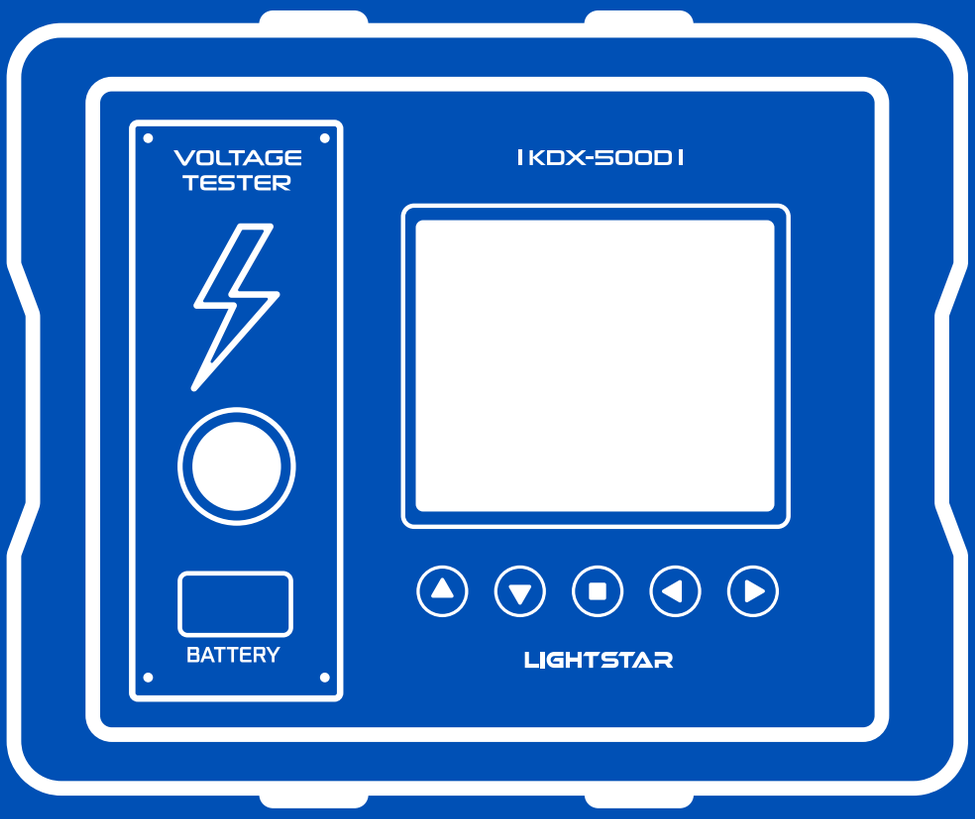
SINCE 1979

ENG VERSION

LIGHTSTAR

CATALOGUE Vol. 10



PRODUCTS

ANALOGUE METER

TRANSFORMER / SHUNT

DIGITAL METER

TRANSDUCER

TEST MEASURING EQUIPMENT

CHARGING DEVICE

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 contamiN/Ated area, excessive vibration or excessive humidity.**

5. **Please use F.G(Field Ground) termiNal alone with 1.25㎟ 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)

Caution

1. **Please use within rating and performance range.**
   It may cause short life and fire.

2. **Do Not exceed replay 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.

General Instruction

1. **If you are using our products in combiN/Ation 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 Types, please consider to apply redundant safety device such as safety circuits.**

   ① Using outdoors, potential chemical contamiN/Ation, 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.**

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 mainteN/Ance
   ③ Misuse or abusive use
   ④ Adverse exterNal conditions, such as thunderstorm, acts of god.

Disclaimer

Product specification and configuration are subject to change without notice.

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.

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 Committe)

2005
10 - KS(Korean Standard) Approved for Instrument Current Transformer
(KS C 1 706, No .04-0458 by Korean Standard Association)

2006
01- INNO-BIZ Approved
(No.6021-068 by Small and Medium Business Administration)

2007
10 - CE(Conformity European) Approved for AC Voltage Analog Meter

2008
03 - KS(Korean Standard) Approved for Power metering Current Transformer
(K S C 1707, N o.08-0124 b y Korean Stand and Association)

2010
09 - CE(Conformity European) Approved for Single-phase potential transformer
06 - Designation of SME enterprises with Promising Exports (Director of Small and Medium Enterprises, Busan-Ulsan)
03 - CE(Conformity European) Approved for Digital Meter, Current Transformer, Transducer etc..

2011
06 - KS(Korean Standard) Approved for Demand Controller IV

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)

2017
08- Information and communication technology in the construction industry.

2019
03 - Establishment of LIGHTSTAR VINA(Ho Chi Minh)

2020
04- Skilled Korean Mr,LIM BYUNG CHENON

2021
09- The Korea Human Resources Corporation has approved companies that excel in human resource support and development.
11- Electric vehicle charging device approved

2022
04 - Establishment of LIGHTSTAR JAPAN (TOKYO)
10- Busan Ji-Sanhak Cooperation branch selection
12- Family-friendly enterprise approved

2023
05-Development of test device for measurement of electric vehicle chargers

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

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 voltage test	
Voltage test over 500V Ex) 3kV	

Types of measurements

Types of measurements	Symbol
Measuring component for DC	
Measuring component for AC	
1 Measuring component for 3 wire	3 ~ IE
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 =+2.5 % of Full Scale(F.S)
1.5 Class =+1.5 % of Full Scale(F.S)
1.0 Class =+1.0 % of Full Scale(F.S)

Maximum indicated value

Maximum indicated value on Analog meter

Auxilary items

Items to be connected to anolog meter for certain Type

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

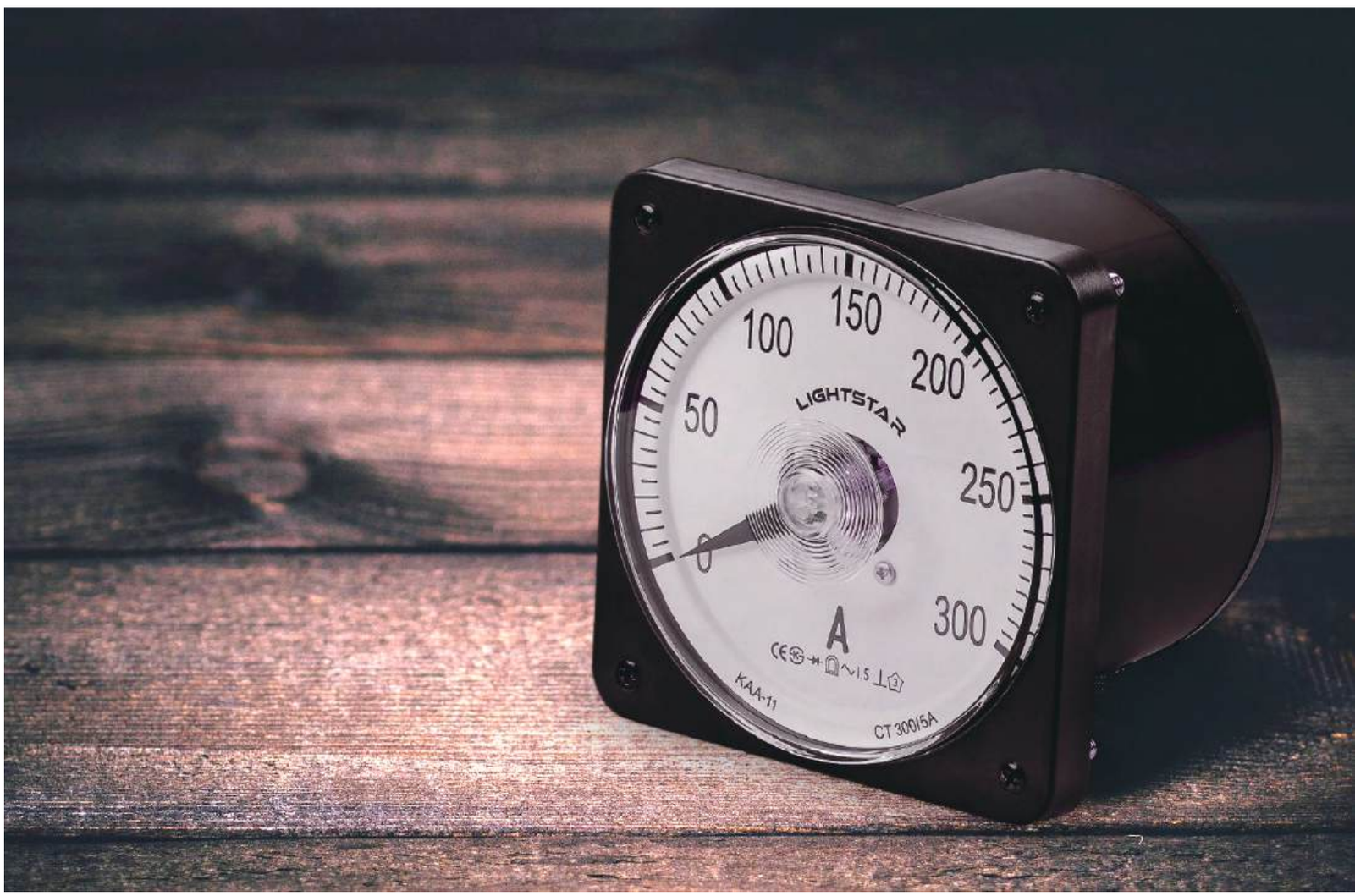
Combination of rectifier and moving coil type for AC current or AC voltage

Common specifications

Allowable temperature	-23 ±10℃
Operating temperature	-10~40℃
Preservation temperature	-20~60℃
Operating humidity	25~80%
Insulation resistance	10MΩ or higher
Withstand voltage	3.32kV/1min
Power Consumption	1.0VA

LIGHTSTAR
㈜광성계측기

ANALOG METER



CE certification

CE stands for "Conformité Européenne" 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 EMCD(Electro Magnetic Compatibility Directive).
LIGHTSTAR achieved CE certificate for Analog meter, Current Transformer, Digital meter, Power meter, and Transducers.

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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68 Type Analog Meter KA□-68



12
72 Type Analog Meter KA□-72



13
80 Type Analog Meter KA□-80



14
81 Type Analog Meter KA□-81



15
08 Type Analog Meter KA□-08



16
08N Type Analog Meter KA□-08N



17

11 Type Analog Meter KA□-11



18~19

Watt Meter KAG-□



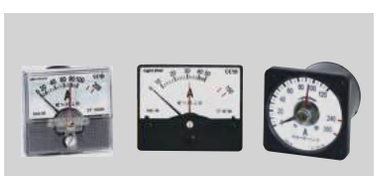
20~21

Var Meter KAI-□



22

Power Factor Meter KAH-□



23

Double Indicatior Meter KA□-□D



24

ELP(Electro Luminescent Panel) Meter KAJ-□



25

3P Selector Meter KAS-□



26~29

Analog Meter Relay KAR-□



30

Ao·Vo Meter KAM-11□



30

RMS Meter KAK-□

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

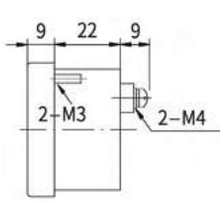
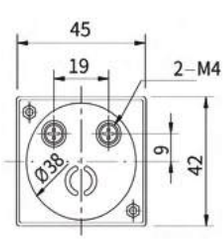
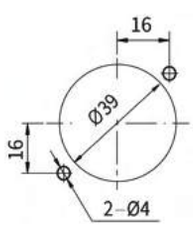
Type	Model No	Operation	Class	Max input	Note
AC Ammeter	KAA-45		2.5	AC 1A, 5A, 10A, 20A, 30A	1
AC Voltmeter	KAB-45		2.5	AC 150V, 300V, 600V	2
DC Ammeter	KAC-45	or	2.5	DC 150μA, 5A, 50mV, 60mV	3
DC Voltmeter	KAD-45		2.5	DC 150V, 300V, 600V	4
Signal meter	KAE-45	or	2.5	AC 18V, DC 10V, AC 4~20mA, DC 1mA	5
Frequency meter	KAF-45		1.0	V : 110V or 220V Hz : 45~65Hz, 55~65Hz	6

Customized product can be produced by order

1. Dedicated external transducer included / use CT over AC 30A
2. Use PT(VT) over AC 600V / Order the same specification with the transformer
3. Use shunt with 50mV, 60mV
4. Use voltage divider over DC 600V
5. Bezel design to be customized
6. Dedicated external transducer included

Drawing

Unit:mm

Type	Side	Rear	Panel cut	Weight
Bolt fixed				40g

50 Type Analog Meter

Certificates



Model No

KA① -50 Type

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

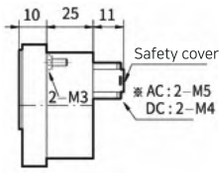
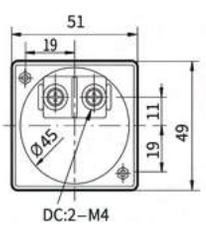
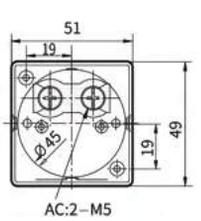
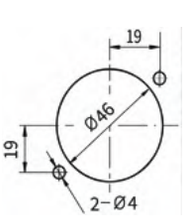
Technical Data

Type	Model No	Operation	Class	Max input	Note
AC Ammeter	KAA-50		2.5	AC 1A, 5A, 10A, 20A, 30A	
AC Voltmeter	KAB-50		2.5	AC 150V, 300V, 600V	
DC Ammeter	KAC-50	or	2.5	DC 150μA, 5A, 50mV, 60mV	
DC Voltmeter	KAD-50		2.5	DC 150V, 300V, 600V	
Signal meter	KAE-50	or	2.5	AC 18V, DC 10V, AC 4~20mA, DC 1mA	
Frequency meter	KAF-50		1.0	V : 110V or 220V Hz : 45~65Hz, 55~65Hz	

- Customized product can be produced by order
- 1. Use CT over AC 30A
- 2. Use PT(VT) over AC 600V / Order the same specification with the transformer
- 3. Use shunt with 50mV, 60mV
- 4. Use voltage divider over DC 600V
- 5. Bezel design to be customized

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

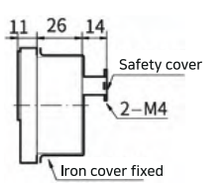
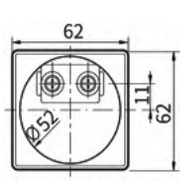
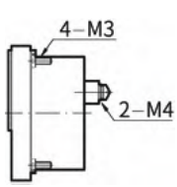
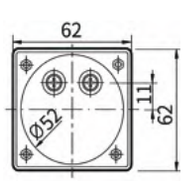
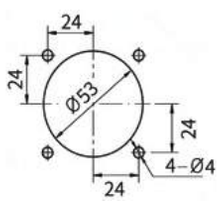
Technical Data

Type	Model No	Operation	Class	Max input	Note
AC Ammeter	KAA-60		2.5	AC 1A, 5A, 10A, 20A, 30A	1
AC Voltmeter	KAB-60		2.5	AC 150V, 300V, 600V	2
DC Ammeter	KAC-60	or	2.5	DC 150μA, 5A, 50mV, 60mV	3
DC Voltmeter	KAD-60		2.5	DC 150V, 300V, 600V	4
Signal meter	KAE-60	or	2.5	AC 18V, DC 10V, AC 4~20mA, DC 1mA	5
Frequency meter	KAF-60		1.0	V : 110V or 220V Hz : 45~65Hz, 55~65Hz	

Customized product can be produced by order
1. Use CT over AC 30A
2. Use PT(VT) over AC 600V / Order the same specification with the transformer
3. Use shunt with 50mV, 60mV
4. Use voltage divider over DC 600V
5. Bezel design to be customized

Drawing

Unit:mm

Type	Side	Rear	Panel cut	Weight
Iron cover fixed				80g
Bolt fixed				80g

63 Type Analog Meter

Certificates



Model No

KA① -68 Type

① Type			
A	AC Ammeter	D	DC Voltmeter
B	AC Voltmeter	E	Signal meter
C	DC Ammeter	F	Frequency meter

How to order) KAB-68 AC 600V

Technical Data

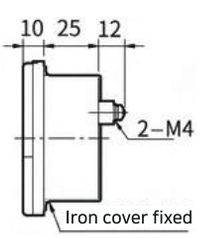
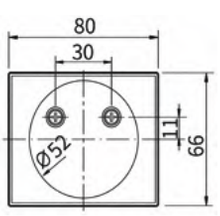
Type	Model No	Operation	Class	Max input	Note
AC Ammeter	KAA-68		2.5	AC 1A, 5A, 10A, 20A, 30A	1
AC Voltmeter	KAB-68		2.5	AC 150V, 300V, 600V	2
DC Ammeter	KAC-68	or	2.5	DC 150μA, 5A, 50mV, 60mV	3
DC Voltmeter	KAD-68		2.5	DC 150V, 300V, 600V	4
Signal meter	KAE-68	or	2.5	AC 18V, DC 10V, AC 4~20mA, DC 1mA	5
Frequency meter	KAF-68		1.0	V : 110V or 220V Hz : 45~65Hz, 55~65Hz	

Customized product can be produced by order

1. Use CT over AC 30A
2. Use PT(VT) over AC 600V / Order the same specification with the transformer
3. Use shunt with 50mV, 60mV
4. Use voltage divider over DC 600V
5. Bezel design to be customized

Drawing

Unit:mm

Type	Side	Rear	Panel cut	Weight
Iron cover fixed				130g

72 Type Analog Meter

Certificates CE KC IP44



Model No

KA①-72 Type

① Type			
A	AC Ammeter	D	DC Voltmeter
B	AC Voltmeter	E	Signal meter
C	DC Ammeter	F	Frequency meter

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

Technical Data

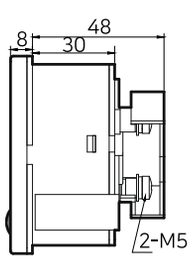
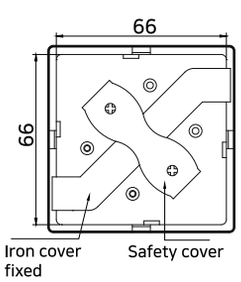
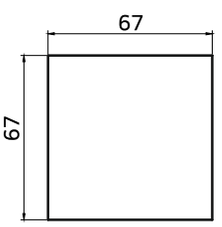
Type	Model No	Operation	Class	Max input	Note
AC Ammeter	KAA-72		2.5	AC 1A, 5A, 10A, 20A, 30A	1
AC Voltmeter	KAB-72		2.5	AC 150V, 300V, 600V	2
DC Ammeter	KAC-72	or	2.5	DC 150μA, 5A, 50mV, 60mV	3
DC Voltmeter	KAD-72		2.5	DC 150V, 300V, 600V	4
Signal meter	KAE-72	or	2.5	AC 18V, DC 10V, AC 4~20mA, DC 1mA	5
Frequency meter	KAF-72		1.0	V : 110V or 220V Hz : 45~65Hz, 55~65Hz	

Customized product can be produced by order

1. Use CT over AC 30A
2. Use PT(VT) over AC 600V / Order the same specification with the transformer
3. Use shunt with 50mV, 60mV
4. Use voltage divider over DC 600V
5. Bezel design to be customized

Drawing

Unit:mm

Type	Side	Rear	Panel cut	Weight
Iron cover fixed				130g

80 Type Analog Meter

Certificates



Model No

KA①-80 Type

① Type			
A	AC Ammeter	D	DC Voltmeter
B	AC Voltmeter	E	Signal meter
C	DC Ammeter	F	Frequency meter

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

Technical Data

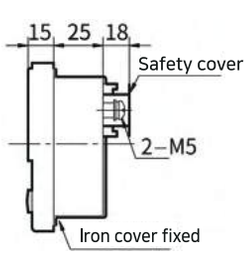
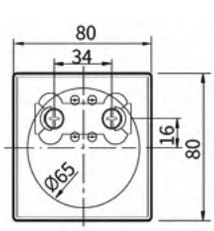
Type	Model No	Operation	Class	Max input	Note
AC Ammeter	KAA-80		2.5	AC 1A, 5A, 10A, 20A, 30A	1
AC Voltmeter	KAB-80		2.5	AC 150V, 300V, 600V	2
DC Ammeter	KAC-80	or	2.5	DC 150μA, 5A, 50mV, 60mV	3
DC Voltmeter	KAD-80		2.5	DC 150V, 300V, 600V	4
Signal meter	KAE-80	or	2.5	AC 18V, DC 10V, AC 4~20mA, DC 1mA	5
Frequency meter	KAF-80		1.0	V : 110V or 220V Hz : 45~65Hz, 55~65Hz	

Customized product can be produced by order

1. Use CT over AC 30A
2. Use PT(VT) over AC 600V / Order the same specification with the transformer
3. Use shunt with 50mV, 60mV
4. Use voltage divider over DC 600V
5. Bezel design to be customized

Drawing

Unit:mm

Type	Side	Rear	Panel cut	Weight
Iron cover fixed				130g

81 Type Analog Meter

Certificates



Model No

KA①-81 Type

① Type			
A	AC Ammeter	D	DC Voltmeter
B	AC Voltmeter	E	Signal meter
C	DC Ammeter	F	Frequency meter

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

Technical Data

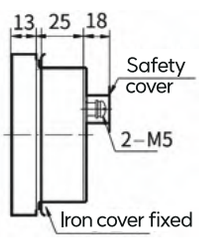
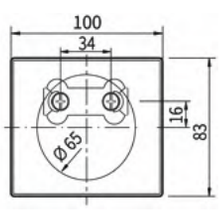
Type	Model No	Operation	Class	Max input	Note
AC Ammeter	KAA-81		1.5	AC 1A, 5A, 10A, 20A, 30A	1
AC Voltmeter	KAB-81		1.5	AC 150V, 300V, 600V	2
DC Ammeter	KAC-81	or	1.5	DC 150μA, 5A, 50mV, 60mV	3
DC Voltmeter	KAD-81		1.5	DC 150V, 300V, 600V	4
Signal meter	KAE-81	or	1.5	AC 18V, DC 10V, AC 4~20mA, DC 1mA	5
Frequency meter	KAF-81		1.0	V : 110V or 220V Hz : 45~65Hz, 55~65Hz	

Customized product can be produced by order

1. Use CT over AC 30A
2. Use PT(VT) over AC 600V / Order the same specification with the transformer
3. Use shunt with 50mV, 60mV
4. Use voltage divider over DC 600V
5. Bezel design to be customized

Drawing

Unit:mm

Type	Side	Rear	Panel cut	Weight
Iron cover fixed				140g

08 Type Analog Meter

Certificates



Model No

KA[ ]-08 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) KAC-08 DC 200μA
KAC -08 DC 200μA BLUE

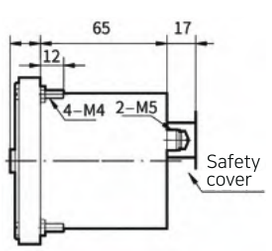
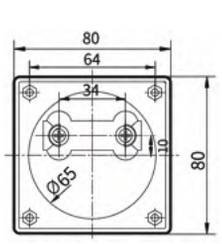
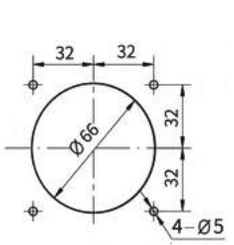
Technical Data

Type	Model No	Operation	Class	Max input	Note
AC Ammeter	KAA-08		1.5	AC 1A, 5A, 10A, 20A, 30A	1
AC Voltmeter	KAB-08		1.5	AC 150V, 300V, 600V	2
DC Ammeter	KAC-08	or	1.5	DC 150μA, 5A, 50mV, 60mV	3
DC Voltmeter	KAD-08		1.5	DC 150V, 300V, 600V, 1500V	4
Signal meter	KAE-08	or	1.5	AC 18V, DC 10V, AC 4~20mA, DC1mA	5
Frequency meter	KAF-08		1.0	V : 110V or 220V Hz : 45~65Hz, 55~65Hz	

Customized product can be produced by order
1. Use CT over AC 30A
2. Use PT(VT) over AC 600V / Order the same specification with the transformer
3. Use shunt with 50mV, 60mV
4. Use voltage divider over DC 600V.
5. Bezel design to be customized

Drawing

Unit:mm

Type	Side	Rear	Panel cut	Weight
Bolt fixed				350g

08N Type Analog Meter

Certificates



Model No

KA[ ]-08N 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) KAC-08N DC 200μA

Technical Data

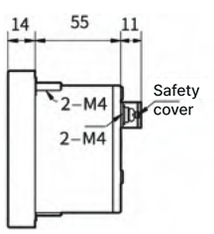
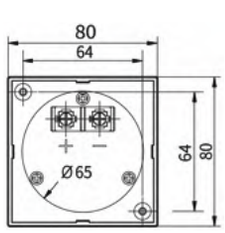
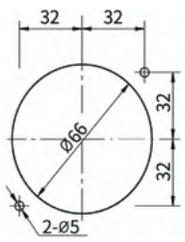
Type	Model No	Operation	Class	Max input	Note
AC Ammeter	KAA-08N		1.5	AC 1A, 5A, 10A, 20A, 30A	1
AC Voltmeter	KAB-08N		1.5	AC 150V, 300V, 600V	2
DC Ammeter	KAC-08N	or	1.5	DC 150μA, 5A, 50mV, 60mV	3
DC Voltmeter	KAD-08N		1.5	DC 150V, 300V, 600V	4
Signal meter	KAE-08N	or	1.5	AC 18V, DC 10V, AC 4~20mA, DC 1mA	5
Frequency meter	KAF-08N		1.0	V : 110V or 220V Hz : 45~65Hz, 55~65Hz	

Customized product can be produced by order

1. Use CT over AC 30A
2. Use PT(VT) over AC 600V / Order the same specification with the transformer
3. Use shunt with 50mV, 60mV
4. Use voltage divider over DC 600V
5. Bezel design to be customized

Drawing

Unit:mm

Type	Side	Rear	Panel cut	Weight
Bolt fixed				350g

11 Type Analog Meter

Certificates



Model No

KA[ ]-11 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) KAD-11 DC 600V
KAD-11 DC 600V BLUE

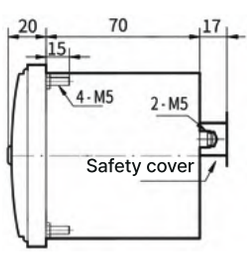
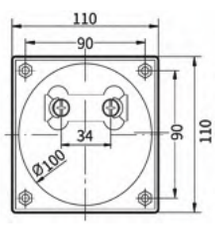
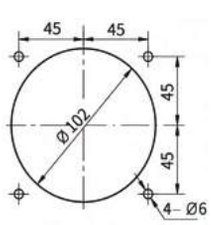
Technical Data

Type	Model No	Operation	Class	Max input	Note
AC Ammeter	KAA-11		1.5	AC 1A, 5A, 10A, 20A, 30A	1
AC Voltmeter	KAB-11		1.5	AC 150V, 300V, 600V	2
DC Ammeter	KAC-11	or	1.5	DC 150μA, 5A, 50mV, 60mV	3
DC Voltmeter	KAD-11		1.5	DC 150V, 300V, 600V, 1500V	4
Signal meter	KAE-11	or	1.5	AC 18V, DC 10V, AC 4~20mA, DC 1mA	5
Frequency meter	KAF-11		1.0	V : 110V or 220V Hz : 45~65Hz, 55~65Hz	

- Customized product can be produced by order
- 1. Use CT over AC 30A
- 2. Use PT(VT) over AC 600V / Order the same specification with the transformer
- 3. Use shunt with 50mV, 60mV
- 4. 4. Use voltage divider over DC 1500V.
- 5. Bezel design to be customized

Drawing

Unit:mm

Type	Side	Rear	Panel cut	Weight
Bolt fixed				450g

Watt Meter

Certificates



Model No

KAG - ①

① Dimension(WxHxDxΦ)
08 80x80x99x65
11 110x110x110x100

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

Calculation method) 1Φ=V x A x COS Θ 3Φ=V x A x COS Θ x √3

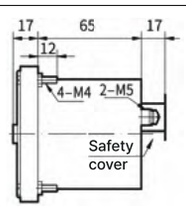
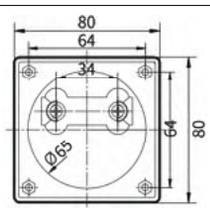
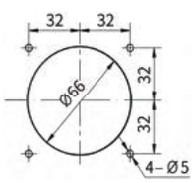
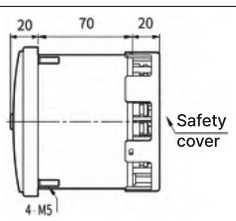
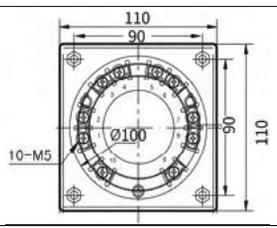
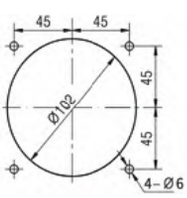
Technical Data

Type	KAG-11				KAG-08
Operation					
Class	1.5				
Input	1P2W	1P3W	3P3W	3P4W	
	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	Dedicated external transducer included
	1A or 5A				
Power Consumption	2VA				
Weight	740g				300g(Meter), 450g(TD)

Customized product can be produced by order

Drawing

Unit:mm

Size	Type	Side	Rear	Panel cut
08Ty	Bolt fixed			
11Ty	Bolt fixed			

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 Dimension(WxHxDxΦ)
08 80x80x99x65
11 110x110x110x100

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

Calculation method) 1Φ=V x A x Sin Θ 3Φ=V x A x Sin Θ x √3

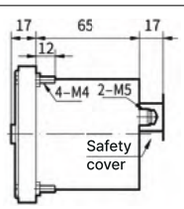
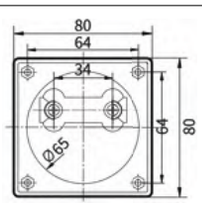
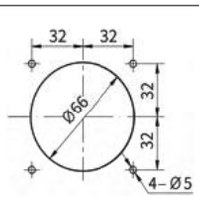
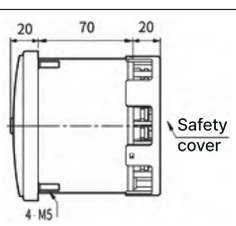
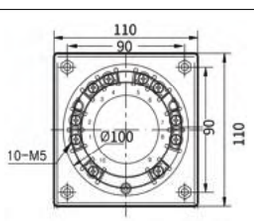
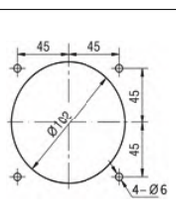
Technical Data

Type	KAI-11				KAI-08
Operation					
Class	1.5				
Input	1P2W	1P3W	3P3W	3P4W	
	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	Dedicated external transducer included
	1A or 5A				
Power Consumption	2VA				
Weight	740g				300g(Meter), 450g(TD)

Customized product can be produced by order

Drawing

Unit:mm

Size	Type	Side	Rear	Panel cut
08Ty	Bolt fixed			
11Ty	Bolt fixed			

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	11.2Mvar	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 28.0MW.
- 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.

Power Factor Meter

Certificates



Model No

KAH- ①②

①	Dimension(WxHxDxΦ)	②	Type
08	80x80x99x65 - Unbalanced (TD External)	B	Balanced
08	80x80x114x65 -Balanced	U	Unbalanced
11	110x110x107x100 - Unbalanced / Balanced		

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

Technical Data - Balance power factor meter

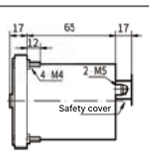
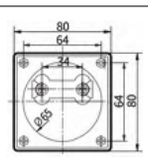
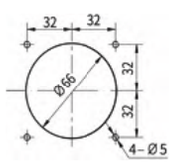
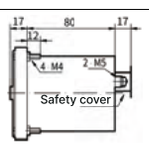
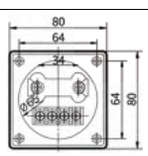
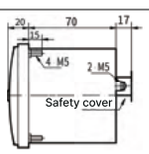
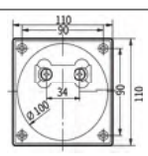
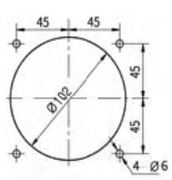
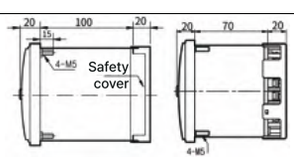
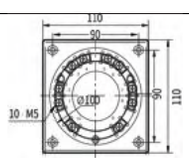
Type	KAH-11B			KAH-08B
Operation				
Class	3.0			
Input	1P2W	1P3W	3P3W	3P4W
	110V or 220V			190/√3V
				380/√3V
	1A or 5A			
Power Consumption	2VA			
Weight	450g			380g

Technical Data - Unbalanced power factor meter

Type	KAH-11U		KAH-08U
Operation			
Class	3.0		
Input	1P3W	3P4W	Dedicated external transducer included
	3P3W		
	110V or 220V	110/√3V 190/√3V 380/√3V	
	1A or 5A		
Power Consumption	2VA		
Weight	800g		300g(Meter)+ 450g(TD)

Drawing

Unit:mm

	Type	Side	Rear	Panel cut
08 TY	RMS meter . Unbalanced power factor meter			
	Balanced Power factor meter			
11 TY	RMS meter			
	Unbalanced/ Balance power factor meter			

Double Indicator Meter

Certificates

Model No

KA□-□□D
① ②③

① Type				② Type		③ Pointer
A	AC Ammeter	F	Frequency meter	50	08	Double
B	AC Voltmeter	G	Watt meter	60	11	
C	DC Ammeter	H	Power Factor meter	72	08N	
D	DC Voltmeter	I	Var meter	80		
E	Signal meter	N	Thermometer	81		

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

Short scale				Long scale	
KA□-50D		KA□-72D		KA□-08D	
KA□-60D		KA□-80D		KA□-08N (08ND)	
KA□-68D		KA□-81D		KA□-11D	

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			

How to order) KAI-11E1A 10kg/㎠/DC 4~20mA, AC 220V ELP

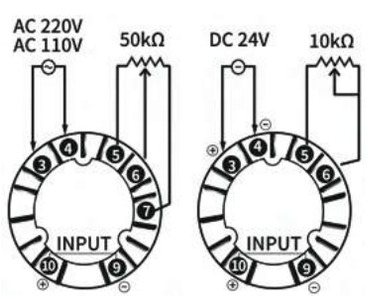
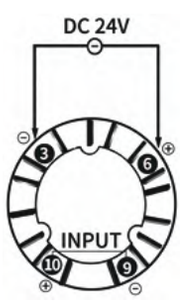
Customized product can be produced by order.

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(Dimmer)	50MΩ(2.0W)	10MΩ(2.0W)	-
	Total control dimmer		
Lighting color	Blue-green	Blue-green	Light purple

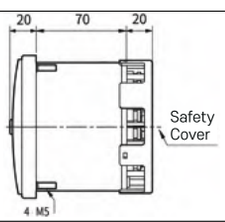
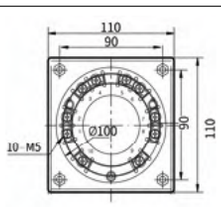
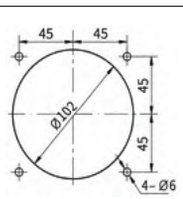
The color of the lighting may be changed without notice.

Connection Diagram

ELP type	LAMP type
	

Drawing

Unit:mm

Type	Side	Rear	Panel cut	Weight
Bolt fixed				400g

3P Selector Meter

Certificates



Model No

KAS - 80 ① ②

① Type		② Circuit	
A	AC Ammeter(0~5A)	3	3P3W
B	AC Voltmeter(0~15V)	4	3P4W
C	DC Ammeter(0~300V)		

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

Measure current or voltage by phase selecting switch

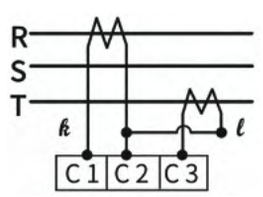
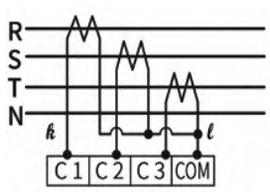
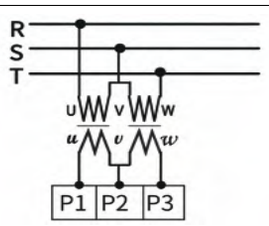
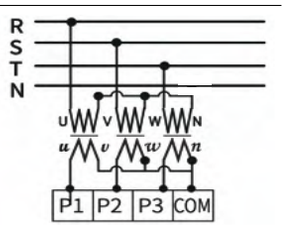
Panel cut 75Φ

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

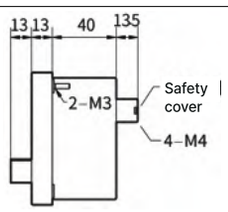
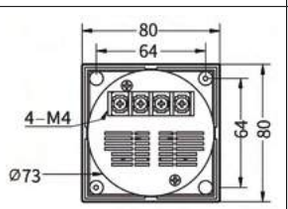
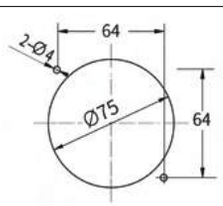
1. Standard : 5A input or use CT
2. Standard 150V, 300 V Direct input or use PT
3. 3P4W displays the phase voltage

Connection Diagram

KAS-80A Ammeter		KAS-80B/C Voltmeter	
			
3P3W	3P4W	3P3W	3P4W

Drawing

Unit:mm

Type	Side	Rear	Panel cut	Weight
Bolt fixed				130g

Analog Meter Relay

Certificates



Model No

KAR - ① 80 ②

① Type				② Setting	
A	AC Ammeter	F	Frequency meter	H	Upper limit setting
B	AC Voltmeter	G	Watt meter	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		

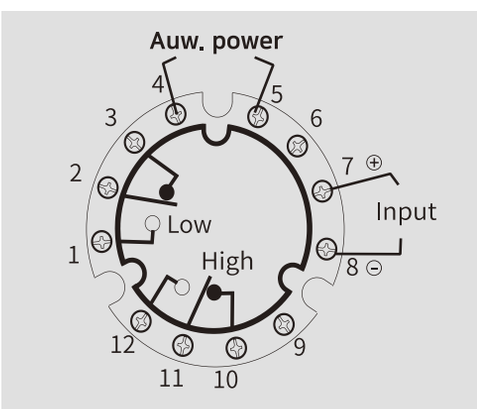
How to order) KAR-A80H AC 100/5A

- 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

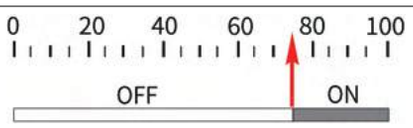
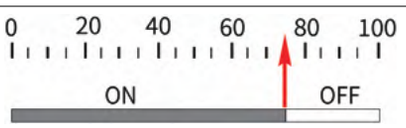
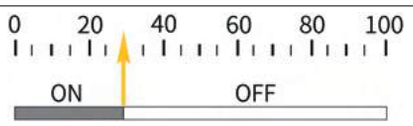
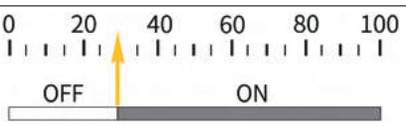
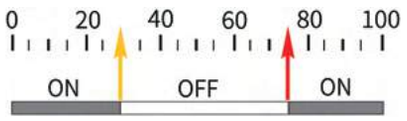
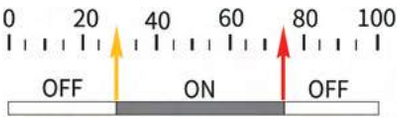
Technical Data

Operating power	AC Current / Voltage		
	DC Current / Voltage		
	Signal meter		
	Watt meter, Power factor meter, Reactive power meter, Thermometer		
	Frequency meter		
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 - contact	B - 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, circuit simplification the durable front window with thin and transparent PC material.
- Available in a Aux power of 100 to 240V
- Output contact capacity is AC 220V/1A, DC 30V/1A
- Protection circuit is applied in case of incorrect wiring for relay control power
- Impulse noise protection circuit is applied

Type

- Alarm and detection for electric equipment
- Alarm and detection for RPM, temperature, speed and pressure

Operating principle

The detection part consists of GL (light emitting diode) and PT (photo transistor). 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 maintained in the default condition at the power initiation(For 2sec). So, our product is designed to restrain relay activation during power-on.

DC surge protection circuit

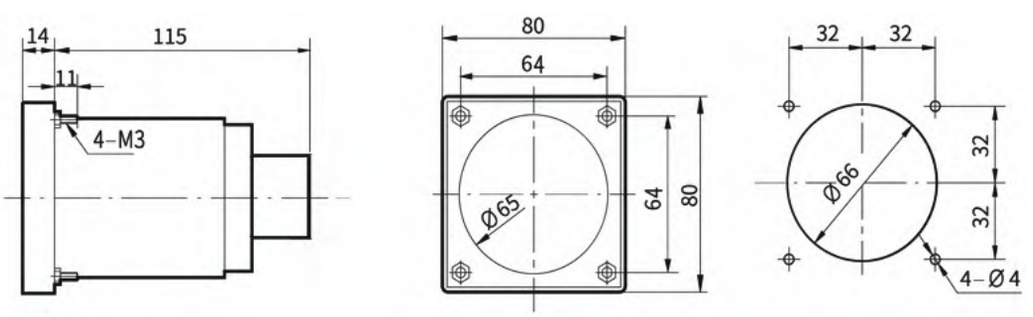
For the case of DC Aux power, a protective circuit is applied to prevent the damage from surge and it needs to be careful over ±10% of designed voltage.

Protection circuit for mis-wiring

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

Drawing

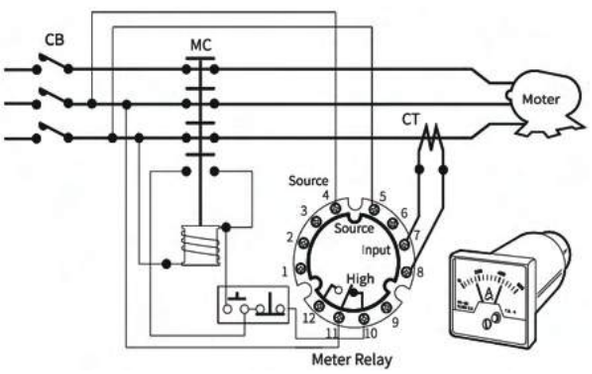
Unit:mm



Analog Meter Relay

Certificates

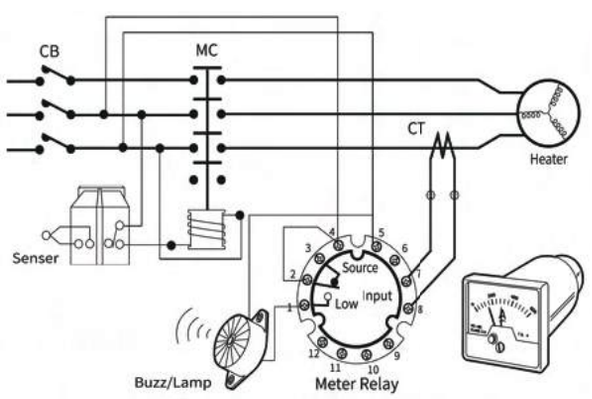
Motor overload protection circuit - High limit setting



It is designed to prevent machines and electric facilities from overload

Input to be connected to secondary of Motor MC

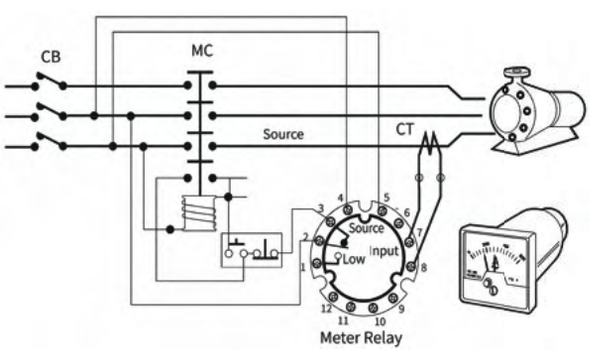
Electric heater open alarm circuit - Low limit setting



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

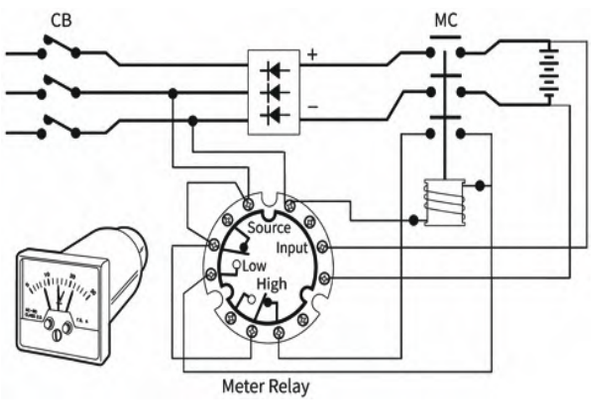
Motor idling protection circuit - Low limit setting



It is designed to prevent motor from continuous idling

Input to be connected to secondary of Motor MC.

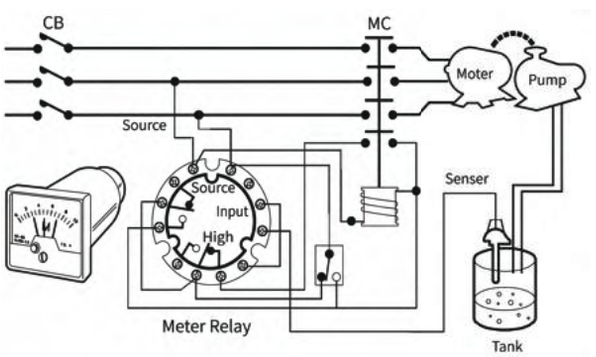
Battery charge control circuit - High/low limit setting



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

Input to be connected to battery directly.

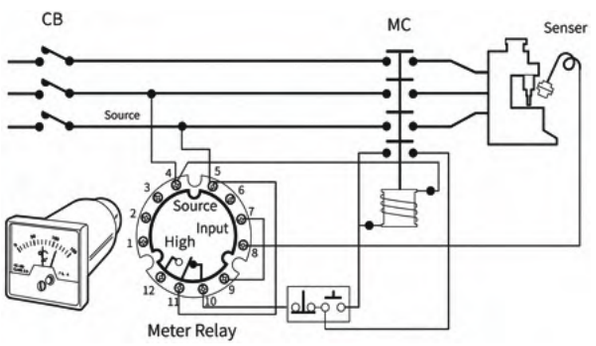
Level control circuit - High / Low limit setting



It is designed to control liquid level.

Input to be connected to level sensor.

Electric Discharge machine temperature control circuit - High / Low limit setting



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

Input to be connected to photosensor

Ao / Vo Meter

Certificates



| Ao Meter KAM-11A |

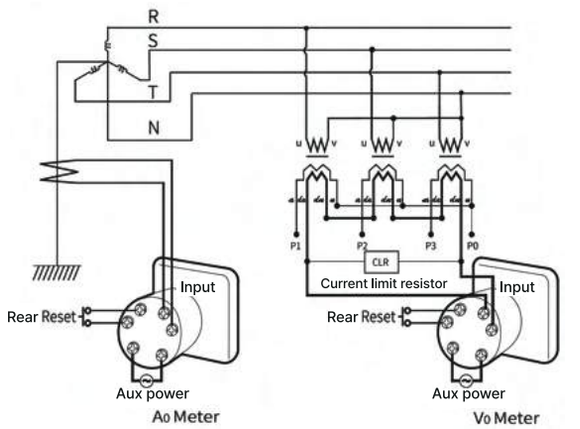


| Vo Meter KAM-11B |

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	1VA	
Holding time	1.0% / 12Hour	
Aux power	AC 100 ~ 240V(60Hz)	
Reset	Front : Push button Rear : Reset terminal	
Weight	750g	
Dimension	110 X 110 X 140	

Connection Diagram



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	5A	
Use CT	Primary current/5A	
Power Consumption	1.0VA	
Weight	350g	450g
Dimension	80 X 80 X 99	110 X 110 X 107

Technical Data

Type	KAK-08B	KAK-11B
Operation		
Class	1.5	
Input	150V, 300V, 600V,	
Use CT	Primary Voltage/110V, 220V	
Power Consumption	1.0VA	
Weight	350g	450g
Dimension	80 X 80 X 99	110 X 110 X 107

CURRENT TRANSFORMER



CE certification

CE stands for "Conformité Européenne" 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 EMCD(Electro Magnetic Compatibility Directive).
LIGHTSTAR achieved CE certificate for Analog meter, Current Transformer, Digital meter, Power meter, and Transducers.

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.

LIGHTSTAR
㈜광성계측기

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3Phase Ring Type Current Transformer **KBD-□□**



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Busbar Type Current Transformer **KBM-□□**



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3Phase Busbar Type Current Transformer **KBF-□□□**



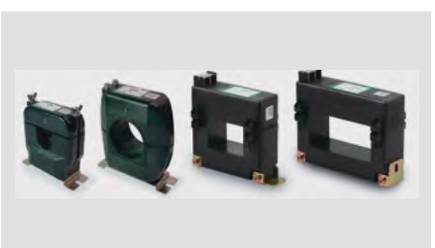
44-46

Busbar Type Current Transformer **KBM-□□**



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Single Phase Potential Transformer **KB□-□□**



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Single Phase Potential Transformer (Ship) **KBT-□□**



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3 Phase Potential Transformer **KBO-□□**

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Ground Potential Transformer **KBG-□□□**



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Current Limit Resister **KBL-□□**



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Voltage Divider for DC **KBV-□**



60-63

Shunt **KBY-□□**

Definition

Burden Impedance burdens for assuring capacity under designed condition

Class Accuracy tolerances for rated current or rate voltage under rated burden

[Current Transformer]

Limit		Ratio error(%)			Phase angle error (min)		
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%	±90min	±45min	±30min
	1.0	±3.0%	±1.5%	±1.0%	±180min	±90min	±60min
	3.0	0.5 In ~ 1.0 In ±3.0%			0.5 In ~ 1.0 In ±180min		

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

[Transformer]

Limit		Ratio error(%)	Phase angle error (min)
Primary current A		0.7~1.1 Vn	0.7~1.1 Vn
class	0.5	±0.5%	±20 min
	1.0	±1.0%	±40 min
	3.0	±3.0%	±120 min

NOTE: " Vn " indicates the rated primary voltage of the rated frequency.

Ratio error: [(Calculated voltage ratio - Measured current ratio)/ Measured voltage 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 over current, CT to be saturated over rated current (Overcurrent factor is not indicated)

Choice of OCR CT (PCT) In case primary current is extremely bigger than rated current, CT core to be saturated and OCR can not be operated properly. Please choose correct CT by considering over current factor " (Max current / Rated primary current of CT) <over current factor"

IEC 61869 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 7626:1993(BS 3938:1973) 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)

Burden

Secondary current	Burden (2.5 ㎟ cable)	Analog ammeter	Digital ammeter	Current transducer	Digital energy meter	EOCR
5A	Approx. 0.18VA/m	1.0VA	0.5VA	1.0VA	1.0VA	1.0VA
1A	Approx. 0.07VA/m	0.2VA	0.10VA	0.20VA	0.20VA	–

General Instruction

Information for safe use

- Operating condition: ambient temperature - 20℃ - 50℃, 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
- For busbar fixing bolt, insulation covers are recommended for safety

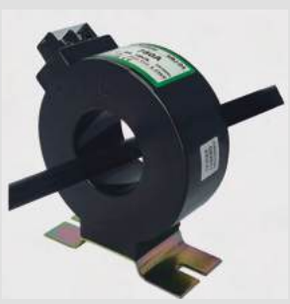
The usage at the 2ndary side of the inverter.

If used under 45Hz, accuracy will be out if acceptable range because of excitation current.

⚠ Caution

1. Do not use a three-phase transformer as a single phase.
2. Do not use potential transformers on the secondary side of the inverter and thyristor circuits.

