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 power	Transducer
WVB	Reactive power (balanced)	Transducer
WV	Reactive power (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

*Please specify this circuit for AC power, Reactive power & Power factor

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 & 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.

Rectangle Type 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 DC Voltmeter		Moving Coil	LMK-12C LMK-12C	1.5 1.5	LMK-10C LMK-10C	2.5 2.5	LMK-8C LMK-8C	2.5 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 AC Voltmeter		Moving iron	LSK-12C LSK-12C	1.5 1.5	LSK-10C LSK-10C	2.5 2.5	LSK-8C LSK-8C	2.5 2.5
AC Ammeter AC Voltmeter		Rectifier	LCK-12C LCK-12C	1.5 1.5	LCK-10C LCK-10C	2.5 2.5	LCK-8C LCK-8C	2.5 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	Accessory
	LMK–12C, 10C, 8C	
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.

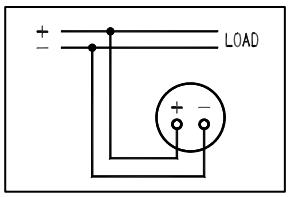
Lead Wire Resistance Value

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

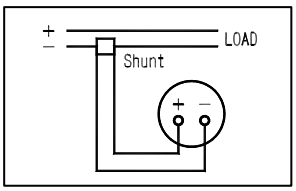
► Meter built-in variable resistance for external resistance correction can manufacture.

► Meter both deflections also can manufacture.

Connecting Diagram

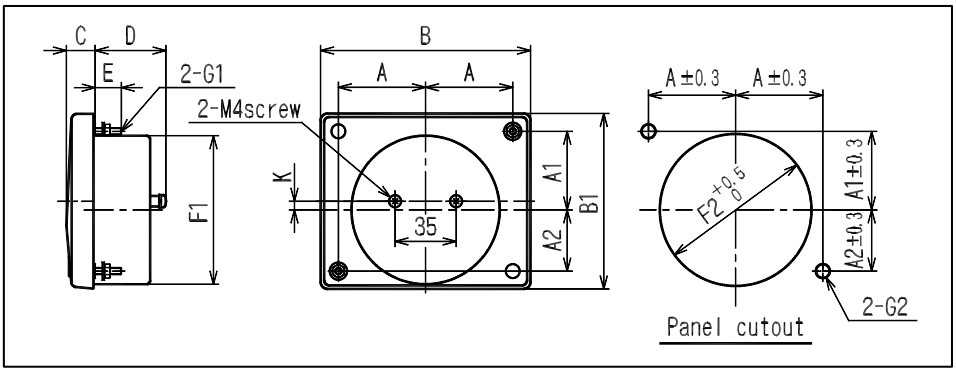


Ammeter



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:

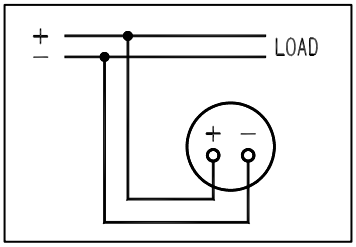
(1) Internal resistance up until 10kΩ/V can manufacture for voltmeter scale 3V or more.

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

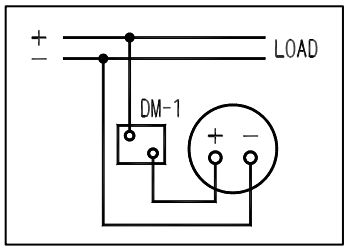
► Meter both deflections can manufacture.

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

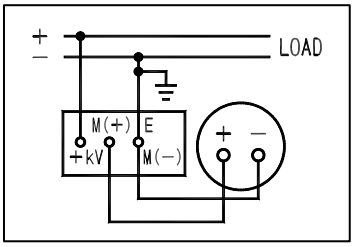
Connection Diagram



Voltmeter

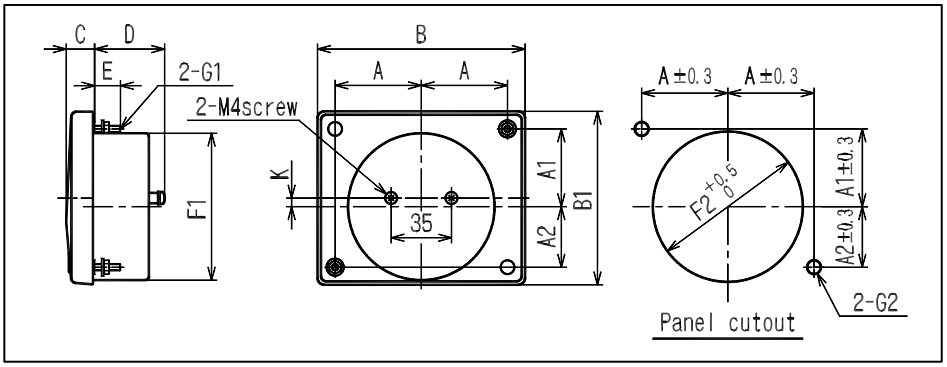


Voltmeter external with Series resistor (DM-1)



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:

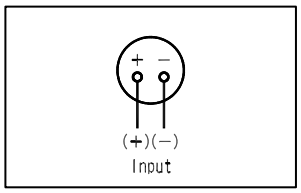
(1) LXK-12C: Internal resistance is 1.1kΩ when 100μA.

(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.

