃ ~ 50℃
40A	AC 2.5 ~ 50A		
200A	AC 25 ~ 200A		
Output	Wireless communication 5000 digits(Bluetooth)		
Aux. power	DC 6V(1.5V AA Alkaline battery 4EA: 5 hours)		
Size	75(W)×40(D)×300(H) (mm)/ 230 100(W)×50(D)×400(H) (mm)/ 450		

Secondary current detection unit

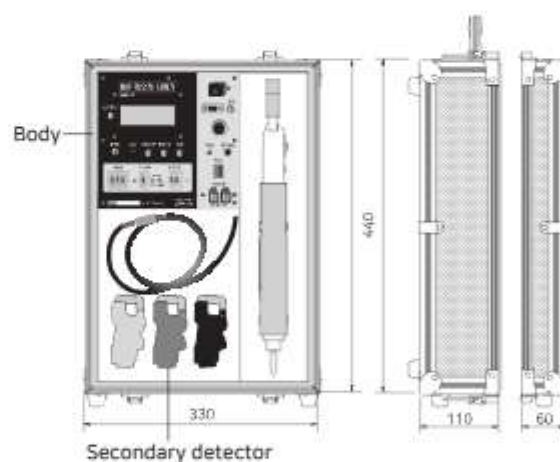
Setting	Range	Accuracy	Temperature
4A	AC 0.25 ~ 5A	±1.0% FS±2digit	-10℃ ~ 50℃
Input line	2.5mm		
length	40(W) × 20(D) × 100(H)(mm) / 18X18(Inside)		

Body

Input	Primary current : wireless communication 1 EA Secondary current : AC 500mV/5A 3EA
Aux. power	DC 5V Lithium ion battery - 5 hours
Accuracy	±2.0% FS±2digit
Size and weight	330(W) X 170(D) X 440(H)(mm) / 10kg

Drawing

Unit:mm



CE certification

CE stands for "Conformité Européene" and indicates conformity with health, safety, and environmental protection standards for products sold within the European Economic Area (EEA). Our CE certified products are complied to the requirements of EU Directives, relating to LVD (Low Voltage Directives) and EMC(Directive Electromagnetic Compatibility Directives). LIGHTSTAR achieved CE certificate for Analog meter, Current Transformer, Digital meter, Power meter and Transducers.

BATTERY CHARGER

KS certification

KS stands for Korean Standard and indicates conformity with Korean government required standards. LIGHTSTAR achieved KS certificate for Analog meter, Current Transformer and Transducers.



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Battery Charger

KH□-□□□



195-196

Rectifier

KHA

Rectifier Controller

KHB



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Rectifier Transformer

KHT



198

DC Dropper

KHD

Battery Charger

Model No.

KH□-□□□

① ② ③

① Type

- Controller external type
- I Controller integrated type

② Input

- 2 AC 3P 220V
- 3 AC 3P 380V
- 4 AC 3P 440V

③ Output

- 1 DC 110V, 30A
- 2 DC 110V, 50A
- 3 DC 110V, 100A

How to order :

KHO-32 External type AC 3Ø 380V, DC 110V, 50A



Controller-Outer
box attached

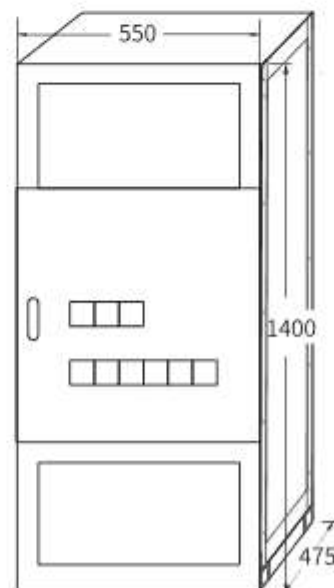
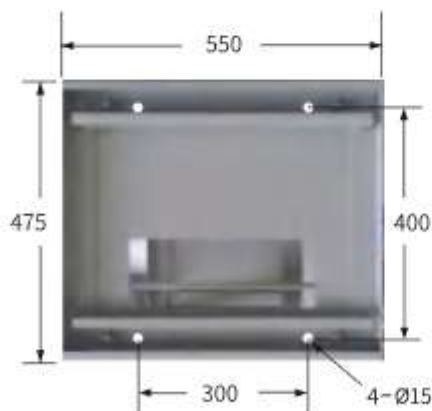


Specification

Input Voltage	AC 3 Phase 220V/380V/440V(60Hz)	Withstand voltage	AC 1.5kV/1 minute (between the external terminal and the case)
Rated Output Voltage	DC 110V	Insulation resistance	More than 10MΩ (DC 500V) Between terminal and ground
Rated Output Current	30A/50A/100A/200A	Operating temperature / humidity	0°C ~ 55°C/20~85% RH
Measurement	AC input voltage, AC input current, DC voltage, load current (LOAD), charge current (BATT), ambient temperature, voltage, Battery trend (DC voltage, charge current, discharge) Current-10 hours data storage	Communication	RS-485

