Varmeters

YP-208NVAR

YP-10NVAR

■Specifications

			Rectangular indicators				
			Y-2N Series			Y-N Series	
Size (width × height) mm			64×60	85×75	100×85	82×82	102×102
Model name			YP-206NVAR	YP-208NVAR	YP-210NVAR	YP-8NVAR	YP-10NVAR
Operation principle			Transducer			Transducer	
Accuracy (grade)			2.5			2.5	
Frequency			50 and 60Hz				
Scale length (mm)			55	70	85	70	90
Weight (kg)			0.07	0.1	0.1	0.1	0.15
Indicator rating and delivery period classification	Circuit	Rating: Secondary rating	Rating: Indicator rating (Po) kvar	Consumption VA: Voltage circuit	Consumption VA: Current circuit I_1 I_3	Consumption VA: Current circuit I_2	Accessory	Delivery period classification
	3-phase 3-wire	110V 5A	0.8~1.2	1.6	0.5	1.0	T-150	○
	3-phase 3-wire	220V 5A	1.6~2.4	3.2	0.5	1.0	T-150	○
	3-phase 4-wire	$\frac{110}{\sqrt{3}}$/110V 5A	0.8~1.2	1.6	0.5	1.0	T-150	○
	3-phase 4-wire	110/190V 5A	1.4~2.0	2.8	0.5	1.0	T-150	○
Page with outer dimensions drawing				35			36	

Remarks (1) The varmeters are bidirectional deflection indicators. Unidirectional deflection indicators can be manufactured upon request.

(2) In regards to "Indicator rating (Po) kvar" in the "Rating" column:

3-phase, 3-wire varmeters
- $Po=\sqrt{3}\times110V\times5A=953\simeq1kvar$ (Po=0.8 to 1.2kvar, taking into account adjustment range multiplying factors of 0.8 to 1.2)
- $Po=\sqrt{3}\times220V\times5A=1906\simeq2kvar$ (Po=1.6 to 2.4kvar, taking into account adjustment range multiplying factors of 0.8 to 1.2)

3-phase, 4-wire varmeters
- $Po=3\times\frac{110}{\sqrt{3}}V\times5A=\sqrt{3}\times110V\times5A=953\simeq1kvar$ (Po=0.8 to 1.2kvar, taking into account adjustment range multiplying factors of 0.8 to 1.2)
- $Po=3\times110V\times5A=\sqrt{3}\times190V\times5A=1650\simeq1.7kvar$ (Po=1.4 to 2.0kvar, taking into account adjustment range multiplying factors of 0.8 to 1.2)

(3) Regarding the maximum scale of a varmeter
- With a bidirectional deflection indicator, the left side is LEAD and the right side is LAG with respect to "zero" as the central division, and the standard scale indicates up to 1/2 of the maximum scale value. A scale indicating up to the maximum scale value can also be manufactured.
- With a unidirectional deflection indicator (with "zero" at the left end), the scale indicates up to the maximum scale value. Please specify LEAD or LAG; the standard is LAG.

(4) Models with a 1A current rating; can also be manufactured; the power consumption is basically the same as that of a 5A model.

(5) The T-150 rectifier is a dedicated accessory (non-compatible accessory), and thus cannot be used in combinations other than those designated for the indicators. The distance between the indicator and the T-150 rectifier must be 5m or less, or the round-trip lead wire resistance must be 0.5Ω or less.

(6) Use a varmeter with an input voltage in the range of 85 to 115% of the rated value (rated voltage ±15%).
The indication may be unstable when used with an input voltage of 85% or less of the rating or the input voltage is switched on and off.

(7) The weight of the T-150 rectifier is approximately 1kg.

(8) Please make sure to read the "Safety Precautions" (pp.5-8) and the "Selection Precautions" (p.9) to assist in selecting the model and use specifications suited to the application.

●Scale calculation formula for varmeter

Phase-wire system	Secondary rating	Scale calculation formula for varmeter	Remarks
3-phase 3-wire	110V 5A	Indicator scale P (kvar)=VT ratio × CT ratio × Po (0.8~1.2) × 1/2	●The value at the left is multiplied by 1/5 in the case of a CT secondary current of 1A.
	220V 5A	Indicator scale P (kvar)=CT ratio × Po (1.6~2.4) × 1/2	
3-phase 4-wire	$\frac{110}{\sqrt{3}}$/110V 5A	Indicator scale P (kvar)=VT ratio × CT ratio × Po (0.8~1.2) × 1/2	
	110/190V 5A	Indicator scale P (kvar)=VT ratio × CT ratio × Po (1.4~2.0) × 1/2	

Calculation example: In the case of a 3-phase, 3-wire circuit, VT 6600/110V and CT 100/5A, and a bidirectional deflection indicator with a scale indicating up to 1/2 the maximum scale value.

$$\text{Indicator scale P (kvar)}=\frac{6600}{110}\times\frac{100}{5}\times Po\ (0.8\sim1.2)\times1/2 = 480\sim720kvar$$

The manufacturable range of the varmeter scale is thus LEAD (480 to 720) ~ 0 ~ LAG (480 to 720) kvar.

The manufacturable range differs slightly according to the rating. For details, refer to the "Varmeter Scale Selection Reference Table" (p.60).

