Rectangle Type Meter - LK Series

LK－8C

LK－10C

LK－12C

LK-series is rectangle meter, 3 size for this type: LK-12, LK-10 & LK-8. Panel cut dimension is conformity with JIS C 1103.

LK-series has original design for instrument cover. It's not only suited for switchboard or panel instrument but also suited for electrical or electronic set. LK-series is a reliable meter be fully satisfied with standard JISC 1102-1~9 (IEC 60051-1 matching) and adopt a most suitable operating principle for measuring object.

Our products improve with realibility special specification for overdue environmental conditions as cold resistance and tropical specification. Please consider to use our product on oversea such as Frigid Zone and Tropical Zone.

FEATURES

- ► High quality and high performance meter.
- ► Flame Retardant Material Meter can manufacture by specify.
- ► Panel locked by 2 screws.

TYPE CODE DESIGNATION

L (1) K – (2) (3) C (4) – (5)

(1) Type of measurand

Mark	Measurand	Operation Principle
M	DC current / voltage	Permanent magnet moving coil
X	DC receiving indicator	Permanent magnet moving coil
Y	AC receiving indicator	Rectifier
S	AC current / voltage	Moving iron
C	AC current / voltage	Rectifier/ RMS value rectifier
W	AC watthour meter	Transducer
WVB	Var meter (balanced)	Transducer
WV	Var meter (unbalanced)	Transducer
PB	Power factor (balanced)	Transducer
P	Power factor (unbalanced)	Transducer
A	Frequency meter	Transducer

(2) Shape

Mark	Rectangle Meter
12	120 × 100
10	100 × 83
8	80 × 67

(3) Structure

Mark	Structure
N	Transducer all-in-one type

(4) Special Specifications

Mark	Specification
H	For SCR
C	Cycle Control
L	With Lamp
S	With Shield

(5) Kind of Circuit

Mark	Circuit
12	Single phase
13	Single phase 3-wire
33	3 phase 3-wire
34	3 phase 4-wire

COMMON STANDARD SPECIFICATIONS

ITEM		SPECIFICATION	
Standard		JISC 1102: 2007 [Electric Indicating Meter Direct Acting Type]	
		JISC 1103 [Dimensions Electric Indicating Meter Switchboards]	
		IEC 60051-1 Conformity	
Class		Refer to [List of LK series]	
Support system		Pivot system (Part of system is Taut band)	
Swing angle of meter		86°	
Dimennsion meter from front		LK-12C: 120×100mm LK-10C: 100×83mm LK-8C : 80×67mm	
Length of scale		LK-12C: 95mm LK-10C: 80mm LK-8C : 61mm	
Color of scale plate		White	
Pointer		Lance shape (Black)	
Installation posture		Vertical (⊥)	
Material panel		Iron or non-iron plate	
Thickness panel		10mm or less (LK-10C & LK-8C type: 6mm or less)	
Color of cover		Black (Munsell N1.5) Dark blue (Munsell 7.5BG 4/1.5)	
Material of case		Cover: Methacrylic acid resin molding (Antistatic treatment)	
Insulation resistance		Between electric circuit and outer case	DC500V, 50MΩ or more
Voltage test		Between electric circuit and outer case	AC3320V, between 5sec.
Safety requiments	Standard	JISC 1010-1	
	Insulation	Between electric circuit and outer case: Base of insulation	
	Use	For indoor use (Cubicle etc.)	
	High altitude	2000m or less	
	Pollution	Pollution level 2	
	Measure category	CATⅢ	
	Max. circuit voltage	600V (Ammeter)	
Operated temperature/ Humidity limit		-10~55℃, Average day temperature 40℃ or less, 25~85% RH (Reference ambient temperature 45℃ for steel ship rules)	
Storage temperature range		-20～70℃	

COMMON SPECIAL SPECIFICATIONS (Please Specify)

ITEM		SPECIFICATION	
Scale	Color line	Red, Green, Yellow (Please specify)	
	Extend scale	LCK, LSK: 2～5-time extend	
	Color area (bar)	Red, Green, Yellow (Please specify)	
	Double scale	Please specify	
	Double seal	Please specify	
	Max. scale division	12 type: 100 division 10 type: 80 division 8 type: 60 division	
	Special scale	Please specify	
Vibration proof specification		Vibration	2~10Hz, amplitude 15mm p-p 10～55Hz, 29.4m/s²
		Shock	147m/s², 30-time
Tropical specification		Rust preventative,「**FOR TROPICS**」will display at the name plate	
Pointer		Knife shape (red), Rod shape (black), combine use with multiple scale etc.	
Control pointer		Lancet shape (red), 2 control pointer also possible to manufacture (red×2)	
Installation posture		Horizontal, or Inclined (specify the angle)	
Flame-retardant materials		Cover	Polycarbonate resin
Protection circuit of meter		Overcurrent	Specify necessary tolerated dose
		Overvoltage	Specify necessary tolerated dose
Extended part of scale		Voltmeter	Up to ±10%, ±20%, ±30% of central scale value 75% or more of scale length
		Ammeter	Up to 20% of upper limit value of effective measuring range 95% or more of scale length
			Up to 50% of upper limit value of effective measuring range 75% or more of scale length
For SCR control waves		AC current, AC voltage, Wattmeter, Frequency	
For cycle control use		AC current, AC voltage (Recitifier Type)	
With lamp		DC6V (10mA), DC12, 24, 48V (6mA)	
Test report		Specify the useful frequency and number of copies of report require	
Scale (Single item)		Not JIS mark	
Color of cover		Specified color	
Terminal cover		Please consultation with us	
Others		Please consultation with us for special frequency	

ITEM TO SPECIFY WHEN MAKE PURCHASE

1).Type Name
2).Rated (Max. scale / Input) *1
3).Color of cover
4).Terminal cover
5).Units
6).Options (Refer to Common Special Specification)
7).Test report (specify use frequency and number of copies require)

*1. For max.scale value of watt or var meter, please refer to List of Standard Max. Scale Value.
Please specify frequency of the power factor meter according to the specification.

OBLONG METER - LK SERIES

LIST OF LK SERIES

MODEL			LK – 12 (N) C		LK – 10C		LK – 8C	
JIS SYMBOL			KS – 3d		KS – 5b		KS – 6b	
Product		Principle	Type	Class	Type	Class	Type	Class
DC Ammeter		Moving Coil	LMK-12C	1.5	LMK-10C	2.5	LMK-8C	2.5
DC Voltmeter			LMK-12C	1.5	LMK-10C	2.5	LMK-8C	2.5
DC Receiving Indicator		Moving coil	LXK-12C	1.5	LXK-10C	2.5	LXK-8C	2.5
AC Receiving Indicator		Rectifier	LYK-12C	1.5	LYK-10C	2.5	LYK-8C	2.5
AC Ammeter		Moving iron	LSK-12C	1.5	LSK-10C	2.5	LSK-8C	2.5
AC Voltmeter			LSK-12C	1.5	LSK-10C	2.5	LSK-8C	2.5
AC Ammeter		Rectifier	LCK-12C	1.5	LCK-10C	2.5	LCK-8C	2.5
AC Voltmeter			LCK-12C	1.5	LCK-10C	2.5	LCK-8C	2.5
Watt Meter	Single phase	Transducer	LWK-12NC-12	1.5	LWK-10C-12	2.5	LWK-8C-12	2.5
	Single phase 3-wire		LWK-12NC-13	1.5	LWK-10C-13	2.5	LWK-8C-13	2.5
	3 phase		LWK-12NC-33	1.5	LWK-10C-33	2.5	LWK-8C-33	2.5
	3 phase 4-wire		LWK-12NC-34	1.5	LWK-10C-34	2.5	LWK-8C-34	2.5
Var Meter	Single phase	Transducer	LWVK-12NC-12	1.5	LWVK-10C-12	2.5	LWVK-8C-12	2.5
	3 phase (balanced)		LWVBK-12NC-33	1.5	LWVBK-10C-33	2.5	LWVBK-8C-33	2.5
	3 phase (unbalanced)		LWVK-12NC-33	1.5	LWVK-10C-33	2.5	LWVK-8C-33	2.5
	3 phase 4-wire		LWVK-12NC-34	1.5	LWVK-10C-34	2.5	LWVK-8C-34	2.5
Power Factor Meter	Single phase	Transducer	LPK-12NC-12	5.0	LPK-10C-12	5.0	LPK-8C-12	5.0
	3 phase (balanced)		LPBK-12NC-33		LPBK-10C-33		LPBK-8C-33	
	3 phase (unbalanced)		LPK-12NC-33		LPK-10C-33		LPK-8C-33	
	3 phase 4-wire (balanced)		LPBK-12NC-34		LPBK-10C-34		LPBK-8C-34	
	3 phase 4-wire (unbalanced)		LPK-12NC-34		LPK-10C-34		LPK-8C-34	
Frequency Meter		Transducer	LAK-12C	1.0	LAK-10C	1.0	LAK-8C	1.0

►Keep in mind please, Transducer type meter does transitional indication at voltage input start.

NEEDLE STYLE INDICATOR STANDARD SCALE DIVISION

Max. scale value (10-time)		1	1.5	2	2.5	3	4	5	6	7.5	8	9
Type	LK-12(N)C	20	30	40	25	30	40	25	30	37.5	40	45
	LK-10C, LK-8C	20	30	20	25	30	20	25	30	15	16	18

BLADE STYLE INDICATOR STANDARD SCALE DIVISION

Max. scale value (10-time)		1	1.5	2	2.5	3	4	5	6	7.5	8	9
Type	LK-12(N)C	50	75	40	50	60	80	50	60	75	80	45
	LK-10C, LK-8C	50	30	40	50	30	40	50	30	37.5	40	45

DC Ammeter (Moving Coil Type) - LMK

AMMETER

Max. Scale Value	Approx. Internal Resistance or Voltage Drop LMK–12C, 10C, 8C	Accessory
25μA	2.26kΩ	–
50μA	1.3kΩ	
100μA (1)	2.1kΩ	
200μA	1kΩ	
500μA	240Ω	
1mA	120Ω	
2mA	11Ω	
5mA	12Ω	
10mA	3.2Ω	
20mA	2.8Ω	
50mA~30A	60mV	
30A~10kA	60mV (2)	Shunt (3)

Note:

(1) LMK-12C: Internal resistance is 1.1kΩ when 100μA

(2) Please use external shunt (60mV) for scale value 30A or more. Shunt 50mV & 100mV also can manufacture.

(3) Lead wire for shunt is not attached. Standard lead wire resistance is 0.07Ω (1.25mm^2)

► Meter value up until 1Ω can manufacture. Please specify your value when lead wire resistance value is over 0.07Ω.

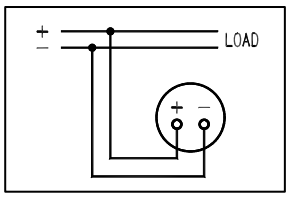
Lead Wire Resistance Value

Cross Section (mm²)	Annealed Copper (Ω/m)	Remarks
1.25	0.0165	JIS C 3317 (HIV)
2.0	0.00924	JIS C 3307 (IV)
3.5	0.00520	Twist wire

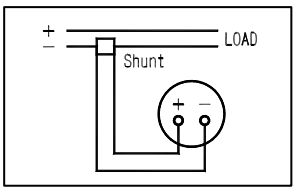
► Meter built-in variable resistance for external resistance correction can manufacture.

► Meter both deflections also can manufacture.

Connecting Diagram

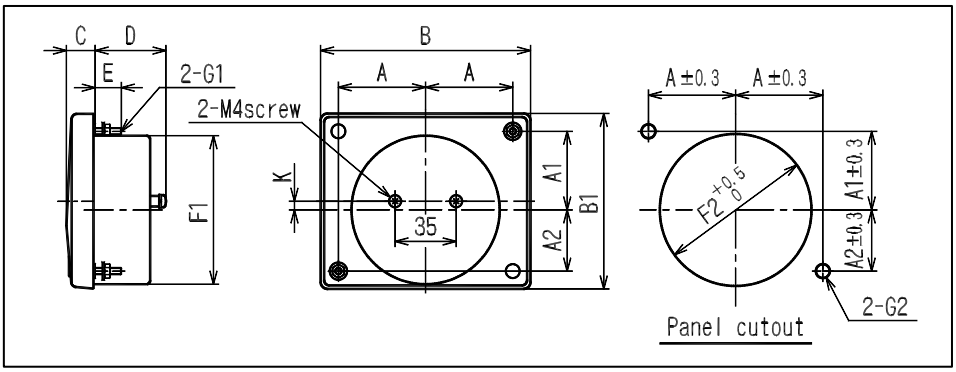


Ammeter



Ammeter external Shunt

Dimensions



Type	A	A1	A2	B	B1	C	D	E	F1	F2	G1	G2	K	weight (g)
LMK-12C	50	45	35	120	100	16	41.5	15	85 Φ	87ΦHole	M4 Screw	5.5ΦHole	0	300
LMK-10C	40	37	27	100	83	14	29.5	10	65 Φ	67ΦHole	M3 Screw	4ΦHole	5	140
LMK-8C	32	29.5	18.5	80	67	14	29.5	10	52 Φ	54ΦHole	M3 Screw	4ΦHole	5.5	110

DC Voltmeter (Moving Coil Type) - LMK

VOLTMETER

Max. Scale Value	Approx. Internal Resistance or Voltage Drop	Accessory
	LMK–12C, 10C, 8C	
50mV ~ 900mV	4mA	–
1V ~ 600V (1) (2)	1mA	
750V/1mA ~ 25kV/1mA (1) (2)	1mA	Series Resistor

Note:

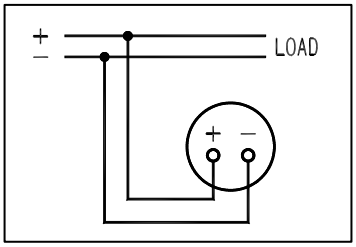
(1) Internal resistance up until 10kΩ/V can manufacture for voltmeter scale 3V or more.

(2) Please use external series resistor (1mA) for scale value 600V or more.

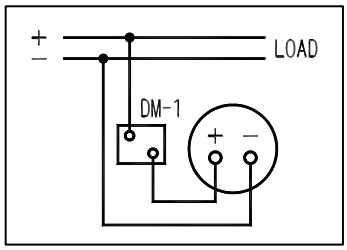
► Meter both deflections can manufacture.

► Protection overvoltage for voltmeter more than 500mV also can manufacture.

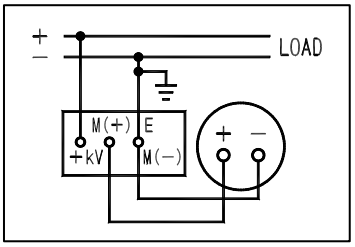
Connection Diagram



Voltmeter

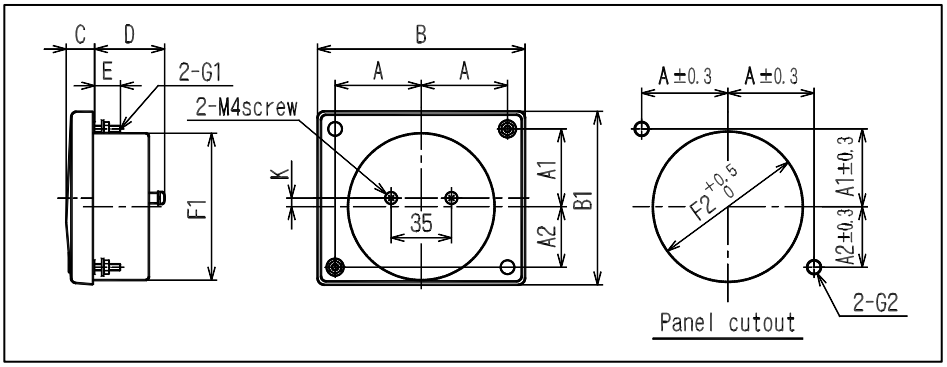


Voltmeter external with Series resistor (DM-1)



Voltmeter external with Series resistor (DM-2~25)

Dimensions



Type	A	A1	A2	B	B1	C	D	E	F1	F2	G1	G2	K	weight(g)
LMK-12C	50	45	35	120	100	16	41.5	15	85 Φ	87ΦHole	M4 Screw	5.5ΦHole	0	300
LMK-10C	40	37	27	100	83	14	29.5	10	65 Φ	67ΦHole	M3 Screw	4ΦHole	5	140
LMK-8C	32	29.5	18.5	80	67	14	29.5	10	52 Φ	54ΦHole	M3 Screw	4ΦHole	5.5	110

DC Receiving Indicator Meter (Moving Coil Type) - LXK

Receiving indicator meter for ammeter or voltmeter can used in received electrical signal from detector or transmitter, and measuring value for various physical volume, electric power, power factor and frequency. Scale value and volume electric input can be manufactured by specify.

For example:

Scale value 100% **Electric input quantity DC 3V**

Scale Value 0～2MPa **Electric input quantity DC 4～20mA**

Meter built-in variable resistor for Input voltage correction (standard ±20%) can manufacture.

DC RECEIVING INDICATOR

Electrical Input Quantity	Internal Resistance Overview	Electrical Input Quantity	Consumption Current
	LXK–12C, 10C, 8C		LXK–12C, 10C, 8C
100μA (1)	2.1KΩ	1V	1mA (3)
500μA	240Ω	2V	
1mA	120Ω	1~5V (2)	
2mA	11Ω	5V	
5mA	12Ω	10V	
10mA	3.2Ω	20V	
20mA	2.8Ω	50V	
4~20mA (2)	2.8Ω	≀	
10~50mA (2)	1.5Ω	300V	

Note:

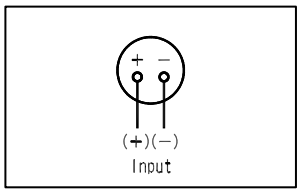
(1) LXK-12C: Internal resistance is 1.1kΩ when 100μA.

(2) Input bias for 1V, 4mA scale zero position adjustment is necessary for meter received input electrical signal with bias DC1-5V, DC4-20mA etc.

(3) Consumption current for VR internal meter is 1mA.

