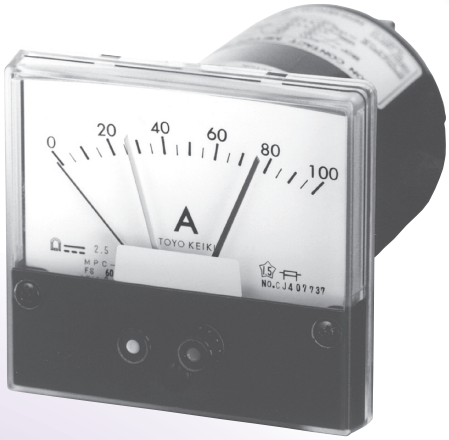
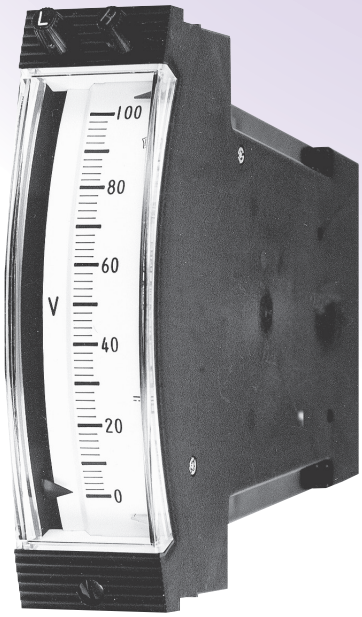
TOYO KEIKI

Contactless Controller

Meter Relay
Non-indicating Regulator



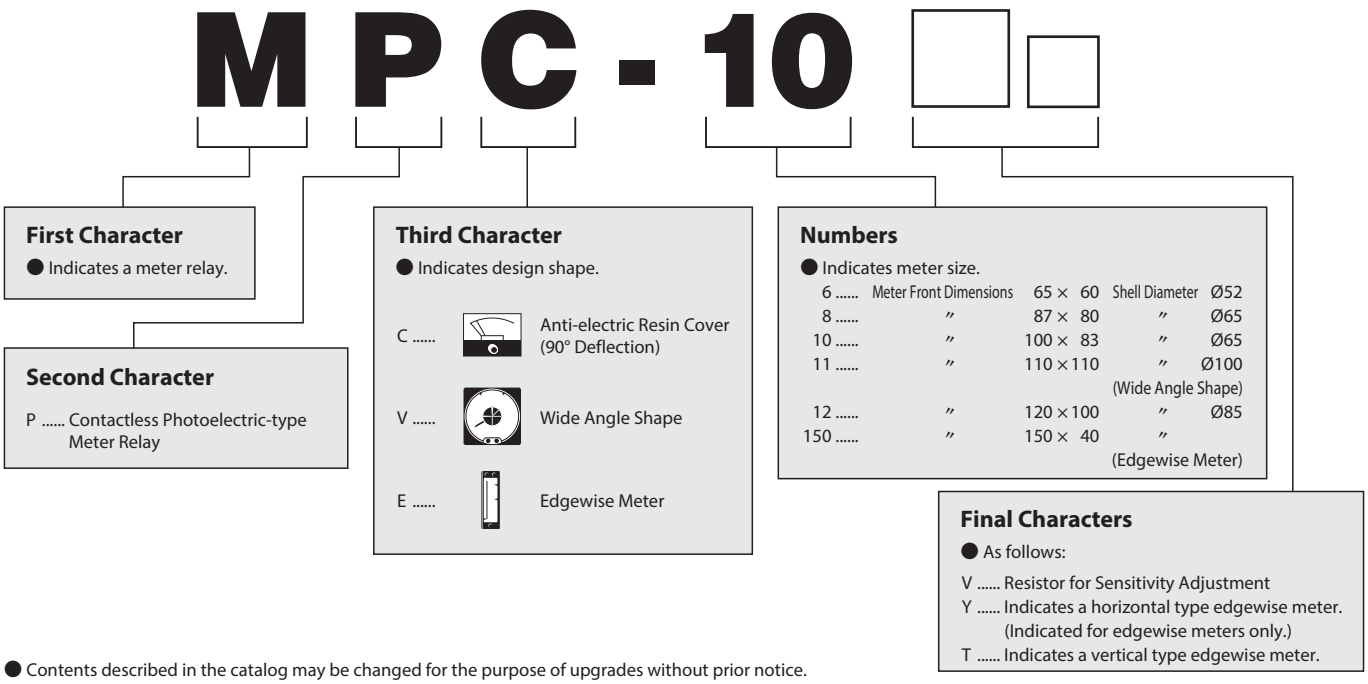


東洋計器株式会社

CAT. NO. MP-12

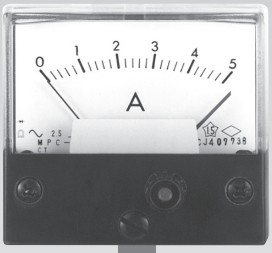
TOYO KEIKI

Contents

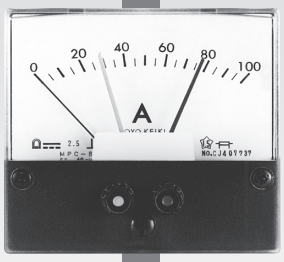


● Contents described in the catalog may be changed for the purpose of upgrades without prior notice.

Meter Relay



MPC-6



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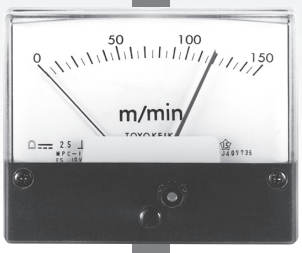

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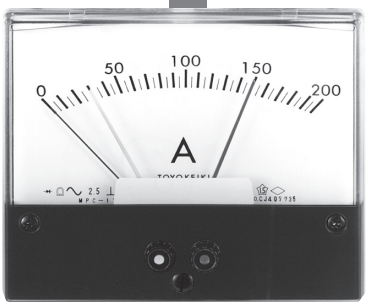
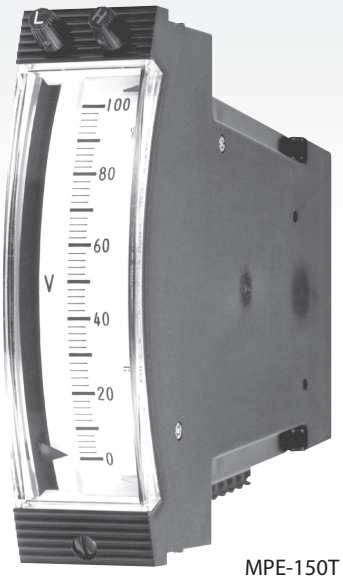


MPC-12

MPV-11



MPE-150T

Non-indicating Regulator

DS-5A

AS-62

TOYO KEIKI

Contactless Meter Relay

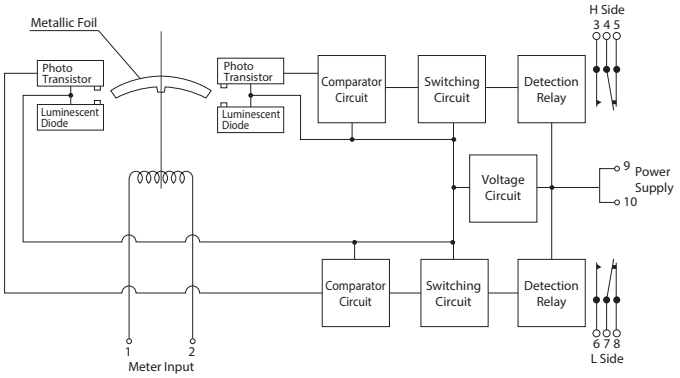
A precise meter relay that uses the deflection of the pointer to control the external circuits. Toyo Keiki manufactures devices with photoelectric-type configurations.

■ Features of Meter Relay

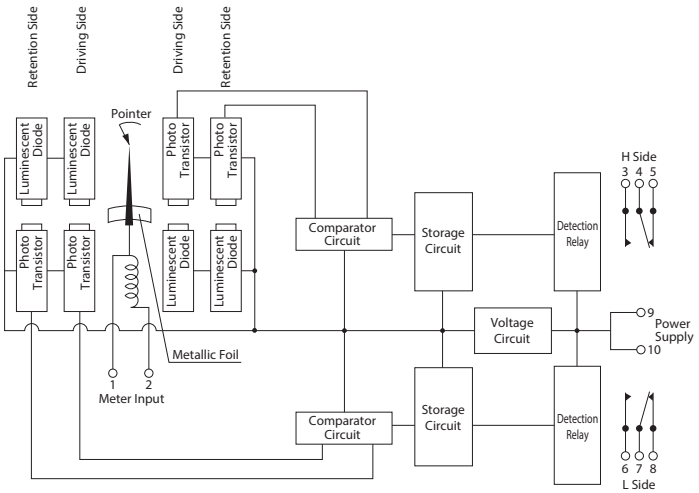
- **These meter relays possess the various features of a contactless solid state relay.**
- **The relay circuits and detection relay are integrated into the main body of the meter.**
  This reduces labor, potential misconnection and other issues in steps such as connection and installation of the included cells.
- **Highly reliable operation.**
- **Reliable operation even during minute meter input.**
- **Set point passage-type relay.**

Operating Principles of Photoelectric Type

A light source and a receiver are installed on the upper limit and lower limit pointers respectively. The collector current of the photo transistor receiver changes when the foil attached to the movable pointer goes between the light source and the receiver by means of the movable coil input. This change in current is converted to a change in voltage which passes through a comparator circuit and a switching circuit to operate the detection relay.



Square/Edgewise Meter Relay
Photoelectric-type Circuit Configuration



Wide-angle Meter Relay
Photoelectric-type Circuit Configuration

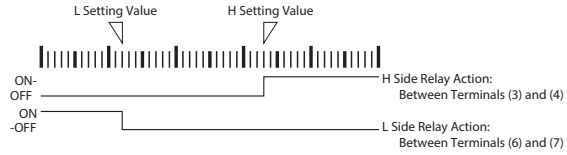
Operation Mechanism of Contactless Meter Relay

While the standard output signal format of the meter relays is a passing signal retaining type, the following three types are used for the MPV-11.

Output Signal Format	Compatible Meter Relay Format
1. Passing Signal Retaining Type	Wide angle shape, square shape, edgewise shape (MPV type, MPC type, MPE type)
2. Passage Type/Instantaneous Type	Wide Angle Shape (MPV type)
3. Stop Type	Wide Angle Shape (MPV type)

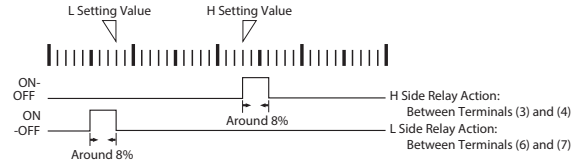
1. Passing Signal Retaining Type

When the pointer moves past the setting value, the passing signal is retained after signal output. The signal returns to normal after the pointer moves back to the setting value.



2. Passage Type/Instantaneous Type

The same structure as the stop type below, except without the stopper. The output signal returns to normal when the pointer reaches around 8% of the scale length past the setting value.



3. Stop Type

The pointer mechanically stops after it passes the H or L setting value and a signal is output. The pointer can reach around 8% of the scale length past the setting value.

Precautions for Use

(1) When using a meter relay with L settings (except the wide angle passing signal retaining type), take care not to turn on the power of the meter relay and the meter input at the same time, as the L side signal will be generated continuously until the meter pointer passes the set L pointer.

(2) Avoid using in areas where the meter will be directly exposed to sunlight in the middle of summer, as these are photoelectric-type meter relays.

Wide-angle Meter Relay (Passing Signal Retaining Type)

While 90° displacement meter relays have a shielding plate at the 90° point and can retain the signal by themselves after the pointer passes this, wide-angle meter relays are mechanically unable to do this because the displacement angle (240°) is too large. An electronic storage method is used instead.
As a result, the following issues occur the first time the auxiliary power supply is turned on. Please take this into account when designing circuits.

(1) When the Auxiliary Power Supply is Turned On (L Side Only)
Load relay operation on the L side should be turned on when the meter pointer is a zero and the auxiliary power supply is turned on, but in this case operation does not occur unless the pointer is displaced to around 17mm before the L setting value.
However, this only occurs the first time the pointer passes after turning on the power. After this, operation is turned off when the L setting value is passed and on after returning to normal, and remains on after returning to zero.
This only occurs for the L setting. Normal operation occurs from the start for the H setting.

(2) When the Auxiliary Power Supply is Stopped
If the indicator input and auxiliary power supply of the meter are applied by different circuits, the auxiliary power supply stops when the pointer goes above the H setting value and the H load relay activates. If the pointer continues to indicate the same value, the H load relay returns (turns off) at the same time as the power supply, and usually turns back on when the power is turned on again.
However, if the power is off for 40 seconds or longer, the storage circuit no longer retains the signal, with the result that the previous signal is no longer output when the power is turned on again. If the power is off for 40 seconds or longer, be sure to return the pointer to the zero position by opening or shorting the meter input circuit.
No issue occurs when the power is off for short periods of less than 40 seconds, as the storage circuit remains live.