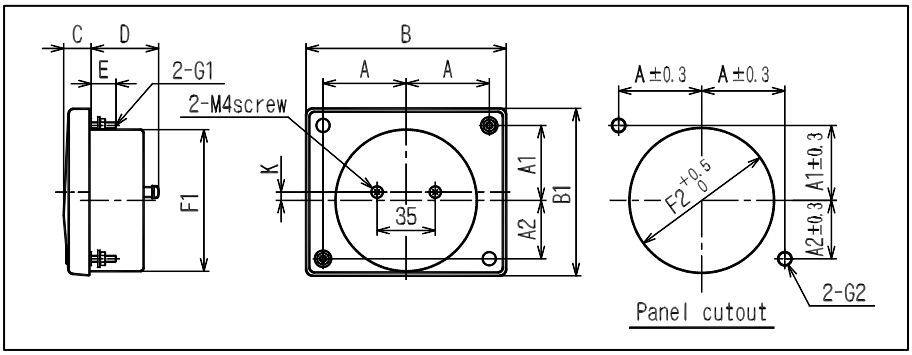
► Meter both deflections can manufacture.

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**

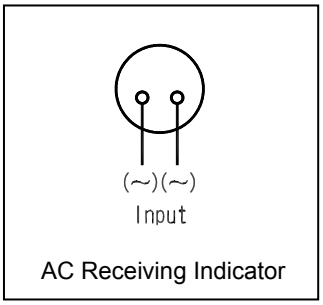
Scale Value 0～2MPa **Input electric quantity DC 4～20mA**

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

AC AMMETER

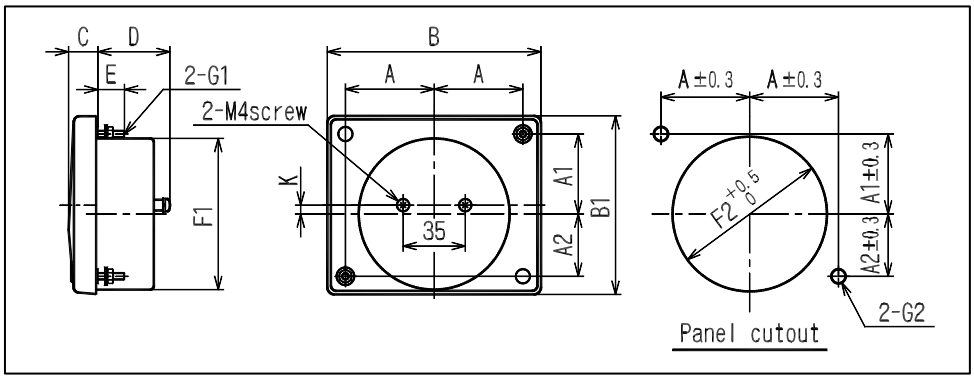
Electrical Input Quantity	Internal Resistance or Consumption VA	Electrical Input Quantity	Consumption Current
	LYK–12C, 10C, 8C		LYK–12C, 10C, 8C
100μA	5kΩ	3V	1mA
500μA	1.5kΩ	～	
1mA	800Ω	300V	
3mA	350Ω		
5mA	300Ω		
10mA 20mA	0.5VA		

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.

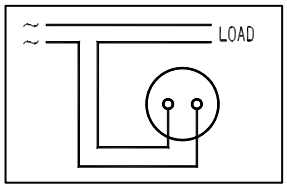
► Meter for 400Hz use can manufacture also please specify.

For SCR Control Waveform

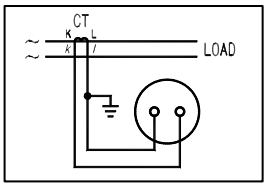
Meter SCR waveform input (Distortion waveform) also can manufacture.

Type name: LSK-□CH

Connection Diagram

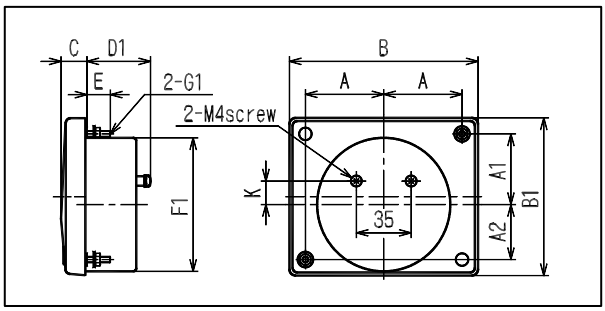


Ammeter



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.

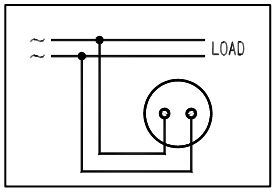
(2) Please use external voltage transformer (VT) 150V for scale 600V or more.

For SCR Control Waveform

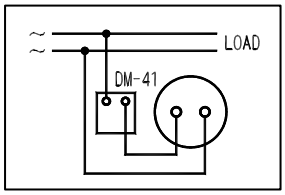
Meter SCR waveform input (Distortion Waveform) can manufacture please specify.