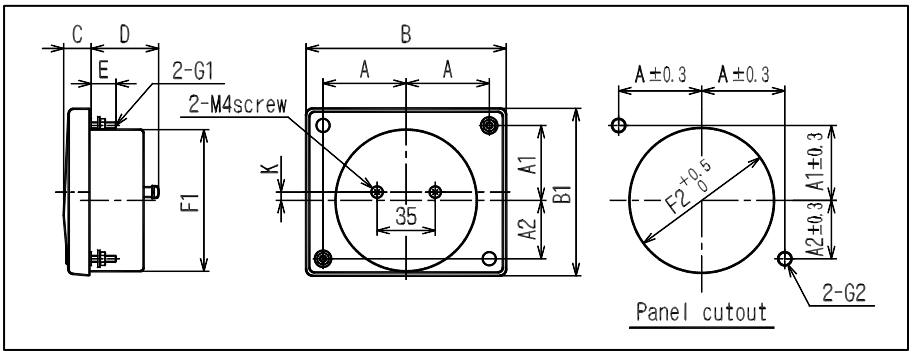
► Meter both deflections can manufacture.

Connection Diagram



DC Receiving Indicator

Dimensions



Type	A	A1	A2	B	B1	C	D	E	F1	F2	G1	G2	K	weight (g)
LXK-12C	50	45	35	120	100	16	41.5	15	85 Φ	87ΦHole	M4 Screw	5.5Φ Hole	0	300
LXK-10C	40	37	27	100	83	14	29.5	10	65 Φ	67ΦHole	M3 Screw	4Φ Hole	5	140
LXK-8C	32	29.5	18.5	80	67	14	29.5	10	52 Φ	54ΦHole	M3 Screw	4Φ Hole	5.5	110

AC Receiving Indicator Meter (Rectifier Type) - LYK

Receiving indicator meter for ammeter or voltameter can used in received electrical signal from detector or transmitter, and measuring value of various physical volume, electric power, power factor and frequency.
Scale value and volume electric input can be manufactured by specify.

For example:

Scale value 100% **Input electric quantity DC 3V**

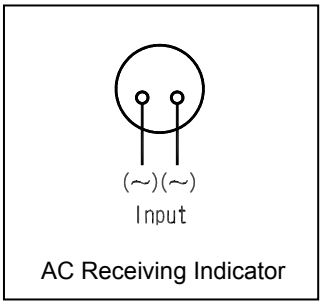
Scale Value 0～2MPa **Input electric quantity DC 4～20mA**

Meter built-in variable resistor for input voltage corrective (standard ±20%) also can manufacture.

AC AMMETER

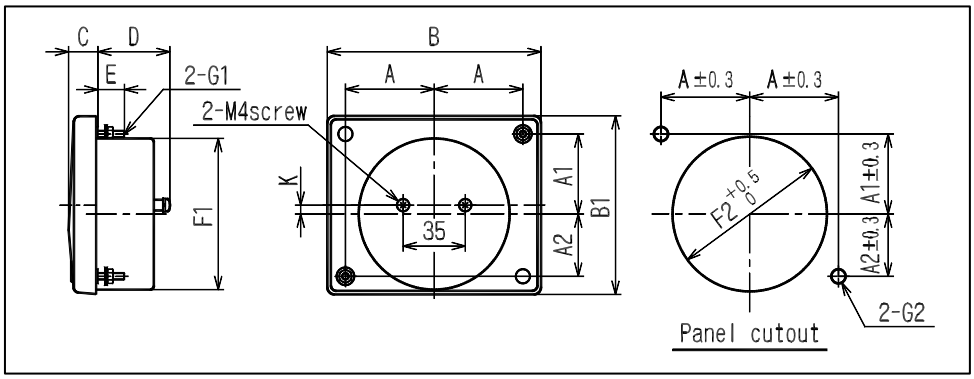
Electrical Input Quantity	Internal Resistance or Consumption VA	Electrical Input Quantity	Consumption Current
	LYK–12C, 10C, 8C		LYK–12C, 10C, 8C
100μA	5kΩ	3V ～ 300V	1mA
500μA	1.5kΩ		
1mA	800Ω		
3mA	350Ω		
5mA	300Ω		
10mA 20mA	0.5VA		

Connection Diagram



AC Receiving Indicator

Dimensions



Type	A	A1	A2	B	B1	C	D	E	F1	F2	G1	G2	K	weight (g)
LYK-12C	50	45	35	120	100	16	41.5	15	85 Φ	87Φ Hole	M4 Screw	5.5Φ Hole	0	300
LYK-10C	40	37	27	100	83	14	29.5	10	65 Φ	67Φ Hole	M3 Screw	4Φ Hole	5	140
LYK-8C	32	29.5	18.5	80	67	14	29.5	10	52 Φ	54Φ Hole	M3 Screw	4Φ Hole	5.5	110

AC Ammeter (Moving Iron Type) - LSK

AC AMMETER

Nomal Scale	Extended Scale				Consumption VA
Max. scale value	2-time	3-time	4-time	5-time	LSK－12C, 10C, 8C
100mA	200mA	300mA	400mA	500mA	1VA
500mA	1A	1.5A	2A	2.5A	
1A	2A	3A	4A	5A	
3A	6A	9A	12A	15A	
5A	10A	15A	20A	25A	
7.5A	15A	22.5A	30A	37.5A	
10A	20A	30A	40A	50A	
15A	30A	45A	60A	75A	
20A	40A	60A	80A	100A	
30A	60A	90A	120A	150A	
5/5A(1) ≀ 10k/5A	10A ≀ 20kA	15A ≀ 30kA	20A ≀ 40kA	25A ≀ 50kA	1VA

Note:

(1) Please use external current transformer (CT) 5A (0.1A or 1A) for scale 30A or more & scale 600V or more in current voltage.

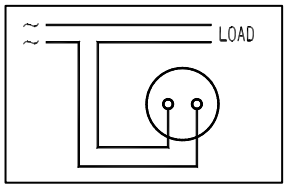
► Meter for 400Hz use can manufacture also please specify.

For SCR Control Waveform

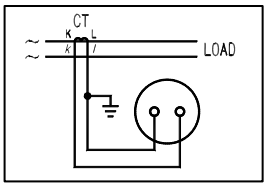
Meter SCR waveform input (Distortion waveform) also can manufacture.

Type name: LSK-□CH

Connection Diagram

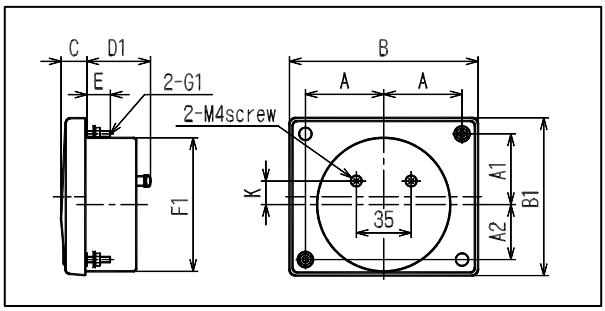


Ammeter



Ammeter external CT

Dimensions



Type	A	A1	A2	B	B1	C	D1	D2	E	F1	F2	G1	G2	K	weight (g)
LSK-12C	50	45	35	120	100	16	41.5	48	15	85 Φ	87Φ Hole	M4 Screw	5.5Φ Hole	15	280
LSK-10C	40	37	27	100	83	14	37.5	45.5	10	65 Φ	67Φ Hole	M3 Screw	4Φ Hole	5	180
LSK-8C	32	29.5	18.5	80	67	14	37.5	45.5	10	52 Φ	54Φ Hole	M3 Screw	4Φ Hole	5.5	150

Voltmeter (Moving Iron Type) - LSK

VOLTMETER

Max. Scale Value	Consumption VA LSK–12C, 10C, 8C	Accessory (Series Resistor)
50V 100V	5VA	—
150V 300V	5VA	—
600V (1)	10VA	DM－41
600/150V (2) ～ 550k/150V	5VA	—

Note:

(1) Please use external DM-41 for scale from 301V～600V.

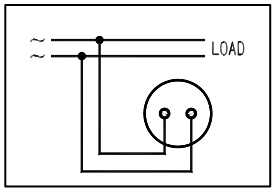
(2) Please use external voltage transformer (VT) 150V for scale 600V or more.

For SCR Control Waveform

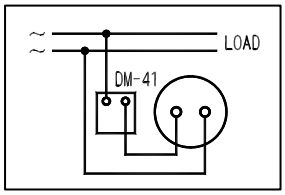
Meter SCR waveform input (Distortion Waveform) can manufacture please specify.

Type Name: LSK-□CH

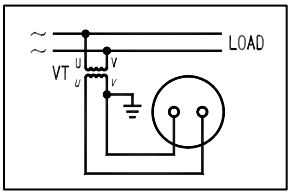
Connection Diagram



Voltmeter

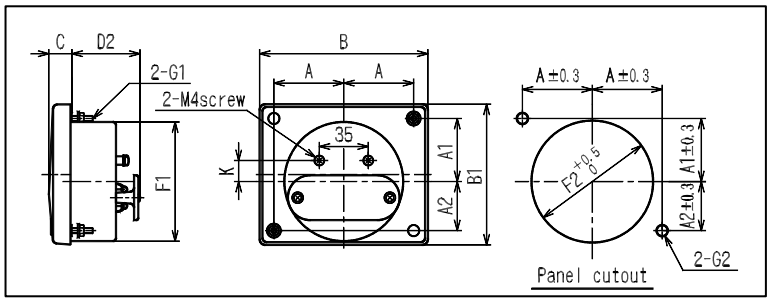


Voltmeter external Series resistor

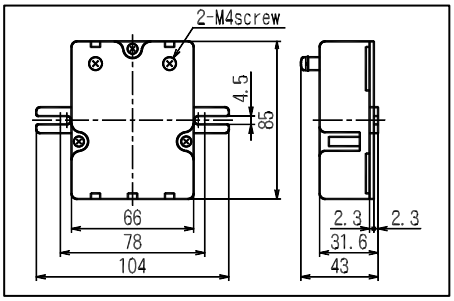


Voltmeter external VT

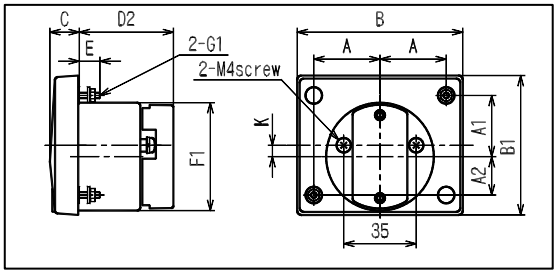
Dimension for Voltmeter LSK-12C



Dimension for DM-41



Dimension for LSK-10C, 8C



Type	A	A1	A2	B	B1	C	D1	D2	E	F1	F2	G1	G2	K	weight(g)
LSK-12C	50	45	35	120	100	16	41.5	48	15	85 Φ	87Φ Hole	M4 Screw	5.5Φ Hole	15	280
LSK-10C	40	37	27	100	83	14	37.5	45.5	10	65 Φ	67Φ Hole	M3 Screw	4Φ Hole	5	180
LSK-8C	32	29.5	18.5	80	67	14	37.5	45.5	10	52 Φ	54Φ Hole	M3 Screw	4Φ Hole	5.5	150

AC Ammeter (Rectifier Type) - LCK

AMMETER

Max. Scale Value	Approx. Internal Resistance or Consumption VA	Accessory
	LCK–12C, 10C, 8C	
100μA	5kΩ	–
500μA	1.5kΩ	
1mA	800Ω	
3mA	380Ω	
5mA (2)	300Ω	
10mA ~ 300mA (2)	0.5VA	
350mA ~ 100A (1)	1VA	MR–CTN

Note:

(1) Please use external current transformer (CT) 5A (0.1A or 1A) for scale 100A or more & scale 600V or more in circuit voltage.

(2) Protection overcurrent for ammeter 100mA or less can manufacture.

► For High harmonic ware use, we can manufacture until 10kHz, please specify.

► Extended Scale also can manufacture. (External with AT-62M, input until 15A only, diagram refer to page 20)

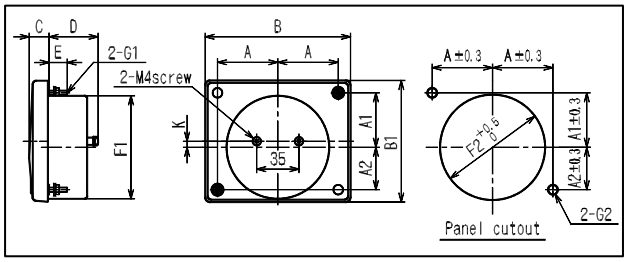
For Cycle Control Wareform Meter

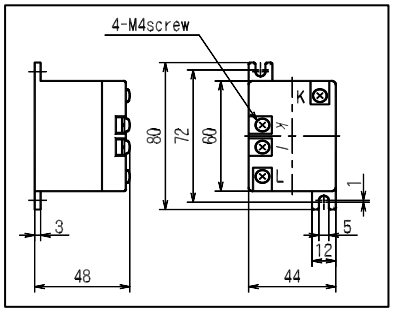
Please use cycle control for cycle control warefrom type.
Type Name: LCTK-□CC, external with AT-62MEC.

For Distorted Wareform Meter (Approx. RMS value rectifier menthod)

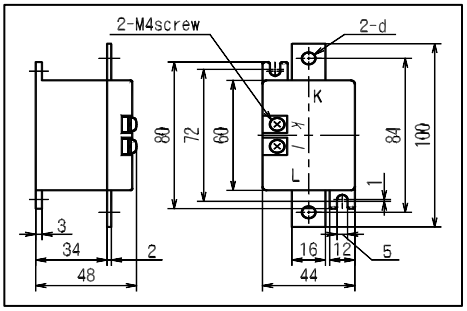
Keep in mind please, that standard rectifier type will be affected by waveform distortion.
Please use approx. RMS value rectifier method for third harmonics mixed with waveform and SCR waveform.
(Type name: LCTK-□C, External with AT-62ME, diagram refer to page 20)

Dimension





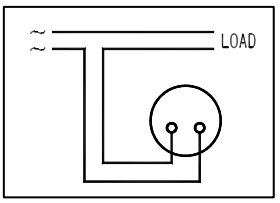
MR-CTN (0.35~25A/10mA)



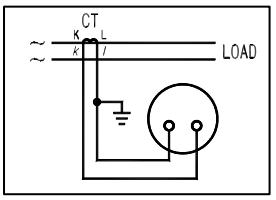
MR-CTN (30~100A/20mA)

Current (A)	d
30~70	Φ6.5
75~100	Φ8.5

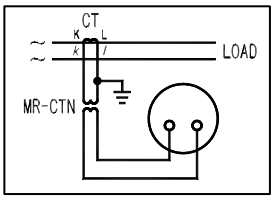
Connection Diagram



Ammeter



Ammeter with CT or MR-CTN



Ammeter with CT and MR-CTN

Type	A	A1	A2	B	B1	C	D	E	F1	F2	G1	G2	K	weight (g)
LCK-12C	50	45	35	120	100	16	41.5	15	85 Φ	87Φ Hole	M4 Screw	5.5ΦHole	0	300
LCK-10C	40	37	27	100	83	14	29.5	10	65 Φ	67Φ Hole	M3 Screw	4ΦHole	5	180
LCK-8C	32	29.5	18.5	80	67	14	29.5	10	52 Φ	54Φ Hole	M3 Screw	4ΦHole	5.5	110

Voltmeter (Rectifier Type) - LCK

VOLTMETER

Max. Scale Value	Consumption Current	Accessory
	LCK–12C, 10C, 8C	
3V ~ 600V	1mA	—
750V ~ 25kV (1)	1mA	Series Resistance

Note:

(1) Please use external series resistance 1mA for scale 600V or more.

► For High harmonic ware use, we can manufacture until 10kHz, please specify.

For Cycle Control Wareform Meter

Please use cycle control for cycle control warefrom type.

Type Name: LCTK-□CC, external with AT-62MEC.

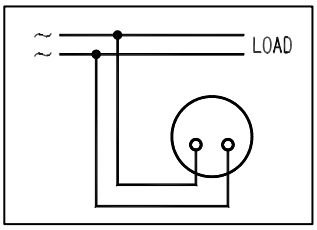
For Distorted Wareform Meter (Approx. RMS value rectifier menthod)

Keep in mind please, that standard rectifier type will be affected by waveform distortion.

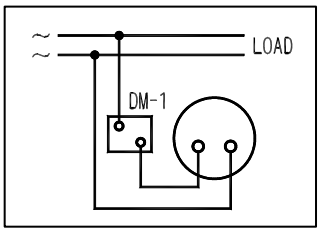
Please use approx. RMS value rectifier method for third harmonics mixed with waveform and SCR waveform.

