L－65C

L－80C

L－110C

L series are wide-angle meters. The series have three types, 110mm angle, 80mm angle and 65mm angle, and the series are in conformity with JIS C 1103 in panel cut-out size.

With long and stepped scales, L series are easy to read and the reading error is small. Also the series are highly reliable meters by adopting the most suitable operational principle in accordance with the measuring object, thus meet the JIS C 1102-1~9 standards (IEC 60051-1 compliant) adequately.

For usage in excessive environmental conditions, special treatments such as cold resistance and tropical specifications are implemented to improve the reliability. The series are most suitable for equipment for exportation to frigid / tropical zone.

■ FEATURES

►**High** quality, high reliability oriented design.
►**Taut** band supporting method is adopted (SL, DL is Pivot adopt)
►**65mm** angle type is most suitable for congested equipment.
►**By** adopting transducer based on electronic technology, more variety is extended.
►**Meter** made of incombustible material is available by specification.

TYPE CODE DESIGNATION

(1) L - (2) (3) C (4) — (5)

(1) Type of Measurand

Mark	Measurand	Opearation 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
WV	Reactive power (unbalanced)	Transducer
PB	Power factor (balanced)	Rectifier
P	Power factor (unbalanced)	Transducer
A	Frequency meter	Transducer
D	Synchroscope detector (1)	Revolving magnetic field moving iron
FPD	Power flow power factor (1)	Transducer

(1) Irregular JIS product.

(2) Shape

Mark	Wide Angle Meter
110	110 × 110
80	80 × 80
65	65 × 65

(3) Structure

Mark	Structure
N	Transducer all-in-one type
None	Separate or no attachment

(4) Special Specifications

Mark	Specification
H	For SCR
C	For Cycle Control

*No code for Standard specification, please specify it if necessary

(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 code for AC Power, Reactive Power & Power Factor

COMMON STANDARD SPECIFICATIONS

ITEM		SPECIFICATION	
Standard		JISC 1102: 2007 [Direct Electric Indicating Instruments]	
		JISC 1103 [Dimensions of Electrical Indicating Instruments Switchboards]	
		IEC 60051-1 Base	
Class		Refer to [List of L series]	
Support method		Taut method SL, DL is Pivot method	
Swing angle of meter		250° (SL=240°, DL=360°)	
Dimensions meter from front		L-110C: 110×110mm	
		L-80C : 80×80mm	
		L-65C : 65×65mm	
Length of scale		L-110C: 200mm (SL=194mm)	
		L-80C : 143mm (SL=135mm)	
		L-65C : 107mm (SL=103mm)	
Scale plate		White	
Pointer		Lancet shape (black)	
Installation posture		Vertical (⊥)	
Material of installation panel		Shared use for Iron plate or non-iron plate	
Thickness of installation panel		10mm or less (SL-80C; L-65C: 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	At DC500V, 50MΩ or more
Voltage test		Between electric circuit and outer case	AC3320V, between 5sec. DL is AC2600V, beween 1min.
Safety requirements	Standard	JIS C 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)	
Operating temperature / humidity limit		-10~55℃, Average day temperature 40℃ or less, 25~85%RH (Reference to steel ship rules ambient temperature 45℃)	
Storage temperature range		-20~70℃	

STANDARD SCALE DIVISION

Max. scale value (10-time)		1	1.5	2	2.5	3	4	5	6	7.5	8	9
Type	L-110C, L-110NC	50	75	40	50	60	40	50	60	37.5	40	45
	L-80C, L-80NC	50	30	40	50	60	40	50	60	37.5	40	45
	L-65C	20	30	20	25	30	20	25	30	15	16	18

COMMON SPECIAL SPECIFICATIONS

ITEM		SPECIFICATION	
Scale	Color line	Red, Green, Yellow (Please specify)	
	Extend scale	CL: 3-fold extend, SL: 2~5-fold extend	
	Color area (bar)	Red, Green, Yellow (Please specify)	
	Double scale	Please specify	
	Double seal	Please specify	
	Max. scale division	110 angle: 100division, 80 angle: 75 division, 65 angle: 60 division	
	Special scale	Please specify	
Vibration proof specification		Vibration	Frequency 2~55Hz, 29.4m/s²
		Shock	147m/s², 30-time
Tropical specification		Rust preventative, 「FOR TROPICS」will display at the name plate	
Pointer		Rod shape (multiple scale)	
Setting pointer		Lancet shape (red)	
Installation posture		Horizontal, slope installation (slope angle by specification)	
Flame-retardant material		Cover	Polycarbonate resin
Protection circuit of meter		Overcurrent	Specify please the required dosis tolerata.
		Overvoltage	Specify please the required dosis tolerata.
Partially extended scale		Voltmeter	75% or more of the length scale Scale median up to ±10%, ±20%, ±30%
		Ammeter	95% or more of the length scale Up to 20% from upper limit value of effective measurement range
			75% or more of the length scale Up to 50% from upper limit value of effective measurement range
For SCR control wave use		AC current, AC voltage, Frequency	
For Cycle control use		AC current, AC voltage (Recitifier Type)	
Scale (single item)		Not JIS mark	
Other		Have a consultation with us for the special frequency.	

PURCHASE SPECIFICATIONS

1). Type name
2). Rating (Max. scale / input) *1
3). Options (refer to common special specifications)
4). Aux. supply (Specify Aux.power for FPDL-110C-33 if necessary)

*1: See the list of standard max. scale value for the max. scale value of watthour and var meter.
As for power factor meter, specify frequency according to the specification table.

LIST OF L-SERIES

Model			L-110(N)C			L-80(N)C			L-65C		
JIS MARK			KW-3a			KW-6			–		
Product		Principle	Type code	class	weight	Type code	class	weight	Type code	class	weight
DC ammeter		Moving coil	ML-110C	1.5	0.5kg	ML-80C	1.5	0.4kg	ML-65C	2.5	0.3kg
DC voltmeter			ML-110C	1.5	0.5kg	ML-80C	1.5	0.4kg	ML-65C	2.5	0.3kg
DC receiving indicator		Moving coil	XL-110C	1.5	0.5kg	XL-80C	1.5	0.4kg	XL-65C	2.5	0.3kg
AC receiving indicator		Rectifier	YL-110C	1.5	0.6kg	YL-80C	1.5	0.5kg	YL-65C	2.5	0.3kg
AC ammeter		Moving iron	SL-110C	1.5	0.35kg	SL-80C	1.5	0.3kg	SL-65C	2.5	0.2kg
AC voltmeter			SL-110C	1.5	0.5kg	SL-80C	1.5	0.45kg	SL-65C	2.5	0.2kg
AC ammeter		Transducer	CL-110NC	1.5	0.5kg	CL-80NC	1.5	0.5kg	–	–	–
		Rectifier	CL-110C	1.5	0.5kg	CL-80C	1.5	0.5kg	CL-65C	2.5	0.3kg
AC voltmeter		Transducer	CL-110NC	1.5	0.5kg	CL-80NC	1.5	0.5kg	–	–	–
		Rectifier	CL-110C	1.5	0.5kg	CL-80C	1.5	0.5kg	CL-65C	2.5	0.3kg
Watthour meter	Single phase	Transducer	WL-110NC-12	1.5	0.6kg	WL-80C-12 *	1.5	0.8kg	WL-65C-12 *	2.5	0.8kg
	Single phase 3 wire		WL-110NC-13	1.5	0.6kg	WL-80C-13 *	1.5	0.8kg	WL-65C-13 *	2.5	1.1kg
	3 phase		WL-110NC-33	1.5	0.6kg	WL-80C-33 *	1.5	0.8kg	WL-65C-33 *	2.5	1.1kg
	3 phase 4 wire		WL-110NC-34	1.5	0.6kg	WL-80C-34 *	1.5	0.8kg	WL-65C-34 *	2.5	1.1kg
Var meter	Single phase	Transducer	WVL-110NC-12	1.5	0.6kg	WVL-80C-12*	1.5	0.8kg	WVL-65C-12 *	2.5	0.8kg
	3 phase		WVL-110NC-33	1.5	0.6kg	WVL-80C-33 *	1.5	0.8kg	WVL-65C-33 *	2.5	1.1kg
	3 phase 4 wire		WVL-110NC-34	1.5	0.6kg	WVL-80C-34 *	1.5	0.8kg	WVL-65C-34 *	2.5	1.1kg
Power factor meter	Sigle phase	Transducer	PL-110NC-12	5.0	0.6kg	PL-80NC-12	5.0	0.5kg	PL-65C-12 *	5.0	0.8kg
	3 phase (balanced)	Rectifier	PBL-110NC-33		0.6kg	PBL-80NC-33		0.5kg	PBL-65C-33 *		0.8kg
	3 phase (unbalanced)	Transducer	PL-110NC-33		0.6kg	PL-80C-33 *		0.8kg	PL-65C-33 *		1.1kg
	3 phase 4 wire (unbalanced)		PL-110NC-34		0.7kg	PL-80C-34 *		0.8kg	PL-65C-34 *		1.4kg
Frequency meter		Transducer	AL-110NC	0.5 (1.0)	0.6kg	AL-80NC	0.5 (1.0)	0.4kg	AL-65C *	1.0	0.7kg
Synchroscope meter	Single phase	Revolving magnetic field moving iron	DL-110C-12 *	Equals 2.5	2.7kg	–	–	–	–	–	–
	3 phase		DL-110NC-33		1.9kg	–	–	–	–	–	–
Power flow power factor meter	3 phase	Transducer	FPDL-110C-33	5	2.9kg	–	–	–	–	–	–

***** Product External with attachment.

► **Keep** in mind that a transducer type meter indicates transitional value at the time of start up when a voltage input is applied.