How to use burden and accuracy



100/5

5VA 5P5
1.0In -2.0
0.2In 0.85

→

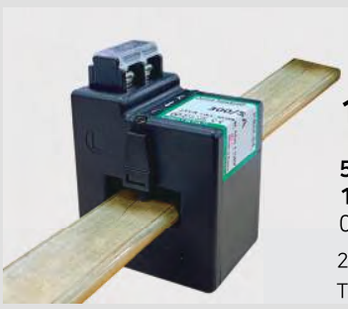


ℓ - ℓ
Common connection

100/5

5VA 5P10
1.0In -0.55

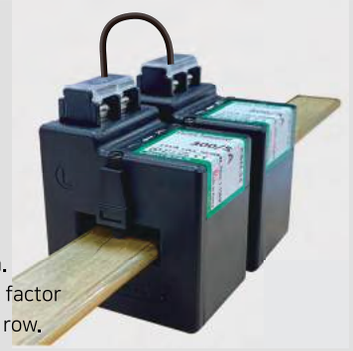
2EA for the same specification.
The accuracy and over current factor will be improved with 2 CT in a row.



150/5

5VA 5P5
1.0In -0.49
0.2In 0.35

→



ℓ - ℓ
Common connection

150/5

5VA 5P10
1.0In + 0
0.2In + 0.05

Over current factor improvement

2EA for the same specification.
The accuracy and over current factor will be improved with 2 CT in a row.



120/5

Turn : 2
60/5



120/5

Turn : 3
40/5



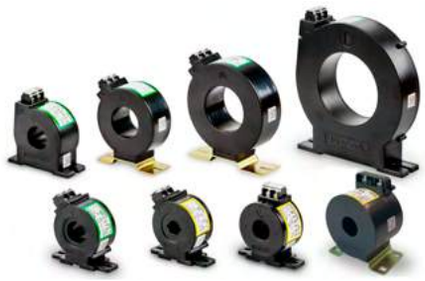
120/5

Turn : 4
30/5

By adding the number of turns, current ratio can be changed but the ratio error/phase angle error is the same.

Ring Type Current Transformer

Certificates



Model No

KBJ - ① ②

① Size	② Use	
26/15/25/03/04/06/10	**N/A**	For Meter(MCT)
	R	For OCR(PCT)

Feature

- Suitable products for digital meter and EOCR. (KBJ-15, 25, 26)
- Rotatable mounting bracket for easy installation. (KBJ-26)
- 30/5-2000/5A Current ratio (15Φ , 25Φ , 26Φ , 30Φ , 40Φ , 60Φ , 100Φ)

Refer to page 35 for accuracy improvement

Specification

Secondary current	Over current strength	Maximum voltage	Withstand voltage	Frequency
5A or 1A	40 Times	1.2kV	4.0kV/1min	50Hz (60Hz order made)

Customized product can be produced by order

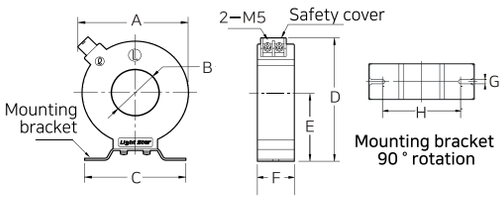
Selection table

Type	For Meter(MCT)(1core)						
Model	KBJ-26	KBJ-15	KBJ-25	KBJ-03	KBJ-04	KBJ-06	KBJ-10
Pri(A)	*Burden / Class						
30	2.5VA / 3.0	1.5VA / 3.0					
40	5VA / 3.0	2.5VA / 3.0					
50		5VA / 3.0	2.5VA / 3.0				
60							
75	5VA / 1.0		5VA / 3.0	5VA / 3.0			
100		5VA / 1.0	5VA / 1.0	5VA / 1.0	5VA / 1.0		
120	15VA / 1.0						
150							
200	40VA / 1.0			15VA / 1.0	15VA / 1.0	5VA / 1.0	
250			15VA / 1.0			15VA / 1.0	15VA / 1.0
300							
400				40VA / 1.0	40VA / 1.0		
500						40VA / 1.0	40VA / 1.0
600							
750							
800							
1000							
1200							
1500							
2000							

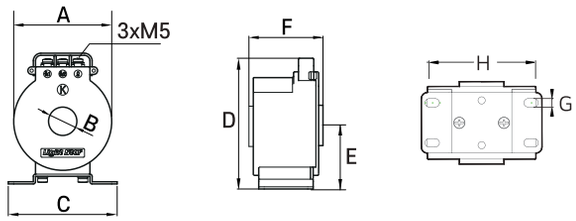
Drawing

Unit:mm

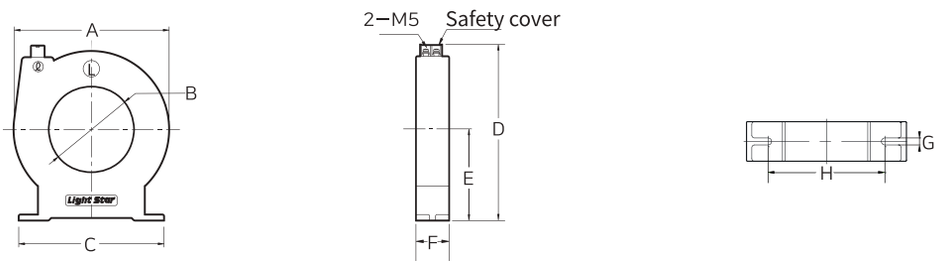
KBJ-04/KBJ-06



KBJ-26



KBJ-03/KBJ-15/KBJ-25/KBJ-10



Type	A	B	C	D	E	F	G	H	Weight
KBJ-03	80	Φ30	100	100	45	40	6	78	550g
KBJ-04	102	Φ40	95	117	64	40	5	70	800g
KBJ-06	125	Φ60	120	141	75	40	5	92	1100g
KBJ-10	182	Φ100	182	203	106	40	6	133	2100g
KBJ-15	66	Φ15	88	88	41	33	7	67	400g
KBJ-25	66	Φ25	88	88	41	33	7	67	320g
KBJ-26	90	Φ26	100	120	57	60	7	82	2500g

Type	For OCR(PCT)				
Model	KBJ-26R	KBJ-03R	KBJ-04R	KBJ-06R	KBJ-10R
Pri(A)	*Burden / Over current factor				
30					
40					
50					
60					
75	2.5VA/5P10				
100					
120					
150					
200	5VA/5P10		2.5VA/5P10		
250					
300		2.5VA/5P10		5VA/5P10	
400			5VA/5P10		
500		5VA/5P10			5VA/5P10
600					
750					
800					
1000					
1200					
1500					15VA/5P10
2000				15VA/5P10	

3Phase Ring Type Current Transforme



Certificates

Model No

KBD - ① ② ③

① Size	② Circuit		③ Use	
12S/22/42/62	2	3P3W(2 Core)	N/A	For Meter(MCT)
13S/21/23/43/63	3	3P4W(3 Core)	E	For OCR(PCT)

Feature

- Optimized design for 3 phase with single CT
- Suitable products for digital meter and EOCR. (KBD-12, 12S, 22, 13, 13S, 21, 23)
- 40/5-1200/5A Current ratio (14Φ, 21.5Φ, 27Φ, 30*45)

Refer to page 35 for accuracy improvement

Specification

Secondary current	Over current strength	Maximum voltage	Withstand voltage	Frequency
5A or 1A	40 Times	1.2kV	4.0kV/1min	50Hz (60Hz order made)

Customized product can be produced by order

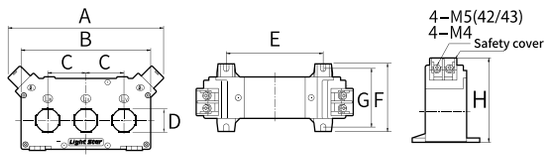
Selection table

Type	For Meter(MCT)(2 core)				
Model	KBD-12	KBD-12S	KBD-22	KBD-42	KBD-62
Pri(A)	*Burden / Class				
50	2.5VA / 3.0	2.5VA / 3.0	2.5VA / 3.0		
60					
75					
100		5VA / 1.0	5VA / 1.0	2.5VA / 3.0	
120	5VA / 3.0				
150	5VA / 1.0			5VA / 3.0	
200				5VA / 1.0	5VA / 1.0
250					
300					15VA / 1.0
400					
500				15VA / 1.0	
600					
750					
800					
1000					
1200					

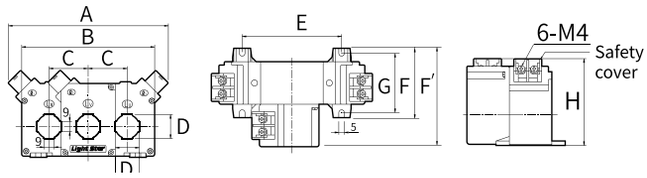
Drawing

Unit:mm

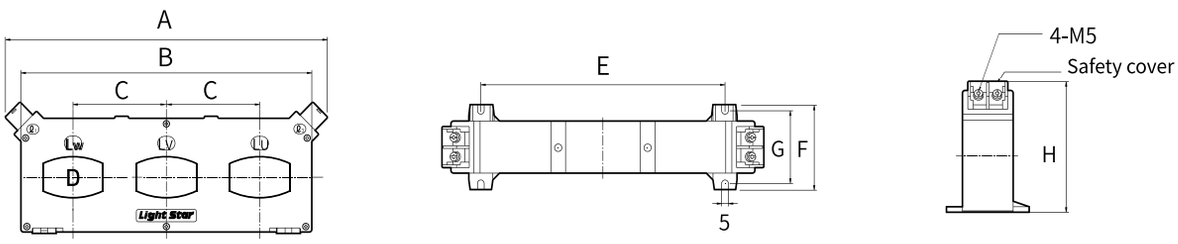
KBD-12/13、12S/13S、22/23、42/43



KBD-21



KBD-62/63



Type	A	B	C	D	E	F	F'	G	H	Weight
KBD-12/13	119	99	30	14	63	62	-	55	59	300g
KBD-12S/13S	119	99	30	14	63	75	-	61	59	385g
KBD-21	136	119	35	21.5	89	62	88	53	78	390g
KBD-22/23	136	119	35	21.5	89	62	-	53	78	380g
KBD-42/43	170	149	44	27	117	63.5	-	53	93	540g
KBD-62/63	235	218	70	30X45	183	64.5	-	53	95	875g

Type	For Meter(MCT)(3 core)					
Model	KBD-13	KBD-13S	KBD-21	KBD-23	KBD-43	KBD-63
Pri(A)	*Burden / Class					
50	2.5VA / 3.0	2.5VA / 3.0	2.5VA / 3.0	2.5VA / 3.0		
60						
75						
100		5VA / 1.0	5VA / 1.0		2.5VA / 3.0	
120	5VA / 3.0					
150				5VA / 1.0	5VA / 3.0	
200	5VA / 1.0				5VA / 1.0	5VA / 1.0
250						
300						15VA / 1.0
400						
500					15VA / 1.0	
600						
750						
800						
1000						
1200						

Busbar Type Current Transformer

Certificates



Model No

KBM - ① ②

① Size	② Use	
31/32/34/36	**N/A**	For Meter(MCT)
	R	For OCR(PCT)

Feature

- Optimized design for circuit breaker (50-1200AF) size
- Suitable products for digital meter and EOCR. (KBM-31,32)
- Minimizing installation space, and removing busbar bending

Install CT with a distance, or add the partition wall to prevent deformation from busbar heat
Torque limit for bus bar fixing bolt : M4 - 5~7 kgf · cm, M5 - 7~10kgf · cm
Be aware of the energizing with busbar fixing bolt(M4/M5)

Refer to page 35 for accuracy improvement

Specification

Secondary current	Over current strength	Maximum voltage	Withstand voltage	Frequency
5A or 1A	40 Times	1.2kV	4.0kV/1min	50Hz (60Hz order made)

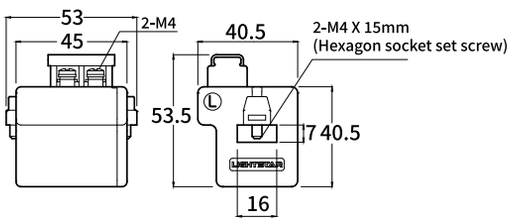
Customized product can be produced by order

Selection table

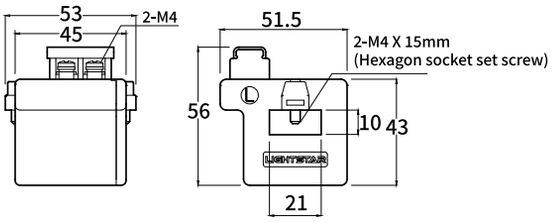
Type	For Meter(MCT) (1 core)				For OCR(PCT)(1 core)	
MCCB	50/100/125AF	225AF	400AF	600-1200AF	400AF	600-1200AF
Model	KBM-31	KBM-32	KBM-34	KBM-36	KBM-34R	KBM-36R
Pri(A)	*Burden / Class				*Burden / Over current factor	
50	2.5VA / 3.0	1.5VA / 3.0				
60		2.5VA / 3.0				
75						
100			5VA / 3.0	5VA / 3.0		
120			5VA / 1.0			
150	5VA / 3.0	5VA / 3.0		5VA / 1.0		
200		5VA / 1.0		15VA / 1.0		
250			15VA / 1.0			2.5VA/5P10
300					2.5VA/5P10	
400				40VA / 1.0		
500						5VA/5P10
600						
750						
800						
1000						
1200						
1500						

Drawing

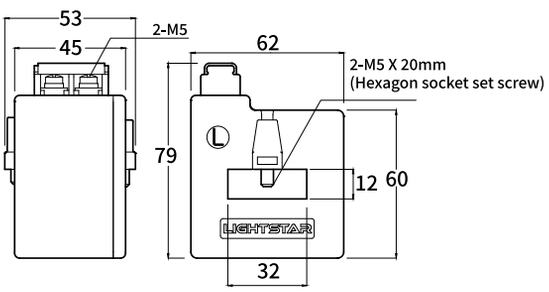
Unit:mm



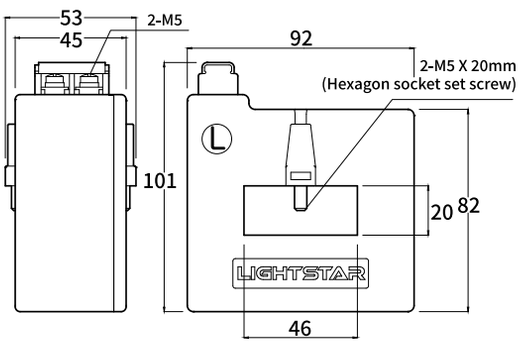
KBM-31 - For 100AF / Weight : 160g



KBM-32 - For 250AF / Weight : 170g

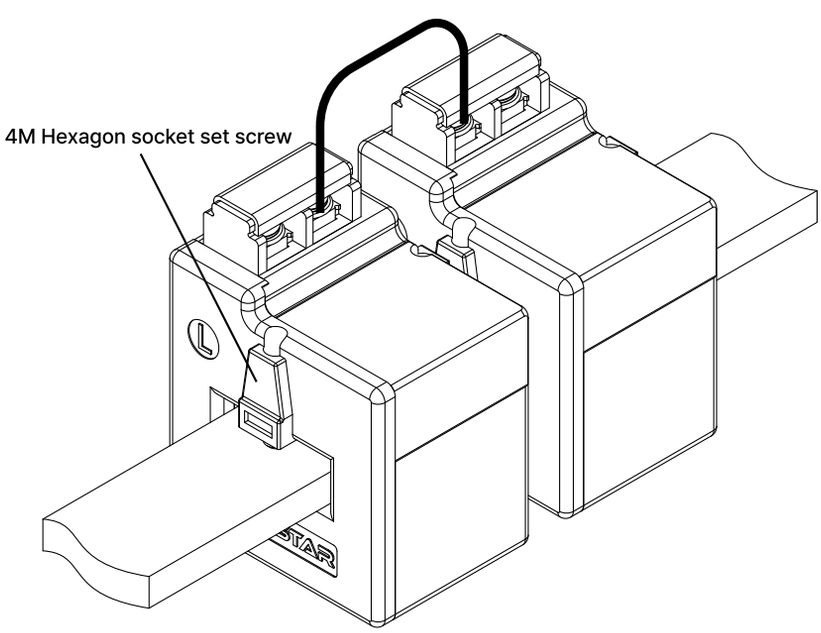


KBM-34 - For 400AF / Weight : 440g



KBM-36 - For 600AF / Weight : 670g

KBM-31/ 32/ 34/ 36 2CT in a row(Allowable strength of hexagon socket set screw 4M, over 30kg)



3Phase Busbar Type Current Transformer

Certificates



Model No

KBF - ① ② ③

① Size	② Circuit		③ Use	
02/12S/22/42/62	2	3P3W(2 Core)	**N/A**	For Meter(MCT)
03/13S/23/43/63	3	3P4W(3 Core)		

Feature

- Optimized design for circuit breaker (30~1200AF) size
- Suitable products for digital meter and EOCR. (KBF-02, 03, 22, 23)
- Minimizing installation space, and removing busbar bending

Install CT with a distance, or add the partition wall to prevent deformation from busbar heat
Torque limit for bus bar fixing bolt : M4 - 5~7 kgf · cm, M5 - 7~10kgf · cm
Be aware of the energizing with busbar fixing bolt(M4/M5)

Refer to page 35 for accuracy improvement

Specification

Secondary current	Over current strength	Maximum voltage	Withstand voltage	Frequency
5A or 1A	40 Times	1.2kV	4.0kV/1min	50Hz (60Hz order made)

Customized product can be produced by order

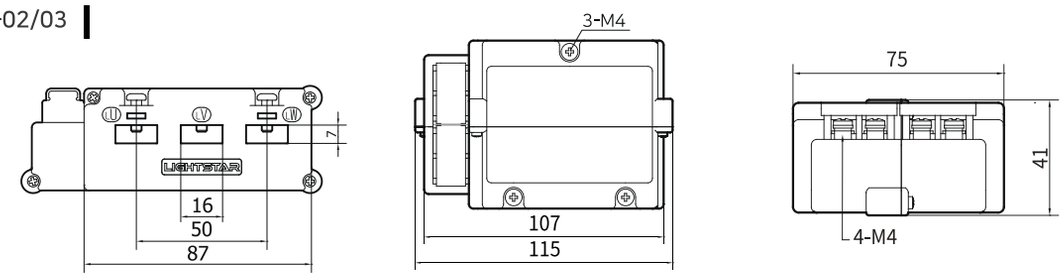
Selection table

Type	For Meter(MCT) (2 core)					
MCCB	50/100AF	125AF	125AF	225AF	400AF	600-1200AF
Model	KBF-02	KBF-12S	KBF-12	KBF-22	KBF-42	KBF-62
Pri(A)	* Burden / Class					
50	2.5VA / 3.0	2.5VA / 3.0	2.5VA / 3.0	2.5VA / 3.0	2.5VA / 3.0	
60						
75						
100		5VA / 1.0				
120						
150	5VA / 3.0		5VA / 3.0	5VA / 3.0		
200				5VA / 1.0	5VA / 1.0	5VA / 1.0
250						
300						
400						
500						15VA / 1.0
600						
750						
800						
1000						
1200						

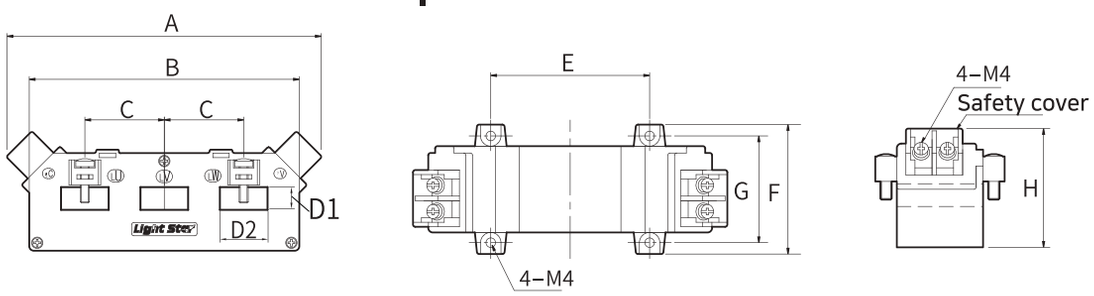
Drawing

Unit:mm

KBF-02/03



KBF-12/13,12S/13S,22/23/42/43,62/63



Type	CB	A	B	C	D1XD2	E	F	G	H	Weight
KBF-12/13	125AF	122	102	30	7 X 16	60	59	49	52	300g
KBF-12S/13S	125AF	122	102	30	7 X 16	60	69	59	52	400g
KBF-22/23	250AF	139	119	35	10 X 21	70	57	47	52	320g
KBF-42/43	400AF	168	149	44	20 X 30	88	57	47	70	460g
KBF-62/63	600~1200AF	237	218	70	25 X 46	140	57	47	85	750g

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

Type	For Meter(MCT) (3 core)					
MCCB	50/100AF	125AF	125AF	225AF	400AF	600-1200AF
Model	KBF-03	KBF-13S	KBF-13	KBF-23	KBF-43	KBF-63
Pri(A)	* Burden / Class					
50	2.5VA / 3.0	2.5VA / 3.0				
60				2.5VA / 3.0		
75			2.5VA / 3.0			
100		5VA / 1.0			2.5VA / 3.0	
120						
150	5VA / 3.0		5VA / 3.0	5VA / 3.0		
200				5VA / 1.0	5VA / 1.0	5VA / 1.0
250						
300						
400						
500						15VA / 1.0
600						
750						
800						
1000						
1200						

Busbar Type Current Transformer

Optimized design for circuit breaker



Certificates

Model No

KBM - ① ②

① Size	② Use	
05/06/06D/07/08/10/12/13/16/14/18/21	N/A	For Meter(MCT)
	R	For OCR(PCT)

Feature

- Optimized design for circuit breaker (1600-6300AF) size
- Suitable products for digital meter and EOCR. (KBM-05R, KBM-12R)
- Minimizing installation space, and removing busbar bending
- Install CT with a distance, or add the partition wall to prevent deformation from busbar heat
- Torque limit for bus bar fixing bolt : M4 - 5~7 kgf · cm, M5 - 7~10kgf · cm
- Be aware of the energizing with busbar fixing bolt(M4/M5)
- Refer to page 35 for accuracy improvement

Specification

Secondary current	Over current strength	Maximum voltage	Withstand voltage	Frequency
5A or 1A	40 Times	1.2kV	4.0kV/1min	50Hz (60Hz order made)

- Customized product can be produced by order

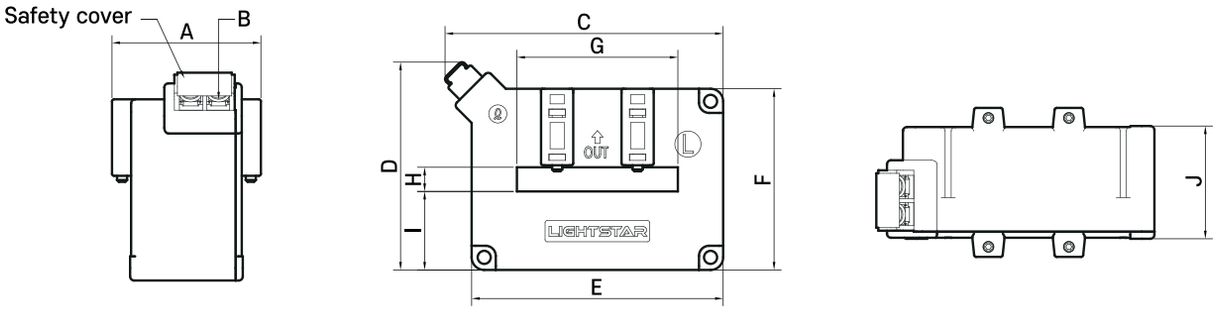
Selection table

	For Meter(MCT)(1 core)											
Model	KBM-05	KBM-06	KBM-06D	KBM-07	KBM-08	KBM-10	KBM-12	KBM-13	KBM-14	KBM-16	KBM-18	KBM-21
Pri(A)	*Burden / Class											
100	2.5VA / 3.0	5VA / 1.0	15VA / 1.0	15VA / 1.0	5VA / 1.0							
120	5VA / 3.0											
150												
200	5VA / 1.0	15VA / 1.0	40VA / 1.0	40VA / 1.0	15VA / 1.0	5VA / 1.0						
250												
300							5VA / 1.0					
400	15VA / 1.0	40VA / 1.0				15VA / 1.0		15VA / 1.0	15VA / 1.0	15VA / 1.0	15VA / 1.0	
500					40VA / 1.0		15VA / 1.0					
600						40VA / 1.0		40VA / 1.0	40VA / 1.0			
750	40VA / 1.0						40VA / 1.0			40VA / 1.0	40VA / 1.0	40VA / 1.0
800												
1000												
1200												
1500												
1600												
2000												
2500												
3000												
4000												
5000												
6000												
7500												
10000<												

Drawing

Unit : mm

KBM-05/06/07/08/10/12/13/14/16/18/21



Type	A	B	C	D	E	F	G	H	I	J	Weight
KBM-05	59	2-M5	107	104	95	92	61	40	26	40	800g
KBM-06	65	2-M5	118	88	105	75	52	12	12	65	1000g
KBM-07	127	2-M5	148	113	135	100	82	12	47	115	8500g
KBM-08	74	2-M5	138	103	125	90	80	12	39	55	1000g
KBM-10	74	2-M5	165	120	155	110	105	30	40	55	1300g
KBM-12	59	2-M5	157	121	145	110	105	47	31.5	40	840g
KBM-13	74	2-M5	220	185	210	175	135	85	45	55	1800g
KBM-14	71	3-M5	122	2-M5	174	103	130	35	34	55	2000g
KBM-16	74	2-M5	185	2-M5	210	175	160	85	45	55	2100g
KBM-18	71	3-M5	136	2-M5	224	117	180	43	37	55	2700g
KBM-21	73	3-M5	184	2-M5	268	165	210	85	41	60	3200g

	For OCR(PCT)											
Model	KBM-05R	KBM-06R	KBM-06RD	KBM-07R	KBM-08R	KBM-10R	KBM-12R	KBM-13R	KBM-14R	KBM-16R	KBM-18R	KBM-21R
Pri(A)	*Burden / Over current factor											
100		2.5VA / 5P10	5VA / 5P10	5VA / 5P20								
120												
150												
200		5VA / 5P10										
250												
300												
400	2.5VA / 5P10		15VA / 5P10	15VA / 5P20	5VA / 5P10	5VA / 5P10						
500												
600								5VA / 5P10				
750												
800												
1000	5VA / 5P10						5VA / 5P10	15VA / 5P10	5VA / 5P10	5VA / 5P10	5VA / 5P10	5VA / 5P10
1200										15VA / 5P10		15VA / 5P10
1500					15VA / 5P10	15VA / 5P10			15VA / 5P10		15VA / 5P10	
1600												
2000												
2500								40VA / 5P10	40VA / 5P10	40VA / 5P10	40VA / 5P10	40VA / 5P10
3000												
4000												
5000												
6000												
7500												
10000<												

Recommended CT per ACB type

LSIS

Rated current	Frame / ACB Terminal	Busbar size	CT No.
200A	1600AF AN-D / AS-D / 15tX50X1EA	5tX50X1EA	KBM-06
400A			
630A		5tX50X2EA	
		10tX60X1EA	KBM-05
800A		6tX50X2EA	
		10tX60X1EA	
1000A		8tX50X2EA	
1250A		6tX75X2EA	KBM-12
		8tX60X2EA	KBM-05
		10tX50X2EA	
1600A		6tX75X3EA	KBM-12
		10tX60X2EA	KBM-05
		8tX60X3EA	KBM-05
2000A	2000AF AS-D / 15tX75X1EA	8tX75X3EA	KBM-12
		10tX100X2EA	
1600A	3200AF AS-E / 20tX75X1EA		KBM-12
		6tX75X3EA	
		10tX60X2EA	
		8tX60X3EA	
2000A		8tX75X3EA	
		10tX100X2EA	
2500A		10tX75X3EA	
		8tX75X4EA	②KBM-13
3200A		10tX100X3EA	①KBM-13
		10tX75X4EA	②KBM-13
4000A	4000AF AS-E / 10tX100X3EA	10tX100X4EA	KBM-13
		10tX75X5EA	
4000A	5000AF AS-F / 20tX125X2EA	10tX100X4EA	KBM-13
5000A		10tX125X4EA	
4000A	6300AF AS-G / 20tX125X2EA 20tX150X2EA	10tX100X4EA	KBM-16
5000A		10tX125X4EA	
6300A		10tX150X4EA	

① Busbar bending is recommended for 3P4W
② Busbar bending is recommended

HHI

Rated current	Frame / ACB Terminal	Busbar size	CT No.
200A	A Frame HGS/HGN 06-16 / 15tX50X1EA	5tX50X1EA	KBM-06
400A			
630A		5tX50X2EA	
		10tX60X1EA	KBM-05
800A		6tX50X2EA	
		10tX60X1EA	
1000A		8tX50X2EA	
1250A		6tX75X2EA	KBM-12
		8tX60X2EA	KBM-05
		10tX50X2EA	
1600A		6tX75X3EA	KBM-12
		10tX60X2EA	KBM-05
		8tX60X3EA	
2000A	A Frame HGN20 / 15tX75X1EA	8tX75X3EA	KBM-12
		10tX100X2EA	
630A	B Frame HGS/HGN 06-25 / 20tX75X1EA	5tX50X2EA	KBM-05
		10tX60X1EA	
800A		6tX50X2EA	
		10tX60X1EA	
1000A		8tX50X2EA	
1250A		6tX75X2EA	KBM-12
		8tX60X2EA	
		10tX50X2EA	
1600A		6tX75X3EA	
		10tX60X2EA	
		8tX60X3EA	
2000A		8tX75X3EA	
		10tX100X2EA	
2500A		10tX75X3EA	
		8tX75X4EA	②KBM-13
3200A	B Frame HGN32 / 20tX90X1EA	10tX100X3EA	①KBM-13
		10tX75X4EA	②KBM-13
4000A	B Frame HGN40 / 15tX100X2EA	10tX100X4EA	①KBM-13
		10tX125X3EA	②KBM-13
4000A	B Frame HGN40 / 15tX125X2EA	10tX100X4EA	KBM-13
		10tX125X3EA	
3200A	C Frame HGN32-50 / 20tX125X2EA	10tX100X3EA	KBM-13
4000A		10tX100X4EA	
5000A		10tX125X4EA	
4000A	D Frame HGN40-63 / 20tX125X2EA	10tX100X4EA	KBM-16
5000A		10tX125X4EA	
6300A		10tX150X4EA	

3Phase Busbar Type Current Transformer (for ACB)



Certificates

Model No

KBF -7 ① ② ③ ④

① ACB-Type	② Circuit	③ Terminal	④ Use
	2 3P2W(2CT)	**0** Current transformer	**N/A** For Meter(MCT)
	3 3P4W(3CT)	**1** Voltage terminal + CT+ energizing LED	**R** OCR Type
		2 Temperature sensor + CT	
		3 Temperature sensor + Voltage terminal+ CT	
		4 Voltage terminal + CT	

Feature

- Optimized design for circuit breaker (1600AF) size
- Suitable products for digital meter
- Optimized design for 400/5A ~ 2000/5A
- Minimizing installation space, and removing busbar bending
- Install CT with a distance, or add the partition wall to prevent deformation from busbar heat
- Torque limit for bus bar fixing bolt : M4 - 5~7 kgf · cm, M5 - 7~10kgf · cm
- Be aware of the energizing with busbar fixing bolt(M4/M5)

Specification

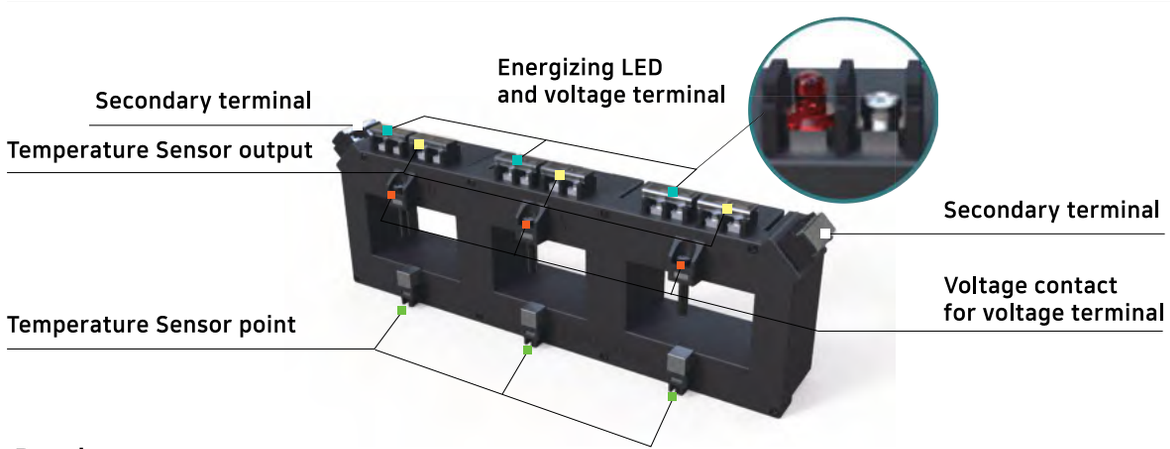
Secondary current	5A or 1A
Over current strength	40 Times
Maximum voltage	1.2kV
Withstand voltage	4.0kV/1min
Frequency	50Hz (60Hz order made)

Selection table

	For meter(MCT)		For OCR(PCT)	
Model	KBF-72 (2 core)	KBF-73 (3 core)	KBF-72R (2 core)	KBF-73R (3 core)
Pri(A)	*Burden / Class		* Burden /Over current factor	
200~300	5VA / 1.0	5VA / 1.0		
400			2.5VA/5P10	2.5VA/5P10
500~800	15VA / 1.0	15VA / 1.0		
1000	40VA / 1.0	40VA / 1.0	5VA/5P10	5VA/5P10
1200				
1500~1600				
2000				

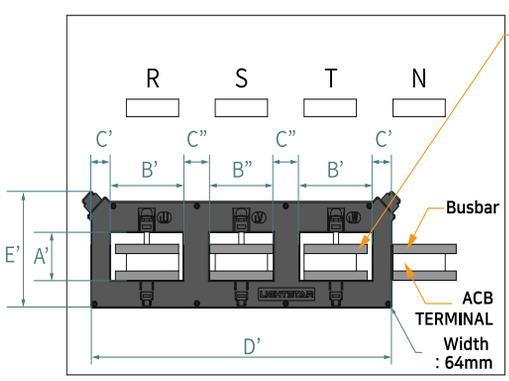
- Primary current other than this table can be produced by order
- Weight : 1700g
- Customized product can be produced by order

Description



Drawing

Dimensions (Unit: mm)	
KBF-7□	
A'	41
B'	69
B''	61
C'	19
C''	25.5
D'	288
E'	105



- 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.
- O-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.

Split-Type Current Transformer

Certificates



KBC-03S (Cable) | KBC-06S (Cable) | KBC-05 (Busbar) | KBC-12 (Busbar)

Model No

KBC-①②

① Size	② Mounting bracket		③ Use	
03/06/05/12	**N/A**	None	**N/A**	For Meter(MCT)
	S	Mounting bracket included(Option)	**S**	For OCR(PCT)

Panel securing support is optional

Feature

- Minimizing working time by split core. Made in 2 type for cable 2 type for busbar
- Optimized design for ACB terminal (KBC-05, 12 except special designed 1600-3200AF)
- Suitable products for digital meter (KBC-03R, 05R)

Install CT with a distance, or add the partition wall to prevent deformation from busbar heat

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

Be aware of the energizing with busbar fixing bolt(M4/M5)

Refer to page 35 for accuracy improvement

Specification

Secondary current	Over current strength	Maximum voltage	Withstand voltage	Frequency
5A or 1A	40 Times	1.2kV	4.0kV/1min	50Hz (60Hz order made)

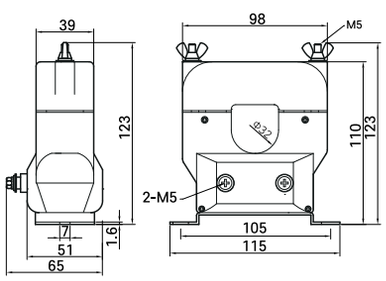
Customized product can be produced by order

Selection table

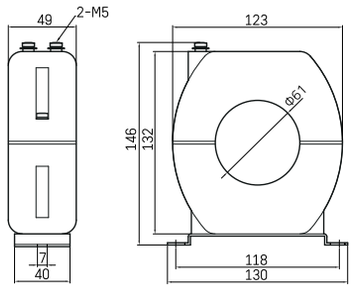
<table>
<tr><th rowspan="2">Model</th><th colspan="4">For Meter(MCT)</th><th colspan="4">For OCR(PCT)</th></tr>
<tr><th>KBC-03</th><th>KBC-06</th><th>KBC-05</th><th>KBC-12</th><th>KBC-03R</th><th>KBC-06R</th><th>KBC-05R</th><th>KBC-12R</th></tr>
<tr><td>Pri(A)</td><td colspan="4">*Burden / Class</td><td colspan="4">* Burden / Over current factor</td></tr>
<tr><td>100</td><td rowspan="2">2.5VA / 1.0</td><td rowspan="6"></td><td rowspan="2"></td><td rowspan="6"></td><td rowspan="2"></td><td rowspan="6"></td><td rowspan="3"></td><td rowspan="6"></td></tr>
<tr><td>120</td></tr>
<tr><td>150</td><td>5VA / 3.0</td><td>5VA / 3.0</td></tr>
<tr><td>200</td><td rowspan="3">5VA / 1.0</td><td rowspan="3">5VA / 1.0</td><td rowspan="2">2.5VA / 5P10</td></tr>
<tr><td>250</td><td rowspan="2">2.5VA / 5P10</td></tr>
<tr><td>300</td></tr>
<tr><td>400</td><td rowspan="3">15VA / 1.0</td><td rowspan="3">5VA / 1.0</td><td rowspan="3">15VA / 1.0</td><td>5VA / 1.0</td><td rowspan="3">5VA / 5P10</td><td rowspan="4">5VA / 5P10</td><td rowspan="2">2.5VA / 5P10</td></tr>
<tr><td>500</td><td rowspan="3">15VA / 1.0</td><td rowspan="2">5VA / 5P10</td></tr>
<tr><td>600</td><td rowspan="8">5VA / 5P10</td></tr>
<tr><td>750</td><td rowspan="8">15VA / 1.0</td><td rowspan="8"></td><td rowspan="8"></td></tr>
<tr><td>800</td></tr>
<tr><td>1000</td></tr>
<tr><td>1200</td><td rowspan="4">15VA / 1.0</td><td rowspan="4">15VA / 5P10</td></tr>
<tr><td>1500</td></tr>
<tr><td>2000</td><td rowspan="2">15VA / 5P10</td></tr>
<tr><td>2500</td></tr>
</table>

Drawing

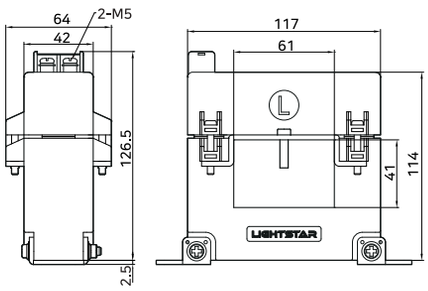
Unit:mm



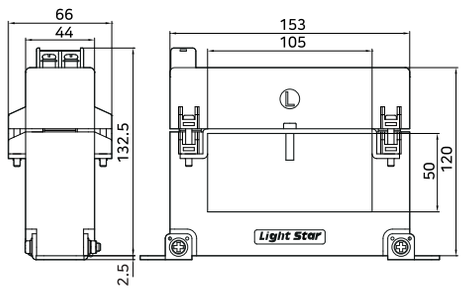
KBC-03S(Cable) - Weight 1100g



KBC-06S(Cable) -Weight 1800g



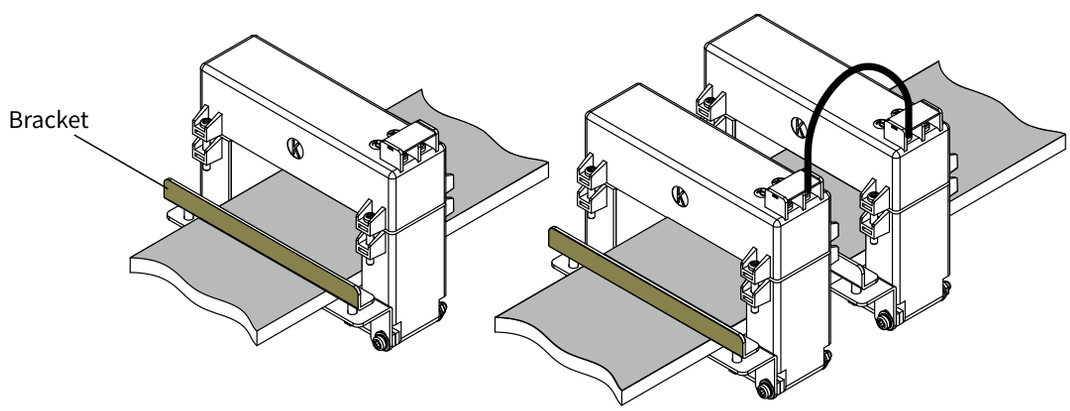
KBC-05(Busbar) - Weight 1480g



KBC-12(Busbar) - Weight 1630g

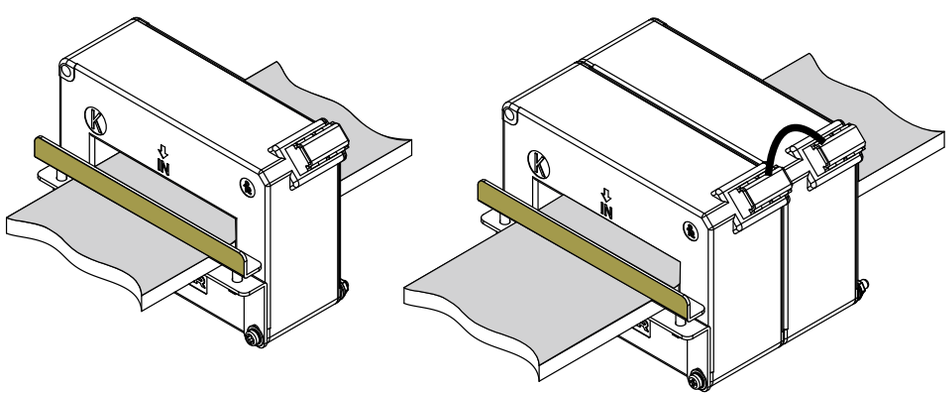
Bracket installation drawing (Allowable strength of bracket bolt 5M, over 50kg)

Sold separately



KBM-05/06/12/13/16/21/08/10/14/18 Bracket installation drawing

Sold separately



Current Transformer For Metering Service



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

Model No

KBK- 08

Feature

- Easy cable installation with single bolt
- Minimize cable install space and easy connection with busbar
- Refer to page 35 for accuracy improvement
- Decrease electrical loss by using sectional spacious rod.

Specification

Secondary current	Over current strength	Maximum voltage	Withstand voltage	Frequency
5A or 1A	40 Times	1.2kV	4.0kV/1min	50Hz (60Hz order made)

Customized product can be produced by order

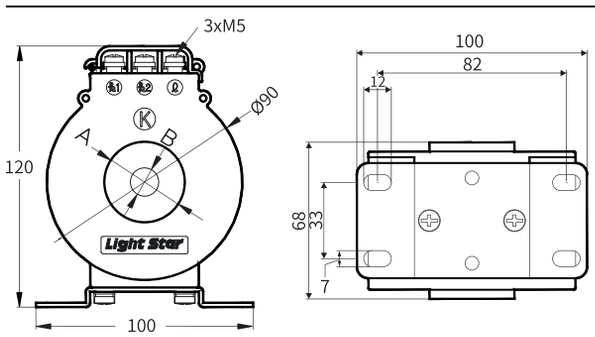
Selection table

Dual ratio			Single ratio					
Pri(A)	* Burden / Class	* Burden / Over current factor	Pri(A)	* Burden / Class	* Burden / Over current factor	Pri(A)	* Burden / Class	* Burden / Over current factor
75/150	15VA / 0.5	N/A	100	5VA/0.5	N/A	400	15VA/0.5	N/A
150/300			120			500		
200/400			150	15VA/0.5		750		
250/500			200			1000		
500/1000			250			3000		

Customized product can be produced by order

Drawing

Unit:mm



Dual ratio	Single ratio	A	B	Contact section	Conductive section
75/150 ~ 250/500	100/5A ~ 500/5A	Φ20	Φ13	180㎟	280㎟
500/1000	750 ~1000/5A	Φ37	Φ13	940㎟	1120㎟

Primary terminal bolt torque : M8 - 117~153kgf · cm,
M12 - 402~524kgf · cm

Secondary terminal bolt torque : M5 - 28.4~37.2 kgf · cm

Weight : 2.5kg

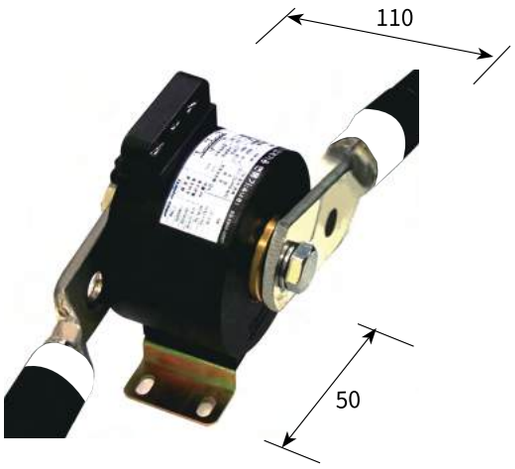
Dimension

Unit:mm

Connection terminals (Option)

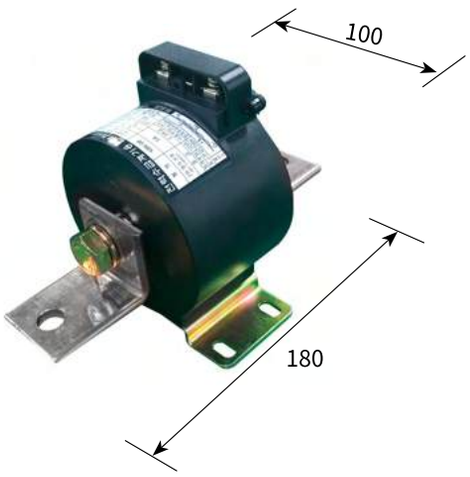
Type 1

H:120



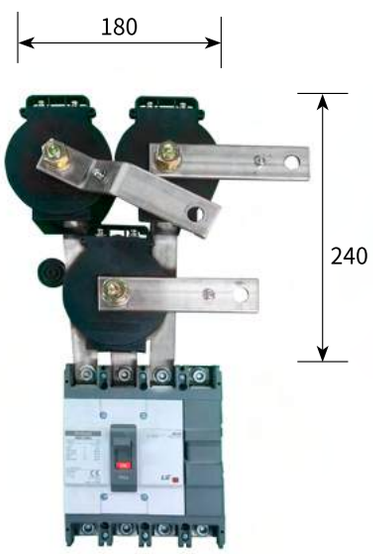
Type 2

H:120



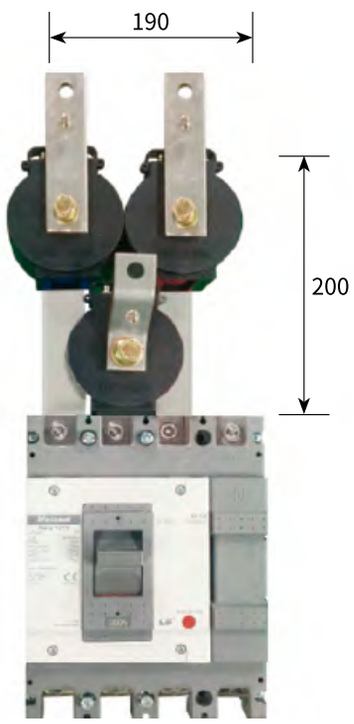
250AF

H:120



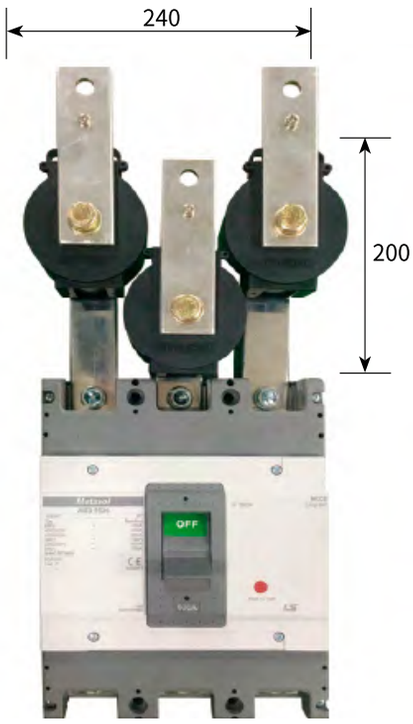
400AF

H:120



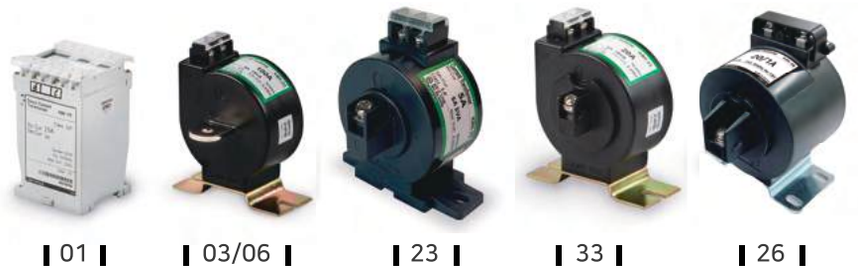
600~1200AF

H:120



Direct Connect Typ
Current Transforme

Certificates



01 | 03/06 | 23 | 33 | 26

Model No

KBK-[ ]
①

① Size **01/03/06/23/33/26**

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%

Specification

Secondary current	Over current strength	Maximum voltage	Withstand voltage	Frequency
5A or 1A	40 Times	1.2kV	4.0kV/1min	50Hz (60Hz order made)

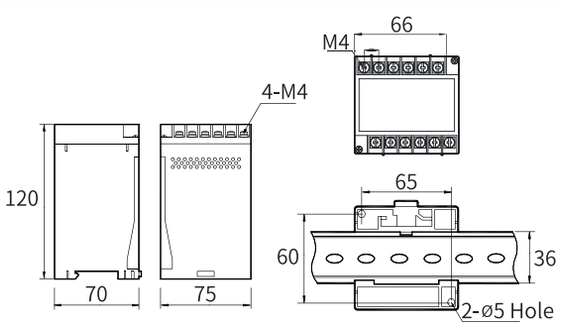
Customized product can be produced by order

Primary current

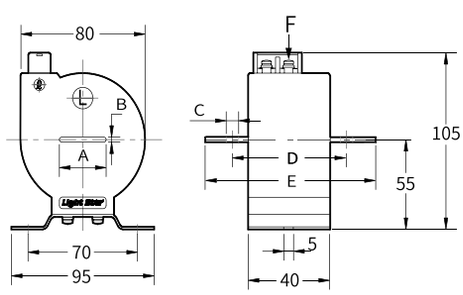
Model	KBK-01	KBK-23	KBK-33	KBK-03	KBK-06	KBK-26
Pri(AT)	* Burden / Class					
5~20	15VA/1.0	5VA/1.0	15VA/1.0	-	-	15VA/0.5
30~40	-					
50~150		-		15VA/1.0		
200~1000			-	-	15VA/1.0	-
Weight	1000g	300g	500g	700g	750g	1.8kg

Drawing

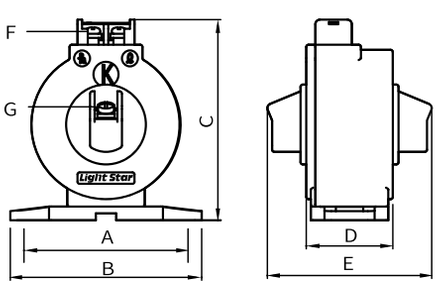
Unit:mm



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-26	82	100	120	60	108	2-M5	2-M5/M8
KBK-23	72	84	88	38	72.5	2-M4	2-M5
KBK-33	70	95	105	40	95	2-M5	2-M5/M8

Secondary terminal bolt torque
: M4 - 9.8~13.5 kgf · cm, M5 - 28.4~37.2kgf · cm
Primary terminal bolt torque
: M4 - 9.8~13.5 kgf · cm, M5 - 28.4~37.2kgf · cm
M8 - 117~153kgf · cm, M12 - 402~524kgf · cm

Single Phase Potential Transformer

Certificates



KBQ



KBR



KBS

Model No

KB ☐-☐☐☐
① ②③

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
	0 Order-made	

How to order) KBS-11 220/110V 15VA

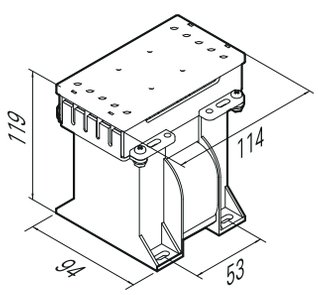
Specification

Type	KBQ-☐☐	KBR-☐2	KBR-☐3	KBS-☐1
Burden	50VA	50VA	100VA	15VA
Class	1.0	1.0	1.0	1.0
Weight	2.0kg	3.5kg	5.0kg	1.2kg
Insulations	Varnish impregnation (A)	Flame retardant case and polyester flame retardant resin filling (E Class)		
Rated voltage	Follow voltage classification			
Max voltage	1.2 Vn Continuous			
Frequency	50Hz (60Hz order made)			
Withstand voltage	3kV/1min			
Induced withstand voltage	120Hz、2Vn/1.0			
Rated fuse	0.5kV T2A 80kA			

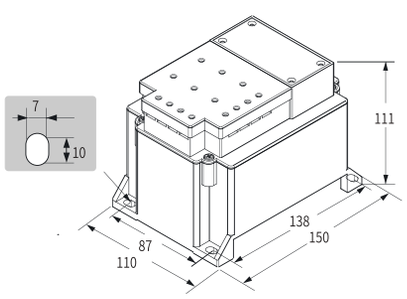
Customized product can be produced by order

Drawing

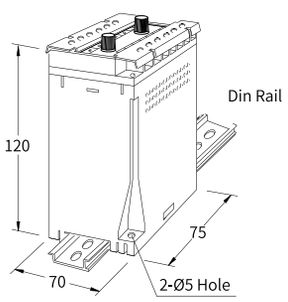
Unit:mm



KBQ



KBR



KBS

Single Phase Potential Transformer (Ship)



Certificates

Model No

KBT-①②

How to order)
KBT-11 220/110V 15VA

① Voltage			② Rated burden	
	Primary	Secondary	**1**	15VA
1	220V	110V	**2**	50VA
2	380V	110V	**3**	100VA
3	440V	110V	**0**	Order-made
4	460V	115V		
0	Order-made			

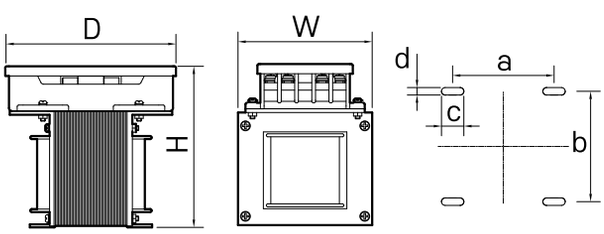
Specification

Burden	15VA	50VA	100VA	200VA
Class	1.0			
Rated voltage	Follow voltage classification			
Maximum voltage	1.2 Vn Continuous			
Frequency	50Hz (60Hz order made)			
Withstand voltage	3kV/1 min			
Induced withstand voltage	120Hz, 2Vn 1min			
Fuse	500V/2A			
Insulations	Varnish impregnation (A Class)			

Customized product can be produced by order

Drawing

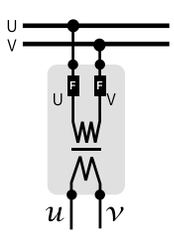
Unit:mm



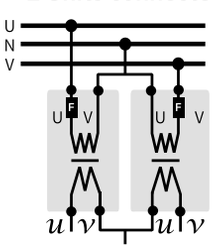
		Burden			
		15VA	50VA	100VA	200VA
Dimension (mm)	H	108	124	131	150
	W	90	111	120	137
	D	114	114	114	114
	a	68±1	68±1	93±1	88
	b	74±1	93±1	102±1	120
	c	15	10	18	18
	d	5	5	5	5
	Weight	2.5kg	3.5kg	5kg	7.8kg

Connection diagram

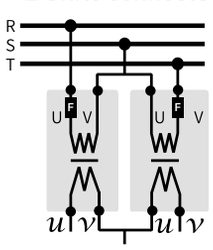
1P2W



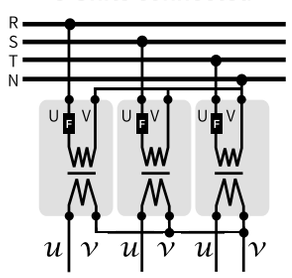
1P3W
2 Units connected



3P3W
2 Units connected



3P4W
3 Units connected



Information

Primary N phase of transformer(3P4W) shall be connected to neutral line. Otherwise, measuring value can not be correct.