(Type name: LCTK-☐C, External with VT-62ME)

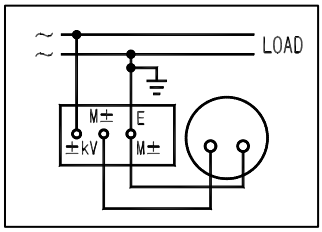
Connection Diagram



Voltmeter

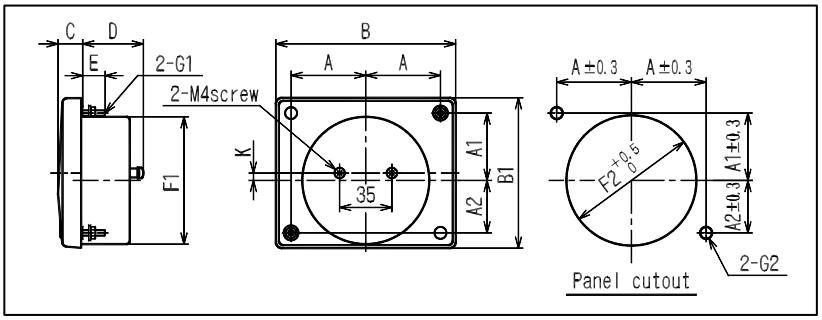


Voltmeter external series resistor (DM-1)



Voltmete external series resistor (DM-2~25)

Dimensions



Type	A	A1	A2	B	B1	C	D	E	F1	F2	G1	G2	K	weight (g)
LCK-12C	50	45	35	120	100	16	41.5	15	85 Φ	87Φ Hole	M4 Screw	5.5Φ Hole	0	300
LCK-10C	40	37	27	100	83	14	29.5	10	65 Φ	67Φ Hole	M3 Screw	4Φ Hole	5	180
LCK-8C	32	29.5	18.5	80	67	14	29.5	10	52 Φ	54Φ Hole	M3 Screw	4Φ Hole	5.5	110

WATTHOUR METER (All-In-One Transducer Type) (1)

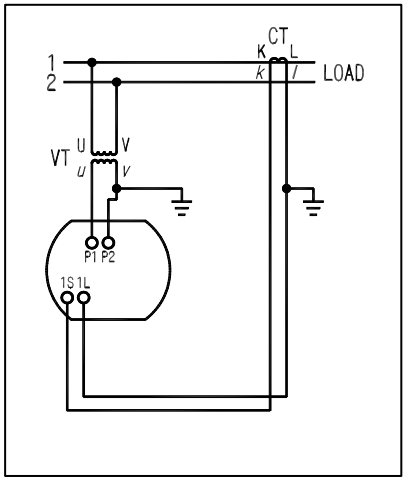
Application	Type	Rating (2)	Consumption VA		Accessory
			Voltage	Current	
Single phase	LWK-12NC-12	110V, 5A (1A)	2VA	1VA	—
		220V, 5A (1A)	3.5VA	1VA	
Single phase 3-wire	LWK-12NC-13	110V, 5A (1A)	2VA	1VA	—
3 phase 3-wire	LWK-12NC-33	110V, 5A (1A)	2VA	1VA	—
		220V, 5A (1A)	3.5VA	1VA	
3 phase 4-wire	LWK-12NC-34	110V √3V, 5A (1A)	2VA	1VA	—
		220V √3V, 5A (1A)	3.5VA	1VA	

Note:

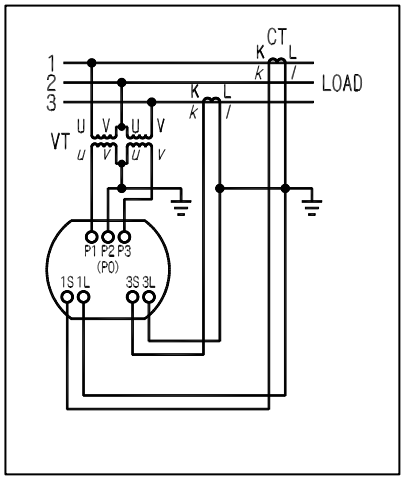
(1) Please refer to (page 18) for manufacture limit and max. scale value.

(2) Please use external CT, 5A(1A) or VT, 110V respectively if above rating is exceeds.
Usable voltage range: 110V: 90～130V & 220V: 180～260V

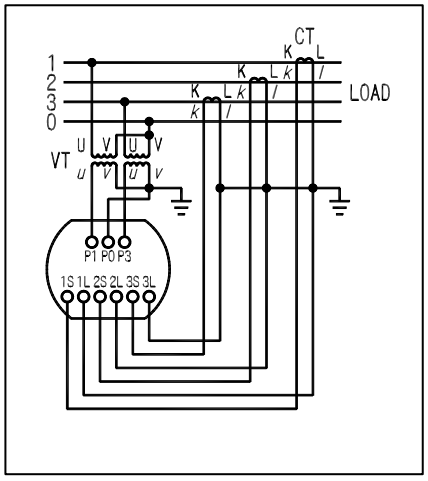
Connection Diagram



Single phase watthour meter

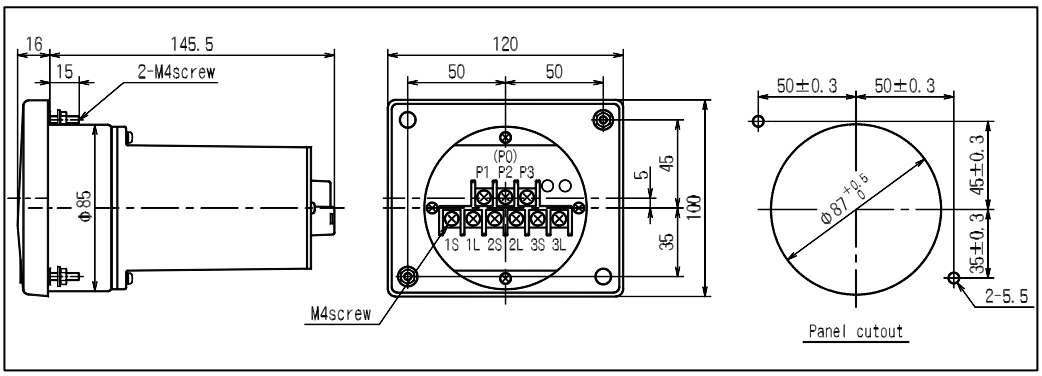


Single phase 3-wire & 3 phase 3-wire watthour meter



3 phase 4-wire watthour meter

Dimensions



Type	Weight
LWK-12NC	0.44kg
LWVK-12NC	

VAR METER (All-In-One Transducer Type) (1)

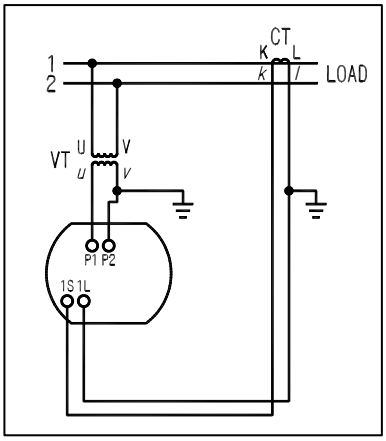
Application	Type	Rating (2)	Consumption VA		Accessory
			Voltage side	Current side	
Single phase	LWVK-12NC-12	110V, 5A (1A)	2VA	1VA	—
		220V, 5A (1A)	3.5VA	1VA	
Single phase 3-wire	LWVK-12NC-33	110V, 5A (1A)	2VA	1VA	—
		220V, 5A (1A)	3.5VA	1VA	
3 phase 4-wire	LWVK-12NC-34	110V, 5A (1A)	2VA	1VA	—
		220V, 5A (1A)	3.5VA	1VA	

Note:

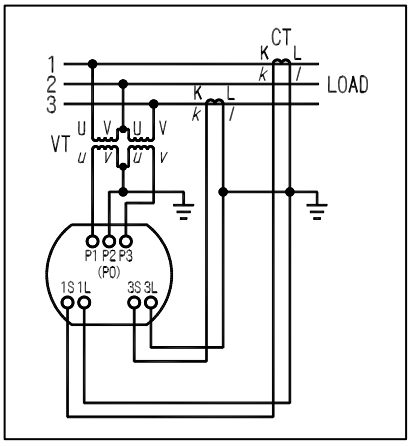
(1) Please refer to (page 18) for manufacture and max. scale value.
Standard scale: Lead□var～0～Lag□var

(2) Please use external CT, 5A (1A) or VT, 110V respectively if above rating is exceeds.
Usable voltage range: 110V: 90～130V & 220V: 180～260V

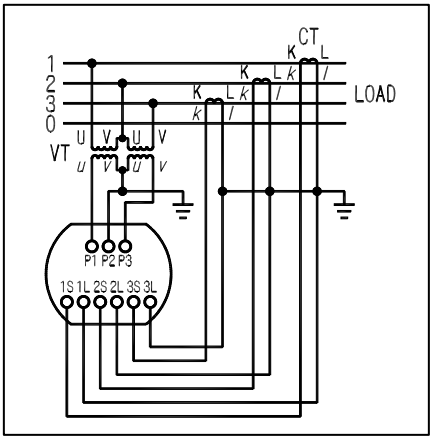
Connection Diagram



Single phase var meter

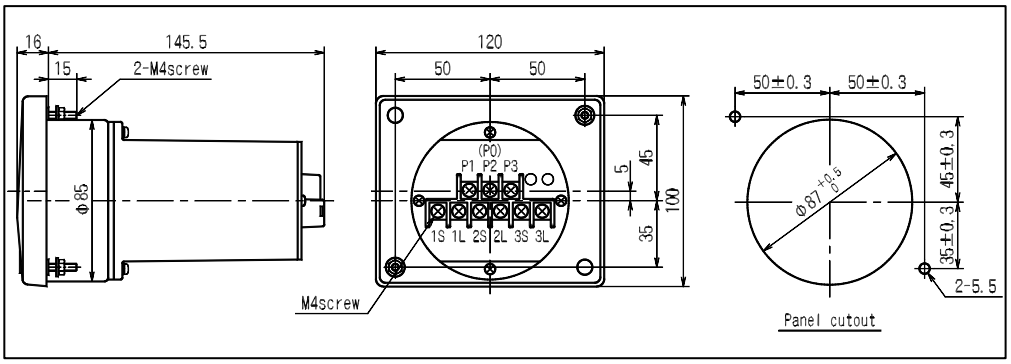


3 phase 3-wire var meter



3 phase 4-wire var meter

Dimensions



Type	Weight
LWK-12NC	0.44kg
LWVK-12NC	

Watthour Meter (Transducer Type) - LWK

WATTHOUR METER (Eexternal with Transducer Type) (1)

Application	Type	Rating (2)	Consumption VA		Accessory (Transducer)
			Voltage side	Current side	
Single phase	LWK-10C-12	110V, 5A (1A)	2VA	1VA	WT-62M-12
	8C-12	220V, 5A (1A)	3.5VA	1VA	
Single phase 3-wire	LWK-10C-13 8C-13	110V, 5A (1A)	Each phase 2VA	Each phase 1VA	WT-83M-13
3 phase	LWK-10C-33	110V, 5A (1A)	Each phase 2VA	Each phase 1VA	WT-83M-33
	8C-33	220V, 5A (1A)	Each phase 3.5VA	Each phase 1VA	
3 phase 4-wire (3)	LWK-10C-34	110V/√3V, 5A (1A)	Each phase 1.5VA	Each phase 1VA	WT-83M-34
	8C-34	220V/√3V, 5A (1A)	Each phase 3VA	Each phase 1VA	

Note:

(1) Please refer to (page 18) for manufacture limit and max. scale value.

(2) Please use external CT, 5A (1A) or VT, 110V respectively if above rating is exceeds.
Usable voltage range: 110V: 90～130V & 220V: 180～260V

(3) 3 phase 4-wire is voltage balanced.

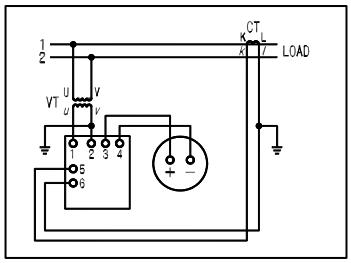
► For High harmonic ware, please specify the frequency.

For SCR Control Wareform

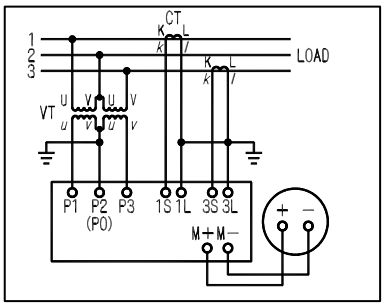
Type name: LWK-□CH-□.

Aux. power is necessary. (3 phase 4-wire can not be manufacture)

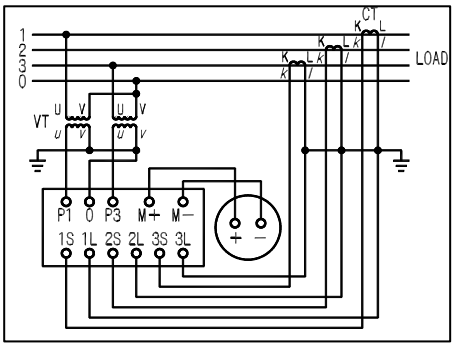
Connection Diagram



Single phase watthour meter
External with WT-62M-12

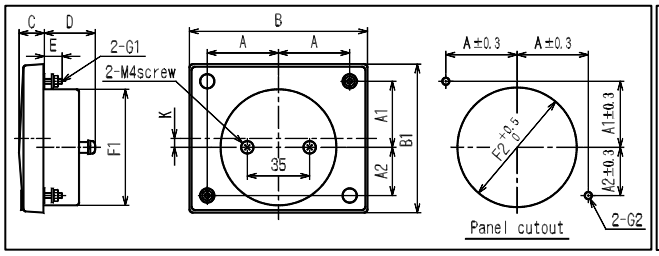


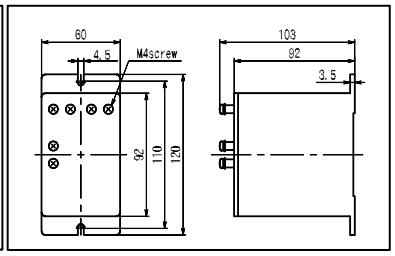
Single phase 3 wire & 3 phase watthour
meter external with WT-83M-13/33



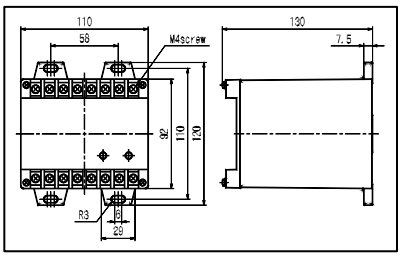
3 phase 4 wire watthour meter
external with WT-83M-34

Dimensions





For Type: □T-62M□-□



For Type: □T-83M-□

Type	A	A1	A2	B	B1	C	D	E	F1	F2	G1	G2	K	weight (g)
LWK-10C	40	37	27	100	83	14	29.5	10	65 Φ	67Φ Hole	M3 Screw	4Φ Hole	5	990
LWK-8C	32	29.5	18.5	80	67	14	29.5	10	52 Φ	54Φ Hole	M3 Screw	4Φ Hole	5.5	950

Var Meter (Transducer Type) - LWVK

VAR METER (External with Transducer Type) (1)

Application	Type	Rating (2)	Consumption VA		Accessory (Transducer)
			Voltage side	Current side	
Single phase (3)	LWVK-10C-12 8C-12	110V, 5A(1A)	3.5VA	1.5VA	WVT-62M-12
		220V, 5A(1A)	3.5VA	1.5VA	
3 phase (4) (balanced)	LWVBK-10C-33 8C-33	110V, 5A(1A)	Each phase 3.5VA	Each phase 1.5VA	WVBT-83M-33
		220V, 5A(1A)	Each phase 3.5VA	Each phase 1.5VA	
3 phase (4) (unbalanced)	LWVK-10C-33 8C-33	110V, 5A(1A)	Each phase 3.5VA	Each phase 1.5VA	WVT-83M-33
		220V, 5A(1A)	Each phase 3.5VA	Each phase 1.5VA	
3 phase 4-wire (4)(5) (unbalanced)	LWVK-10C-34 8C-34	110V, 5A(1A)	Each phase 3.5VA	Each phase 1.5VA	WVT-83M-34
		220V, 5A(1A)	Each phase 3.5VA	Each phase 1.5VA	

Note:

(1) Please refer to (page 18) for manufacture limit and max. scale value.
Standard scale: Lead□var～0～Lag□var

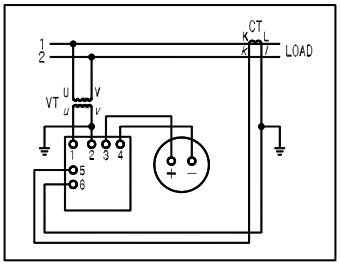
(2) Please use external CT, 5A (1A) or VT, 110V respectively if above rating is exceeds.
Usable voltage range: 110V: 90～130V & 220V: 180～260V

(3) Please specify the frequency (50Hz or 60Hz) for single phase circuit.

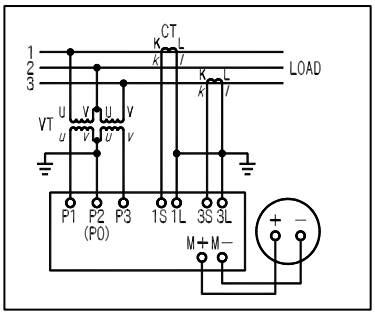
(4) Please use 3 phase, 3 phase 4-wire in positive phase sequence.

(5) 3 phase 4-wire is voltage balanced.