Standard Specifications

Item \ Model Name / Operating Principles		MPC-6	MPC-8	MPC-10	MPC-12	MPE-150	MPV-11
Operating Principles		Photoelectric Type					
Outside (mm)		65 × 60	87 × 80	100 × 83	120 × 100	150 × 40	110 × 110
Scale Length (mm)		Approx. 48	Approx. 68	Approx. 80	Approx. 100	Approx. 100	Approx. 170
Accuracy Class		2.5			1.5 (2.5) ( ) indicates rectifier type		
Pointer		Wand Type				Triangular Spearhead Type	Triangular Type
Set Pointer		Wand Type H : Red L : Yellow				Spearhead Type H : Red L : Yellow	
Scale Plate		White Base					
Scale Division		12 ~ 25	12 ~ 25	20 ~ 45	24 ~ 50		35 ~ 75
Mounting Posture		Vertical					
Cover		Special Anti-electric Resin				Methacrylic Resin and ABS Resin	Methacrylic Resin
Base		Between Terminals : Phenol Resin Body : ABS Resin				ABS Resin and Aluminum Board	Between Terminals : Phenol Resin Body : ABS Resin
Cover Coating Color		Black or Munsell Notation 7.5B G4/1.5 (Blue-green)					
Setting		Both H and L can be set as desired throughout the entire scale range					
Minimum Set Gap between H and L (Against Scale Length)		5%					
Operating Error for Setting Value (Against Scale Length)		2.5			1.5		
Dead Band		1.0					
Meter Action	Passage Type	○	○	○	○	○	○
	Stop Type	———	———	———	———	———	○
Auxiliary Power Supply	DC AC	According to Auxiliary Power Supply Specifications of Meter Relay on page 6					
Output Signal	Retaining Type	○	○	○	○	○	○
	Instantaneous Type	———	———	———	———	———	○
Contact Arrangement and Capacity		1A each for H and L AC 100V 1A	1ab each for H and L, AC 100V 1A (resistance load)				1ab each for H and L AC 220V 3A
Insulation Test		Between electrical circuit and outer casing of meter: 10MΩ or more for 500V mega					
Voltage Test		Between electrical circuit and outer casing of meter: AC 1500V (50/60Hz per minute), between contact relay circuit and other electrical circuits: AC 500V (50/60Hz per minute)					
Characteristics of Meter		Characteristics of the meter part are based on JIS C standards 1102-1 to 9.					
Weight		Approx. 260g	Approx. 380g	Approx. 400g	Approx. 680g	Approx. 560g	Approx 1.4kg
Remarks		With Terminal Cover	With Terminal Cover	With Terminal Cover	With Terminal Cover	With Terminal Cover	With Terminal Cover

Specified Items when Ordering

Item		Entry Guide	Specified Items		Note
Model Name		Select one of the above model names	Example: MPC-6, 8, 10, 12		
	Scale	Enter the value displayed on the scale plate			
	Upper Limit Value Inherent to Meter	Not required if this value is the same as that displayed on the scale plate			
	Specifications of Meter Interior	When there is a particular need to specify the meter sensitivity or internal resistance	mA Ω		
Set Method		Upper limit (H), lower limit (L) or upper and lower limits (H/L)	H, L, H · L, H · H, L · L		
External Circuit Impedance		(Indicated only for millivolt meters and μA meters)	Ω		
Attached Panel		Attached Panel Standard Products MPC-6, 8, 10 ... 2.0mm MPC-12 ..... 3.2mm (specification required in other cases)			
Auxiliary Power Supply Voltage		AC or DC, voltage value	AC 110V $^{+5}_{-10}$% AC 220V $^{+5}_{-10}$% etc.		
Other (Accessories, etc.)		Indicates whether accessories are required when the rated range is exceeded	CT, VT, series resistor, shunt, generator, none needed, etc.		
Quantity		XX items	Desired delivery time	days after order	

TOYO KEIKI

Meter Relay Specifications List

[Standard Products Specifications Table]

Maximum Scale Value or Rating			MPC-6	MPC-8, 10, 12	MPC-11	MPC-150	Notes
			Accessories	Accessories	Accessories	Accessories	
DC Ammeter (Moving-coil type)	100μA		None	None	———	None	
	200μA ~ 20mA		None	None	None	None	
	Over 20mA, up to 1A		M-2A	None	None	None	Meter 100mV
	Over 1A, less than 5A		M-2A	M-2A	M-2A	M-2A	
	5A or above		Externally Attached Shunt	Externally Attached Shunt	Externally Attached Shunt	Externally Attached Shunt	Meter 60mV
DC Voltmeter (Moving-coil type)	1V-150V		None	None	None	None	Over 500V, less than 750V (M-2A)
	Over 150V, up to 300V		M-1	None	None	None	3 voltage division terminals for 750V and higher
	Over 300V, up to 500V		M-2A	M-1	M-1	M-1	(Various types of series resistor depending on voltage)
AC Ammeter (Mean value rectifier type)	500μA or more, up to 20mA		M-2A	None	None	None	
	Over 20mA, up to 100mA		M-2A and C-3	M-2A	None	M-2A	
	Over 100mA, up to 5A		M-2A and C-3	C-3	None	C-3	
	Over 5A, up to 100A		M-2A and C-3	C-3	C-3	C-3	
	□ /5A (for CT)		M-2A and C-3	C-3	None	C-3	
	□ /5A (for CT) with extended scale		M-2A and C-3	C-3	None	M-2A and C-3	
AC Voltmeter (Mean value rectifier type)	3V or more, up to 300V		M-2A	None	None	None	Install M-2A near the meter.
	Over 300V, up to 500V		M-2A	M-1	M-1	M-1	
	□ / 110V (for VT)		M-2A	None	None	None	Meter 150V
Frequency Electronic device type (Differential Method)	45 ~ 55Hz	110V	FM-3	FM-3	FM-3	FM-3	110V 1VA
	55 ~ 65Hz	220V					220V 2VA
	45 ~ 65Hz						
1P Wattmeter Electronic device type	110V 5A		ERG-3 (RRG-3)	ERG-3 (RRG-3)	ERG-3 (RRG-3)	ERG-3 (RRG-3)	110V 1VA; 220V 1VA; 5A 0.5VA — 1P varmeter can also be manufactured. In ( )
	220V 5A						
3P Wattmeter Electronic device type	110V 5A		ERG-3 (RRG-3)	ERG-3 (RRG-3)	ERG-3 (RRG-3)	ERG-3 (RRG-3)	110V Per phase 1VA; 220V Per phase 1VA; 5A Per phase 0.5VA — 3P varmeter can also be manufactured. In ( )
	220V 5A						
1P Power Factor Meter Electronic device type	LEAD LAG	110V 5A	URG-3	URG-3	URG-3	URG-3	110V 0.8VA
	0.5 ~ 1 ~ 0.5	220V 5A					5A 0.8VA
3P Unbalanced Power Factor Meter Electronic device type	LEAD LAG	110V 5A	UuRG-3 (URG-3)	UuRG-3 (URG-3)	UuRG-3 (URG-3)	UuRG-3 (URG-3)	110V Per phase 0.5VA; 5A Per phase 0.8VA — 3P balanced power rate meter can also be manufactured. In ( )
	0.5 ~ 1 ~ 0.5	220V 5A					
Tachometer	100rpm ~ 5000rpm		M-2A	None	None	None	

Note: 1) Specify 1P varmeter, 3P varmeter or 3P unbalanced power factor meter (50Hz or 60Hz). 2) See P9 and 10 for outside dimensions of accessories.
3) See P11 and 12 for connection diagrams of meter circuits. 4) M.R.S.-response can also be manufactured for AC ammeter and AC voltmeter.

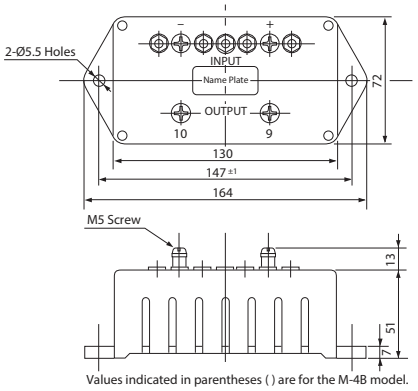
[Auxiliary Power Supply Specifications of Meter Relay]

Auxiliary Power Supply Voltage		MPC-6		MPC-8, 10, 12		MPC-11		MPC-150	
		Accessories	Power Consumption	Accessories	Power Consumption	Accessories	Power Consumption	Accessories	Power Consumption
AC	100V	P-3 (4 terminals)	1.5VA	None	1.5VA	None	1.5VA	P-3	1.1VA
	200V	P-3 (4 terminals)	1.5VA	None	1.5VA	None	1.5VA	P-3	1.1VA
	24V	None	1.5VA	None	1.5VA	None	1.5VA	None	1.1VA
DC	12V	None	100mA	None	100mA	None	100mA	None	100mA
	24V	None	80mA	None	80mA	None	80mA	None	80mA
	25 ~ 70V	M-4A	100mA	M-4A	100mA	M-4A	100mA	M-4A	100mA
	71 ~ 150V	M-4B	150mA	M-4B	150mA	M-4B	150mA	M-4B	150mA

● Variation of auxiliary power supply is ±10% of the values in the table.

[Power Unit]

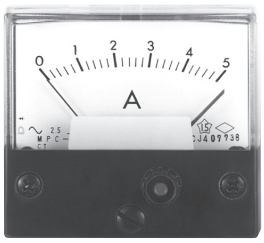
● M-4A Model (M-4B Model)

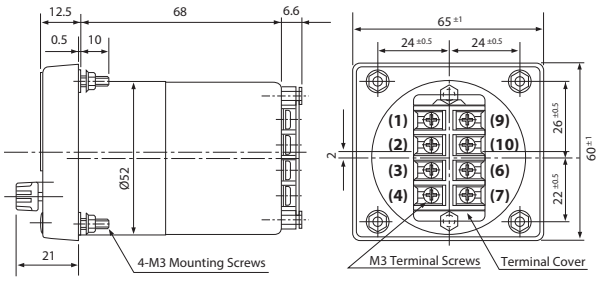


Values indicated in parentheses ( ) are for the M-4B model.

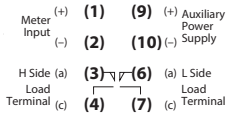
[Outside Dimensions]

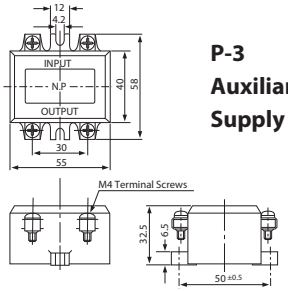
● MPC-6





● Terminal Number Diagram



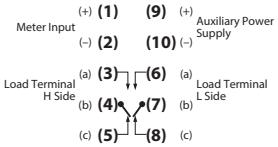


P-3
Auxiliary Power Supply Accessories

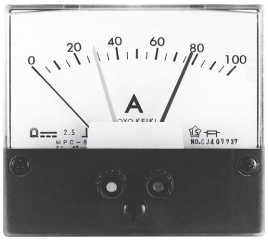
Note 1) The terminal number configuration in the diagram on the right also applies to terminal configurations for meter relays not specified in the terminal number diagram.

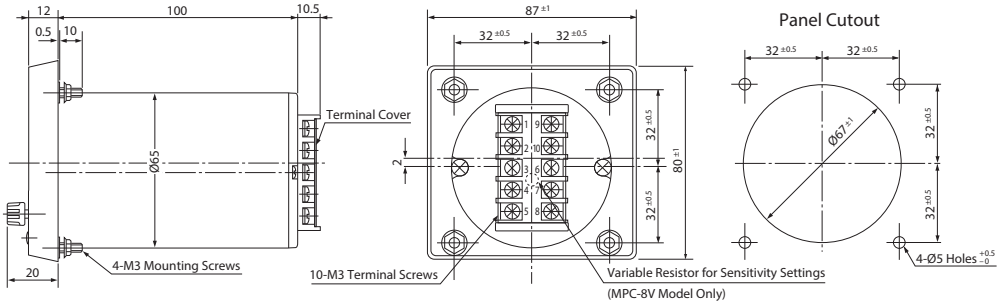
2) As per the diagram for the meter input terminal and power supply terminal; unrelated to polarity in the diagram for AC.