3Phase Potential Transformer

Certificates



Model No

KBO-①②

How to order)
KBO-22
3P3W 380/110V
KBO-31 3P4W 380√3/190√3V

Note
3P4W 380√3/190√3V

① Circuit		② Voltage		
			Primary	Secondary
1	1P3W	**1**	220V	110V
2	3P3W	**1**	220V	110V
		2	380V	110V
		3	380V	220V
		4	440V	110V
		5	440V	220V
		0	Order-made	
3	3P4W	**1**	380/√3V	190/√3V
		0	Order-made	

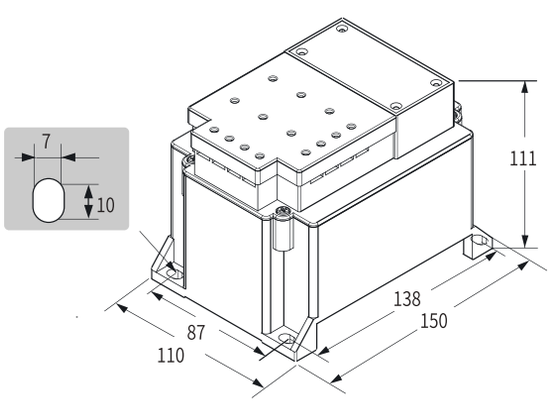
Specification

Burden	3P3W, 50VA(25VA X 2) 3P4W, 50VA(17VA X 3)	Withstand voltage	3kV/1 min
Class	1.0	Induced withstand voltage	120Hz, 2Vn 1min
		Fuse	500V/2A
		Insulations	Flame retardant case and polyester flame retardant resin filling (E Class)
Rated voltage	Follow voltage classification	Weight	5.0kg
Maximum voltage	1.2 Vn Continuous		
Frequency	50Hz (60Hz order made)		

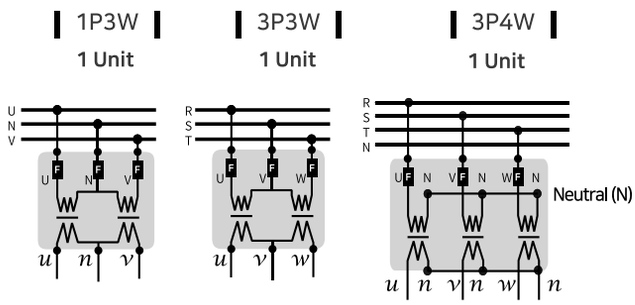
Customized product can be produced by order

Drawing

Unit:mm



Connection diagram



Information

In case, Primary N phase of transformer connected to neutral line, open phase may not be checked correctly.
In order to prevent transformer damage, we highly recommend not to connect groundings with PT.

Small 3 Phase Potential Transformer

Certificates



Model No

KBU-① ②

How to order)
KBU-22
3P3W 380/110V
KBU-31 3P4W 380√3/190√3V

Note
3P4W 380√3/190√3V

Customized product can be produced by order.

① Circuit		② Voltage		
			Primary	Secondary
1	1P3W	**1**	220V	110V
2	3P3W	**1**	220V	110V
		2	380V	110V
		3	380V	220V
		4	440V	110V
		5	440V	220V
		0	Order-made	
3	3P4W	**1**	380/√3V	190/√3V
		0	Order-made	

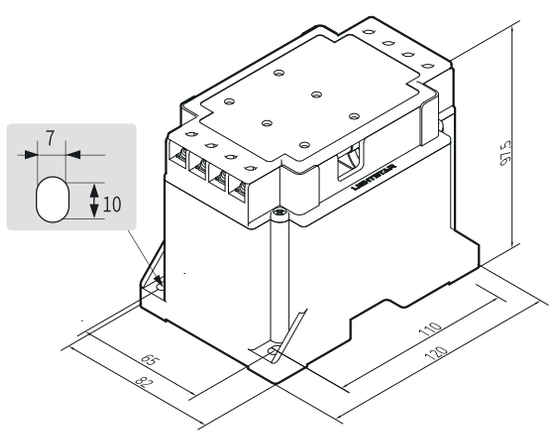
Specification

Burden	3P3W, 50VA(7.5VA X 2) 3P4W, 50VA(5VA X 3)	Withstand voltage	3kV/1 min
Class	1.0	Induced withstand voltage	120Hz, 2Vn 1min
		Fuse	500V/2A
		Insulations	Flame retardant case and polyester flame retardant resin filling (E Class)
Rated voltage	Follow voltage classification	Weight	5.0kg
Maximum voltage	1.2 Vn Continuous		
Frequency	50Hz (60Hz order made)		

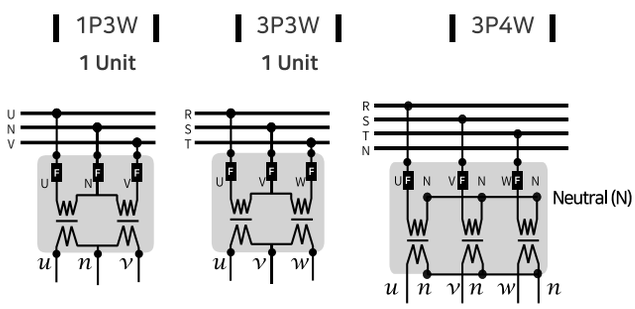
Customized product can be produced by order

Drawing

Unit:mm



Connection diagram



Information

In case, Primary N phase of transformer connected to neutral line, open phase may not be checked correctly.
In order to prevent transformer damage, we highly recommend not to connect groundings with PT.

Ground Potential Transformer

Certificates



Model No

KBG-□□□
① ② ③

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

How to order) 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 Vo meter, OVGR, earth leakage lamp, CLR, SGR and DGR.

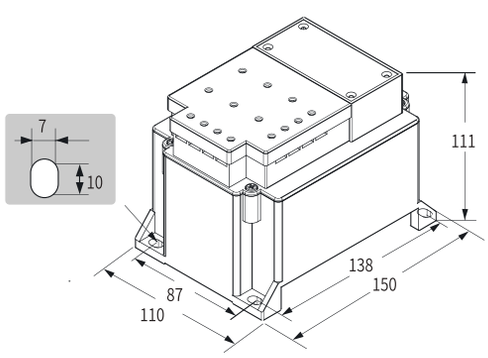
Specification

Burden	Secondary 50VA, Tertiary 100VA	Withstand voltage	3kV/1 min
Class	1.0	Induced withstand voltage	120Hz, 2Vn 1min
		Fuse	500V/2A
		Insulations	Flame retardant case and polyester flame retardant resin filling (E Class)
Rated voltage	Follow voltage classification	Weight	5.0kg
Maximum voltage	1.2 Vn Continuous		
Frequency	50Hz (60Hz order made)		

Customized product can be produced by order

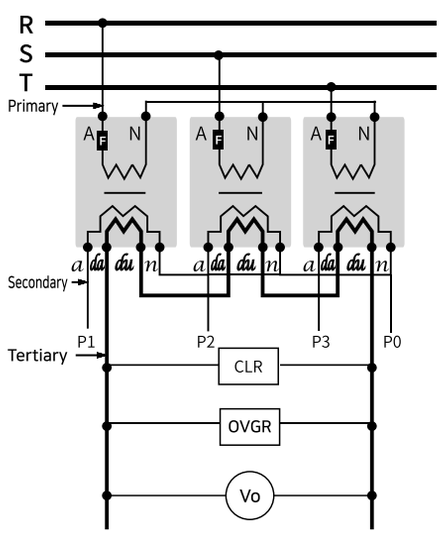
Drawing

Unit:mm



Connection diagram

3 units connected



Information

In case, Primary N phase of transformer connected to neutral line, open phase may not be checked correctly.

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

Current Limit Resister



Model No

KBL-①②

① GPT Primary voltage				② GPT Tertiary voltage	③ Capacity (W)
1	220/√3	**5**	480/√3	**1** 110/3	**1** 200W
2	380/√3	**6**	3300/√3	**2** 190/3	**2** 400W
3	440/√3	**7**	6600/√3		
4	460/√3	**0**	Order-made		

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 ungrounded 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) 200	0.22	220/√3	110/3	3.5	251	1) 200	0.44
380/√3		3.5	433	1) 200	0.44	380/√3		6.0	145	1) 200	0.76
440/√3		4.0	374	1) 200	0.51	440/√3		6.9	125	1) 200	0.88
460/√3		4.2	358	1) 200	0.53	460/√3		7.2	120	1) 200	0.92
480/√3		4.4	343	1) 200	0.55	480/√3		7.6	115	1) 200	0.96
3300/√3		30.1	50	2) 400	3.81	3300/√3		52.0	17	2) 400	6.58
6600/√3		60.2	25	2) 400	7.62	6600/√3		103.9	8	2) 400	13.16

Body material : Iron case Weight : 1300g 1) Continuous 2) Instantaneous: 1min

CLR resistance fomula

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

- E_1 : Primary voltage
- n : GPT Primary voltage ÷ Tertiary voltage
- Ig : 0.38

Ex) Primary 6600/√3, Tertiary 190/3190/3

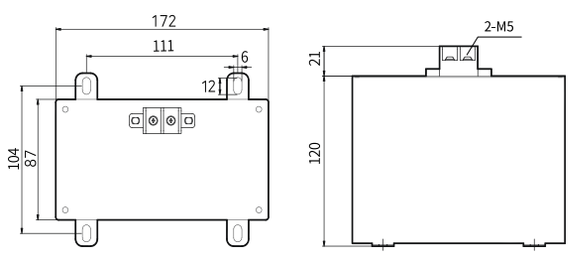
$$R = \frac{6600}{\sqrt{3}} \times \frac{9}{(60.2)^2 \times 0.38} \fallingdotseq 25[\Omega]$$

Ex) Primary 440/√3, Tertiary 190/3

$$R = \frac{440}{\sqrt{3}} \times \frac{9}{4^2 \times 0.38} \fallingdotseq 374[\Omega]$$

Drawing

Unit:mm



Connection diagram

Refer to page 57

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 can not be insulated

In case connecting DC instruments, accuracy is determined by the connection resistance

How to order) KBV-2 DC 1500V DC 1mA

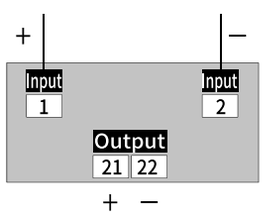
Specification

Class	1.0%	Insulation resistance	More than 10MΩ (Terminal and exterior box)
Operating temperature	-10~55℃	Withstand voltage	AC 2kV/1min(KDV-1), AC 5kV/1min(KDV-2,3)
Operating humidity	20~80%	Weight	160g(LTy)

Input/Output

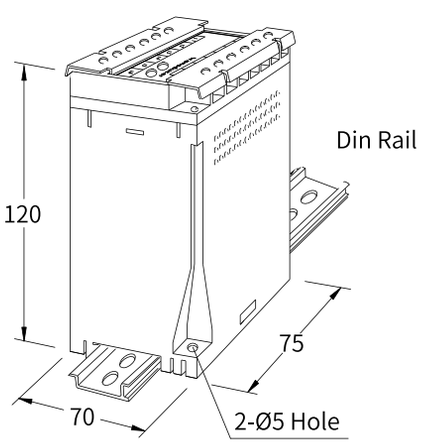
Input	Output	Accuracy
300V~1000V	DC 1mA	0.5% (Less than 5kΩ) 1.0% (Less than 10kΩ)
1000V~2000V		
2000V~3000V		

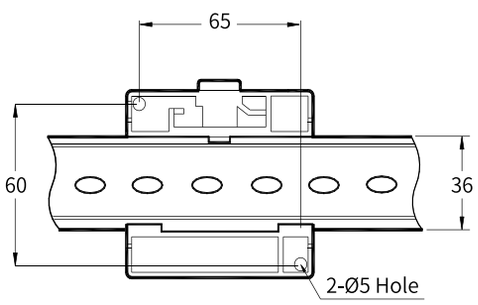
Connection diagram



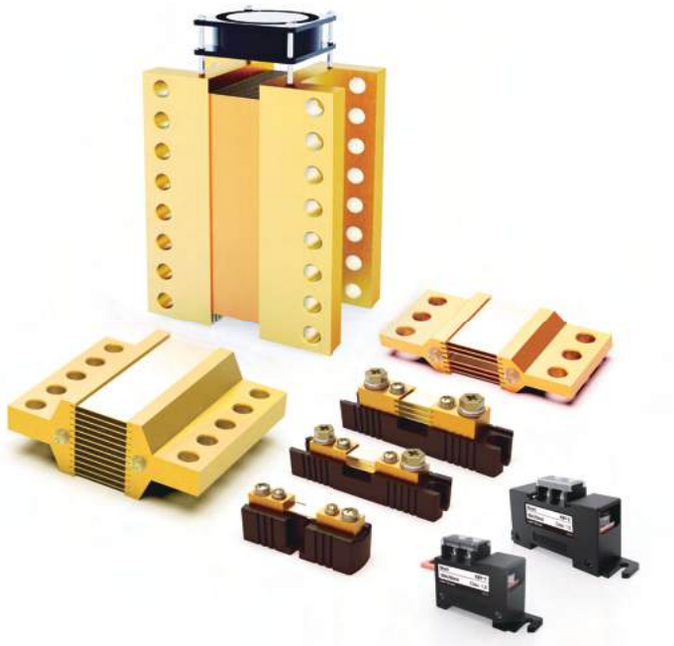
Drawing

Unit:mm





Shunt



Model No

KBY-□□□□
①②③

① Size		
1 1A~50A	2 60A~150A	3 200A~300A
4 400A~1500A	5 2000A~4000A	6 5000A~6000A
② Type (KBY-□A, B)		
A Breaker type	B Cable type	None
③ Voltage drop value		
50mV	60mV	

How to order) KBY-1A 50A 50mV(Cable type), KBY-2B 100A 50mV(Breaker type)

Specification

Type	Primary current	Weight(kg)	Rated voltage drop (Output)	Class	Insulation resistance	Withstand voltage
KBY-1□	1A ~ 50A	100g(Cable type)	50.0mV or 60.0mV	1.0 0.5	10MΩ	2kV/1 min
KBY-1A		60g(Breaker type)				
KBY-1B		80g(Cable type)				
KBY-2□	60A ~ 150A	180g(Cable type)				
KBY-2A		80g(Breaker type)				
KBY-2B		100g(Cable type)				
KBY-3	200A ~ 300A	0.20kg			N/A	N/A
KBY-4	400A ~ 600A	0.48kg				
	750A ~ 1000A	0.80kg				
	1200A ~ 1500A	1.20kg				
KBY-5	2000A	1.66kg				
	2500A	2.20kg				
	3000A	2.80kg				
	4000A	3.40kg				
KBY-6	5000A	7.50kg				
	6000A	9.00kg				
	7000A	10.5kg				
	8000A	12.0kg				
	9000A	13.5kg				
	10000A	15.0kg				

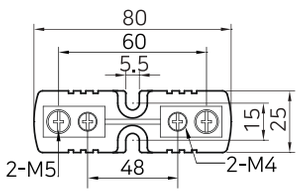
- KBY-□A(Cable type) - Safety cover applied for energized part. DIN Rail applicable.
- KBY-□B(Breaker type) - Safety cover applied for energized part. CB direct connect.
- KBY-6(5000A~10,000A) Fan operation requires AC 220V power. On/off at 75°C.
- Customized product can be produced by order

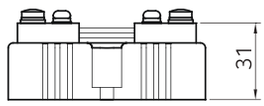
Drawing

Type	Dimension

KBY-1

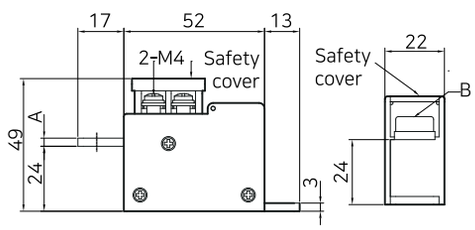


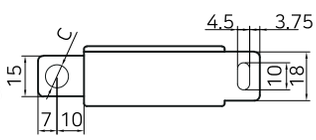




KBY-□A



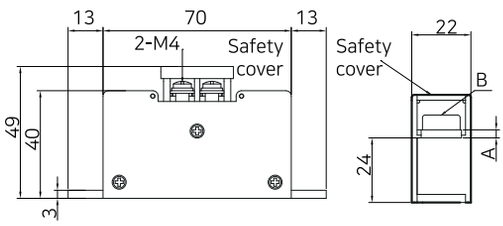


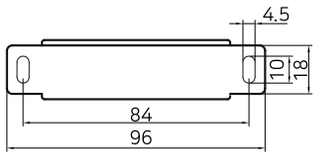


		A	B	C
KBY-1A	1~50A	1t	M6	Φ6.5
KBY-2A	60~150A	3t	M8	Φ8.5

KBY-□B



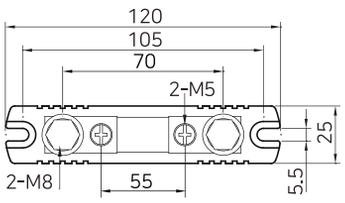


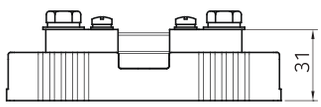


		A	B
KBY-1B	1~50A	1t	M6
KBY-2B	60~150A	3t	M8

KBY-2

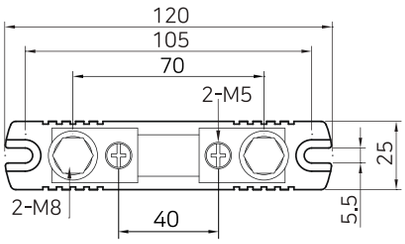


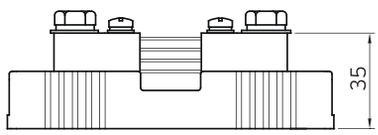




KBY-3

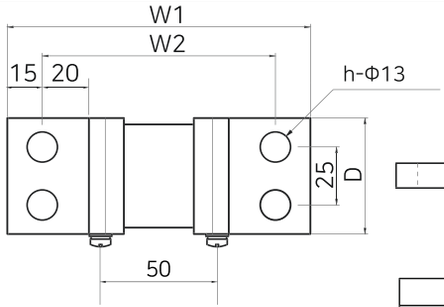


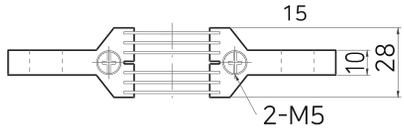




KBY-4







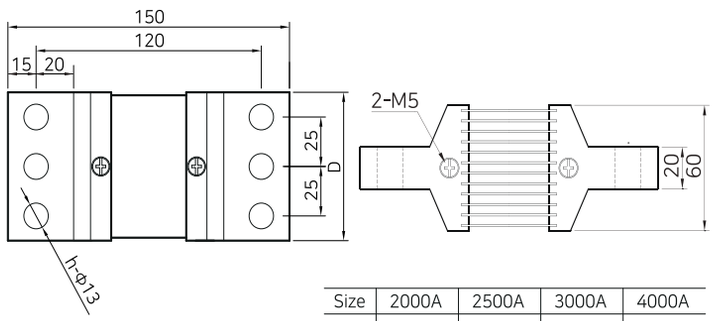
	400A~600A	750A~1000A	1200A~1500A
D	30	50	75
h	2-Φ13	4-Φ13	6-Φ13
W1	130±1.5		
W2	100±1.5		

Drawing

Type	Dimension

KBY-5





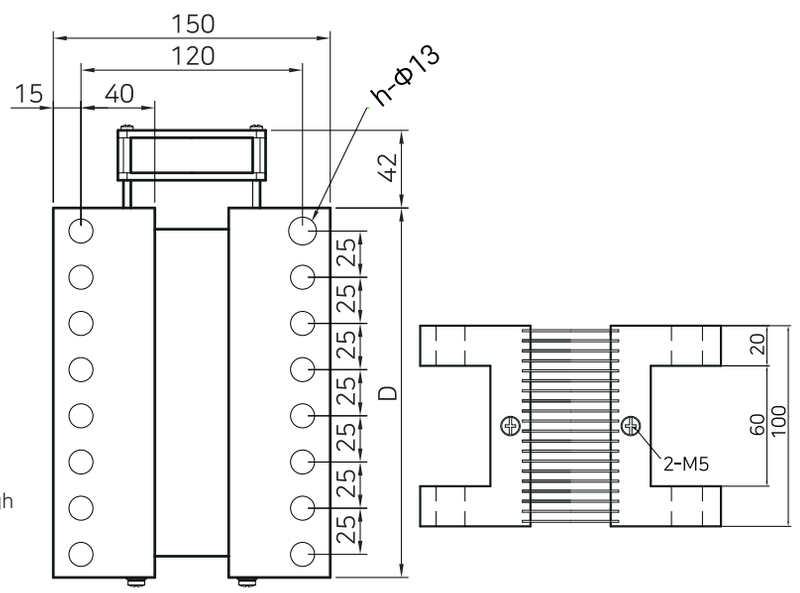
Size	2000A	2500A	3000A	4000A
D	75	100	100	125
h	6-Φ13	8-Φ13	8-Φ13	10-Φ13

Additional fan is recommended to circulate air on the vertical side of the blade.

KBY-6

Fan operated with 75℃ over

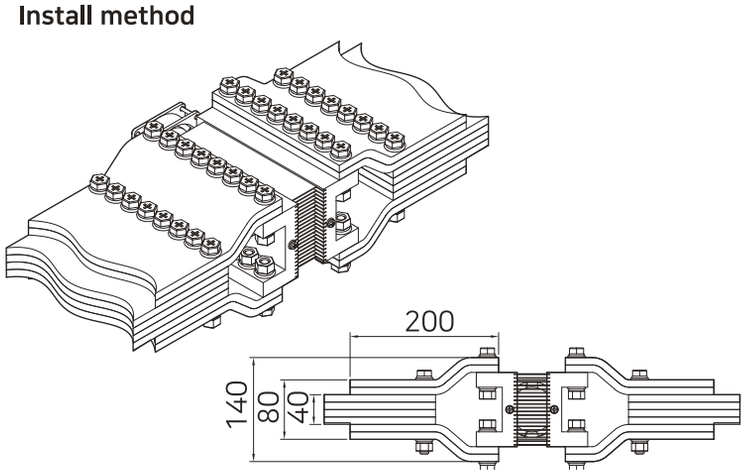




Integrated fan is mandatory as the excess heat can not be cooled enough without forced air circulation.

Size	5000A	6000A	7000A	8000A	9000A	10000A
D	100	125	150	175	200	200
h1	16-Ø13	20-Ø13	24-Ø13	28-Ø13	32-Ø13	32-Ø13

Install method



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 and usually 50mV or 60mV.
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 1000A / 50mV, it generates 50 W when 1000 A is energized and 12.5W when the current used is 500A.
In order to protect other equipment 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 ℃, 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 ±0.0001...% between 40 and 60℃

Operating time

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

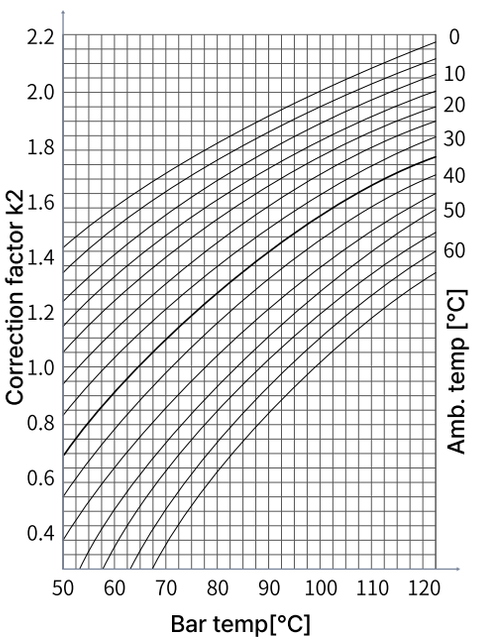
Rated current of bar E-Cu(DIN 43 671)

Continuous current for bus bar

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

Width x Thickness (mm)	Sectional area (mm)	Weight 1)	Material 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	E-Cu F30	379	447	380	448
30 X 10	299.0	2.660		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 / dm 3
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 ℃ maximum
2. The temperature of the bus bar and bus bar system shall not exceed 40℃ (Average 35 ℃ 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 IN65 = 573 A
When the air temperature is 20℃ and the bar temperature is 65 ℃, the correction factor is k2 = 1.29

$$I_{N85} = I_{N65} \times k_2$$
$$= 573A \times 1.29 = 740A$$

References: RITTAL Catalog



DIGITAL METER

CE certification

CE stands for "Conformité Européenne" 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 EMCD(Electro Magnetic Compatibility Directive).
LIGHTSTAR achieved CE certificate for Analog meter, Current Transformer, Digital meter, Power meter, and Transducers.

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.

LIGHTSTAR
㈜광성계측기

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77 Temperature Meter KDN-□□



78 3 Phase AC Current Meter KDA-3P



79 3 Phase AC Voltage Meter KDB-3P



80 Single Phase AC Watt · Wh Meter KDL-□□



81 DC Watt · Wh Meter KDM-□□



82 3 Phase AC Watt Meter KDG-□



83 3 Phase AC Watt · Wh Meter KDW-□



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Advanced Panel Power Meter KDQ-□



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12Ch Panel Power Meter KTG-PM12



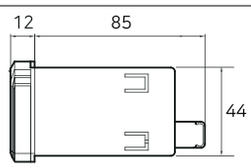
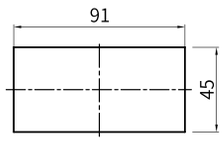
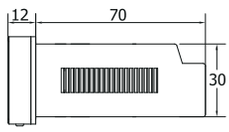
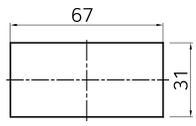
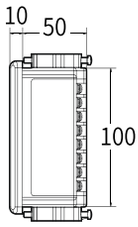
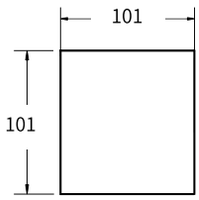
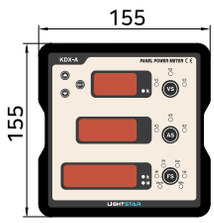
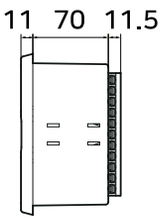
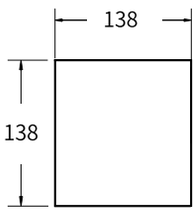
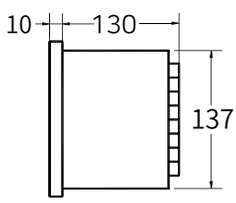
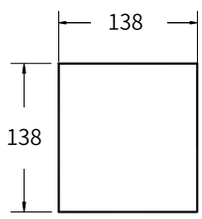
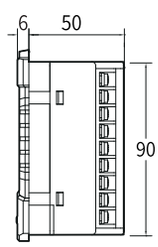
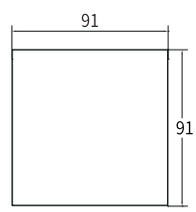
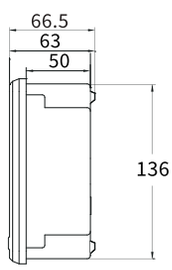
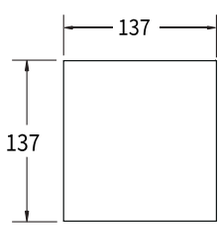
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Demand Controller KCD-□

Product dimensions

Drawing

Unit : mm

Type	Front	Side	Panel cut
A-1			
A-2			
A-3			
C			
D			
E			
F			

Term

RMS value

$$Vrms = \frac{V\ peak}{\sqrt{2}}$$

* Vrms : RMS value
* Vpeak : Peak value

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.

rdg(reading)

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

FS(Full scale)

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

Average value

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

$$Vav = \frac{2V\ peak}{\pi}$$

* Vav : RMS value
* Vpeak : Peak value

± 2 digit

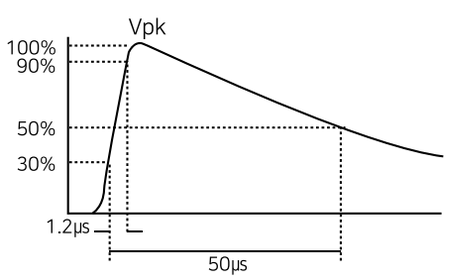
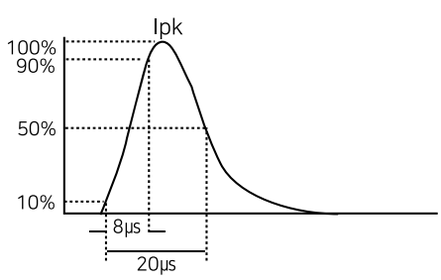
The lowest digit of measured value have tolerances up to ±2

Accuracy

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

Surge impulse test

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

Voltage waveform	Current waveform
	
• Increase : 30%~90%, of Vpk 1.2μs • Decrease : By 50% of Vpk 50μs	• Increase : 10%~90%, of Ipk 8μs • Decrease : By 50% of Ipk 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.

AC Current Meter

Certificates CE



Model No

KDP - A[①][②]

AC Current meter(AC A)

① Type	
S	72x36
N/A	98x50
② Communication(Option)	
C	RS-485
N/A	None

Customized product can be produced by order.

CT Ratio can be set manually.

Specification

Aux. power	KDP-A	Standard	AC 90 ~ 260V(50/60Hz) DC110V
		Option	DC 24V Only
	KDP-AS	Standard	AC 220V(50/60Hz)
		Option	AC 110V(50/60Hz)
Operating temperature	-10~50℃		
Operating humidity	20~85%		
Storage temperature	-20~60℃		
Insulation resistance	More than 10㏁		
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)		
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min		
Withstand voltage	AC 2kV/1min		
Surge immunity	4kV/2kV		
Electrostatic discharge	8kV/6kV		
Maximum allowed input	110% of input range		
Text height(LED)	7Segment LED Display(0.8inch, Red)		
Max display value	9999		
Measuring interval	1Time / sec		
Weight	KDP-A	180g	
	KDP-AS	165g	
Communication	Protocol : Modbus RTU Interface : RS-485 2wire Baudrate : 9600bps, 19200bps		

Input

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

Setting

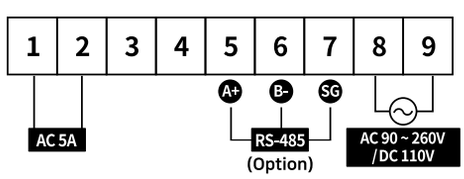
- Ad-t(A/D Type) : rMS(RMS value) , AvG(Average value)
- Ct(C.T) : CT primary current
- Fr-Eq(Frequency) : 50/60Hz
- Id(Communication address)
- bAud (Communication speed) : 9600/19200bps

Display range

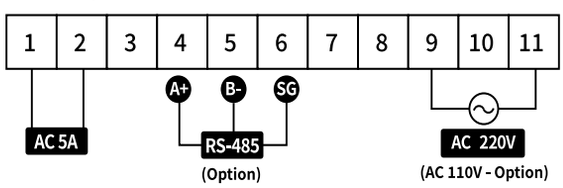
No	Setting	Display
1	5/5	5.000
2~8	10/5~50/5	50.00
9~32	60/5~500/5	500.0
33~57	600/5~6000/5	5000

Terminal connection

KDP-A



KDP-AS



Drawing

Refer to page 68 type A-1, A-2

AC Voltage Meter

Certificates CE



Model No

KDP - B□□□ AC Voltage Meter(AC V)

① ②

① Type	
1S	72x36(DC)
2S	72x36(PT)
N/A	98x50
② Communication(Option)	
C	RS-485
N/A	None

PT ratio can be set manually.

Specification

Aux. power	KDP-B	Standard	AC 90 ~ 260V(50/60Hz) DC110V
		Option	DC 24V Only
	KDP-B□S	Standard	AC 220V(50/60Hz)
		Option	AC 110V(50/60Hz)
Operating temperature	-10~50℃		
Operating humidity	20~85%		
Storage temperature	-20~60℃		
Insulation resistance	More than 10MΩ		
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)		
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min		
Withstand voltage	AC 2kV/1min		
Surge immunity	4kV/2kV		
Electrostatic discharge	8kV/6kV		
Maximum allowed input	110% of input range		
Text height(LED)	7Segment LED Display(0.8inch, Red)		
Max display value	9999		
Measuring interval	1Time / sec		
Weight	KDP-B	180g	
	KDP-B□S	165g	
Communication	Protocol : Modbus RTU Interface : RS-485 2wire Baudrate : 9600bps, 19200bps		

Input

Range	30~500V(Rating :100 or 190V)
Accuracy	±(0.3% of rdg + 0.1% of F.S)

Setting

- Ad-t (A/D Type) : rms (RMS value) Avg (Average value)
- In : Input value(500/190/110V)
- Pt (P.T) : PT primary voltage
- Fr-Eq (Frequency) : 50/60Hz
- Id (Communication address)
- bAud (Communication speed) : 9600/19200bps

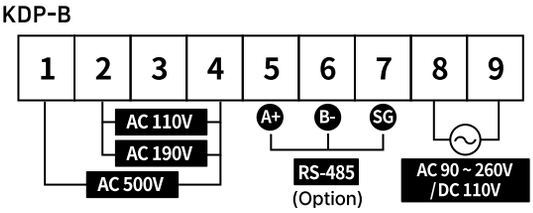
Display range

No	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	
7	6600	6.60	kV
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	

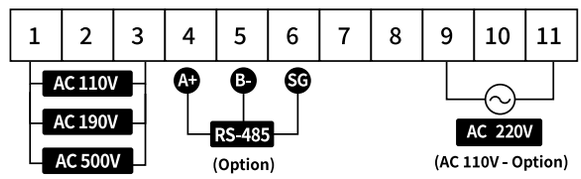
PT ratio can be set manually for order made.

Terminal connection

KDP-B



KDP-B□S



Drawing

Refer to page 68 type A-1, A-2

DC Current Meter

Certificates CE



Model No

KDP - C ① ② DC Current Meter (DC A)

① Type	
S	72x36
N/A	98x50
② Communication(Option)	
C	RS-485
N/A	None

Customized product can be produced by order.
Shunt ratio can be set manually.

Setting

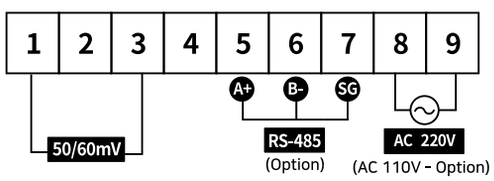
- rAtE (Rate) : CT Ratio
- In : Input value(50/60mV)
- Id (Communication address)
- bAud (Communication speed) : 9600/19200bps

Specification

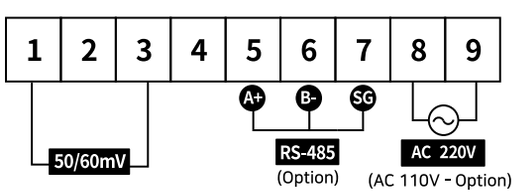
Aux. power	KDP-C	Standard	AC 90~260V(50/60Hz) DC110V
		Option	DC 24V Only
	KDP-CS	Standard	AC 220V(50/60Hz)
		Option	AC 110V(50/60Hz)
Operating temperature	-10~50℃		
Operating humidity	20~85%		
Storage temperature	-20~60℃		
Insulation resistance	More than 10MΩ		
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)		
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min		
Withstand voltage	AC 2kV/1min		
Surge immunity	4kV/2kV		
Electrostatic discharge	8kV/6kV		
Maximum allowed input	110% of input range		
Text height(LED)	7Segment LED Display(0.8inch, Red)		
Max display value	9999		
Measuring interval	1Time / sec		
Weight	KDP-C	180g	
	KDP-CS	165g	
Communication	Protocol : Modbus RTU Interface : RS-485 2wire Baudrate : 9600bps, 19200bps		

Terminal connection

KDP-C



KDP-CS



Input

Range	±60mV(Rating : 50 or 60mV)
Accuracy	±(0.3% of rdg + 0.2% of F.S)

Drawing

Refer to page 68 type A-1, A-2

DC Voltage Meter

Certificates CE



Model No

KDP - D□□

① ② DC Voltage Meter(DC V)

① Type	
1S	72x36(500V)
2S	72x36(50V or 5V)
N/A	98x50(500/50/5V)
② Communication(Option)	
C	RS-485
N/A	None

- Customized product can be produced by order.
- The voltage divider primary can be set manually.
- Use voltage divider over 500V

Specification

Aux. power	KDP-D	Standard	AC 90 ~ 260V(50/60Hz) DC110V
		Option	DC 24V Only
	KDP-DS	Standard	AC 220V(50/60Hz)
		Option	AC 110V(50/60Hz)
Operating temperature	-10~50℃		
Operating humidity	20~85%		
Storage temperature	-20~60℃		
Insulation resistance	More than 10MΩ		
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)		
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min		
Withstand voltage	AC 2kV/1min		
Surge immunity	4kV/2kV		
Electrostatic discharge	8kV/6kV		
Maximum allowed input	110% of input range		
Text height(LED)	7Segment LED Display(0.8inch, Red)		
Max display value	9999		
Measuring interval	1Time / sec		
Weight	KDP-D	180g	
	KDP-DS	165g	
Communication	Protocol : Modbus RTU Interface : RS-485 2wire Baudrate : 9600bps, 19200bps		

Input

Range	±500V/±50V/±5V
Accuracy	±(0.3% of rdg + 0.1% of F.S)

Setting

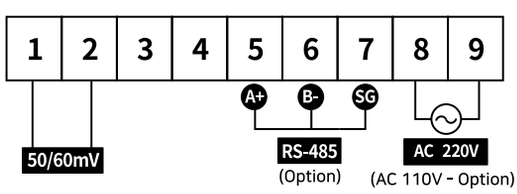
- In (Input) : Input value(5/50/500V)
- Id (Communication address)
- bAud (Communication speed) : 9600/19200bps

Display range

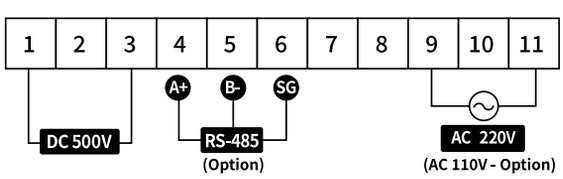
No	Setting	Display
1	500	500.0
2	50	50.00
3	5	5.000

Terminal connection

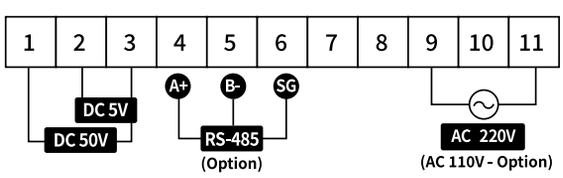
KDP-D



KDP-D1S



KDP-D2S



Drawing

Refer to page 68 type A-1, A-2

Customized Indicating Meter

Certificates CE



Model No

KDE - ① ② ③ ④

① Type	② Input	③ Unit			④ Communication(Option)	
A AC Current	1 0~50mV	0	Order made		C	RS-485
B AC Voltage	2 ±50mV	1	kW	Power	N/A	None
C DC Current	3 0~10V	2	℃	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/㎠	Pressure		
	0 Order made	8	%	Percentage (Power factor)		
		9	m/sec	Speed		
		10	g	Weight		
		11	rpm			

How to order)
KDE-D311 DC Voltage / DC 0~10V
KDE-C58 DC Current /DC 4~20mA

Customized product can be produced by order.

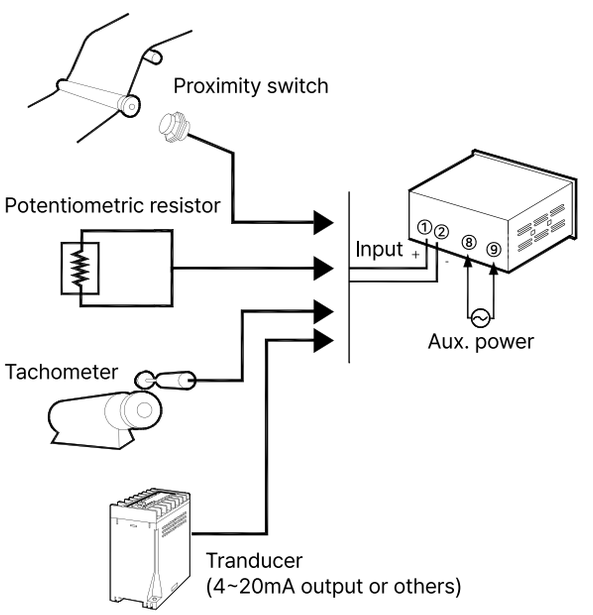
Specification

Aux. power	Standard	AC 90 ~ 260V(50/60Hz) ,DC110V
	Option	DC 24V Only
Operating temperature	-10~50℃	
Operating humidity	20~85%	
Storage temperature	-20~60℃	
Insulation resistance	More than 10MΩ	
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)	
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min	
Withstand voltage	AC 2kV/1min	
Surge immunity	4kV/2kV	
Electrostatic discharge	8kV/6kV	
Maximum allowed input	110% of input range	
Text height(LED)	7Segment LED Display(0.8inch, Red)	
Max display value	9999	
Measuring interval	1Time / sec	
Weight	180g	
Communication	Protocol : Modbus RTU Interface : RS-485 2wire Baudrate : 9600bps, 19200bps	

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)

Connection diagram



Drawing

Refer to page 68 type A-1

Frequency Meter

Certificates CE



Model No

KDF - ① ②

① Input	
AC 50~260V	99.99
AC 10V	99.99
AC 10V	999.9

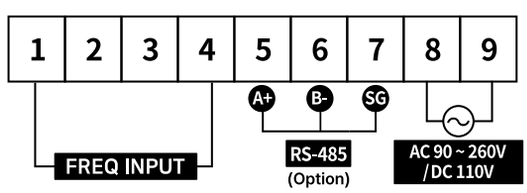
② Communication(Option)	
C RS-485	**N/A** None

How to order)KDF 99.99 / AC 50~260V
Standard : AC 50~260V / 99.99Hz
Customized product can be produced by order.

Specification

Aux. power	AC 90 ~ 260V(50/60Hz) , DC110V
Operating temperature	-10~50℃
Operating humidity	20~85%
Storage temperature	-20~60℃
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min
Withstand voltage	AC 2kV/1min
Surge immunity	4kV/2kV
Electrostatic discharge	8kV/6kV
Maximum allowed input	110% of input range
Text height(LED)	7Segment LED Display(0.8inch, Red)
Max display value	9999
Measuring interval	1Time / sec
Weight	180g
Communication	Protocol : Modbus RTU Interface : RS-485 2wire Baudrate : 9600bps, 19200bps

Terminal connection



Input

Range	30.00 ~ 999.9Hz
Accuracy	± 0.01Hz

Drawing

Refer to page 68 type A-1

Power Factor Meter



Model No

KDH - ① ② ③

① Circuit	② Voltage/Current	③ Communication(Option)
1 1P2W	**1** 110V/5A	**C** RS-485
2 1P3W	**2** 220V/5A	**N/A** None
3 3P3W	**3** 380√3 / 190√3V / 5A	
4 3P4W	**4** 22900/√3 / 190√3V / 5A	
	5 380√3V/ 5A	

How to order)KDH-43 3P4W, 380√3/190√3V/5A Customized product can be produced by order.

Specification

Aux. power	Standard	AC 90 ~ 260V(50/60Hz) ,DC110V
	Option	DC 24V Only
Operating temperature	-10~50℃	
Operating humidity	20~85%	
Storage temperature	-20~60℃	
Insulation resistance	More than 10MΩ	
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)	
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min	
Withstand voltage	AC 2kV/1min	
Surge immunity	4kV/2kV	
Electrostatic discharge	8kV/6kV	
Maximum allowed input	110% of input range	
Text height(LED)	7Segment LED Display(0.8inch, Red)	
Max display value	100.0	
Measuring interval	1Time / sec	
Weight	180g	
Communication	Protocol : Modbus RTU Interface : RS-485 2wire Baudrate : 9600bps, 19200bps	

Input

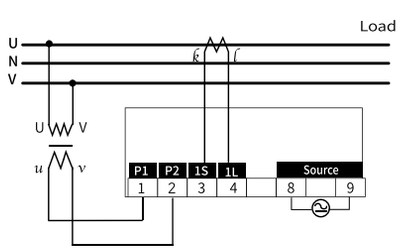
Range	Voltage	30~300V(Rating : 110 or 190V)
	Current	0.05~6A(Rating : 5A)
Accuracy		±(1.0% of rdg+1.0°)

Drawing

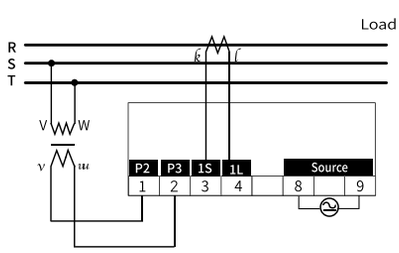
Refer to page 68 type A-1

Connection diagram

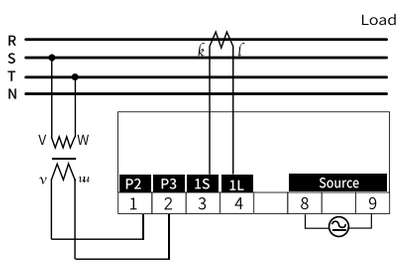
1P3W



3P3W



3P4W



Temperature Meter



Model No

KDN - ① ②

① Type		② Communication(Option)	
1P	1 Channel	**C**	RS-485
3P	3 Channel	**N/A**	None
0	Order-made		

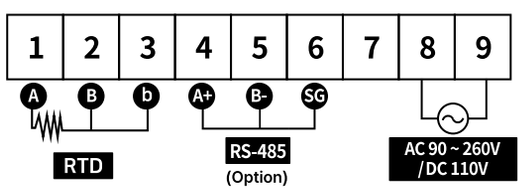
Setting: H.SET, L.SET, dt-s,Buzz, id, baud(KDN-3p Only)
Customized product can be produced by order.