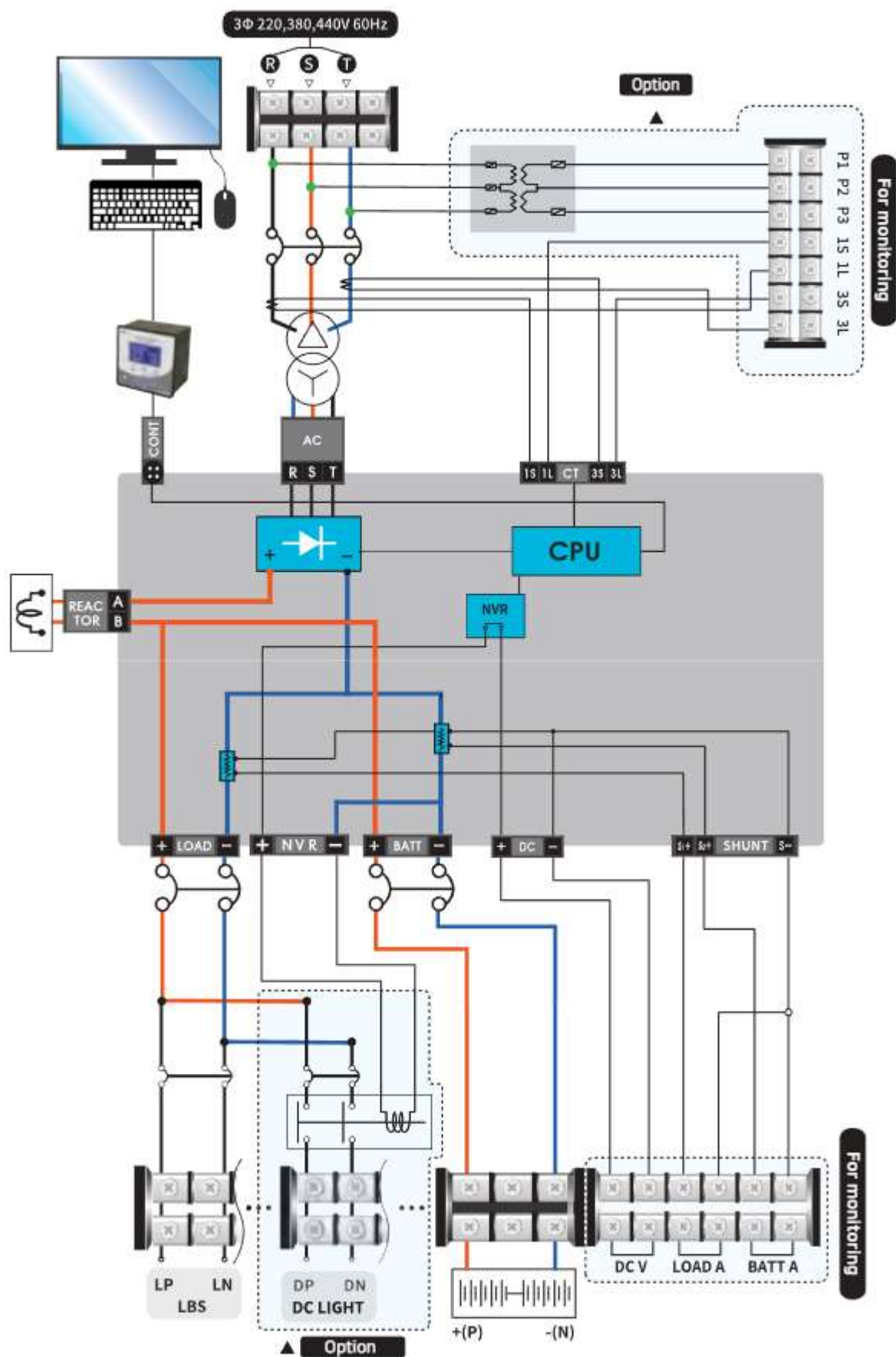
Dimensions

Unit:mm



- DC 100A output product can be provided by order.
- DC 200A output product can be provided by order.

Basic circuit diagram



Rectifier



Model No.

KHA-

① ②

① Output Voltage

1 DC 110V

2 DC 125V

② Rated capacity

A 30A

B 50A

How to order KHA-1A Rectifier DC 110V, 30A Output

Overview

Converts 3-phase AC power into DC for charging.

Feature

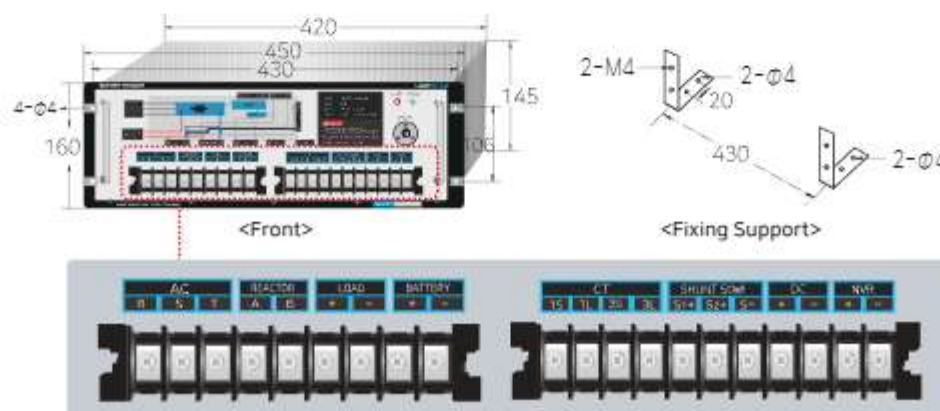
- Equipped with DC voltage and DC current terminals for monitoring
- Built-in NVR (No Voltage Relay)
- Rack or shelf mounting

Specification

Type	KHA-1A	KHA-2A	KHA-1B	KHA-2B
Rated Output Voltage	DC 110V	DC 125V	DC 110V	DC 125V
Rated Output Current	DC 30A		DC 50A	
Rated Input Voltage	3-Phase AC 110V(50/60Hz)	3-Phase AC 120V(50/60Hz)	3-Phase AC 110V(50/60Hz)	3-Phase AC 120V(50/60Hz)
Floating voltage	DC 110~127V	DC 120~140V	DC 110~127V	DC 120~140V
Equalizing voltage	DC 110~137V	DC 120~152V	DC 110~137V	DC 120~152V
Number of batteries	12V / 9	12V / 10	12V / 9	12V / 10
Withstand voltage	AC 1.5kV/1 minute (between external terminal and case)			
Insulation resistance	More than 10MΩ(DC 500V) Between terminal and ground			
Operating temperature / Humidity	-10°C~50°C/20~85% RH			

Dimensions

Unit:mm



Rectifier Controller



Model No.

KHB

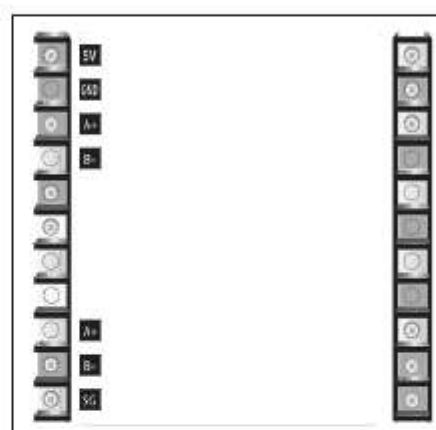
Overview

Set up and control LIGHT STAR rectifier (KHA) and display the status.