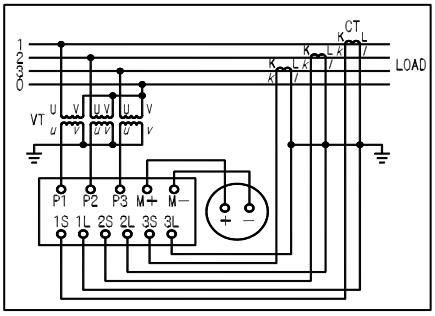
Connection Diagram



Single phase var meter external WVT-62M-12

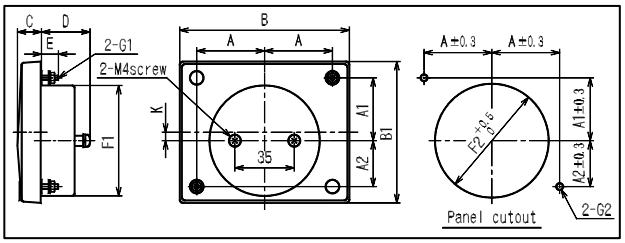


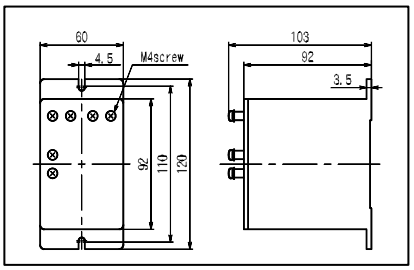
Single phase 3-wire / 3 phase var meter external WVT, WVBT-83M-13/33



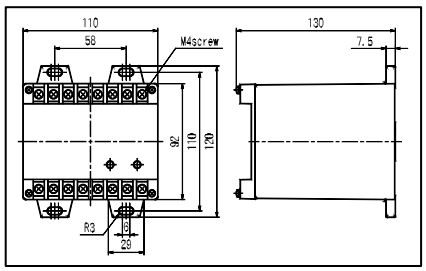
3 phase 4-wire var meter external WVT-83M-34

Dimensions





For Type: □T-62M□-□



For Type: □T-83M-□

Type	A	A	A2	B	B1	C	D	E	F1	F2	G1	G2	K	weight (g)
LWV(B)K-10C	40	37	27	100	83	14	29.5	10	65 Φ	67Φ Hole	M3 Screw	4ΦHole	5	990
LWV(B)K-8C	32	29.5	18.5	80	67	14	29.5	10	52 Φ	54Φ Hole	M3 Screw	4ΦHole	5.5	950

MANUFACTURED LIMIT MAX. SCALE VALUE METER

Manufacturable range will be limited where intrinsic max. scale value is within the scope as shown in the list at below. But in the case, the meter is used external CV or VT, max. scale value will be calculated as following formula:

$$\text{Intrinsic Max. scale value} = \frac{\text{Max. scale value}}{\text{VT ratio} \times \text{CT ratio}}$$

Type Name	Rating			Manufacturable Intrinsic Range	
				Watthour Meter	Var Meter
Single phase	110V / 5A(1A)			350~600W (70~120W)	350~600var (70~120var)
	220V / 5A(1A)			700~1200W (140~240W)	700~1200var (140~240var)
Single phase 3-wire	110V / 5A(1A)			600~1200W (120~240W)	—
3 phase 3-wire	110V / 5A(1A)			600~1200W (120~240W)	600~1200var (120~240var)
	220V / 5A(1A)			1200~2400W (240~480W)	1200~2400var (240~480var)
3 phase 4-wire	Line	Phase	Current	—	—
	110V	110/√3V	5A (1A)	600~1200W (120~240W)	600~1200var (120~240var)
	220V	220/√3V	5A (1A)	1200~2400W (240~480W)	1200~2400var (240~480var)

REFERENCE LIST FOR STANDARD MAX. SCALE VALUE THREE PHASE WATTMETER

The following table is the standard of 3 phase wattmeter.
This table also applies for 3 phase 4 wire wattmeter, single phase 3 wire wattmeter and var meter.
Standard for single phase wattmeter calculation : listed value × 1/2

Line vol. / CT ratio	6600V (VT6600 / 110V)			3300V (VT3300 / 110V)			440V (VT440 / 110V)			220V			110V		
5 / 5A	kW 60	kW 50	kW 40	kW 30	kW 25	kW 20	kW 4	kW 5	kW 3	kW 2	kW 1.5	kW 1.2	kW 1	kW 0.8	kW 0.6
7.5 / 5A	90	75	60	45	40	30	6	5	4	3	2.5	2	1.5	1.2	1
10 / 5A	120	100	80	60	50	40	8	7.0	6	4	3	2.5	2	1.5	1.2
15 / 5A	200	150	120	100	75	60	12	10	8	6	5	4	3	2.5	2
20 / 5A	240	200	150	120	100	80	15	—	12	8	6	5	4	3	2.5
25 / 5A	300	250	200	150	120	100	20	—	15	10	8	7.5	5	4	3
30 / 5A	400	300	240	200	150	120	24	—	20	12	10	8	6	5	4
40 / 5A	480	400	300	240	200	150	30	—	24	15	12	10	8	7.5	5
50 / 5A	600	500	400	300	250	200	40	—	30	20	15	12	10	8	6
60 / 5A	750	600	480	400	300	240	48	—	40	24	—	20	12	10	8
75 / 5A	900	750	600	450	400	300	60	50	40	30	25	20	15	12	10
100 / 5A	1200	1000	800	600	500	400	80	75	60	40	30	25	20	15	12
150 / 5A	2000	1500	1200	1000	750	600	120	100	80	60	50	40	30	25	20
200 / 5A	2400	2000	1500	1200	1000	800	150	—	120	80	60	50	40	30	25
250 / 5A	3000	2500	2000	1500	1200	1000	200	—	150	100	80	75	50	40	30
300 / 5A	4000	3000	2400	2000	1500	1200	240	—	200	120	100	80	60	50	40
350 / 5A	4000	—	3000	2000	—	1500	300	250	200	150	120	100	75	60	50
400 / 5A	4800	4000	3000	2400	2000	1500	300	—	250	150	120	100	80	75	50
450 / 5A	6000	5000	4000	3000	2500	2000	400	300	250	200	150	120	100	75	60
500 / 5A	6000	5000	4000	3000	2500	2000	400	—	300	200	150	120	100	75	60
600 / 5A	7500	6000	4800	4000	3000	2400	500	—	400	240	—	200	120	100	70
750 / 5A	9000	7500	6000	4500	4000	3000	650	500	400	300	250	200	150	120	100
800 / 5A	10MW	8000	7500	5000	—	4000	700	600	500	300	250	200	150	120	100
1000 / 5A	12MW	10MW	8000	6000	5000	4000	800	750	600	400	300	250	200	150	120
1200 / 5A	15MW	12MW	10MW	7500	6000	5000	1000	800	750	500	400	300	250	200	150
1500 / 5A	20MW	15MW	12MW	10MW	7500	6000	1200	1000	800	600	500	400	300	250	200

POWER FACTOR METER [1]

Application	Type	Rating [2]	Consumption VA		Accessory (Transducer)	
			Voltage side	Current side	10C	8C
Single phase	LPK-12NC-12 10C-12 8C-12	110V,5A (1A) 220V, 5A (1A)	2VA	1VA	PT-62M-12 [5]	
			2VA	1VA		
3 phase (balanced)	LPBK-12NC-33 10C-33 8C-33	110V, 5A (1A) 220V, 5A (1A)	Each phase 1VA	Each phase 1VA	PBT-62M-33 [5]	
			Each phase 2VA	Each phase 1VA		
3 phase (unbalanced) [4]	LPK-12NC-33 10C-33 8C-33	110V, 5A (1A) 220V, 5A (1A)	Each phase 1VA	Each phase 1VA	PT-63M-33 [5]	
			Each phase 2VA	Each phase 1VA		
3 phase 4-wire (balanced)	LPBK-12NC-34 10C-34 8C-34	110V, 5A (1A) 220V, 5A (1A)	Each phase 1VA	Each phase 1VA	PBT-62M-34 [5]	
			Each phase 2VA	Each phase 1VA		
3 phase 4-wire (unbalanced) [3] [4]	LPK-12C-34 10C-34 8C-34	110V, 5A (1A) 220V, 5A (1A)	Each phase 1VA	Each phase 1VA	PT-64M-34 [5]	
			Each phase 2VA	Each phase 1VA		

Note:

[1] Standard Scale: Lead0.5～1～Lag0.5.
Scale for 3 phase 3-wire balance only: Lead0～1～Lag0.
(Effective measuring range: Lead0.3～1～Lag0.3 also can be manufacture)
Please speficy frequency (50Hz or 60Hz) for all type except 3 phase balanced circuit.

[2] Please use external CT, 5A (1A) or VT, 110V respectively if above rating is exceeds.
Usable voltage range: 110V: 90～130V & 220V: 180～260V
Please use in positive phase sequence.

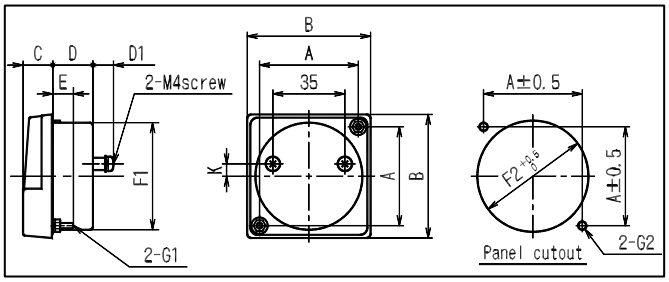
[3] All type for LPK-12C, 10C, 8C-34 will attached with PT-64M-34 (diagram please refer to page 20).

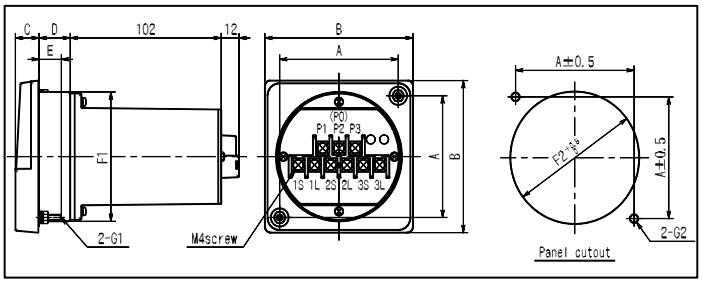
[4] 3 phase (unbalanced), 3 phase 4-wire (unbalanced) is voltage balanced.

[5] Refer to next page for the connection diagram.

Dimensions

For LPBK-12N

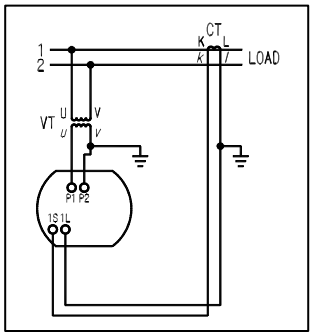




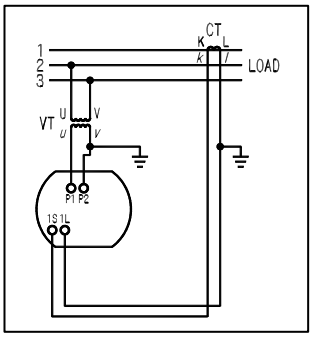
Type		A	A1	A2	B	B1	C	D	E	F1	F2	G1	G2	K	weight (g)
LPK-10C	LPBK-10C	40	37	27	100	83	14	29.5	10	65 Φ	67ΦHole	M3 Screw	4Φ Hole	5	880
LPK-8C	LPBK-8C	32	29.5	18.5	80	67	14	29.5	10	52 Φ	54ΦHole	M3 Screw	4Φ Hole	5.5	900

Power Factor Meter (Transducer Type) - LPK

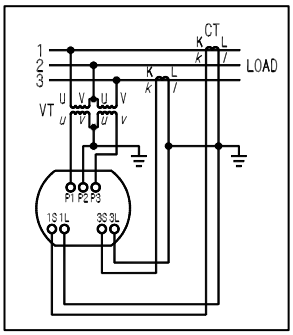
Connection Diagram (All-in-one Transducer Type)



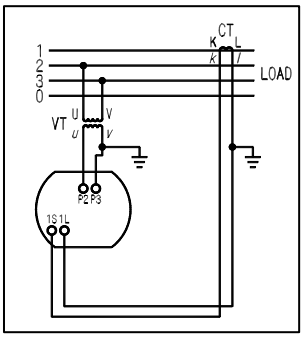
Single Phase
Power Factor Meter



3 phase 3-wire
Power Factor Meter
(Balanced)

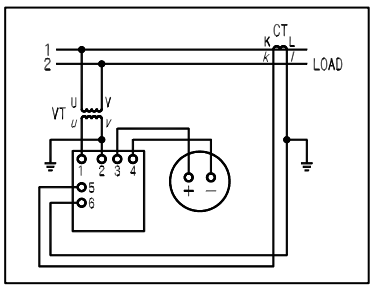


3 phase 3-wire
Power Factor Meter
(Unbalanced)

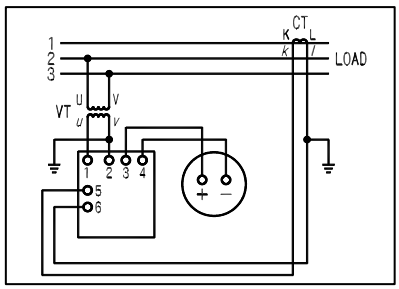


3 phase 4-wire
Power Factor Meter
(Balanced)

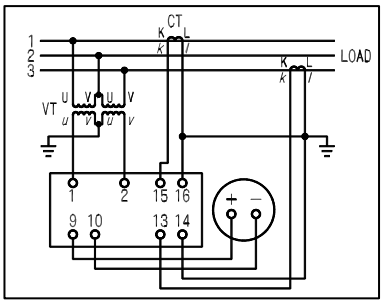
Connection Diagram (External with Transducer Type)



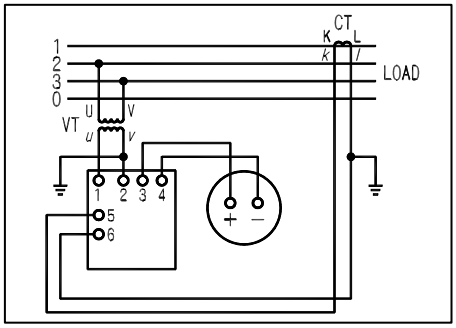
Single Phase Power Factor Meter
External PT-62M-12



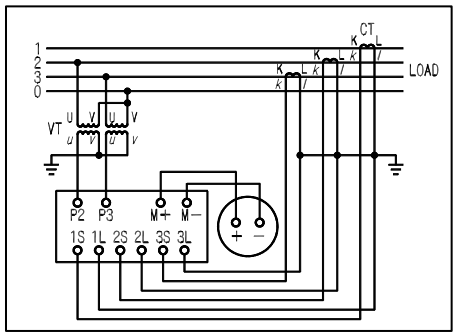
3 Phase Balanced Power Factor Meter
External PBT-62M-33



3 Phase Unbalanced Power Factor Meter
External PT-63M-33



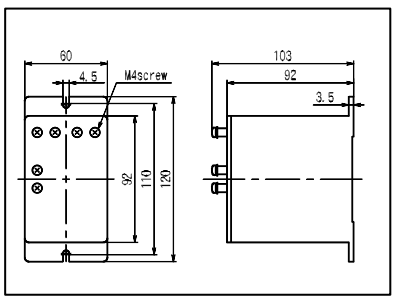
3 Phase 4-wire (balanced)
Power Factor Meter
External PBT-62M-34



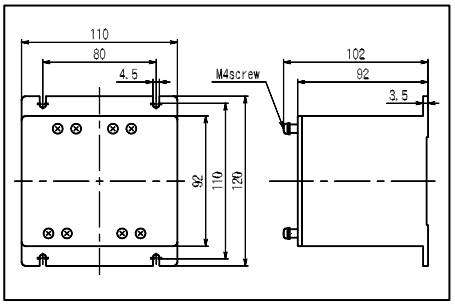
3 Phase 4-wire (unbalanced)
Power Factor Meter
External PT-64M-34

Note:
Error maybe observed if phase sequence is wrong.

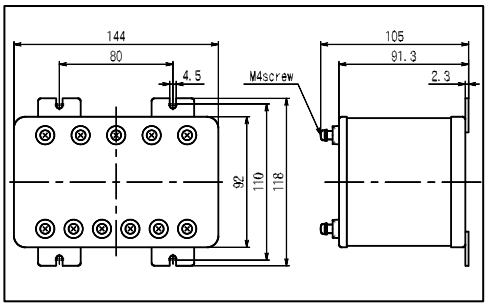
Dimension For Attachment Transducer



☐T-62M☐-☐



PT-63M-33



PT-64M-☐

FREQUENCY METER

Rated Voltage	Measurement Range	Consumption VA	Voltage Change Range
		LAK-12C, 10C, 8C	
110V (2)	45 ~ 55Hz 55 ~ 65Hz 45 ~ 65Hz 350 ~ 450Hz (1)	1.7VA	90 ~ 130V
220V (2)	45 ~ 55Hz 55 ~ 65Hz 45 ~ 65Hz 350 ~ 450Hz (1)	2.5VA	180 ~ 260V

Note:

(1) Special frequency measurement range also can be manufactured (up until 1000Hz)

(2) Usable voltage range: 110V: 90～130V & 220V: 180～260V

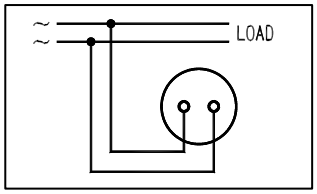
Please contact with us for manufactured the above rated voltage and voltage change range.

For SCR Wareform Meter

Meter SCR waveform input (Distortion waveform) also can be manufactured.

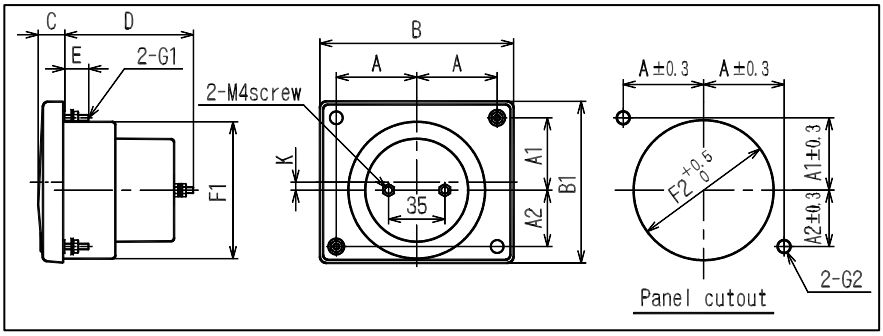
Type name: LAK-□CH

Connection Diagram



Frequency Meter

Dimensions



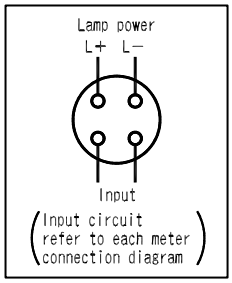
Type	A	A1	A2	B	B1	C	D	E	F1	F2	G1	G2	K	weight (g)
LAK-12C	50	45	35	120	100	16	80	15	85 Φ	87Φ Hole	M4 Screw	5.5Φ Hole	0	400
LAK-10C	40	37	27	100	83	14	68	10	65 Φ	67Φ Hole	M3 Screw	4Φ Hole	5	250
LAK-8C	32	29.5	18.5	80	67	14	68	10	52 Φ	54Φ Hole	M3 Screw	4Φ Hole	5.5	210