● Terminal Number Diagram

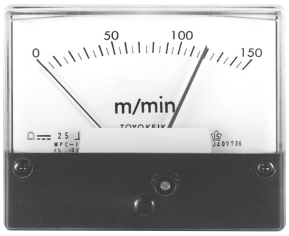


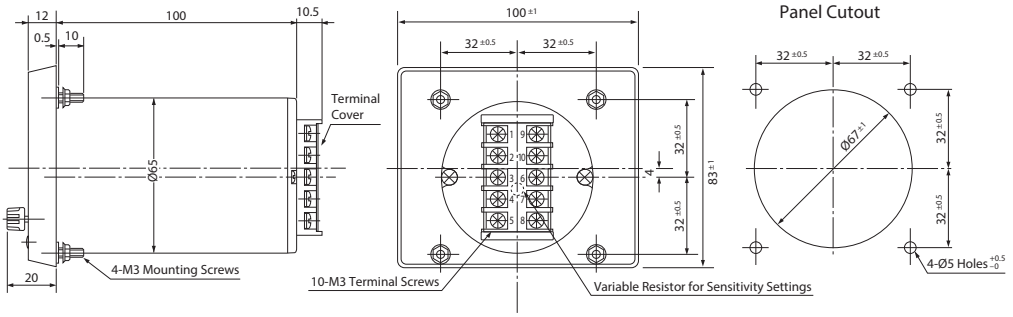
● MPC-8



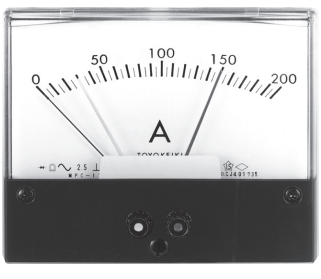


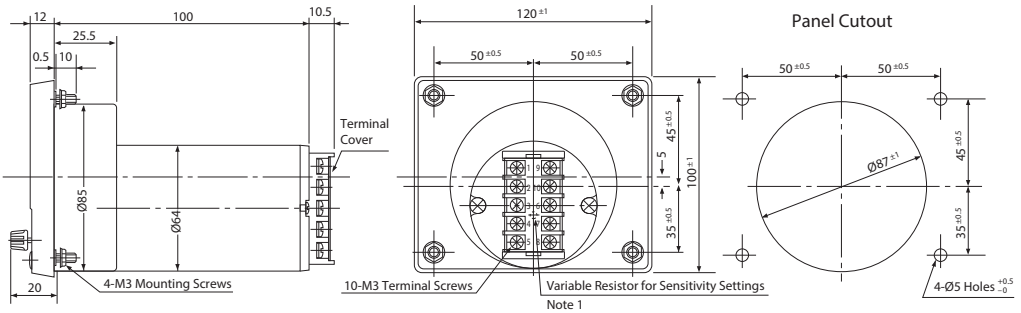
● MPC-10



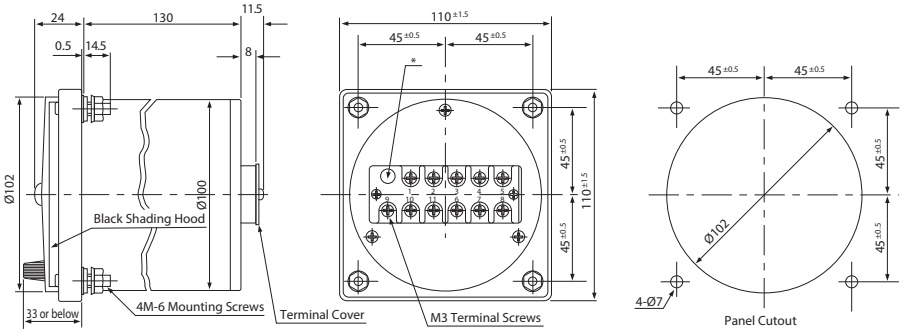


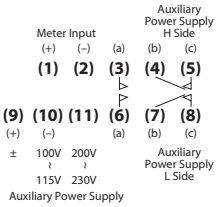
● MPC-12





● MPV-11



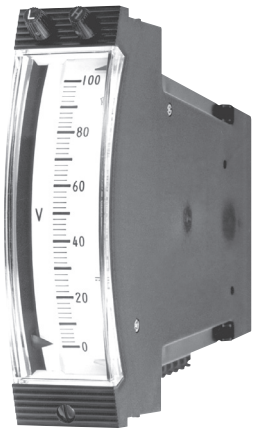


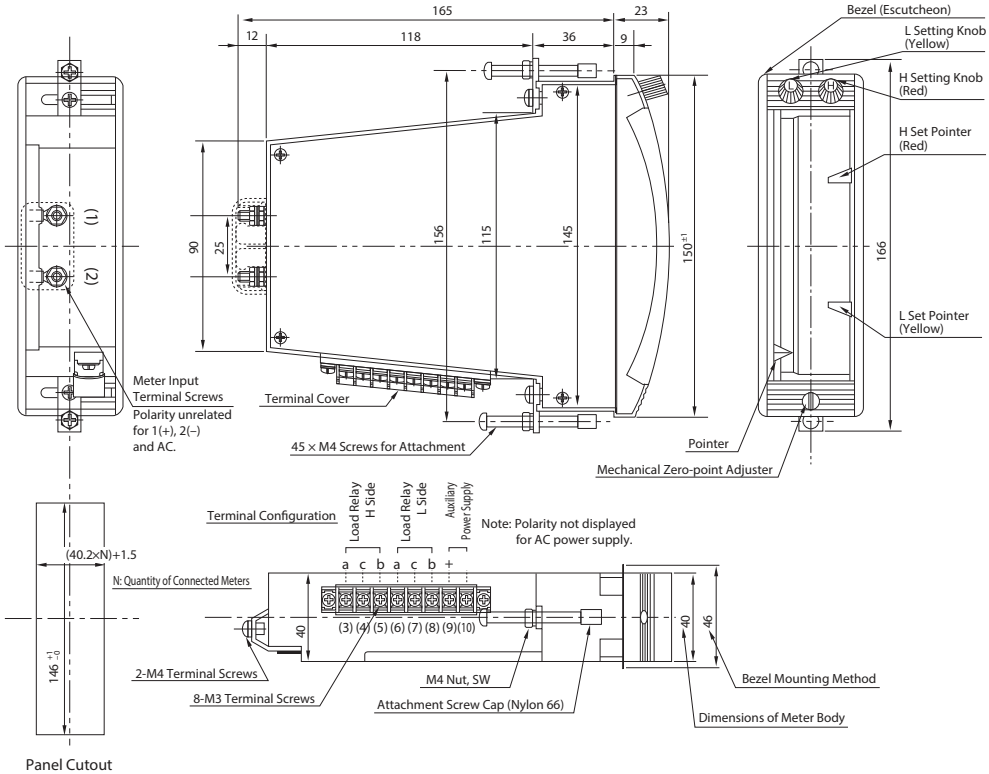
Note:

Auxiliary Power Supply	Terminals Used
AC 100 ~ 115V	9, 10
AC 200 ~ 230V	9, 11
D.C V	9 (+), 11 (–)

* Indicates resistance values for resistor for sensitivity adjustment.

● MPE-150



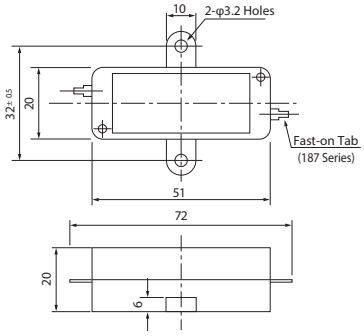


Meter Attachment Method

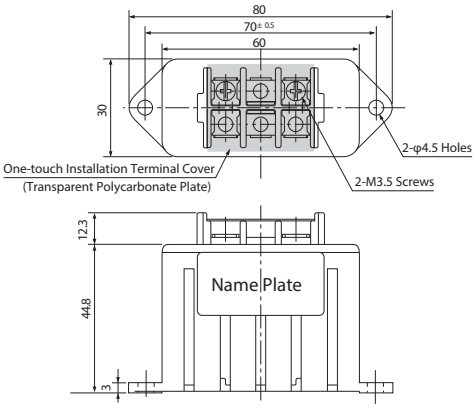
1. Insert meter after panel cutout.
2. Secure the attachment bracket to the meter body with the M4 screws.
3. Push in the panel face and secure with the 45 M4 setscrews.
4. Lock with the M4 nuts.

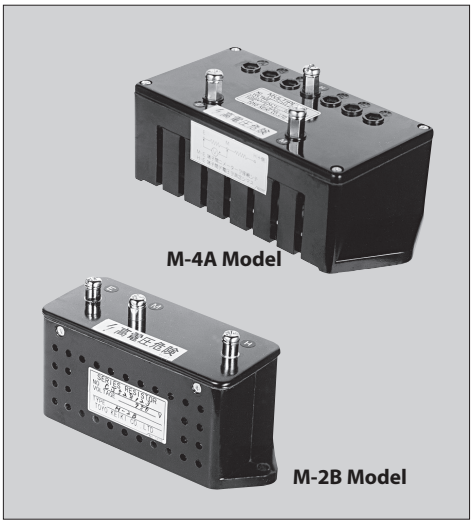
Series Resistor Outside Dimensions

M-1 Model
Weight: Approx. 20g

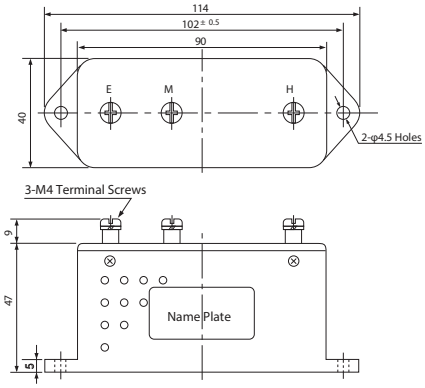


M-2A Model
Weight: Approx. 100g

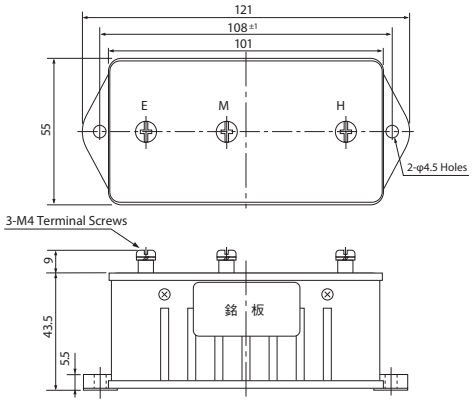




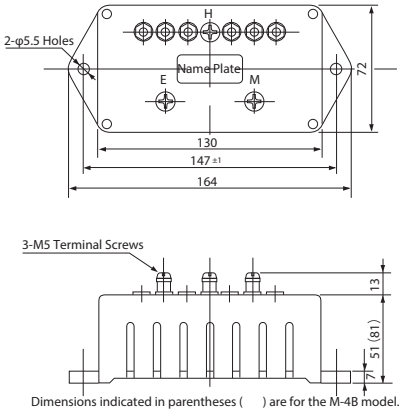
M-2B Model
Weight: Approx. 0.15kg



M-3 Model
Weight: Approx. 0.15kg

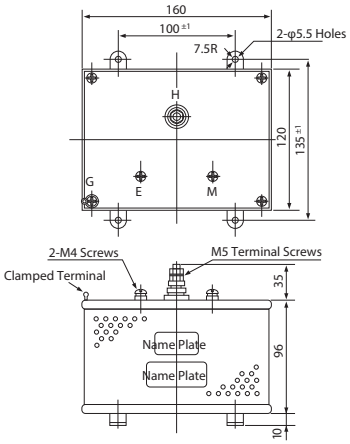


M-4A Model (M-4B Model)
Weight: Approx. 0.3kg



Dimensions indicated in parentheses ( ) are for the M-4B model.

M-6 Model
Weight: Approx. 0.8kg



Series Resistor Models for DC Voltmeter

Rating	Model	Rating	Model
500 V	M-1	4000 V	M-6
750 V	M-2B	5000 V	M-6
1000 V	M-3	7500 V	M-6
1500 V	M-3		
2000 V	M-4A		
3000 V	M-4A		

● Voltage division (3 terminals) is used for 750V and higher.

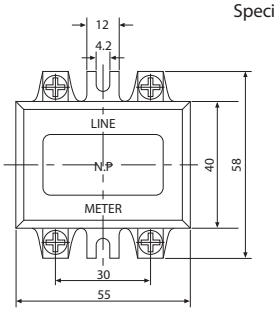
Converter Outside Dimensions

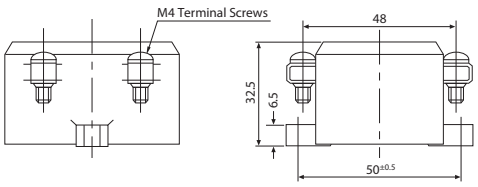
C-3 Model Current Transducer

1) 15A or Less

Specifications

Rated Load	0.1VA
Primary Current:	Various types less than 15A
Secondary Current	10mA
Circuit Voltage	460V
Voltage Test	AC2000V
Weight	Approx. 0.2kg

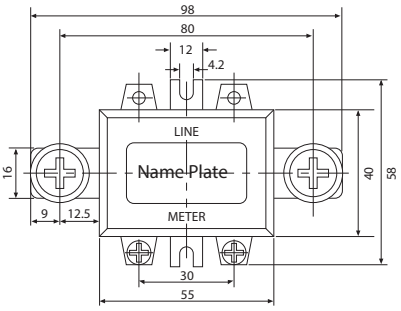




2) 15A and Above, Up to 100A

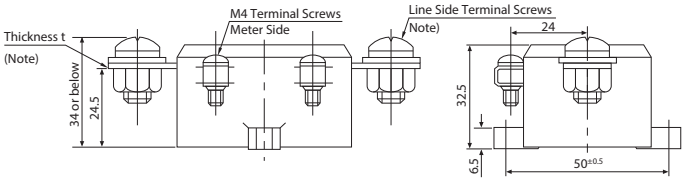
Specifications

Rated Load	0.1VA
Primary Current:	Various types 15A and above, up to 100A
Secondary Current	10mA
Circuit Voltage	460V
Voltage Test	AC2000V
Weight	Approx. 0.26kg

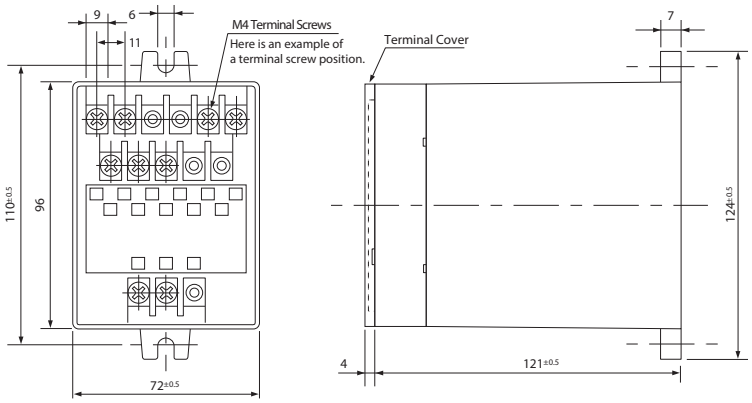


Note)

Primary Current Type	Conductor Thickness t (mm)	Line Side Terminal Screws
15A - 75A	1.5	M6×14
75A - 100A	2	M8×16



ERG-3 Model, URG-3 Model
RRG-3 Model, UuRG-3 Model
Converter



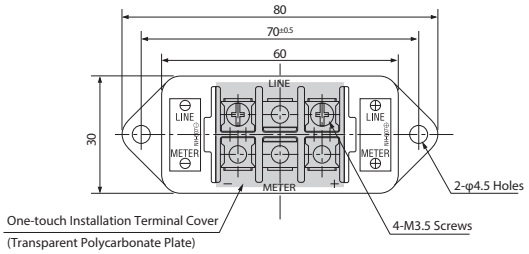
Case Material: Glass fiber-strengthened PC resin
Terminal Part Material: Glass fiber-strengthened PBT resin
Cover Material: Transparent polycarbonate resin

*Din rail mounts can also be manufactured. In such cases, the model name is □ RG-3A.