Type Name: LSK-□CH

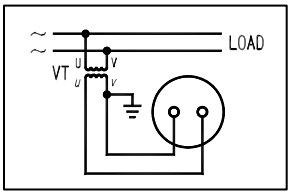
Connection Diagram



Voltmeter

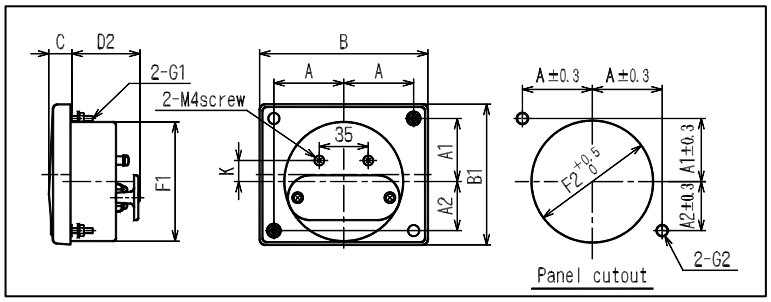


Voltmeter external Series resistor

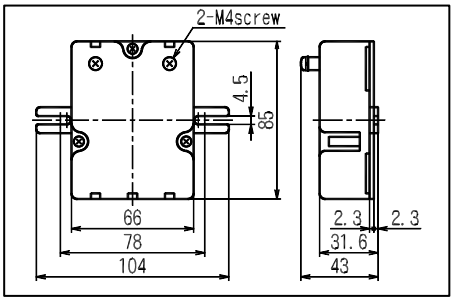


Voltmeter external VT

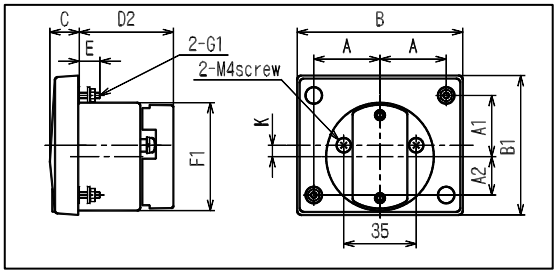
Dimension for Voltmeter LSK-12C



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)

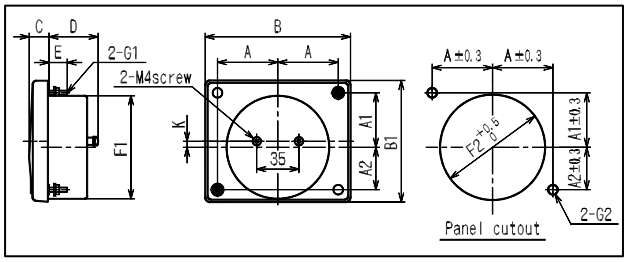
For Cycle Control Wareform Meter

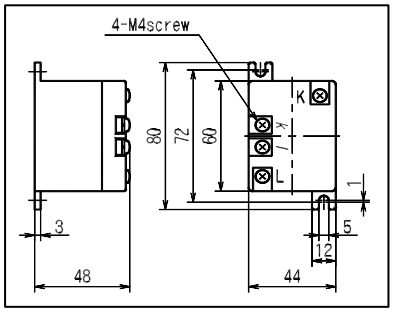
Please use cycle control for cycle control warefrom type.
Type Name: LCTK-□CC, external with AT-62MEC.

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

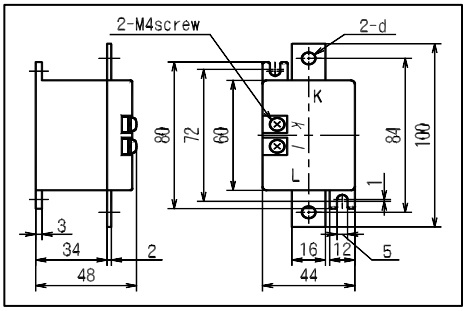
Keep in mind please, that standard rectifier type will be affected by waveform distortion.
Please use approx. RMS value rectifier method for third harmonics mixed with waveform and SCR waveform.
(Type name: LCTK-□C, External with AT-62ME, diagram refer to page 20)

Dimension





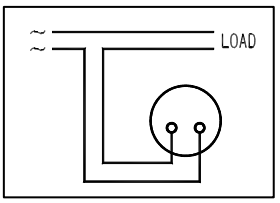
MR-CTN (0.35~25A/10mA)



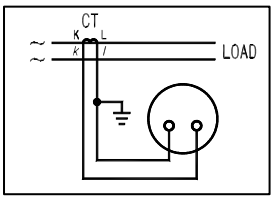
MR-CTN (30~100A/20mA)

Current (A)	d
30~70	Φ6.5
75~100	Φ8.5

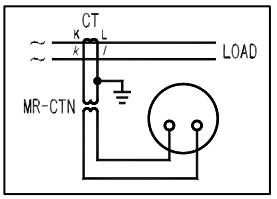
Connection Diagram



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.

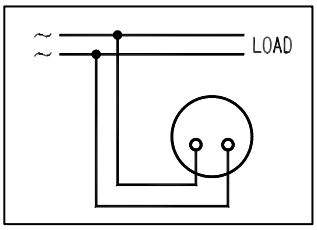
For Distorted Wareform Meter (Approx. RMS value rectifier menthod)

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

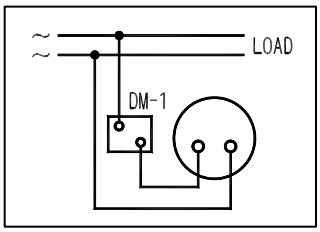
Please use approx. RMS value rectifier method for third harmonics mixed with waveform and SCR waveform.