Feature

- Trend graph (10 hours) for Charge / discharge current and voltage
- RS485 communication
- Automatic correction of charging voltage depending on temperature

Rear terminal view

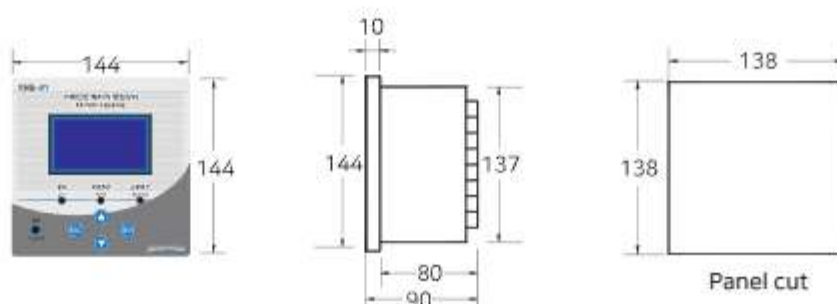


Specification

Display	AC Voltage, AC Current	Primary AC voltage (using PT from voltage transformer secondary), AC current with (CT ratio)
	Output DC Voltage	DC 80V~160V(±2% FS)
	Battery current	DC -50~50A(±2% FS)
	Temperature	-20℃~100℃(±3℃)
	Trend	DC voltage, charge current, discharge current (10 hours data storage)
	Load current	DC 0A~50A(±2% FS)
Setting		Nominal voltage, rated capacity, charge mode (floating, equalizing, stop), equalizing charge time, Alarm voltage, alarm current, alarm delay time, manual operation, communication address
Input		Rectifier (KHA) aux power and communication signal
Communication		RS 485, Modbus, 9600bps, DATA BIT:8bit, PARITY:None
Operating temperature / humidity		0℃~55℃ / 20~80% RH

Dimensions

Unit:mm



Rectifier Transformer



Model No.

KHT- 

① Primary voltage	② Secondary voltage and rated capacity
2 AC 3P 220V	1 AC 3P 110V/5kVA
3 AC 3P 380V	2 AC 3P 110V/7.5kVA
4 AC 3P 440V	

- How to order) KHT-31 Transformer AC 3Ø 380V/110V, 5kV, 60Hz
KHT-42 Transformer AC 3Ø 440V/110V, 7.5kV, 60Hz
- 60Hz standard, 50Hz is made to order.
- Double winding transformer

Overview

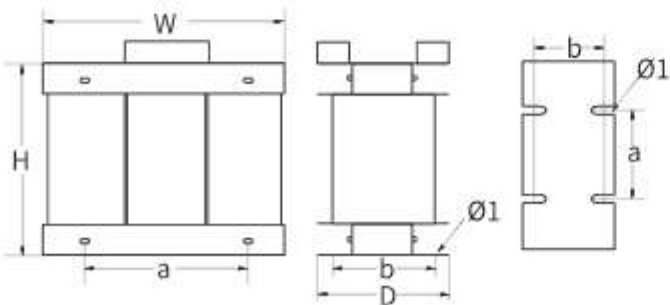
Electrical equipment that steps down from AC 3-phase voltage to the input voltage of our rectifier (KHA)

Specification

Number of phases	3-phase	Insulation type	B
Insulation resistance	More than 100MΩ (DC 500V) Between input /output terminal and outer case	Operating temperature / humidity	-10℃~50℃/20~85% RH
Rated Frequency	50Hz or 60Hz	Withstand voltage	AC 2.5kV/1 min (between the input and output terminals and the outer box)
Input	220/380/440V	Output	105/110/115/120V

Dimensions

Unit:mm



	Rated capacity	
	5kVA	7.5kVA
W	300	330
H	165	285
D	175	175
a	220	175
b	160	160
Φ1	10 x 30	10 x 30

DC Dropper



Model No.

KHD-
①

① Output Current

30 30A

Overview

Under battery discharge, this device is used for lowering voltage from high voltage.

Feature

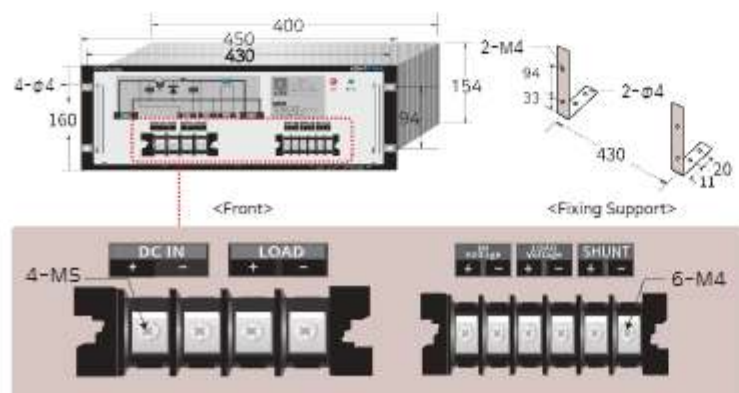
By using switching circuit method, battery can be used for a longer time comparing to the relay and diode conversion method.

Specification

Input Voltage	DC 115~150V
Output Voltage	DC 110V $\pm 2V/30A$
Withstand voltage	AC 1.5kV/1 minute (between the external terminal and the case)
Insulation resistance	More than 10M Ω (DC 500V)(DC 500V)Between terminal and ground
Operating temperature / humidity	-10°C~50°C/20~85% RH
Heat dissipation capacity	450W/h

Dimensions

Unit:mm



CE certification

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| OTHERS

KS certification

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KHY-□□



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Condenser Trip Device
With Volt meter

KHY-14A



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KCD-4



208-209

Lighting Controller

KCL-□□



210-211

TCR (Trip Current Relay)

KYR-□□

Condenser Trip Device



Model No.

KHY-

① Input	② Capacitor capacity
1 AC 110V	1 1000 μ F/160V
	2 2700 μ F/160V

How to order

KHY-11 AC 110V/1000 μ F 160V

Customized product can be produced by order.

Overview

This device used to trip circuit breaker in case of emergency such as power failure or blackout condition. Internal condenser need to be charged with designed capacity. Also, this device can be used as rectifier in case of power online and can be used for small meter source power

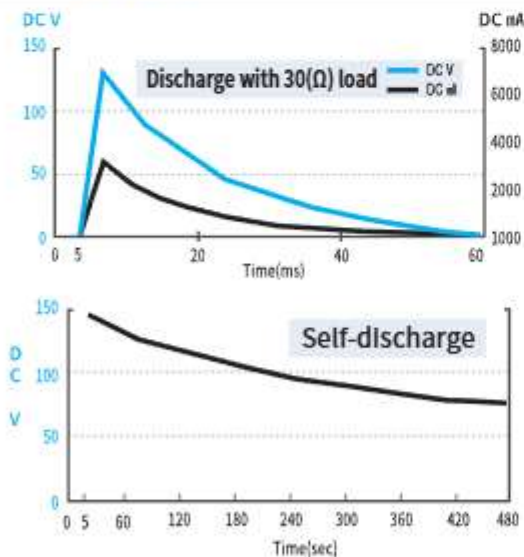
Specification

Type	KHY-11, KHY-12
Operating temperature	-10°C ~ 50°C
Operating humidity	20 ~ 85%
AC source	AC 110V
Frequency	50/60Hz
Charging voltage	DC 145V, Max

Function

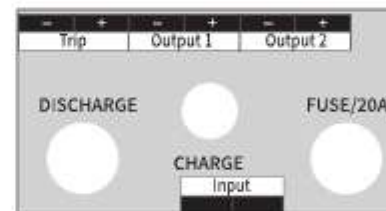
Discharge characteristics	Refer to the graph below
Condenser capacity	KHY-11(1000 μ F/160V), KHY-12(2700 μ F/160V)
Rectifying capacity	DC 10A/110V
Applicable standard	IEC60694/KSC4611

Discharge graph



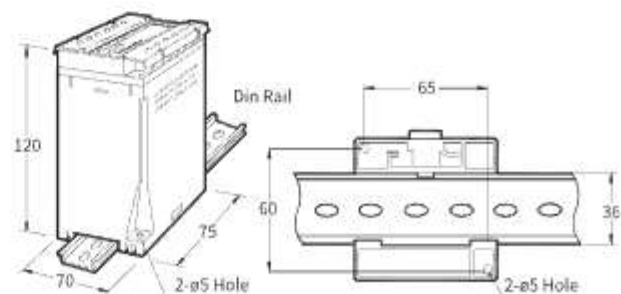
Please note that the charge amount can be varied depending on the specifications.