Specification

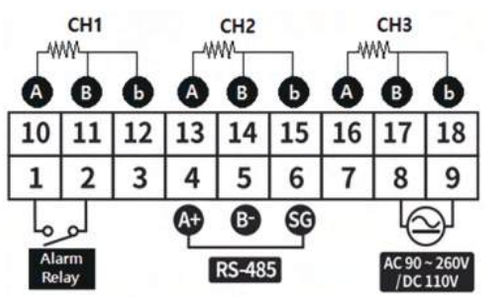
Aux. power	Standard	AC 90 ~ 260V(50/60Hz) ,DC110V
	Option	DC 24V Only
Operating temperature	-10~50℃	
Operating humidity	20~85%	
Storage temperature	-20~60℃	
Insulation resistance	More than 10MΩ	
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs, 2kA)	
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min	
Withstand voltage	AC 2kV/1min	
Surge immunity	4kV/2kV	
Electrostatic discharge	8kV/6kV	
Maximum allowed input	110% of input range	
Text height(LED)	7Segment LED Display(0.8inch, Red)	
Contact capacity	AC 250V/2Q, DC 30V/2A	
Max display value	9999	
Measuring interval	1Time / sec	
Weight	180g	
Communication	Protocol : Modbus RTU Interface : RS-485 2wire Baudrate : 9600bps, 19200bps	

Terminal connection

KDN-1P



KDN-3P



Input

Range	Resistance(RTD)	-50~200.0℃ / PT 100Ω
Accuracy		±(0.5% of rdg + 1digit)

Drawing

Refer to page 68 type A-1

3Phase AC Current Meter

Certificates CE



Model No

KDA-3P ①

① Communication(Option)

C RS-485	**N/A** None

How to order) KDA-3P

R,S,T by the select button

Specification

Aux. power	AC 90 ~ 260V(50/60Hz) , DC110V
Operating temperature	-10~50℃
Operating humidity	20~85%
Storage temperature	-20~60℃
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min
Withstand voltage	AC 2kV/1min
Surge immunity	4kV/2kV
Electrostatic discharge	8kV/6kV
Maximum allowed input	110% of input range
Text height(LED)	7Segment LED Display(0.8inch, Red)
Max display value	9999
Measuring interval	1Time / sec
Weight	270g
Communication	Protocol : Modbus RTU Interface : RS-485 2wire Baudrate : 9600bps, 19200bps

Input

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

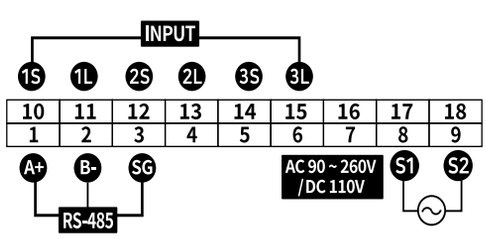
Display range

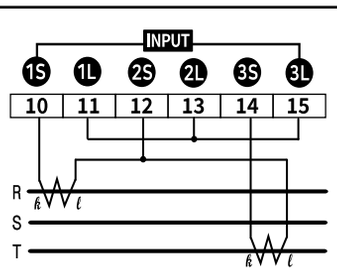
No	Setting	Display
1	5/5	5.000
2~8	10/5~50/5	50.00
9~32	60/5~500/5	500.00
33~57	600/5~6000/5	5000

Drawing

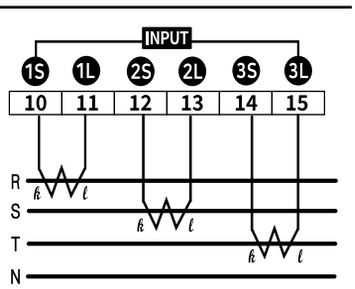
Refer to page 68 type A-1

Connection diagram





3P3W



3P4W

3Phase AC Voltage Meter

Certificates CE



Model No

KDB-3P[ ]
①

① Communication(Option)

C RS-485	**N/A** None

How to order)KDB-3P

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

Specification

Aux. power	AC 90 ~ 260V(50/60Hz) , DC110V
Operating temperature	-10~50℃
Operating humidity	20~85%
Storage temperature	-20~60℃
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min
Withstand voltage	AC 2kV/1min
Surge immunity	4kV/2kV
Electrostatic discharge	8kV/6kV
Maximum allowed input	110% of input range
Text height(LED)	7Segment LED Display(0.8inch, Red)
Max display value	9999
Measuring interval	1Time / sec
Weight	250g
Communication	Protocol : Modbus RTU Interface : RS-485 2wire Baudrate : 9600bps, 19200bps

Display range

No	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	
7	6600	6.60	kV
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 set manually for order made

Up to 500V, direct connections is possible without PT

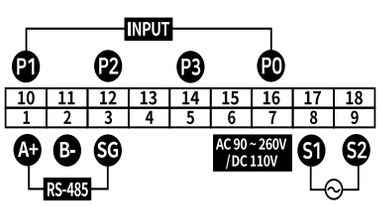
Input

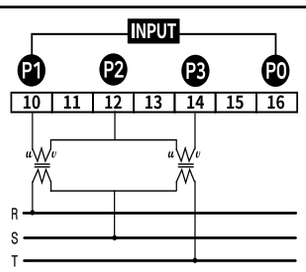
Range	30~500V(Line to line)
Accuracy	±(0.3% of rdg + 0.1% of F.S)

Drawing

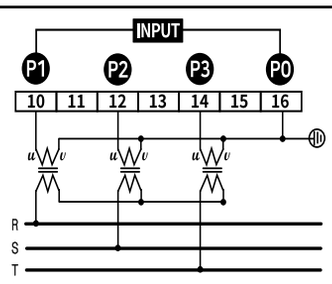
Refer to page 68 type A-1

Connection diagram





3P3W



3P4W

Single Phase AC Watt / Hour Meter

Certificates CE



Model No

KDL - ① ②

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

- Customized product can be produced by order.
- How to order) KDL - WC : W,Wh, RS-485, KDL-G : V, A, W None
- KDL - W indicates W and ± Wh only

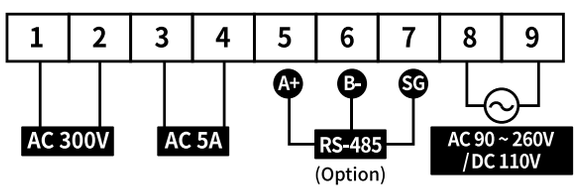
Specification

Aux. power	AC 90 ~ 260V(50/60Hz) , DC110V
Operating temperature	-10~50℃
Operating humidity	20~85%
Storage temperature	-20~60℃
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min
Withstand voltage	AC 2kV/1min
Surge immunity	4kV/2kV
Electrostatic discharge	8kV/6kV
Maximum allowed input	110% of input range
Text height(LED)	7Segment LED Display(0.8inch, Red)
Max display value	9999/999999(6digit)
Measuring interval	1Time / sec
Weight	250g
Communication	Protocol : Modbus RTU Interface : RS-485 2wire Baudrate : 9600bps, 19200bps

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



Input

Range	AC Voltage	30~300V
	AC Current	0.05~5.5A(Rating : 5A)
Accuracy	V	±(0.3% of rdg + 0.1% of F.S)
	A	±(0.3% of rdg + 0.2% of F.S)
	W	Class 1.0 as per IEC 62053-21
	Wh	Class 1.0 as per IEC 62053-21

Drawing

Refer to page 68 type A-1

DC Watt / Hour Meter

Certificates CE



Model No

KDM- ① ②

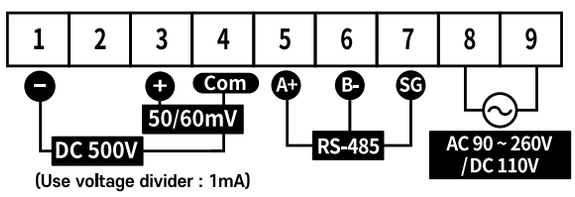
① Input		② Communication(Option)	
W	W, Wh(6digit)	C	RS-485
G	V, A, W	N/A	None

- Customized product can be produced by order.
- How to order) KDL - WC : W,Wh, RS-485, KDM-G : V, A, W, None
- KDL - W indicates W and ± Wh only

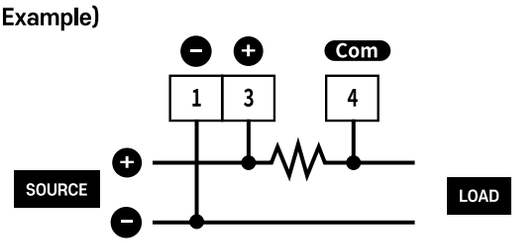
Specification

Aux. power	AC 90 ~ 260V(50/60Hz) , DC110V
Operating temperature	-10~50℃
Operating humidity	20~85%
Storage temperature	-20~60℃
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs, 2kA)
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min
Withstand voltage	AC 2kV/1min
Surge immunity	4kV/2kV
Electrostatic discharge	8kV/6kV
Maximum allowed input	110% of input range
Text height(LED)	7Segment LED Display(0.8inch, Red)
Max display value	9999 / 999999(6digit)
Measuring interval	1Time / sec
Weight	250g
Communication	Protocol : Modbus RTU Interface : RS-485 2wire Baudrate : 9600bps, 19200bps

Connection diagram



Example)



Input

Range	Voltage	±500V
	DC Current	-±60mV (Rating : 50 or 60mV)
Accuracy	V	±(0.3% of rdg + 0.1% of F.S)
	A	±(0.3% of rdg + 0.2% of F.S)
	W	Class 1.0 as per IEC 62053-21
	Wh	Class 1.0 as per IEC 62053-21

Drawing

Refer to page 68 type A-1

3P AC Watt Meter



Model No

KDG - ①

① Communication(Option)	
C	RS-485
N/A	None

Customized product can be produced by order.

Specification

Aux. power	AC 90 ~ 260V(50/60Hz) , DC110V
Operating temperature	-10~50℃
Operating humidity	20~85%
Storage temperature	-20~60℃
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min
Withstand voltage	AC 2kV/1min
Surge immunity	4kV/2kV
Electrostatic discharge	8kV/6kV
Maximum allowed input	110% of input range
Text height(LED)	7Segment LED Display(0.8inch, Red)
Max display value	9999
Measuring interval	1Time / sec
Weight	270g
Communication	Protocol : Modbus RTU Interface : RS-485 2wire Baudrate : 9600bps, 19200bps

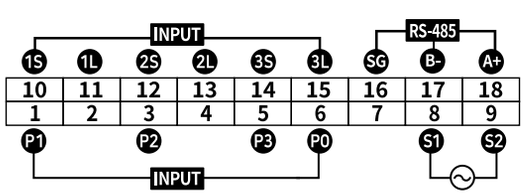
Input

Setting	DISPLAY	Range	Default
PT Secondly	U-In	500/190/110/63.5	500 (Direct)
PT Primary	Pt	220/380/440/460/480 /3.30k/6.60k/7.20k /11.0k/11.4k/22.0k /22.9k/66.0k/154k	220
CT	Ct	5~6000	5
Frequency	FrEq	50/60	60
Communication address	Id	0~255	255
Communication speed	bAud	9600/19200	9600
Accuracy		±(0.3% of rdg + 0.1% of F.S)	

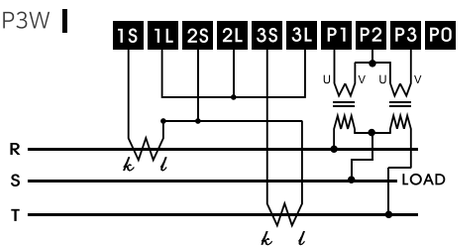
Drawing

Refer to page 68 type A-1

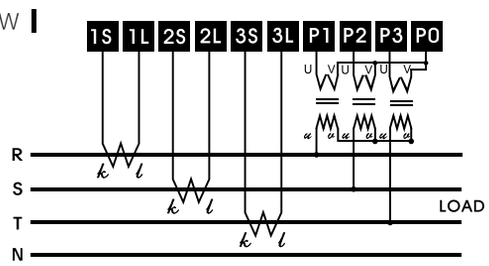
Connection diagram



3P3W



3P4W



Note : N Phase of PT primary shall not be wired.

AC Watt . Watthour Meter



Model No

KDW - ①

① Communication(Option)		
C	RS-485	
N/A	None	Customized product can be produced by order.

Specification

Aux. power	AC 90 ~ 260V(50/60Hz) , DC110V
Operating temperature	-10~50℃
Operating humidity	20~85%
Storage temperature	-20~60℃
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs, 2kA)
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min
Withstand voltage	AC 2kV/1min
Surge immunity	4kV/2kV
Electrostatic discharge	8kV/6kV
Maximum allowed input	110% of input range
Text height(LED)	7Segment LED Display(0.8inch, Red)
Max display value	9999(Power), 999999(Power energy)
Measuring interval	1Time / sec
Weight	270g
Communication	Protocol : Modbus RTU Interface : RS-485 2wire Baudrate : 9600bps, 19200bps

Input

Setting	DISPLAY	Range	Default
PCT Ratio	rAt Io	1.000~300.000	1.0
Frequency	Fr E9	50/60	60
Communication address	Id	0~255	255
Communication speed	bAud	9600/19200	9600

<PCT Ratio>
PT Ratio (Primary voltage ÷ Secondary voltage) X CT Ratio
Primary current ÷ Secondary current). Choose decimal point first and choose the value for the PCT Ratio.

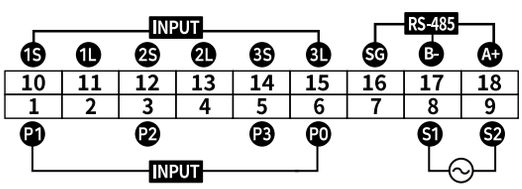
(Example)
3.454545 (PT Ratio) X 100 (CT Ratio) ≒345.4545
You can set '345.455' or '345.45'

Accuracy	Watt	±(0.3% of rdg + 0.1% of F.S)
	Watt hour	Class 1.0 as per IEC 62053-21

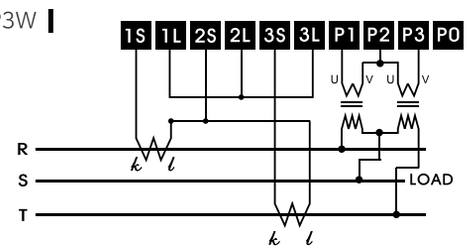
Drawing

Refer to page 68 type A-1

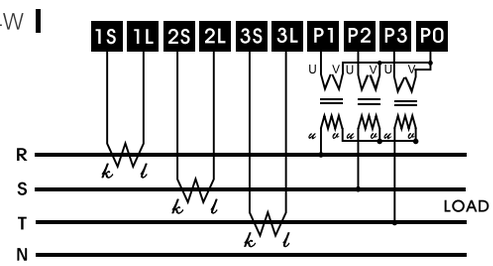
Connection diagram



3P3W



3P4W



Note : N Phase of PT primary shall not be wired.

Push Button Digital Meter Relay

Certificates CE



Model No

KDP - [ ] R [ ]
① ②

① Input		② Communication(Option) / DC Output(Option)	
A AC Current(AC A)	5A	**C**	RS-485
B AC Voltage(AC V)	110V/190V/500V	**E**	DC Output (DC ~20mA)
C DC Current(DC A)	50mV/60mV	**N/A**	None/DC Output None
D DC Voltage(DC V)	5V/50V/500V		

How to order)KDP-AR(AC Current)

Limit setting can be done by the front button

Customized product can be produced by order.

Specification

Aux. power	AC 90 ~ 260V(50/60Hz) , DC110V
	DC 24V Only (without E type)
Operating temperature	-10~50℃
Operating humidity	20~85%
Storage temperature	-20~60℃
Insulation resistance	More than 10MΩ
Contact capacity	AC 250V/2A, DC 30V/2A
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min
Withstand voltage	AC 2kV/1min
Surge immunity	4kV/2kV
Electrostatic discharge	8kV/6kV
Maximum allowed input	110% of input range
Text height(LED)	7Segment LED Display(0.8inch, Red)
Max display value	9999
Measuring interval	1Time / sec
Weight	250g
Communication	Protocol : Modbus RTU Interface : RS-485 2wire Baudrate : 9600bps, 19200bps

Input

Accuracy	V	±(0.3% of rdg + 0.1% of F.S)
	A	±(0.3% of rdg + 0.2% of F.S)

Setting(CT Primary Value Setting)

- KDP-AR(AC Current) : Ad-t (A/D Type: RMS/AVG Choice)
  Ct (CT, Primary value setting)
- KDP-BR(AC Voltage) : Ad-t (A/D Type: RMS/AVG Choice)
  In (Input: 500/190/110V)
  Pt (PT, Primary value setting)
- KDP-CR(DC Current) : rAtE (RATE : CT Ratio)
  In (Input specification: 50/60/200mV)
- KDP-DR(DC Voltage) : In (Input specification: 500/50/5V)

Setting

	HI Output		GO Output		LOW Output	
	Relay	LED	Relay	LED	Relay	LED
Hi set < Display	ON		OFF		OFF	
Low set > Display	OFF		OFF		ON	
Low ≤ Display ≤ HI	OFF		ON		OFF	
Hi set < Low set	Error(-) will be displayed					

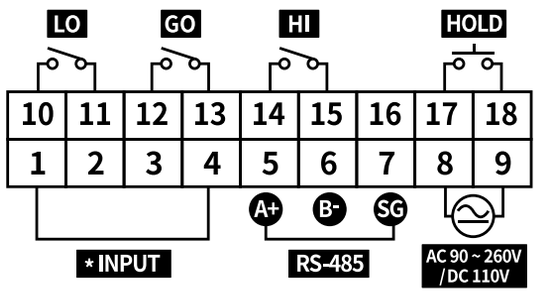
Drawing

Refer to page 68 type A-1

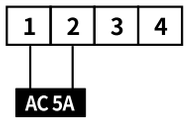
Connection diagram

KDP-□R

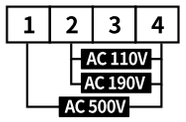
* Refer to manual type E



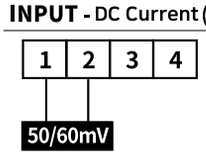
INPUT - AC Current (KDP-AR)



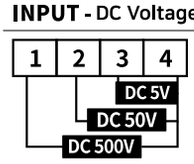
INPUT - AC Voltage (KDP-BR)



INPUT - DC Current (KDP-CR)



INPUT - DC Voltage (KDP-DR)



Digital Leakage Current Meter



Model No

KDS-10	Digital Leakage Current Limit Meter

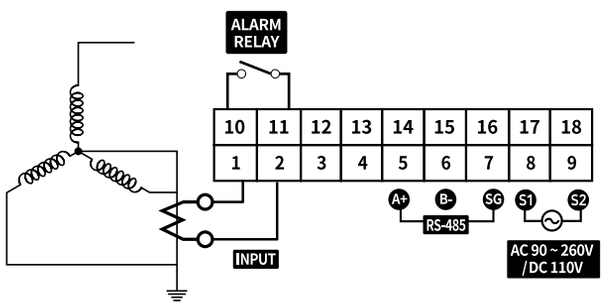
Overview

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

Connection diagram



Specification

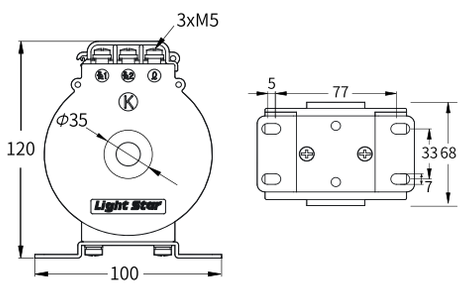
Aux. power	AC 90 ~ 260V(50/60Hz) , DC110V
Operating temperature	-10~50℃
Operating humidity	20~85%
Storage temperature	-20~60℃
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min
Withstand voltage	AC 2kV/1min
Surge immunity	4kV/2kV
Electrostatic discharge	8kV/6kV
Maximum allowed input	110% of input range
Text height(LED)	7Segment LED Display(0.8inch, Red)
Contact capacity	AC 250V/2Q, DC 30V/2A
Max display value	9999
Measuring interval	1Time / sec
Weight	450g
Communication	Protocol : Modbus RTU Interface : RS-485 2wire Baudrate : 9600bps, 19200bps

Drawing

Unit : mm

Refer to page 68 type A-1

Dedicated current transformer(KBJ-26L)



Input

Range	KBJ-26L 30A / 50mA
Accuracy	±(0.3% of rdg + 0.2% of F.S)

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

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.

Feature

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

Specification

Aux. power	AC 90 ~ 260V(50/60Hz) , DC110V
Operating temperature	-10~50℃
Operating humidity	20~85%
Storage temperature	-20~60℃
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs, 2kA)
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min
Withstand voltage	AC 2kV/1min
Surge immunity	4kV/2kV
Electrostatic discharge	8kV/6kV
Maximum allowed input	110% of input range
Measuring interval	1Time / sec
Weight	450g
Communication	Protocol : Modbus RTU Interface : RS-485 2wire Baudrate : 9600bps, 19200bps

Drawing

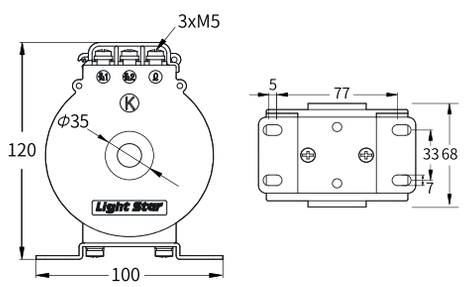
Unit : mm

Refer to page 68 type A-1

Input

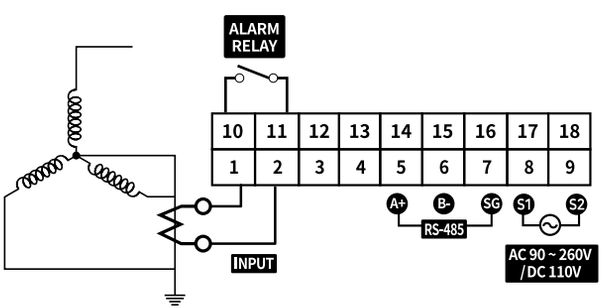
Range	Voltage	25~300V
	Current	0.03~30A
Accuracy	Voltage	±(0.3% of rdg + 0.1% of F.S)
	Leakage current	±(0.3% of rdg + 0.2% of F.S)

Dedicated current transformer(KBJ-26L)

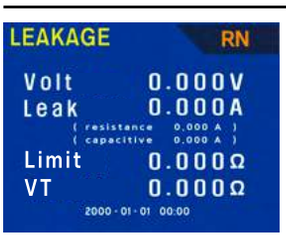


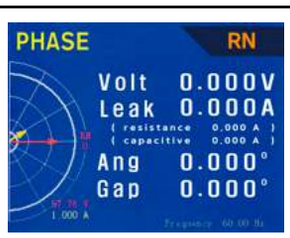
Primary current	0.03~30.0A
Secondary current	0.03~30mA
Class	1.0
Burden	Less than 500Ω

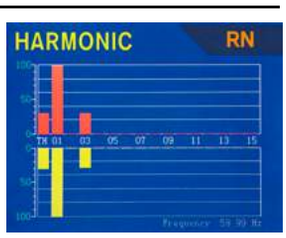
Connection diagram



KDS-20 Display [Color LCD 320X240]







Rectifier Switch Board Digital Meter



Model No

KDV-[①]

① Input Specification	
1 20~250V Direct connection	**2** 380/110V Use PT

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.

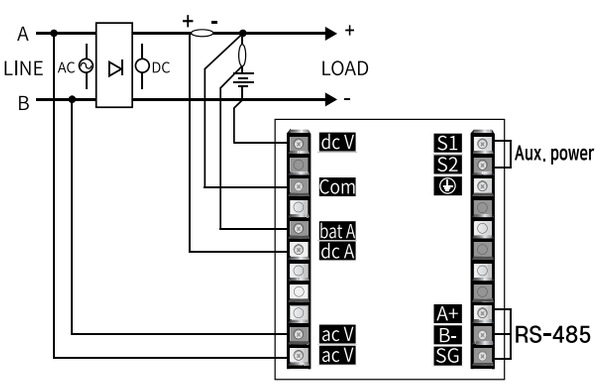
Specification

Aux. power	AC 90~260V(50/60Hz), DC 110V
Operating temperature	-10~50℃
Operating humidity	20~85%
Storage temperature	-20~60℃
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min
Withstand voltage	AC 2kV/1min
Surge immunity	4kV/2kV
Electrostatic discharge	8kV/6kV
Maximum allowed input	110% of input range
Measuring interval	1Time / sec
Weight	800g
Communication	Protocol : Modbus RTU Interface : RS-485 2wire Baudrate : 9600bps

Display items

Item	Display	Indicate LED
AC V	AC Voltage	VAC
	AC Voltage max (Peak Hold)	MAX VAC
DC V	DC Voltage	VDC
	DC Voltage max (Peak Hold)	MAX VDC
DC A	DC Current	IDC
	DC Current max (Peak Hold)	MAX IDC
	Battery Current	IBAT
	Battery Current max (Peak Hold)	MAX IBAT

Connection diagram



Input

Item		Range	Accuracy (%)
AC Voltage	KDV-1	20~250V	± (0.5% of rdg + 0.1% of FS)
	KDV-2	380/110V	
DC Voltage	Common	20~270V	± (0.3% of rdg + 0.1% of FS)
DC Current		0.5~50mV	± (0.3% of rdg + 0.1% of FS)

Drawing

Refer to Page 68 type C

Power Conversion Efficiency Meter



Model No

KDV-3
①

① Power Conversion Efficiency Meter

Overview

This measures the input DC value and output AC value in a solar power generation system to monitor the electrical efficiency of the inverter in real-time

Function

- Indicates DC voltage/current and AC 3-phase voltage/current.
- Calculate the energy(AC / DC Wh) and the efficiency.

Input

Item		Range
AC 3 phase Voltage		line voltage AC 50 ~ 500V
AC 3 phase Current		AC 0.05 ~ 6.0A (CT Ratio :5A)
DC Voltage		DC 50~750V
DC Current		DC 50mV or 60mV (Shunt)
Accuracy (%)	Voltage	±(0.2% rdg + 0.1% F.S)
	Current	±(0.2% rdg + 0.2% F.S)
	Power	Class 0.5 as per IEC 62053-22
	Power factor	±(0.5% rdg + 0.5 °)
	Frequency	±0.02Hz
	Power energy	Class 0.5 as per IEC 62053-22

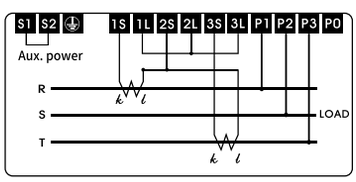
Specification

Aux. power	AC 90~260V(50/60Hz), DC 110V
Operating temperature	-10~50℃
Operating humidity	20~85%
Storage temperature	-20~60℃
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min
Withstand voltage	AC 2kV/1min
Surge immunity	4kV/2kV
Electrostatic discharge	8kV/6kV
Maximum allowed input	110% of input range
Measuring interval	1Time / sec
Weight	800g
Communication	Protocol : Modbus RTU Interface : RS-485 2wire Baudrate : 9600/19200bps

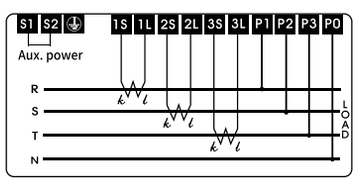
Connection diagram

AC Input

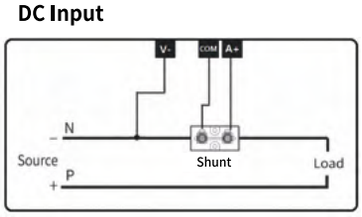
3Φ3W



3Φ4W



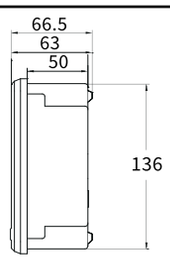
DC Input

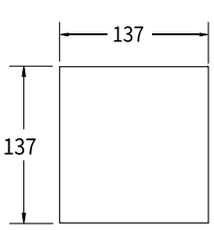


Drawing

Unit : mm







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.

Setting items

Setting	Range	Unit	Remarks
Contract power	1~500	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	

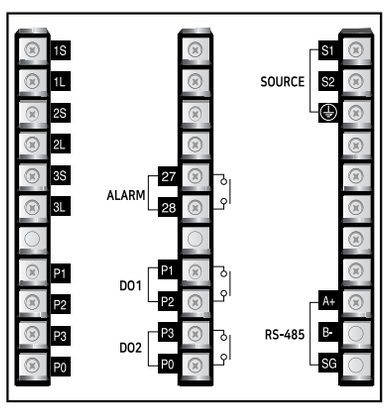
Specification

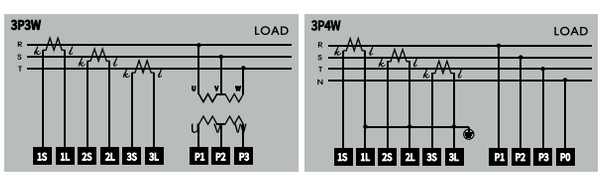
Aux. power	AC 90 ~ 260V(50/60Hz) , DC110V
Operating temperature	-10~50℃
Operating humidity	20~85%
Storage temperature	-20~60℃
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min
Withstand voltage	AC 2kV/1min
Surge immunity	4kV/2kV
Electrostatic discharge	8kV/6kV
Maximum allowed input	110% of input range
Display	128X64 dot Matrix Graphic LCD Indicate LED : Red 3Φ 5 PCS
Measuring interval	1Time / sec
Weight	800g
Communication	Protocol : Modbus RTU Interface : RS-485 2wire Baudrate : 9600bps

Input

Range	Rated input	3P3W AC 440/110V, 5A 3P4W AC 380√3V, 5A
Accuracy	Instant power	±(0.2%)
	Accumulated energy	±(1.0%+0.03%/day)

Connection diagram





Drawing

Refer to page 68 type D

Panel Power Meter

Certificates CE



Model No

KDX - ① ②

① Measurement	② Communication(Option)
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)	

How to order example) KDX-AC KDX-B

Customized product can be produced by order.

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

Overview

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

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

Aux. power	KDX-A/B : AC 90 ~ 260V(50/60Hz) , DC110V KDX-C : AC 220V(60Hz) Only	
Operating temperature	-10~50℃	
Operating humidity	20~85%	
Storage temperature	-20~60℃	
Insulation resistance	More than 10㏁	
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)	
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min	
Withstand voltage	AC 2kV/1min	
Surge immunity	4kV/2kV	
Electrostatic discharge	8kV/6kV	
Maximum allowed input	110% of input range	
Display	14.2 LED(0.56inch, Red)	
Max display value	9999	
Measuring interval	1Time / sec	
Weight	KDX-A/B	800g
	KDX-C	1000g
Communication	Protocol : Modbus RTU, Melsec(Option) Interface : RS-485 2wire Baudrate : 9600bps	

Input

Range	Line voltage	KDX-A/B 40~500V, KDX-C 50~500V (Rating :110 or 190V) Frequency 45~65HZ	
	Current input (common)	KDX-A/B 0.1~6A, KDX-C 0.5~6A (Rating : 5A)	
Accuracy	Division	A/B	C
	V	± (0.3% of rdg + 0.1% of F.S)	± (0.5% of rdg + 0.1% of F.S)
	A	± (0.3% of rdg + 0.2% of F.S)	± (0.5% of rdg + 0.2% of F.S)
	PF	± (1.0% of rdg + 1.0°)	1.5 Times of A / B
	W Wh	Class 1.0 as per IEC 62053-21	
	var varh	Class 2.0 as per IEC 62053-23	
	Hz	± 0.1Hz	± 0.2Hz

Detailed Function

Function keys

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



VS Button

- V1, V2, V3, PT Primary current selection

Setting mode (SET + VS Key) → Wiring method(▼ , ▲ Key) → Save(VS key) → P.T ratio(▼ , ▲ Key) → Save(VS Key)

AS Button

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

Setting mode (SET + AS Key) → Setting(▼ , ▲ Key) → Save (AS 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

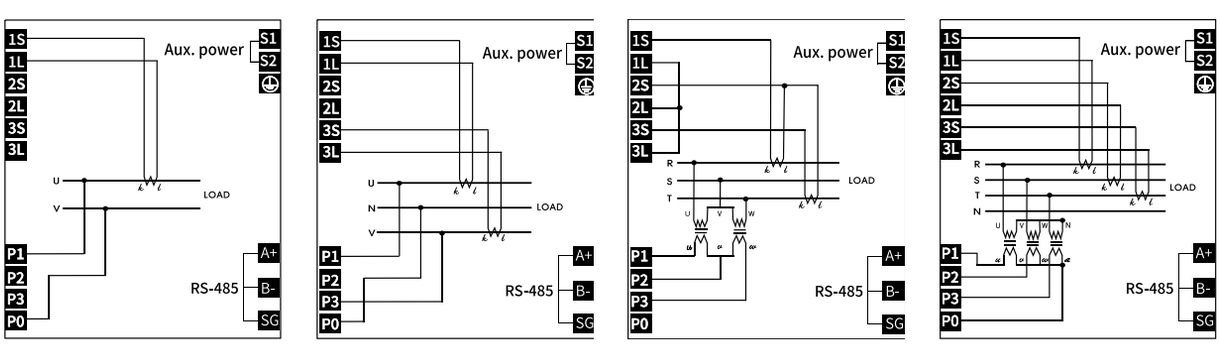
C . T Primary current value selection

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

FS Button

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

Connection diagram



1P2W | 1P3W | 3P3W | 3P4W

Note : N Phase of PT primary shall not be wired.

Drawing

Refer to page 68 type D

Panel Power Meter



Certificates CE

Model No

KDY - A ①

① Communication

C	RS-485	**N/A**	None

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

Customized product can be produced by order

Overview

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

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

Specification

Aux. power	AC 90 ~ 260V(50/60Hz) , DC110V
	DC 24V Only
Operating temperature	-10~50℃
Operating humidity	20~85%
Storage temperature	-20~60℃
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min
Withstand voltage	AC 2kV/1min
Surge immunity	4kV/2kV
Electrostatic discharge	8kV/6kV
Maximum allowed input	110% of input range
Display	14.2 LED(0.56inch, Red)
Max display value	9999
Measuring interval	1Time / sec
Weight	450g
Communication	Protocol : Modbus RTU, Melsec(Option) Interface : RS-485 2wire Baudrate : 9600bps

Input

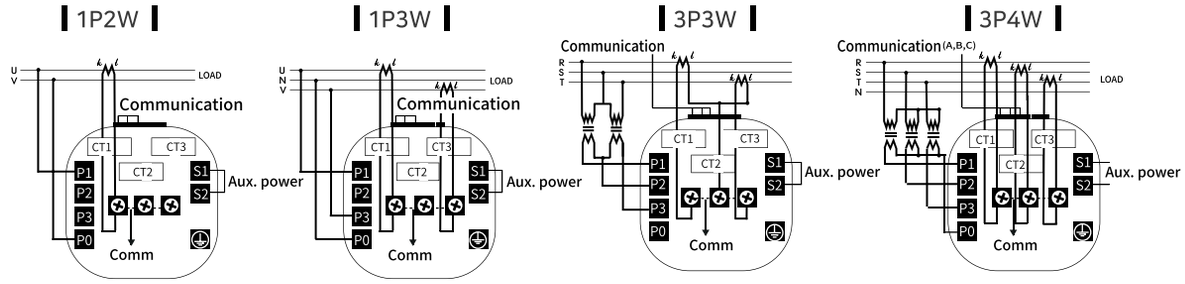
Range	Line voltage	40~500V (Without PT, up to 500V input.)
	Current input	0.1~6A
	Frequency	45~65Hz 1P2W, 1P3W, 3P3W, 3P4W Common

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

Setting 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→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

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
W→PF→var→Hz→Wh→varh

⚠ 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 high rank	varh high rank
Display C	W	T Phase V	TR V	A3	W	Wh Low rank	varh Low rank

Accuracy

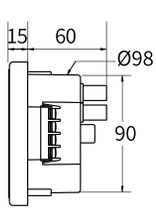
V	±(0.3% rdg + 0.1% FS)
A	±(0.3% rdg + 0.2% FS)
PF	±(1.0% rdg + 1.0 °)
Hz	±0.1 Hz
W/wh	Class 1.0 as per IEC 62053-21
var/varh	Class 2.0 as per IEC 62053-23

at 45~65㎐, at COS Ø ± 0.8~1.0, 23℃

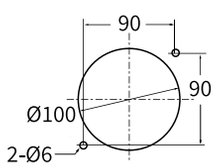
Drawing

Unit : mm





Panel dimension



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

Panel Power Meter



Certificates CE KC

Model No

KDY - 200
①

① Digital meter

Display : 3P V, 3P A, 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

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

Aux. power	AC 90 ~ 260V(50/60Hz) , DC110V
Operating temperature	-10~50℃
Operating humidity	20~85%
Storage temperature	-20~60℃
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min
Withstand voltage	AC 2kV/1min
Surge immunity	4kV/2kV
Electrostatic discharge	8kV/6kV
Maximum allowed input	110% of input range
Display	Custom LCD
Measuring interval	1Time / sec
Weight	500g
Communication	Protocol : Modbus RTU Interface : RS-485 2wire Baudrate : 9600bps, 19200bps

Input

Range	Line voltage	40~500V(Rating : 110 or 190V)
	Current input	0.1~6A(Rating : 5A)
	Frequency	45~65Hz 1P2W, 1P3W, 3P3W, 3P4W

Accuracy

Voltage	±(0.2% rdg + 0.1% F.S)
Current	±(0.2% rdg + 0.2% F.S)
Power factor	±(0.5% rdg + 0.5 °)
Frequency	± 0.02Hz
Active power	Class 0.5 as per IEC 62053-22
Active energy	
Reactive power	Class 1.0 as per IEC 62053-24
Reactive energy	

Configuration



Power indicator LED

Phase

Current usage rate

Communication state RX/TX

Σ : TOTAL / Ln : n phase

Clear view

Lead, Lag, Minus

Unit of measurement

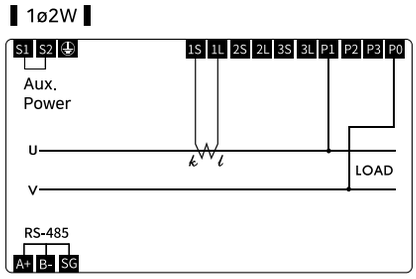
Integrated energy

Setting button

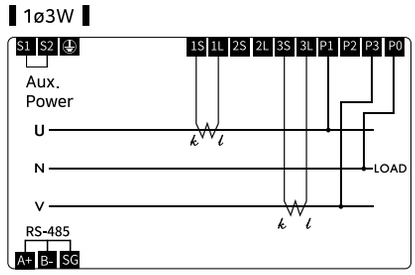
MAX	kwh	RS-485	
Max value Auto saving	Energy generation Energy consumption	RS-485 communication	Clear view

Connection diagram

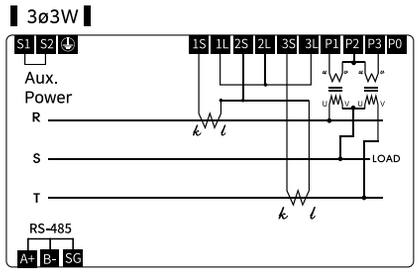
▌1ø2W ▐



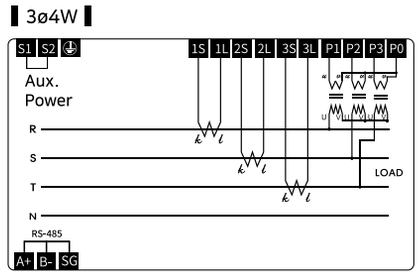
▌1ø3W ▐



▌3ø3W ▐



▌3ø4W ▐

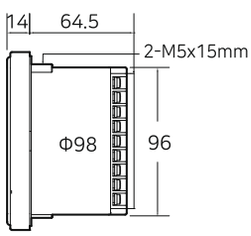


Note : N Phase of PT primary shall not be wired.

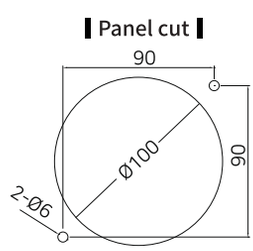
Drawing

Unit : mm





▌Panel cut ▐



Certificates (KCP-03/06S)


KCP-06


KCP-12


KCP-SM


KCP-03/06S

Model No

KCP - ① ②

① Display type and number of circuits		② Communication	
06	7segment Led, 6Circuit	**C**	RS-485
12	7segment Led, 12Circuit	**N/A**	None
03S	Custom LCD, 3Circuit		
06S	Custom LCD, 6Circuit		
SM	Custom LCD, 6Circuit		

Overview

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

Specification

Aux. power	AC 90 ~ 260V(50/60Hz) , DC110V	Surge immunity	4kV/2kV
		Electrostatic discharge	8kV/6kV
Operating temperature	-10~50℃	Maximum allowed input	110% of input range
Operating humidity	20~85%		
Storage temperature	-20~60℃	Max display value	9999
Insulation resistance	More than 10㏁	Measuring interval	1Time / sec
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)	Communication	Protocol : Modbus RTU Interface : RS-485 2wire Baudrate : 9600bps
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min	Contact capacity	Relay AC 250V, 5A / DC 30V, 5A
Withstand voltage	AC 2kV/1min		

	KCP-06	KCP-12	KCP-03S	KCP-06S	KCP-SM
Output	6	12	3	6	6
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 • Frequency - 50 or 60Hz • Target power factor - LAG (+) 80~100 • Control method - 1 (Sequential) / 2 (Recursive) • Low load range - 0 ~ 999(kW/MW) • Delay time - 5 ~ 1800 sec		• 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	7 Segment LED(0.5Inch, Red)		Custom LCD		
Weight	700g	800g	450g		800g
Feature	Dip switch : Easy control (ON / OFF / AUTO)		Small size : Spaces		Intelligent control
Display	Power factor, Voltage, Current, Active power, Reactive power				Power factor, Voltage, Current, Active power, Reactive power Trend, Condenser input time

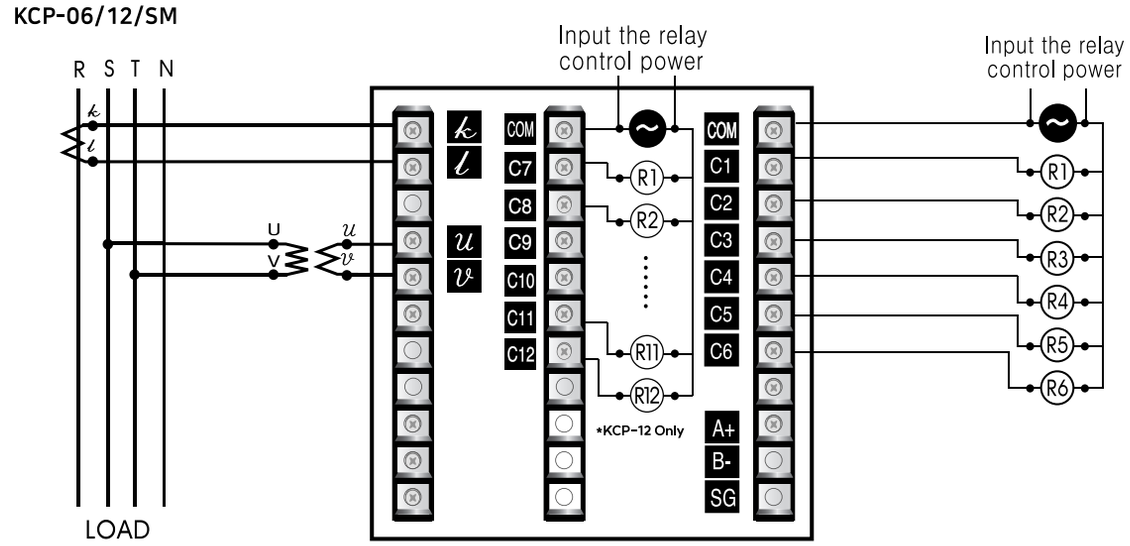
Accuracy

V	±(0.3% rdg + 0.1% FS)	Hz	±0.1 Hz
A	±(0.3% rdg + 0.2% FS)	W/wh	Class 1.0 as per IEC 62053-21
PF	±(1.0% rdg + 1.0 °)	var/varh	Class 2.0 as per IEC 62053-23

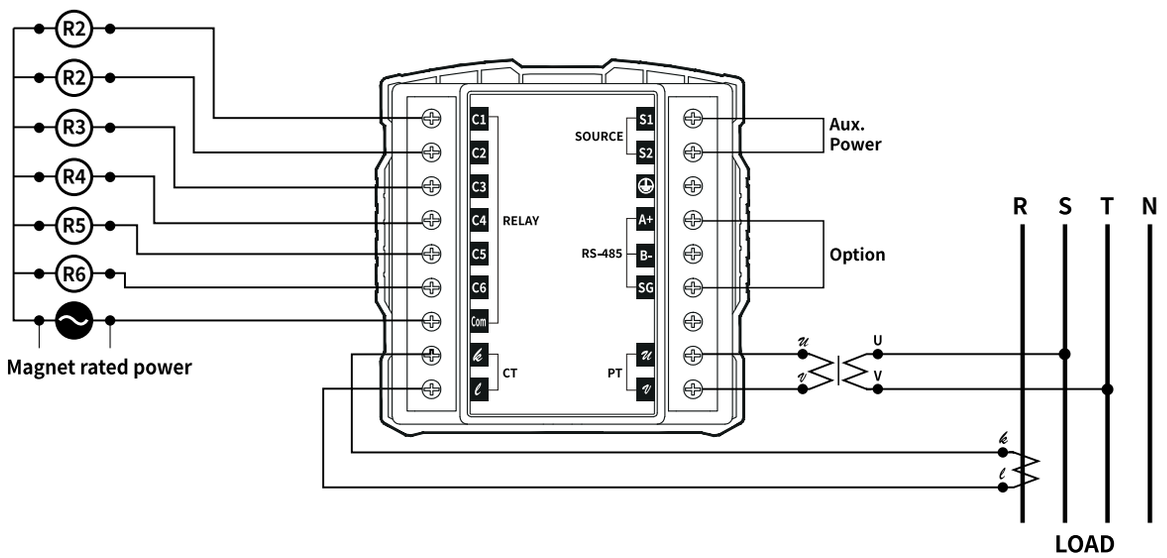
at 45~65Hz, at COS Ø ± 0.8~1.0, 23℃

Connection diagram

KCP-06/12/SM



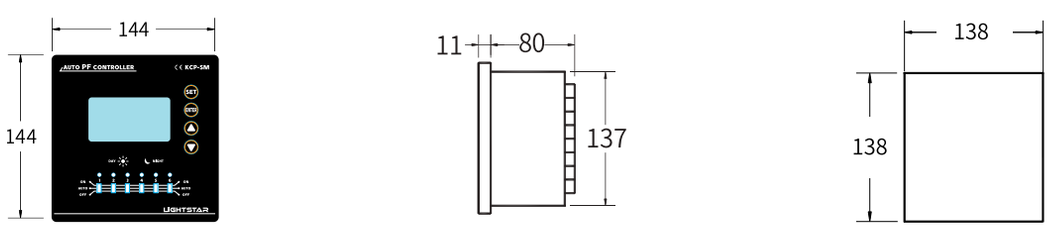
KCP-03S/06S



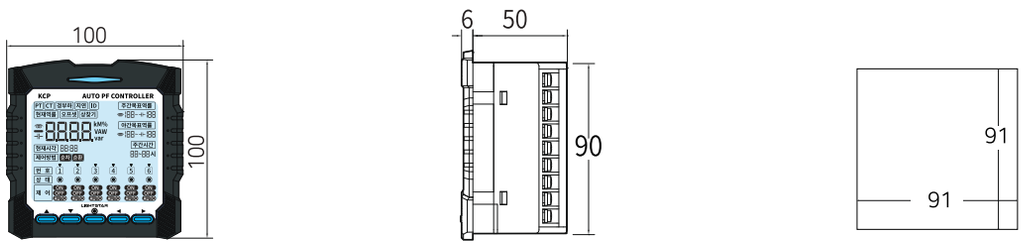
Drawing

Unit : mm

KCP-06/12/SM



KCP-03S/06S



Auto PF Controller



Certificates

Model No

KCP-06U□□

① ②

① Number of circuits		② Communication	
06U	Unbalance 6 Circuit	**C**	RS-485
		N/A	None

Overview

PF Controller combining with power meter, which can monitor 3 phase power data, unbalanced PF controller can enable more stable power factor control.

Function

- Display : 3P Voltage Current, Watt, Wh, PF, THD, Frequency
- Intelligent power factor control : Calculating the required capacity by measuring the 3P Power factor, and engage the suitable capacitor to compensate PF efficiently.
- Day · Night control : The device allows for setting control ranges depending on daytime and nighttime, and it also supports cable connection error.
- Harmonic limit setting : If THD exceeds limit the condenser input is blocked.

  The more THD, PF will be degraded. If the capacitor engaged in this condition, THD of voltage will be decreased as capacitor absorb the THD of current. However, THD may affect capacitor and reduce the lifespan by noise and heat.

Specification

Aux. power	AC 90 ~ 260V(50/60Hz) , DC110V	Maximum allowed input	110% of input range
Operating temperature	-10~50℃	Contact capacity	AC 250V, 5A / DC 30V, 5A
Operating humidity	20~85%	Measuring interval	1Time / sec
Storage temperature	-20~60℃	Communication	Protocol : Modbus RTU Interface : RS-485 2wire Baudrate : 9600bps, 19200bps
Insulation resistance	More than 10MΩ		
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs, 2kV)	Setting items	Setting: Voltage / Current ratio, Light loading, ON/OFF Delay time, Harmonic content, Time, Frequency, Communication Target power factor : Daily · Night Control method : Sequential control, Circulation control Intelligent control - Condenser value
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min	Electrostatic discharge	8kV/6kV
Withstand voltage	AC 2kV/1min	Weight	800g
Surge immunity	4kV/2kV		

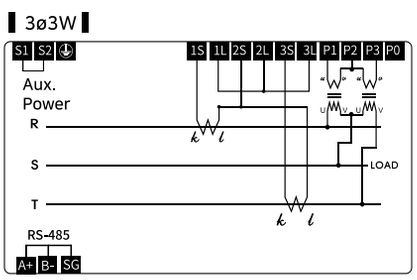
Accuracy

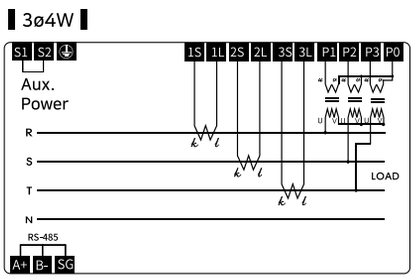
Voltage	± (0.2% of rdg + 0.1% of FS)	Active power	Class 0.5 as per IEC 62053-22
Current	± (0.2% of rdg + 0.2% of FS)	Active energy	
Power factor	± (0.5% of rdg + 0.5°)	Reactive power	Class 1.0 as per IEC 62053-24
Frequency	± 0.02 Hz	Reactive energy	

Configuration



Connection diagram



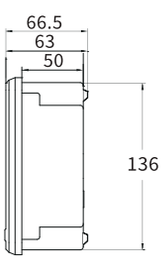


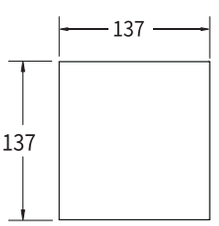
Note : N Phase of PT primary shall not be wired.

Drawing

Unit : mm







Panel Power Meter



Certificates CE KC

Model No

KDX - 2 ① ②

① Measurement	② Communication
0 Standard	**0** None
1 Standard + DOx2 + DIx4	**1** RS-485
2 Standard + TEMPx2	**2** Ethernet
3 Standard + DOx2 + DIx4 + TEMPx2	

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.