[Terminal Arrangement Diagram]

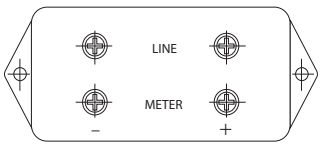
Series Resistors for AC Voltmeter
Rectifiers for AC Ammeter

M-2A



FM-3

(Outside dimensions are the same as the M-3 model on page 9)



For Frequency Meter

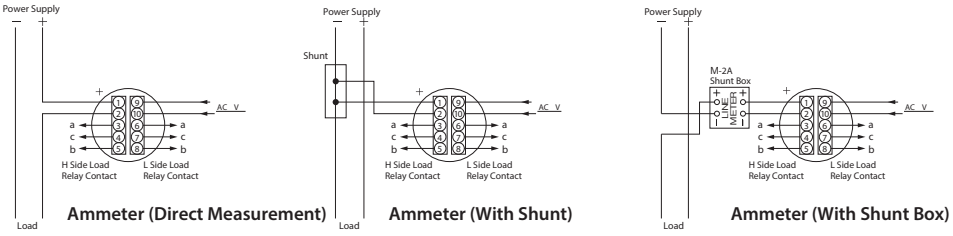
Meter Connection Diagram

Note 1. The terminal diagram below is for MPC-10 and 12. For the terminal arrangements of other models, see the outside dimensions page for those models.

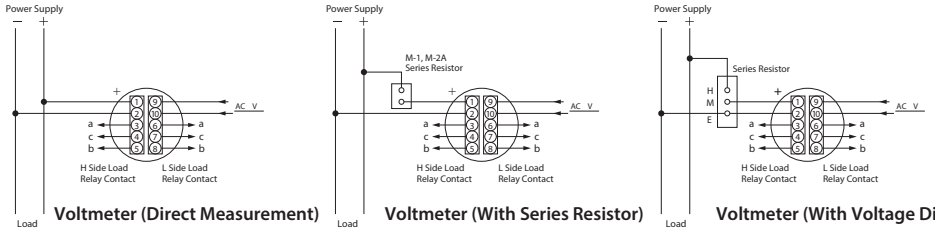
Note 2. The example auxiliary power supply connection is for AC. See the example connection on the next page for DC auxiliary power supplies.

Note 3. Accessories (P-3) are required for the MPC-6 even if the auxiliary power supply is AC. See the the example connection on the next page for information on connections.

●DC Ammeter and DC Voltmeter (Moving-coil Type)



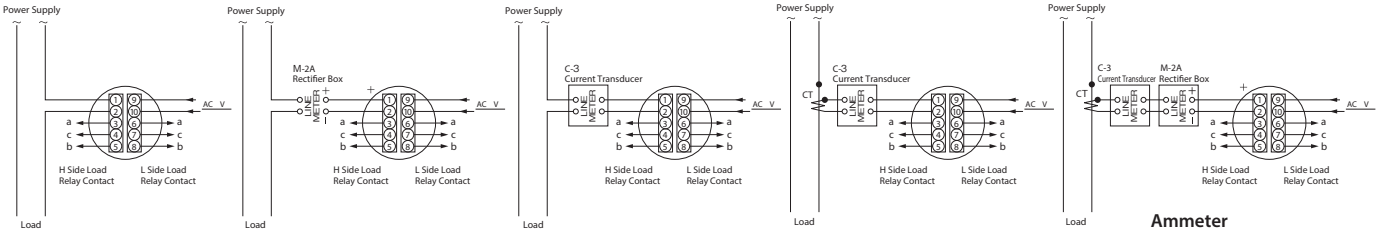
Ammeter (Direct Measurement) **Ammeter (With Shunt)** **Ammeter (With Shunt Box)**



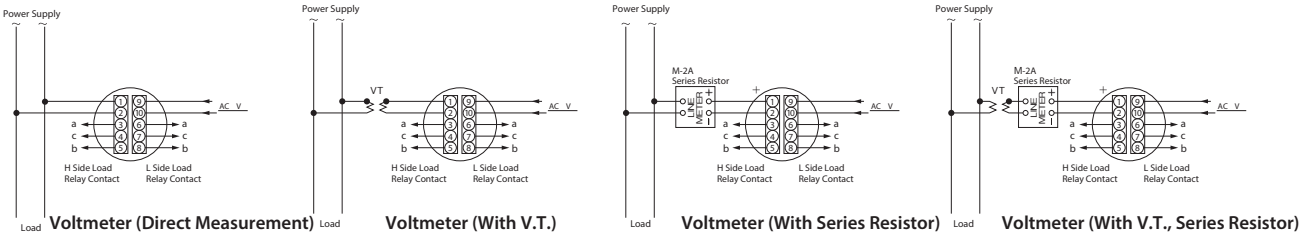
Voltmeter (Direct Measurement) **Voltmeter (With Series Resistor)** **Voltmeter (With Voltage Division Type Series Resistor)**

Voltage division type series resistor should be used when the maximum scale value is 750V or higher.

●AC Ammeter or Voltmeter (Rectifier Type)

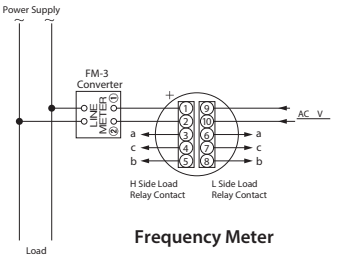


Ammeter (Direct Measurement) **Ammeter (With Rectifier Box)** **Ammeter (With Current Transducer)** **Ammeter (With CT, Current Transducer)** **Ammeter (With Current Transducer, Rectifier Box)**



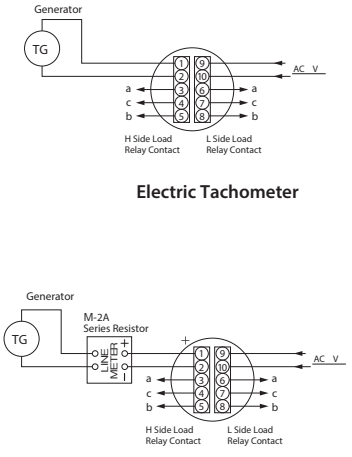
Voltmeter (Direct Measurement) **Voltmeter (With V.T.)** **Voltmeter (With Series Resistor)** **Voltmeter (With V.T., Series Resistor)**

●Differential Analyzer Frequency Meter



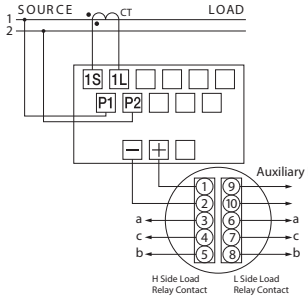
Frequency Meter **Frequency Meter (With V.T.)**

●Electric Tachometer (Rectifier)

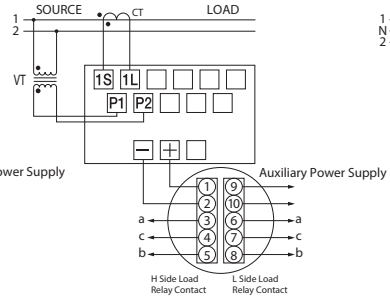


Electric Tachometer **Electric Tachometer (With Series Resistor)**

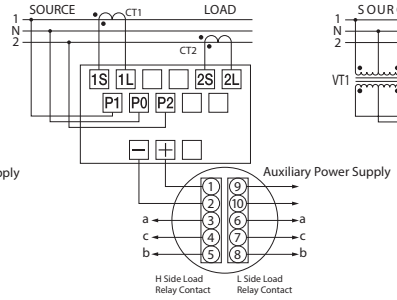
●Wattmeter and Varmeter (Electronic Device Type)



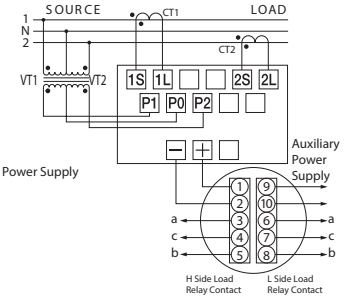
1P Wattmeter, Varmeter (With C.T.)



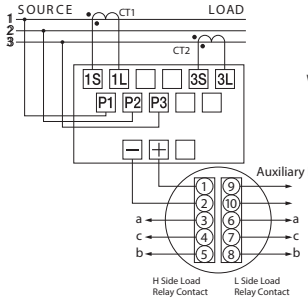
1P Wattmeter, Varmeter (With C.T., V.T.)



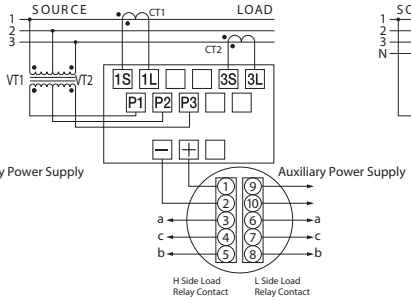
1P3W Wattmeter, Varmeter (With C.T.)



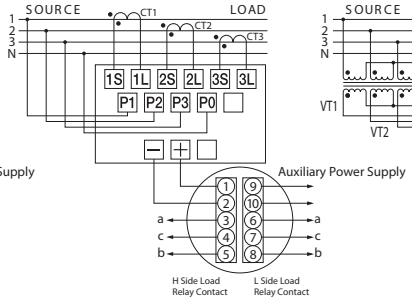
1P3W Wattmeter, Varmeter (With C.T., V.T.)



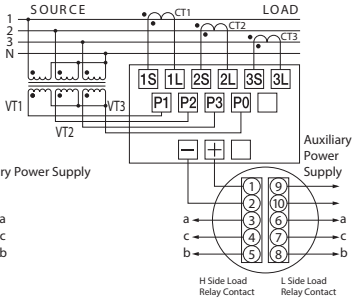
3P Wattmeter, Varmeter (With C.T.)



3P Wattmeter, Varmeter (With C.T., V.T.)

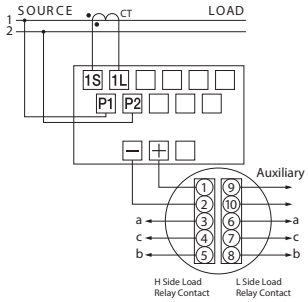


3P4W Wattmeter, Varmeter (With C.T.)

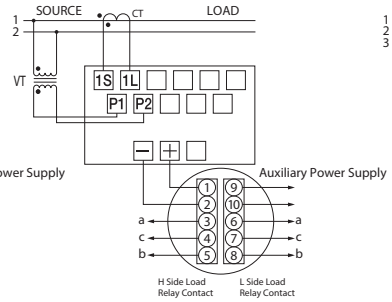


3P4W Wattmeter, Varmeter (With C.T., V.T.)

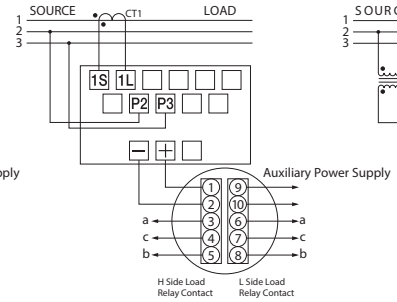
●Power Factor Meter (Electronic Device Type)



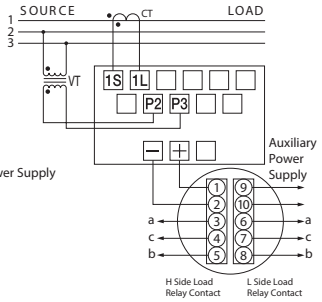
1P Power Factor Meter (With C.T.)



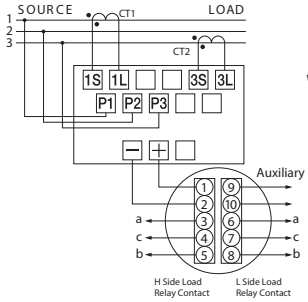
1P Power Factor Meter (With C.T., V.T.)