Terminal layout



Drawing

Refer to Transducer L Ty drawing



Condenser Trip Device With Volt meter



Model No.

KHY-14A

Overview

This device used to trip circuit breaker in case of emergency such as power failure or blackout condition. Internal condenser need to be charged with designed capacity. Also, this device can be used as rectifier in case of power online and can be used for small meter source power

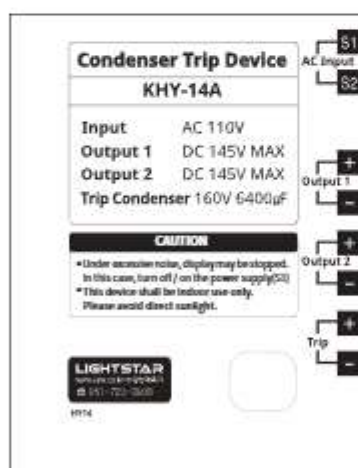
Specification

Refer to page 201

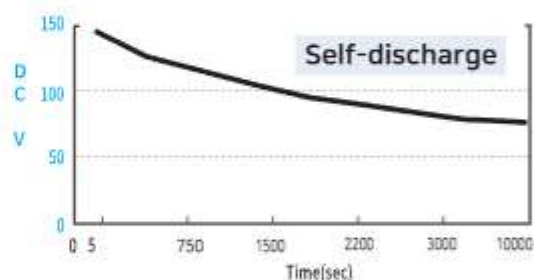
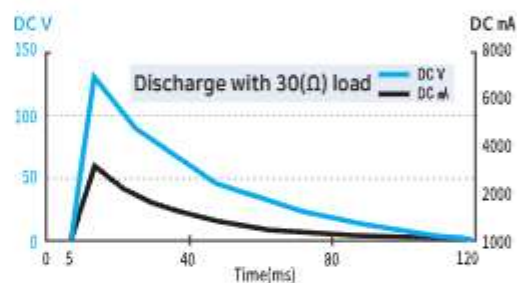
Function

Condenser capacity : KHY-14A(6400 μ F/160V)
Refer to Page 201 for other details

Terminal layout

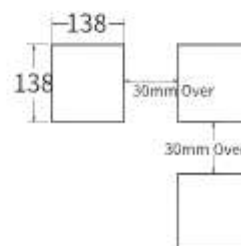
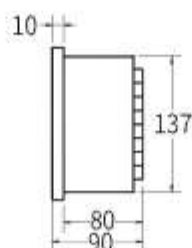


Discharge graph



Drawing

Unit:mm



Auto Transfer Switch Controller



Model No.

KYC

Collaborated with Hyundai Heavy Industries

Overview

This device used to switch normal power to emergency power under power failure or blackout condition.

Specification

Accuracy	$\pm(0.5\% \text{ rdg} + 1\text{digit})$	Aux. power	AC 90~260V (50/60Hz) / DC 110V
Operating temperature	-10°C ~ 50°C	Operating humidity	20 ~ 85%
Withstand voltage	AC 2kV 1 minute	Insulation resistance	More than 10MΩ
Surge impulse	Voltage (1.2μs/ 50μs, 5kV), Current(8μs/20μs)	Burst immunity	Level 4(IEC 61000-4-4)
Input Voltage	3Ø3W 220, 380, 400, 440, 480(V)		
Number of contacts	6EA	Contact capacity	AC 250/5A, DC 30V/5A
Control switch	16ø LED(Green 2EA, Yellow 1EA)		
Weight and dimensions	600g / 144x144x90 mm		

Function

- Measurement, timer, UVR, OVR.
- Panel front door installation.
- Three LAMPs are included to show power status.
- Equipped with 4 relay output to operate lamp and buzzer, following power condition.

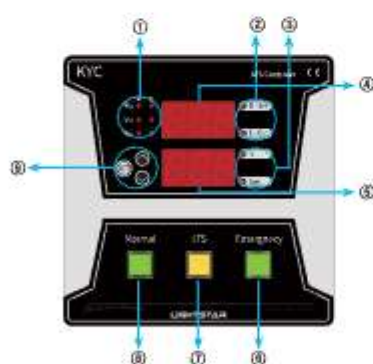
Feature

- Setting value: Rated voltage, automatic recovery, over voltage, under voltage, detection time, unbalance ratio, time, switching delay time.

Caution

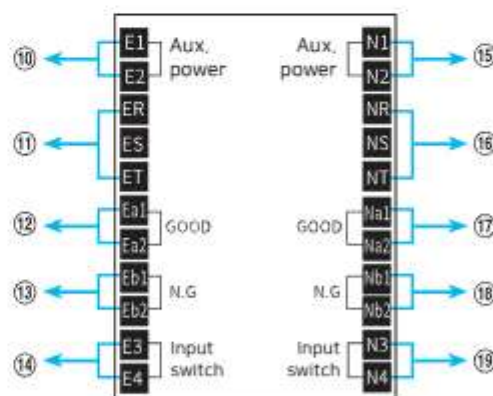
- Alarm occurs if power (Normal or Emergency) is NOT supplied.
- Do not ground the PT for aux power.

Setting



- ① Voltage LED ② Error LED ③ Unit LED
- ④ Upper Display ⑤ Lower Display
- ⑥ EMERGENCY POWER manual switching button.
- ⑦ POWER LAMP test button.
- ⑧ NORMAL POWER manual switching button.
- ⑨ Setting/ UP / DOWN KEY

Rear terminal diagram



- ⑩ Emergency power supply ⑪ EMERGENCY 3P voltage input.
- ⑫ Emergency power output(Normal)
- ⑬ Emergency power output(Error)
- ⑭ Emergency MC control output. ⑮ Normal power supply.
- ⑯ Normal Three-P voltage input ⑰ Normal power output(Normal)
- ⑱ Normal power output(Error) ⑲ NORMAL MC control output.