Frequency Meter (Transducer Type) - LAK

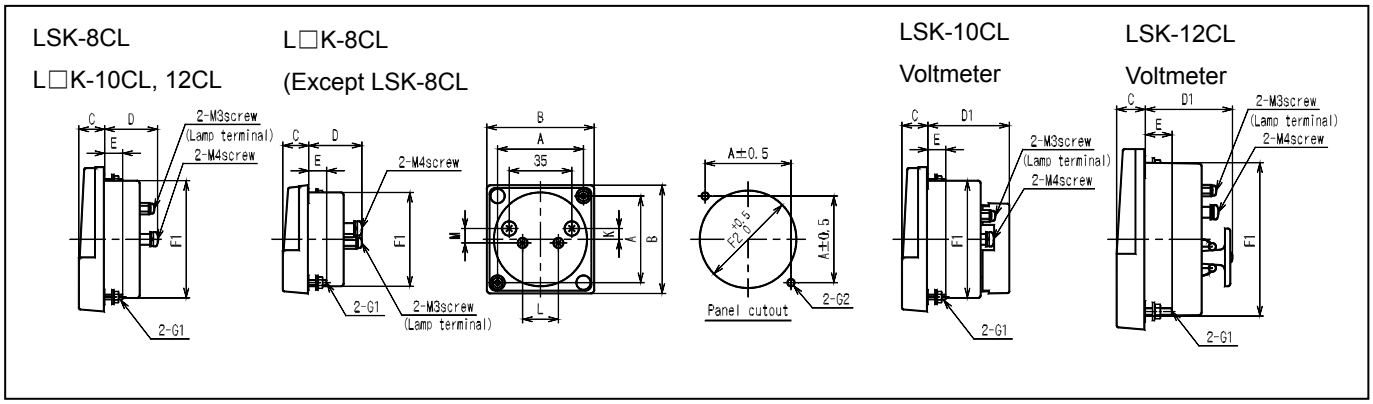
METER EXTERNAL WITH LAMP

Product Name		LK-12C	LK-10C	LK-8C	Accessory
DC Ammeter , Voltmeter		LMK-12CL	LMK-10CL	LMK-8CL	—
DC Receiving Indicator		LXK-12CL	LXK-10CL	LXK-8CL	—
AC Receiving Indicator		LYK-12CL	LYK-10CL	LYK-8CL	—
AC Ammeter, Voltmeter		LSK-12CL	LSK-10CL	LSK-8CL	External DM-41 for LSK-8CL
AC Ammeter, Voltmeter		LCK-12CL	LCK-10CL	LCK-8CL	—
Watt Meter (unbalanced)		LWK-12CL-12,13,33,34	LWK-10CL-12,13,33,34	LWK-8CL-12,13,33,34	External Transducer
Var Meter	Unbalanced	LWVK-12CL-12,33,34	LWVK-10CL-12,33,34	LWVK-8CL-12,33,34	External Transducer
	Balanced	LWVBK-12CL-33	LWVBK-10CL-33	LWVBK-8CL-33	External Transducer
Power Factor Meter	Unbalanced	LPK-12CL-12,33,34	LPK-10CL-12,33,34	LPK-8CL-12,33,34	External Transducer
	Balanced	LPBK-12CL-33,34	LPBK-10CL-33,34	LPBK-8CL-33,34	External Transducer
Frequency		LAK-12CL	LAK-10CL	LAK-8CL	External Transducer

Connection Diagram



Dimensions



Type	A	A1	A2	B	B1	C	D	D1	E	F1	F2	G1	G2	K	L	M	weight(g)
L□K-12CL	50	45	35	120	100	16	41.5	48	15	85Φ	87ΦHole	M4 screw	5.5ΦHole	0	35	17	300
L□K-10CL	40	37	27	100	83	14	29.5	45.5	10	65Φ	67ΦHole	M3 screw	4ΦHole	5	35	17	140
L□K-8CL	32	29.5	18.5	80	67	14	30.5	-	10	52Φ	54ΦHole	M3 screw	4ΦHole	5.5	20	8	100

Please refer to below for LSK

Type	A	A1	A2	B	B1	C	D	D1	E	F1	F2	G1	G2	K	L	M	weight(g)
LSK-12CL	50	45	35	120	100	16	41.5	48	15	85Φ	87ΦHole	M4 screw	5.5ΦHole	15	25	12	280
LSK-10CL	40	37	27	100	83	14	39.5	45.5	10	65Φ	67ΦHole	M3 screw	4ΦHole	5	38	13	180
LSK-8CL	32	29.5	18.5	80	67	14	40.5	-	10	52Φ	54ΦHole	M3 screw	4ΦHole	5.5	13	6	150

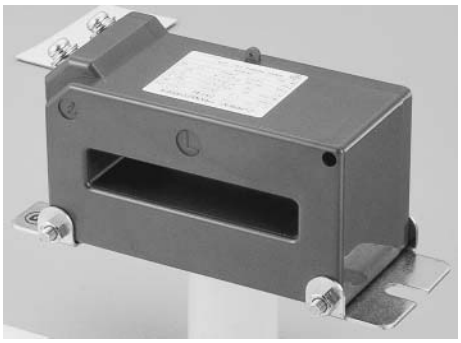
Instrument Accessory

Current Transformers (CT) & Voltage Transformers (VT)

It is possible to measure a large current by combine with 5A or 1A current transformer.

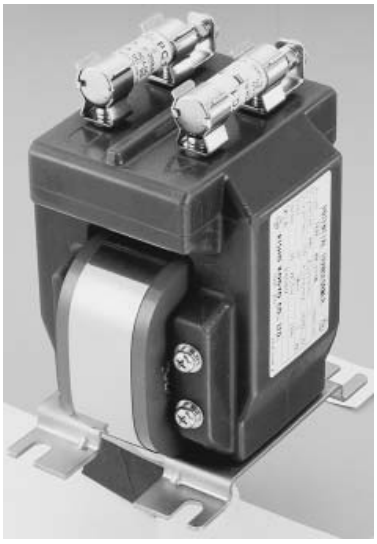
Circle Window Type & Square Window Type for use depending on the magnitude of the current.

It is possible to measure a large voltage by combine with 110V voltage transformer.



FEATURES

► High reliability & high performance current transformer.
Compliance with:
JIS C-1731-1 Standard Instrument current transformer &
JED-1201 Standard Instrument voltage transformer.
Class: 1.0
Tolerance:±1.0%



►Depend on the intended use, we have few selections for current transformer & voltage transformer like mold type or dry open type can be choice.

Specification List for Current Transformers (CT) & Voltage Transformers (VT)

Instrument Transformers

- JIS C 1731-1 standard for Current Transformer & JEC-1201 standard for Voltage Transformer
- Instrument transformer have few selections depend on the intended use like mold type or dry open type etc.
- Low voltage transformer wiring work is easy & compact.

List of Current Transformers

Max. circuit voltage (V)	Construction	Insulated system	Type Name	Primary current (A)	Secondary current (A)	Rated burden (VA)	Class	Frequency (Hz)	Over current (Times)	weight (kg)
Below 1,150	Circle Window	ABS resin	CPI–1TR	5~30	5	1	1.0	50/60	40	0.5
		Epoxy resin Mould ABS coated	CR2–5	10~750	5	5	1.0	50/60	40	0.8
			CR2–15	10~750	5	15	1.0	50/60	40	0.7
			CR2–40	20~750	5	40	1.0	50/60	40	0.9
	Square Window	Epoxy resin Mould ABS coated	CS1–15	200~750	5	15	1.0	50/60	40	1.2
			CS1–40	200~2,000	5	40	1.0	50/60	40	1.1
	Primary Winding	ABS resin	CPX–15	5~30	5	15	1.0	50/60	40	0.75
		Epoxy resin Mould ABS	CM1-15	5~30	* 5	15	1.0	50/60	40	1.8

※2017.1.31. CPI-1TR: Discontinued Production

※2017.1.31. CPX-15: Discontinued Production

- Product with mark * can be manufacture by secondary current 1A.

List of Voltage Transformers

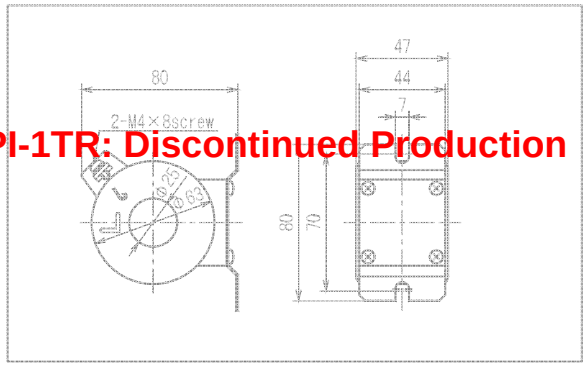
Max. circuit voltage (V)	Construction	Insulated system	Type Name	Primary current (A)	Secondary current (A)	Rated burden (VA)	Class	Frequency (Hz)	AC Withstand voltage	weight (kg)
Below 230	Winding Type	Dry opening type	PDI–1	220	110	15	1.0	50/60	2kV, 1 min	2.2
						50				3.6
Below 460				440					3kV, 1 min	
						100				6.5
Below 460	With a fuse	Epoxy resin mould	RP–111N	220	110	50	1.0	50/60	2kV, 1 min	5.0
				440					3kV, 1 min	
			RP–112N	220	110	100	1.0	50/60	2kV, 1 min	6.0
				440					3kV, 1 min	
			RP–113N	220	110	200	1.0	50/60	2kV, 1 min	8.5
				440					3kV, 1min	

Circle Window Type (Below 1,150V)

Insulated System	Type Name	Primary current (A)																						Secondary current	Rated Burden
		/	5	10	15	20	25	30	40	50	60	75	80	100	120	150	200	250	300	400	500	600	750	(A)	(VA)
ABS resin	CPI-1TR	*T	24	15	10	8	※2017.1.31. CPI-1TR: Discontinued Production																	5	10
Epoxy resin ABS coated	CR2-5	*T	-	10	8	5	4	4	3	2	2	2	-	1	1	1	1	1	1	1	1	1	1	5	5
	CR2-15	*T	-	15	10	10	6	5	5	3	4	2	3	2	2	1	1	1	1	1	1	1	1	5	15
	CR2-40	*T	-	-	-	10	8	7	5	4	4	4	3	2	2	2	1	1	1	1	1	1	1	5	40

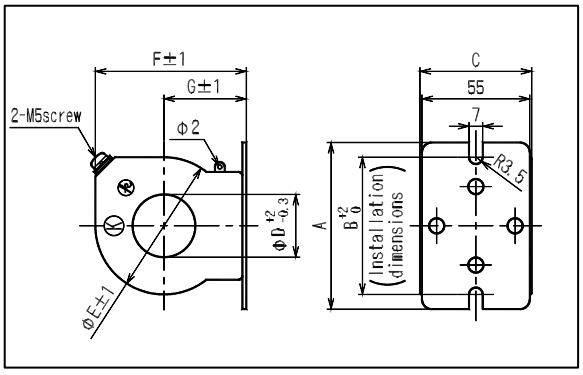
* T = Number of primary conductor penetration.

CPI-1TR 10VA



※2017.1.31. CPI-1TR: Discontinued Production

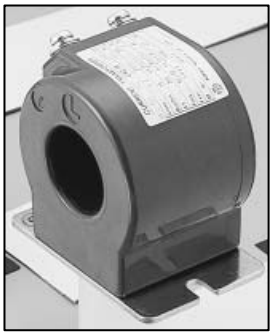
CR2 – 5

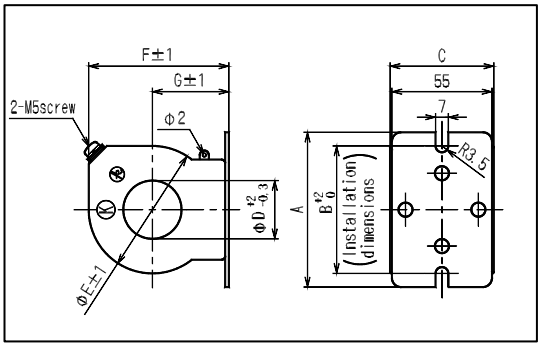


Primary Current (A)	A	B	C	ΦD	ΦE	F	G
10~200	85	70	57	23	61	70	37
240~400	85	70	55	32	70	77	42
500~750	100	85	57	50	86	93	50

Circle Window Type (Below 1,150V)

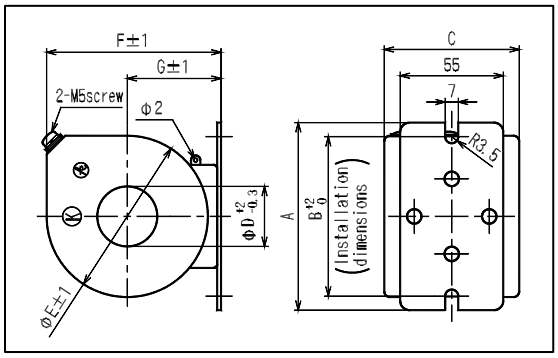
CR2 – 15





Primary Current (A)							A	B	C	ΦD	ΦE	F	G
10	15	25	30	50	75	150	100	85	57	25	76	83	45
60	80	120	240~400				85	70	55	32	70	77	42
20	40	100	200				100	85	55	32	70	77	42
500~750							100	85	57	50	86	93	50

CR2 – 40



Primary Current (A)	A	B	C	ΦD	ΦE	F	G
20~400	100	85	72	32	86	93	50
500~750	100	85	57	50	86	93	50

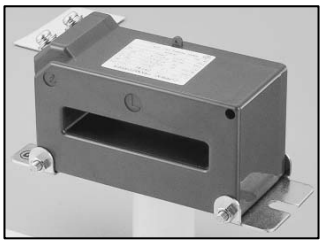
Current Transformers (CT)

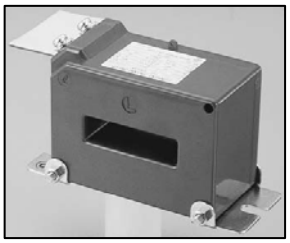
Square Window Type (Below 1,150V)

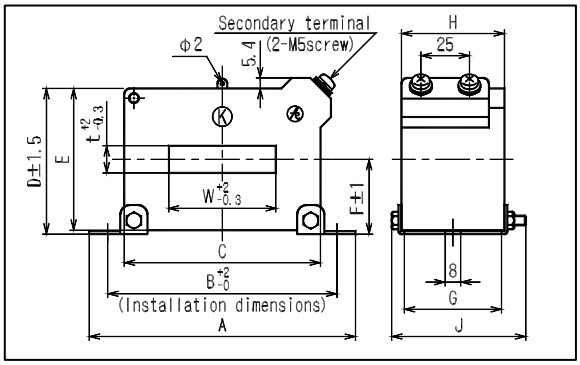
Insulated System	Type Name	Primary Current (A)	Secondary Current (A)	Rated Burden (VA)	A	B	C	D	E	F	G	H	J	W	t
Epoxy resin Mould ABS coated	CS1-15	200, 300, 400, 500	5	15	137	118	101	75	73	39	50	53	69	55	14
		600, 750			150	131	114	64	62	33	50	53	69	80	14
	CS1-40	200	5	40	163	144	130	107	104	55	65	68	84	55	14
		300,400,500			137	118	101	75	73	39	50	53	69	55	14
		600, 750			150	131	114	64	62	33	50	53	69	80	14
		1,000, 1,200, 1,500, 2,000			169	150	133	82	80	42	50	53	69	105	28

◆ Fitting metal for bus bar also available (Option onerous)

CS1–15, CS1–40





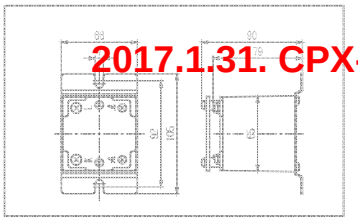


Primary Winding Type

CPX – 15

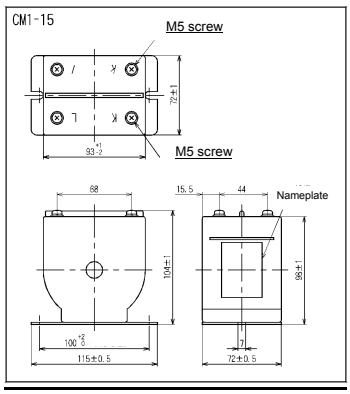
Insulated System	Type Name	Primary Current (A)	Secondary Current (A)	Rated Burden (VA)
ABS resin	CPX–15	5, 10, 15, 20, 30	5	15

2017.1.31. CPX-15: Discontinued Production



CM1-15

Insulated System	Type Name	Primary Current (A)	Secondary Current (A)	Rated Burden (VA)
Epoxy resin Mould ABS coated	CM1–15	5, 10, 15, 20, 30	5	15



Voltage Transformers (VT)

For low voltage Instrument use below 460V & 230V

1) Dry Open Type

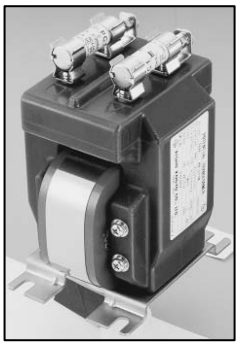
Type Name	Max. Circuit Voltage (V)	Primary Voltage (V)	Secondary Voltage (V)	Rated Burden (VA)	Dimension (mm)					
					A	B	C	A'	B'	D' (Attachment)
PDI – 1	230	220	110	15	100	90	110	70	75	6 × 15 cut
				50	120	100	125	74	85	7 × 15 cut
				100	135	130	140	84	105	7 × 15 cut
	460	440	110	15	100	90	110	70	75	6 × 15 cut
				50	120	100	125	74	85	7 × 15 cut
				100	135	130	140	84	105	7 × 15 cut

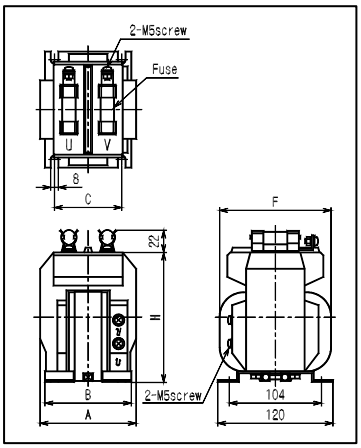
For below 460V

2) Epoxy Resin Mould

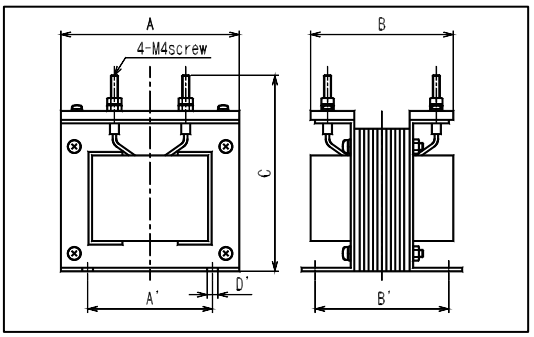
Type Name	Max. Circuit Voltage (V)	Primary Voltage (V)	Secondary Voltage (V)	Rated Burden (VA)	Dimension (mm)				
					A	B	C	F	H
RP-111N	460	220, 440	110	50	100	90	70	116	135
RP-112N				100	114	90	70	134	160
RP-113N				200	114	100	80	154	162

RP–111N, RP–112N, RP–113N





PDI–1



◆ **Item To Specify When make Purchase**

1) Type name
2) Primary current (voltage) / Secondary current (voltage)
3) Rated burden (VA)

Instrument Accessory

Direct Current Shunt & Resistor Series

SHUNT

Shunt is possible to combine with mill voltmeter for measuring a large current.