How to order) KDX-210 3P4W(DI&DO, None)
KDX-211 3P4W(DI&DO, RS-485)

Standard : 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.
- Input / Output information can be checked in real time, and output can be controlled directly / indirectly.
- The temperature monitoring of 2 channels. (PT100Ω)
- Easy to use.
- Relay out can be supported for Voltage / Current / Power / Temp

Specification

Aux. power	AC 90 ~ 260V(50/60Hz) , DC110V	Surge immunity	4kV/2kV
		Electrostatic discharge	8kV/6kV
Operating temperature	-10~50℃	Maximum allowed input	110% of input range
Operating humidity	20~85%	Display	Custom LCD
Storage temperature	-20~60℃	Contact capacity	AC 250V, 5A / DC 30V, 5A
Insulation resistance	More than 10MΩ	Measuring interval	1Time / sec
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs, 2kA)	Communication	Protocol : Modbus RTU Interface : RS-485 2wire Baudrate : 9600bps, 19200bps
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min	Setting items	Connection method, PT ratio, CT ratio, Communication setting, Frequency, DO control
Withstand voltage	AC 2kV/1min	Weight	800g

Input

- Range — Voltage 40V~500V (Rating : 110 or 190V) Current 0.1~6A(Rating : 5A) Frequency 45~65Hz
- Accuracy

Voltage	± (0.2% of rdg + 0.1% of FS)	Active power	Class 0.5 as per IEC 62053-22
Current	± (0.2% of rdg + 0.2% of FS)	Active energy	
Power factor	± (0.5% of rdg + 0.5°)	Reactive power	Class 1.0 as per IEC 62053-24
Frequency	± 0.02 Hz	Reactive energy	

KDX-200 and 201 are same as KDX-300.

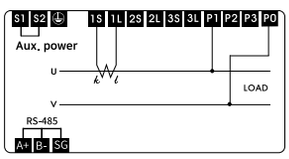
Configuration



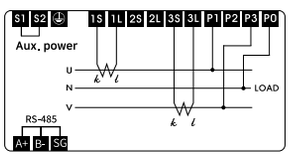
Digital I/O	°C		MAX	kwh	RS-485 ETHERNET	
Digital Input / Output	Temperature measurement or Leakage current	Limit setting Contact output Voltage current Power, Temperature	Max value Auto saving	Energy generation Energy consumption	RS-485 or Ethernet communication	Clear view

Connection diagram

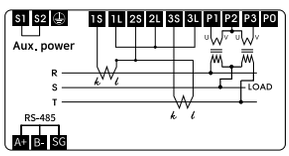
▌1ø2W ▌



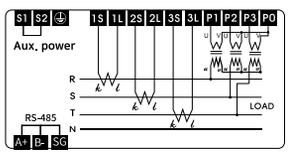
▌1ø3W ▌



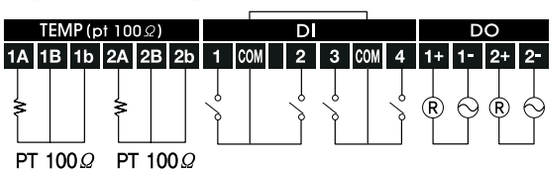
▌3ø3W ▌



▌3ø4W ▌



▌Pin terminal ▌

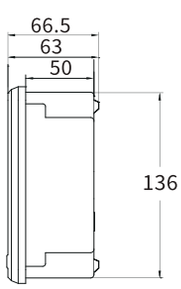


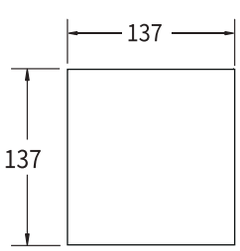
Note : N Phase of PT primary shall not be wired.

Drawing

Unit : mm







Panel Power Meter



Certificates CE KC

Model No

KDX - 300
①

① Digital meter (Standard)

- 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 communi-cationRS-485Communication
- 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

Aux. power	AC 90 ~ 260V(50/60Hz) , DC110V	Surge immunity	4kV/2kV
		Electrostatic discharge	8kV/6kV
Operating temperature	-10~50℃	Maximum allowed input	110% of input range
Operating humidity	20~85%	Display	Custom LCD
Storage temperature	-20~60℃	Contact capacity	AC 250V,5A / DC 30V,5A
Insulation resistance	More than 10MΩ	Measuring interval	1Time / sec
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs, 2kA)	Communication	Protocol : Modbus RTU Interface : RS-485 2wire Baudrate : 9600bps, 14400, 19200bps
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min	Setting items	Connection method, PT ratio, CT ratio, Communication setting, Frequency, DO control
Withstand voltage	AC 2kV/1min	Weight	450g

Input

Range	Line voltage	40~500V(Rating : 110 or 190V)
	Current input	0.1~6A(Rating : 5A)
	Frequency	45~65Hz

Accuracy

Voltage	± (0.2% of rdg + 0.1% of FS)	Active power	Class 0.5 as per IEC 62053-22
Current	± (0.2% of rdg + 0.2% of FS)	Active energy	
Power factor	± (0.5% of rdg + 0.5°)	Reactive power	Class 1.0 as per IEC 62053-24
Frequency	± 0.02 Hz	Reactive energy	

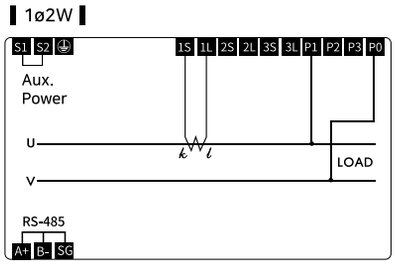
Configuration



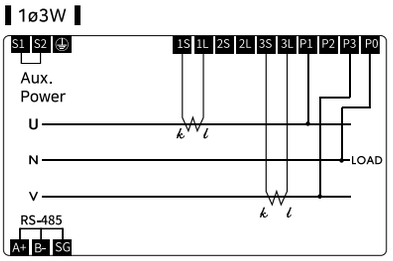
MAX	kwh	RS-485	
Max value Auto saving	Energy generation Energy consumption	Power monitoring with RS-485	Clear display

Connection diagram

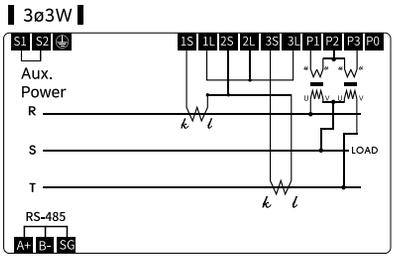
1ø2W



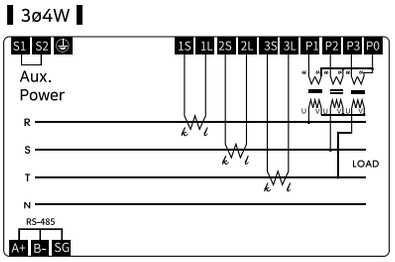
1ø3W



3ø3W



3ø4W

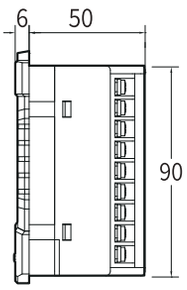


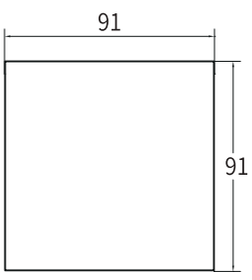
Note : N Phase of PT primary shall not be wired.

Drawing

Unit : mm







Internal Type Power Meter

Certificates



Model No

KDX - 400M
①

① Internal Type Power meter

Overview

This device can monitors electrical data(such as voltage, current, active power, reactive power, surface power, PF, frequency, active energy, and reactive energy) by communication with RS-485 or LAN. And small LCD display energy only.

Function

- Remote power quality monitoring with RS - 485 and LAN communication
- Monitoring harmonics and phase angle (up to 15th)

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

Feature

- Can be installed in the distribution panel with 140 x 140 x 40 Size

Specification

Aux. power	AC 90 ~ 260V(50/60Hz) , DC110V	Surge immunity	4kV/2kV
		Electrostatic discharge	8kV/6kV
Operating temperature	-10~50℃	Maximum allowed input	110% of input range
Operating humidity	20~85%	Display	Custom LCD
Storage temperature	-20~60℃		
Insulation resistance	More than 10MΩ	Measuring interval	0.5 Time / sec
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)	Communication	Protocol : Modbus RTU(PC) Interface : RS-485 2wire Baudrate : 9600bps, 19200bps
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min	LAN Communication	Protocol : Modbus TCP/IP(PC) Interface : RJ45(LAN)
Withstand voltage	AC 2kV/1min	Weight	200g

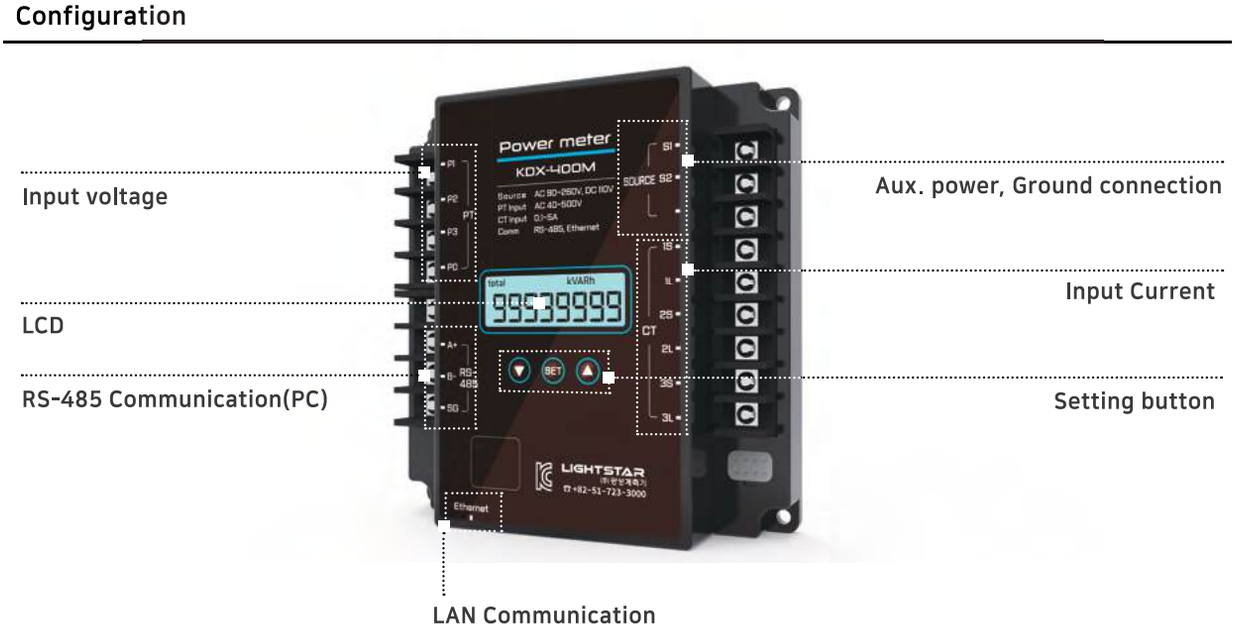
Input

Range	Voltage	Line to line 40~500V(Rating : 110 or 190V)
	Current	0.05~5A(Rating)
	Power factor	±0.200~1.000
	Frequency	45~65Hz (1P2W, 1P3W, 3P3W, 3P4W common)

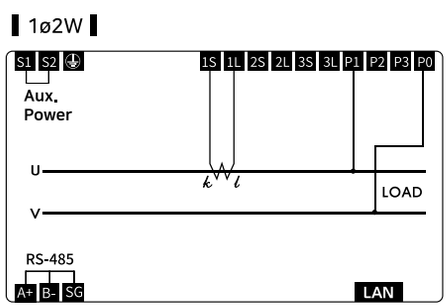
Accuracy

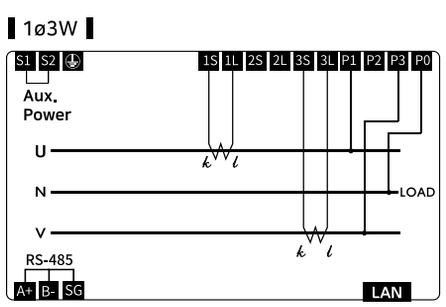
Voltage	± (0.2% of rdg + 0.1% of FS)	Active power	Class 0.5 as per IEC 62053-22
Current	± (0.2% of rdg + 0.2% of FS)	Active energy	
Power factor	± (0.5% of rdg + 0.5°)	Reactive power	Class 1.0 as per IEC 62053-24
Frequency	± 0.02 Hz	Reactive energy	

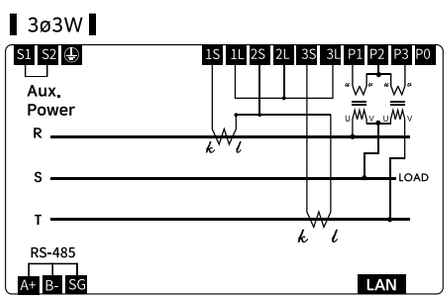
Configuration

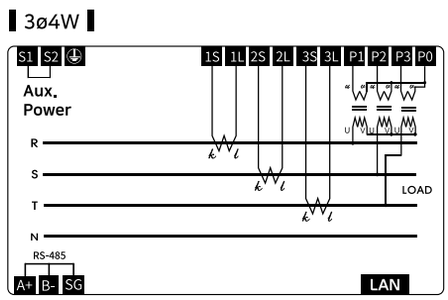


Connection diagram





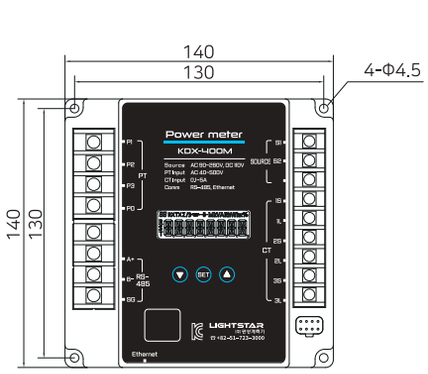


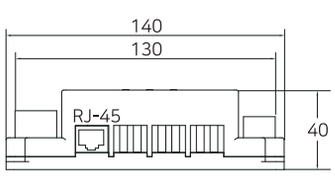


Note : N Phase of PT primary shall not be wired.

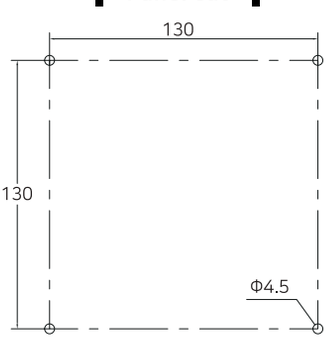
Drawing

Unit : mm





Panel cut



Residual Voltage Test Meter



Certificates

Model No

KDX-500[ ][ ]
①

①	Measurement(M+D Set : M and D are connected by 8pin LAN cable.)
M	Measure (Panel inside insalled)
D	Display (Panel door installed)

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.
In order to prevent electric shock accident, this device can monitor the residual voltage by redundant wiring.

Function

- Remote power quality monitoring with RS-485 / LAN communication.
- Residual voltage can be checked by one touch safety button.
- Safety status can be checked easily by LED and voltage value.

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

Feature

- When the power is cut off, the residual voltage can be measured using the USB auxiliary battery.
- Disconnect measurement and display and connect 8-pin LAN cable

Specification

Aux. power	AC 90 ~ 260V(50/60Hz) DC110V External battery(USB 5V)	Surge immunity		1.2/50us, 2kV (IEC 61000-4-5)	
		Electrostatic discharge		8kV/4kV	
Operating temperature	-10~50℃	Maximum allowed input		110% of input range	
Operating humidity	20~85%	Display		Custom LCD(60 X 55 X 15.5)mm Check current status LED : SK6812 (다색 LED)	
Storage temperature	-20~60℃	Radio frequency impulse		CE : 0.15~0.5MHz : 79(66)dbuV, 0.5~30MHz : 73(60)dBuV, (KN22) RE : 30~230MHz : 40dbuV/m, 230~1000MHz : 47dBuV, (KN22)	
Insulation resistance	More than 10MΩ	Electromagnetic Radiation		0.5 Time /sec	
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)	Communication	M	Protocol : Modbus TCP (PC Communication) Interface : RJ45(LAN)	Use 8-pin LAN cable
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min		D	Protocol : Modbus RTU ((Measure, Display)) Interface : RJ-45 [RS-485:1(15), 2(GND), 7(A+), 8(B-)] Baudrate : 19200bps(Fix)	
Withstand voltage	AC 2kV/1min	Weight		200g(KDX-500M), 500g(KDX-500D)	

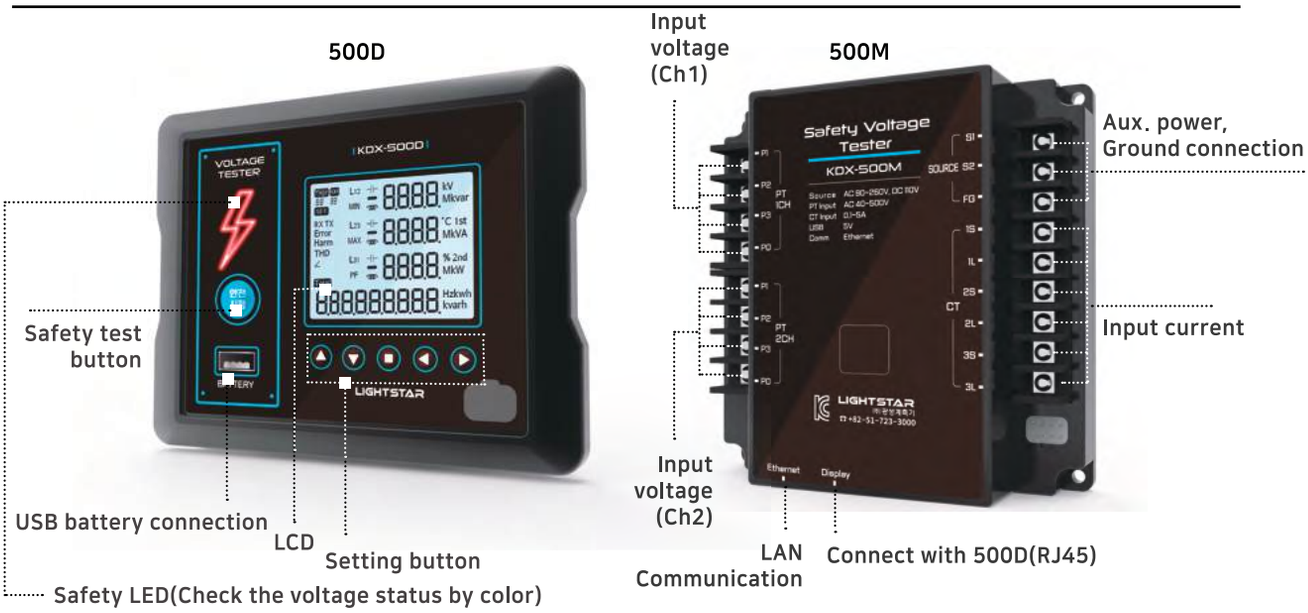
Input

Voltage	Line to line 40~600V (Residual high voltage 3V~) (Rating : 110 or 190V)
Current	0.1 ~ 6.0A(Rating : 5A)
Frequency	45~65Hz (3P3W, 3P4W)

Accuracy

Voltage	± (0.2% of rdg + 0.1% of FS)	Active power	Class 0.5 as per IEC 62053-22
Current	± (0.2% of rdg + 0.2% of FS)	Active energy	
Power factor	± (0.5% of rdg + 0.5°)	Reactive power	Class 1.0 as per IEC 62053-24
Frequency	± 0.02 Hz	Reactive energy	

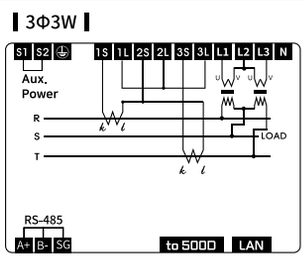
Configuration

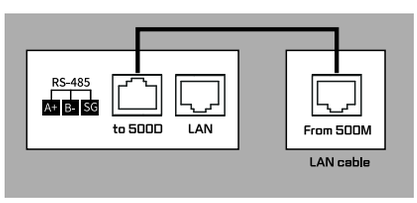


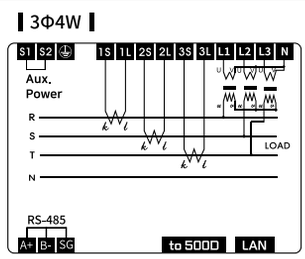
Normal power			
Color	Red light	Blue light	Yellow light
Voltage status	OVR (Over voltage +10% over)	Normal voltage	UVR (Under voltage -10% less)

USB battery		
Color	Green light	Red light
Voltage status	No voltage	Residual voltage exists over setting voltage

Connection diagram





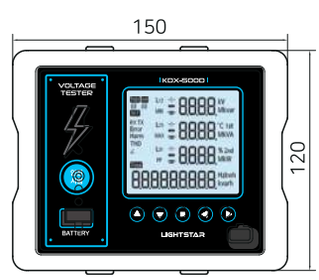


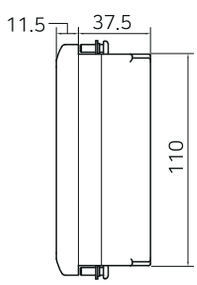
Note : N Phase of PT primary shall not be wired.

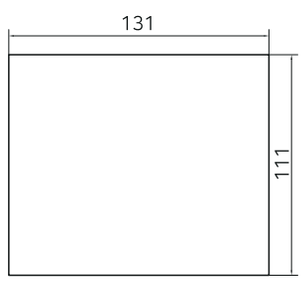
Drawing

Unit : mm

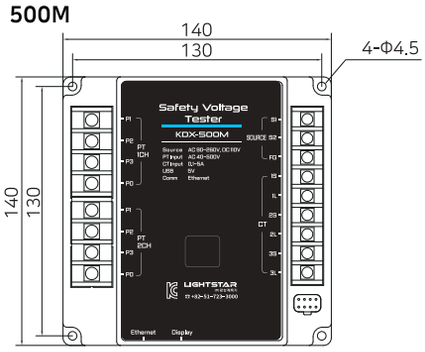
500D

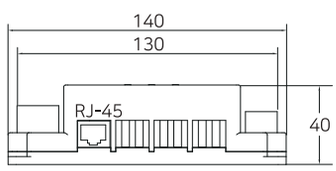


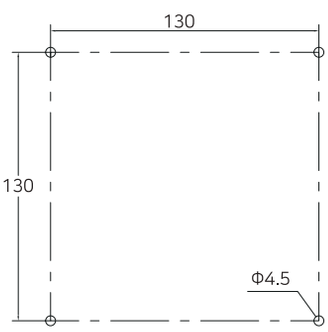




500M







Residual Voltage Test Meter



Model No

KDX-510
①

① Residual Voltage Test Meter(Need to use with KDX-500M)

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.
In order to prevent the electric shock accident, this device can monitor the residual voltage by redundant wiring.

Function

- Remote power quality monitoring with RS-485 / LAN communication.
- Residual voltage can be checked by one touch safety button.
- Safety status can be checked easily by LED and voltage value.

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

Feature

- The status of the dual-voltage measurement is indicated through auxiliary LED divided into Danger, Safe, and Diagnosis.
- Disconnect measurement and display and connect 8-pin LAN cable

Specification

Aux. power	AC 90 ~ 260V(50/60Hz) DC110V	Surge immunity		1.2/50us, 2kV (IEC 61000-4-5)	
		Electrostatic discharge		8kV/4kV	
Operating temperature	-10~50℃	Maximum allowed input		110% of input range	
Operating humidity	20~85%	Display		Custom LCD(60 X 55 X 15.5)mm Check current status LED : Status LED : SK6812	
Storage temperature	-20~60℃	Radio frequency impulse		CE : 0.15~0.5MHz : 79(66)dbuV, 0.5~30MHz : 73(60)dBuV, (KN22) RE : 30~230MHz : 40dbuV/m, 230~1000MHz : 47dBuV, (KN22)	
Insulation resistance	More than 10MΩ	Electromagnetic Radiation		0.5 Time /sec	
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)	Communication	500D	Protocol : Modbus TCP (PC Communication) Interface : RJ45(LAN)	Use 8-pin LAN cable
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min		510	Protocol : Modbus RTU ((Measure, Display)) Interface : RJ-45 [RS-485:1(15), 2(GND), 7(A+), 8(B-)] Baudrate : 19200bps(Fix)	
Withstand voltage	AC 2kV/1min	Weight		200g(KDX-500M), 500g(KDX-500D)	

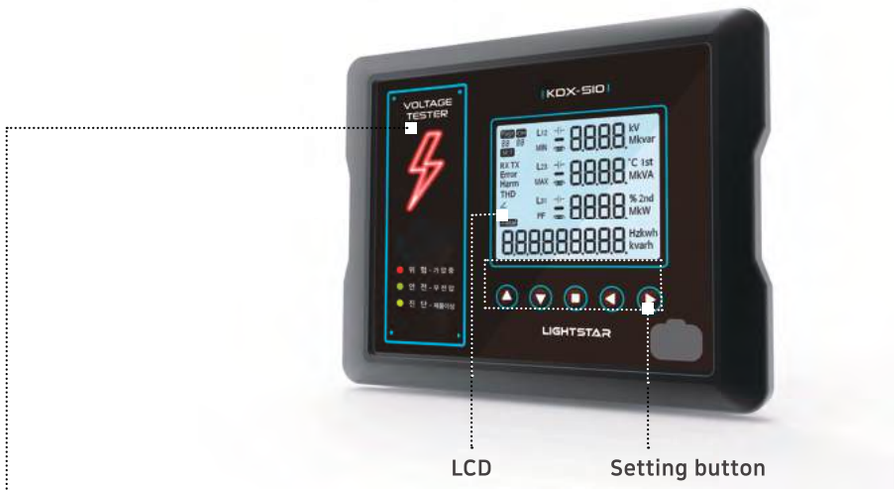
Input

Voltage	Line to line 40~600V (Residual high voltage 3V~) (Rating : 110 or 190V)
Current	0.1 ~ 6.0A(Rating : 5A)
Frequency	45~65Hz (3P3W, 3P4W)

Accuracy

Voltage	± (0.2% of rdg + 0.1% of FS)	Active power	Class 0.5 as per IEC 62053-22
Current	± (0.2% of rdg + 0.2% of FS)	Active energy	
Power factor	± (0.5% of rdg + 0.5°)	Reactive power	Class 1.0 as per IEC 62053-24
Frequency	± 0.02 Hz	Reactive energy	

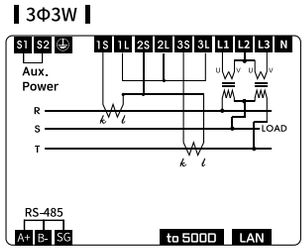
Configuration

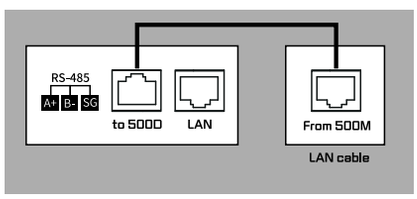


Normal power				
Color	Red light	Red light	Green light	Yellow light
Voltage status	Normal voltage	OVR (Over voltage +15% over) UVR (Under voltage -15% less)	No voltage	Abnormal status (1Ch, 2Ch difference more than 15%)

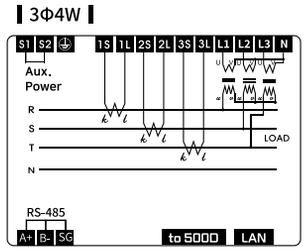
Connection diagram

3Φ3W





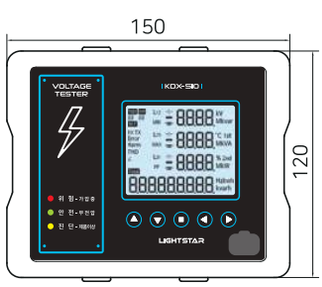
3Φ4W

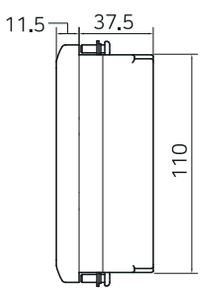


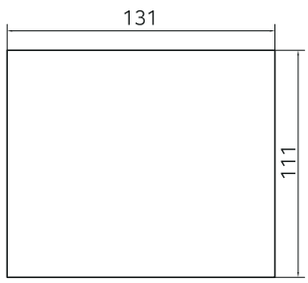
Note : N Phase of PT primary shall not be wired.

Drawing

Unit : mm







AC 3P V · A Meter

Certificates (KDO-100)



Model No

KDO -[ ]
①

① Data / Comm	
100	3P V, 3P A / None
200	3P V, 3P A, W, PF, Hz / None
201	3P V, 3P A, W, PF, Hz / RS-485

Overview

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

Direct connection is possible without PT up to 500V.

Specification

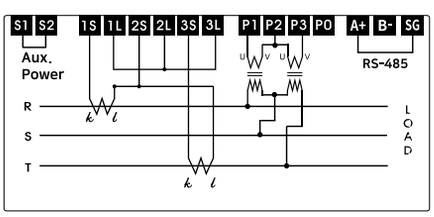
Aux. power	AC 90 ~ 260V(50/60Hz) , DC110V	Surge immunity	4kV/2kV
		Electrostatic discharge	8kV/6kV
Operating temperature	-10~50℃	Maximum allowed input	110% of input range
Operating humidity	20~85%	Display	7 Segment LED(0.56Inch, Red)
Storage temperature	-20~60℃	Max display value	999
Insulation resistance	More than 10MΩ	Measuring interval	1Time / sec
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs, 2kA)	Communication(Option)	Protocol : Modbus RTU Interface : RS-485 2wire Baudrate : 9600bps
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min	Weight	500g
Withstand voltage	AC 2kV/1min		

Input

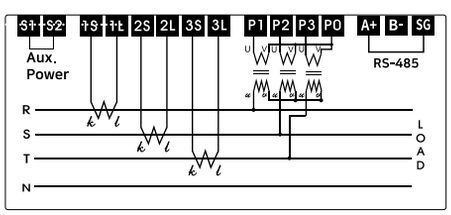
Range	Line Voltage	AC 50~ 500V (Rating : 110 or 190V)	Accuracy	Voltage	± (0.3% of rdg + 0.1% of FS)
				Current	± (0.3% of rdg + 0.2% of FS)
				Power	Class 1.0 as per IEC 62053-21
	Current	AC 0.1~ 6.0A(Rating : 5A)		Power factor	±(1.0% rdg + 1.0 °)
				Frequency	± 0.1 Hz

Connection diagram

3Ø3W



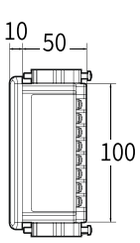
3Ø4W

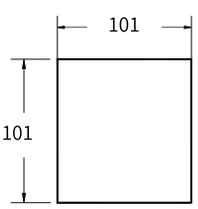


Note : N Phase of PT primary shall not be wired.

Drawing







AC 3P V · A Meter



Model No

KDO - 300

① Data / Comm

3P V, 3P A / RS-485

Overview

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

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

Specification

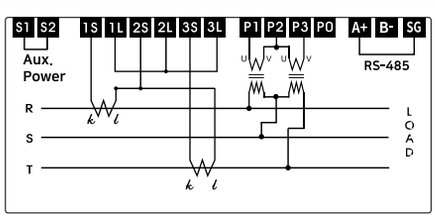
Aux. power	AC 90 ~ 260V(50/60Hz) , DC110V	Surge immunity	4kV/2kV
		Electrostatic discharge	8kV/6kV
Operating temperature	-10~50℃	Maximum allowed input	110% of input range
Operating humidity	20~85%	Display	7 Segment LED(0.56Inch, Red)
Storage temperature	-20~60℃	Max display value	9999
Insulation resistance	More than 10MΩ	Measuring interval	1Time / sec
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs, 2kA)	Communication	Protocol : Modbus RTU Interface : RS-485 2wire Baudrate : 9600bps, 19200bps
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min	Weight	500g
Withstand voltage	AC 2kV/1min		

Input

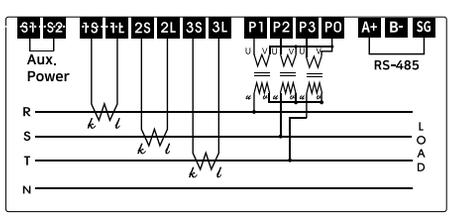
Range	Line Voltage	AC 50~ 500V (Rating : 110 or 190V)	Accuracy	Voltage	± (0.3% of rdg + 0.1% of FS)
	Current	AC 0.1~ 6.0A(Rating : 5A)		Current	± (0.3% of rdg + 0.2% of FS)

Connection diagram

3Ø3W



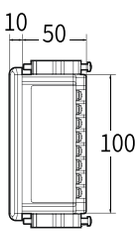
3Ø4W

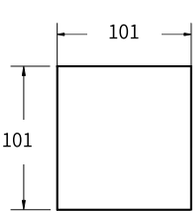


Note : N Phase of PT primary shall not be wired.

Drawing







AC 3P V · A Meter



Model No

KDO - 400

① Data

3P V, 3P A

Overview

Monitoring 3Phase voltage and current with 6 sets of LED display

- CT ratio : Customized product can be produced by order.
- PT ratio : Unable to set
- The current measurement range is set by order made.

Specification

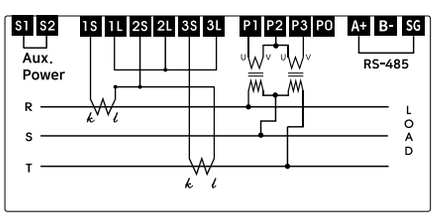
Aux. power	AC 90 ~ 260V(50/60Hz) , DC110V	Withstand voltage	AC 2kV/1min
		Surge immunity	4kV/2kV
Operating temperature	-10~50℃	Electrostatic discharge	8kV/6kV
Operating humidity	20~85%	Maximum allowed input	110% of input range
Storage temperature	-20~60℃	Display	7 Segment LED Display(0.56inch, Red)
Insulation resistance	More than 10MΩ	Max display value	999
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs, 2kA)	Measuring interval	1Time / sec
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min	Weight	500g

Input

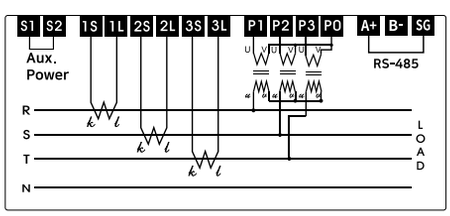
Range	Line voltage	AC 50~ 500V	Accuracy	Voltage	± (0.3% of rdg + 0.1% of FS)
	Current	AC 0.1~ 6.0A(Rating : 5A)		Current	± (0.3% of rdg + 0.2% of FS)

Connection diagram

3Ø3W



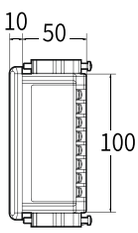
3Ø4W

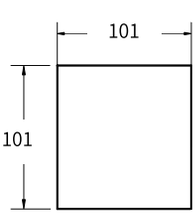


Note : N Phase of PT primary shall not be wired.

Drawing







Phase Sequence Detector



Model No

KDO - ①

① Relay

500	PHASE SEQUENCE DETECTOR(PSD)	510	PHASE SEQUENCE RELAY(PSR)

Overview

By checking the 3- phase of input voltage, NORMAL state, and REVERSE state to display by LED. (Relay option)

Function

- If the three-phase phase is normal, it is displayed in green LED, and if reversed, it is displayed in red LED.
- The relay contacts are available depending on the LED(option).

Specification

Aux. power (Relay)	AC 110, 220V (50/60Hz)	Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min
		Withstand voltage	AC 2kV/1min
Operating temperature	-10~50℃	Surge immunity	4kV/2kV
Operating humidity	20~85%	Electrostatic discharge	8kV/6kV
Storage temperature	-20~60℃	Maximum allowed input	110% of input range
Insulation resistance	More than 10MΩ	Display	Circle LED(Diameter : 10mm, Red / Green)
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs, 2kA)	Weight	310g

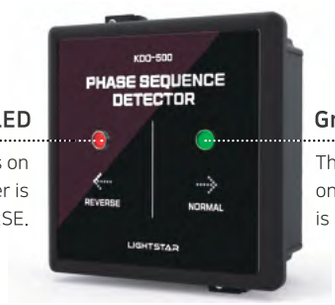
Input

Range	Voltage	r, s, t	Line to line AC 100~250V, 50/60Hz
		R, S, T	Line to line AC 250~500V, 50/60Hz

Output

Output terminal	Ta, Tb, Tc	AC 250V/3A, DC 30V/3A(Relay)

Configuration

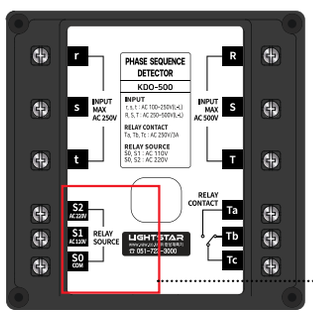


Red LED

The red LED is on if the phase order is REVERSE.

Green LED

The green LED is on if the phase order is NORMAL.

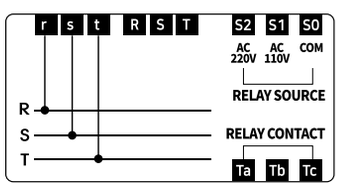


Relay

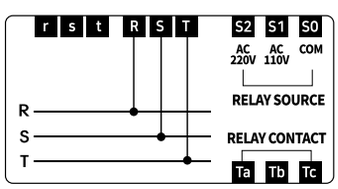
By applying relay Aux. power, the relay connects Ta and Tc output terminals If the green LED is on in the normal state, and the relay connect Tb and Tc output terminals If the red LED is on in the reverse phase state.

Connection diagram

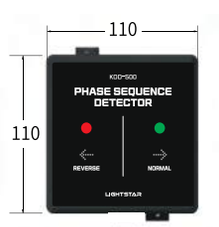
AC 100~250V

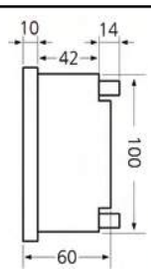


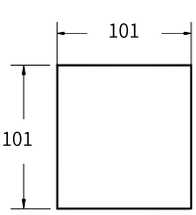
AC 250~500V



Drawing







V /A · Hz Relay Meter



Model No

KDU - ①

① Data / Comm					
100	V, Hz / None	**200**	V, A, Hz / None	**201**	V, A, Hz / RS-485

Overview

Monitoring voltage, current and frequency, and relay contact will be activated if exceed setting range. (OVR / UVR / OFR /UFR)

Up to 500V, direct connection is possible without PT

Specification

Aux. power	AC 90 ~ 260V(50/60Hz) , DC110V	Surge immunity	4kV/2kV
		Electrostatic discharge	8kV/6kV
Operating temperature	-10~50℃	Maximum allowed input	110% of input range
Operating humidity	20~85%	Display	7Segment LED(0.56inch, Red)
Storage temperature	-20~60℃	Max display value	999
Insulation resistance	More than 10MΩ	Measuring interval	1Time / sec
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)	Weight	400g
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min	Communication	Protocol : Modbus RTU Interface : RS-485 2wire Baudrate : 9600bps
Withstand voltage	AC 2kV/1min		
Contact capacity	AC 250V, 5A / DC 30V, 5A		

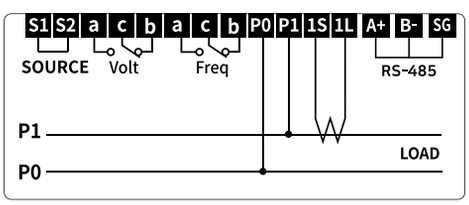
Input

Range	Voltage	AC 50~ 500V	Current	0.1~6A(Ratio 5A)	Accuracy	Voltage	± (0.3% of rdg + 0.1% of FS)
						Current	± (0.5% of rdg + 0.2% of FS)
	Frequency	45~ 65Hz				Frequency	± 0.1Hz

Setting

OVR / UVR	500~100V	Delay time	0.16~5.0 sec
		HOLD	ON/OFF
OFR / UFR	65~45Hz	No Voltage	ON/OFF

Connection diagram



The current value can not be set.

Drawing

Refer to page 68 type A-3

DER Relay Meter



Certificates CE KC

Model No

KDU - 300
①

① OVR, UVR, OFR, UFR, RPR

Overview

Monitoring voltage, current and frequency, and relay contact will be activated if exceed setting range. (OVR / UVR / OFR / UFR / RPR)

Specification

Aux. power	AC 90 ~ 260V(50/60Hz) , DC110V	Withstand voltage	AC 2kV/1min
Operating temperature	-10~50℃	Surge immunity	4kV/2kV
Operating humidity	20~85%	Electrostatic discharge	8kV/6kV
Storage temperature	-20~60℃	Maximum allowed input	110% of input range
Insulation resistance	More than 10MΩ	Display	Custom LCD
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs, 2kA)	Measuring interval	1Time / sec
		Contact capacity	AC 250V, 5A / DC 30V, 5A
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min	Weight	800g

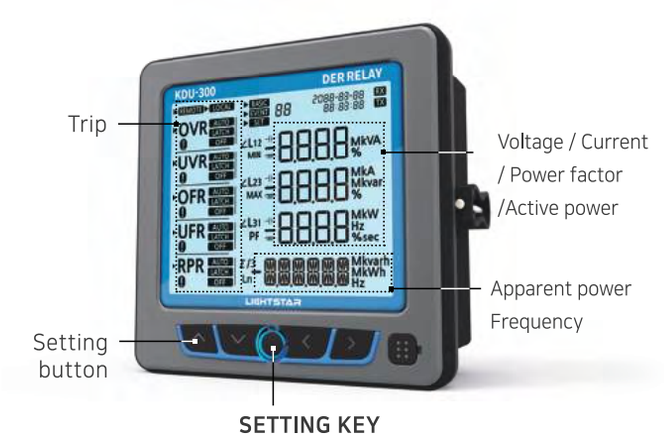
Input

Range	Voltage	60~500.0V(Rating : 110 or 190V)	Accuracy	Voltage	±(0.3% of rdg + 0.1% of FS)
	Current	0.1~6A(Rating : 5A)		Current	±(0.3% of rdg + 0.2% of FS)
	Power factor	± 0.250~1.000		Active power	Class 1.0 as per IEC 62053-21
	Frequency	45.0~70.0Hz(3P3W, 3P4W)		Apparent power	Class 1.0 as per IEC 62053-21

Setting formal

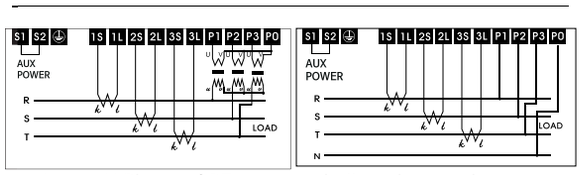
Component		Operation	Setting		Delay time		
			Range	Unit	Range	Unit	Type
59	OVR	Time delayed	60~310V	1V	0.05~60.00sec	0.01sec	Definite time
27	UVR	Time delayed	60~310V	1V	0.05~60.00sec	0.01sec	Definite time
32P	RPR	Time delayed	3~1800W	1W	0.05~60.00sec	0.01sec	Definite time
81O	OFR	Time delayed	45.0~65.0Hz	0.1Hz	0.1~60.00sec	0.01sec	Definite time
81U	UFR	Time delayed	45.0~65.0Hz	0.1Hz	0.1~60.00sec	0.01sec	Definite time

Configuration



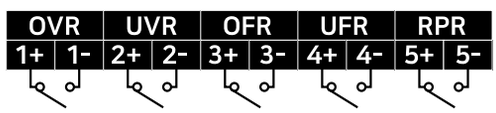
Connection diagram

3P3W(3P4W) 3P4W



Note : N Phase of PT primary shall not be wired.

Relay



Drawing

Refer to page 100 type KDX-200

Advanced Power Meter with ELD Function

Certificates Korea Fire Industry Technology Institute

Model No

KDQ - 310 ①	① Advanced Power Meter with ELD Function
	Power Meter + Leakage detector + ACB Control + Temperature(PT100Ω) + RS-485 communication

Overview

Monitoring the electrical data including leakage current, TR temperature, and THD.
Also, ACB control can be done by one device with easy installation.

Function

- Leakage current : Monitoring leakage current and phase by dedicated ZCT (KBJ-26), which is installed at the 2ndary of main TR.
- Power measurement : Harmonic, (Voltage / Current 1st~15th) 3P Voltage, Current, Power factor, Frequency, Active power, Reactive power, Active energy, Reactive energy.
- TR Temperature : Temperature measurement by are achieved through PT-100 ohms and relay.
- ACB : 2 sets DO for ACB control, 2 sets of DI for ACB status.
- Earth leakage : Monitoring 16ch leakage value with test, alarm, buzzer and relay.

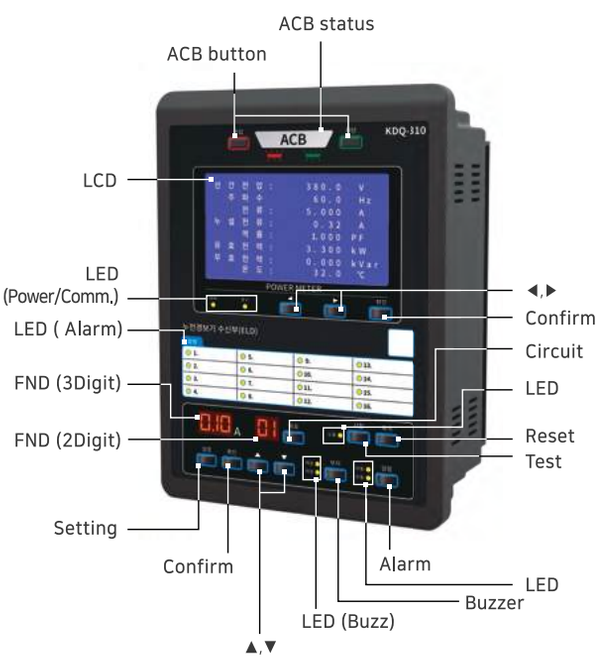
Input

Input	Voltage	Line to line 40.0~500V
	Current	0.050~5.500A
	Power factor	(lead)-0.500~1.000~0.500(lag)
	Phase angle	0.0° ~ 359.9°
	Frequency	45.0~65.0Hz
	Leakage current	0.06~1.00A (ZCT)
	Leakage current	0.01~30.00A(KBJ-26)
	Temperature	-50~100°C(PT-100Ω)
Input / Output	Digital Input	ACB Input / Output(DI ON1,2/OFF1,2) AC/DC 110V or 220V
	Digital Output	ACB Input / Output(DO ON1,2/OFF1,2) AC 240V 16A, DC125V 30A, Load resistor
		Leakage alarm contact (Ta, Tc), Temperature alarm contact (ALARMa, ALARMc) AC 250V / 1A, DC 24V /2A
Accuracy	Line voltage	±(0.3% of rdg + 0.1% of FS)
	Phase voltage	±(0.3% of rdg + 0.1% of FS)
	Phase current	±(0.3% of rdg + 0.2% of FS)
	Power factor	±(0.5% of rdg +0.5°)
	Active power	Class 0.5 as per IEC 62053-21
	Active energy	
	Apparent power	
	Reactive power	Class 1.0 as per IEC 62053-24
	Reactive energy	
	Frequency	±0.02Hz
	Leakage current	±(1% of rdg + 1digit)
	Line voltage	±(1% of rdg + 0.02% of FS) + CT error
	Temperature	±(1% of rdg + 1digit)

Specification

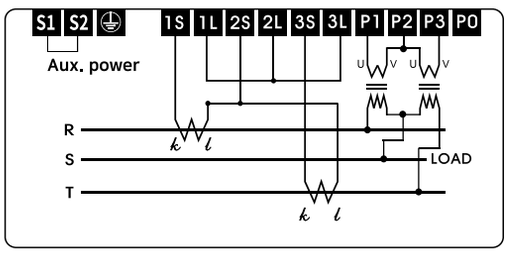
Aux. power	AC 90 ~ 260V(50/60Hz) , DC110V
Operating temperature	-10~50℃
Operating humidity	20~85%
Storage temperature	-20~60℃
Insulation resistance	More than 10MΩ
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min
Withstand voltage	AC 2kV/1min
Surge immunity	4kV/2kV
Electrostatic discharge	8kV/6kV
Maximum allowed input	110% of input range
Display	LCD(BACk Light : White)
Measuring interval	1Time / sec
Weight	800g
Communication	Protocol : Modbus RTU Interface : RS-485 2wire Baudrate : 9600bps, 19200bps

Configuration

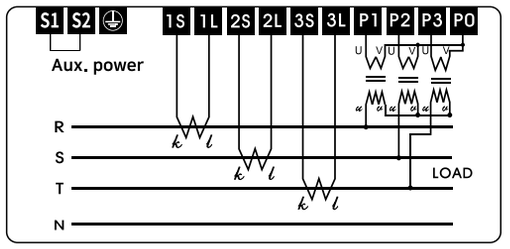


Connection diagram

3P3W

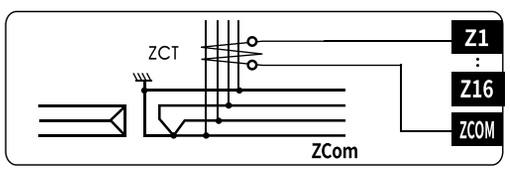


3P4W

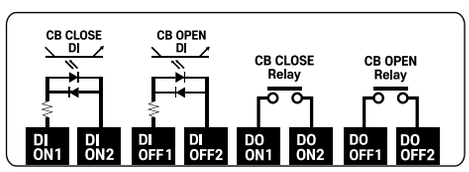


Note : N Phase of PT primary shall not be wired.