Drawing

Refer to 202 Page

16 Channel Current Limit Setting Device



Model No.

KYE-16

Overview

This device is used for motor to check current, idle condition, overcurrent, phase failure, 3P voltage unbalance, And the status can be shown in color - Stop(off), Normal operation(yellow), Over-load operation(red), Low-load operation(blue)

Specification

Accuracy	± {1% of rdg + 2 digit}
Aux. power	AC 90~260V (50/60Hz)
Operating temperature	-10 ~ 50℃
Withstand voltage	AC 2kV 1 minute
Surge impulse	Current terminal (8μs/20μs)
Burst immunity	Level 4(IEC 61000-4-4)

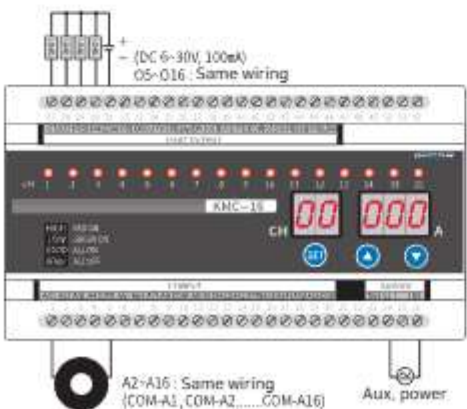
Function

Input	AC current - 16 channel (50A/20mA, with dedicated CT) Frequency -60Hz
Output	Digital Output - 16 channel Open Collect - 6~30V, 100mA Less than 100mA
Display	16 channel 3 color LED, Channel 2digit, Current value 3digit
Setting Key	3(SET, ↓, ↑)

Setting items

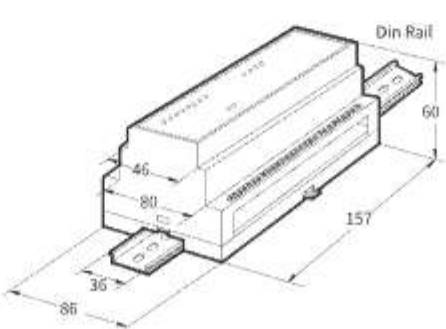
Current Settings	Upper limit	Set upper limit value for control
	Lower limit	Set lower limit value for control
	Minimum value	To determine whether the load operate
Delay time	Start	Hold for setting time from the load starts even if the values over limit.
	On	Hold for setting time from moment of values over the limit.
	Off	Hold for setting time from the recovery moment
Channel	All	Select all channels when setting all
	Each	Select each channel
Automatic recovery mode		Alarm reset auto matically if the value return to normal from abnormal (on/off)

Connection diagram



Drawing

Unit:mm



For KYE-16 only
70 X 90X 35(Φ25)

Motor Controller



Model No.

KYB

Collaborated with ORIENTAL

특징

- Current measurement and over-current relay.
- Operating time measurement.
- Clear LED display.
- The heater is turned off when the motor is in RUN, and it is turned on when the motor is in STOP.
- The motor and heater can not be turned on at the same time.
- Upon external trip (alarm) signal input, alarm operation (motor stop, alarm message display) is possible.

Specification

Current accuracy	$\pm (0.5\% \text{ of rdg} + 3\text{digit})$
Aux. power	AC 90~260V (50/60Hz) /DC 110V
Operating temperature	-10°C~50°C
Operating humidity	20 ~ 85%
Withstand voltage	AC 2kV 1 minute
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/50μs, 5kV), Current(8μs/20μs)
Burst immunity	Level 4(IEC 61000-4-4)
Input	AC 0.1~6A, 60Hz(50Hz Option)
Display update speed	0.5sec
Weight and dimensions	600g/144 × 144 × 90mm

Function

Setting	Current ratio, moving time, breaking current
Input contact	MOTOR(RUN, STOP) remote switch FAULT input
Output contact	MAIN MC Contact(M-MC) HEATER MC Contact(H-MC) (Contact capacity : AC 220V, 5A)
Current Display	maximum 5000
Cumulative operation time indication	Up to 9999 hours
Protective device	Overcurrent relay

Overview

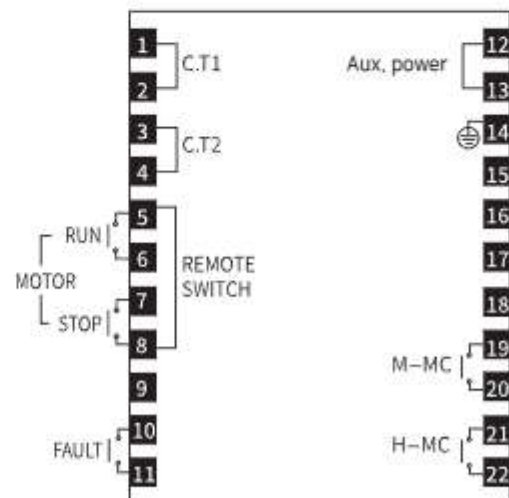
This device is used for to control small crane or hoist for on-shore project

Front



- ① Setting key
 - UP & DOWN : Set value
 - SET : Save set value
- ② Display : FND 4×2
- ③ Unit LED
 - General LED (TRIP, SEC, A): Ø 3 mm
 - Operation LED(SOURCE, HEATER, MOTOR : Ø6mm)
- ④ Manual button : Motor and Heater, ON/OFF

Terminal layout



Drawing

Refer to page 202

Current Transformer Open Detector



Model No.

KYS-01

Overview

Under CT secondary open condition, current transformer can be damaged and making noise due to insulation breakdown. This device used to protect current transformer while CT secondary open condition.

Feature

- | Connected to the secondary side of the CT to monitor the voltage of each phase, and if the voltage exceeds the set value, close secondary of CT.
- | Two contacts relay for alarm in case CT secondary opens.
- | Recovery and short circuit button for testing recovery and short.