There are 2 types wire connection with insulating stand & bus bar connection can use depending on the magnitude of the current.

FEATURES

► High reliability & high performance shunt.
This product is compliance with:
JIS C-1721-1976 standard.
Class: 1.0
Tolerance: ±1.0%
►Continuous excitation current have set at 80% or less on the rated value.
► We have 2sets voltage terminal DSW type.
► Also have 3sets output terminal DST type for consideration of the heat dissipation and avoid rise in the temperature.

RESISTOR SERIES

External with resistor series is possible to combine with milliampere meter for measuring a large voltage.

FEATURES

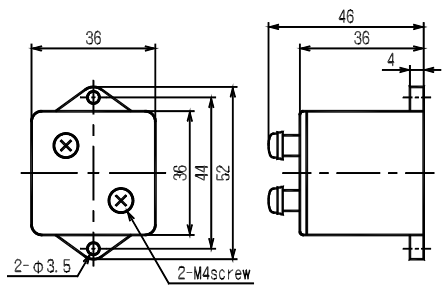
► High reliability & high performance resistor series.
► There are 7 types from DM-1 (750V) until DM-25 (25kV) can use depending on the magnitude of the voltage.
► DM-2～25 will built-in the measures against open resistor.

DC SHUNTS

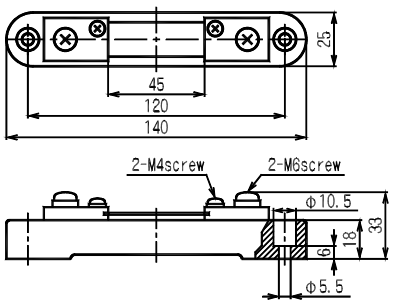
For DC Shunts

- Shunts type DS, DSW and DST is compliance with standard JIS (JIS C-1721-1976).
  Continuous excitation current is 80% or less of the range value.
  Please consultation with us when specification overload capacity or other is different.
- Standard for shunts terminal voltage is 60mV and 100mV, Please refer to diagram at below and specify it.
- Power consumption of shunt is (Current) X (Millivolt) which becomes larger in proportionality of the rated current.
- Please attach especially a large current shunt in consideration of radiation to make the minimize temperature rise of a resistor part.
- Please clamping enough the connection of the electric wire, so that contact resistance becomes small.
- Pay attention not to make a contact between current terminal and voltage terminal electrically to prevent error.

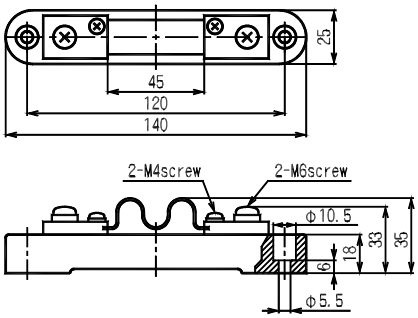
DM-1 10mA～4A 60mV, 100mV



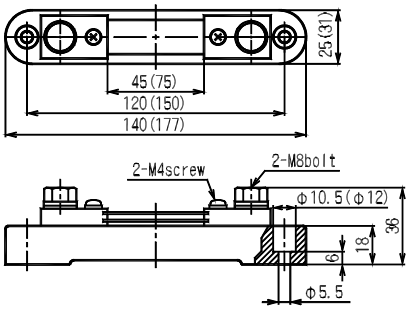
DS 5A～50A 60mV



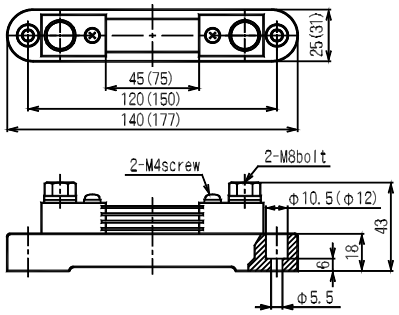
DS 5A～50A 100mV



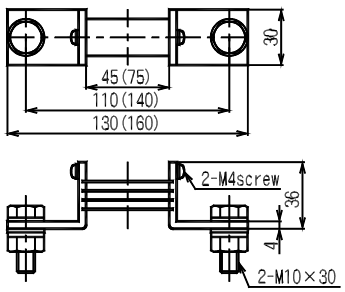
DS 60～100A 60mV (100mV)



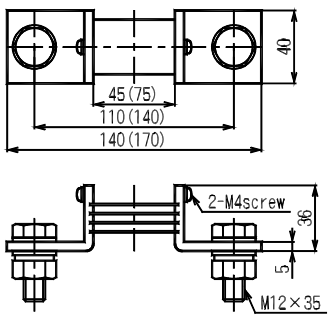
DS 120A～200A 60mV (100mV)



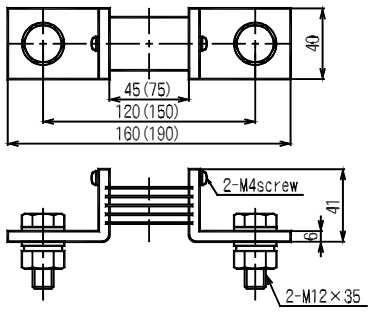
DS 225A～300A 60mV (100mV)



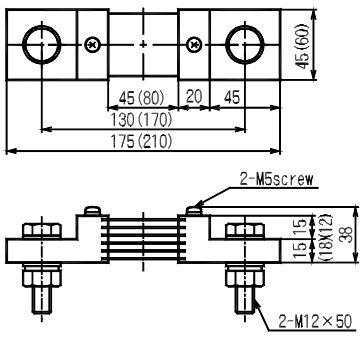
DS 350A～450A 60mV (100mV)



DS 500A～600A 60mV (100mV)

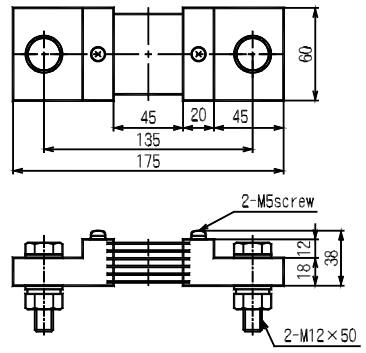


DS 750A 60mV (100mV)

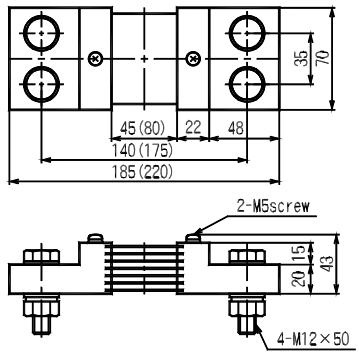


DS SHUNTS

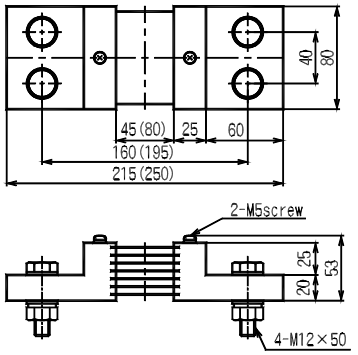
DS 1000A 60mV



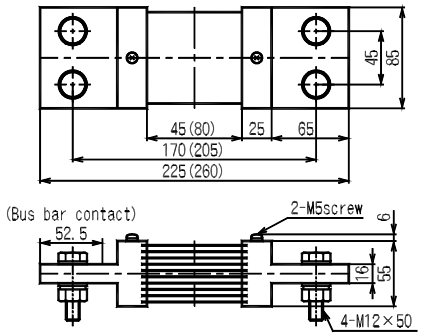
DS 1500A 60mV (1000A 100mV)



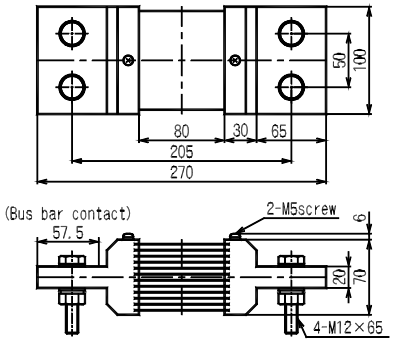
DS 2000A 60mV (1500A 100mV)



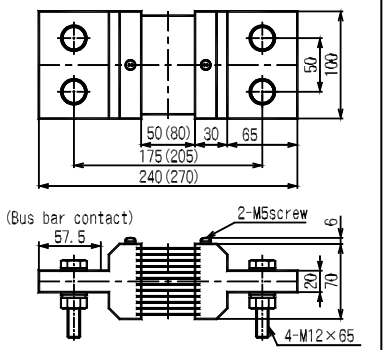
DS 2500A 60mV (2000A 100mV)



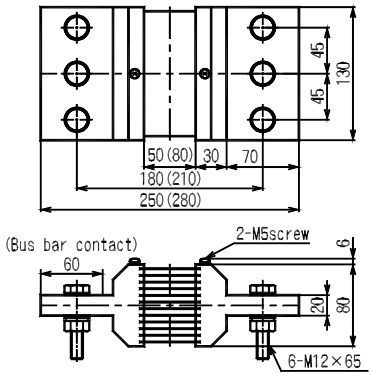
DS 2500A 100mV



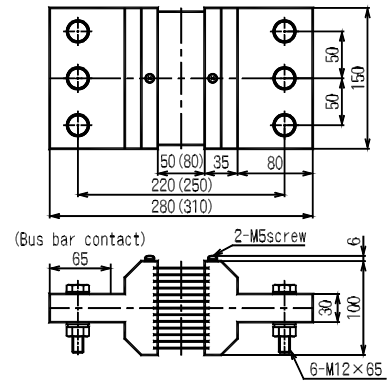
DS 3000A 60mV (100mV)



DS 4000A 60mV (100mV)



DS 5000A 60mV (100mV)



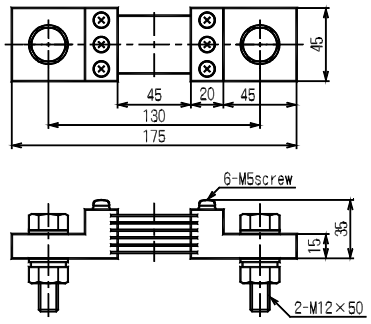
- Please consultation with us when 5000A is exceeding.
- Please inform us if the load resistance value is less then 900A (by our indication meter type name)
- Please specify the item as below when make order
  1) Type Name
  2) Input (A)/ output (mV)
  3) Option (with or without shunt stand etc.)

DS SHUNTS

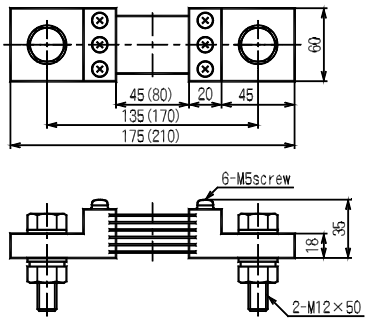
For DST Type Shunt

- Standard JIS C 1721-1976.
- Standard shunt terminal voltage is 60mV and 100mV, other voltage also can manufacture please request.
- There are 3 sets output terminal.
- Manufactured this product in consideration of the heat dissipation avoid rise in the temperature.

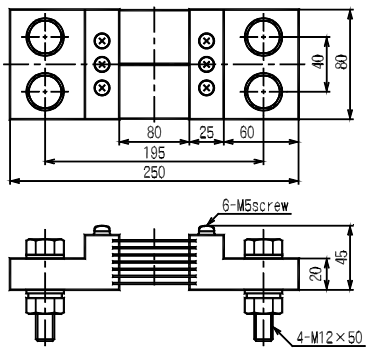
DST 750A 60mV



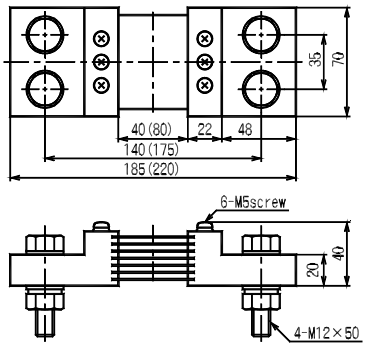
DST 1000A 60mV, (750A 100mV)



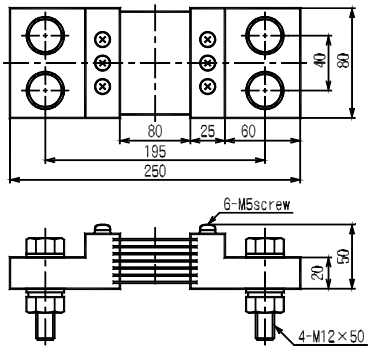
DST 1100A~1300A 100mV



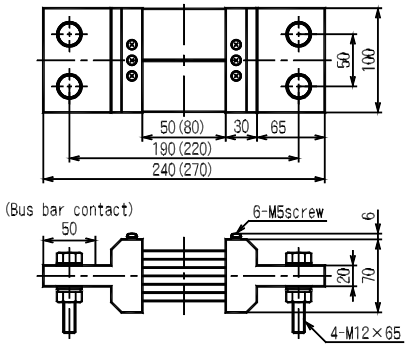
DST 1300A~1500A 60mV, (1000A 100mV)



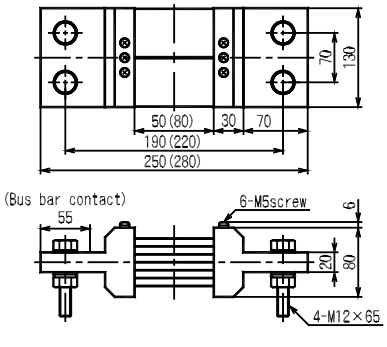
DST 1350A~1500A 100mV



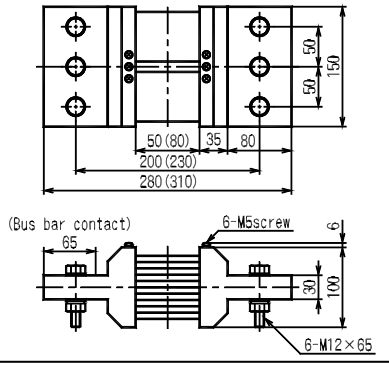
DST 2000A 60mV (100mV)



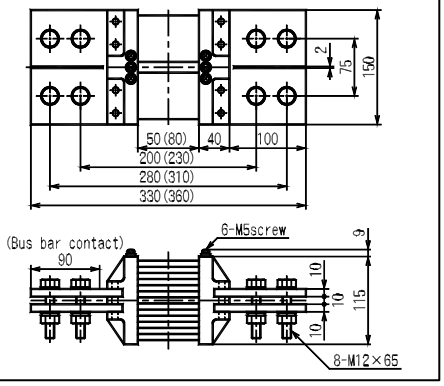
DST 2300A~3000A 60mV (100mV)



DST 3500A~4000A 60mV (100mV)



DST 4500A~5000A 60mV (100mV)

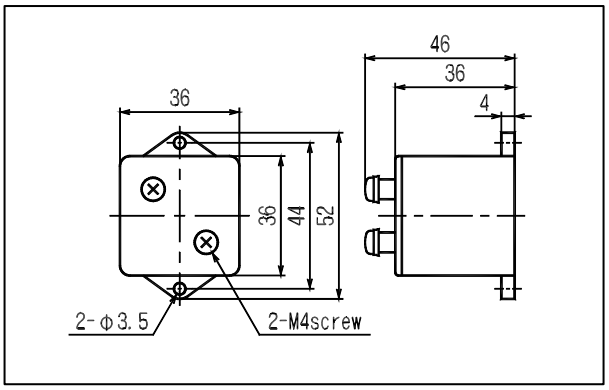


- Please consultation with us when 5000A is exceeded.