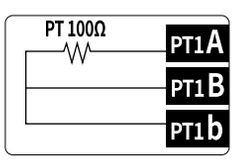
ZCT



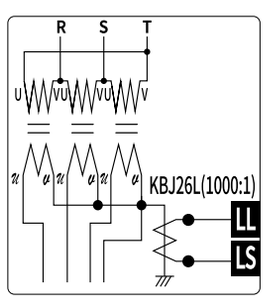
ACB



Temperature(PT100Ω)

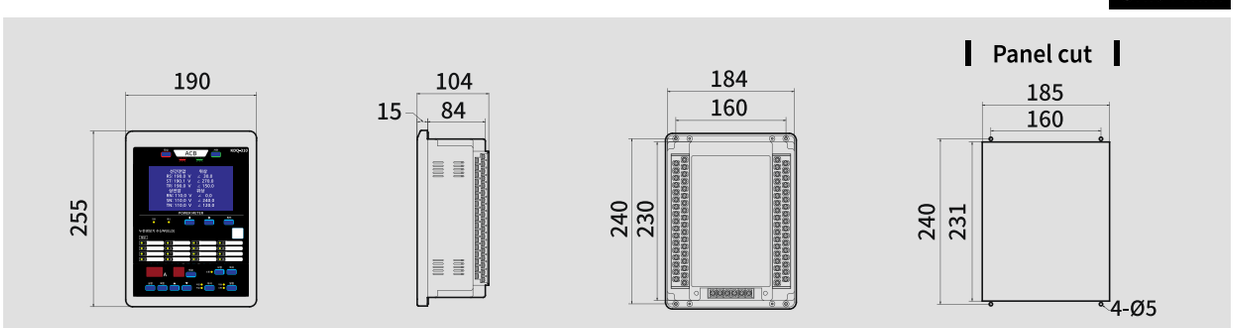


Leakage current



Drawing

Unit : mm



Advanced Power Meter with ELD Function

Certificates Korea Fire Industry Technology Institute

Model No

KDQ - ① ②

① Advanced Power Meter with ELD Function	② Function		③ Communication	
	320	Advanced power meter + Leakage detector	C	RS-485
	330	Advanced power meter + Leakage detector +ACB controller	N/A	None

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 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

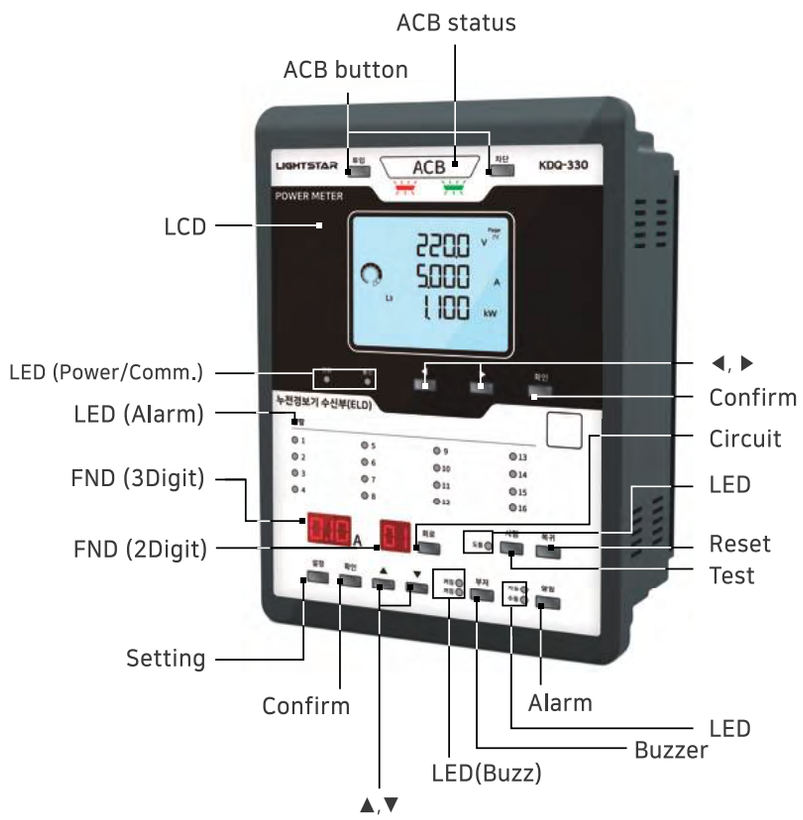
Aux. power	AC 90 ~ 260V(50/60Hz) , DC110V
Operating temperature	-10~50℃
Operating humidity	20~85%
Storage temperature	-20~60℃
Insulation resistance	More than 10㏁
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min
Withstand voltage	AC 2kV/1min
Surge immunity	4kV/2kV
Electrostatic discharge	8kV/6kV
Maximum allowed input	110% of input range
Display	LCD(BACk Light : White)
Measuring interval	1Time / sec
Weight	800g
Communication	Protocol : Modbus RTU Interface : RS-485 2wire Baudrate : 9600bps, 19200bps

Input

Input	Voltage	Line to line 40.0~500V
	Current	0.050~5.500A
	Power factor	(lead)-0.500~1.000~0.500(lag)
	Phase angle	0.0° ~ 359.9°
	Frequency	45.0~65.0Hz
	Leakage current	0.06~1.00A (ZCT only)
Input / Output	Digital Input	ACB Input / Output(DI ON1,2/OFF1,2) AC/DC 110V or 220V
	Digital Output	ACB Input / Output(DO ON1,2/OFF1,2) AC 240V 16A, DC125V 30A Load resistor
		Leakage alarm contact (Ta, Tc), Temperature alarm contact (ALARMa, ALARMc) AC 250V / 1A, DC 24V /2A
Accuracy	Line voltage	±(0.3% of rdg + 0.1% of FS)
	Phase voltage	±(0.3% of rdg + 0.1% of FS)
	Phase current	±(0.3% of rdg + 0.2% of FS)
	Power factor	±(0.5% of rdg +0.5°)
	Active power	Class 0.5 as per IEC 62053-21
	Active energy	
	Apparent power	
	Reactive power	Class 1.0 as per IEC 62053-24
	Reactive energy	
	Frequency	±0.02Hz
	Leakage current	±(1% of rdg + 1digit)

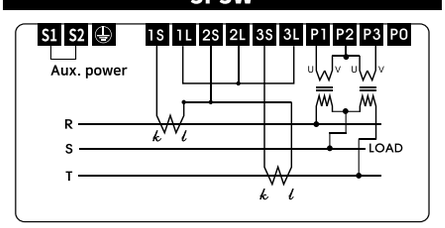
Configuration

KDQ-330

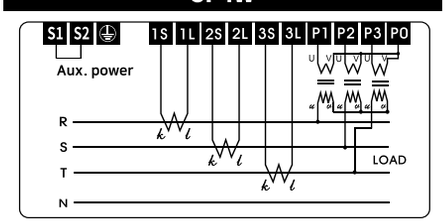


Connection diagram

3P3W

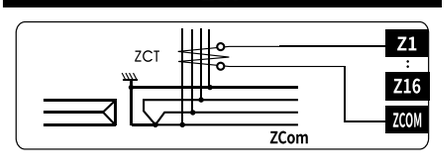


3P4W

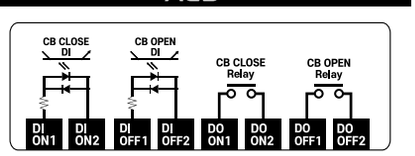


Note : N Phase of PT primary shall not be wired.

ZCT

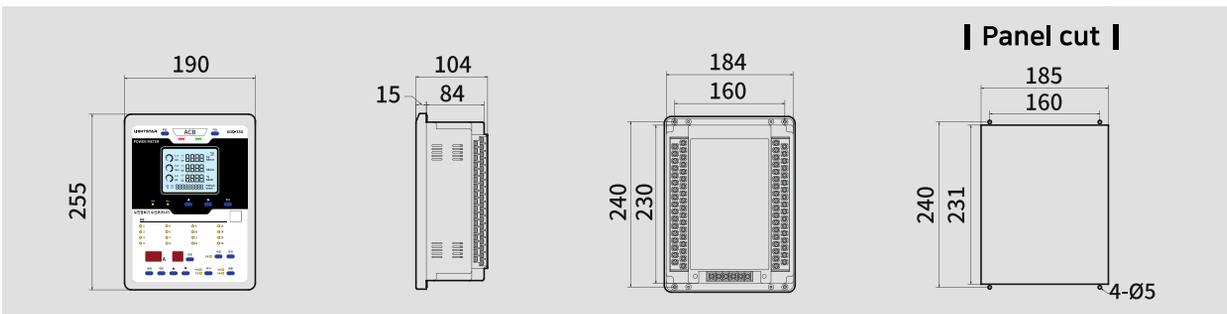


ACB



Drawing

Unit : mm



12Ch Panel Power Meter



Certificates CE KC

Model No

KTG-PM12 ① 12Ch Panel Power Meter

①

Overview

It is a device to measure / display various measurement elements of power system, to remotely monitor measured data using RS-485 communication, and to save data to SD card.
It is able to measure / display the voltage, current, active power, reactive power, apparent power, power factor, frequency, active / reactive energy for each phase by inputting PT ratio and CT ratio of 12 channels, displays current, power, and power factor.
Average / Maximum / Minimum voltage, current, power, and power factor according to setting time.

Feature

- It has 3phase current 12 channels, allowing a total of 36 multiple current inputs.
- It is convenient to check the measurement information for each channel because it is possible to change / display channel by pressing one-touch key.
- Remote power monitoring using RS-485 communication is possible. (MODBUS-RTU)
- This can be used to check the past records using the USB cable.

Specification

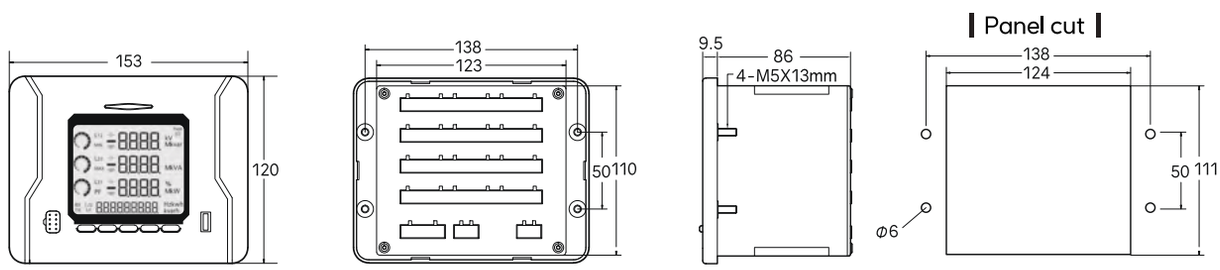
Aux. power	AC 90V ~ 260V
Operating temperature	-10~50℃
Operating humidity	20~85%
Storage temperature	-20~60℃
Insulation resistance	100MΩ (DC 500V)
Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs, 2kA)
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min
Withstand voltage	AC 2kV/1min
Surge immunity	4kV/2kV
Electrostatic discharge	8kV/6kV
Maximum allowed input	110% of input range
Display	LCD (BACK LIGHT : WHITE)
Measuring interval	1Time / sec
Weight	1300g
Communication	Protocol : Modbus RTU Interface : RS-485 2wire Baudrate : 9600bps, 19200bps

Input

input	Voltage	Line to Line 40.0~500.0 V
	Current	0.05~5A
	Power factor	±0.200~1.000
	Frequency	45~65Hz
Accuracy	Voltage	± (0.3% of rdg + 0.1% of FS)
	Current	± (0.3% of rdg + 0.2% of FS)
	Power factor	± (0.5% of rdg + 0.5 °)
	Active power	Class 0.5 as per IEC 62053-21
	Active energy	
	Reactive power	Class 1.0 as per IEC 62053-24
	Reactive energy	
	Frequency	±0.02Hz

Drawing

Unit : mm



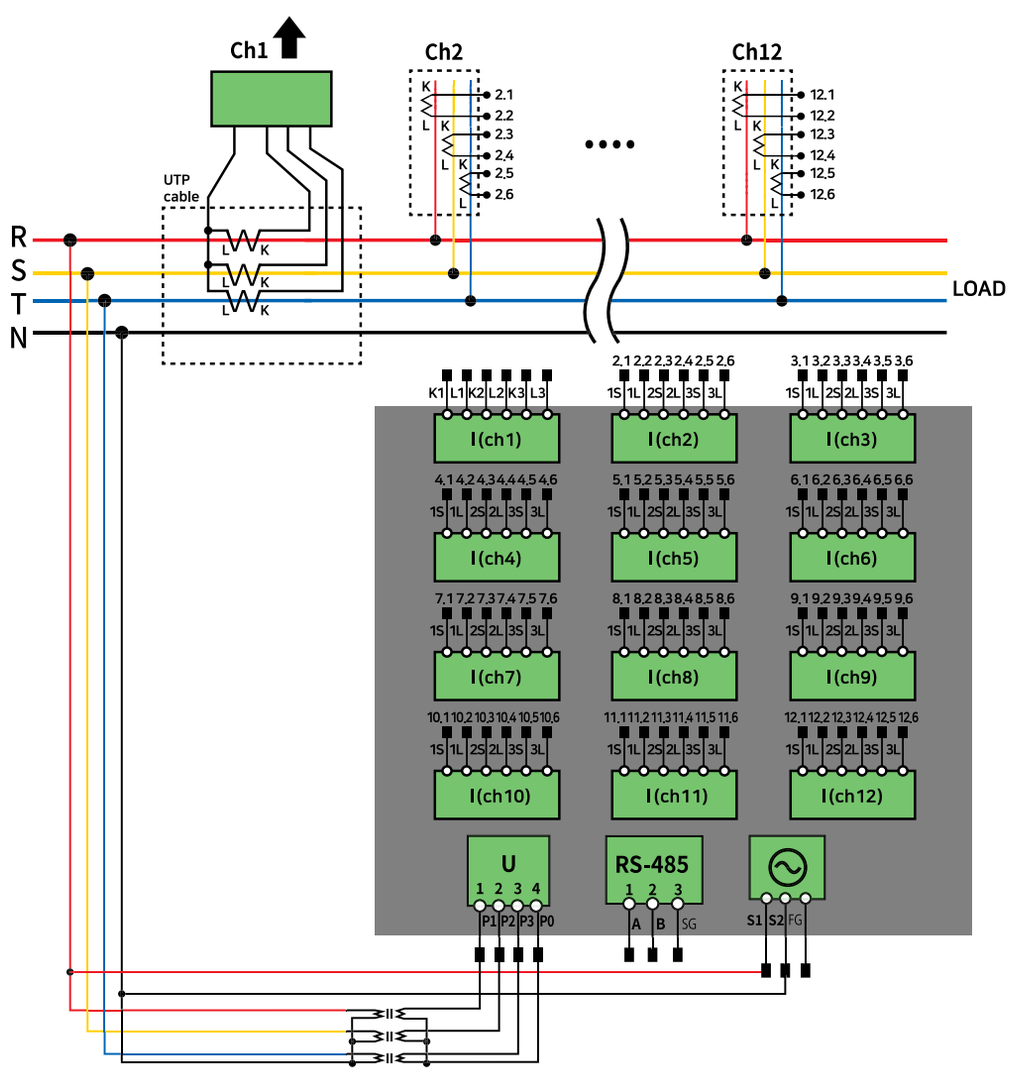
Configuration



KEY

KEY	Measure mode	Set mode
▲	Change channel (1 → 12)	Increase value
▼	Change channel (12→1)	Decrease value
●	Change page (min/max/avg), hold for 2 seconds to switch to setting mode	Enter or save hold for 2 seconds to switch to Measure mode
◀	Change parameter (Energy - power - Power factor - Current - Voltage)	Page Down
▶	Change parameter (Voltage - Current - Power factor - Power - Energy)	Page Up

Connection diagram



Demand Controller





Model No

KCD - ①

①	Demand Controller
4	Demand Controller
500	Demand Controller (High efficiency energy material certified)

Overview

KCD-500 : High efficiency energy material certified.

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

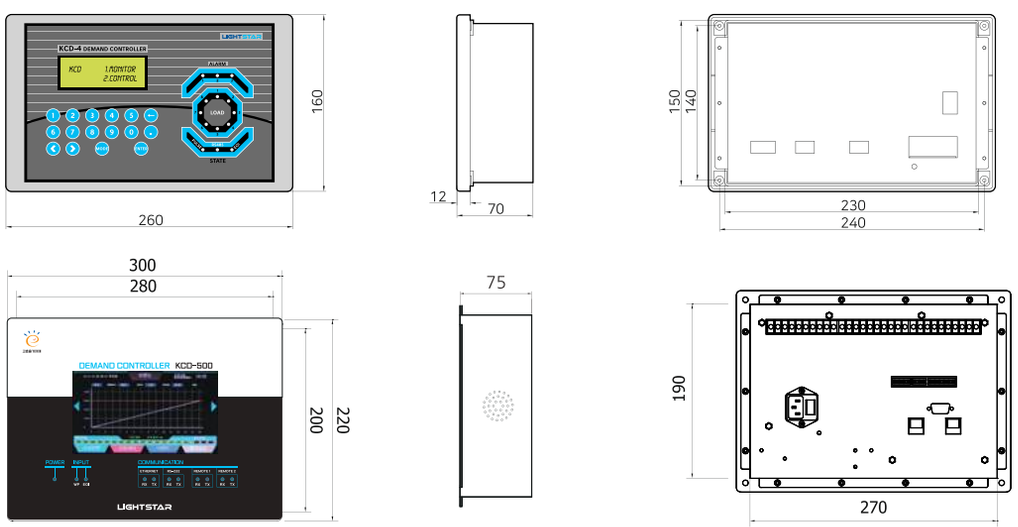
- Connected with KEPCO Approved energy meter, and control the demand with WP and EOI signal.
- HMI Program to be provided in order to monitor power, setting, control status and trend by PC.
- Remote load controller (KCD-04) can be connected and control to various load.

Specification

Aux. power	KCD-4 : AC90V~260V(60Hz), DC110V			Display	KCD-4	Contact status 8EA, Alarm 3EA, Signal input 3EA (Pulse, EOI, RS-485) LED
	KCD-500 : AC90V~260V(60Hz), DC110~125V				KCD-500	On (Power), Input signal(Pulse, EOI) Communication(RS-232), Ethernet, RS-485)LED
Operating temperature	-10~50℃(KCD-4), -20~50℃(KCD-500)					
Operating humidity	10~90%	Storage temperature	-20~60℃			
Insulation resistance	More than 10MΩ	Surge immunity	4kV/2kV			
Electrostatic discharge	8kV/6kV			Output	KCD-4	Remote load control (KCD-04)
Surge impulse	Voltage(1.2μs/ 50μs,5kV), Current(8μs/ 20μs)				KCD-500	Loading Relay (250V / 10A) A,B Contact 8 channel Loading Relay (250V / 10A) A Contact 3 channel Remote load control (KCD-04)
Burst	Level 4(IEC 61000-4-4) 4kV/2kV, 3min					
Withstand voltage	AC 2kV/1min			Weight	930g(KCD-4), 2600g(KCD-500)	
Communication	KCD-4	1) RS-485(PC) Communicated with PC (HMI) 2) RS-485(LOAD) Connected with remote load controller (KCD-04)		KCD -500	1) RS-232 Communicated with PC (HMI) 2) RS-485(LOAD) Communicated with PC (HMI) or LG ACP 3) RS-485(1,2) Connect with remote load controller (KCD-04)	

Drawing

Unit:mm



EARTH LEAKAGE DETECTOR



CE certification

CE stands for "Conformité Européenne" 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 EMCD(Electro Magnetic Compatibility Directive).
LIGHTSTAR achieved CE certificate for Analog meter, Current Transformer, Digital meter, Power meter, and Transducers.

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.

LIGHTSTAR
㈜광성계측기

CONTENTS



126~127 KG□-□
Earth Leakage Detector(Relay)



128~129 KGC-□
Zero Phase Current Transformer for Cable



130~131 KGB-□

Zero Phase Current Transformer for Busbar



132 KG□-□S

Zero Phase Current Transformer for SGR(SELECTIVE GROUND RELAY)

Earth Leakage Detector/Earth Leakage Detector and relay



Certificates Korea Fire Institute approved

Model No

KGD - ①②③

① Number of circuits	② Communication		③ Use	
08 08Circuit	**C**	RS-485	**R**	Relay contact for each circuit
10 10Circuit	**N/A**	None	**N/A**	Common contact 1EA
12 12Circuit				
16 16Circuit				

Overview

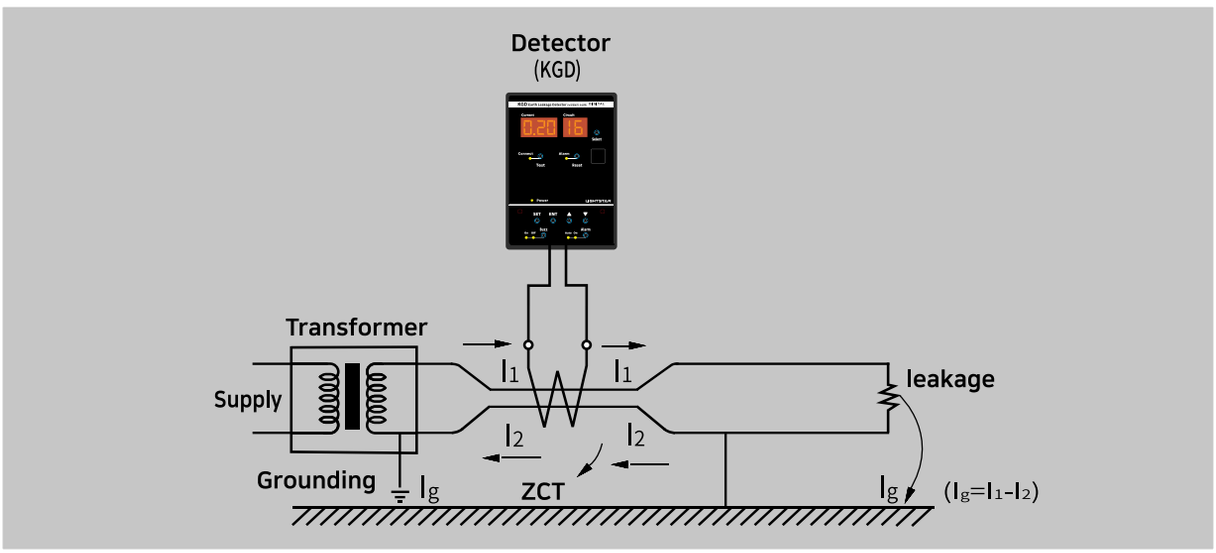
This device can be used for detecting earth leakage for low voltage(<AC600V). Alarm and buzzer to be activated if measured current from ZCT is exceed setting value.

Specification

Item	KGD-08	KGD-10	KGD-12	KGD-16	KGD-08CR
Circuit	8Circuit	10Circuit	12Circuit	16Circuit	8Circuit
Input	ZCT output (KGB, KGC)				
Display	• Leakage : 7-segment LED 3Digit • Circuit : 7-segment LED 2Digit • Status LED : Green(Normal), Yellow(Test), Red(Alarm)				

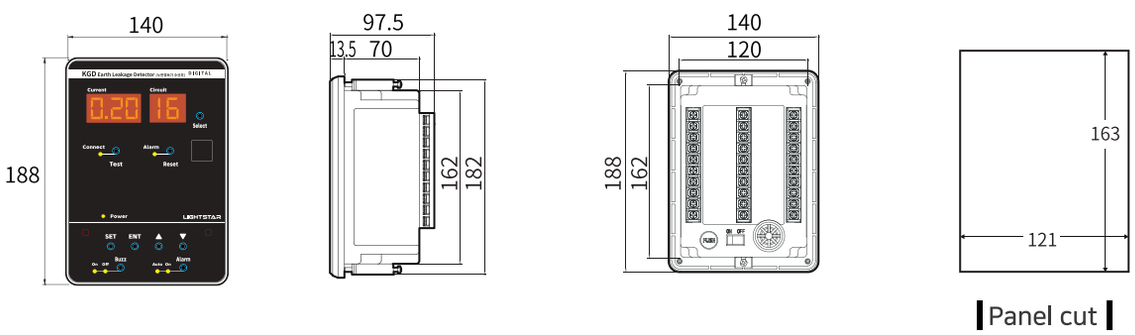
Aux. power	AC/DC 90 ~ 260V (50/60Hz)	Insulation resistance	More than 5MΩ
Contact capacity	AC 250V/5A 0.3sec, DC 30V/5A	Withstand voltage	AC 2.2kV(60Hz)/1 min
Contact output	1EA(KGD-08,10,12,18)/8EA(KGD-08CR)		
Sensitivity setting	0.2A~1.0A(0.1A Unit Setting)	Surge impulse	Voltage(1.2μs/ 50μs,5kV) Current(8μs/ 20μs)
Operating temperature	-20℃ ~ 60℃		
Operating humidity	45~85% RH(Not lower than dew point)	Burst	Level 4 (IEC 61000-4-4)
Operating	Within 1 second when 75% or more of setting value		
Inoperative	Inoperative when less than 52% of setting current continues 30 sec and more.	Electrostatic discharge	8kV / 6kV (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		
Communication (Option)	Protocol : Modbus RTU Interface : RS-485 Baudrate : 9600bps	Radio frequency Radiation resistance	0.15~80Mhz 10V/m (IEC 61000-4-3)
Operating temperature	-20℃ ~ 60℃	Impact Test	50gf, 5times
Operating humidity	45~85% RH(Not lower than dew point)		
Vibration	Frequency : 10~150Hz Acceleration amplitude : 0.981m/s² Sweep speed : 1 octave / min Sweep cycles : 1 time per axis	Internal Impedance	2kΩ

Operating principle

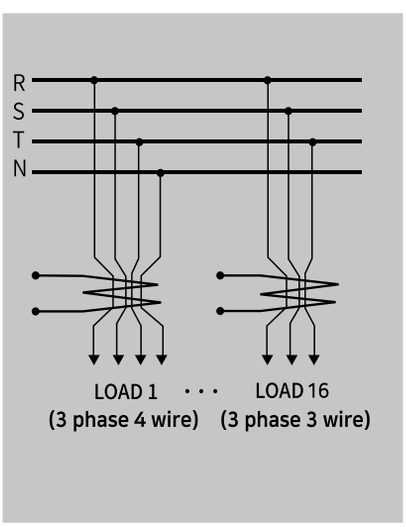


Drawing

Unit : mm



Connection diagram



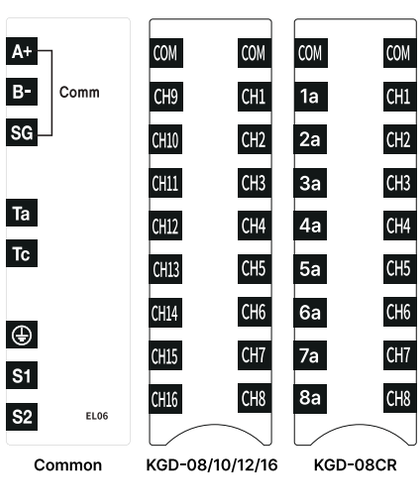
Terminal configuration

Common

- S1, S2 : Aux. power (AC/DC 90~260V)
- ⏚ : Earth(Grounding terminal)
- Ta, Tc : Non-voltage contact
- A+, B-, SG : RS-485 Communication (Option)
- COM : ZCT Common

Input and Output

- KGD-08/10/12/16
  ch1~ch16 : ZCT input for each circuit
- KGD-08CR
  1a~8a : Contact output for each circuit
  ch1~ch8 : 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

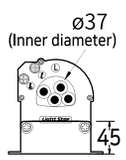
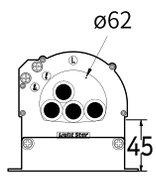
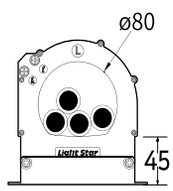
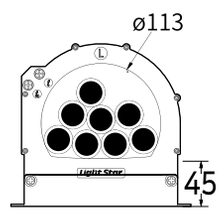
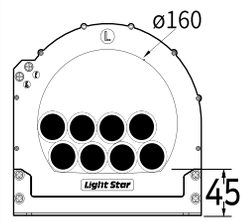
In order to minimized cable bending radius, bottom of ZCT hole is designed as wide and flat.
And considering cable duct height(40mm), the bottom of ZCT hole is 45mm height.

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 200㎃ / 100㎷ (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

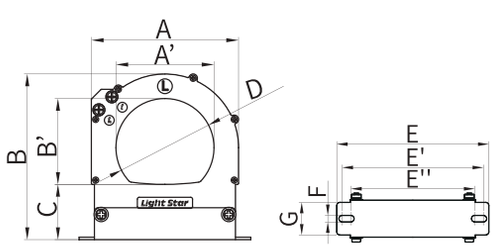
35SQ	185A	120SQ	410A	185SQ	542A	240SQ	641A	400SQ	940A

Caution

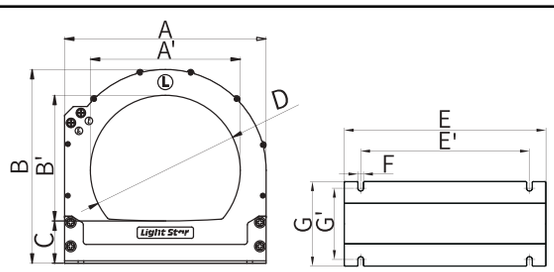
1. If the N phase does not pass through the ZCT, a leakage alarm will be generated.
2. It is recommended to use 2 core shield cable or twist pair cable for secondary cable, in order to prevent electrostatic induction and electronic induction.
3. At the time of wire penetration, locate cables evenly and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

Drawing

Unit : mm



KGC-30/50/75/100



KGC-150

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



KGB-01,02,03



KGB-05,07,11

Certificates Korea Fire Institute approved

Model No

KGB- ①

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

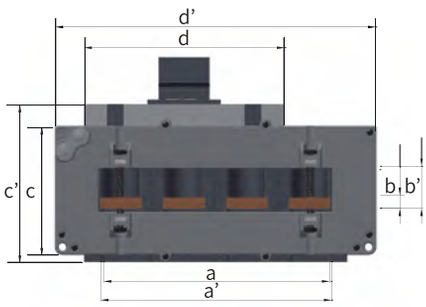
Type	KGB-01	KGB-02	KGB-03	KGB-05	KGB-07		KGB-11		
Circuit breaker	100AF	125AF	225AF	400AF	400AF	600AF	600AF	800AF	1000AF
	3P3W 3P4W	3P3W 3P4W	3P3W 3P4W	3P3W 3P4W	3P4W (Expanded type)	3P3W	3P4W	3P3W 3P4W	3P3W 3P4W
Rated primary current	100A	150A	300A	400A	600A		1000A		
Maximum voltage/ Frequency	Less 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								

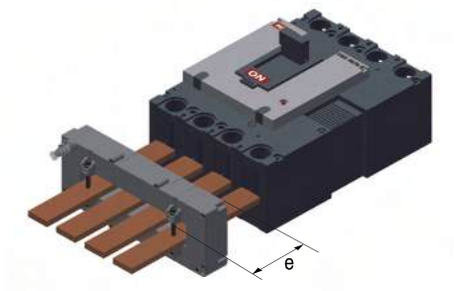
The rated primary current is the current for official test. Test terminal is not included.

Caution

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

Drawing



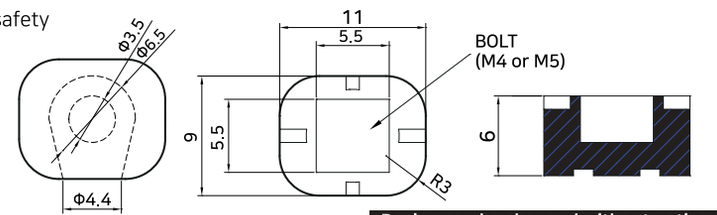


Dimension

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

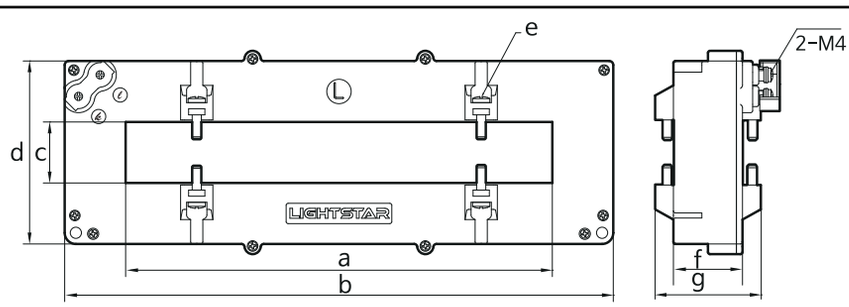
- Please prevent direct contact with busbar, which may cause CT deformation and damage.
- Torque limit for bus bar fixing bolt(Excess torque may cause bending and distortion) : M4 - 5~7 kgf · cm, M5 - 7~10kgf · cm
- Be aware of the energizing with busbar fixing bolt(M4/M5)
- Please be aware that bus 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

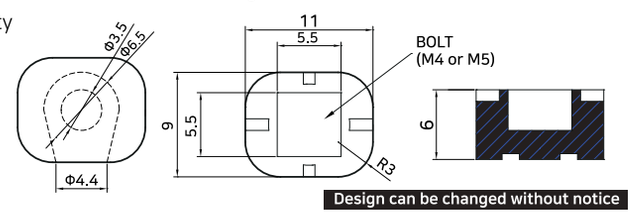
① Type	② Size					③ Use
C Cable Type	Type	Cable Type	Primary current	Size (Unit:mm) Inside		**S** for SGR
B Busbar Type				W	H	
	30	Less than 100AF	150A	37	29	
	50	Less than 225AF	400A	62	48	
	75	Less than 400AF	600A	80	70	
	100	Less than 600AF	1000A	113	90	
	150	Less than 1000AF	1500A	160	134	

Type	Busbar Type			Primary current	Size (Unit:mm) Inside W	H
05	400AF 3P3W(linear)			400A	163	30
07	400AF 3P4W(expandable),600AF 3P3W			600A	210	30
11	600AF	800AF	1000AF	1000A	260	30
	3P4W	3P3W,3P4W	3P3W,3P4W			

This item is not suitable for DGR (Directional Ground fault Relay) and GOCR(Ground Over Current Relay)

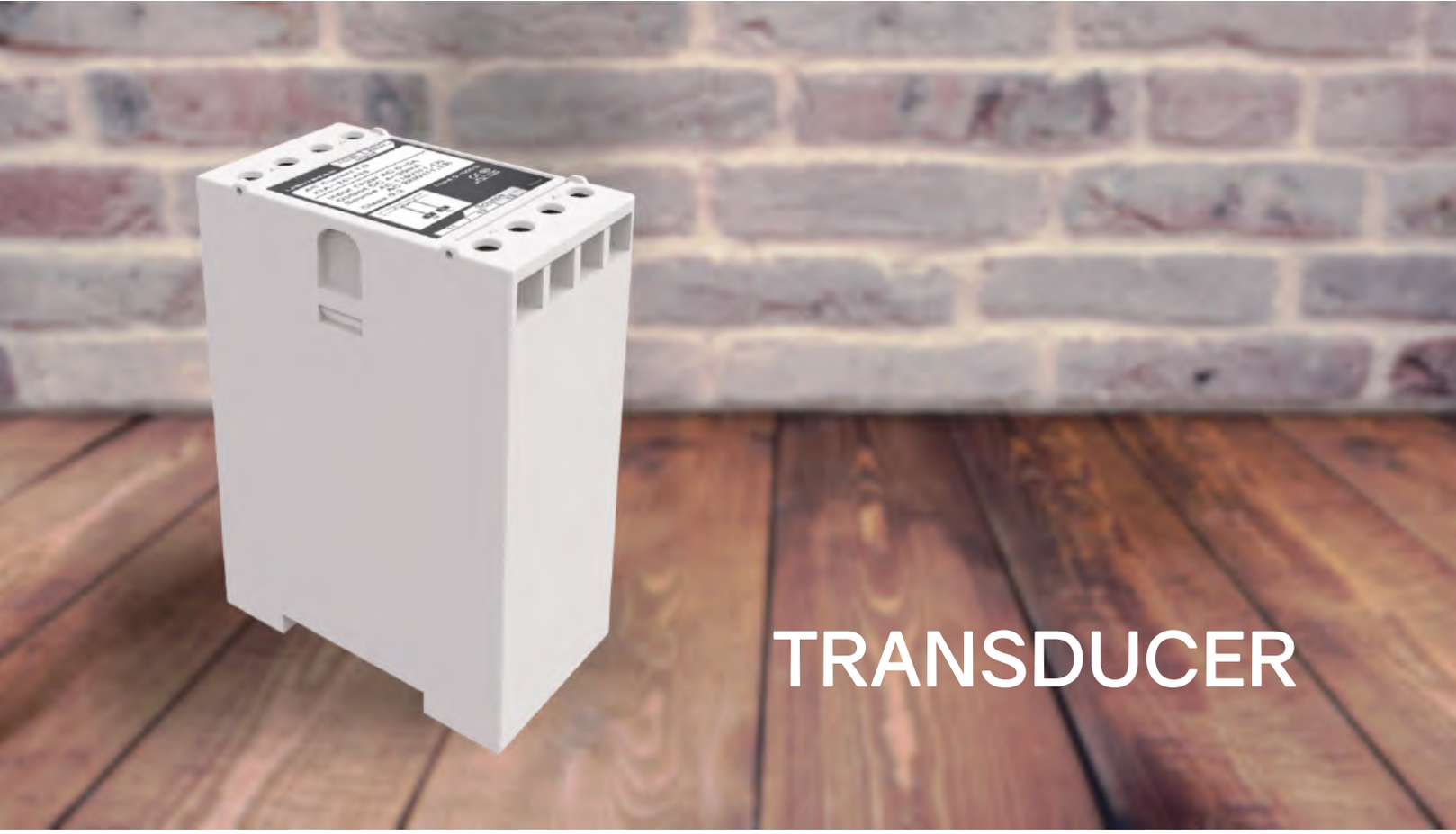
Refer to Page 129 & 131 for dimension and drawing

- 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
- Be aware of the energizing with busbar fixing bolt(M4/M5)
- Please be aware that bus bar fixing bolt for current transformer can be energized
- Bolt insulation covers are recommended for safety



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 - Exrtenal support : AC 1500V/1min
Operating temperature	-10℃ ~ +50℃



TRANSDUCER

CE certification

CE stands for "Conformité Européenne" 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 EMCD(Electro Magnetic Compatibility Directive).
LIGHTSTAR achieved CE certificate for Analog meter, Current Transformer, Digital meter, Power meter, and Transducers.

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.

LIGHTSTAR
㈜광성계측기

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AC Voltage Socket Transducer KSB



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DC Isolated Socket Transducer KSD



154
Frequency Socket Transducer KSF



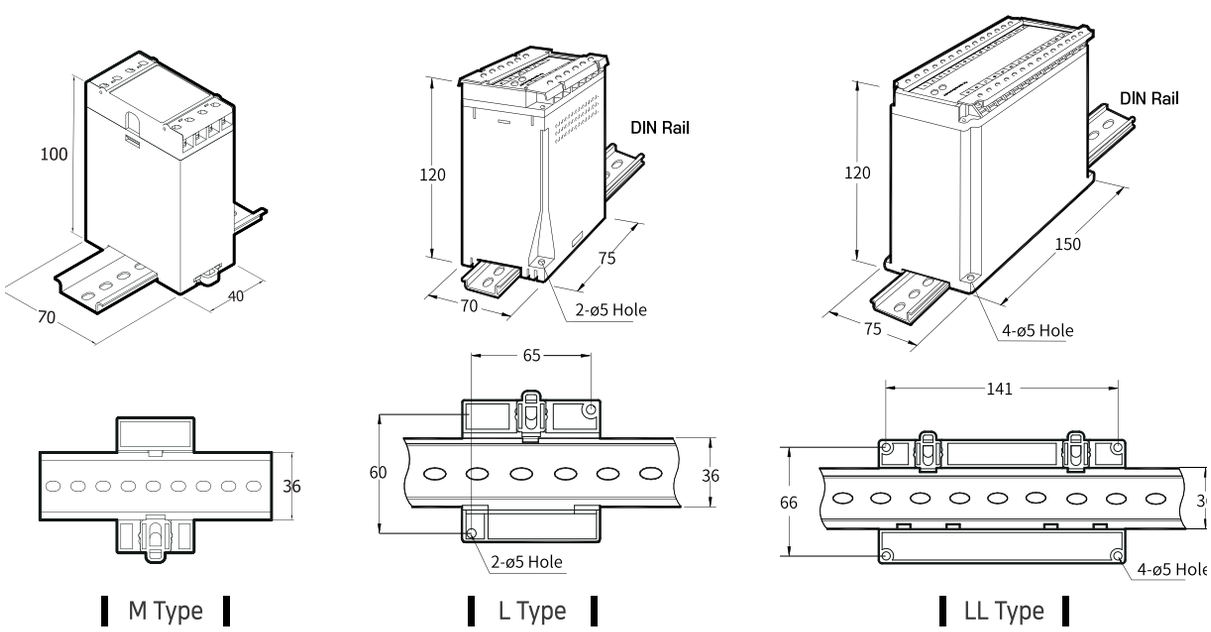
155
Potential Socket Transducer KSL



156
RTD Socket Transducer KSP

Drawing

Unit : mm



Definition

Class

KS C 1708 Accuracy tolerances for transducer as per base value.

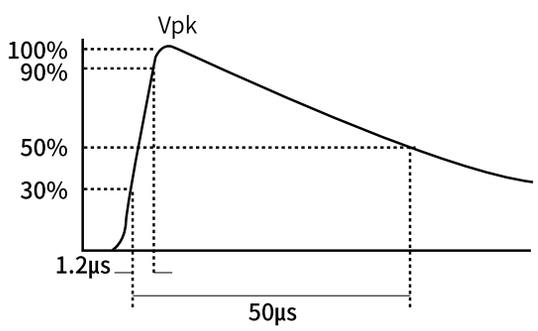
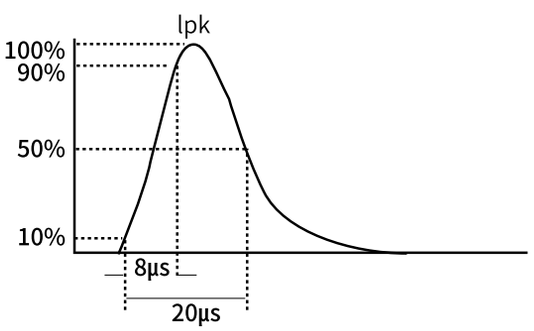
Example) 0.1 Class = Tolerance to base value ±0.1%
0.25 Class = Tolerance to base value ±0.25%
1.0 Class = Tolerance to base value ±1.0%
0.2Class = Tolerance to base value ±0.2%
0.5 Class = Tolerance to base value ±0.5%
3.0Class = Tolerance to base value ±3.0%

Base value

Numerical differences from max output to min output.

Surge impulse test (Lightning surge)

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	Current waveform
	
• Increase : 30%~90%, of Vpk 1.2μs • Decrease : By 50% of Vpk 50μs	• Increase : 10%~90%, of Ipk 8μs • Decrease : By 50% of Ipk 20μs0μs

Withstanding voltage

Test with AC voltage more than 1min 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 (Hole Type)



Model No

KTC-[ ]
①

① Type
15
25

Overview

This is device that measures the input AC Transducer and outputs it as a DC 4-20mA.

Specification

Class	Average(1.0)	Withstand voltage	AC 2kV /1min
Aux. power	DC 24V(1.0VA/EA)	Max allowable current	A-200% 10sec, 120% continuous
Operating temperature	-10~50℃		
Operating humidity	20 ~ 85%	Response time	1 sec, 0~90%
Storage temperature	-20~60℃	Weight	200g
Insulation resistance	More than 100MΩ DC 500V		

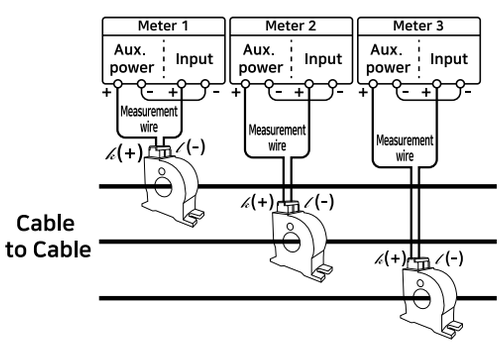
Input

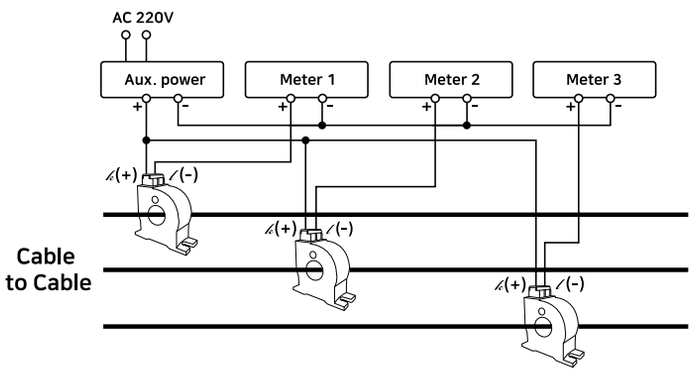
KTC-15	0-50,60,80,75A
KTC-25	0~100,120,150, 200, 250, 300A

Load resistance by output

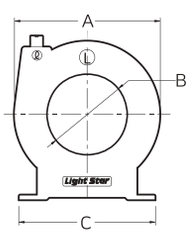
DC	Load resistance
4~20㎃	0~600Ω

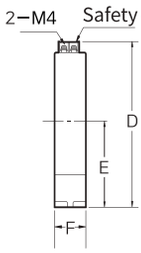
Connection diagram





Drawing







Type	A	B	C	D	E	F	G	H	Weight
KTC-15	66	Φ15	88	88	41	33	7	67	400g
KTC-25	66	Φ25	88	88	41	33	7	67	320g

AC Current Transducer

Certificates

[MTy] [LLTy] [LTy]



Model No

KTA-①②③④⑤

① AC Current Input	② DC Output	③ Circuit	
1 0 ~ 1A	**6** 4 ~ 20mA	**1A/1R**	1P2W(LTy) - Average / RMS
2 0 ~ 5A	**7** 0 ~ 1mA	**2R**	1P3W(LLTy) - RMS
	8 1 ~ 5V	**3R**	3P3W(LLTy) - RMS
	9 0 ~ 10V	**4R**	3P4W(LLTy) - RMS
	0 Order-made	**5A**	1P2W(MTy) - Average

④ Aux. power	⑤ Number of outputs
1 AC 110/220V	**S** 1 Output(M,L ty) for Single phase 3 Output(LL ty) for 3 phase
2 AC 90~260V, DC 110V, 220V	**T** 2 Output for Single phase
3 DC 24	

1. 1P2W (L Ty) RMS : AC 110V / 220V Only
2. 1P2W (M Ty) Average : AC 110V / 220V Only
3. 3P3W, 3P4W RMS : AC 90-260, DC 110V, 220V Only
4. 2 Output : 1P2W(L Ty) AC 90/260, DC 110V, 220V Only

Specification

Class	Average value(0.2): Rms value(0.5)	Withstand voltage	AC 2kV /1min
Aux. power	AC 110/220V, AC 90~260V, DC110V, 220V DC 24V(For single phase)	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%	Response time	1 sec, 0~90%
Storage temperature	-20~60℃	Weight	200g(MTy), 500g(L Ty) 570g(LL Ty)
Insulation resistance	More than 100MΩ DC 500V		

Input

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

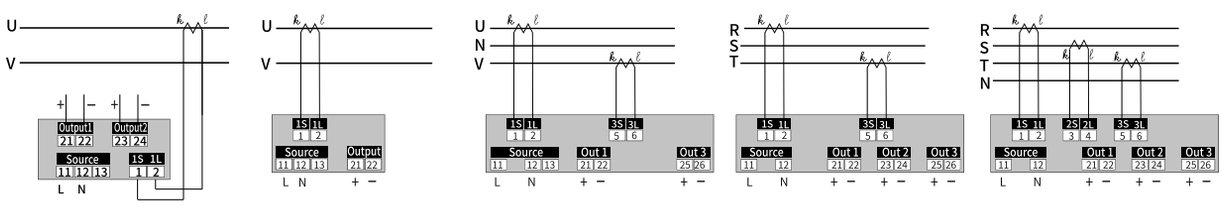
Load resistance by output

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

Drawing

Refer to page 135

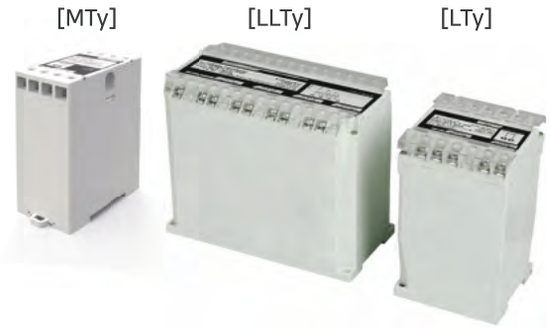
Connection diagram



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

AC Voltage Transducer

Certificates



Model No

KTB- ① ② ③ ④ ⑤

① AC Voltage Input	② DC Output	③ Circuit
1 0 ~ 150V	**6** 4 ~ 20mA	**1A/1R** 1P2W(LTy) - Average / RMS
2 0 ~ 300V	**7** 0 ~ 1mA	**2R** 1P3W(LLTy) - RMS
0 Order-made	**8** 1 ~ 5V	**3R** 3P3W(LLTy) - RMS
3 Phase : 30≥	**9** 0 ~ 10V	**4R** 3P4W(LLTy) - RMS
1 Phase : 420V ≥	**0** Order-made	**5A** 1P2W(MTy) - Average

④ Aux. power	⑤ Number of outputs
1 AC 110/220V	**S** 1 Output(M,L ty) for Single phase 3 Output(LL ty) for 3 phase
2 AC 90~260V, DC 110V, 220V	**T** 2 Output(For single phase)
3 DC 24V	

1. 1P2W (L Ty) RMS : AC 110V / 220V Only
2. 1P2W (M Ty) Average : AC 110V / 220V Only
3. 3P3W, 3P4W RMS : AC 90-260, DC 110V, 220V Only
4. 2 Output : 1P2W(L Ty) AC 90/260, DC 110V, 220V Only

Specification

Class	Average value(0.2): Rms value(0.5)	Withstand voltage	AC 2kV /1min
Aux. power	AC 110/220V, AC 90~260V, DC110V, 220V DC 24V(For single phase)	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%	Response time	1 sec, 0~90%
Storage temperature	-20~60℃	Weight	200g(MTy), 500g(L Ty) 550g(LL Ty)
Insulation resistance	More than 100MΩ DC 500V		

Input

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

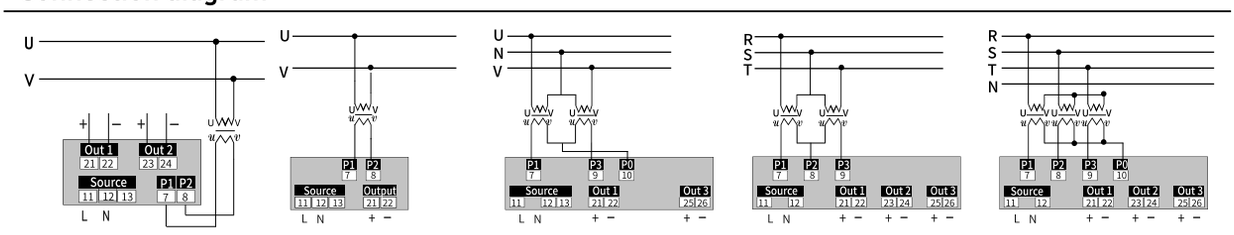
Load resistance by output

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

Drawing

Refer to page 135

Connection diagram



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

DC Isolated Transducer



Certificates CE

Model No

KTD-①②③④

① DC Voltage/Current input	② DC Output	③ Aux. power	④ Number of outputs
1 0 ~ 50mV	**6** 4 ~ 20mA	**1** AC 110/220V (Except 2 Output)	**S** 1 Output
2 ±50mV	**7** 0 ~ 1mA	**2** AC 90~260V, DC 110V, 220V	**T** 2 Output
3 0 ~ 10V	**8** 1 ~ 5V	**3** DC 24V (Except 2 Output)	
4 0 ~ 150V	**9** 0 ~ 10V		
5 4 ~ 20mA	**0** Order-made		
6 0 ~ 1mA			
7 0 ~ 10mA			
8 0 ~ 20mA			
0 Order-made			

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 /1min
Aux. power	AC 110/220V, AC 90~260V, DC110V, 220V DC 24V	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
Storage temperature	-20~60℃	Response time	1 sec, 0~90%
Insulation resistance	More than 100MΩ DC 500V	Weight	500g(L Ty)

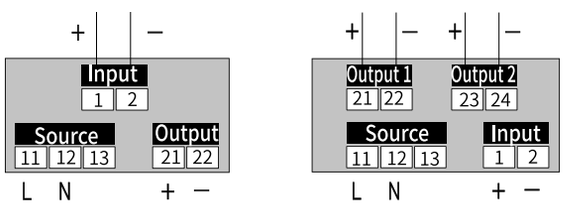
Input

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

Load resistance by output

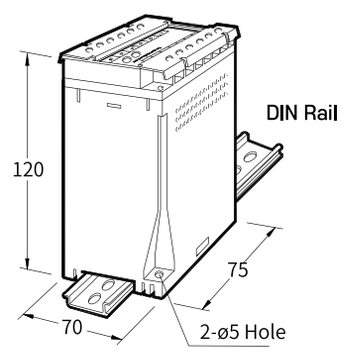
DC	Load resistance
4~20mA	0~500Ω
0~1mA	0~10kΩ
1~5V	More than 200Ω
0~10V	More than 500Ω

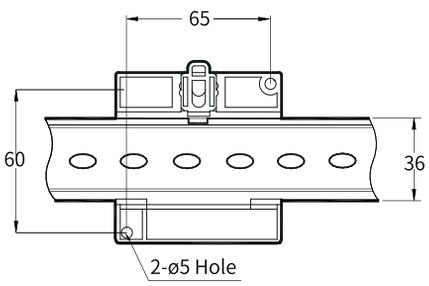
Connection diagram



1 Output　　2 Output

Drawing





Frequency Transducer

Certificates



Model No

KTF- ① ② ③ ④

① AC Voltage 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	**3** DC 24V (Except 2 Output)	
	9 0 ~ 10V		
	0 Order-made		

How to order) KTF-181S
0~120Hz/1~5V/AC
110/220V/1 Output

Customized product can be produced by order.