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

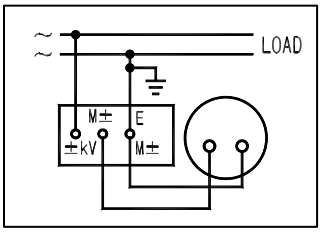
Connection Diagram



Voltmeter

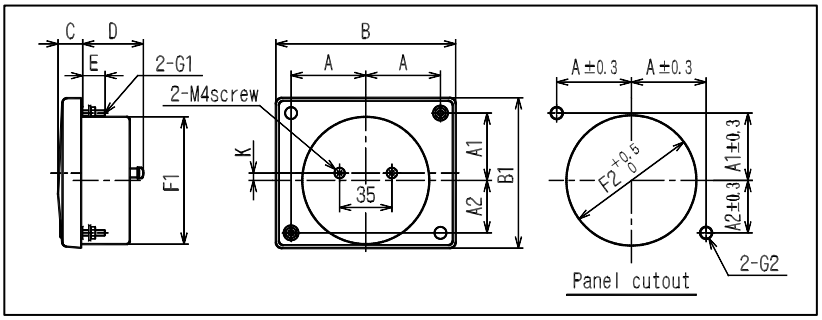


Voltmeter external series resistor (DM-1)



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)

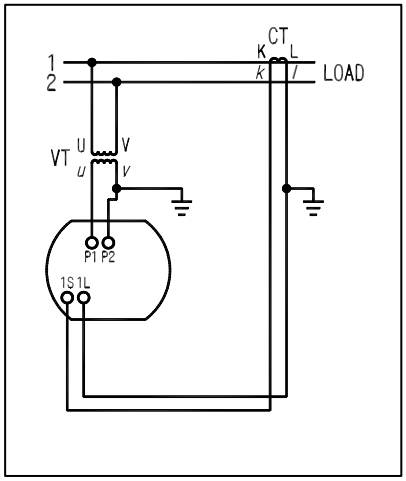
Application	Type	Rating (2)	Consumption VA		Accessory
			Voltage	Current	
Single phase	LWK-12NC-12	110V, 5A (1A)	2VA	1VA	—
		220V, 5A (1A)	3.5VA	1VA	
Single phase 3-wire	LWK-12NC-13	110V, 5A (1A)	2VA	1VA	—
3 phase 3-wire	LWK-12NC-33	110V, 5A (1A)	2VA	1VA	—
		220V, 5A (1A)	3.5VA	1VA	
3 phase 4-wire	LWK-12NC-34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

Note:

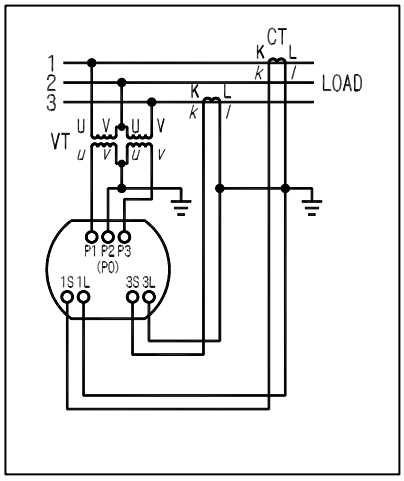
(1) Please refer to (page 18) for manufacture limit and max. scale value.