§ Wide Angle METER §

DC AMMETER / DC VOLTMETER (MOVING COIL TYPE) **ML**

DC AMMETER

MAX. SCALE VALUE	APPROX. INTERNAL RESISTANCE or VOLTAGE DROP		ATTACHMENT
	ML-110C, 80C	ML-65C	
200μA	1.6kΩ	1.6kΩ	–
1mA	185Ω	185Ω	
5mA	10Ω	12Ω	
20mA	2.5Ω	3Ω	
50mA~30A	50mV	60mV	–
30A~10kA (1)	60mV (2)		Shunt

Note:

(1) Any max. scale value exceeding 30A is dealt by a 60mV meter with an external shunt.

(2) Shunt lead wire is not attached. The standard of lead wire resistance is 0.07Ω (1.25mm²)

►A meter with a built-in adjustable resistor for external resistance correction can be manufactured.

DC VOLTMETER

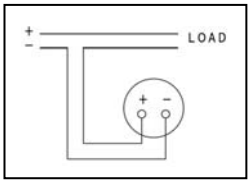
MAX. SCALE VALUE	APPROX. CONSUMPTION CURRENT		ATTACHMENT
	ML-110C, 80C	ML-65C	
50mV~900mV	5mA	2mA	–
1V~600V	1mA	1mA	–
750V/1mA~25kV/1mA	1mA	1mA	Series resistor (3)

Note:

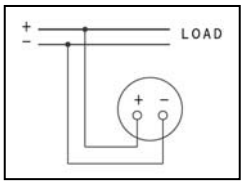
(3) Any max. scale value exceeding 600V is dealt by a 1mA meter with series resistor.

■ CONNECTION DIAGRAM

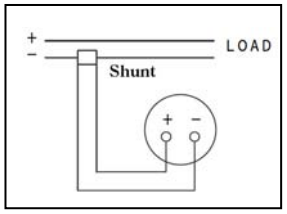
Ammet



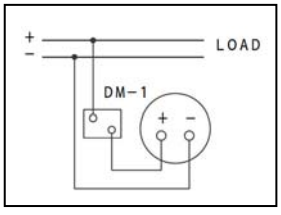
Voltmeter



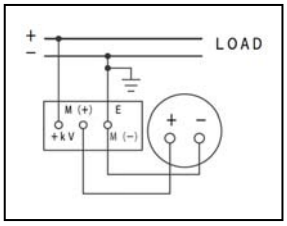
Ammeter
External with Shunt



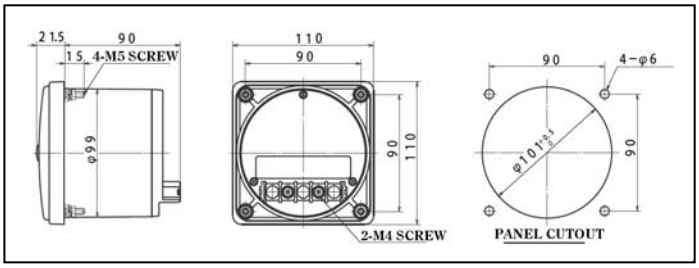
Voltmeter External with
Series Resistor (DM-1)



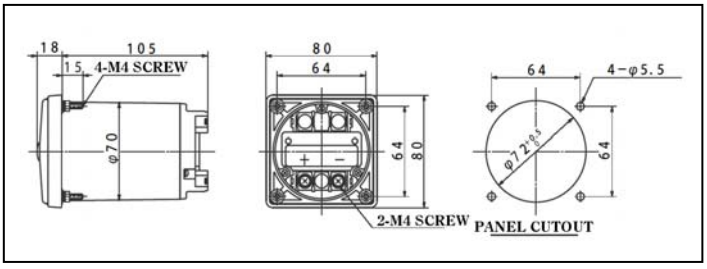
Voltmeter External with
Series Resistor (DM-2~25)



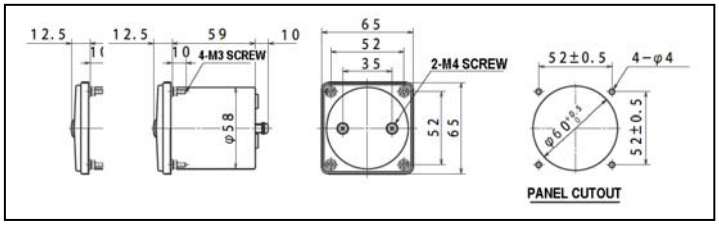
■ DIMENSIONS



L-110C



L-80C



L-65C

DC RECEIVING INDICATOR

► A receiving indicator is an ammeter or a voltmeter that is used to received electrical signal from a detector or a transmitter, and then measures and indicates various physical quantities, power, power factor, frequency and so on.

VOLUME of ELECTRICAL INPUT	APPROX. INTERNAL RESISTANCE		VOLUME of ELECTRICAL INPUT	CONSUMPTION CURRENT	
	XL-110C, 80C	XL-65C		XL-110C, 80C	XL-65C
200μA	1.6kΩ	1.6kΩ	1V		1mA
500μA	630Ω	630Ω	2V		1mA
1mA	185Ω	185Ω	1~5V (1)		1mA
2mA	500Ω	18Ω	5V		1mA
5mA	10Ω	12Ω	10V	1mA (2)	1mA
10mA	5Ω	6Ω	20V		1mA
20mA	2.5Ω	3Ω	50V		1mA
4~20mA (1)	6Ω	6Ω	≀		1mA
10~50mA (1)	12.5Ω	1.5Ω	300V		1mA

Note:

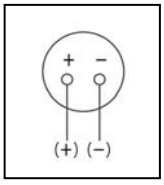
(1) For receiving indicator that receives biased signal such as input DC1~5V, DC4~20mA, zero point adjustment is required when receiving such biased input.

(2) Consumption curent of VR built-in measuring is 2mA (XL-65C is 1mA)

► A meter with bidirectionally swinging pointer can be manufactured.

■ CONNECTION DIAGRAM

DC Receiving Indicator

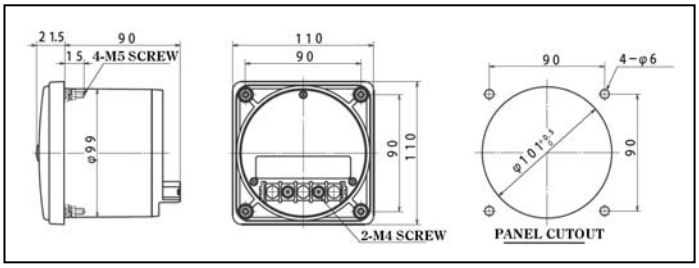


Input

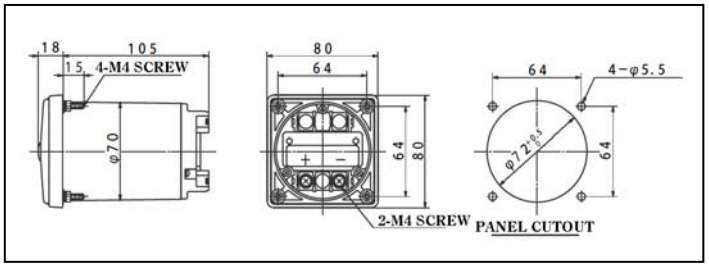
Terminal cover is optional.

Please specify if need.