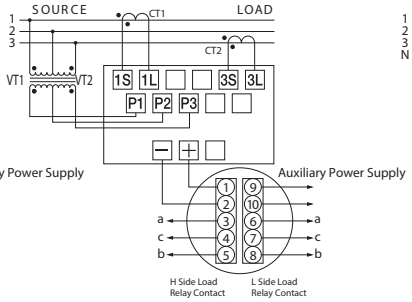
3P Balanced Power Rate Meter (With C.T.)



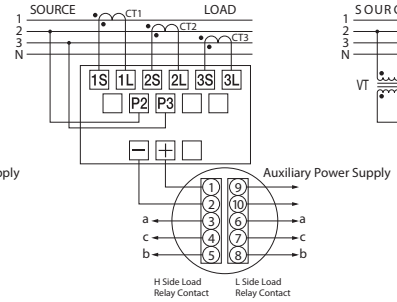
3P Balanced Power Rate Meter (With C.T., V.T.)



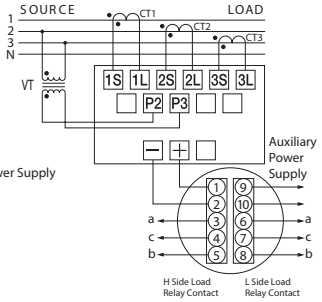
3P Unbalanced Power Factor Meter (With C.T.)



3P Unbalanced Power Factor Meter (With C.T., V.T.)



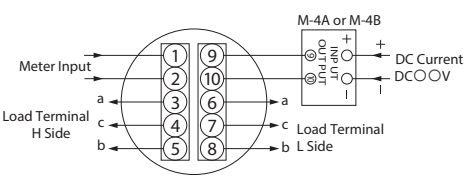
3P4W Power Factor Meter (With C.T.)



3P4W Power Factor Meter (With C.T., V.T.)

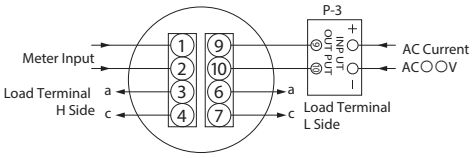
●Overall Connection Diagram (Example)

●MPC-8, MPC-10, MPC-12 Model
For DC Auxiliary Power Supply



Note: M-4A (M-4B) not required when the auxiliary power supply is DC24V or DC12V

●MPC-6 Model
For AC Auxiliary Power Supply



Note: P-3 not required when the auxiliary power supply is AC24V or AC12V

Standard Table of Wattmeter Measurement Range

This standards chart is a resource for determining the measurement range values of wattmeters and varmeters, so 3P wattmeter CT ○○○A/5A standards are indicated.

Line Voltage / VT Ratio / Intrinsic Power Value / CT Ratio	110V			220V			440V			3300V			6600V		
							440V/110V			3300V/110V			6600V/110V		
	625 Or 667W	750* Or 833W	1kW*	1.25 Or 1.33kW	1.5* Or 1.67kW	2kW*	625 Or 667W	750* Or 833W	1kW*	667W	833W*	1kW Or 1.11kW	625 Or 667W	833W*	1kW Or 1.11kW
5A/5A	—	750 W	1 kW	1.2 kW	1.5 kW	2 kW	2.5 kW	3 kW	4 kW	20 kW	25 kW	30 kW	40 kW	50 kW	60 kW
7.5A/5A	1 kW	1.2 kW	1.5 kW	2 kW	2.5 kW	3 kW	4 kW	5 kW	6 kW	30 kW	40 kW	50 kW	60 kW	75 kW	100 kW
10A/5A	1.2 kW	1.5 kW	2 kW	2.5 kW	3 kW	4 kW	5 kW	6 kW	8 KW	40 kW	50 kW	60 kW	80 kW	100 kW	120 kW
15A/5A	2 kW	2.5 kW	3 kW	4 kW	5 kW	6 kW	8 kW	10 kW	12 kW	60 kW	75 kW	100 kW	120 kW	150 kW	200 kW
20A/5A	2.5 kW	3 kW	4 kW	5 kW	6 kW	8 KW	10 kW	12 kW	(16 kW)	80 kW	100 kW	120 kW	150 kW	200 kW	(240 kW)
30A/5A	4 kW	5 kW	6 kW	8 kW	10 kW	12 kW	15 kW	20 kW	(24 kW)	120 kW	150 kW	200 kW	(240 kW)	300 kW	400 kW
40A/5A	5 kW	6 kW	8 KW	10 kW	12 kW	(16 kW)	20 kW	(24 kW)	(32 kW)	(160 kW)	200 kW	(240 kW)	300 kW	400 kW	(480 kW)
50A/5A	—	7.5 kW	10 kW	12 kW	15 kW	20 kW	25 kW	30 kW	40 kW	200 kW	250 kW	300 kW	400 kW	500 kW	600 kW
75A/5A	10 kW	12 kW	15 kW	20 kW	25 kW	30 kW	40 kW	50 kW	60 kW	300 kW	400 kW	500 kW	600 kW	750 kW	1 MW
100A/5A	12 kW	15 kW	20 kW	25 kW	30 kW	40 kW	50 kW	60 kW	80 kW	400 kW	500 kW	600 kW	800 kW	1 MW	1.2 MW
150A/5A	20 kW	25 kW	30 kW	40 kW	50 kW	60 kW	80 kW	100 kW	120 kW	600 kW	750 kW	1 MW	1.2 MW	1.5 MW	2 MW
200A/5A	25 kW	30 kW	40 kW	50 kW	60 kW	80 kW	100 kW	120 kW	(160 kW)	800 kW	1 MW	1.2 MW	1.5 MW	2 MW	(2.4 MW)
300A/5A	40 kW	50 kW	60 kW	80 kW	100 kW	120 kW	150 kW	200 kW	(240 kW)	1.2 MW	1.5 MW	2 MW	(2.4 MW)	3 MW	4 MW
400A/5A	50 kW	60 kW	80 kW	100 kW	120 kW	(160 kW)	200 kW	(240 kW)	(320 kW)	(1.6 MW)	2 MW	(2.4 MW)	3 MW	4 MW	(4.8 MW)
500A/5A	—	75 kW	100 kW	120 kW	150 kW	200 kW	250 kW	300 kW	400 kW	2 MW	2.5 MW	3 MW	4 MW	5 MW	6 MW
750A/5A	100 kW	120 kW	150 kW	200 kW	250 kW	300 kW	400 kW	500 kW	600 kW	3 MW	4 MW	5 MW	6 MW	7.5 MW	10 MW
1000A/5A	120 kW	150 kW	200 kW	250 kW	300 kW	400 kW	500 kW	600 kW	800 kW	4 MW	5 MW	6 MW	8 MW	10 MW	12 MW
1500A/5A	200 kW	250 kW	300 kW	400 kW	500 kW	600 kW	800 kW	1 MW	1.2 MW	6 MW	7.5 MW	10 MW	12 MW	15 MW	20 MW
2000A/5A	250 kW	300 kW	400 kW	500 kW	600 kW	800 kW	1 MW	1.2 MW	(1.6 MW)	8 MW	10 MW	12 MW	15 MW	20 MW	(24 MW)
3000A/5A	400 kW	500 kW	600 kW	800 kW	1 MW	1.2 MW	1.5 MW	2 MW	(2.4 MW)	12 MW	15 MW	20 MW	(24 MW)	30 MW	40 MW

Note) Numerical values inside parentheses indicate values that deviate from JIS standards, but can be manufactured.

Using the Above Chart

[1] For **3P wattmeters, 3P4W wattmeters** and **1P3W wattmeters**, **the measurement range values** are displayed in the voltage ratios (VT ratio differences) and CT ratio differences in the table above. (There are three types defined for the same VT and CT ratios. Choose the appropriate type. However, an item marked with * in the intrinsic power field needs to be selected for the wide angle meter.)

E.g.) For a VT: 3300V/110V, CT: 100A/5A 3P wattmeter... select the appropriate one from 400kW, 500kW or 600kW from the table above.

[2] For **1P wattmeters**, **3P varmeters**, and **3P4W varmeters**, the **values displayed above are multiplied by 1/2**, and are multiplied by **1/4** for **1P varmeters**.

Note 1) For varmeters, read kW units as kvar.

Scale is LEAD □ ~0~LAG □ kvar.

Example: For a VT: 3300V/110V, CT: 100A/5A 3P varmeter

…LEAD2500~LAG250 kvar or LEAD300~0~LAG300 kvar

(500 × 1/2) (500 × 1/2) (600 × 1/2) (600 × 1/2)

2) For **3P varmeters** or **3P4W varmeters with zero left meters**, follow the **values as displayed above**, and for **1P varmeters with zero left meters**, **the values in the table above are multiplied by 1/2.**

[3] If the CT ratio exceeds the range listed above, (for example, VT: 3300V/110V, CT: 5000A/5A 3P wattmeter) select a value from the CT: 500A/5A row (2MW, 2.5MW, 3MW) and multiply it by 10.

Note) In the situation above, scale indicators are 20MW, 25MW and 30MW. (It is preferable that the highest 3 digits of scales are displayed.)

[4] If CT ratios do not correspond with those indicated above (for example, CT: 60A/5A), use the calculation chart below to acquire the measurement range, then choose from among them the value with the best ending number.

Measurement Range = Intrinsic Power × VT Ratio × CT Ratio

Note) Select a value indicated below from the intrinsic power value in the above calculation chart. However, intrinsic power values vary depending on meter type. Use the multiplier indicated below to calculate the value.

Meter Types	Multiplier
3P Wattmeters, 3P4W Wattmeters, 1P3W Wattmeters	1
1P Wattmeters, 3P varmeters and 3P4W varmeters	1/2 (1 for varmeters with zero left meters)
1P Varmeter	1/4 (1/2 for zero left meters)

Example: VT: 3300V/110V, CT: 60A/5A 3P Wattmeter

Measurement Range = (667W, 833W, 1kW or 1.11kW) x 3300 / 110 x 60 / 5
= 240kW, 300kW, 360kW or 400kW.

[5] Values of 1, 1.2, 1.5, 2, 2.5, 3, 4, 5, 6, 7.5 or 8, or integers that are multiples of those 10 values are preferable selections for the upper range scale value. (JIS standards)

[6] Even when using a CT of 1A for the secondary current, the measurement range value is as indicated on the left (selection standards chart).

Note) If CT ratios do not correspond (for example, CT: 60A/1A) with those indicated to the left (selection standards chart), follow calculation chart [4] below to calculate the measurement range value. However, intrinsic power values vary depending on meter type. Use the multiplier indicated below to calculate.

Meter Types	Multiplier
3P Wattmeters, 3P4W Wattmeters, 1P3W Wattmeters	1/5
1P Wattmeters, 3P varmeters and 3P4W varmeters	1/10 (1/5 for varmeters with zero left meters)
1P Varmeter	1/20 (1/10 for zero left meters)

Example: VT: 440V/110V, CT: 60A/1A 1P Wattmeter

Measurement range = [(625W, 667W, 750W, 833W or 1kW) x 1/10] x 440 / 110 x 60 / 1
= 15kW, 16kW, 18kW, 20kW or 24kW. However, 15kW or 20kW should be selected.

Production Limits of Meters (Wattmeter, Varmeter)

The production range of wattmeters and varmeters can be manufactured according to the indicated range of intrinsic power values in the calculation chart below.

$$\text{Intrinsic Power Value [W]} = \frac{\text{Measurement Range Value [W]}}{\text{VT Ratio x CT Ratio}}$$

Example: VT: 6600V/110V, CT: 50A/5A

When measurement range value = 400kW

$$\text{Intrinsic Power Value W} = \frac{400\text{kW}}{60\times10} = 667\text{W}$$

Product Name	Rating	Production Range
1P Wattmeter, 1P Varmeter	110V 5A 220V 5A	300 ~ 625W (var) 600 ~ 1250W (var)
3P Wattmeter, 3P Varmeters 1P3W Wattmeter	110V 5A 220V 5A	500 ~ 1250W (var) 1000 ~ 2500W (var)
3P4W Wattmeter 3P4W Varmeter	110V/$\sqrt{3}$V 5A 220V/$\sqrt{3}$V 5A	500 ~ 1250W (var) 1000 ~ 2500W (var)

Note) The meter production range for using a CT of 1A for the secondary current is the value indicated on the left multiplied by 1/5.

Earth-resistance Meter Relay MPV-11, MPC-12

[Overview]

This meter relay can measure the earth resistance value of a contactless AC circuit while also detecting abnormal earth resistance values in the same circuit. Comprising a contactless meter relay and extra power unit, this meter relay can be used for a wide range of purposes such as detecting abnormalities in grounding accidents in settings such as boats.
A particularly useful feature is the fixed voltage circuit built into the extra power unit, which maintains a roughly fixed voltage circuit even during fluctuations of ±10% in the input voltage of AC115V, preventing measurement error.

[Features]

- Earth resistance measurements can be taken continuously while also setting and detecting the desired earth resistance values on the scale of the photoelectric-type detection setting mechanism, as well as activating warning equipment using the relay circuit contact.
- Lines can be measured and detected while live.