Specification

Class	0.1(0~120Hz), 0.5	Withstand voltage	AC 2kV /1min
Aux. power	AC 110/220V, AC 90~260V, DC110V, 220V DC 24V	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%		
Storage temperature	-20~60℃	Response time	1 sec, 0~90%
Insulation resistance	More than 100MΩ DC 500V	Weight	500g(L Ty)

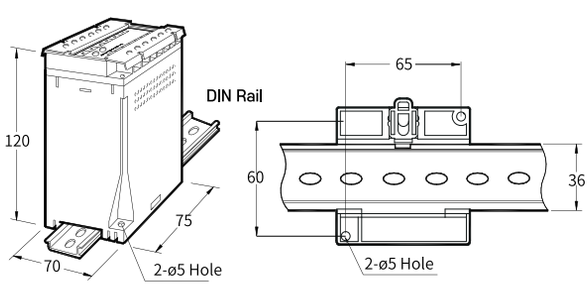
Input

0~120Hz : AC 90~240V

Load resistance by output

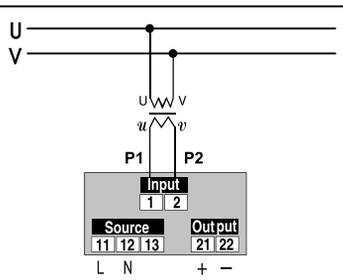
DC	Load resistance
4~20mA	0~500Ω
0~1mA	0~10kΩ
1~5V	More than 200Ω
0~10V	More than 500Ω

Drawing

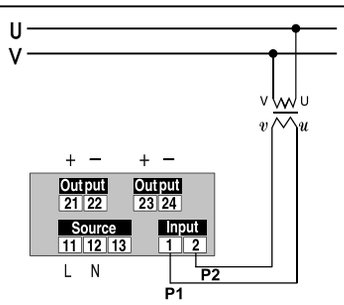


Connection diagram

1 Output



2 Output



Watt Transducer

Certificates



Model No

KTG - ① ② ③ ④ ⑤

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

AC input

① Circuit		② Voltage/Current		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
3	3P3W	1	110V/5A	1000W	**0** Order-made
		2	220V/5A	2000W	④ Aux. power
		0	Order-made		**2** AC 90~260V, DC 110V, 220V
4	3P4W	1	208/√3V/5A	2000W	⑤ Number of outputs
		2	380/√3/190/√3V/5A	2000W	**S** 1 Output
		3	380/√3V/5A	4000W	**T** 2 Output
		4	11400/√3/190/√3V/5A	1660W	
		5	22900/√3/190/√3V/5A	1660W	
		0	Order-made		

Specification

Class	0.2	Withstand voltage	AC 2kV /1min
Aux. power	AC 90~260V, DC110V, 220V	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
Storage temperature	-20~60℃	Response time	1 sec, 0~90%
Insulation resistance	More than 100MΩ DC 500V	Weight	510g(LLTy)

Input

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

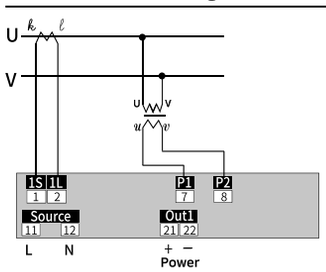
Load resistance by output

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

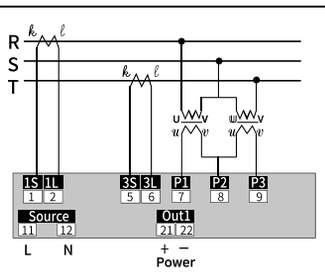
Drawing

Refer to page 135

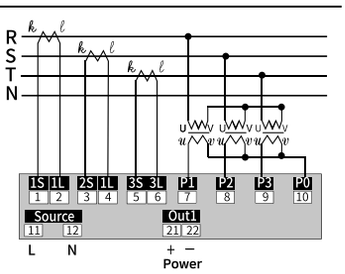
Connection diagram



1P2W(LLType)



3P3W(LLType)



3P4W(LLType)

Watt · Watt-hour Transducer

Certificates



Model No

KTW- □ □ □ □ □ □ □ □ □
①②③④⑤⑥

AC input

① Circuit		② Voltage/Current		Input value	③ DC Output	⑤ Aux. power
1	1P2W	1	110V/5A	600W	6 4 ~ 20㎃	2 AC 90~260V, DC 110V,220V
		2	220V/5A	1200W	7 0 ~ 1㎃	⑥ Number of outputs
		0	Order-made		8 1 ~ 5V	S 1 Output
2	1P3W	1	220/110V/5A	1000W	9 0 ~ 10V	
3	3P3W	1	110V/5A	1000W	0 Order-made	
		2	220V/5A	2000W	④ Count(Watt-hour)	
		0	Order-made		A Contact relay (10,000count/1 hour rated energy)	
4	3P4W	1	208/√3V/5A	2000W	B Contactless open collector (10,000count/1 hour rated energy)	
		2	380/√3/190/√3V/5A	2000W	C Potential signal 5V Pulse	
		3	380/√3V/5A	4000W		
		4	11400/√3/190/√3V/5A	1660W	How to order) KTW-116A2S	
		5	22900/√3/190/√3V/5A	1660W	1P2W/110, 5A/4~20㎃/Electrical contact / DC 110V/1 Output	
		0	Order-made			

Specification

Class	Power (0.2) Energy (0.5)	Withstand voltage	AC 2kV /1min
Aux. power	AC 90~260V, DC110V, 220V	Surge impulse	Voltage(1.2㎲/ 50㎲, 5kV) Current(8㎲/20㎲)
Operating temperature	-10~50℃	Max allowable current	A-200% 10sec, 120% continuous
Operating humidity	20 ~ 85%	Max allowable voltage	V-150% 10sec, 120% continuous
Storage temperature	-20~60℃	Response time	1 sec, 0~90%
Insulation resistance	More than 100MΩ DC 500V	Weight	510g(LLTy)

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

Connection diagram

Refer to page 147

Drawing

Refer to page 135

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/√3 190/√3	380/√3	22900/√3 190/√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	3000	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 / 5A2. 3P3W, 2.
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

1Pulse/1Wh
1Pulse/0.01kWh
1Pulse/0.1kWh
1Pulse/1kWh
1Pulse/0.01MWh
1Pulse/0.1MWh
1Pulse/1MWh

Power Factor Transducer

Certificates



Model No

KTH - ① ② ③ ④ ⑤ ⑥

How to order) KTH-B4361S
3P4W / 380/ √3V 5A/ 4~20㎃/
AC 90~260V/1 Output

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

① Classification
B Balance
U Unbalance

AC input

② Circuit		③ Voltage/Current		④ DC Output (LEAD~LAG)
1	1P2W	**1**	110V/5A	**6** 4~12~20㎃
		2	220V/5A	**7** 0~0.5~1㎃
		0	Order-made	**8** -5~0~+5V
2	1P3W	**1**	220/110V/5A	**9** -1~0~+1V
3	3P3W	**1**	110V/5A	**0** Order-made
		2	220V/5A	⑤ Aux. power
		0	Order-made	**2** AC 90~260V, DC 110V, 220V
4	3P4W	**1**	190/√3V/5A	⑥ Number of outputs
		2	208/√3V/5A	**S** 1 Output
		3	380/√3V/5A	**T** 2 Output (Unbalance only)
		0	Order-made	

Specification

Class	Balance (0.5) Unbalance (3.0)	Withstand voltage	AC 2kV /1min
Aux. power	AC 90~260V, DC110V, 220V	Surge impulse	Voltage(1.2㎲/ 50㎲, 5kV) Current(8㎲/20㎲)
Operating temperature	-10~50℃	Max allowable current	A-200% 10sec, 120% continuous
Operating humidity	20 ~ 85%	Max allowable voltage	V-150% 10sec, 120% continuous
Storage temperature	-20~60℃	Response time	1 sec, 0~90%
Insulation resistance	More than 100MΩ DC 500V	Weight	510g(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
4~12~20㎃	0~500Ω
0~0.5~1㎃	0~10kΩ
-5~0~+5V	More than 200Ω
-1~0~+1V	More than 500Ω

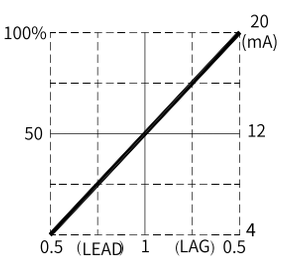
Connection diagram

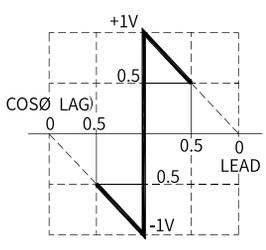
Refer to page 146-147

Drawing

Refer to page 135

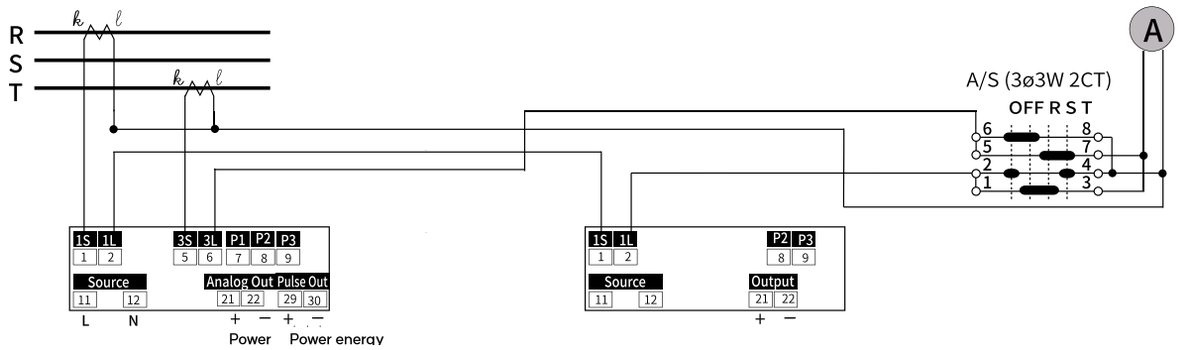
Input/Output signal





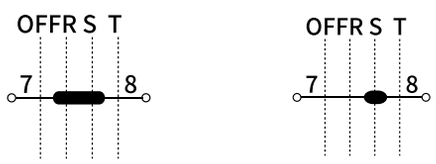
Connection diagram (Cam Switch)

3P3W 2CT(Watt/Watt-hour Transducer / VAR Transducer / Power Factor Transducer)



KTG W(W/Wh) KTH (PF)

Contact symbols

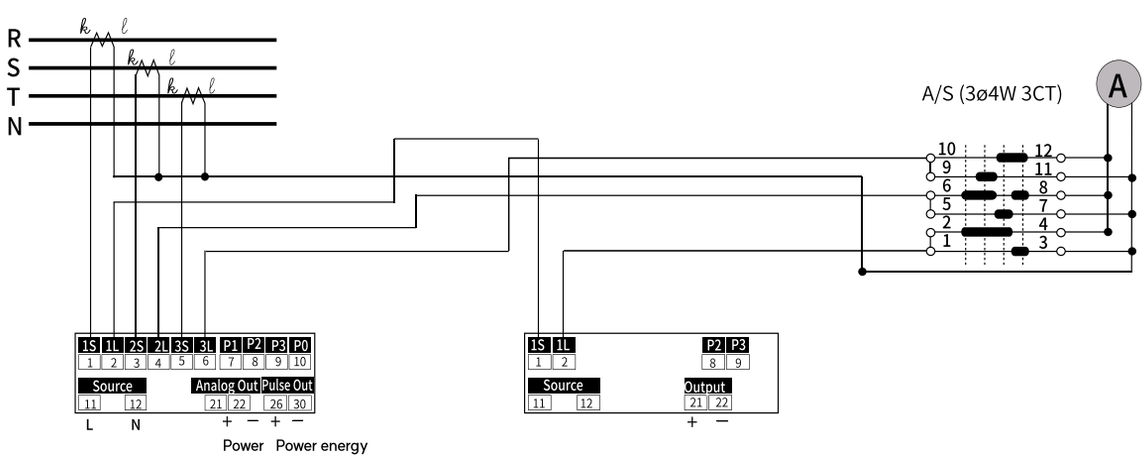


Continuous closed circuit | Intermittent closed circuit

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

3P4W 3CT(Watt/Watt-hour Transducer / VAR Transducer / Power Factor Transducer)



KTG W(W/Wh) KTI (var) KTH (PF)

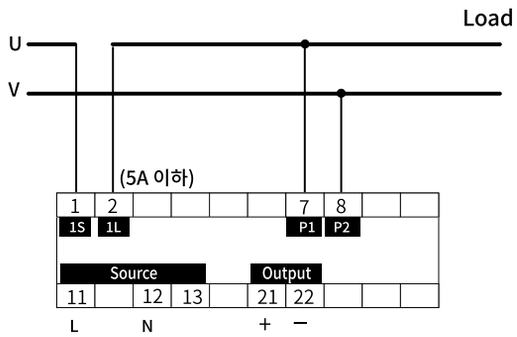
The A / S (Cam Switch) is based on the Koino product. Please check the manufacturer's terminal number

PT connection is not shown

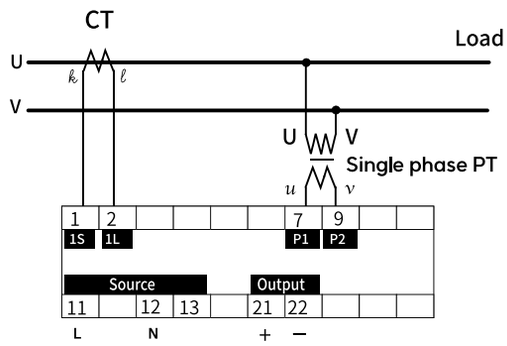
Connection diagram

1P2W(Watt/Watt-hour Transducer / VAR Transducer)

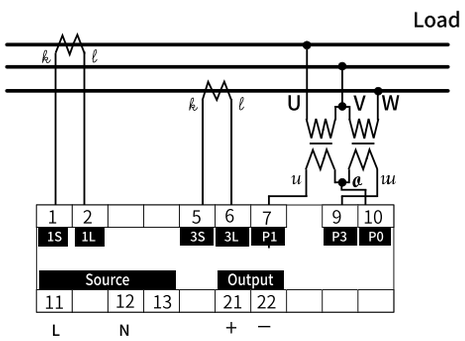
Direct connections without CT.



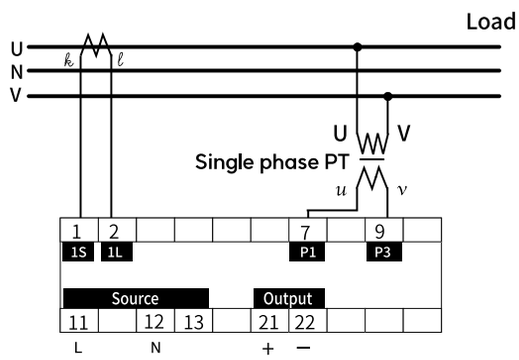
1P2W(Balanced Power Factor Transducer)



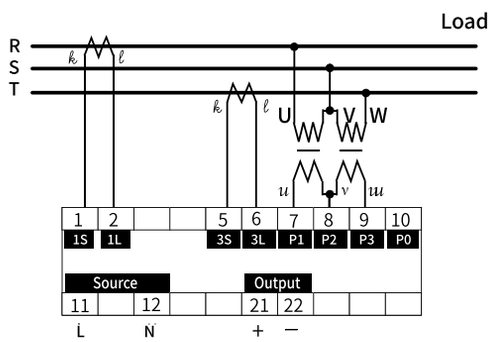
1P3W(Watt/Watt-hour Transducer / VAR Transducer)



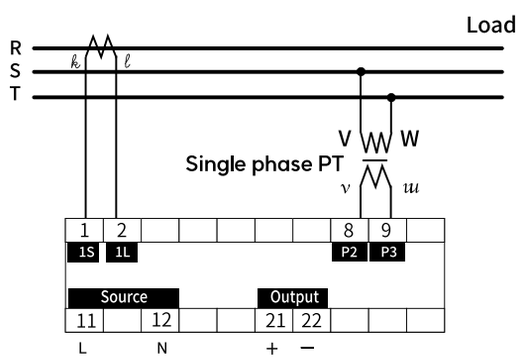
1P3W(Balanced Power Factor Transducer)



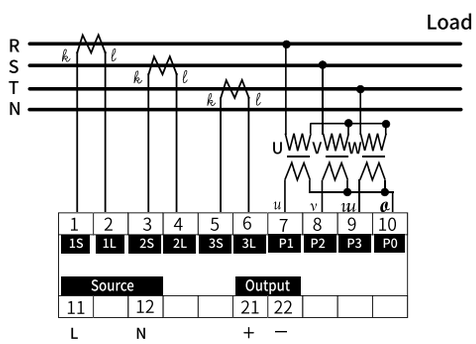
3P3W(Watt/Watt-hour Transducer / VAR Transducer / Unbalanced Power Factor Transducer)



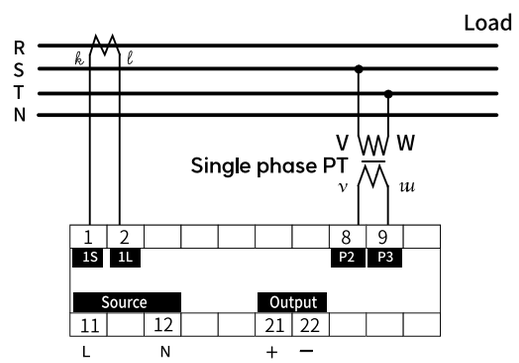
3P3W(Balanced Power Factor Transducer)



3P4W(Watt/Watt-hour Transducer / VAR Transducer / Unbalanced Power Factor Transducer)



3P4W(Balanced Power Factor Transducer)



Pulse · Analog Transducer



Model No

KTK- ① ② ③ ④ ⑤

How to order) KTK-1161S
Open collector signal/120Hz/4~20㎃/AC 110/220V

① Input	② Input Range	③ DC Output
1 Open collector	**1** 0~120Hz	**6** 4 ~ 20㎃
2 Voltage pulse	**2** 0~1kHz	**7** 0 ~ 1㎃
	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 (Except 2 Output)	**S** 1 Output
2 AC 90~260V, DC 110V, 220V	**T** 2 Output
3 DC 24V / 1 Output	

Specification

Class	0.5	Withstand voltage	AC 2kV /1min
Aux. power	AC 110/220V, AC 90~260V, DC110V, 220V DC 24V	Surge impulse	Voltage(1.2㎲/ 50㎲, 5kV) Current(8㎲/20㎲)
Operating temperature	-10~50℃	Response time	1 sec, 0~90%
Operating humidity	20 ~ 85%		
Storage temperature	-20~60℃	Weight	500g(LTy)
Insulation resistance	More than 100MΩ DC 500V		

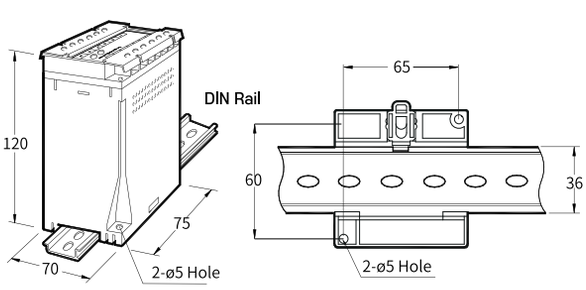
Input

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

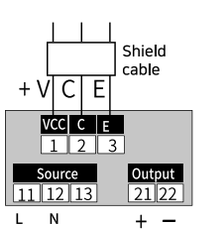
Load resistance by output

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

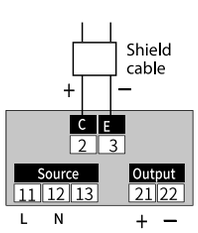
Drawing



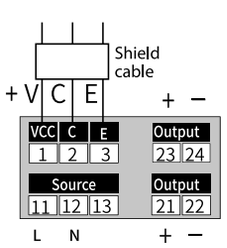
Connection diagram



Input (Open collector)



Input (voltage / pulse signal)



Input (Open collector) -2 output

Potential Transducer



Model No

KTL- ① ② ③ ④

How to order) KTL-161S
0Ω~10kΩ/4 ~ 20mA/AC 110/220V/1 Output

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	**S** 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 /1min
Aux. power	AC 110/220V, DC 24V	Surge impulse	Voltage(1.2μs/ 50μs, 5kV) Current(8μs/20μs)
Operating temperature	-10~50℃	Response time	1 sec, 0~90%
Operating humidity	20 ~ 85%		
Storage temperature	-20~60℃	Weight	500g(LTy)
Insulation resistance	More than 100MΩ DC 500V		

Input

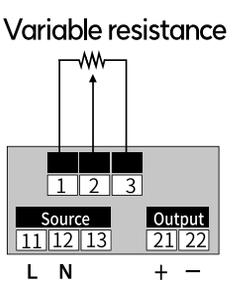
Resistance	0Ω~10kΩ

Load resistance by output

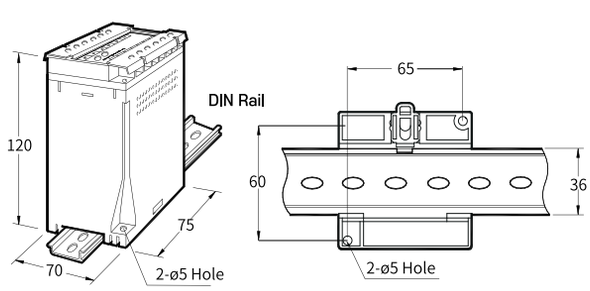
DC	Load resistance
4~20mA	0~500Ω
0~1mA	0~10kΩ
1~5V	More than 200Ω
0~10V	More than 500Ω

Connection diagram

1 Output



Drawing



RTD Transducer

Certificates CE



Model No

KTP- ① ② ③ ④ ⑤

How to order) KTP-1161S
PT 100Ω/PT 0~200℃/
4~20㎃/AC 110/220V/1
Output

Customized product can be produced by order

① Input	② Temperature range	③ DC Output
1 PT 100Ω	**1** 0~200℃	**6** 4 ~ 20㎃
2 PT 50Ω	**0** Order-made	**7** 0 ~ 1㎃
0 Order-made		**8** 1 ~ 5V
		9 0 ~ 10V
		0 Order-made

④ Aux. power	⑤ Number of outputs
1 AC 110/220V	**S** 1 Output
2 DC 24V	

Specification

Class	0.5	Withstand voltage	AC 2kV /1min
Aux. power	AC 110/220V, DC 24V	Surge impulse	Voltage(1.2μs/ 50μs, 5kV) Current(8μs/20μs)
Operating temperature	-10~50℃	Response time	1 sec, 0~90%
Operating humidity	20 ~ 85%		
Storage temperature	-20~60℃	Weight	500g(LTy)
Insulation resistance	More than 100MΩ DC 500V		

Input

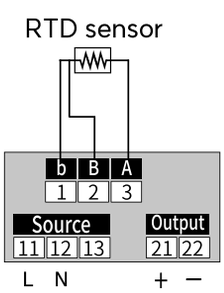
PT(JIS) Sensor 3Wire	100Ω 50Ω Order-made

Load resistance by output

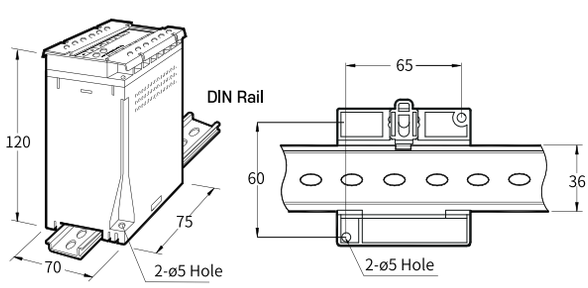
DC	Load resistance
4~20㎃	0~500Ω
0~1㎃	0~10kΩ
1~5V	More than 200Ω
0~10V	More than 500Ω

Connection diagram

1 Output



Drawing



AC Current Socket Transducer

Certificates



Model No

KSA-□□□□
①②③

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

Customized product can be produced by order.

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

Specification

Class	0.2	Withstand voltage	AC 2kV /1min
Aux. power	AC 220V(60Hz), AC 110V(60Hz)	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
Storage temperature	-20~60℃	Response time	1 sec, 0~90%
Insulation resistance	More than 100MΩ DC 500V	Weight	400g

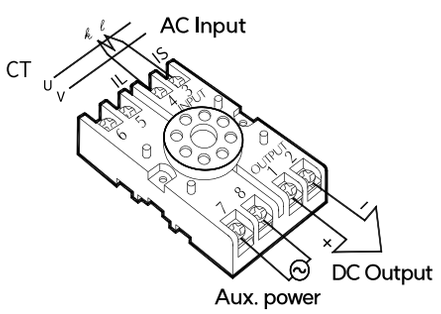
Input

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

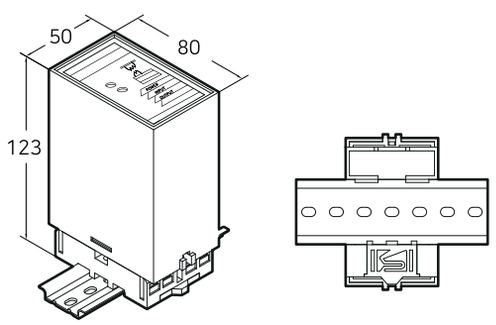
Load resistance by output

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

Connection diagram



Drawing



AC Voltage Socket Transducer



Certificates

Model No

KSB-①②③

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

Customized product can be produced by order

① AC input	② DC Output	③ Aux. power
1 0~150V	**6** 4 ~ 20㎃	**1** AC 220V(Standard)
2 0~300V	**7** 0 ~ 1㎃	**2** AC 110V
0 Order-made	**8** 1 ~ 5V	
(AC 300V ≥)	**9** 0 ~ 10V	
	0 Order-made	

Specification

Class	0.2	Withstand voltage	AC 2kV /1min
Aux. power	AC 220V(60Hz), AC 110V(60Hz)	Surge impulse	Voltage(1.2㎲/ 50㎲, 5kV) Current(8㎲/20㎲)
Operating temperature	-10~50℃	Max allowable voltage	D-100%
Operating humidity	20 ~ 85%	Measurement range	0~300V
Storage temperature	-20~60℃	Response time	1 sec, 0~90%
Insulation resistance	More than 100MΩ DC 500V	Weight	400g

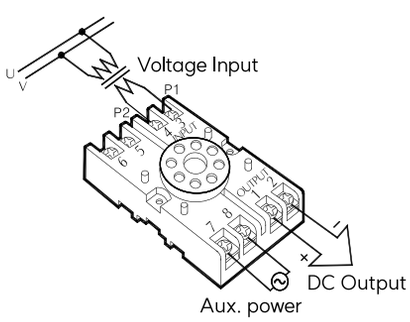
Input

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

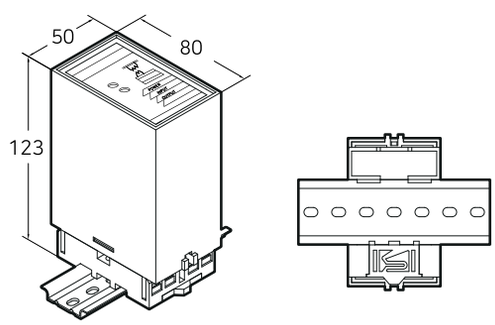
Load resistance by output

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

Connection diagram



Drawing



DC Isolated Socket Transducer



Model No

KSD-①②③④

① Input	② DC Output	③ Aux. power	④ Number of outputs
1 0~50mV	**6** 4 ~ 20mA	**1** AC 220V(Standard)	**S** 1 Output
2 0~60mV	**7** 0 ~ 1mA	**2** AC 110V	
3 0~10V	**8** 1 ~ 5V		
4 1~5V	**9** 0 ~ 10V		
5 4~20mA	**0** Order-made		
6 0~1mA			
7 0~10mA			
8 0~20mA			
0 Order-made			

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

Customized product can be produced by order.

Specification

Class	0.25	Withstand voltage	AC 2kV /1min
Aux. power	AC 220V, AC 110V	Surge impulse	Voltage(1.2μs/ 50μs, 5kV) Current(8μs/20μs)
Operating temperature	-10~50℃	Max allowable voltage	V-150% 10sec
Operating humidity	20 ~ 85%	Measurement range	0~100%
Storage temperature	-20~60℃	Response time	1 sec, 0~90%
Insulation resistance	More than 100MΩ DC 500V	Weight	400g

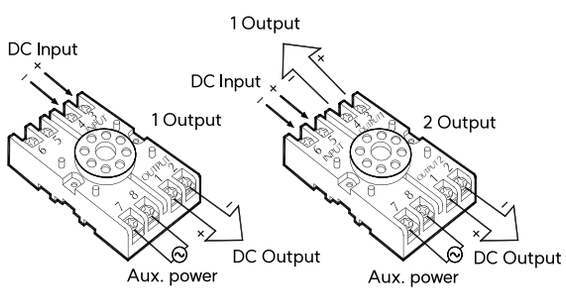
Input

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

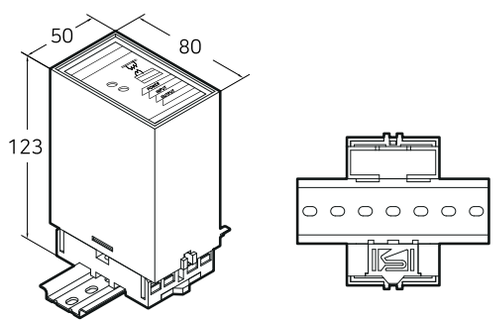
Load resistance by output

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- ① ② ③

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 /1min
Aux. power	AC 220V, AC 110V	Surge impulse	Voltage(1.2μs/ 50μs, 5kV) Current(8μs/20μs)
Operating temperature	-10~50℃	Max allowable voltage	D-100%
Operating humidity	20 ~ 85%	Measurement range	0~120Hz
Storage temperature	-20~60℃	Response time	1 sec, 0~90%
Insulation resistance	More than 100MΩ DC 500V	Weight	400g

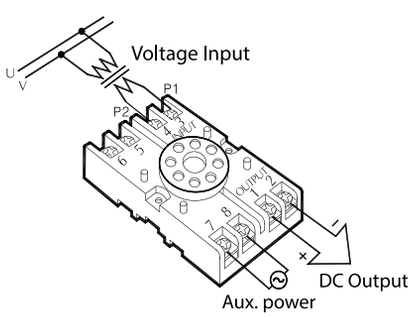
Input

AC Voltage	0~120Hz AC 90~240V

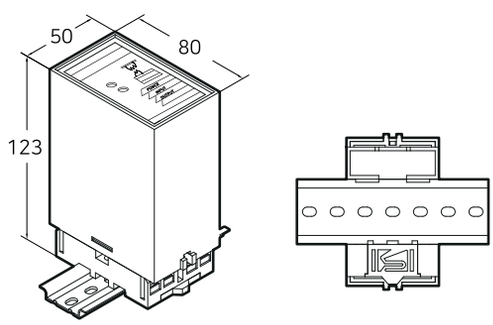
Load resistance by output

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- ①②③

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

Customized product can be produced by order

① Input	② DC Output	③ Aux. power
1 0~500Ω	**6** 4 ~ 20mA	**1** AC 220V(Standard)
2 0~1kΩ	**7** 0 ~ 1mA	**2** AC 110V
3 0~10kΩ	**8** 1 ~ 5V	
0 Order-made	**9** 0 ~ 10V	
	0 Order-made	

Specification

Class	0.5	Withstand voltage	AC 2kV /1min
Aux. power	AC 220V, AC 110V	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%		
Storage temperature	-20~60℃	Response time	1 sec, 0~90%
Insulation resistance	More than 100MΩ DC 500V	Weight	400g

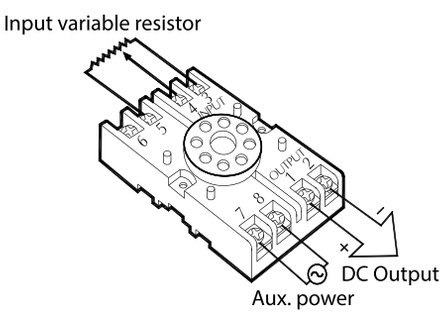
Input

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

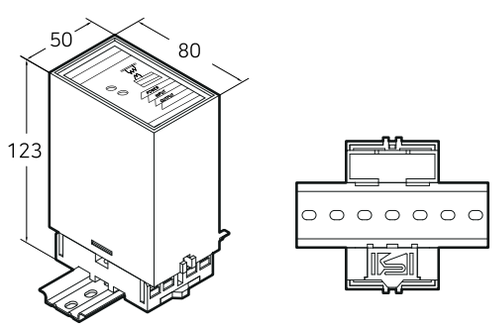
Load resistance by output

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- ① ② ③ ④

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 /1min
Aux. power	AC 220V(60Hz), AC 110V(60Hz)	Surge impulse	Voltage(1.2μs/ 50μs, 5kV) Current(8μs/20μs)
Operating temperature	-10~50℃	Measurement range	According to input specification
Operating humidity	20 ~ 85%		
Storage temperature	-20~60℃	Response time	1 sec, 0~90%
Insulation resistance	More than 100MΩ DC 500V	Weight	400g

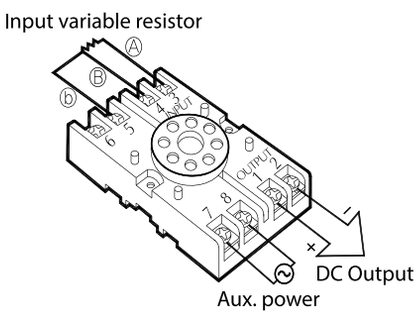
Input

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

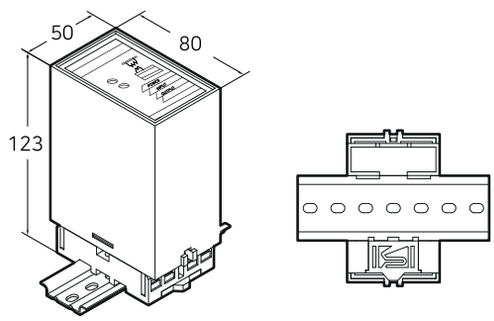
Load resistance by output

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

Connection diagram



Drawing



LIGHTSTAR
㈜광성계측기

TEST MEASURING EQUIPMENT



CE certification

CE stands for "Conformité Européenne" 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 EMCD(Electro Magnetic Compatibility Directive).
LIGHTSTAR achieved CE certificate for Analog meter, Current Transformer, Digital meter, Power meter, and Transducers.

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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166-167
3Phase Power Calibrator KZP-3



168
CT Tester, Transformer Error Meter KZA-□□□

Portable 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: 9600bps(fixed)
- Transmission format : Start 1bit, Data 8bit, Parity None Stop 1bit

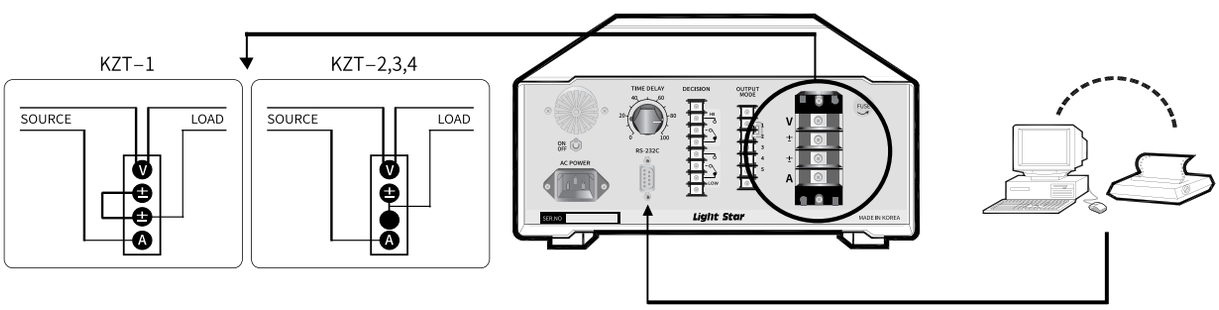
Feature

- 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.
- Test results can be decided by choosing external input or internal current collecting method.
- 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		±(0.2% of rdg + 0.1% FS)at 45~65Hz			
Accuracy about frequency (Voltage, Current)	20Hz	±2% FS			
	45~65Hz	Refer to the upper part.			
	2kHz	±3% FS			
	20kHz	±5% FS			
Aux. power		AC 90~260V(50/60Hz), DC 110V		Weight	2.5kg

Connection diagram



Portable Power Meter



Model No

KZM-B①

① Current input range	
1	0.200~20.00A(CT) , 1~6000W
2	0.020~2.000A(CT) , 1.0~600.0W
3	0.200~2.00A(Shunt), 1.0~600.0W

Overview

Testing device for single phase electric equipment.

3 sets of display to show voltage, current, power and PF.

Feature

- Computer program will be provide for multi purpose
- Simple and robust design / economical price

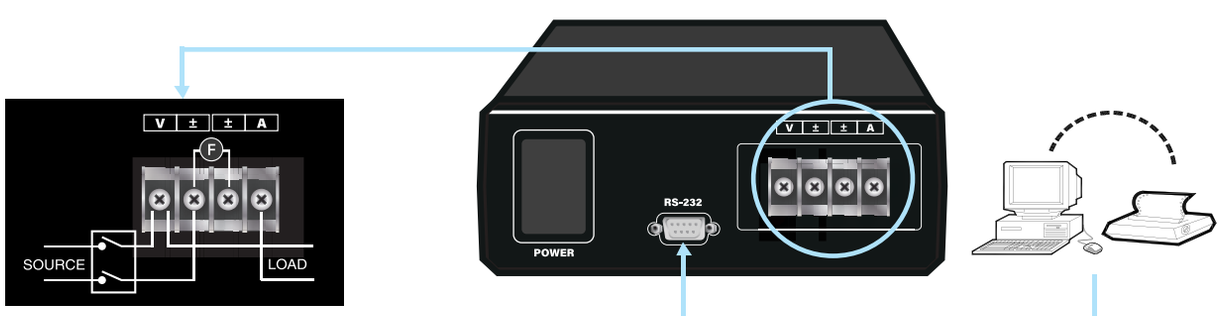
Communication

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

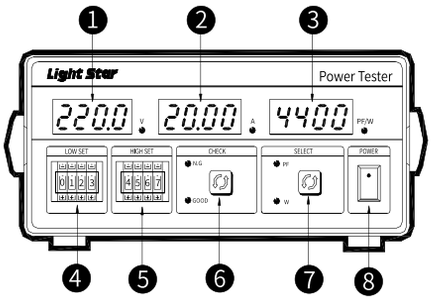
Specification

	Input			
Type	Voltage	Current	Power	Power factor
KZM - B1(CT)	10.0~300.0V	0.200~20.00A	1~6000W	±0.20~1.00PF
KZM - B2(CT)		0.020~5.000A	0.1~600.0W	
KZM - B3(Shunt)		0.020~2.000A	0.1~600.0W	
Accuracy	Voltage	±(0.3% of rdg + 0.04% FS)		
	Current	±(0.3% of rdg + 0.05% FS)		
	Power factor	±(0.5% of rdg + 0.5°)		
	Active power	Class 0.5 as per IEC 62053-22		
		PF=1	0.16A ≤ I ≤ 0.8A ±(1.0% of rdg) 0.8A ≤ I ≤ 20A ±(0.5% of rdg)	
		PF=+0.5 -0.8	0.32A ≤ I ≤ 1.6A ±(1.0% of rdg) 1.6A ≤ I ≤ 20A ±(0.6% of rdg)	
Frequency	45~65Hz			
Aux. power	AC 90~260V(50/60Hz), DC 110V		Weight	1.2kg

Connection diagram

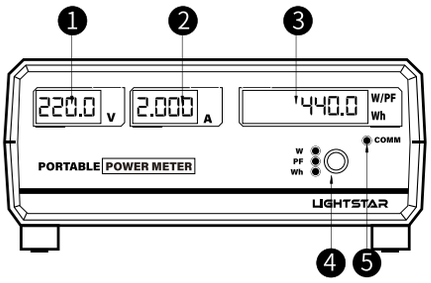


KZT-1,2,3,4



❶ Voltage display
❷ Current display
❸ Power / Power factor display
❹ Low limit setting switch
❺ High limit setting switch
❻ Check button
❼ Select button (PF/W)
❽ Power switch

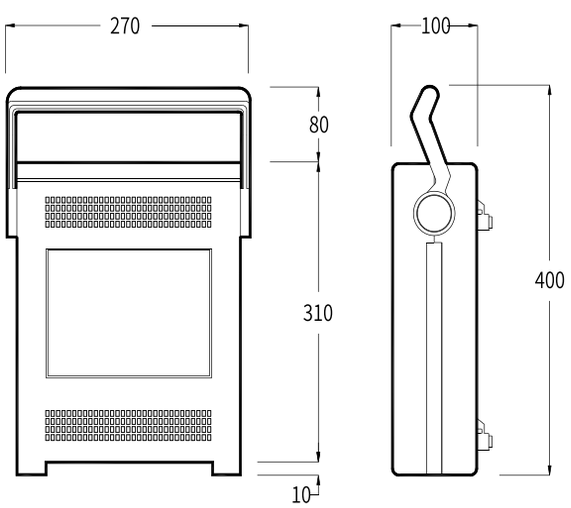
KZM-B□



❶ Voltage display
❷ Current display
❸ Power / Power Factor display
❹ Select button (W Wh PF)
❺ Communicatic

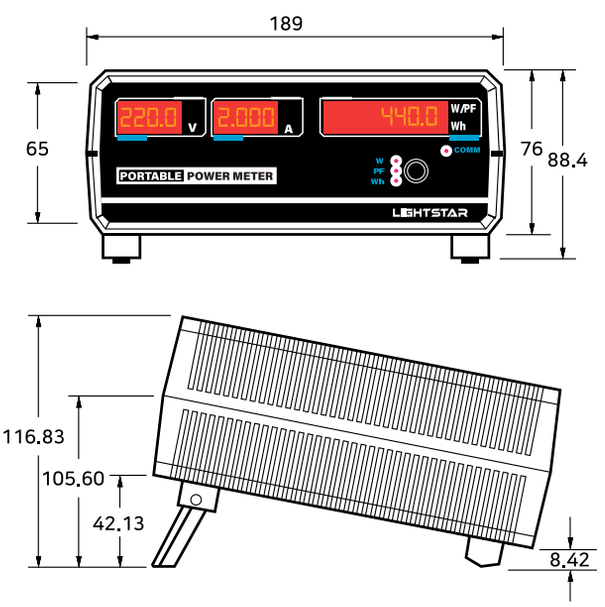
KZT Drawing

Unit:mm



KZM Drawing

Unit:mm



Portable power quality meter

Model No

KSM-1□□

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 Operating distance: Max 5M
Wiring method	1Ø2W, 3Ø3W, 3Ø4W			

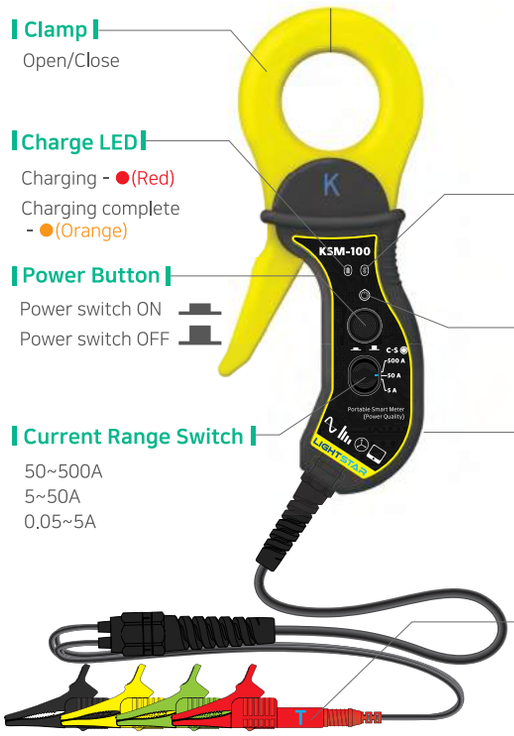
Accuracy

Main body

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

Main body(KSM-100)



Clamp
Open/Close

Charge LED
Charging - ●(Red)
Charging complete - ●(Orange)

Power Button
Power switch ON
Power switch OFF

Current Range Switch
50~500A
5~50A
0.05~5A

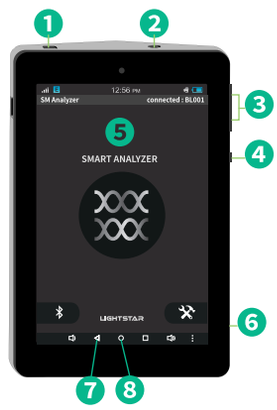
Bluetooth LED
Waiting ●(Red)
Connected ●(Blue)

Power LED
Power switch ON ●(Red)

Charging port
Micro 5Pin

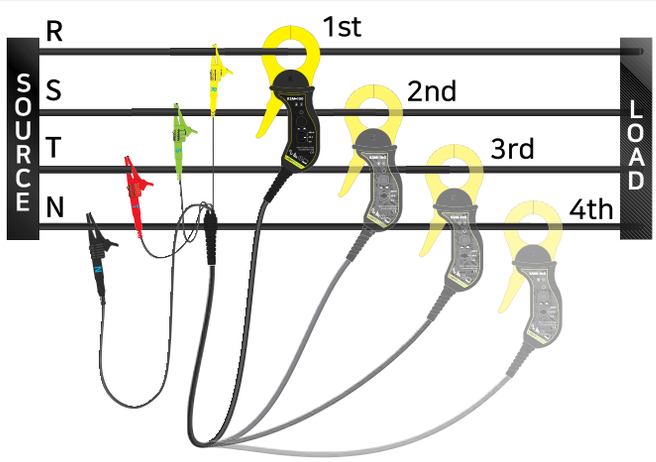
Voltage clamp
R phase ●(Yellow)
S phase ●(Green)
T phase ●(Red)
N phase ●(Black)

Display(Android)



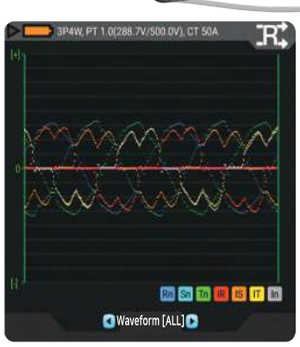
1. External connector connector
2. Earphone
3. Volume UP / DOWN button
4. Power / Lock button
5. Touch screen
6. Speaker
7. Previous button
8. Home button

Example

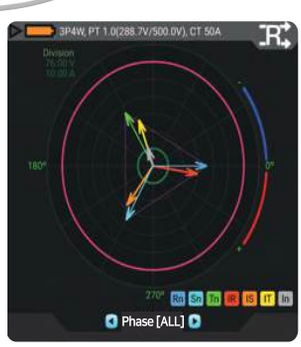




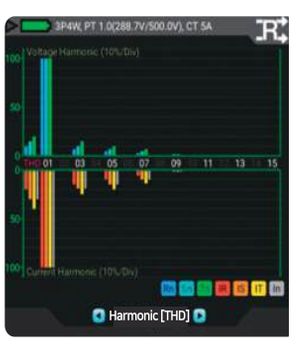
Data



Waveform



Phase



Harmonic

AC Calibrator



Model No

KZP-11

Overview

Accurate (±0.1%) calibrating device which can generate AC voltage(3~720V) or AC current (5mA~60A) with 60VA capacity.
This device can be used for electrical meter production lines or academic demonstrations.