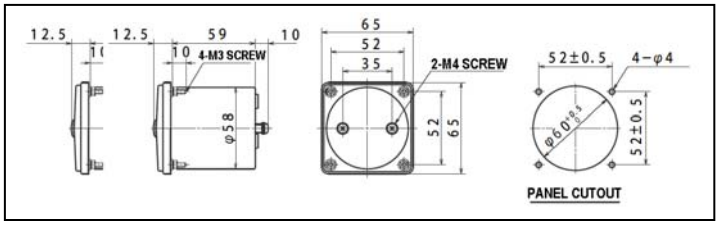
■ DIMENSIONS



L-110C



L-80C



L-65C

AC AMMETER

MAX. SCALE VALUE		APPROX. INTERNAL RESISTANCE or VOLTAGE DROP				OPERATIONAL PRINCIPLE
Normal scale	3-time extended	CL-110NC	CL-80NC	CL-110C, 80C	CL-65C	
1mA 10mA ～ 300mA	—	—	—	3V	1.5V 0.5VA	Rectifier type
0.5A	1.5A	0.4VA (1)	0.4VA (1)	—	1VA * (2)	CL-110NC, 80NC are transducer type (RMS value rectifying method); CL-65C is rectifier type.
1A	3A					
5A	15A					
7.5A	22.5A					
10A	30A					
15A	—			—	1VA * (2)	
20A	—					
30A	—					
5/5A ～ 10k/5A	15/5A ～ 30k/5A	0.4VA	0.4VA	—	1VA * (2)	

Note:

(1) When max. scale value exceeds 30A (30A for L-80) or circuit voltage exceeds 600V, use a 5A (1A) meter external with CT (current transformer).

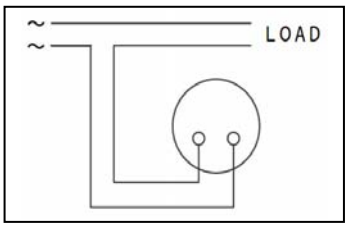
(2) MR-CTN is attached to L-65C. Transducer AT-62M is attached when with scale extension.

For Cycle Control Wareform Meter

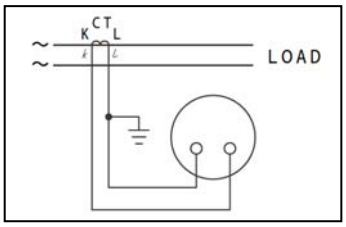
Use a cycle control type for cycle control waveform.

Type: CTL-110NCC (when input is 301～600V, T2-72 will attached), CTL-80CC (AT-62MEC will attached)

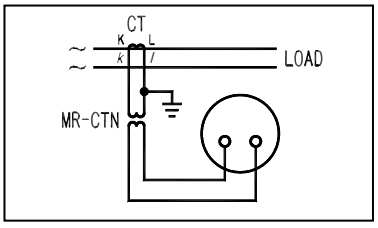
■ CONNECTION DIAGRAM



Ammeter

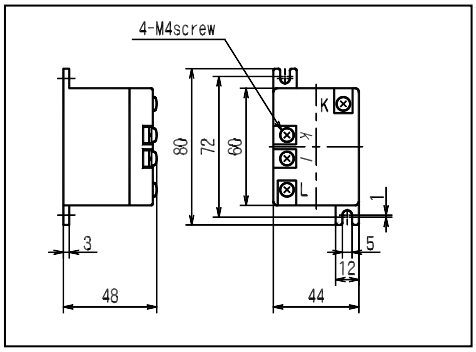


Ammeter External with CT

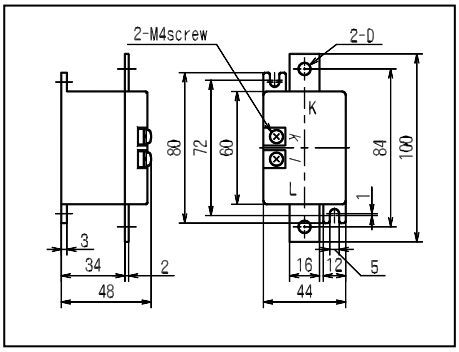


Ammeter External with MR-CTN

■ DIMENSIONS



MR-CTN (0.35～25A/ 10mA)



MR-CTN (30～100A/ 20mA)

AC VOLTMETER & RECEIVING INDICATOR (TRANSDUCER TYPE / RECTIFIER TYPE) **CL YL**

AC VOLTMETER

MAX. SCALE VALUE	OPERATING CURRENT or VA CONSUMPTION			OPERATIONAL PRINCIPLE
	CL-110NC, 80NC	CL-110C, 80C	CL-65C	
3V~25V	–	3mA	1.1mA	CL-110NC, 80NC are transducer type (RMS value rectifying method); CL-110C, 80C, 65C are rectifier type.
30V~100V	–	1.1mA		
150V 300V	0.8VA 1.8VA	–		
600V	–	0.7VA		
600V/150V (3) ~ 500k/150V	0.8VA	–	–	

Note:

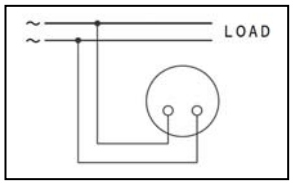
(3) For any max. scale value exceeding 600V, please use 150V meter external with VT (voltage transformer). Series resistor method meter can be manufactured as well, please consultation with us if you need it.

AC RECEIVING INDICATOR

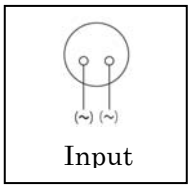
Receiving indicator is an ammeter or a voltmeter that is used to received electrical signal from detector or transmitter, and measures indicates various physical quantities, power, power factor, frequency and so on.

VOLUME of ELECTRICAL INPUT	APPROX. INTERNAL RESISTANCE			VOLUME of ELECTRICAL INPUT	CONSUMPTION CURRENT	
	YL-110C, YL-80C	YL-65C			YL-110C, YL-80C	YL-65C
500μA	6kΩ	3kΩ		3~6V	3.3mA	1.1mA
1mA	3kΩ	1.5kΩ		7.5~12V	3.15mA	
3mA	1kΩ	670Ω		15~25V	2.94mA	
5mA	600Ω	250Ω		30V~300V	1.1mA	
10mA	300Ω	50Ω				
20mA	150Ω	25Ω				

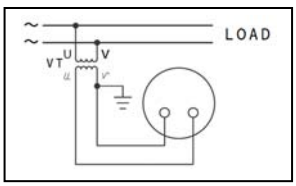
■ CONNECTION DIAGRAM



Voltmeter



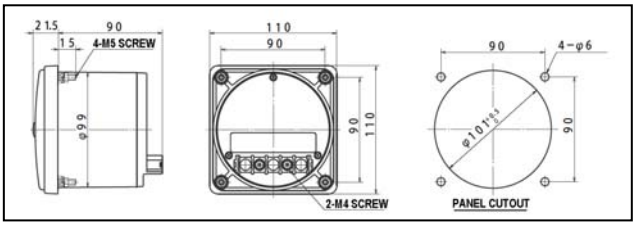
AC RECEIVING INDICATOR



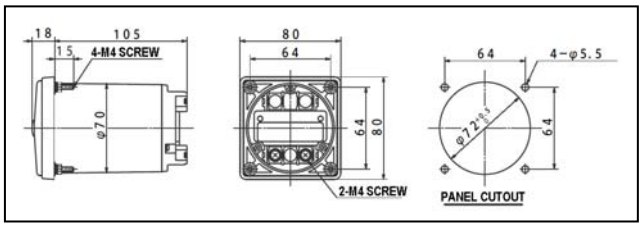
Voltmeter External with VT

Terminal cover is optional.
Please specify if need.

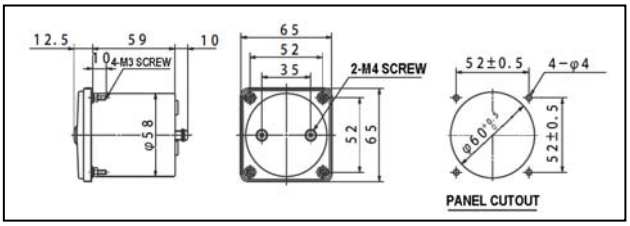
■ DIMENSIONS for CL & YL Type



L-110C



L-80C



L-65C

AC AMMETER (MOVING IRON TYPE) **SL**

AMMETER

NORMAL SCALE	EXTENDED SCALE				APPROX. VA CONSUMPTION		
Max. scale value	2-fold	3-fold	4-fold	5-fold	SL-110C	SL-80C	SL-65C
100mA	200mA	300mA	400mA	500mA	3VA	3VA	3VA
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) ≀ 10kA/5A	10A ≀ 20kA	15A ≀ 30kA	20A ≀ 40kA	25A ≀ 50kA	3VA	3VA	3VA

Note:

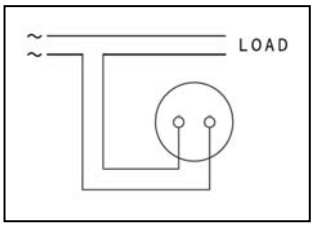
(1) When max. scale value exceeds 30A or the circuit voltage exceeds 600V, use 5A (0.1A, 1A) meter external with CT (current transformer).