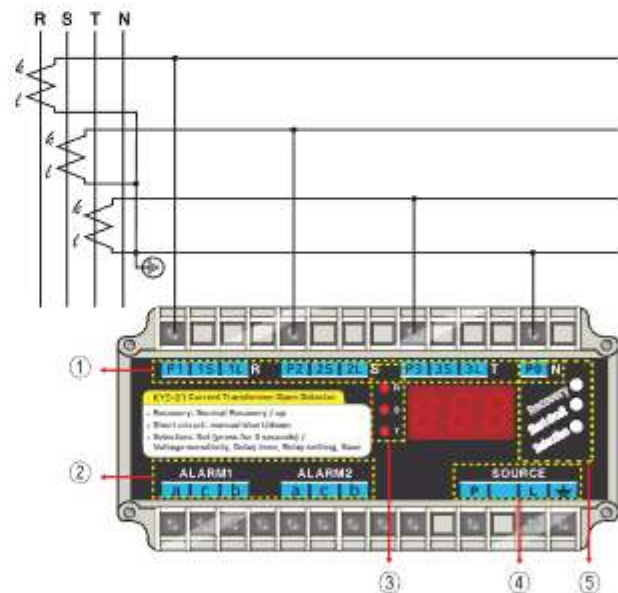
Specification

Input	0,1~6A
Aux. power	AC/DC 90~260V(50/60Hz), DC 110V
Operating humidity	20~85%
Withstand voltage	AC 2kV Can withstand 1 minute
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(2μs/ 50μs, 5kV), Current(8μs/20μs)
Burst immunity	Level 4(IEC 61000-4-4)
Short circuit relay	10A, 250V AC(1 Form A), Power on time : 0,3sec / Fixed time
Alarm relay	5A, 250V AC(1 Form C), Power on time : 0,3 sec / Fixed time
Operating temperature	-10~50℃
Elevation	Less than 1,000m Nori seaweed

Function

- | Open / closed state LED.
- | Voltage sensitivity digital setting (4 levels).
- | Delay time setting (1 to 10 sec).
- | Manual short and recovery for each phase.
- | Relay setting(Activate/ de-activate) for alarm condition.

Connection diagram



- ① CT secondary connection : R(P1), S(P2), T(P3), N(P0)
 - ② Alarm relay : ALARM1(A, C, B), ALARM2(A, C, B)
 - ③ Display LED: Open (On), short (OFF)
 - ④ Aux. power
 - ⑤ Switch for Recovery, Short circuit and Selection
 - Recovery: Normal Recovery / up
 - Short circuit: manual short/down
 - Selection: Set (press for 3 seconds) /
- Voltage sensitivity, Delay time, Relay setting, Save

Demand Controller IV



Model No.

KCD - 4
① ②

① Demand Controller

② 4th product

Characteristics

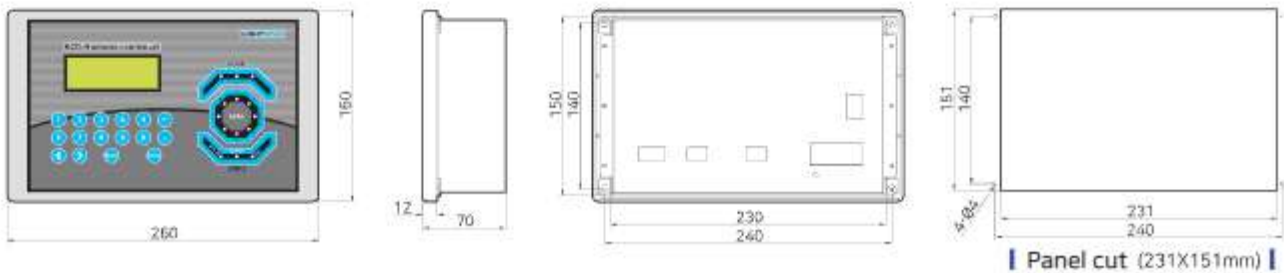
- Economical price
- Panel and Switchgear attachment Type
- Easy to monitor and set using 16 keys and LCD

Specification

Input	EOI, WP-(Open Collector)	Withstand voltage	AC 2kV/1 minute
Output	Connection to KCD-04 (Load Relay 8Channel)	Insulation resistance	More than 10MΩ
Setting input device	16Key	Surge impulse	1:1/50μs, 6kV
Aux. power	AC/DC 90~260V(50/60Hz), DC 110V	Burst immunity	Level 4 (IEC 61000-4-4)
Operating humidity	20~85%	communication	1) Communication with PC (MMI) to control and set up. 2) RS-485 Port(LOAD) Connecting to KCD-04.
Display	1) LCD 4Line x 20 Character 2) LED indicator Contact Status Display Alarm Status Display Signal Input(Pulse, EOI, RS485) 3EA		

Drawing

Unit:mm



Lighting Controller

Model No.

KCL- [] [] []

①

① Circuit number

08 08 LAMP

16 16 LAMP

32 32 LAMP

RC MC controller (16 circuits)

Overview

This device is used for lighting control and monitoring.
KCL-RC is used for controlling magnetic contact.

Feature

- Up to 16 Relay X 2ch with one lighting controller.
- Remote control by RS-485 communication.
- Secure control system for approved manager only.
- Group control.

Configuration

LED display window

Blue ● Light Off
Red ● Light On
Off ● Not Used

ALL Key

Turn on or off all lights

Number key

Enter the number and setting values
for lighting controls.



| KCL-08/16/32 |

FND Display window

Lighting number, group number.

ON/OFF Key

Lights On/Off

Direction key

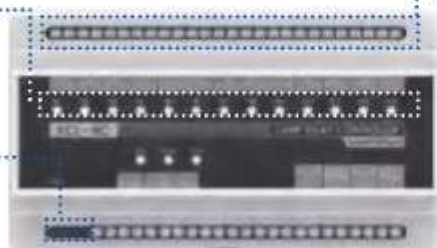
Select light number in setting made.

LED display

Relay status (ON / OFF)

Dip Switch

Used for 32 lamps type only
(for 17-32 Lamps)