[Standard Specifications]

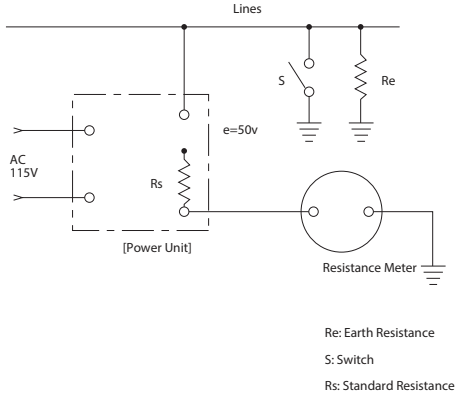
Meter Relay		MPV-11	MPC-12	Note
Outside (mm)		110×110	120×110	
Scale Length (mm)		Approx. 170	Approx. 100	Intrinsic Error: Indicated value ±5% Between 0.05~1MΩ ±10%
Accuracy Class		———	———	
Pointer		Tapered Type	Wand Type	
Set Pointer		Triangular with Red H	Wand Type with Red H	
Scale Plate		White Base		● Extra Power Unit RG-3
Scale Division				
Mounting Posture		Vertical		
Cover		Methacrylic Resin	Special Anti-electric Resin	● Meter Sensitivity DC250μA
Base		● Between Terminals - Phenol Resin ● Body Cover - ABS resin		
Cover Coating Color		N - 1.5 (black) or 7.5B G4/1.5 (blue-green)		
Setting		H Setting (Single Side Only)		
Operating Error for Setting Value (Against Scale Length)		1.5	1.5	
Dead Band		1.0	1.0	
Meter Action Note 1)	Stop Type	———	———	
	Passage Type	○	○	
Auxiliary Power Supply	A C	AC110V, AC115V, AC220V		
Output Signal Note 2)	Retaining Type	○	○	
	Instantaneous Type	———	———	
Output Contact Arrangement and Capacity		1ab, AC220V, 3A	1ab, AC100V, 1A	
Insulation Test		Between electrical circuit and outer casing of meter: 10MΩ or more for 500V mega		
Voltage Test		Between electrical circuit and outer casing of meter: AC 1500V (50/60Hz per minute) Between contact relay circuit and other electrical circuits: AC 500V (50/60Hz per minute)		
Characteristics of Meter		Characteristics of the meter part are based on JIS C 1102-1 to 9		

Note 1) Meter Action: Passage Type - The pointer can pass to the end of the scale even if it exceeds the setting value.

Note 2) Output: Retaining Type - Output is retained even when the pointer passes the setting value. The output is discarded when the pointer goes back below the setting value.

Note 3) Others: a) DC circuit type can also be manufactured if desired.
b) See the page about our contactless meter relay for details.
c) In particular, a standard meter type can be manufactured if the detection equipment is not required.
d) Also includes a converter.
Type I S-3: For 3P
Type I S-1: For 1P

[Operating Principles]



Circuit Configuration Diagram

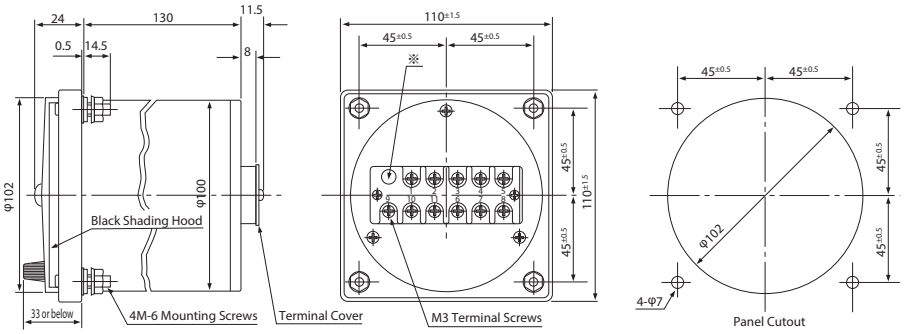
Apply an AC power supply to the extra power unit to generate DC50V on the output side. This DC power supply can be used to combine the unit with a DC ammeter with an MΩ scale, making it possible to take measurements and read earth resistance for circuit currents that change depending on the ground status.
The AC side and output side of the extra unit are insulated by a transformer. This means that the DC power supply can be considered separate from the lines, creating the basic circuit shown on the left.
In the circuit diagram on the left, DC50V is being generated by the power unit, the power is connected to the meter in a series where Rs = 0.2 MΩ (scale centering on meter), and a resistance value is being indicated.
When switch S is turned on, the pointer of the meter moves to the maximum, indicating 0MΩ in this case.
This means that the maximum current sensitivity value of the inflow current is $i = \frac{50V}{0.2M\Omega} = 250\mu A$

If a grounding accident occurs and the earth resistance is 0.2 MΩ (Re = 0.2 MΩ), the inflow current $i_1 = \frac{50V}{Rs+Re} = \frac{50V}{0.2M\Omega+0.2M\Omega} = 125\mu A$ and the center scale point of 0.2 MΩ is indicated.

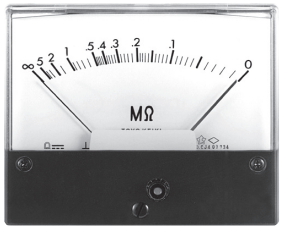
The relationship between the earth resistance value and the current i is as shown below.

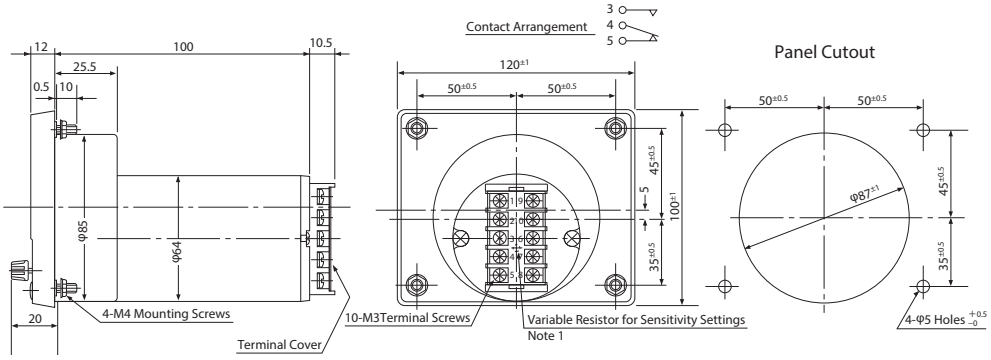
[Outside Dimensions]

■MPV-11



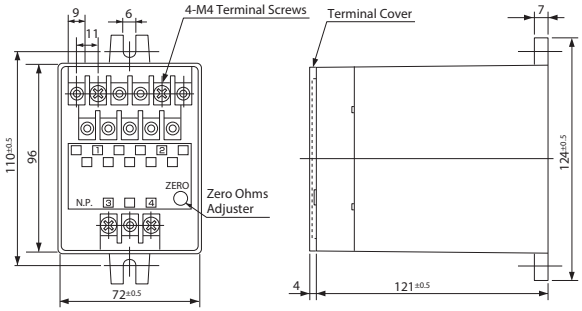
■MPC-12





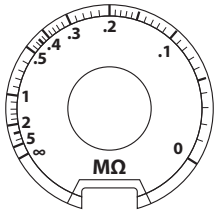
■RG-3

[Extra Power Unit]



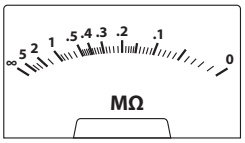
[Scale Drawing]

MPV–11



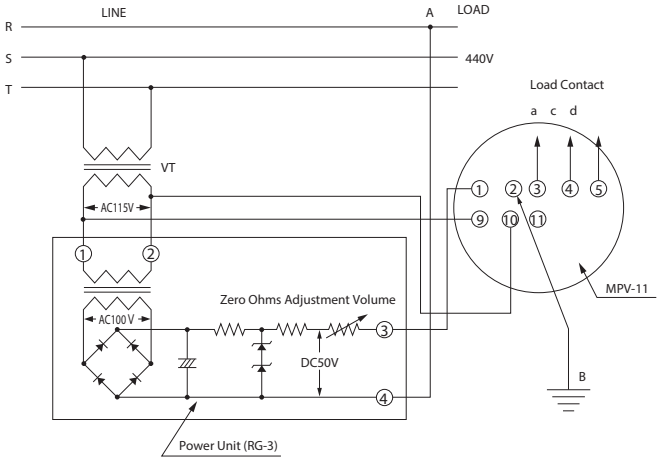
0-5 MΩ (Center Point 0.2 MΩ)

MPC–12



0-5 MΩ (Center Point 0.2 MΩ)

[Connection Diagram]



Note) Measurement point A can be measured from LINE, R, S or T.
Auxiliary Power Supply
110V System (9) (10)
220V System (9) (11)

[How to Use]

- Resistance value between LINE, R, S or T and earth is measured between A and B.
- In the diagram on the left, the measurement is taken from phases S and T, but any phase can be used.
- The diagram on the left shows an example connection between MPV and 11, but the same result will be obtained between MPC and 12 (vertical terminal array).
- The zero ohms adjustment volume is a backup device embedded in the center of the power unit. Insulate auxiliary power supply terminals (9) and (10) before checking the zero ohms adjustment.
  (To stop the output signal of the relay circuit.)

[Specified Items when Ordering]

- Model Name — MPV-11 or MPC-12
- Scale — 0-5 MΩ (Center point 0.2 MΩ)
- Auxiliary Power Supply — AC, 110V, etc.
- Attached Panel — Fe or NFe (Specify MPC-12 model only)
- Mounting Posture — ⊥, ⌐ etc.
- Cover Coating Color — N-1.5 (black) or 7.5 BG 4/1.5 (blue-green)
- Other — Non-standard specifications

Stationary Non-indicating Regulator AS-62·DS-62

<Solid State Relay>

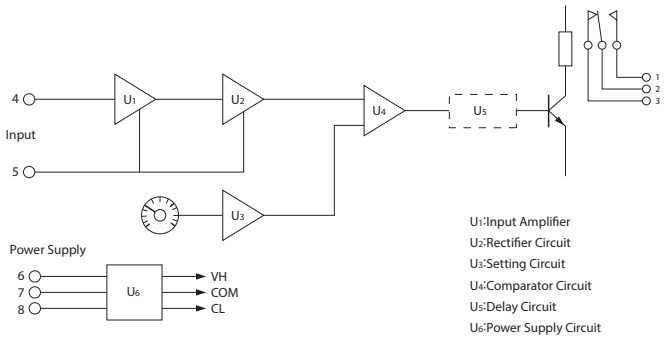
[Overview]

This product is a non-indicating adjustment meter with no meter drive unit. The AS-62 uses AC input while the DS-62 uses DC input. The auxiliary power supply can be used for AC 100/110V and AC 200/220V. This product can also be manufactured with a DC24V power supply. The on/off status of the relay is shown by a red LED on the front, and the setting scale also has an extremely easy-to-see structure. Two attachment methods can be used: by connector or by panel mounting. Panel mounting is done by connecting the lines using the terminal block on the back (M4 screws). Compact design with front panel measuring 62.5x62.5.

[Operating Principles]

AS-62 (AC Input)

Block Diagram

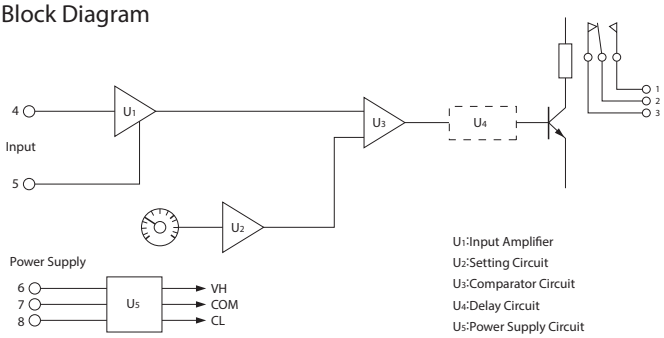


[Overview of Operation]

After amplifying the input signal with the input amplifier (U_1), the entire wave is rectified and flattened with the rectifier circuit (U_2) and then input on the signal side with the comparator circuit (U_4).
Meanwhile, the voltage set by the dial is input on the setting side with the setting circuit (U_3). The output from (U_4) is a VH or VL value depending on this input. This signal is input into a relay drive transistor to turn the relay on and off. Here, the delay circuit (U_5) delays the signal from U_4 for around 1 second in the event of a signal delay. The circuit constant differs depending on the specifications. In the event of a power supply delay, the relay does not operate for around 7 seconds after the power supply is turned on, even when the U_4 output voltage is VH. This circuit responds to the average input value, not DC components.

DS-62 (DC Input)

Block Diagram



[Overview of Operation]

After amplifying the input signal with the input amplifier (U_1), the signal is input on the signal side with the comparator circuit (U_3). Meanwhile, the voltage set by the dial is created by the setting circuit (U_2) and input on the setting side of the comparator circuit (U_3). The output from (U_4) is VH or VL depending on the relationship between the signal and the setting value. This signal is input into a relay drive transistor to turn the relay on and off. The delay circuit (U_5) creates signals for power supply delays (approximately 7 seconds) and signal delays (approximately 1 second) according to the specifications.

[Specifications]

Model Name

□ **S–62** □ – □□□□ – □

		A : AC Input D : DC Input
		H : H Setting Value L : L Setting Value
		1 : DC Power Supply (DC24V) 2 : AC Power Supply (AC100/110V / AC200/220V)
		Input
DC		0 : 60mV 1 : 100mV 2 : 0~1V 3 : 0~5V 4 : 1~5V 5 : 4~20mA
AC		6 : 1A 7 : 5A 8 : 150V 9 : Others
		0 : No Delay 1 : Power Supply Delay 2 : Signal Delay
		1 : Socket Attachment 2 : Panel Mounting

[Performance]

Input Impedance

60mV, 100mV	———	10kΩ
1V, 5V, 1~5V	———	1MΩ
4~20mA	———	10Ω
5A	———	6mΩ
1A	———	30mΩ
150V	———	1MΩ

The following standards apply to products with other input specifications.