For SCR Control Wareform

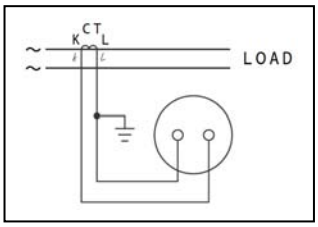
Meter for SCR waveform input (distortion waveform) can be manufactured as well.

Type name: SL-110CH

■ CONNECTION DIAGRAM



Ammeter

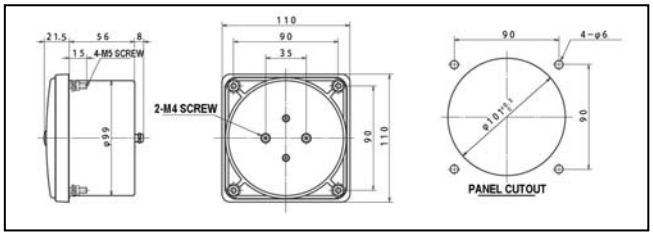


Ammeter External with CT

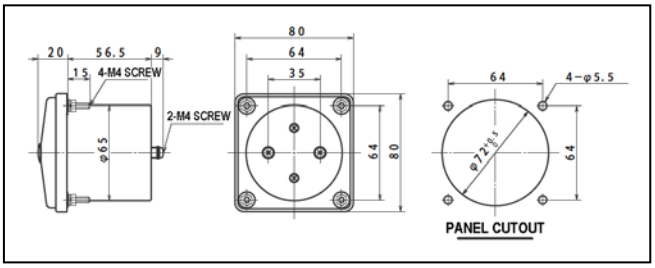
Terminal cover is optional.

Please specify if need.

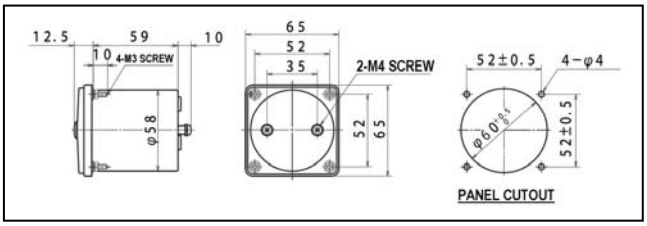
■ DIMENSIONS



L-110C



L-80C



L-65C

AC AMMETER / VOLTMETER (MOVING IRON TYPE) **SL**

VOLTMETER

MAX. SCALE VALUE	APPROX. VA CONSUMPTION		ATTACHMENT (SERIES RESISTOR)
	SL-110C	SL-80C, 65C	
50V	8VA	8VA	SL-80C,65C: DM-41
100V			
150V			
300V			
600V			
600/150V (1) ≀ 550k/150V	8VA	8VA	

Note:

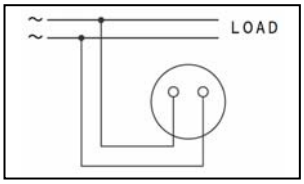
(1) When the max. scale value exceeds 600V, please use 150V meter external with VT (Voltage transformer)

For SCR Control Wareform

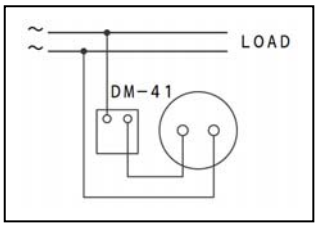
Meter for SCR waveform input (distortion waveform) can be manufactured as well.

Type name: SL-110CH

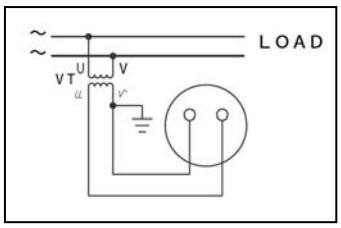
■ CONNECTION DIAGRAM



Voltmeter

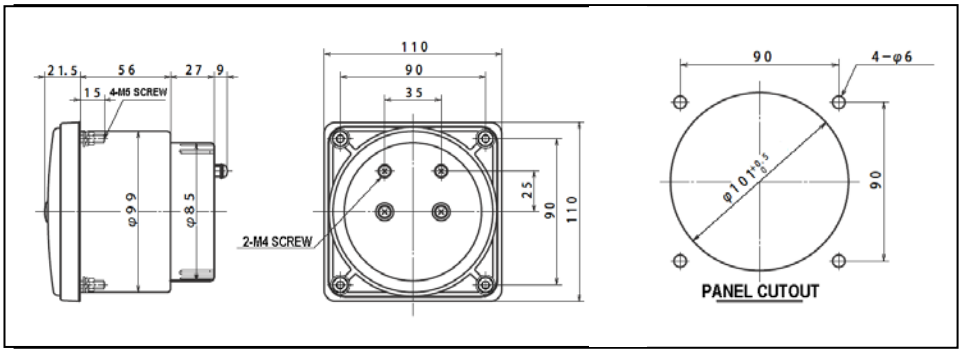


Voltmeter External with Series Resistor

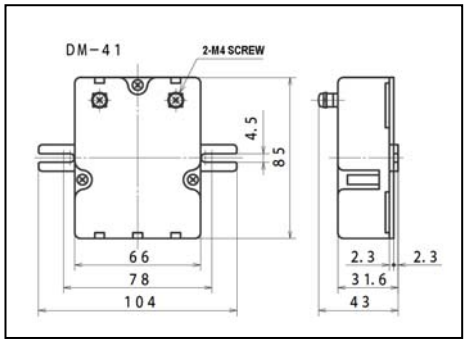


Voltmeter External with VT

■ DIMENSIONS



■ DIMENSIONS (DM-41)



Terminal cover is optional.

Please specify if need it.

FREQUENCY METER (TRANSDUCER TYPE) **AL**

FREQUENCY METER

Rated Voltage	Measurement range	Approx. VA consumption		Attachment (Transducer)
		AL-110NC, 80NC	AL-65C	
110V (2)	45~55Hz 55~65Hz 45~65Hz (1) 350~450Hz (1)	1.5VA	1.7VA	AL-65C: FT-62M
220V (2)	45~55Hz 55~65Hz 45~65Hz (1) 350~450Hz (1)	1.5VA	2.5VA	

Note:

(1) Class: 1.0

Special frequency range can be manufactured as well (up to 1000Hz)

(2) Applicable voltage range: 90~130V for 110V; 180~260V for 220V.

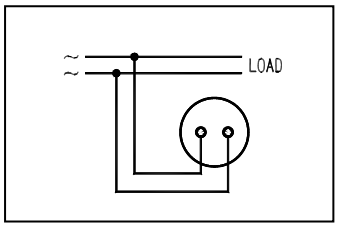
Please consultation with us for manufactured the above rated voltage and applicable voltage range.

For SCR Control Wareform

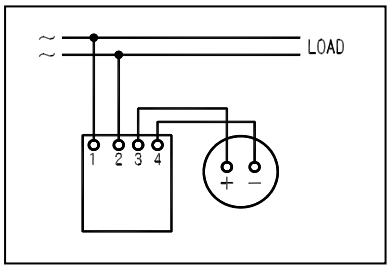
Meter for SCR waveform input (distortion waveform) can be manufactured as well. (H at end of type name)