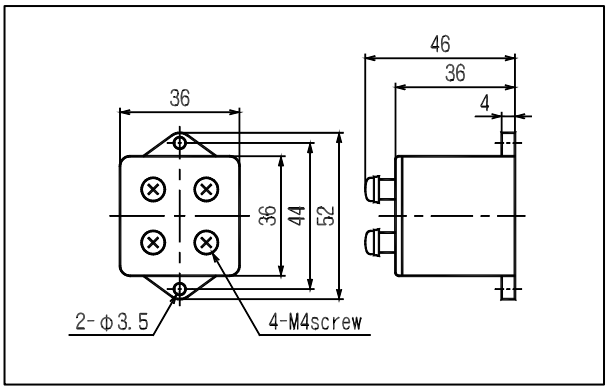
RESISTOR SERIES

External with Resistor Series

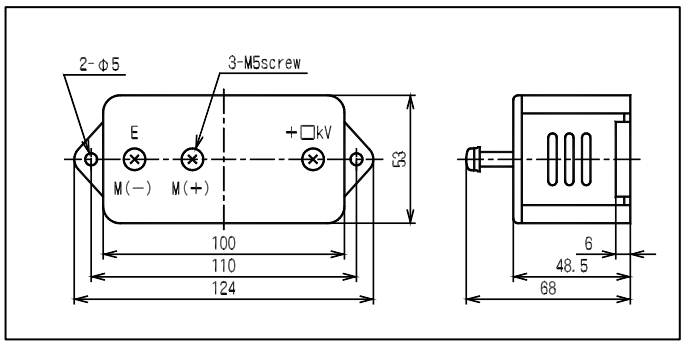
DM – 1 (Below 1000V)



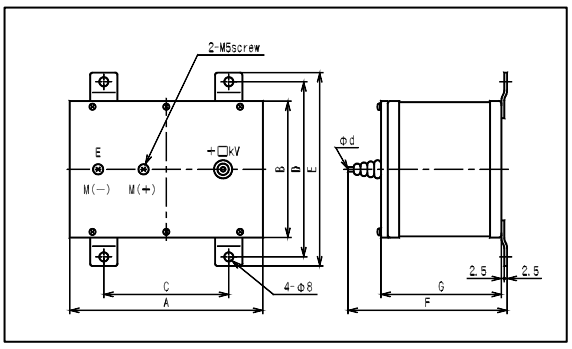
DM – 1T (Rectifier built in)



DM – 2 (Below 2500V)



DM – 5, 10, 15, 20, 25 (5～25kV)

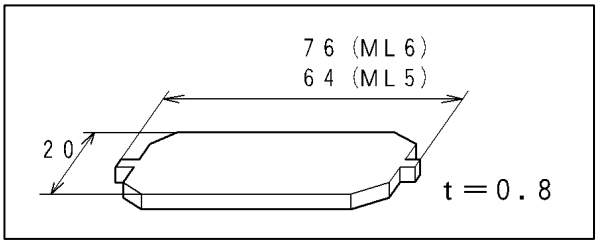


Type Name	Rated	A	B	C	D	E	F	G	d
DM – 5	5000V	170	120	110	154	170	140	106	4
DM – 10	10kV	220	160	140	194	210	140	106	4
DM – 15	15kV	290	210	200	248	264	190	146	5
DM – 20	20kV	390	260	300	294	310	220	176	5
DM – 25	25kV	500	330	400	356	372	280	236	5

OPTIONS

1. TERMINAL COVER FOR TYPE WIDE ANGLE L SERIES

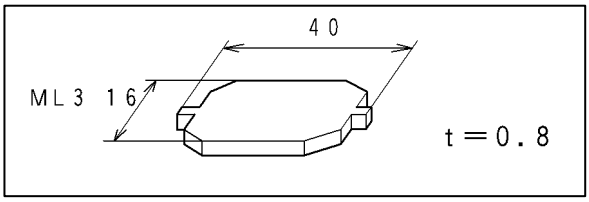
Terminal Cover for Type ML- 6 and ML- 5



Set into terminal block

Type Name	Units Required	
	ML-6	ML-5
ML-110C, YL-110C, XL-110C, CL-110C, AL-110C, PL-110NC-12, PBL-110NC-33, WL-110NC-12, WVL-110NC-12,	–	1
WL-110NC-33, 34 WVL-110NC-33, 34	1	1

Terminal Cover for Type ML- 3



Set into terminal block

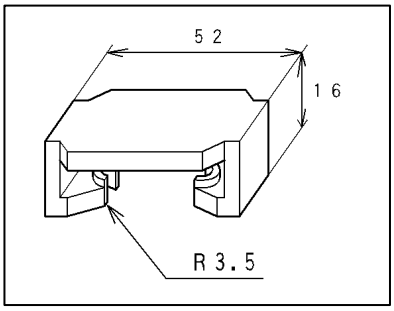
Type Name		Units Required		
		ML-6	ML-5	ML-3
ML-80C, YL-80C, XL-80C, CL-80C, AL-80C, PL-80C-12		–	–	1
WL-80C-12, 33, 34 Attach with transducer	WT-53MC-12	–	1	–
	WT-53MC-33	1	1	1
	WT-53MC-34 (1)	1	1	1
WVL-80C-12, 33, 34 Attach with transducer		–	–	1
	WVT-53MC-12	–	1	–
	WVT-53MC-33	1	1	1
	WVT-53MC-34 (2)	1	1	1
PL-80C-33, 34 Attach with transducer		–	–	1
	PT-53MC-33, 34	1	1	1

(1) For WT-53MC-34, use two OA-BCP3 made by OHM.

(2) For WVT-53MC-34, use two OA-BCP3 made by OHM.

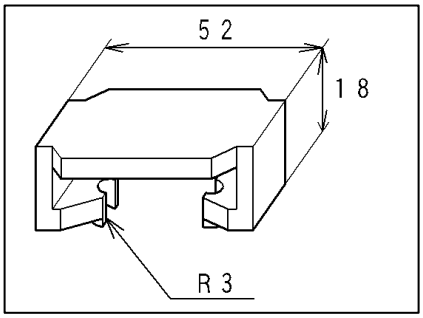
2. TERMINAL COVER FOR TYPE WIDE ANGLE L SERIES

Terminal Cover For Type SL



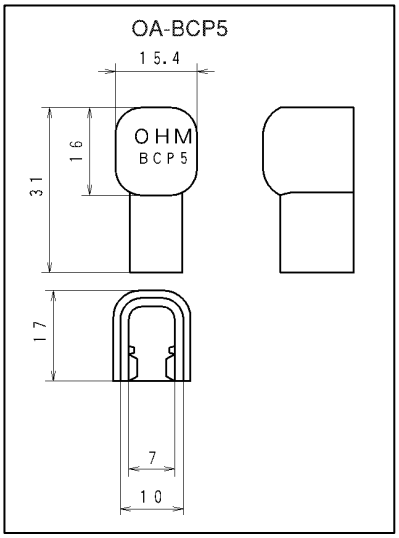
Set into terminal block

Terminal Cover For Narrow Angle

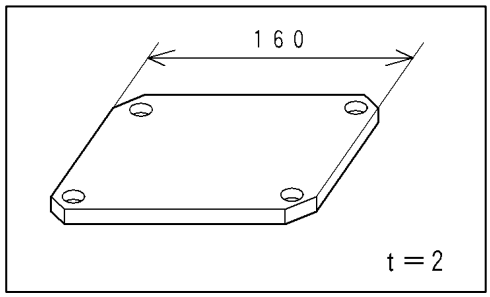


Type Name	Units Required	
	SL terminal cover	Narrow-angle terminal cover
SL-110C	1	-
SL-80C	1	-
□L-65C	-	1

3. TERMINAL COVER FOR TYPE WIDE ANGLE L SERIES



Set into terminal fitting



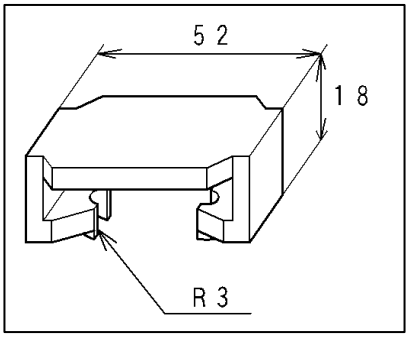
Multiplier covers for single phase Synchroscope meter (Cover: DMD-50)
Lock screw on pillar.

Type Name	Unit Required	
	OA-BCP5	Cover DMD-50
DL-110C-12	6	1
DL-110NC-33	5	-

***** Please specify cover DMD-50 when ordering. The meter shall be shipped with the cover fixed.

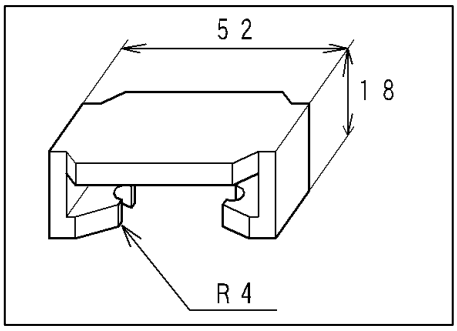
4. TERMINAL COVER FOR TYPE NARROW ANGLE METER COMMON

Narrow Angle Terminal Cover



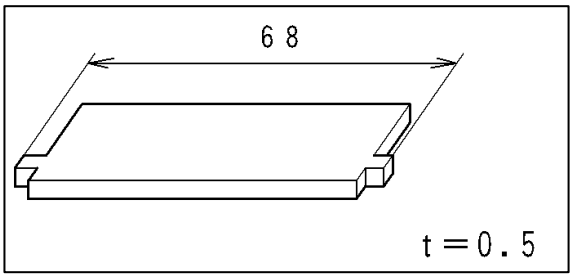
Set into terminal fitting

Hz Terminal Cover



Type Name	Measurement Element	Mark	Narrow Angle Terminal Cover	Hz Terminal Cover
			Units Required	
P□K-120C/ 100C/ 80C/ 60C (Except 120NC1, 100NC) L□K-12C/ 10C/ 8C (Except 12C, 10C, 8C) P□D-96 (Except P□D-96N) F□K-7/ 5 FAK-7C/ 5C PAD-96	DC Current / Voltage	M	2pcs terminal cover is necessarily for P□D-96 Series 2 Pointers type 1	-
	DC Receiving Indicator Meter	X		
	AC Receiving Indicator Meter	Y		
	AC Current / Voltage	S		
	AC Current / Voltage	C		
	AC Watthour Meter	W		
	AC Var Meter (balanced)	WVB		
	AC Var Meter (unbalanced)	WV		
	Power Factor (balanced)	PB		
	Power Factor (unbalanced)	P		
	Heat Electric Temperature	H		
	Heat Electric Temperature	HT		
	Revolutions (DC)	Z		
	Revolutions (AC)	V		
PAK-120C/ 100C/ 80C/ 60C LAK-12C/ 10C/ 8C/ 6C	Frequency	A	-	1

5. TERMINAL COVER FOR TYPE NARROW ANGLE PK/ LK INTERGRATED

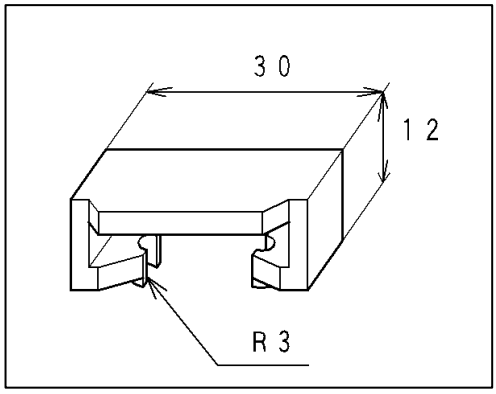


Set into terminal block

Meter Type	Units Required
	Kw Terminal Cover
P□K-□NC-□	1
L□K-□NC-□	

6. TERMINAL COVER FOR TYPE F SERIES

Terminal Cover For Type MF

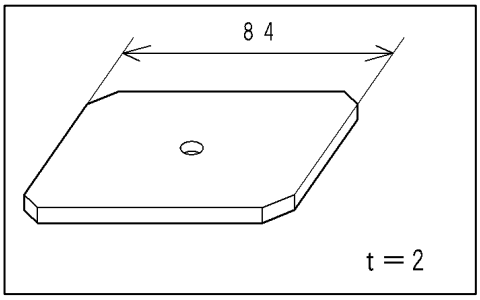


Type Name	Measurement Element	Mark	Units Required	
			1 Pointers	2 Pointers
□F – 17 □F – 15 □F – 10	DC Current/ Voltage	M	1	2
	DC Receiving Indicator Meter	X	1	2
	AC Receiving Indicator Meter	Y		
	AC Current/ Voltage	C		
	AC Watthour Meter	W		
	AC Var Meter (balanced)	WVB		
	AC Var Meter (unbalanced)	WV		
	Power Factor (balanced)	PB		
	Power Factor (unbalanced)	P		
	Frequency	A		
	Heat Electric Temperature	H		
	Heat Electric Temperature	HT		
	Revolutions (DC)	Z		
	Revolutions (AC)	V		

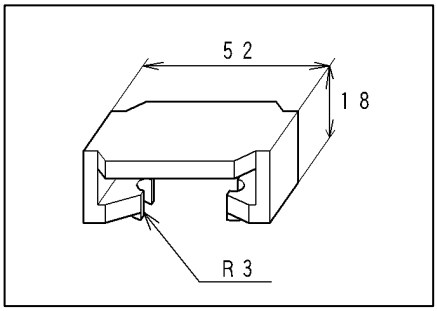
Use specify terminal cover or
OA-BCP3 for attachment transducer

7. TERMINAL COVER FOR TYPE PWD – 96

Terminal Cover For Tye PWD – 96



Narrow Angle Terminal Cover



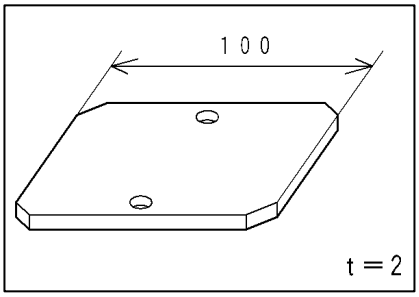
Please use nut to lock the meter stud.

Type Name	Measurement Element	Mark	Unit Required		
			Terminal Cover PWD-96	Narrow Angle Terminal Cover	
P□D-96N-□	Power	W	1	1 Pointer	2 Pointers
	Reactive Power	WV		-	-
	Power Factor (balanced)	P			
	Power Factor (unbalanced)	PB			
P□D-96-□-□	Power	W	-	1	1
	Reactive Power	WV			
	Power Factor (balanced)	P			
	Power Factor (unbalanced)	PB			

Use specify terminal cover or OA-BCP3 for attachment transducer

8. TERMINAL COVER FOR TYPE EL SE

Terminal Cover For Type EL

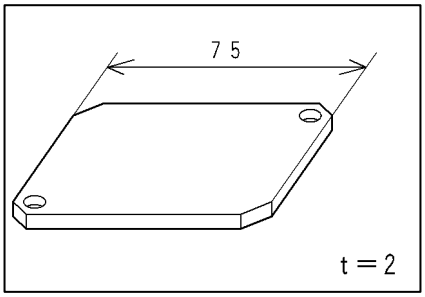


Lock screw on pillar.

Type Name	Measurement Element	Mark	Terminal Cover Type EL
			Units Required
Wide Angle Meter Relay □EL-110C EP Series Normal Angle Meter Relay (All-in-one Type Ralay Box) □EP-100NC/ 120NC EK Series Normal Angle Meter Relay (All-in-one Type Relay Box) □EK-12NC	DC Current/ Voltage	M	1
	DC Receiving Indicator Meter	X	
	AC Receiving Indicator Meter	Y	
	AC Current/ Voltage	S	
	AC Current/ Voltage	C	
	AC Watthour Meter	W	
	AC Var Meter (balanced)	WVB	
	AC Var Meter (unbalanced)	WV	
	Power Factor (balanced)	PB	
	Power Factor (unbalanced)	P	
	Frequency	A	
	Heat Electric Temperature	H	
	Heat Electric Temperature	HT	
	Revolutions (DC)	Z	
	Revolutions (AC)	V	

9. TERMINAL COVER FOR TYPE DM – 61

Terminal Cover For Type DM – 61



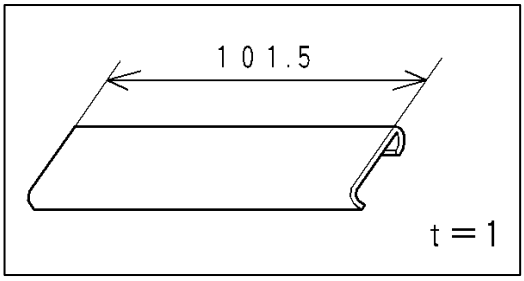
Lock screw on pillar.

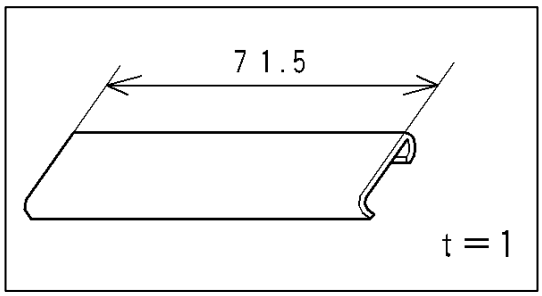
Attached Relay Box Type Name	Terminal Cover Type DM – 61
	Units Required
DM – 61	1

***** Please use EP/ EK series normal angle attached relay box for DM-61 terminal cover.

10. TERMINAL COVER FOR TYPE EF SERIES

Terminal Cover For EF Serise



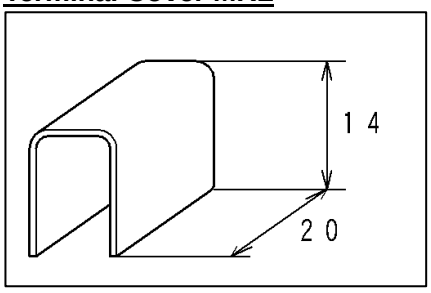


Type Name	Measurement Element	Mark	Terminal Cover For EF Series Units Required
□EF – 17 □EF – 15	DC Current/ Voltage	M	1
	DC Receiving Indicator Meter	X	
	AC Receiving Indicator Meter	Y	
	AC Current/ Voltage	S	
	AC Current/ Voltage	C	
	AC Watthour Meter	W	
	AC Var Meter (balanced)	WVB	
	AC Var Meter (unbalanced)	WV	
	Power Factor (balanced)	PB	
	Power Factor (unbalanced)	P	
	Frequency	A	
	Heat Electric Temperature	H	
	Heat Electric Temperature	HT	
	Revolutions (DC)	Z	
	Revolutions (AC)	V	

RTF – 15	-	1
RTF – 10	-	1

11. TERMINAL COVER FOR HIGHEST (LOWEST) INDICATOR METER

Terminal Cover MRL



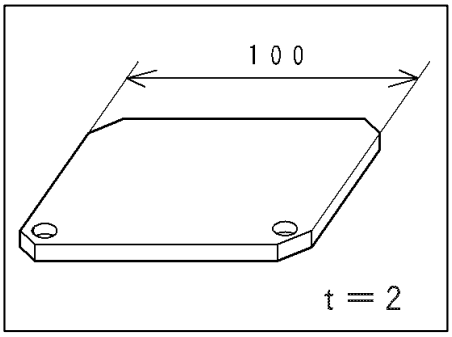
Set into terminal fitting

Type Name	Measurement Element	Mark	Terminal cover for MRL
Highest (Lowest) Indicator Meter □RL-110CH, 110CL, 110CHL □RL-80CH, 80CL, 80CHL	DC Current/ Voltage	M	2
	DC Receiving Indicator Meter	X	2 addition for electromagnetism return 2 addition for Aux. Power Supply
	AC Receiving Indicator Meter	Y	
	AC Current/ Voltage	S	
	AC Current/ Voltage	C	
	AC Watthour Meter	W	
	AC Var Meter (balanced)	WVB	
	AC Var Meter (unbalanced)	WV	
	Power Factor (balanced)	PB	
	Power Factor (unbalanced)	P	
	Frequency (Except PAK, LAK)	A	
	Heat Electric Temperature	H	
	Heat Electric Temperature	HT	
	Revolutions (DC)	Z	
	Revolutions (AC)	V	