(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

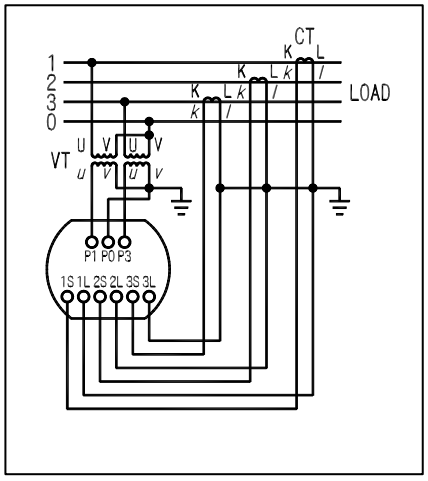
Connection Diagram



Single phase watthour meter

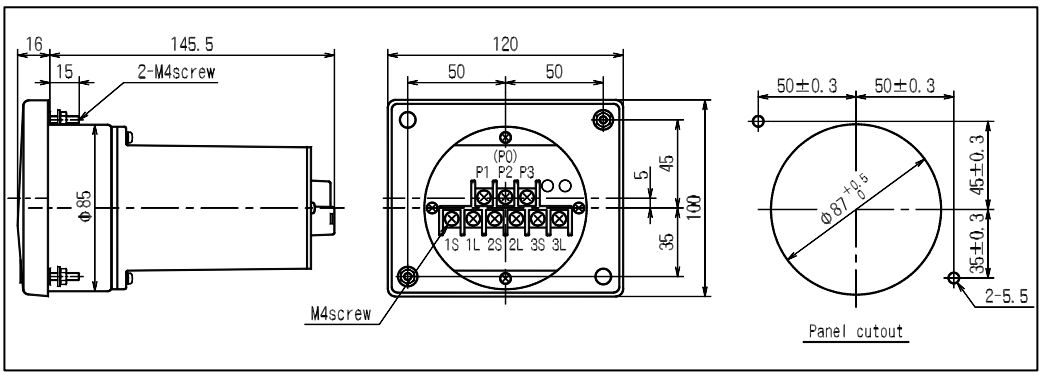


Single phase 3-wire & 3 phase 3-wire watthour meter



3 phase 4-wire watthour meter

Dimensions



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

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

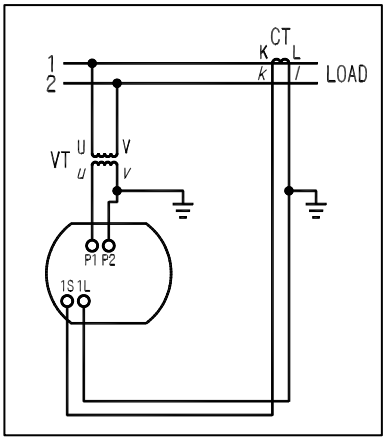
Application	Type	Rating (2)	Consumption VA		Accessory
			Voltage side	Current side	
Single phase	LWVK-12NC-12	110V, 5A (1A)	2VA	1VA	—
		220V, 5A (1A)	3.5VA	1VA	
Single phase 3-wire	LWVK-12NC-33	110V, 5A (1A)	2VA	1VA	—
		220V, 5A (1A)	3.5VA	1VA	
3 phase 4-wire	LWVK-12NC-34	110V, 5A (1A)	2VA	1VA	—
		220V,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

Note:

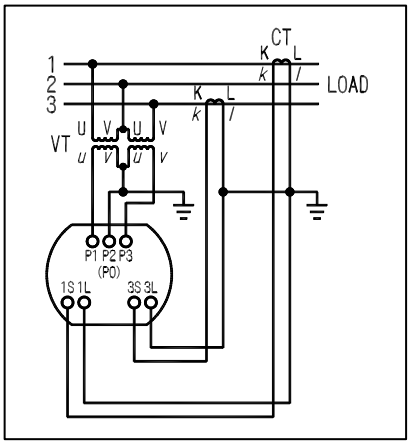
(1) Please refer to (page 18) for manufacture and max. scale value.
Standard scale: Lead□var～0～Lag□var

(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

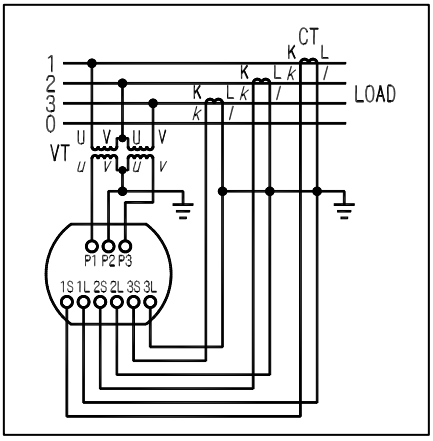
Connection Diagram



Single phase var meter

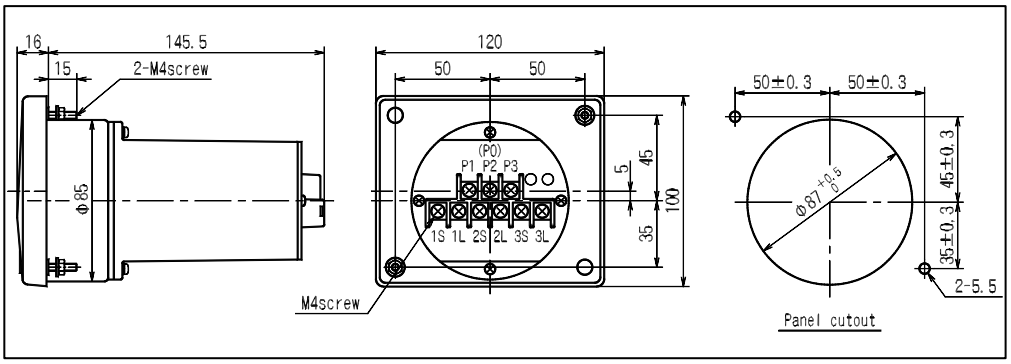


3 phase 3-wire var meter



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.

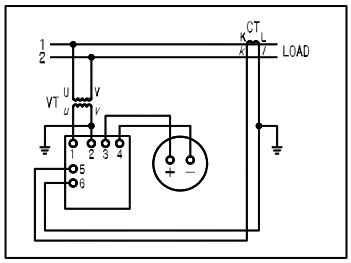
► For High harmonic ware, please specify the frequency.

For SCR Control Wareform

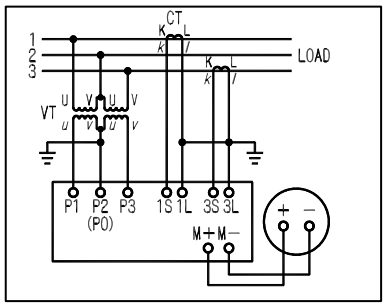
Type name: LWK-☐CH-☐.

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

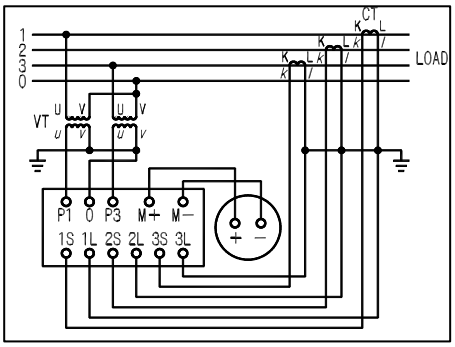
Connection Diagram



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

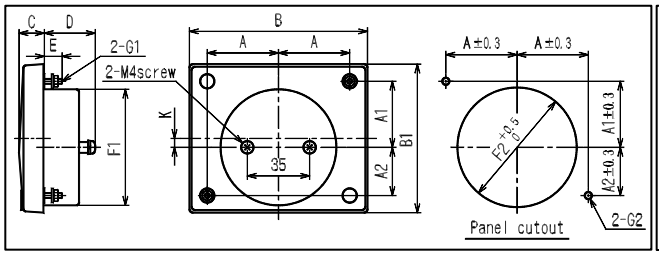


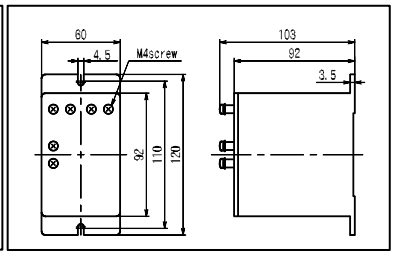
Single phase 3 wire & 3 phase watthour
meter external with WT-83M-13/33