Type Name: AL-110CH

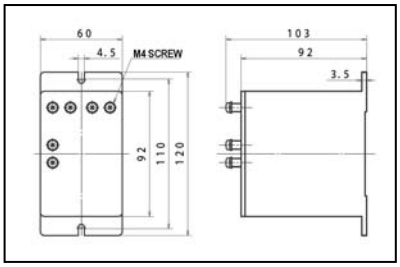
■ CONNECTION DIAGRAM



Frequency

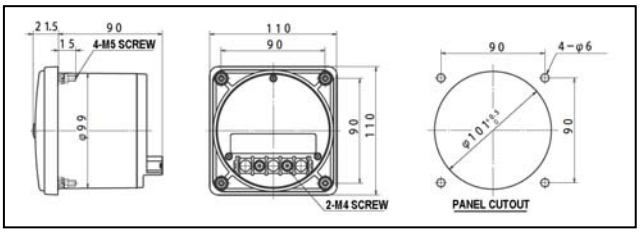


Frequency External with FT-62M

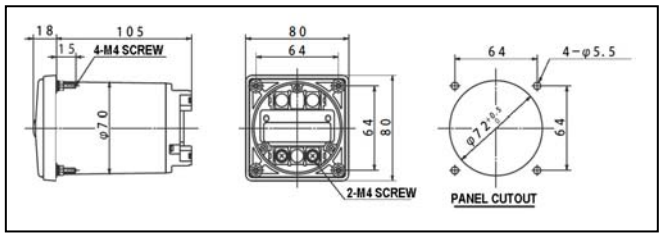


FT-62M

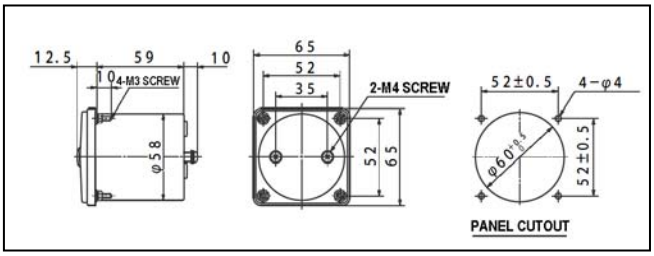
■ DIMENSIONS for CL & YL Type



L-110NC



L-80C



L-65C

POWER FACTOR METER (TRANSDUCER TYPE) **PL**

POWER FACTOR METER

Application	Type	Rating (2)	Approx. VA consumption		Attachment (Transducer)	
			Voltage side	Current side	80C	65C
Single Phase (1)	PL-110NC-12 80NC-12 65C-12	110V, 5A(1A) 220V, 5A(1A)	0.6VA 1.2VA	0.9VA 0.9VA	–	PT-62M-12 (3)
3 phase (balanced)	PBL-110NC33 80NC33 65C33	110V, 5A(1A) 220V, 5A(1A)	0.6VA each phase 1.2VA each phase	0.9VA each phase 0.9VA each phase	–	PBT-62M-33 (3)
3 phase (unbalanced) (1)	PL-110NC-33 80C-33 65C-33	110V, 5A(1A) 220V, 5A(1A)	1.9VA each phase 4.0VA each phase	1.1VA each phase 1.1VA each phase	PT-53MC-33	PT-63M-33 (3)
3 phase 4 wire (unbalanced) (1)	PL-110NC-34 80C-34 65C-34	110/√3V,5A(1A) 220/√3V,5A(1A)	0.8VA each phase 2.5VA each phase	1.1VA each phase 1.1VA each phase	PT-53MC-34	PT-64M-34 (3)

Note:

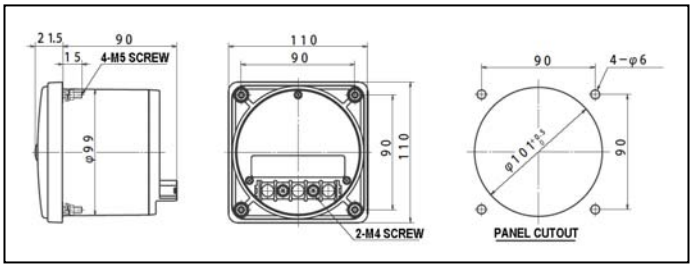
(1) Standard scale is Lead0.5~1~Lag0.5.
Only available for 3 phase 3 wire: Lead0~1~Lag0 (effective measuring range: Lead0.3~1~Lag0.3)
Please specify the frequency either 50Hz or 60Hz (except 3 phase balanced circuit).

(2) In case above rating is exceeding, use 110V, 5A (1A) meter external with CT or VT respectively.
Applicable voltage range: 90~130V for 110V; 180~260V for 220V.
Please use the meter in positive phase sequence.

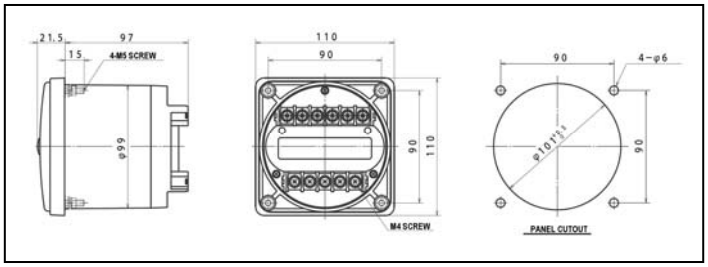
(3) Voltage side consumption VA of PL-65 is max. 2VA.

■ DIMENSIONS

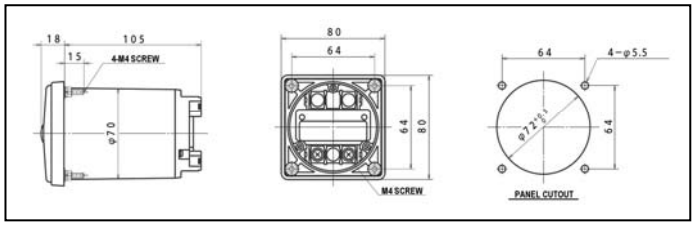
PBL-110NC



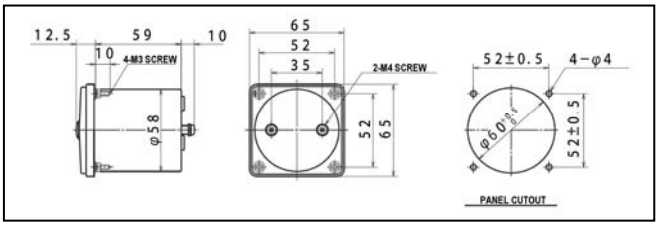
PL-110NC



L80C / L-80NC

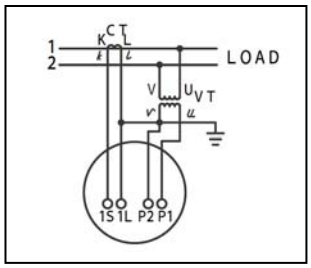


L-65C

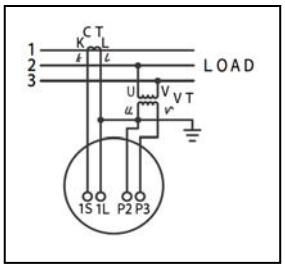


■ CONNECTION DIAGRAM

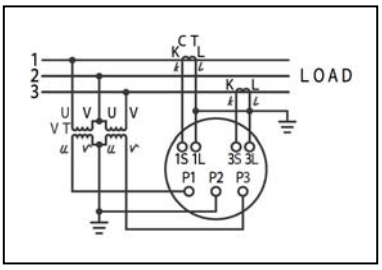
L-110C



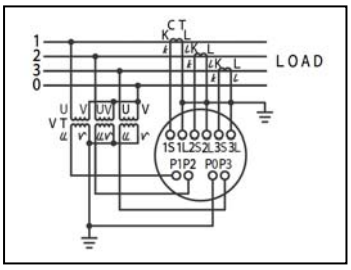
Single Phase
Power Factor Meter



3 Phase 3 Wire Power
Factor Meter (Balanced)

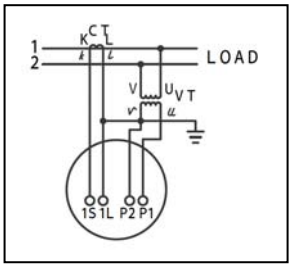


3 Phase 3 Wire Power
Factor Meter (Unbalanced)

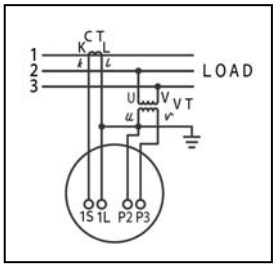


3 Phase 4 Wire
Power Factor Meter

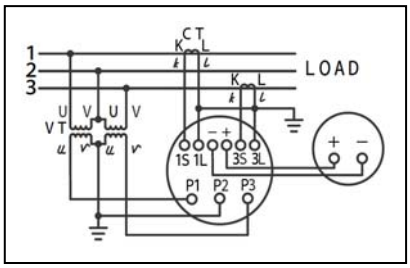
L-80C



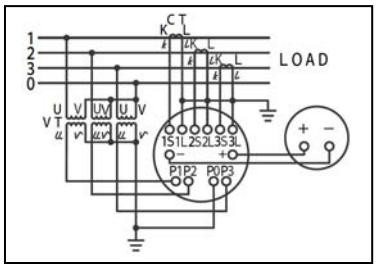
Single Phase
Power Factor Meter



3 Phase 3 Wire Power
Factor Meter (Balanced)

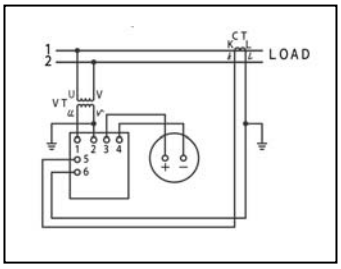


3 Phase 3 Wire Power Factor
Meter (Unbalanced)
External with PT-53MC-33

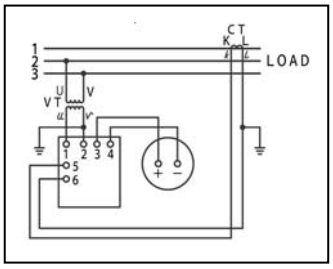


3 Phase 4 Wire Power
Factor Meter External
with PT-53MC-34

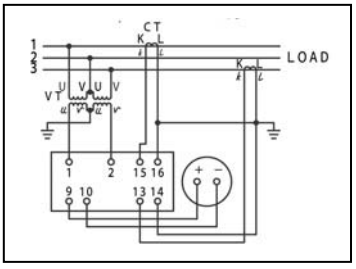
L-65C



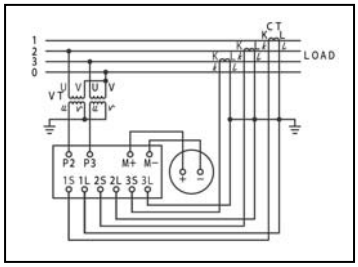
Single Phase Power Factor
Meter External with
PT-62M-12