Feature

- **Frequency** : 50, 60 Hz, and 120Hz with 44 - 70 Hz (continuously variable by 0.01Hz resolution).
- **Output dividing function**: Easy to divide output step by step by using output dial (by 16 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)

Specification

<table>
<tr><td>Distortion rate</td><td colspan="5">Voltage output: 0.07%, Current output: 0.18% at range 40 to 120%</td></tr>
<tr><td rowspan="10">Output</td><td>Setting</td><td>Range</td><td>Resolution</td><td>Max output</td><td>Accuracy: 50/60Hz</td></tr>
<tr><td>150V</td><td>3V~180V</td><td>10mV</td><td>83mA</td><td rowspan="8">(0.1% of setting value + 0.015% of Range)
± 0.1% of range, output in under 20% of range.
(Range ±0.1%)</td></tr>
<tr><td>300V</td><td>5V~360V</td><td>100mV</td><td>41mA</td></tr>
<tr><td>600V</td><td>10V~720V</td><td>100mV</td><td>20mA</td></tr>
<tr><td>1A</td><td>5mA~1.2A</td><td>100μA</td><td>50V</td></tr>
<tr><td>5A</td><td>10mA~6A</td><td>1mA</td><td>10V</td></tr>
<tr><td>15A</td><td>50mA~18A</td><td>1mA</td><td>4.6V</td></tr>
<tr><td>50A</td><td>100mA~60A</td><td>10mA</td><td>1V</td></tr>
<tr><td colspan="5">If setting is 1% or less of Range, the output is "0".</td></tr>
<tr><td>Output setting and display</td><td colspan="5">4 Dial setting / Voltage (V) - 3 LED / current (A) - 4 LED</td></tr>
<tr><td>Output dividing</td><td colspan="5">(Output) = (setting)X n/m
m : 1,2,3,.....,16(16-way split), n : 1,2,3,.....,16(16-way split)</td></tr>
<tr><td>Deviation setting</td><td colspan="5">1 Dial setting</td></tr>
<tr><td>Deviation display</td><td colspan="5">3 LED display, maximum display 10.0% (0.05 to 10.0%)</td></tr>
<tr><td>Response time</td><td colspan="5">Approximately 1 sec (0 to 1005) of the setting value (Full scale)</td></tr>
<tr><td>Insulation resistance</td><td colspan="5">100Ω or more with 500 V DC between power supply and case between power supply and output terminal</td></tr>
<tr><td>Withstand voltage</td><td colspan="5">1 minute with 1500 V AC between power supply and output terminal, with power supply and case</td></tr>
<tr><td>Sweep speed</td><td colspan="2">Approximately 120% to set</td><td>Output frequency</td><td colspan="2">44~70Hz Continuous variable(0.01step)</td></tr>
<tr><td>Output terminal</td><td colspan="2">Bias binding</td><td>Aux. power</td><td colspan="2">AC 220 ±10%, 50Hz or 60Hz</td></tr>
<tr><td>Operating temperature and humidity</td><td colspan="2">-10~50℃, 20~85% RH</td><td>Power consumption</td><td colspan="2">Less than 500VA</td></tr>
<tr><td>Accessories</td><td colspan="5">Power cord 1 set, instruction manual 1 set</td></tr>
</table>

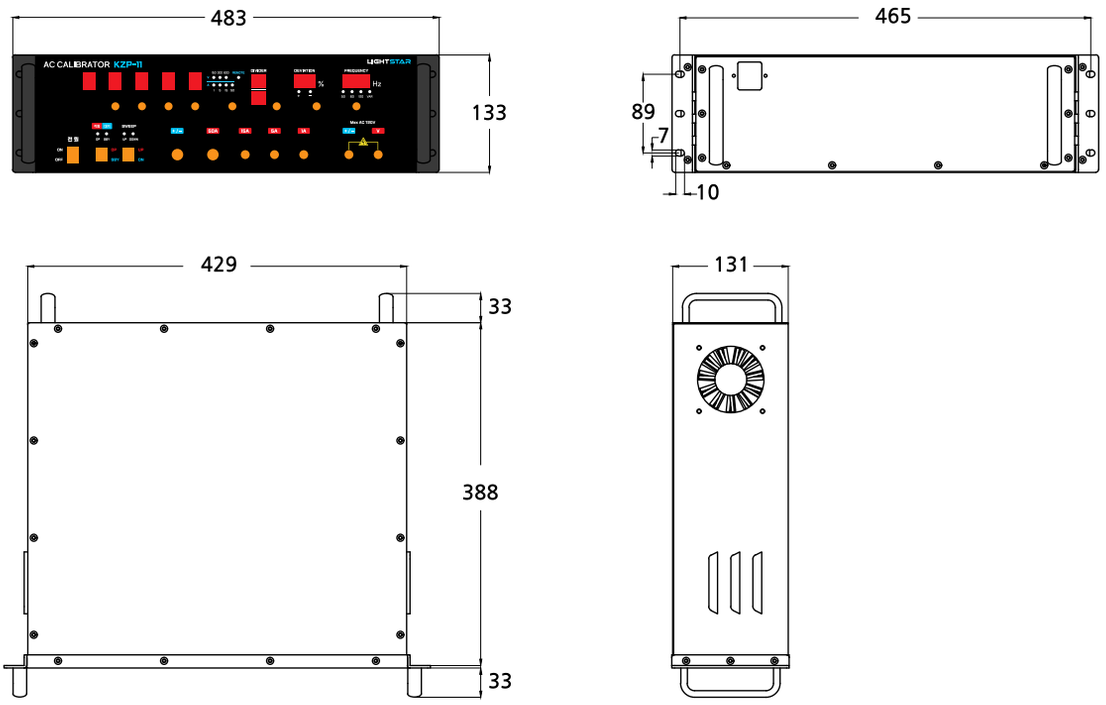
Model with AC110v Aux. power is order-made

Terminal wiring

50A→10SQ	15A→6SQ	5A→2.5SQ	1A→1.5SQ

Drawing

Unit:mm



Case (option)

Unit:mm





External size : 615(W)*585(D)*190(H)
Internal size : 447(W)*482(D)*145(H)
Depth size : 43
Weight : 8kg
Material : Polypropylene



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

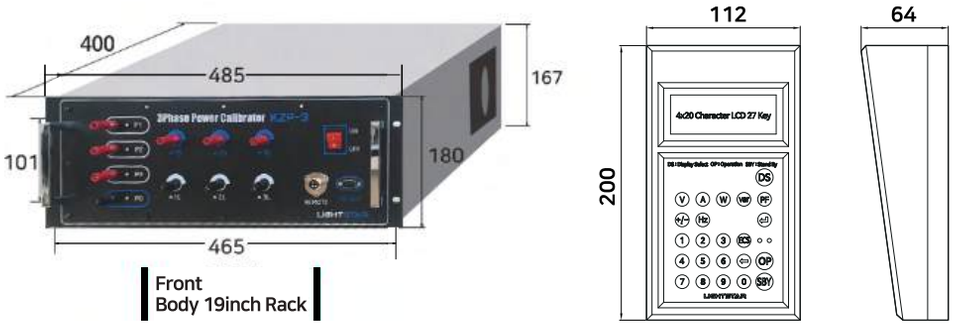
- Three phase power (A, V, W, Hz, PF) Generation with single phase power
- PC remote control
- Using the keypad and encoder to change the output value instantaneously.
- Automatic holding function in case of misconnection
- 3 phase angle individual adjustment

Specification

Aux. power	AC 220V ± 10%, 50/60Hz	Frequency	▌Output Range : 45Hz ~ 65Hz ▌Resolution : 0.01Hz ▌Rate of change : ±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 : ±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 : ±0.1% of rdg (320~50VL-N) ±0.1% F.S		
Current output	▌Output Range : 0 ~ 6.000A ▌Resolution : 0.001A ▌Maximum load : 15VA (6A) ▌Accuracy : 6A~1A(±0.1% rdg + 0.015% F.S) 1A~0A(±0.5% rdg + 0.1% F.S)	Display	▌20 characters (W) x 4 columns (H) ▌LCD Backlight (yellow green) ▌Display size : 98(W) × 60(H)× 13.5(T)mm ▌Character size : 2.95(W) × 4.755(H)mm
Power factor	▌3-phase setting or each phase ▌Input Range : -1.000 ~ 0.000 ~ +1.000 (Power Factor) ▌Resolution : 0.001(Power Factor) ▌Accuracy : ±0.35 ˚ (Phase angle)	Communication	▌Interface : RS-232C ▌Transmission protocol : Modbus ▌Transmission speed : fixed at 9600 bps ▌Transmission distance : within 5M

Drawing

Unit:mm



Front
Body 19inch Rack

Output controller

Case (option)

Unit:mm





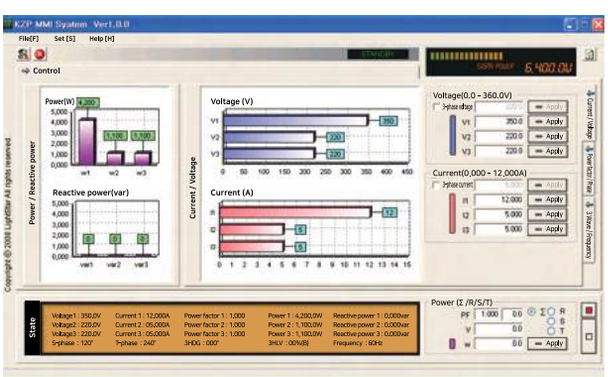


External size : 615(W)*585(D)*250(H)
Internal size : 447(W)*482(D)*185(H)
Depth size : 43
Weight : 9kg
Material : Polypropylene

HMI Control

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

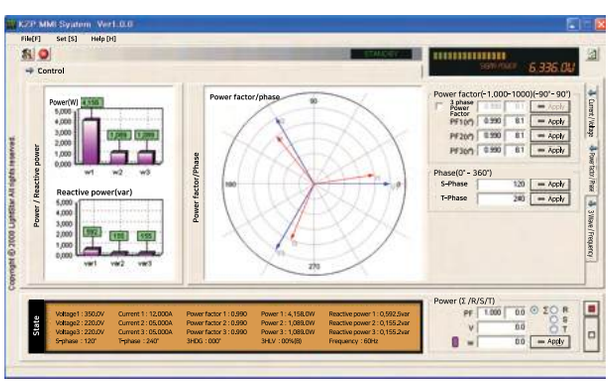
Voltage / current setting and display



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

If KZP 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.

CT Tester

Model No

KZA-□□□□
① ②

① Types	② Output	
2 Current transformer testing device	**04** Current 0~400A	**32** Current 0~3200A
3 Potential Transformer testing device	**08** Current 0~800A	**70** Voltage 0~720V

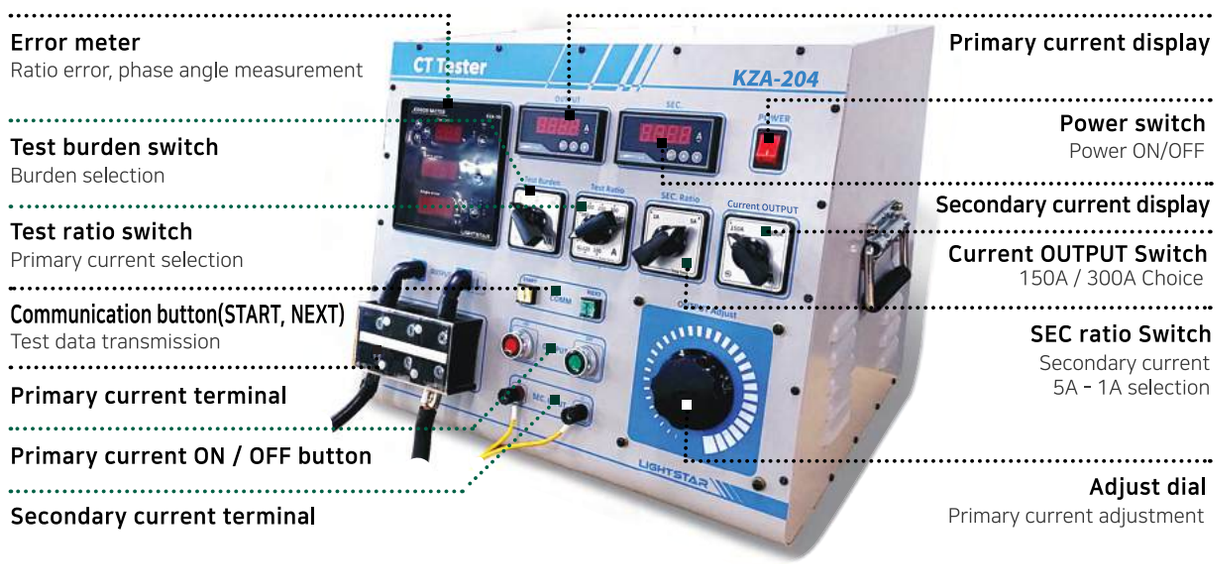
Overview

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



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.

BATTERY CHARGER



CE certification

CE stands for "Conformité Européenne" 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 EMCD(Electro Magnetic Compatibility Directive).
LIGHTSTAR achieved CE certificate for Analog meter, Current Transformer, Digital meter, Power meter, and Transducers.

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.

LIGHTSTAR
㈜광성계측기

CONTENTS



171~175
Battery Charger KH□-□□□







172~173
Rectifier KHA
Rectifier Controller KHB

174
Rectifier Transformer KHT

Battery Charger

Model No

KH[ ]-[ ][ ][ ]
① ②③

① Type	
O	Controller external type
I	Controller integrated type
② Input (Frequency)	
2	AC 3P 3W 220V(60Hz)
3	AC 3P 3W 380V(60Hz)
4	AC 3P 3W 440V(60Hz)
③ Output	
1	DC 110V, 30A
2	DC 110V, 50A
3	DC 110V, 100A

How to order) KHO-32 External type AC 3P 380V, DC 110V, 50A



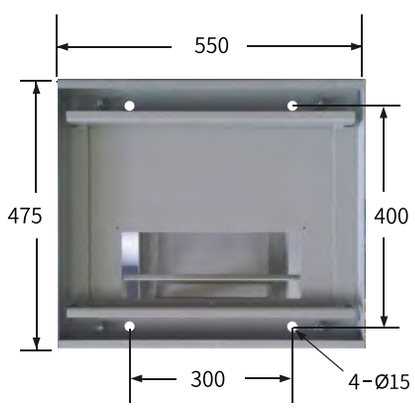
Controller-Outer box attached

Specification

Input voltage	AC 3 Phase 220V/380V/440V(60Hz) 60Hz (50Hz order made)	Withstand voltage	AC 1.5kV/1min (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	Operating temperature / humidity	0℃ ~ 55℃/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	Setting	Nominal voltage, Rated Capacity, Charging Mode (Float or Equalize or Stop), Equalization Charge Time, Alarm Voltage, Alarm Current, Alarm Delay Time, Manual Operation, Communication Address
Trend	DC Voltage, Charging Current, Discharge Current (Data recorded over 10 hours)	Communication	RS-485 / RS-485, Modbus, 9600bps, DATA BIT:8bit, PARITY:None

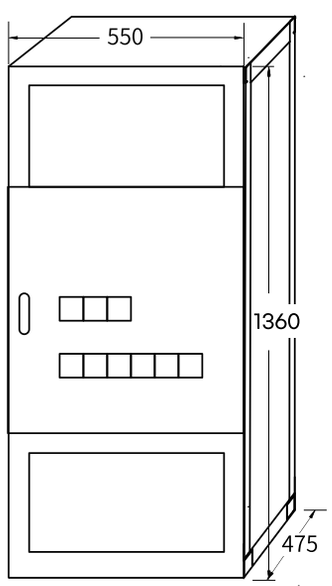
Drawing

Unit:mm



Fixed dimensions

DC 200A output product can be provided by order.



outer case

Rectifier



Model No

KHA-①②

① Output voltage	② Rated capacity
1 110V	A 30A
2 Order-made	B 50A

How to order) KHA-1A Rectifier DC 110V, 30A Output

Overview

Converts 3-phase AC power into DC for charging (with use KHB)

Feature

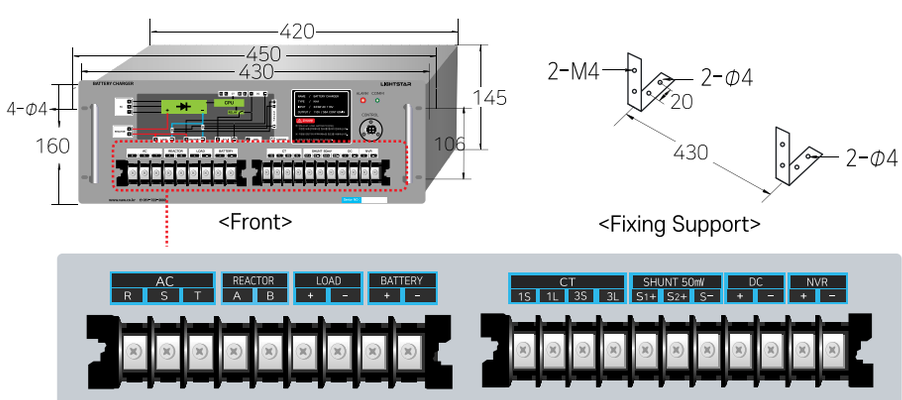
- Equipped with DC voltage and DC current terminals for monitoring
- Built-in NVR (No voltage Relay)
- Rack or shelf mounting

Specification

Type	KHA-1A	KHA-1B
Rated Output voltage	DC 110V	DC 118V
Rated Input voltage	3-Phase AC 110V(50/60Hz)	3-Phase AC 120V(50/60Hz)
Floating voltage	DC 108~124V	DC 120~138V
Equalizing voltage	DC 124V	DC 138V
Number of batteries	12V / 9	12V / 9
Rated Output Current	DC 30A	DC 50A
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℃~50℃/20~85% RH	

Drawing

Unit:mm



Rectifier Controller



Model No

KHB

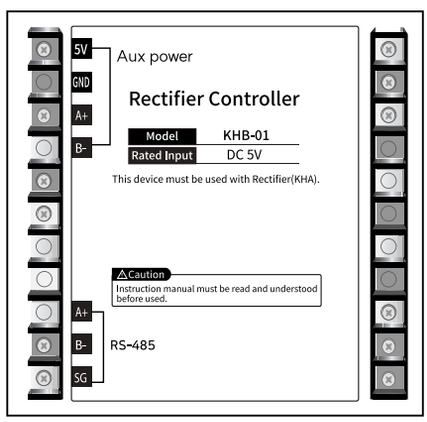
Overview

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

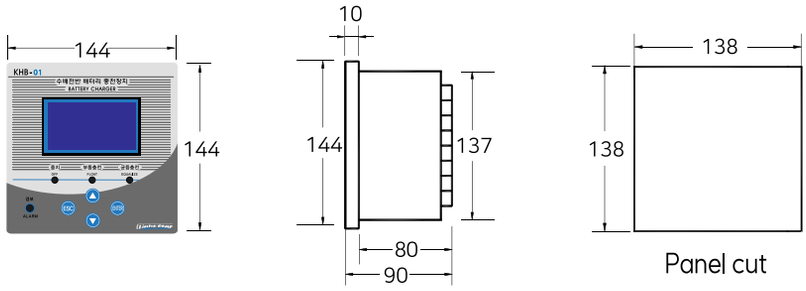


Specification

Display	AC Voltage, AC Current	Primary AC voltage (using PT from voltage transformer secondary), AC current(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

Drawing

Unit:mm



Rectifier Transformer



Model No

KHT- ①②

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 3P 380V/110V, 5kV, 60Hz
KHT-42 Transformer AC 3P 440V/110V, 7.5kV, 60Hz

60Hz standard, 50Hz is made to order. Double winding transformer.

Overview

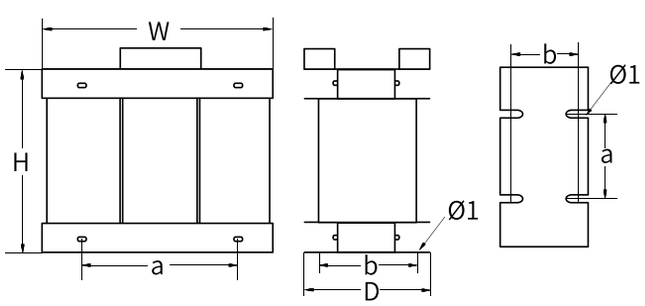
Electrical equipment that steps down from AC 3-phase voltage to the input voltage of our rectifier (KHA)

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 (60Hz order made)	Withstand voltage	AC 2.5kV/1 min (between the input and output terminals and the outer box)
Input	220/380/440V	Output Item	105/110/115/120V

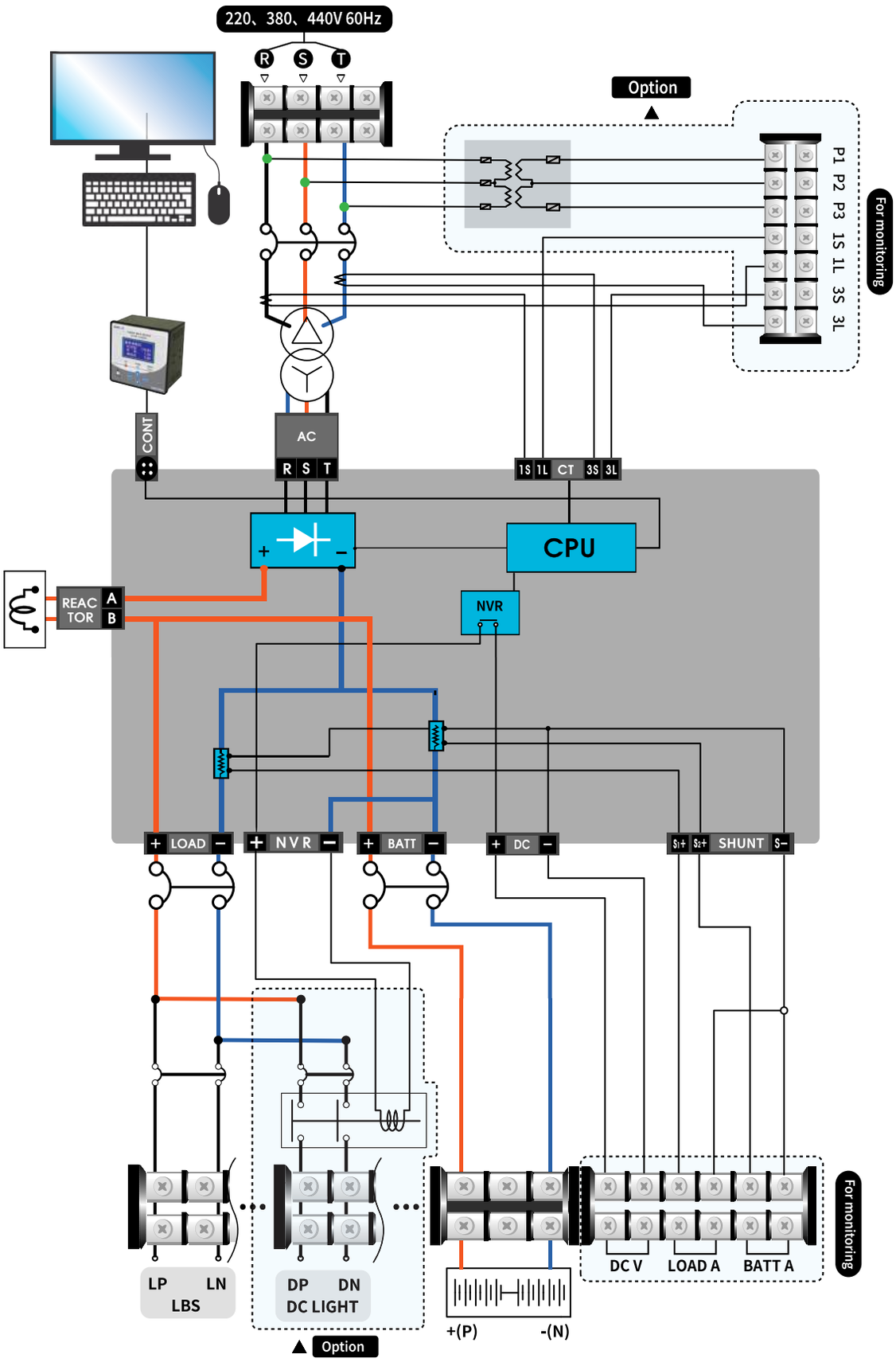
Drawing

Unit:mm



Rated capacity		
Size	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

Basic circuit diagram



Abbreviation for electric terminology

Abbreviation	English	Abbreviation	English
A	ammeter	KW	kilowatt
ABS	automatic block system	KWH	kilowatt hour
AC	alternating current	LA	lightning arrester
AC	armored cable	LAN	local Area Network
ACB	air circuit breaker	LBS	load breaker switch
ACSR	aluminium conductor steel reinforced	LCD	liquid Crystal Display
AM	amplitude modulation	LCP	local control panel
AMP	amplifier	LCX	leakage coexial sheath cable
AMP	ampere	LED	light Emitting Diode
ANT	antenna	MCB	main circuit breaker
AS	ammeter switch	MCC	motor control center
ATS	automatic transfer switch	MCCB	metal clad circuit breaker
C	condenser capacitor	MCCB	moulded - case circuit breaker
CAD	computer Aided Design	MCP	motor control panel
CAM	computer Aided Manufacturing	MDF	main distribution frame
CATV	cable television	MOF	metering out fit
CB	circuit breaker	MRC	mobile radio communication
CCTV	closed circuit television	MRT	mass rapid transit
CH	cable head	MW	megawatt
CKT	circuit	NFB	no fuse breaker
COAX	coaxial, coaxial cable	OCB	oil circuit breaker
COS	change-over switch	OCGR	over current ground relay
CP	control panel	OCR	over current relay
CSC	centralized substation control	OF	optical fiber
dB	decibel	Ohm	ohm
DC	direct current	OLR	over load relay
DCS	distributed control system	OVR	over voltage relay
DDC	direct digital control	OW	out-door pvc insulated wire
DS	disconnecting switch	P	pole / pair / power
DSS	double slip switch	P	pump
E	earth (wire)	PABX	private automatic branch exchanger
EL	elevator	PF	power fuse
ELA	earth leakage detector	PLC	programmable logic controller
EMC	electro magenetic compatibility	PSI	power supply instrument
EMI	electro magenetic interferecne	PT	potential transformer
EP	electrical panelboard	PWM	pulse width modulation
EPS	electric pipe space	R.F	radio frequency
F	fuse	RAM	random access memory
FA	fire alarm	RF	radio frequency
FL	fluorescent lamp	RF	resonance frequence
FR	frequency relay	SS	substation
FRP	fiber grass reinforced plastic	SW	switch
GCB	gas circuit breaker	TR	transformer
GEN	generator	V	volt
GR	ground resistor	V	voltmeter
GV	pvc insulated grounding wire	VA	volt ampere
HP	horsepower	VAN	value added network
HZ	hertz	VD	voltage drop
IPS	impulses per second	VF	pvc insulated flexible wire
ITr	indication transformer	VS	voltmeter switch
IV	in-door pvc insulated wire	VVVF	variable voltage variable frequency
KIN	600v grade in-door pvc insulated wire	W	watt
KS	korean standards	XFMR	transformer
KVA	kilovolt ampere		

OTHERS

LIGHTSTAR
㈜광성계측기



CE certification

CE stands for "Conformité Européenne" 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 EMCD(Electro Magnetic Compatibility Directive).
LIGHTSTAR achieved CE certificate for Analog meter, Current Transformer, Digital meter, Power meter, and Transducers.

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



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Condenser Trip Device with Volt meter KHY-14A



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183
Motor Controller KYB



184~185
Lighting Controller KCL



186~187
TCR (Trip Current Relay) KYR-□□



188
Current Transformer Open Detector KYS-01□



189
Condensor Discharging Coil KBN

Condenser Trip Device



Model No

KHY-①②

① Input	② Capacitor capacity
1 AC 110V	1 1000μF/160V
	2 2700μF/160V

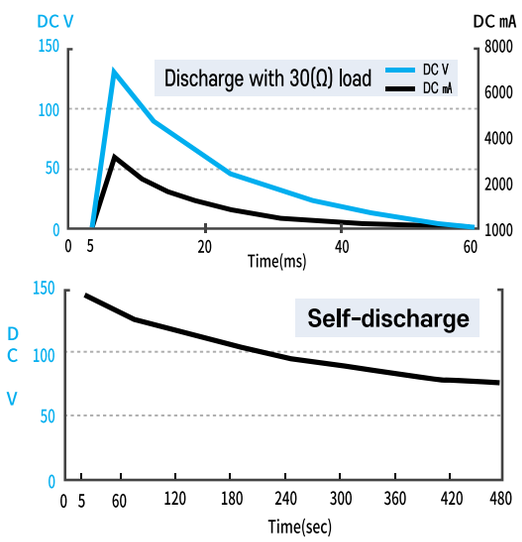
How to order)
KHY-11 AC 110V/1000μF 160V

Customized product can be produced by order.

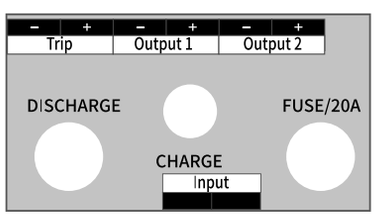
Specification

Type	KHY-11, KHY-12	
Operating temperature	-10℃ ~ 50℃	
Operating humidity	20 ~ 85%	
AC source	AC 110V	
Frequency	50/60Hz	
Charging voltage	DC 145V, Max	
Weight	KHY-11	390g
	KHY-12	450g
	KHY-13	320g

Discharge graph (KHY-11)



Terminal layout



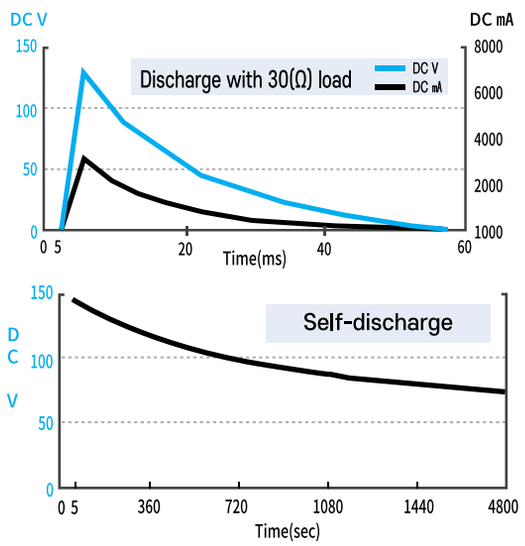
Overview

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

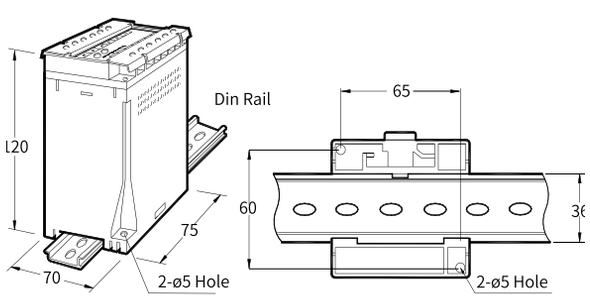
Function

Output	Refer to the graph below
Condenser capacity	KHY-11(1000uF/160V), KHY-12(2700uF/160V)
Rectifying capacity	DC 10A/110V
Applicable standard	IEC60694/KSC4611

Discharge graph (KHY-12)



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 the amount of electric charge can be check by the integrated volt meter.

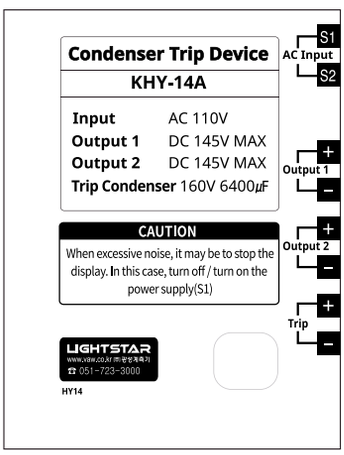
Specification

Operating temperature	-10℃ ~ 50℃
Operating humidity	20 ~ 85%
AC source	AC 110V
Frequency	50/60Hz
Charging voltage	DC 145V, Max
Weight	730g

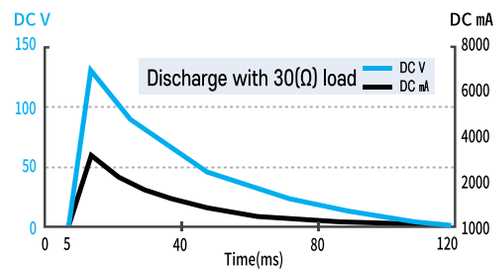
Function

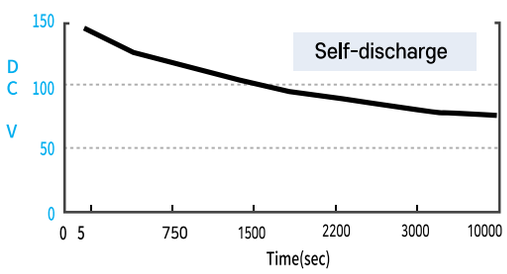
Output	Refer to the graph below
Rectifying capacity	DC 10A/110V
Applicable standard	IEC60694/KSC4611

Terminal layout



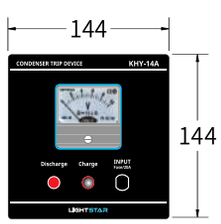
Discharge graph

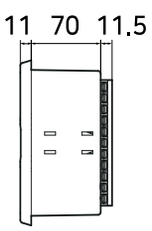


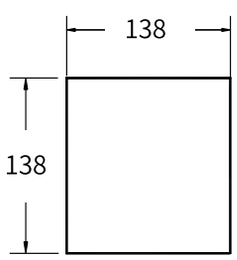


Drawing

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	±(0.5% rdg + 1digit)	Aux. power	AC 90~260V (50/60Hz) /DC 110V
Operating temperature	-10℃ ~ 50℃	Operating humidity	20 ~ 85%
Withstand voltage	AC 2kV 1min	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 / 144×144×90 mm		

Feature

- 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.

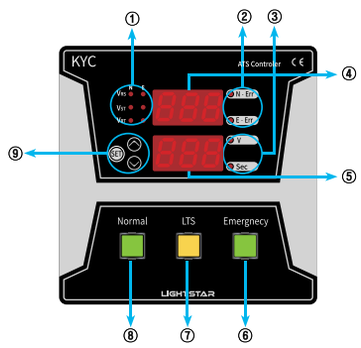
Caution

- Alarm occurs if power (Normal or Emergency) is NOT supplied.
- Do not ground the PT for Aux power.

Drawing

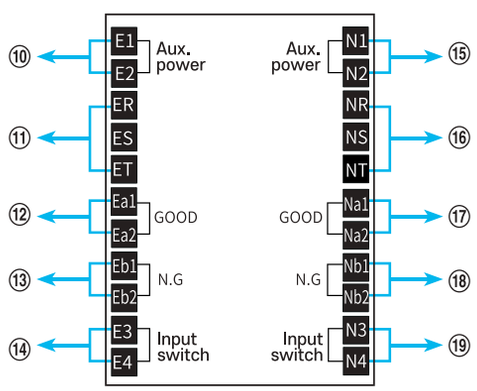
Refer to Page 180

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 3-Phaes voltage input ⑰ Normal power output(Normal)
⑱ Normal power output(Error) ⑲ NORMAL MC control output.

16Channel Current Limit Setting Device



Model No

KYE-16

Overview

This device is used for motor to check current, idle condition, over current, 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 1min
Surge impulse	Current terminal (8μs/20μs)
Burst immunity	Level 4(IEC 61000-4-4)
Weight	380g

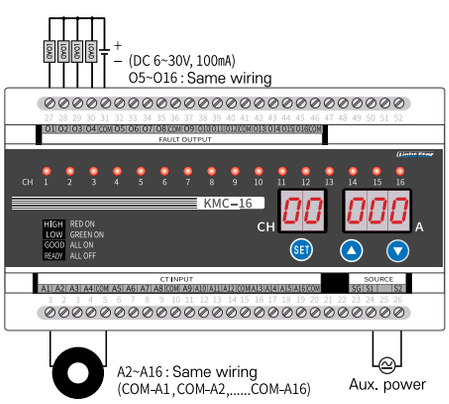
Function

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

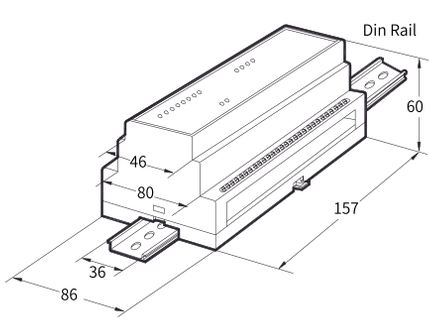
Current Settings	Upper limit	Set upper limit value for control
	Lower limit	Set lower limit value for control
	Minimum value	To determine whether the load operate
Delay time	Start	Hold for setting time from the load starts even if the values over limit.
	On	Hold for setting time from moment of values 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 automatically 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

Feature

- 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

Accuracy	± (0.5% of rdg + 3digit)
Aux. power	AC 90~260V (50/60Hz)/DC 110V
Operating temperature	-10℃~50℃
Operating humidity	20 ~ 85%
Withstand voltage	AC 2kV 1min
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 X 144 X 90mm

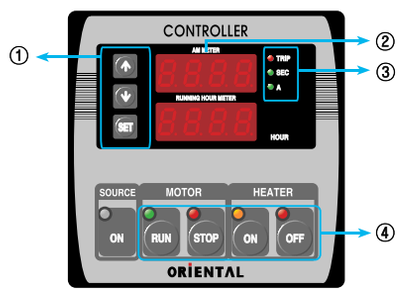
Function

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	Over current relay

Overview

This device is used for to control small crane or hoist for on-shore project

Front



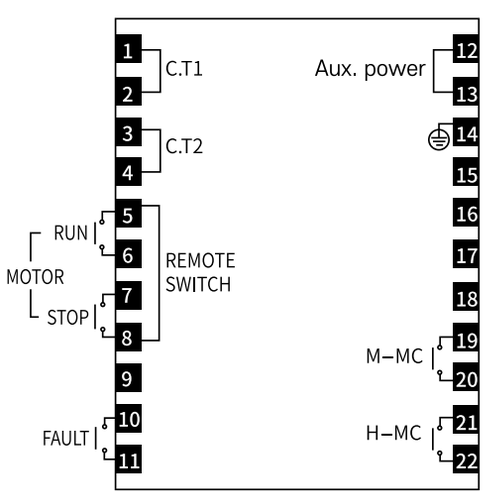
① Setting key
- UP & DOWN : Set value
- SET : Save set value

② Display : FND 4×2

③ Unit LED
- General LED(TRIP, SEC, A) : Ø3㎜
- Operation LED(SOURCE, HEATER, MOTOR : Φ 6㎜)

④ Manual button : Motor and Heater, ON/OFF

Terminal layout



Drawing

Refer to page 180

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.



FND Display window
Lighting number, group number.

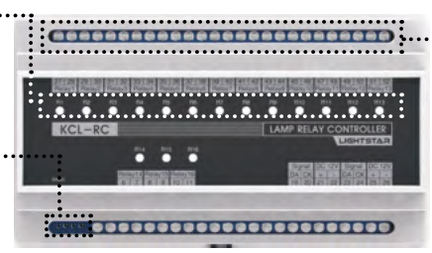
ON/OFF Key
Lights On/Off

Direction key
Select light number in setting made.

KCL-08/16/32

LED display
Relay status (ON / OFF)

Dip Switch
Used for 32 lamps type only (for 17~32 Lamps)



KCL-RC

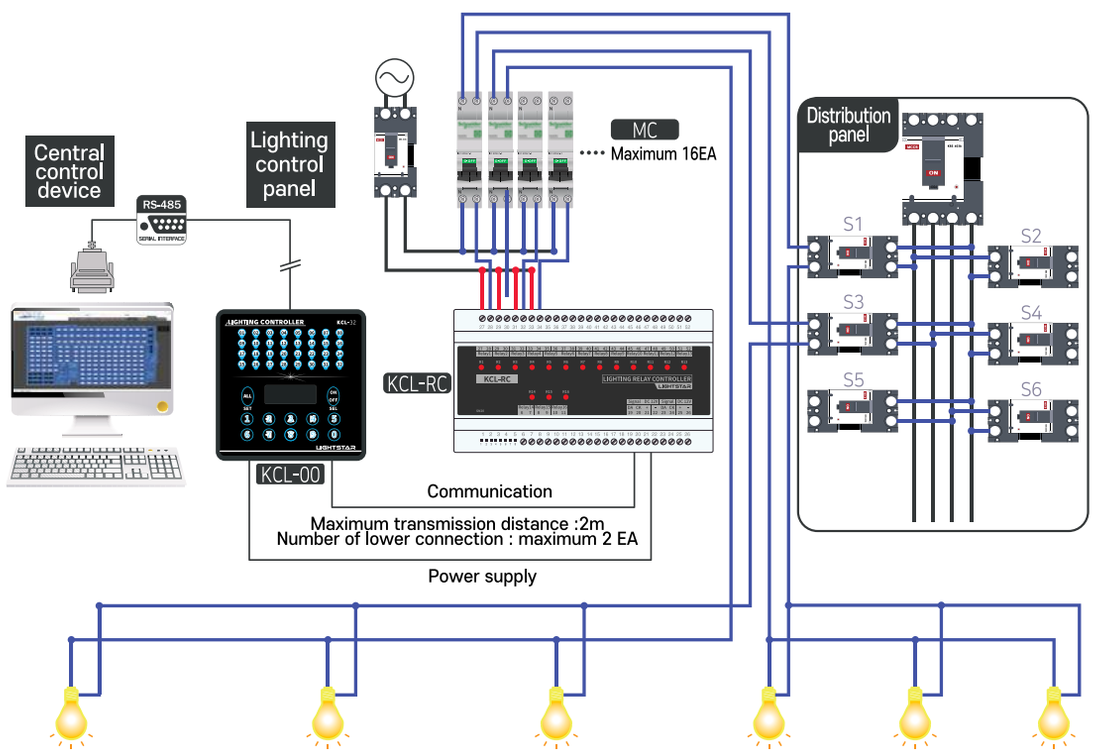
Terminal Name	Signal		DC 12V		Signal		DC 12V	
	DA	CK	+	−	DA	CK	+	−
Terminal No	19	20	21	22	23	24	25	26

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/1min	Surge impulse	Voltage (1.2/50μs, 5 kV) Current (8μs/20μs) (IEC 60255-5)
Burst	Burst, Level 4(IEC 61000-4-4)	Electrostatic discharge	±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 ~ 9999)	Display	- FND : 14.2(0.56")mm Red(4digit) - LED : Lighting number with 32 LEDs
Weight			
KCL-08/16/32	490g	KCL-RC	160g/410g

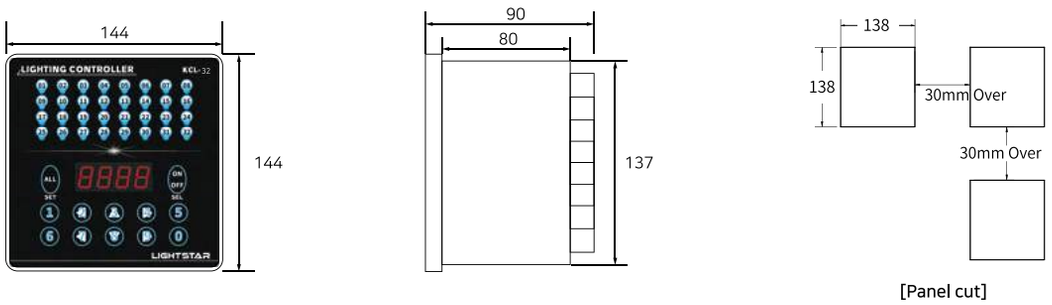
Connection diagram



Drawing

Unit:mm

KCL-08/16/32



[Panel cut]

TCR (Trip Current Relay)



Terminal type | Penetration type

Model No

KYR-①②③

① Terminal type									① Penetration type			② Output
NO	Current		NO	Current		NO	Current		NO	Current		A a contact
	On	Off		On	Off		On	Off		On	Off	B b contact
P5	0.5	0.45	03	3.0	2.7	15	15.0	13.5	30	30.0	27.0	③ Operating time
01	1.0	0.9	05	5.0	4.5	20	20.0	18.0	40	40.0	36.0	1 Instantaneous
02	2.0	1.8	10	10.0	9.0	25	25.0	22.5	50	50.0	45.0	2 Delayed

How to order) KYR-20A1

Customized product can be produced by order.

Overview

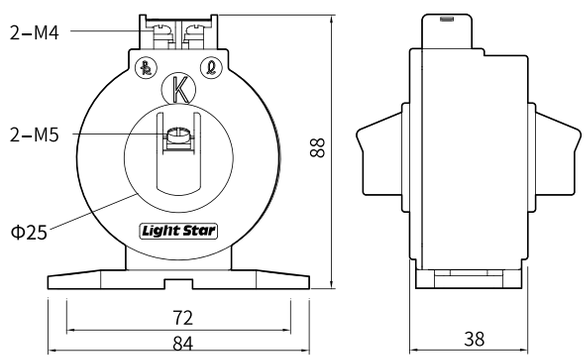
This device includes internal relay to operate as A contact or B contact, which can be activated following the current value.
This can be used for checking the operation staus of small electric devices , and can be connected directly without source power.

Specification

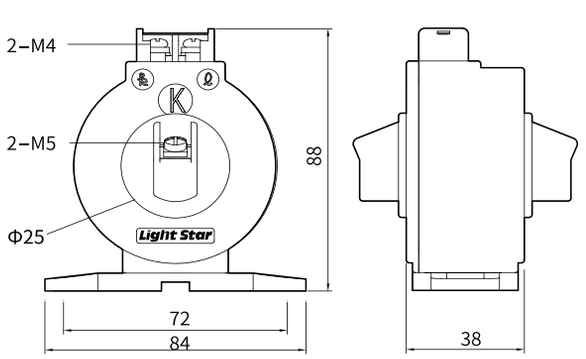
Contact capacity	AC 220V 0.3A	Output operating time	0.1sec(Instantaneous) / 3sec(Delayed)
Withstand voltage	2kV, 1 minute between input and contact	Frequency	50~60Hz
Rated voltage	Less than AC 300V	Allowable current	200%(Continuous)
On-current allowable range	±5%	Operating temperature	-10℃ ~ 50℃
OFF-current allowable range	±5%	Weight	200g

Drawing

Unit:mm



Terminal type

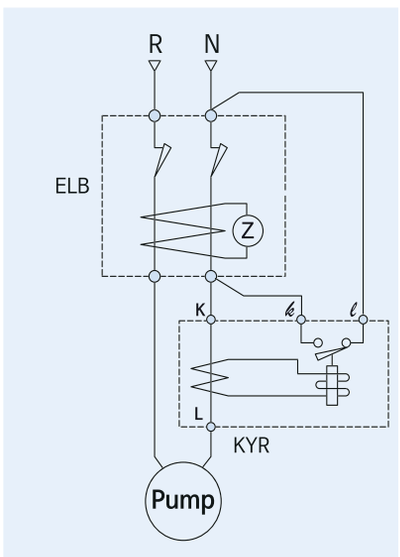


Penetration type

Caution

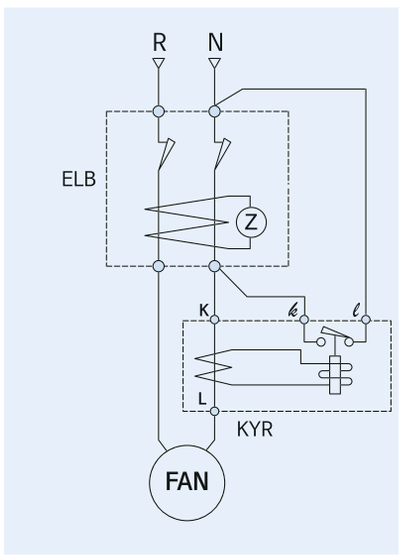
- TCR (Trip Current Relay) is manufactured by operation and return current value. Please inform ON/OFF range before order.
- For single phase system N phase of ELB(Earth Leakage Breaker) must be connected with TCR terminal of TCR k&l side
- The condition of TCR and ELB must be checked regularly
- Any problem issues related TCR will be followed on company's redemption policy.

Connection diagram



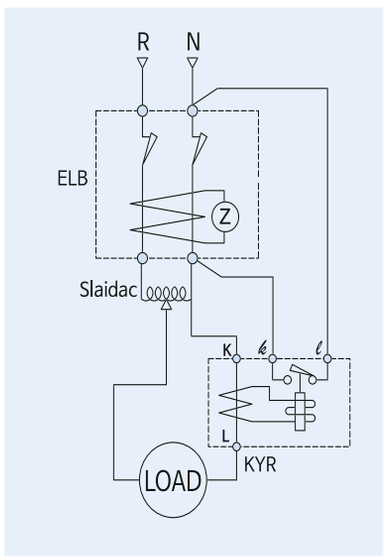
Protect pump idle condition

Under pump idle condition, current will be reduced. TCR(Trip Current Relay) will activate ELB for low current limit.



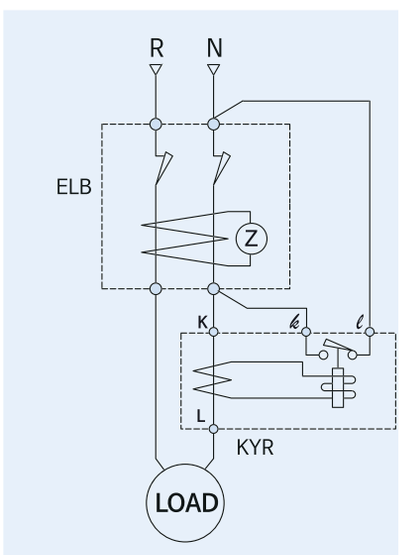
Protect Fan/Pump overload condition

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.



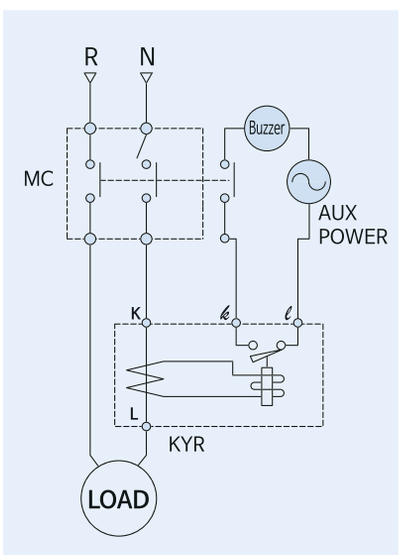
Protect sildax over current

Slidax has a large secondary current at low secondary voltages.
TCR(Trip Current Relay) will activate ELB for high current limit.



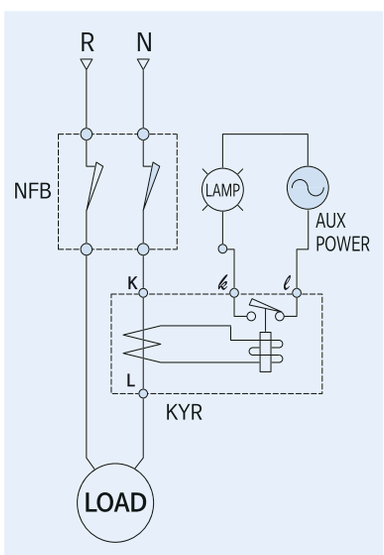
Current limit variation for ELB

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

Current Transformer Open Detector



Model No

KYS-01①

①	Communication
C	RS-485
N/A	None

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.

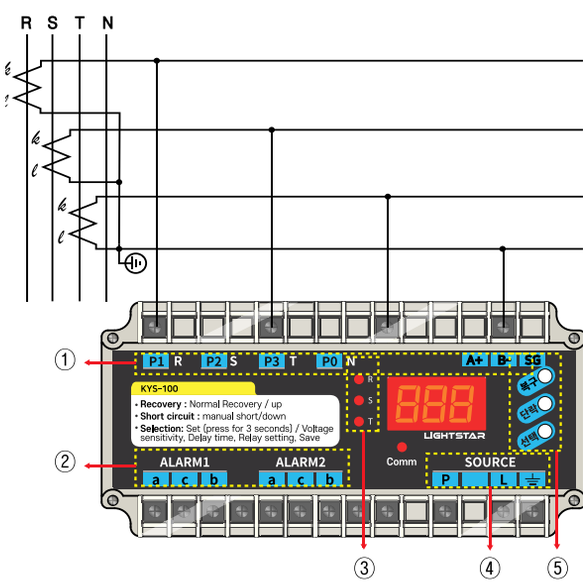
Feature

- 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 1min
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 from sea level
Weight	650g

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

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.

Drawing

Refer to page 135

Condensor Discharging Coil



Model No

KBN

Overview

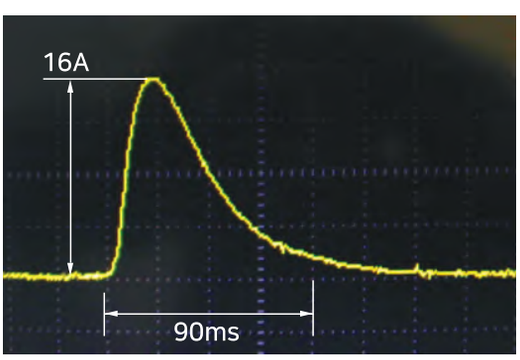
Connected parallel with condenser(Capacitor), which used for Power factor controller.
To protect electrical devices from frequent turn ON/OFF by reducing electric charge collision.

Specification

Insulation resistance	More than 10MΩ	Discharging time	1 time / More than 10 sec
Discharging capacity	100kVA/380V	Discharging voltage	DC 600V
Withstand voltage	2kV/1min	Circuit	3 phase
Temperature rise	Less than 50deg	Weight	2910g

Customized product can be produced by order

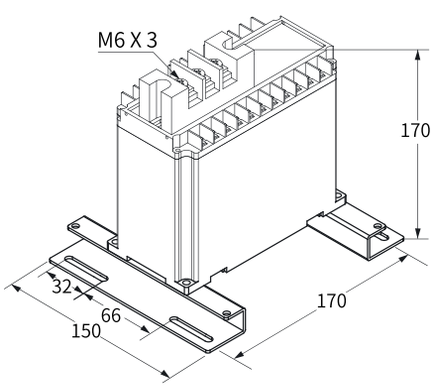
Discharge characteristic graph(AC 380V, 100kVar)



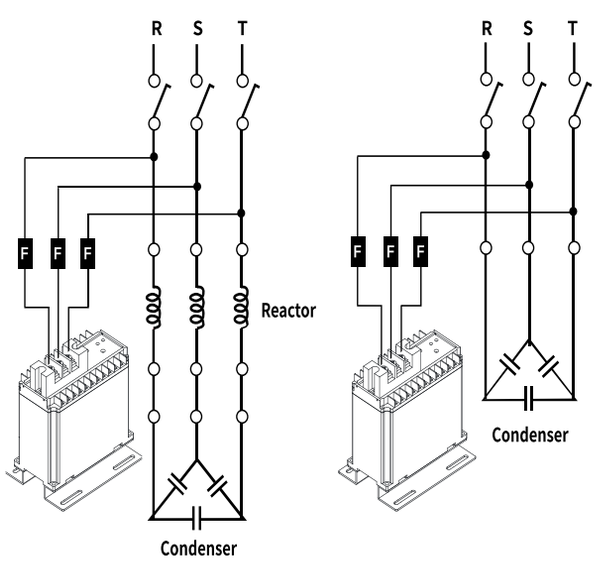
Drawing

Unit:mm

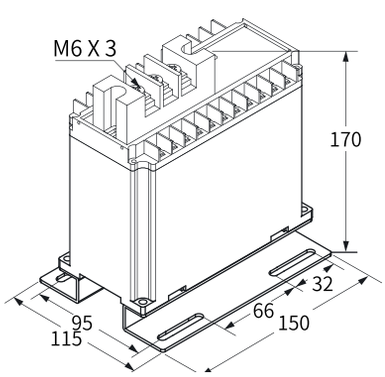
Case 1



Connection diagram



Case 2



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