60mV or More, Up to 100mV	———	10kΩ
101mV or More, Up to 300V	———	1MΩ
Ammeter Input	———	Resistance value generating a 200mV voltage drop

Pickup Error			± 1.5%
Delay	Signal Delay	———	Approx. 1 second
	Power Supply Delay	———	Approx. 7 seconds
Response Speed	A S-62	———	Approx. 0.2 seconds
	D S-62	———	Approx. 0.1 seconds

Dead Band	Around 2%
Temperature Coefficient	±0.5%/10˚C
Load Relay Contact Capacity	1 ab AC 250V, 3A (resistance load) DC 30V, 3A (resistance load)
Power Consumption	Approx. 3VA (AC power supply), 2.5W (DC power supply)
Operating Temperature Limits	0˚C~50˚C
Storage Temperature Range	-10˚C~60˚C
Maximum Relative Humidity	85%

Input Overload Capacity

60mV, 100mV	———	10V
1V	———	50V
5V, 1~5V	———	250V
4~20mA	———	100mA
1A	———	10A
5A	———	50A
150V	———	500V

Insulation Test (500V, test with mega)

Electrical circuit - outer casing, input - auxiliary power supply, input - relay output

20 MΩ or more between each phase

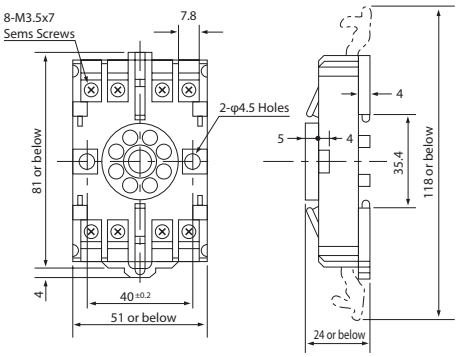
Voltage Test

Electrical circuit - outer casing, input - auxiliary power supply, input - relay output

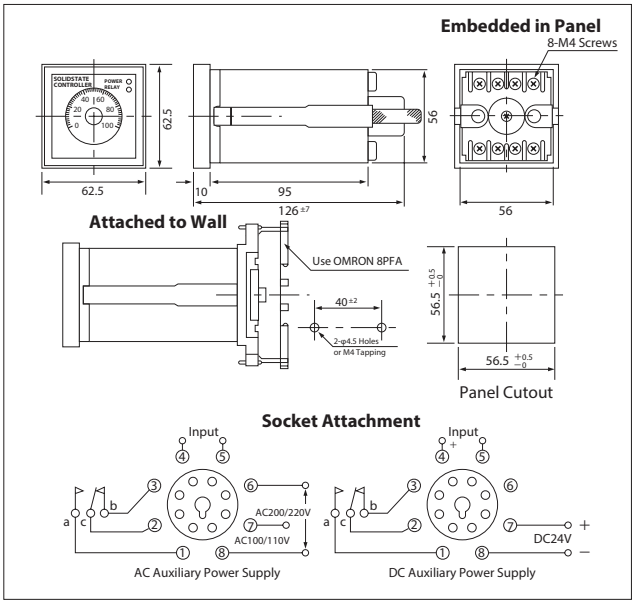
2000V per minute between each phase

Outer Casing Material	Polycarbonate resin, phenol resin
Weight	Approx. 400g

[8PFA Socket Outside Dimensions]



[Outside Dimensions and Pin Connection Diagram]



[How to Use]

This product can be used by panel mounting or socket attachment. (specify which when ordering)
An attachment bracket and mounting screws are included when panel mount is specified. Do not attach with items other than the included screws.

●Precautions when Handling and Ordering the S-62

1. A frequency range from 40 to 500Hz can be used by the AS-62. Frequencies outside this range are a special specification and prior consultation is needed.

2. To control DC currents larger than 5A, use a shunt to convert the voltage (to around 60mV) and then receive and control with the 60mV input type DS-62. Model names of shunts are as follows.

Over 5A, Less than 50A	S-10A Model 60mV
Over 50A, Less than 300A	S-8A Model 60mV
Over 300A, Less than 5000A	S-8 Model 60mV

To control high DC voltages, add an external series resistor. Model names of series resistors are indicated in the table below.

Over 300V, up to 500V	M - 2 A
Over 501V, up to 750V	M - 2 B
Over 751V, up to 1500V	M - 3
Over 1501V, up to 30000V	M - 4 A
Over 3001V, up to 5000V	M - 6

TOYO KEIKI

Non-indicating Voltage Relay DS-5A (for DC Voltage)

[Features]

- Driver adjust type enables easy and accurate configuration of voltage settings.
- Safe operation even for voltages containing ripples.
- 3 different attachment methods.
  Front attachment (attachment to terminal block or rear connection socket on 8P)
  Rear attachment

[Purposes]

- Voltage detection in DC power supplies
- Voltage detection in rectified power supplies
- Automatic control

[Specifications]

(1) Detection Method Voltage comparison-based voltage detection

(2) Detected Voltage Rating

Model	Setting Range for Detected Voltage		Series Resistor	Note) Power Consumption (W)		Note
	L	H		Detection Side	Operation Side	
DS-5A-24A	20~24V	24~28V	Inside Dimensions	0.2	1.5	
DS-5A-48A	40~48V	48~56V		0.4	1.5	
DS-5A-100A	80~95V	105~120V	Externally connected for operation	1.1	5.0	
DS-5A-U12	10~14V	10~14V	Both the operation unit and the detection unit are externally attached if the setting range is exceeded	0.1	2.0	Scale of general purpose model is 0~100%
DS-5A-U24A	20~28V	20~28V		0.2	1.5	
DS-5A-U48A	40~56V	40~56V		0.5	1.5	

Note 1. Power Consumption (operation at maximum voltage on maximum setting, where L = OFF and H = ON)
Note 2. DS-5A-U□ (A) indicates all-purpose model. Be sure to connect a series resistor if the values in this table will be exceeded. (Calculation method for series resistors can be found on P20.)

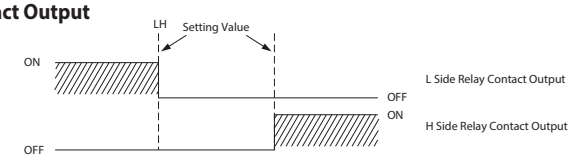
(3) Detection Error Within ±1.5% of upper limit setting maximum voltage value (within ±2.5% for DS-5A-U12)

(4) Set Method VR variance by driver adjustment

(5) Contact Capacity DC 30V/1A (resistance load), AC 100V/1A

(6) Contact Arrangement L side: 1b, H side: 1a

(7) Relay Contact Output



(8) Retained Range Within ±1.5% of upper limit setting maximum voltage (within ±2.0% for DS-5A-U12)

(9) Reaction Time 200mS or less when 97% to 110% of set voltage is applied

(10) Operation Frequency 20 times per 60 seconds, 10 minute stop

(11) Overvoltage Strength (When upper limit setting maximum voltage value is 100%)
Continuous overvoltage of 120% possible with all models)
150% possible for 3 minutes on all models; 200% not possible on any models

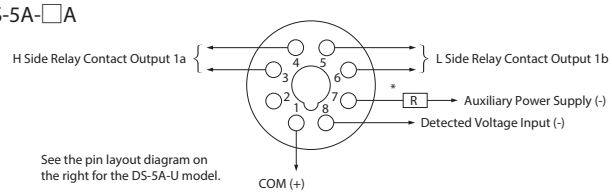
(12) Detection Input Ripples Within 20% P-P

(13) Operating Temperature Limits -10˚C~50˚C

Insulation Test Between Electrical Circuit and Case: DC500V mega 10MΩ or higher
Between Electrical Circuit and Relay Contact: DC500V mega 5MΩ or higher

Voltage Test Between Electrical Circuit and Case: AC 2000V (50/60Hz per minute)
Between Electrical Circuit and Relay Contact: AC500V (50/60Hz per minute)

(14) Pin Layout Diagram
DS-5A-□A

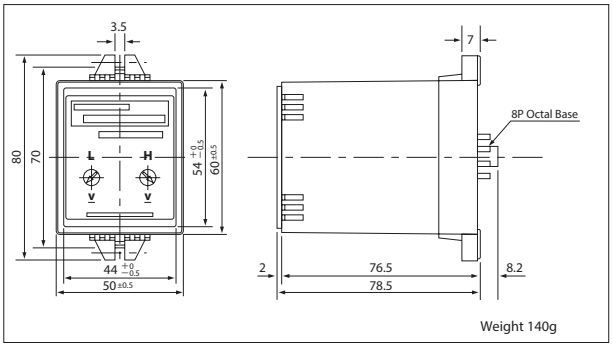


*Included only with R: DS-5A-100A

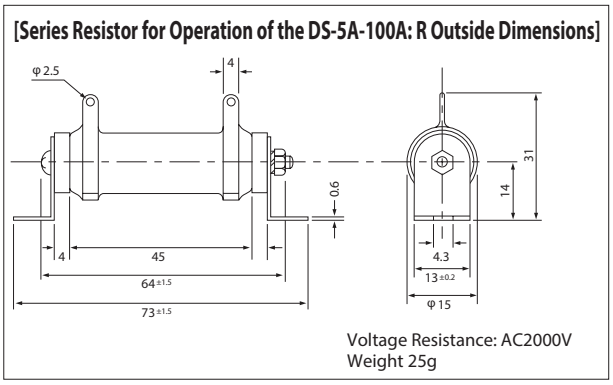
[Overview]

This non-indicating voltage relay detects the voltage of DC power supplies. It can detect both H and L in detected voltage setting ranges, enabling safe operating even with voltages that contain ripples, such as those in rectified power supplies.

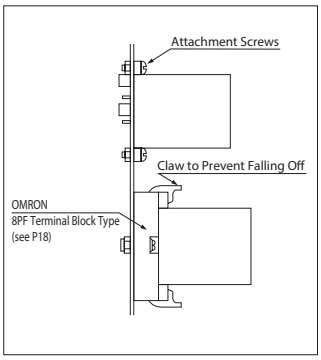
[Outside Dimensions]

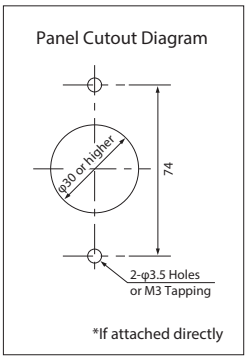


[Series Resistor for Operation of the DS-5A-100A: R Outside Dimensions]



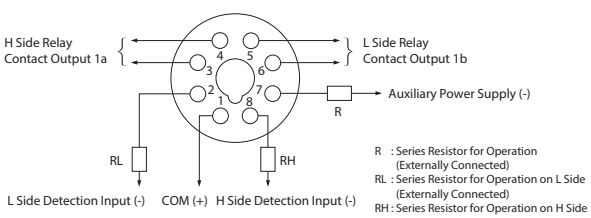
[Attachment Diagram]





[Series Resistor Calculation Method for General-Purpose Detector Side and Operation Side]

(1) Pin Layout Diagram
DS-5A-U□ (A)



(2) Calculation Method for RH or RL Series Resistor for Detection Side (Externally Connected)

(A) Reference Current

The reference current is indicated as a bond.

Model Name	Reference Current Io (mA)	Vu (V)
DS-5A-U12	1.75	12
DS-5A-U24A	2.86	24
DS-5A-U48A	3.33	48

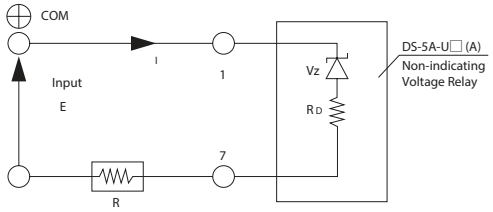
(b) Calculation

$$RH \text{ or } RL = \frac{(\text{Center Point Voltage of Setting (Vo)} - \text{Vu})}{\text{Reference Current (Io)}}$$

(c) Example Calculation

Model Name	Set Voltage Range (V)	Vo (V)	Detection Side Multiplier R_H or R_L Value
DS-5A-U12	22~26	24	$\frac{(24\text{-}12)\ [V]}{1.75\ [mA]}$ =6.86 [kΩ]
DS-5A-U24A	44~52	48	$\frac{(48\text{-}24)\ [V]}{2.86\ [mA]}$ =8.39 [kΩ]
DS-5A-U48A	92~108	100	$\frac{(100\text{-}48)\ [V]}{3.33\ [mA]}$ =15.6 [kΩ]

(3) Calculation Method for R Series Resistor for Operation Power Supply Side (Externally Connected)



E : Auxiliary Power Supply Voltage
R : Series Resistor Externally Connected to Operational Power Supply
I : Current
Rs : DS-5A-U□ Equivalent Resistance
DS-5A-U12 Model 0.086 kΩ
DS-5A-U24A Model 0.4 kΩ
DS-5A-U48A Model 1.36 kΩ

$$I\ min \leqq I = \frac{E\text{-}Vz}{R+R_D} \leqq I\ max$$

Use the equation below to calculate the current I in the input voltage range, then decide on the value for the R series resistor to be connected to the operational power supply.