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

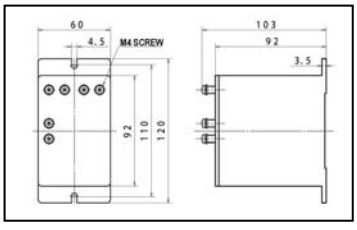


3 Phase Unbalanced Power
Factor Meter External with
PT-63M-33

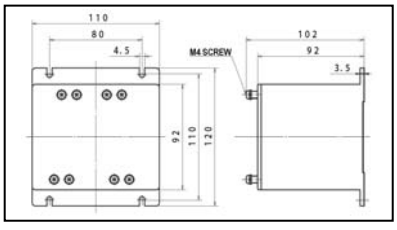


3 Phase 4 Wire Unbalanced
Power Factor Meter
External with PT-64M-34

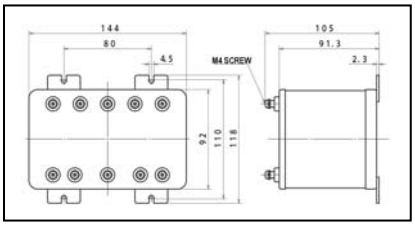
■ DIMENSIONS for Attachment Transducer



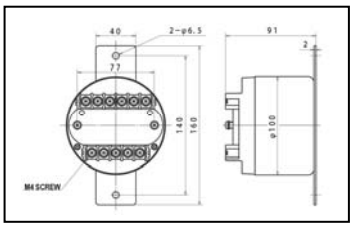
□T-62M□-□



PT-63M-33



□T-64M-□



□T-53MC-□

WATTHOUR METER

APPLICATION	TYPE	RATING (2)	APPROX. VA CONSUMPTION		ATTACHMEN (TRANSDUCER)	
			Voltage side	Current side	80C	65C
Single phase	WL-110NC-12 80C-12 65C-12	110V, 5A(1A)	1.7VA	0.5VA	WT-53MC-12	WT-62M-12
		220V, 5A(1A)	3.7VA	0.5VA		
Single phase 3 wire	WL-110NC-13 80C-13 65C-13	110V, 5A(1A)	1.7VA each phase	0.5VA each phase	WT-53MC-13	WT-83M-13
3 phase 3 wire	WL-110NC-33 80C-33 65C-33	110V, 5A(1A)	1.7VA each phase	0.5VA each phase	WT-53MC-33	WT-83M-33
		220V, 5A(1A)	3.7VA each phase	0.5VA each phase		
3 phase 4 wire (1)	WL-110NC-34 80C-34 65C-34	110/√3V, 5A(1A)	0.8VA each phase	0.5VA each phase	WT-53MC-34	WT-83M-34
		220/√3V, 5A(1A)	2.5VA each phase	0.5VA each phase		

Note:

(1) 3 phase 4 wire is voltage balanced.

(2) In case above rating is exceeding, use 110V, 5A (1A) meter external with CT or VT respectively.
Applicable voltage range: 90~130V for 110V; 180~260V for 220V.

VAR METER (1)

APPLICATION	TYPE	RATING (4)	APPROX. VA CONSUMPTION		ATTACHMENT (TRANSDUECER)	
			Voltage side	Current side	80C	65C
Single phase (2)	WVL-110NC-12 80C-12 65C-12	110V,5A(1A)	1.7VA	0.5VA	WVT-53MC-12	WVT-62M-12
		220V,5A(1A)	1.4VA	0.5VA		
3 phase 3 wire (3)	WVL-110NC-33 80C-33 65C-33	110V,5A(1A)	1.7VA each phase	0.5VA each phase	WVT-53MC-33	WVT-83M-33
		220V,5A(1A)	3.7VA each phase	0.5VA each phase		
3 phase 4 wire (3)	WVL-110NC-34 80C-34 65C-34	110V,5A(1A)	1.7VA each phase	0.5VA each phase	WVT-53MC-34	WVT-83M-34
		220V,5A(1A)	3.7VA each phase	0.5VA each phase		

Note:

(1) Standard scale is Lead□var~0~Lag□var.

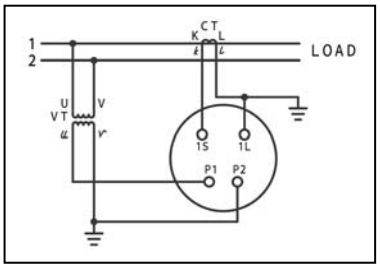
(2) Please specify the frequency either 50Hz or 60Hz for single phase circuit.

(3) 3 phase 3 wire & 3 phase 4 wire is voltage balanced. Please use in positive phase sequence.

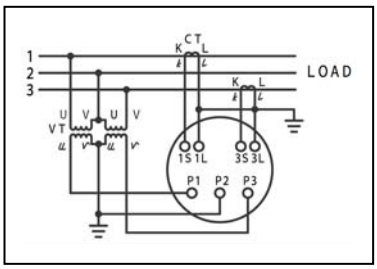
(4) In case above rating is exceeding, use 110V, 5A(1A) meter external with CT or VT respectively.
Applicable voltage range: 90~130V for 110V; 180~260V for 220V.
Please use in positive phase sequence.

■ CONNECTION DIAGRAM

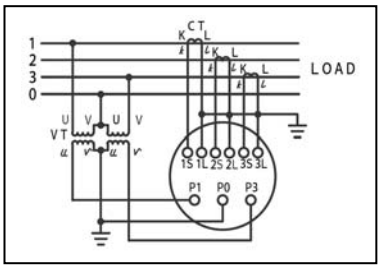
L-110NC



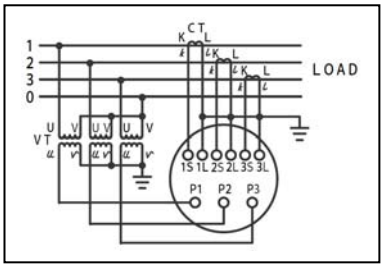
Single Phase Watthour Meter
Single Phase Var Meter



Single Phase 3 wire, 3 Phase 3 Wire
Watthour Meter
3 Phase 3 Wire Var Meter

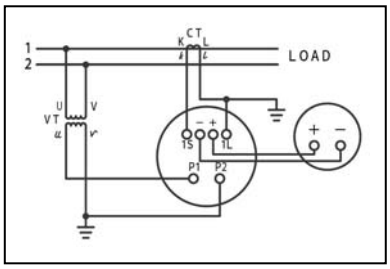


3 Phase 4 Wire Watthour Meter

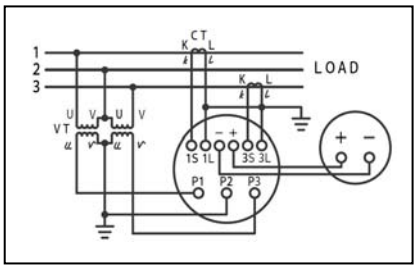


3 Phase 4 Wire Var Meter

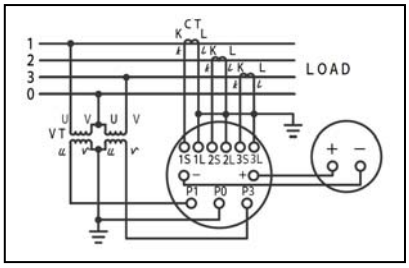
L-80C



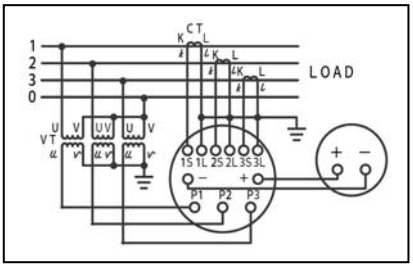
Single Phase Watthour Meter /
Single Phase Var Meter
External with WT (WVT)-53MC-12