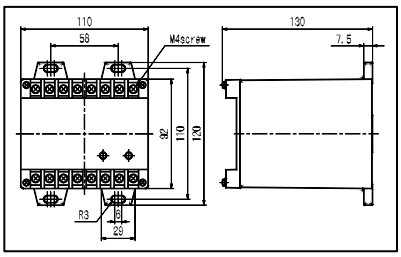
3 phase 4 wire watthour meter
external with WT-83M-34

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

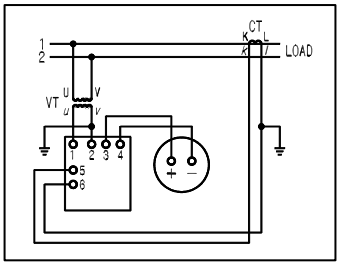
(2) Please use external CT, 5A (1A) or VT, 110V respectively if above rating is exceeds.
Usable voltage range: 110V: 90～130V & 220V: 180～260V

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

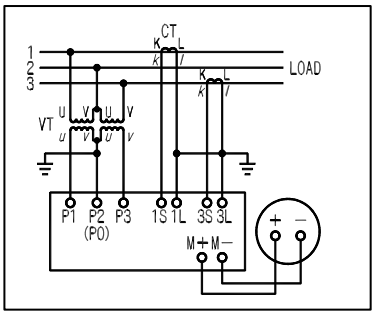
(4) Please use 3 phase, 3 phase 4-wire in positive phase sequence.

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

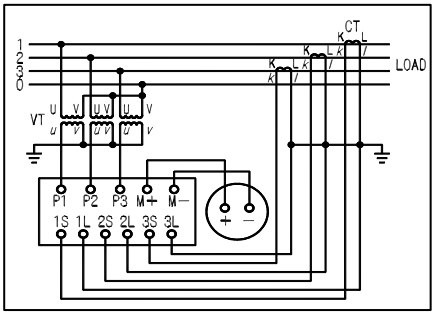
Connection Diagram



Single phase var meter
external WVT-62M-12

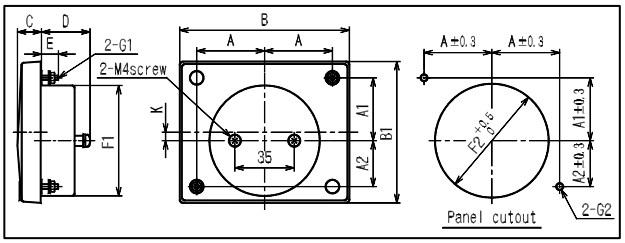


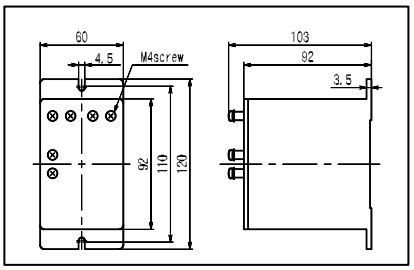
Single phase 3-wire / 3 phase var
meter external WVT, WVBT-83M-13/33



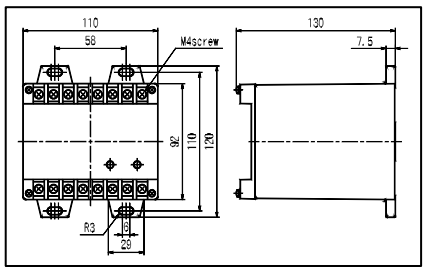
3 phase 4-wire var meter
external WVT-83M-34

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.

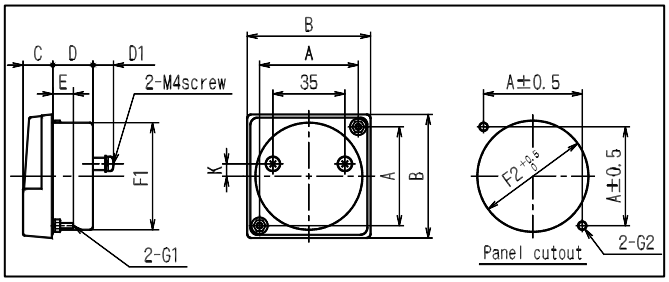
[3] All type for LPK-12C, 10C, 8C-34 will attached with PT-64M-34 (diagram please refer to page 20).

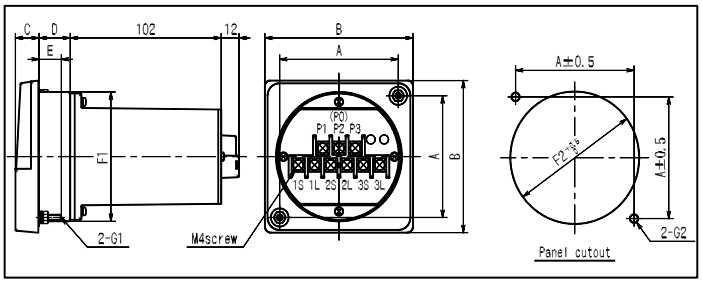
[4] 3 phase (unbalanced), 3 phase 4-wire (unbalanced) is voltage balanced.