| KCL-RC |

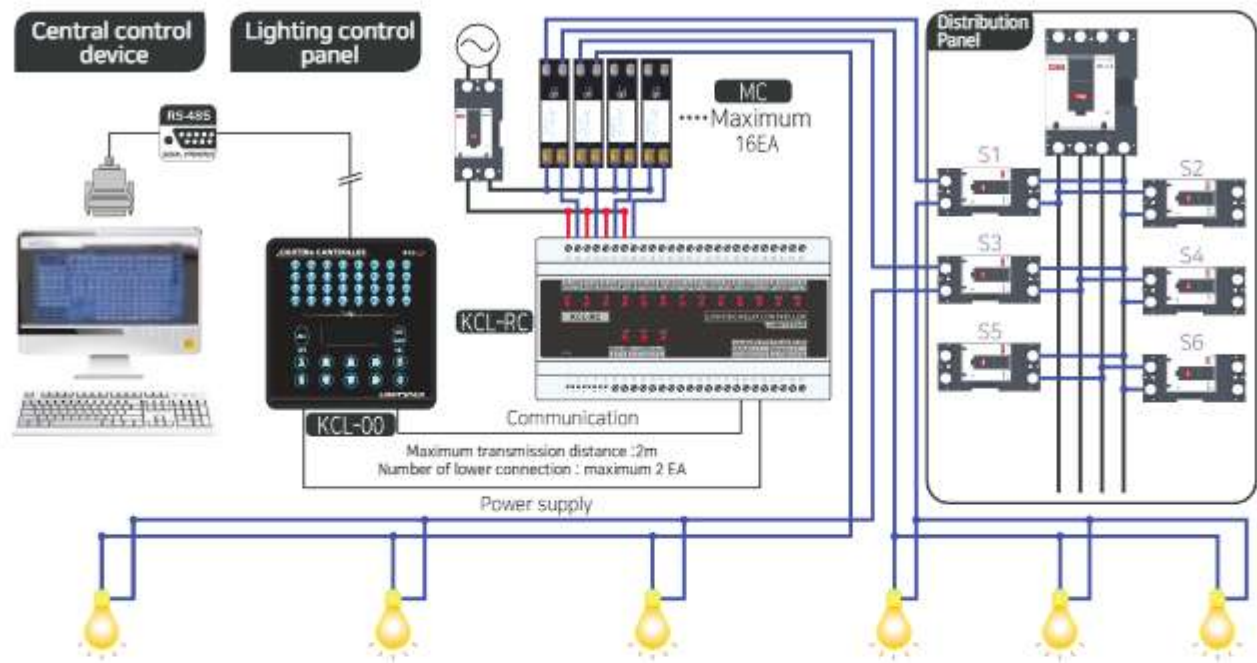
Terminal Name	Signal				DC 12V				Signal				DC 12V			
	DA	CK	+	-	DA	CK	+	-								
Terminal No	19	20	21	22	23	24	25	26								

Terminal Name	Relay 1				Relay 13				Relay 14				Relay 16			
Terminal No	19	20	-	-	51	52	6	7	-	-	10	11				

Specification

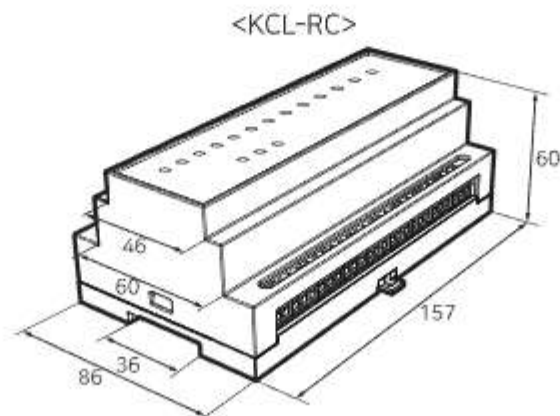
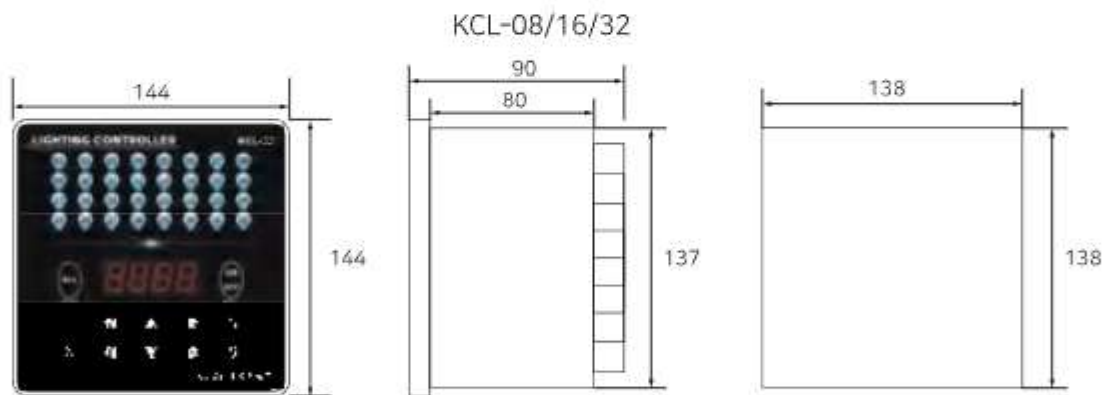
Item	Description	Item	Description
Aux. power	AC 90~260V(50/60Hz), DC 110V	Operating temperature / humidity	-10~50℃(Without frost) 20~85% RH(over dew point)
Communication	Communication : RS-485 multi-drop 2wire(MODBUS RTU), 9600bps		
Test requirement			
Insulation resistance/ Withstand voltage	More than 10MΩ / AC 2kV/1 minute	Surge impulse	Voltage (1.2/50μs, 5 kV) Current (8μs/20μs) (IEC 60255-5)
Noise resistant	Burst, Level 4(IEC 61000-4-4)	Static resistance	±8kV(Air), ±4kV(Contact) (IEC 61000-4-2)
Setting and display			
Setting	-Device address (0 to 255) -Lighting group (40-49) -Number of lights (1-32) -Password (0000 – 999)	Display	- FND : 14.2(0.56")mm Red(4digit) - LED : Lighting number with 32 LEDs

Connection diagram



Panel cut

Unit:mm



TCR (Trip Current Relay)



Terminal type



Penetration type

Model No.

KYR-

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① Terminal type									① Penetration type			② Output		③ Operating time	
NO	Current		NO	Current		NO	Current		NO	Current		A	B	1	2
	On	Off		On	Off		On	Off		On	Off				
P5	0.5	0.45	03	3.0	2.7	15	15.0	13.5	30	30.0	27.0				
01	1.0	0.9	05	5.0	4.5	20	20.0	18.0	40	40.0	36.0				
02	2.0	1.8	10	10.0	9.0	25	25.0	22.5	50	50.0	45.0				

How to order KYR-20A1 20-60A Customized product can be produced by order.

a contact

Overview

This device includes internal relay to operate as A contact or B contact, which can be activated following the current value. This can be used for checking the operation status of small electric devices, and can be connected directly without source power.

Feature

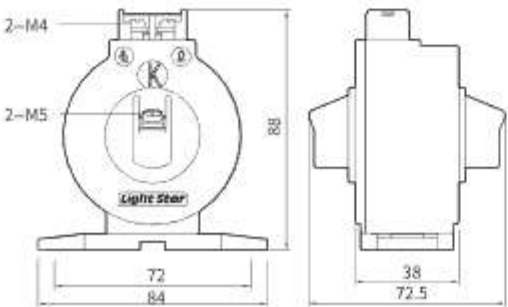
- With various current range, this device can be used as substitutes for normal fuse.
- Easy installation and compact space.