Single Phase 3 Wire,
3 Phase 3 Wire Watthour Meter
3 Phase 3 Wire Var Meter
External with WT (WVT)-53MC-33

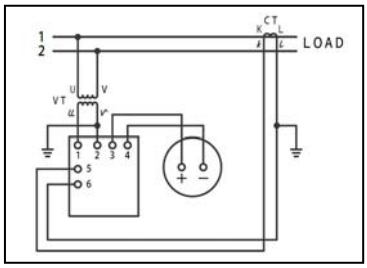


3 Phase 4 Wire Watthour Meter
External with WT-53MC-34

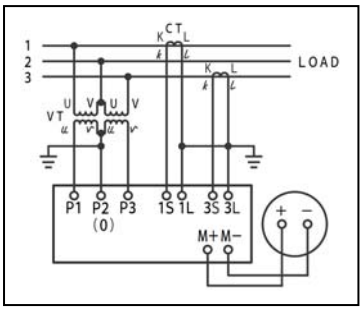


3 Phase 4 Wire Var Meter
External with WVT-53MC-34

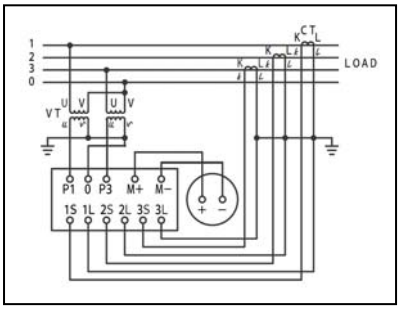
L-65C



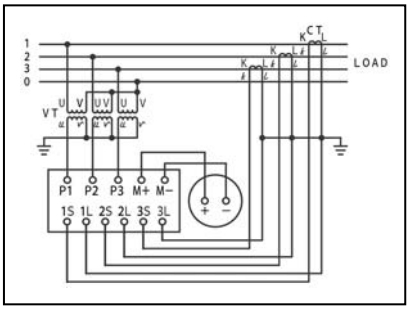
Single Phase Watthour Meter &
Var Meter
External with WT (WVT) -62M-12



Single Phase 3 Wire
Watthour Meter & Var Meter
3 Phase Watthour Meter & Var Meter
External with WT (WVT)-83M-33



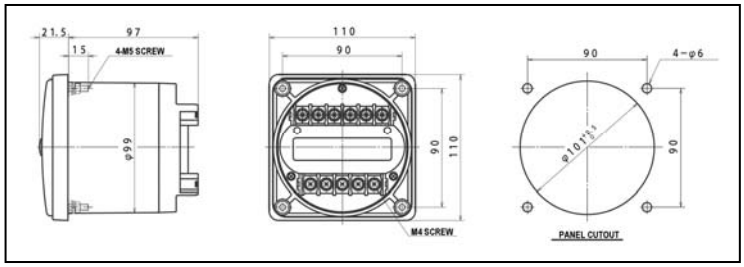
3 Phase 4 Wire Watthour Meter
External with WT-53MC-34



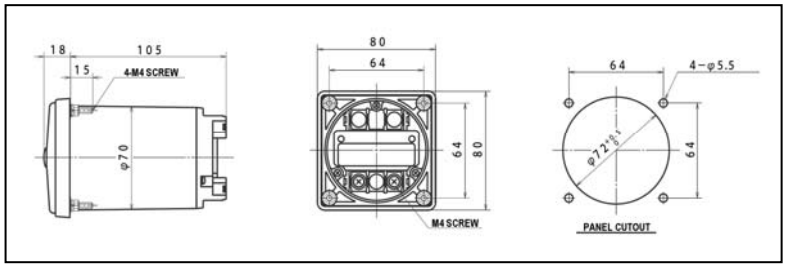
3 Phase 4 Wire Var Meter
External with WVT-83M-34

■ DIMENSIONS

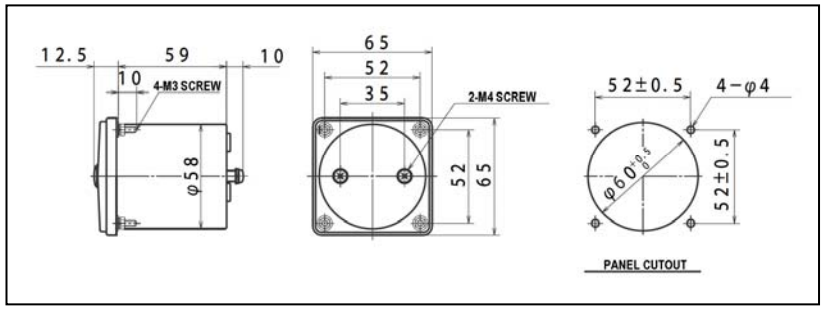
L-110NC



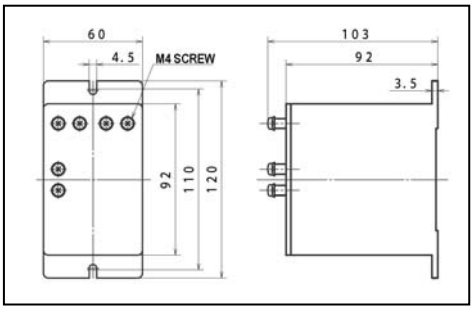
L-80C



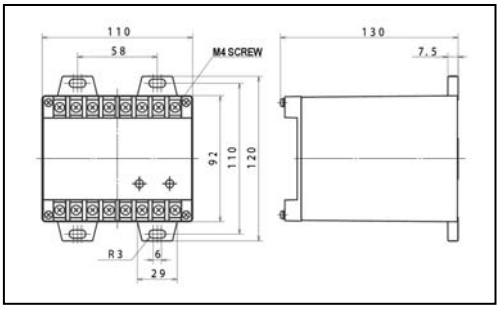
L-65C



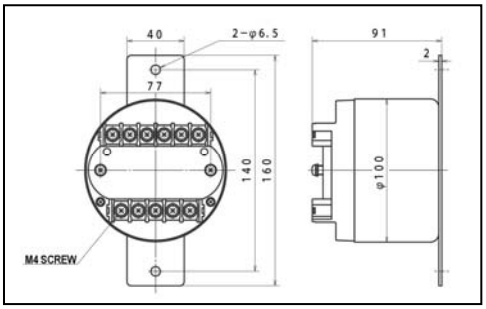
■ DIMENSIONS
For Attachment Transducer



□T-62M□-□



□T-83M-□



□T-53MC-□

Terminal cover is optional.
Please specify terminal cover if need.

§ Wide Angle METER §

WATTHOUR METER / VAR METER (TRANSDUCER TYPE) **WL WVL**

■ MANUFACTURABLE CHARACTERISTIC RANGE OF MAX. SCALE VALUE

Manufacturable range will be limited where intrinsic max. scale value is within the scope as shown in the right list. But in the case, the meter is used with 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 Max. Scale Value	
				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)

■ STANDARD CHARACTERISTIC RANGE OF MAX. SCALE VALUE OF 3 PHASE WATTHOUR METER

This table is the standard of 3-phase watthour meter. 3 phase 4 wire and single-phase 3-wire watthour meter, var meter are pursuant to this standard. The standard for single-phase watthour meter equal the values in the table multiplying 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	7.5	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

SYNCHROSCOPE METER (REVOLVING MAGNETIC FIELD MOVING IRON TYPE) **DL**

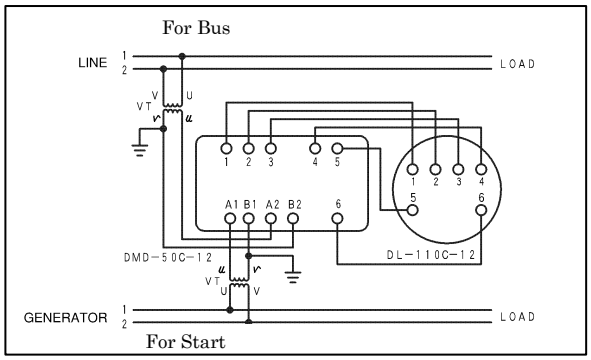
SYNCHROSCOPE METER

METHOD	TYPE	RATED VOLTAGE (1)	RATED FREQUENCY	APPROX. CONSUMPTION VA		ATTACHMENT IMPEDANCE CASE
				Start side	Bus side	
Single phase	DL-110C-12	110V	50Hz 60Hz	9.5VA	4.5VA	DMD-50C-12
3 phase	DL-110NC-33	110V	50Hz,60Hz Both can use	3.7VA each phase	4.5VA	—
		220V	50Hz, 60Hz Both can use	3.7VA each phase	4.5VA	—

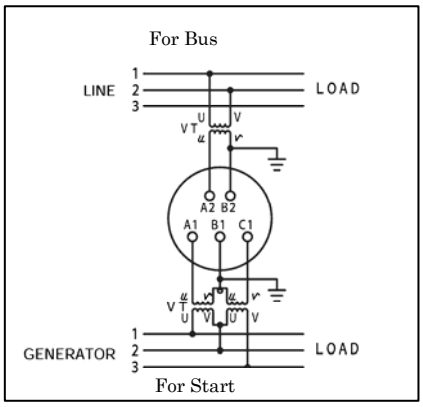
Note:

(1) In the case above rating is exceeding, use an 110V meter external with VT.