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

Dimensions

For LPBK-12N

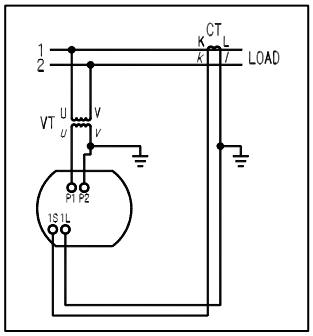




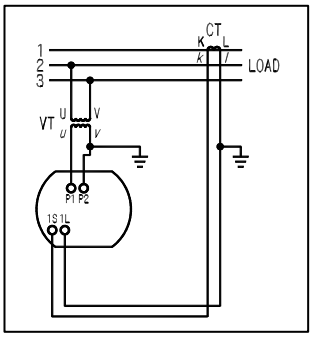
Type		A	A1	A2	B	B1	C	D	E	F1	F2	G1	G2	K	weight (g)
LPK-10C	LPBK-10C	40	37	27	100	83	14	29.5	10	65 Φ	67ΦHole	M3 Screw	4Φ Hole	5	880
LPK-8C	LPBK-8C	32	29.5	18.5	80	67	14	29.5	10	52 Φ	54ΦHole	M3 Screw	4Φ Hole	5.5	900

Power Factor Meter (Transducer Type) - LPK

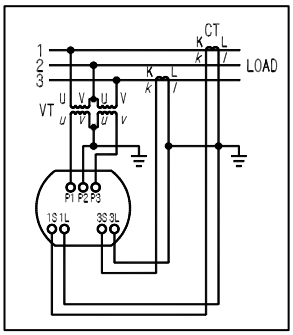
Connection Diagram (All-in-one Transducer Type)



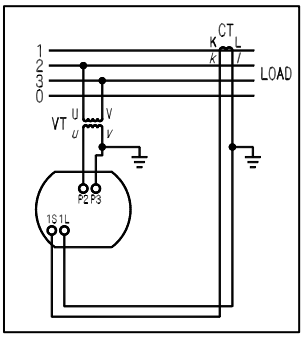
Single Phase
Power Factor Meter



3 phase 3-wire
Power Factor Meter
(Balanced)

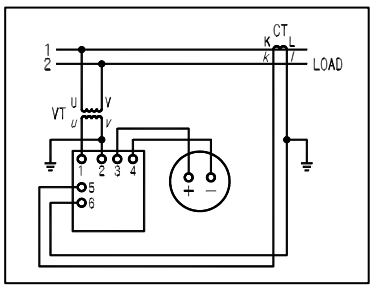


3 phase 3-wire
Power Factor Meter
(Unbalanced)

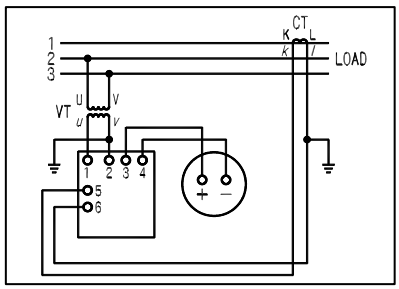


3 phase 4-wire
Power Factor Meter
(Balanced)

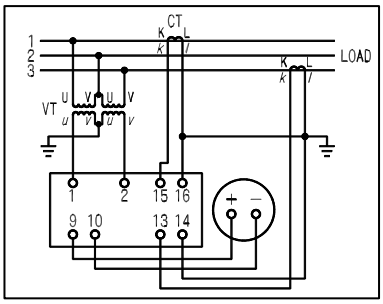
Connection Diagram (External with Transducer Type)



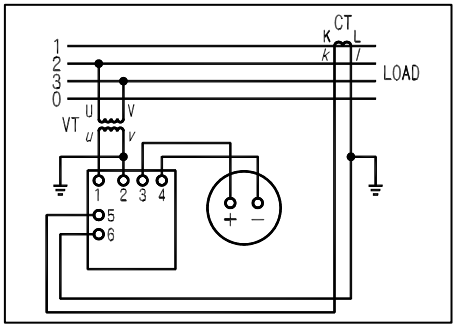
Single Phase Power Factor Meter
External PT-62M-12



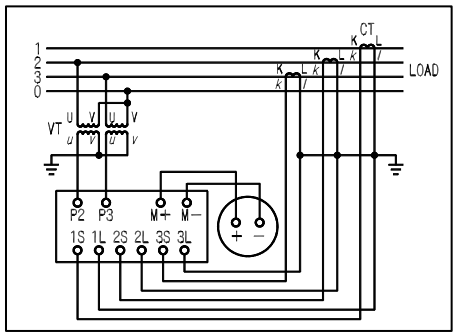
3 Phase Balanced Power Factor Meter
External PBT-62M-33



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



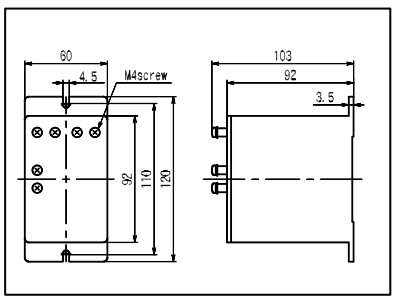
3 Phase 4-wire (balanced)
Power Factor Meter
External PBT-62M-34



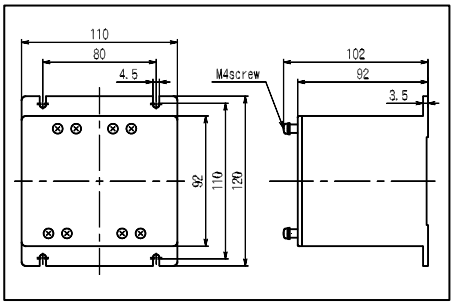
3 Phase 4-wire (unbalanced)
Power Factor Meter
External PT-64M-34

Note:
Error maybe observed if phase sequence is wrong.