* Please Use specify terminal cover or OA-BCP3 for attachment transducer

12. TERMINAL COVER FOR HIGHEST (LOWEST) INDICATOR (ALARM CONTACT)

Terminal Cover ERL

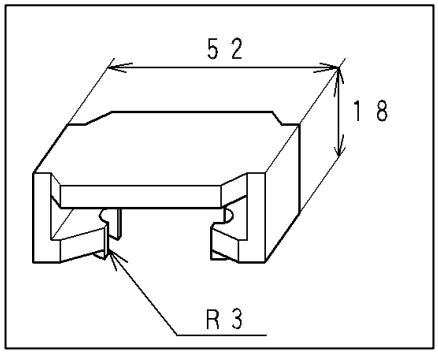


Lock by screw

Type Name	Measurement Element	Mark	Terminal cover for ERL
Highest (Lowest) Indicator Meter (Alarm Contact) □ERL-110C-H, 110C-L, 110C-HL	DC Current/ Voltage	M	1
	DC Receiving Indicator Meter	X	
	AC Receiving Indicator Meter	Y	
	AC Current/ Voltage	S	
	AC Current/ Voltage	C	
	AC Watthour Meter	W	
	AC Var Meter (balanced)	WVB	
	AC Var Meter (unbalanced)	WV	
	Power Factor (balanced)	PB	
	Power Factor (unbalanced)	P	
	Frequency (Except PAK, LAK)	A	
	Heat Electric Temperature	H	
	Heat Electric Temperature	HT	
	Revolutions (DC)	Z	
	Revolutions (AC)	V	

* Please Use specify terminal cover or OA-BCP3 for attachment transducer

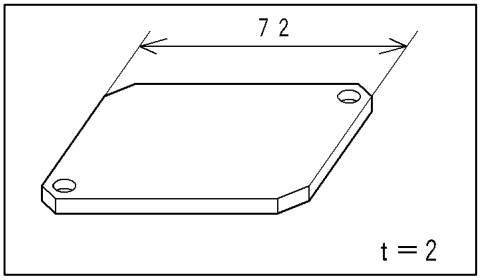
13. TERMINAL COVER FOR MAX. DEMAND AMMETER



Set into terminal fitting

Type Name	Terminal Cover For Narrow Angle
	Units Required
Max. Demand Ammeter BRL – 110CH	1
Max. Demand Ammeter (With warning contact)	2

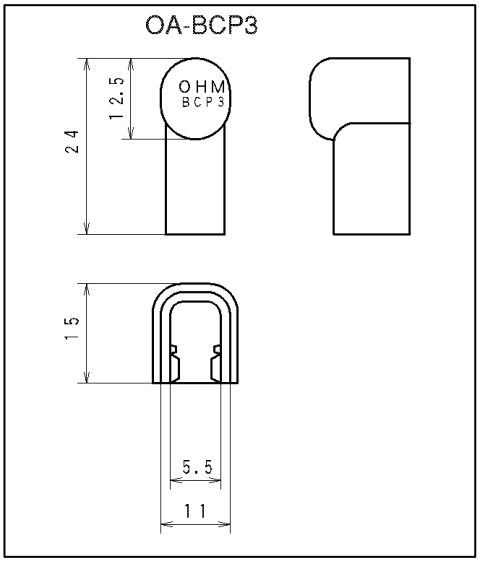
14. TERMINAL COVER FOR AUXILIARY CT



Accessory CT Type	Units Required
	Terminal Cover For MR-CTN
MR – CTN	1

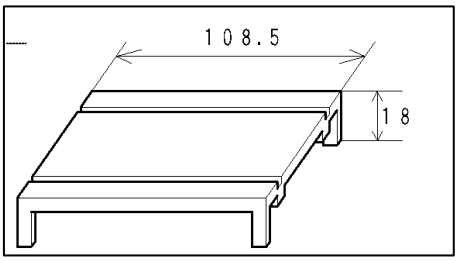
Please use accessory CT cover for Accessory CT, MR-CTN.

15. ATTACHMENT TRANSDUCER TERMINAL COVER



Set into terminal fitting

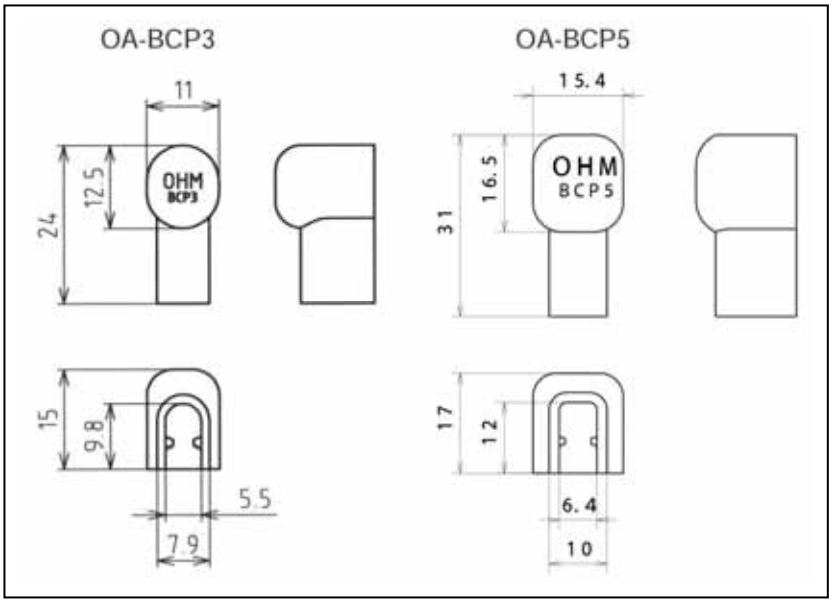
Terminal Cover for T-83M



Attachment Transducer	Units required	
	OA-BCP3	T-83 terminal cover
A(V)T-62M	4	-
W(WV, P, PB)T-62M	6	-
PT-63M	8	-
DM-63(H, L)	10	-
DM-63(HL, HH, LL)	16	-
W(WV, P, PB)T-64M-12	6	-
W(WV, P, PB)T-64M-34	11	-
PT-64M-34	10	-
□-T-83M-□	-	1

* Please Use specify terminal cover or OA-BCP3 for attachment transducer

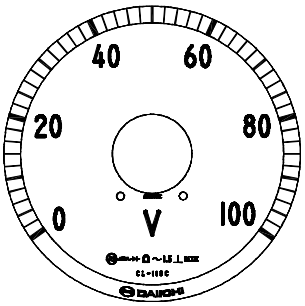
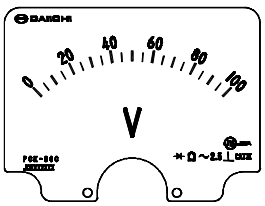
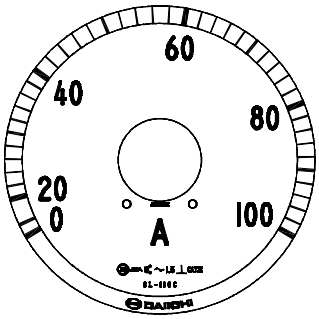
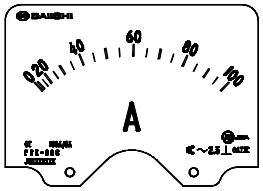
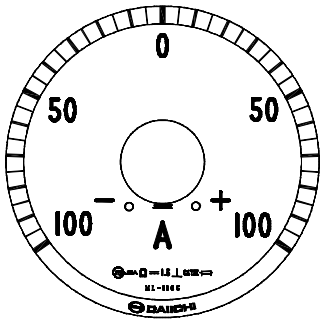
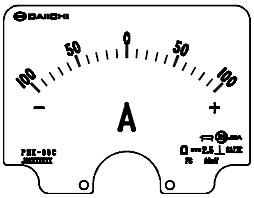
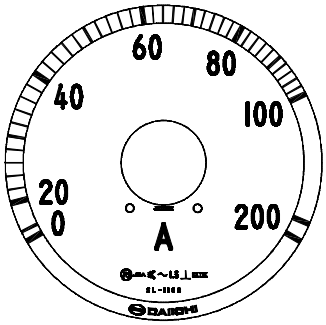
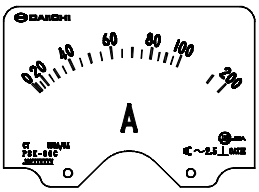
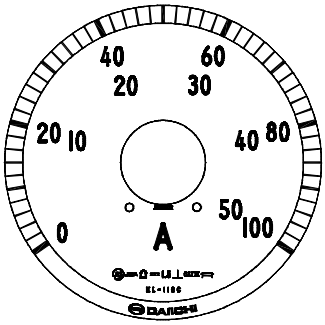
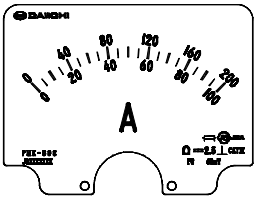
16. SERIES RESISTOR TERMINAL COVER



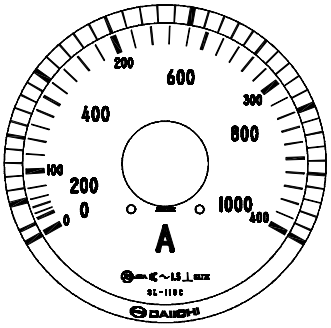
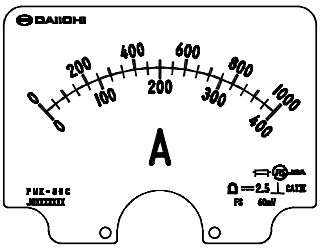
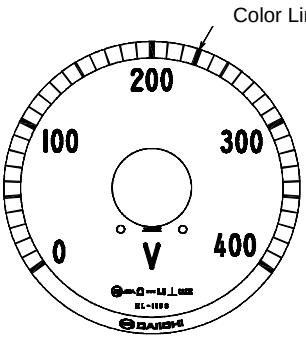
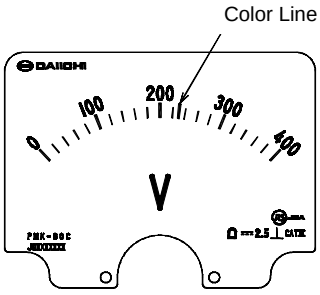
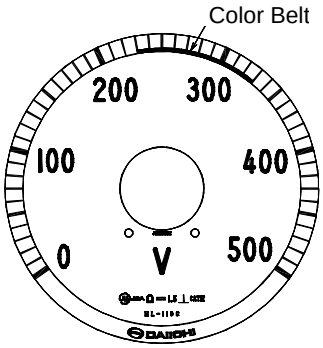
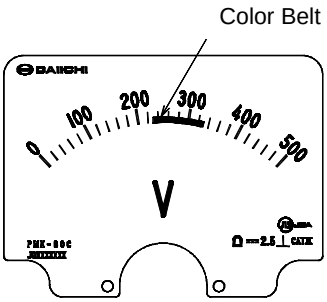
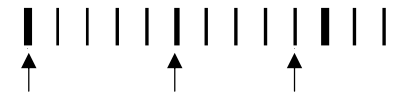
Set into terminal fitting

Type	Units Required	
	OA-BCP3	OA-BCP5
DM – 1	2	-
DM – 2	-	3
DM – 1T	4	-
DM – 41	-	2

EX. SCALE

Scale Specification	Wide Angle Meter Ex.: L-110C	Square Shape Meter Ex.: PK-80C
Standard Scale Scale digit: Black Scale line : Black Unit mark : Black Scale division : Refer to standard lancet shape pointer division		
Moving iron type can be left out the lower value part of scale Scale division : Refer to standard lancet shape pointer division		
± Scale Meter (Both Side Deflect Meter) Scale digit: Black Scale line : Black Unit mark : Black		
Extend Scale (2-Fold Extend) Scale digit: Black ; Extend part: Red Scale line : Black ; Extend part: Red Unit mark : Black		
Single Scale Double Seal Meter Scale digit: Black Scale line : Black Unit mark : Black Standard place a seal of scale figure : Higher value will display at inside & smaller value will display at outside		

EX. SCALE

Scale Specification	Wide Angle Meter Ex.: L-110C	Square Shape Meter Ex.: PK-80C
Double Scale Double Seal Scale digit: Black Scale line : Black Unit mark : Black Scale division : Refer to standard lancet shape pointer division Standard place a seal of scale figure : Higher value will display at outside & smaller value will display at inside For wide angle meter : Higher value will display at inside & smaller value will display at outside		
Coloring Scale (Color Line) Scale color line : Red, Yellow, Green Possible combine the color line & color figure to use for double scale		
Color Belt Color Belt : Red, Yellow, Green		
Scale line and Scale figure 1) Type of scale line Scale figure will print at main line Please refer to standard lancet shape pointer division & standard knife shape pointer division		

2) Figure of scale : Max. 4-digit (9999)
If 10000 is exceed, unit will be change like 6.6kV or use multiple like 36× 1000min^{-1}

3) Please have a consultation with us if scale division is diffirent with standard division (odd scale)
Please specify for Max. division

4) Display「0」will be left out if the scale figure after decimal point is Zero. (like scale figure 1 as below)

5) Display「0」will be left out if the scale figure before decimal point is Zero. (like scale figure 0.5 as below)

Ex. : For range value 1.5

Wide Angle Meter
Scale will display by「1.0」for wide angle meter (except BRL & RL series)

Square Share Meter
BRL & RL series is same scale as square share meter

STANDARD DIVOSION OF LANCET-SHAPED POINTER

L series

PK series

MODEL	L-65C PK-60C, 80C, 100C LK-8C, 10C BRL-110CH Instant Meter		RL-80C PK-120C LK-12C F-10	
MAX. SCALE VALUE	SCALE DIVISION DIAGRAM	DIV.	SCALE DIVISION DIAGRAM	DIV.
1	0 2 4 6 8 10	20	0 2 4 6 8 10	20
1.5	0 *1 5 10 15	30	0 5 10 15	30
2	0 5 10 15 20	20	0 *2 5 10 15 20	40
2.5	0 5 10 15 20 25	25	0 5 10 15 20 25	25
3	0 *1 10 20 30	30	0 10 20 30	30
4	0 10 20 30 40	20	0 *2 10 20 30 40	40
5	0 10 20 30 40 50	25	0 10 20 30 40 50	25
6	0 20 40 60	30	0 20 40 60	30
7.5	0 20 40 60 75	15	0 *3 20 40 60 75	37.5
8	0 20 40 60 80	16	0 *6 20 40 60 80	40
9	0 30 60 90	18	0 *7 30 60 90	45

§ Wide Angle METER §

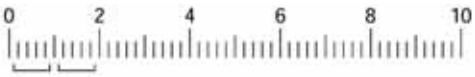
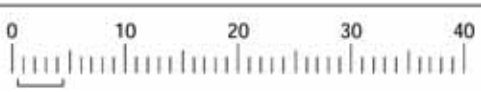
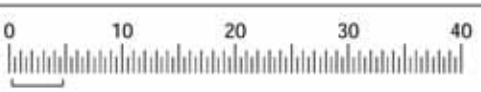
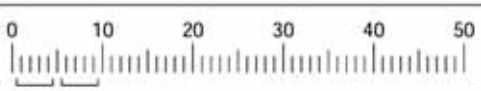
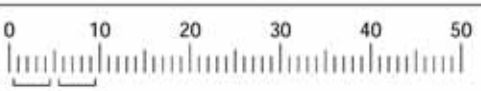
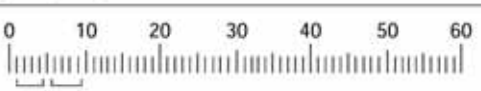
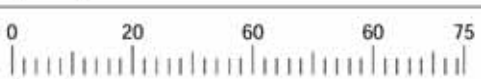
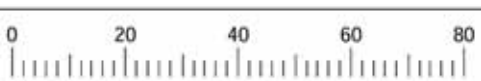
LK series

F series

F series

MODEL	RL−110C BRL−110CH **Utility meter**		F−15, 17 L−110C L−80C EL−110C Note) 4-digit scale of 2T is not manufacturable.	
MAX. SCALE VALUE	SCALE DIVISION DIAGRAM	DIV.	SCALE DIVISION DIAGRAM	DIV.
1	*2 0 2 4 6 8 10	50	*2 0 2 4 6 8 10	50
1.5	0 5 10 15	30	*8 0 5 10 15	75
2	*2 0 5 10 15 20	40	0 5 10 15 20	40
2.5	*4 0 5 10 15 20 25	50	0 5 10 15 20 25	50
3	0 10 20 30	30	*8 0 5 10 15 20 25 30	60
4	*2 0 10 20 30 40	40	0 10 20 30 40	40
5	*4 0 10 20 30 40 50	50	0 10 20 30 40 50	50
6	0 20 40 60	30	*8 0 10 20 30 40 50 60	60
7.5	0 20 40 60 75	37.5	I-110 & I-80: 37.5 DIVISION *9 0 20 40 60 75	75
8	0 20 40 60 80	40	0 20 40 60 80	40
9	0 30 60 90	45	*5 0 20 40 60 80 90	45

STANDARD DIVOSION OF KNIFE-EDGE POINTER

MODEL	PK−60C, 80C, 100C LK− 8C, 10C FK− 5C,		PK−120C LK− 12C FK− 7C	
MAX. SCALE VALUE	SCALE DIVISION DIAGRAM	DIV.	SCALE DIVISION DIAGRAM	DIV.
1		50		50
1.5		30		75
2		40		40
2.5		50		50
3		30		60
4		40		80
5		50		50
6		30		60
7.5		37.5		75
8		40		80
9		45		45

► Division line part of ⌊‾‾⌋ is omitted for moving iron type meter.

► For scale extended meter, red color line and numbers of extended part.

► Have a consultation with us for +/- meter, notation of max. scale value, multiple scale meter, etc.

► *1, becomes 15 divisions for scale extended ammeter PK-60C, PK-80C and LK-8C.

► *2, becomes 20 divisions for scale extended ammeter PK-120C, LK-12C, F-10, 15, 17, RL-80C and RL-110C.

► *3, becomes 15 divisions for scale extended ammeter PK-120C, LK-12C, F-10, 15, 17 and RL-80C.

► *4, becomes 25 divisions for scale extended ammeter RL-110C.

► *5, seal numbers: 0, 30, 60, 90 for type meter F-15, and 17.

► *6, becomes 16 divisions for scale extended ammeter PK-120C, LK-12C, F-10, RL-80C.

► *7, becomes 18 divisions for scale extended ammeter PK-120C, LK-12C, F-10, RL-80C.

► *8, becomes 30 divisions for scale extended ammeter F-15, 17.

► *9, becomes 37.5 divisions for scale extended ammeter F-15, 17.