Specification

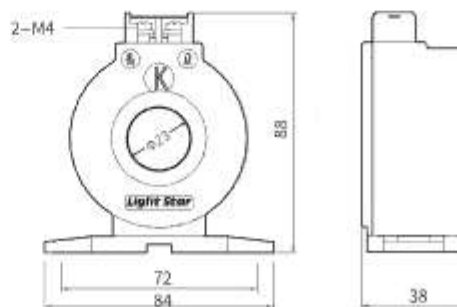
Contact rating	AC 220V 0.3A	Output operating time	0.1sec(Instantaneous) / 3sec(Delayed)
Withstand voltage	2kV, 1 minute between input and contact	Frequency	50-60Hz
Rated voltage	Less than AC 300V	Allowable current	200%(Continuous)
On-current allowable range	±5%	Operating temperature	-10℃ ~ 50℃
OFF-current allowable range	±5%	Weight	200g

Drawing

Unit:mm



Terminal type

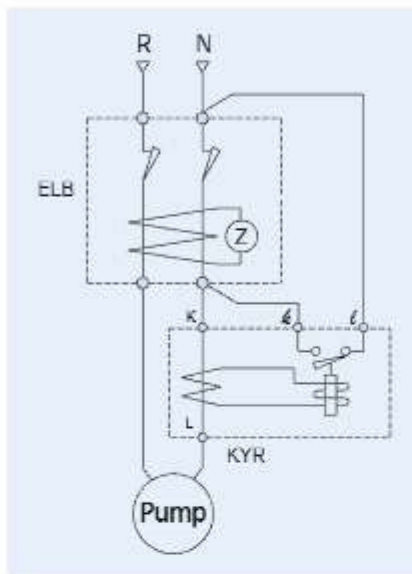


Penetration type

Caution

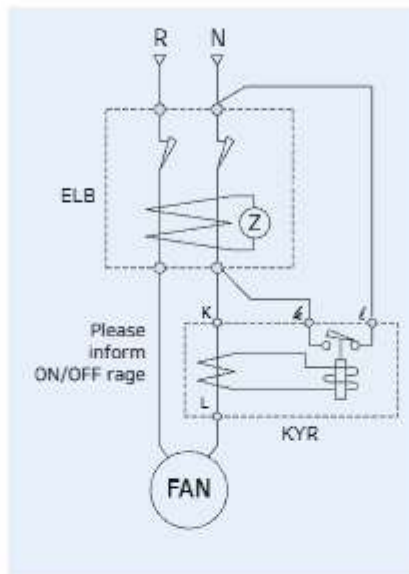
- TCR (Trip Current Relay) is manufactured by operation and return current value. Please inform ON/OFF range before order.
- For single phase system N phase of ELB(Earth Leakage Breaker) must be connected with TCR terminal of TCR k&l side
- The condition of TCR and ELB must be checked regularly.
- Any problem issues related TCR will be followed on company's redemption policy.

Connection diagram



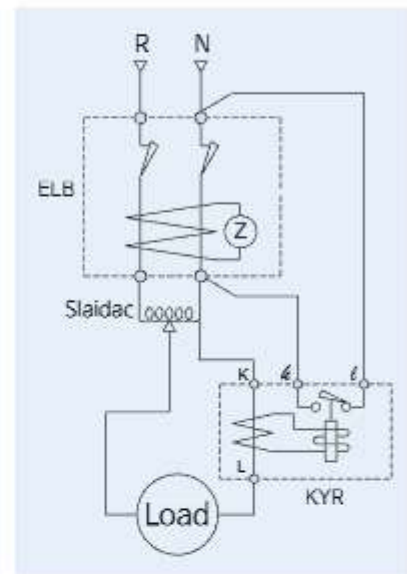
Protect pump idle condition

Under pump idle condition, current will be reduced. TCR(Trip Current Relay) will activate ELB for low current limit.



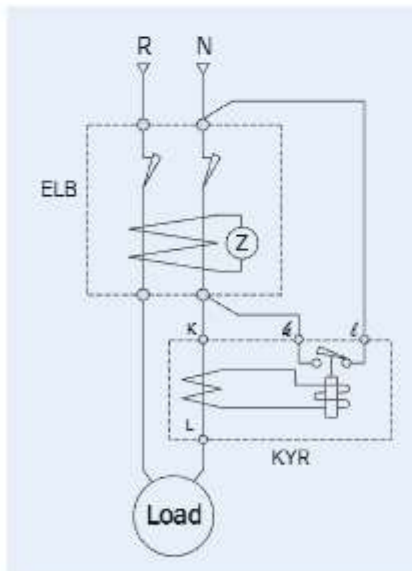
Protect Fan/Pump overload condition

Under Fan/Pump motor overload condition due to obstacle outside, current will be increased. TCR(Trip Current Relay) will activate ELB for high current limit.



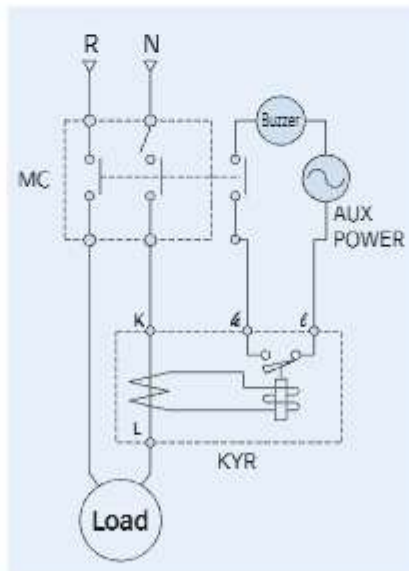
Protect slydax overcurrent

Slidax has a large secondary current at low secondary voltages. TCR(Trip Current Relay) will activate ELB for high current limit.



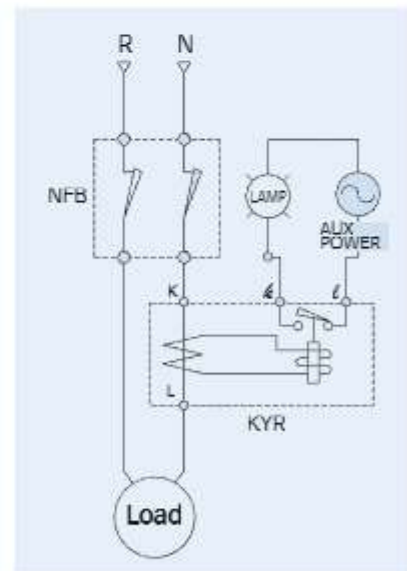
Current limit variation for ELB

If the rated current of some devices is lower than ELB rated current, it is not easy to protect over-current for individual devices. TCR(Trip Current Relay) can activate to operate ELB for this condition.



Alarm for electric heater disconnection

Under no current flows during heater operation, TCR(Trip Current Relay) can activate to alarm the heater disconnection.



Operation status display of electric equipment

In order to check the operation status of electrical equipment easily, TCR(Trip Current Relay) can be used to turn on lamp and show visual indication

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