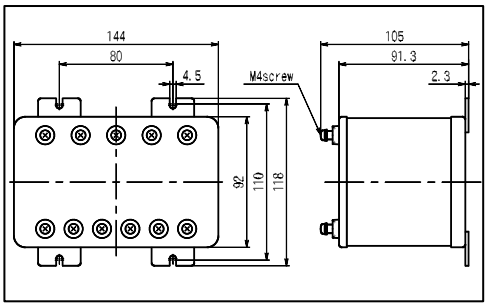
Dimension For Attachment Transducer



☐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

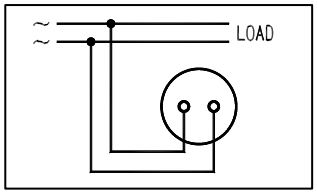
Please contact with us for manufactured the above rated voltage and voltage change range.

For SCR Wareform Meter

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

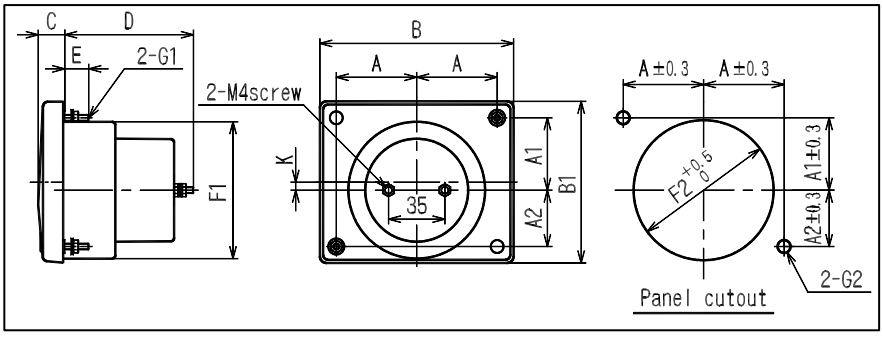
Type name: LAK-□CH

Connection Diagram



Frequency Meter

Dimensions



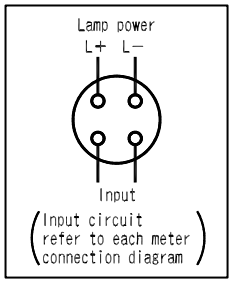
Type	A	A1	A2	B	B1	C	D	E	F1	F2	G1	G2	K	weight (g)
LAK-12C	50	45	35	120	100	16	80	15	85 Φ	87Φ Hole	M4 Screw	5.5Φ Hole	0	400
LAK-10C	40	37	27	100	83	14	68	10	65 Φ	67Φ Hole	M3 Screw	4Φ Hole	5	250
LAK-8C	32	29.5	18.5	80	67	14	68	10	52 Φ	54Φ Hole	M3 Screw	4Φ Hole	5.5	210

Frequency Meter (Transducer Type) - LAK

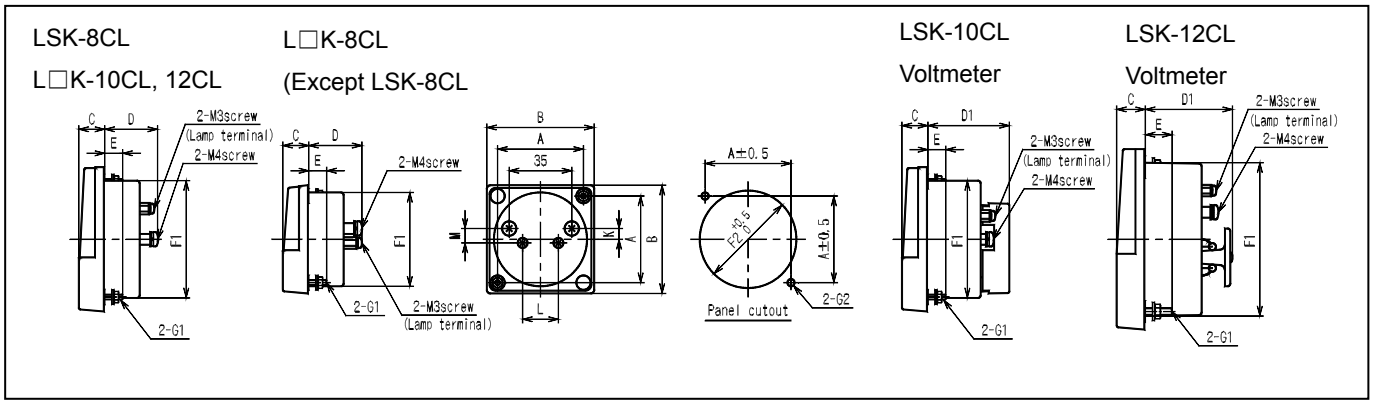
METER EXTERNAL WITH LAMP

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