The current I value is for cases in which both the H and L sides are excited by the load relay of the non-indicating voltage relay (L: OFF, H: ON).

Caution

Model Name	Input Voltage (Voltage of Auxiliary Power Supply) Range E [V] and Resistance Value R of Multiplier on Auxiliary Power Supply Side [kΩ] Emin ≦ E ≦ Emax	Note
DS-5A-U12	$80mA \leqq I = \frac{E\text{-}6}{R+0.086} \leqq 140mA$	V_Z=6V R_D=0.086kΩ
DS-5A-U24A	$25mA \leqq I = \frac{E\text{-}12}{R+0.4} \leqq 70mA$	V_Z=12V R_D=0.4kΩ
DS-5A-U48A	$15mA \leqq I = \frac{E\text{-}24}{R+1.36} \leqq 35mA$	V_Z=24V R_D=1.36kΩ

Emax: Maximum voltage of auxiliary power supply, Imax: Maximum current
Emin: Minimum voltage of auxiliary power supply, Imin: Minimum current

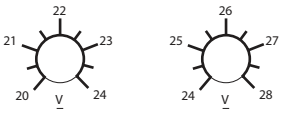
Select R within the range where the above inequality is achieved.

If the inequality is not achieved for I, rework the equation by methods such as raising the R value or narrowing the voltage range of the power supply.

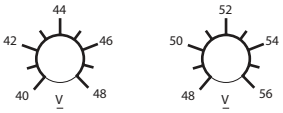
(Note) Settings can be configured in the desired position between 0 and 100% for both H and L.

[Scale Drawing]

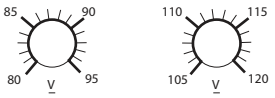
1) DS-5A-24A



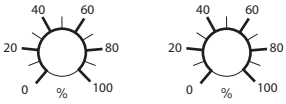
2) DS-5A-48A



3) DS-5A-100A



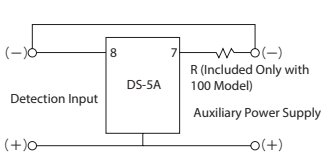
4) DS-5A-U24A, DS-5A-U48A



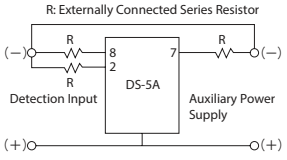
[Connection Circuit Diagram of the External Circuits]

(1) The detection input and auxiliary power supply input are COM and +.

(2) If the detection input and the auxiliary power supply are the same, connect the auxiliary power supply terminal (7) and the detection input (8) (8 and 2 for U shape) as shown in the diagram below.

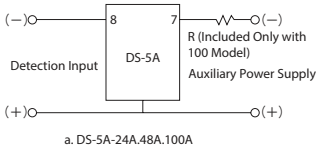


a. DS-5A-24A.48A.100A

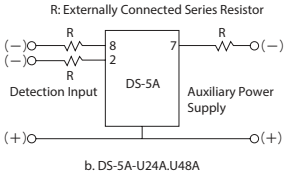


b. DS-5A-U24A.U48A

(3) If the detection input and the auxiliary power supply are separate, connect them as shown in the diagram below.



a. DS-5A-24A.48A.100A



b. DS-5A-U24A.U48A

Precautions for External Connections

- Do not connect with the polarities of the detection input and auxiliary power supply opposing each other.

Power Indicator AS-5-LI (Residual Current/Leakage Current Detector)

[Overview]

This power indicator contains a highly reliable current relay that can detect low current settings. It detects whether there is a 100mA current in circuits with a maximum current of 25A and generates a warning or an indicator drive signal. This means that this device can be used together with a current transducer to detect power consumption of 10W in an AC100V circuit.
It can be used in centralized monitoring to detect electric leakage and power left on in high-rise buildings, dormitories, hospitals and hotel rooms, reducing the workload for inspections and saving energy in security and safety measures.

[Features]

- Highly reliable solid-state electronic parts.
- Lightweight, compact type.
  (Main unit 100g, current transducer 200g)
- Plugs into 8-pin socket, enabling easy security inspections and replacement.

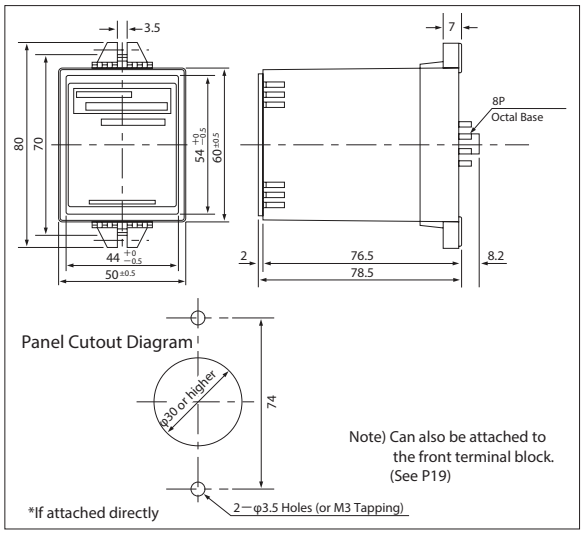
[Purposes]

- Detects small amounts of residual power and issues an alert.
- Detects electric leakage and issues an alert.
- Detector prevents power from being left switched on.

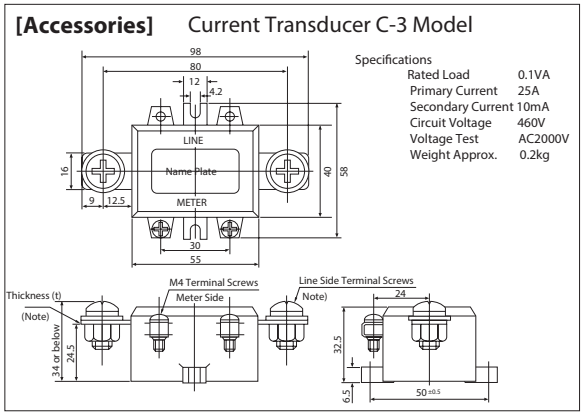
[Specifications]

Operating Error	Pickup: Within setting value ± 10% Dropout: 20% or less of pickup value (dead band is also 20% or less of pickup value)
Maximum Circuit Voltage	AC460V
Maximum Circuit Current	25A
Setting Value	0.1A (fixed)
Relay Contact Output	Contact arrangement 1a
	Contact capacity AC100V, 0.3A (resistance load)
Auxiliary Power Supply Voltage	AC 100V ± 10% 50/60Hz
Accessory	C-3 Model Current Transducer
Insulation Resistance (DC500V Mega)	Between electrical circuit and outer casing 10 MΩ or higher
	Between electrical circuit and relay contact 10MΩ or higher
Voltage Resistance (for 1 minute)	Between electrical circuit and outer casing AC2000V
	Between electrical circuit and relay contact AC500V

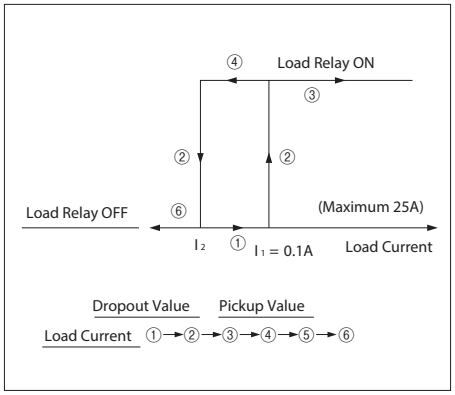
[Outside Dimensions]



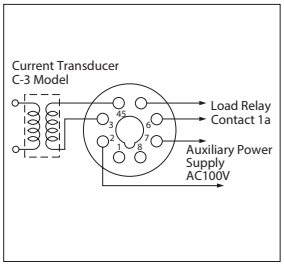
[Accessories] Current Transducer C-3 Model



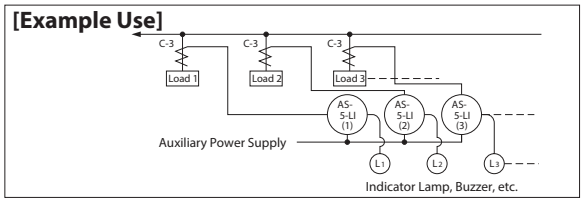
[Operation Diagram]



[Connection Diagram]



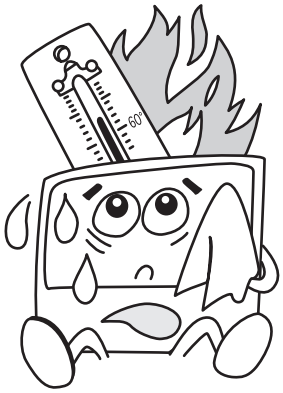
[Example Use]



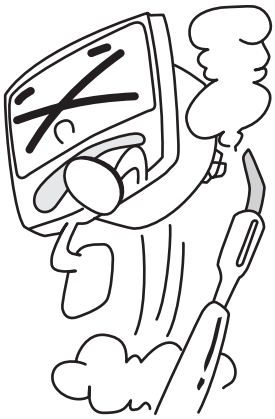
Special Anti-electric Resin Applied to Cover

■ Precautions for Handling Meters

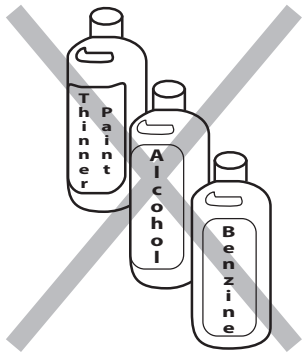
● Be sure to note the following when handling, as the relay covers of the MPC and MPE-10 model meters are made from new materials.



● Avoid high temperature locations (60˚C or over) because the plastic cover and case of the meter are easily affected by heat.



● Do not apply solder directly to meter terminals.



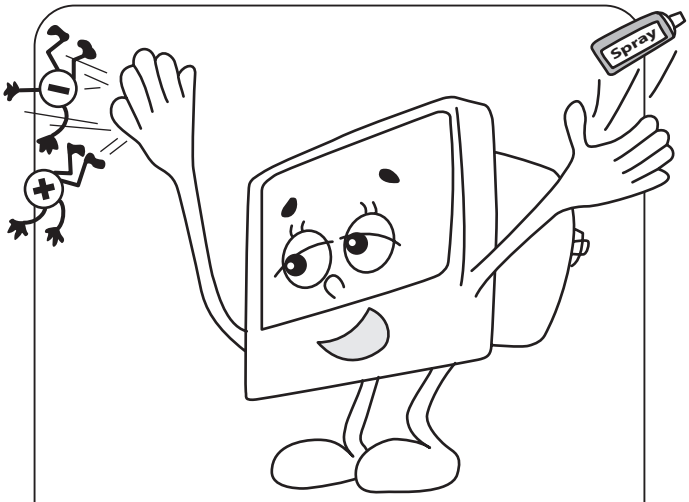
● The cover case may be damaged through contact with chemicals (solvents such as paint thinner, benzine, alcohol, etc.).

A new type of resin cover with a better anti-electric effect is used.

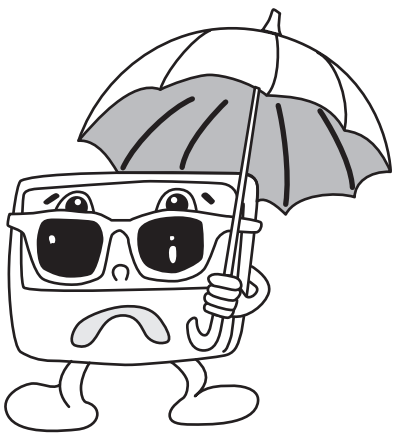
★The molded resin contains a special component that causes self-discharge of static electricity.

This means that:

1) The anti-static effect is unaffected by the humidity of the operating environment.
(The charge half-life is less than 1 second even in a relative humidity of around 23%)
2) The anti-static effect is semi-permanent in normal indoor operating conditions.
3) Maintenance such as application of an anti-static finish is not needed.



● Maintenance with anti-static finish is not needed at all.
● To clean the surface, wipe gently with a light cloth.



Avoid direct sunlight and strong UV rays as much as possible. (This may cause natural degradation in performance.)

The previous acrylic resin is used for the MPV and MPE-150 models. Use an anti-static finish, particularly in poor conditions where static electricity occurs easily, such as low humidity. [Anti-static finish: Anti-static 80S spray (from Tanaka Chemical Laboratory) or Riverson No. 30 spray (from Tokyo Yakuhin Kakosei)]

~Promotion of Environmental Issues~

Our company is fully committed to not using hazardous materials in our products.
All of our main products are manufactured without the use of the six hazardous materials prescribed in the RoHS directives.
Please consult us about the compatibility of each product.
Products that comply with the RoHS directives are distinguished by a label containing the "Ro" mark.

Safety Precautions

- Only allow this product to be handled by people with sufficient knowledge and skill to ensure proper use.
- Carefully review any connection diagrams before soldering to ensure correctly soldered connections.
- Fully tighten screws. Loose screws may cause overheating or burnout.
  Mount the terminal cover after completing connections.
- Do not use if the specified rating is exceeded. Doing so may lead to malfunction or injury.
- Do not touch live parts of the product. Disconnect circuits during maintenance or inspections.

ISO 9001 Registration No. JSAQ 1492

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