■ CONNECTION DIAGRAM

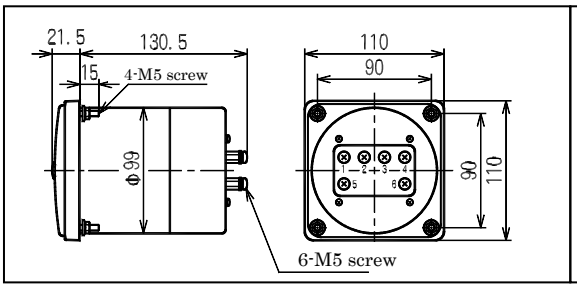


SINGLE PHASE
DL-110C-12

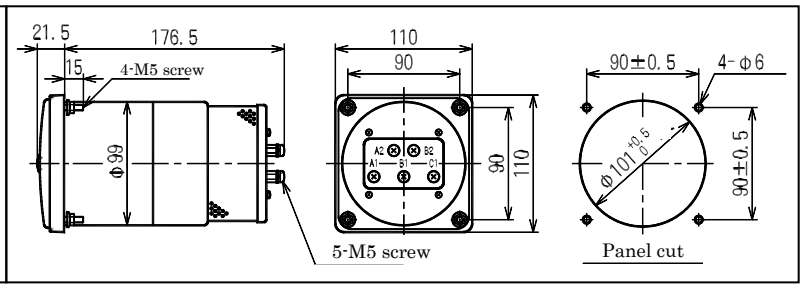


3 PHASE
DL-110NC-33

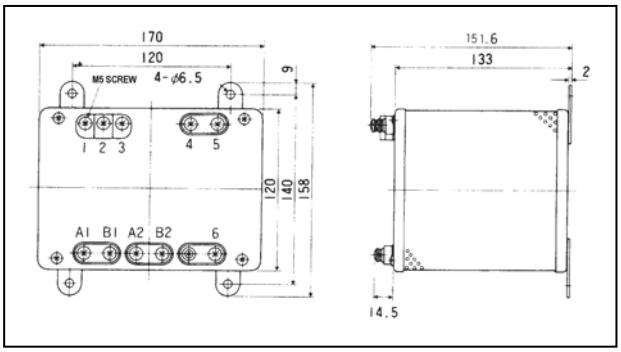
■ DIMENSIONS



SINGLE PHASE



3 PHASE



Attachmnt Impedance Case
DMD-50C-12

Terminal cover is optional.
Please specify if need.

§ Wide Angle METER §

POWER FLOW 3 PHASE POWER FACTOR METER (TRANSDUCER TYPE) **FPDL**

POWER FACTOR METER

METHOD	TYPE	RATED (1)	FREQUENCY	Aux Power (2)	APPROX. CONSUMPTION VA		
					Voltage side	Current side	Aux. power
3 phase 3 wire	FPDL-110C-33	110V, 5A(1A)	50Hz	AC110V AC220V DC110V	P1-P2 5VA 1.5A with aux. power P2-P3 1.5VA	Each 1VA or less	AC3.5VA DC4.5VA when aux. power is attach
			60Hz				
		220V, 5A(1A)	50Hz				
			60Hz				

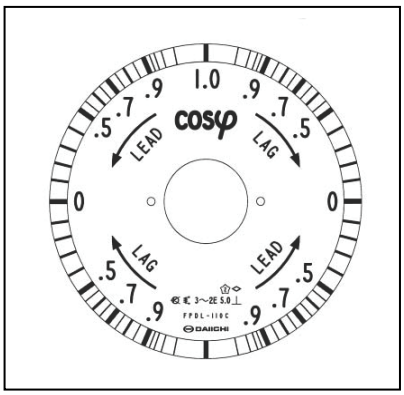
Note:

(1) In case above rating is exceeding, use 110V, 5A (1A) meter external with CT or VT respectively.
Please use the meter in positive phase sequence. (Wareform: Sine ware)

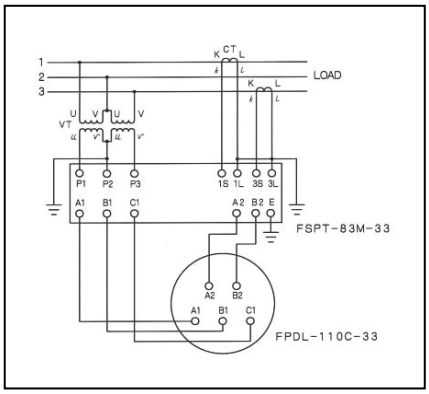
(2) Please specify with aux. power for turn down the consumption VA at voltage side.

(3) Standard scale for upside is receiving and downside is transmission.
Manufacture is possible by specify if upside is transmission and downside is receiving.

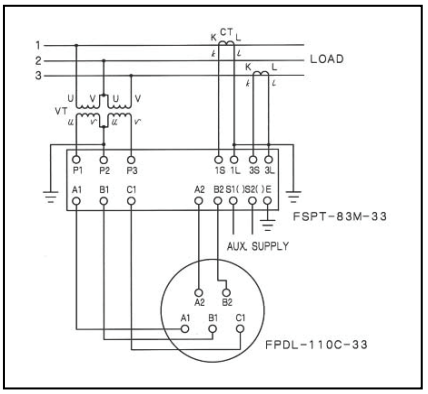
■ SCALE BOARD (3)



■ CONNECTION DIAGRAM

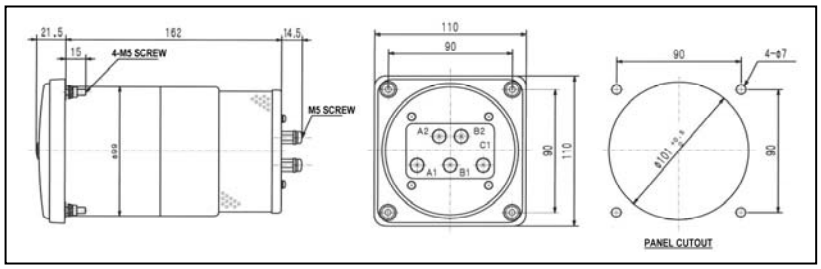


(1) Without Aux. Power
(Supplied by Input Voltage)



(2) With Aux. Power

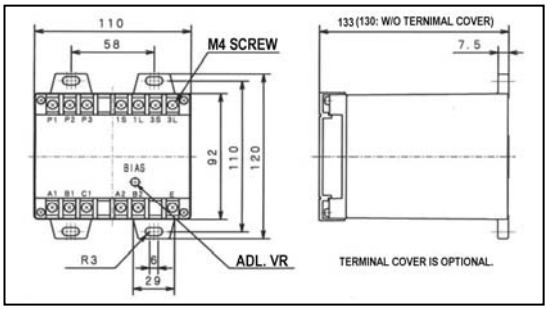
■ DIMENSIONS for Meter



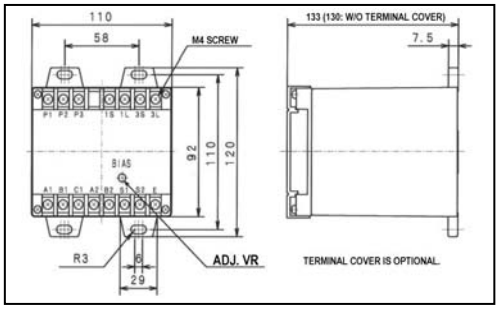
► **Terminal** cover is optional.
Please specify if terminal cover is need.

► **At** the time of installation, please select a place less then mechanical shock, dust and corrosive gas, a place free from the affection of electromagnetic field of a heavy current bus or a saturable reactor nearby.

■ DIMENSIONS for Attachment Transducer (FSPT-83M-33)



(1) Without Aux. Power
(Supplied by Input Voltage)



(2) With Aux. Supply