YP-12NVAR

LP-110NVAR

■Specifications

				Rectangular indicators					Wide-angle indicators								
				Y-N Series					L-N Series								
Size (width × height) mm				122×122					80×80					110×110			
Model name				YP-12NVAR					LP-80NVAR					LP-110NVAR			
Operation principle				Transducer					Transducer								
Accuracy (grade)				1.5					2.5					1.5			
Scale length (mm)				100					124					175			
Weight (kg)				0.5					0.3					0.6			
Indicator rating and delivery period classification	Circuit	Rating		Consumption VA			Accessory	Delivery period classification	Consumption VA			Accessory	Delivery period classification	Consumption VA			Accessory	Delivery period classification
		Secondary rating	Indicator rating (Po) kvar	Voltage circuit	Current circuit I_1 I_3	Current circuit I_2			Voltage circuit	Current circuit I_1 I_3	Current circuit I_2			Voltage circuit	Current circuit I_1 I_3	Current circuit I_2		
	3-phase 3-wire	110V 5A	0.8~1.2	1.6	0.5	1.0	—	○	1.6	0.5	1.0	T-150	○	1.6	0.5	1.0	—	○
		220V 5A	1.6~2.4	3.2	0.5	1.0	—	○	3.2	0.5	1.0	T-150	○	3.2	0.5	1.0	—	○
	3-phase 4-wire	$\frac{110}{\sqrt{3}}$/110V 5A	0.8~1.2	1.6	0.5	1.0	—	○	1.6	0.5	1.0	T-150	○	1.6	0.5	1.0	—	○
		110/190V 5A	1.4~2.0	2.8	0.5	1.0	—	○	2.8	0.5	1.0	T-150	○	2.8	0.5	1.0	—	○
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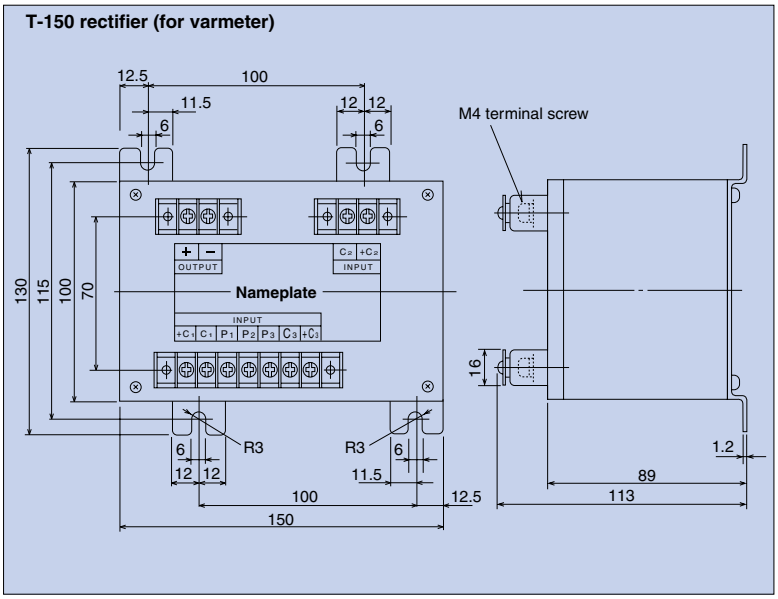
Delivery period classification

Symbol	◎Standard product	○Quasi-standard product	△Special product
Reference delivery period	Immediate delivery	Within 20 days	21 to 60 days

■Outer dimensions of accessory

T-150 rectifier (for varmeter)



■Ordering method

The items in [ ] must be specified.

Model name	Phase-wire system	Indicator rating	Scale	VT ratio	CT ratio	Cover type	Special specifications	Number of units
YP-12NVAR	3P3W	110V 5A	LEAD600-0-LAG600kvar	6600/110V	100/5A	B	Double scale, colored lines, etc.	2
			(Unidirectional deflection indicator) 0-LAG1200kvar					

Varmeters

■Connection diagrams

●3-phase, 3-wire system

Fig. 1 YP-206NVAR, YP-208NVAR, YP-210NVAR, YP-8NVAR, YP-10NVAR and LP-80NVAR (combined with CT)

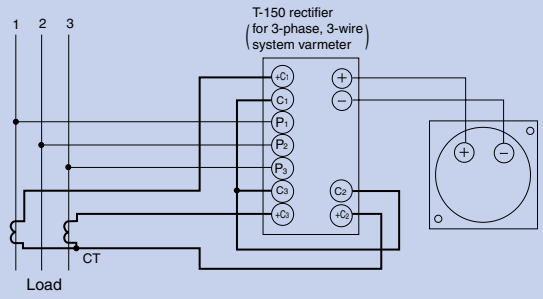


Fig. 2 YP-206NVAR, YP-208NVAR, YP-210NVAR, YP-8NVAR, YP-10NVAR and LP-80NVAR (combined with VT and CT)

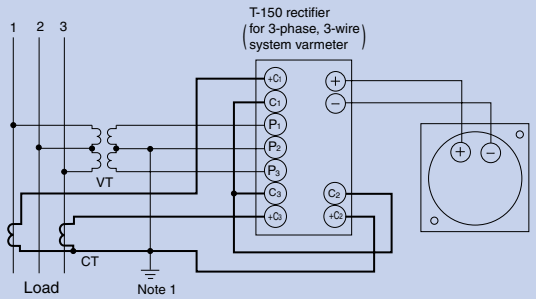


Fig. 3 YP-12NVAR and LP-110NVAR (combined with CT)

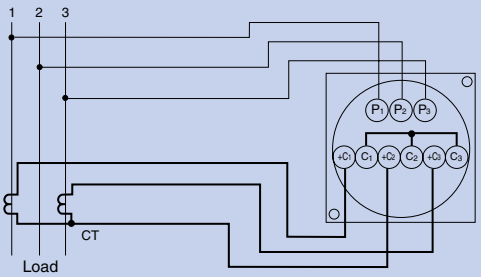
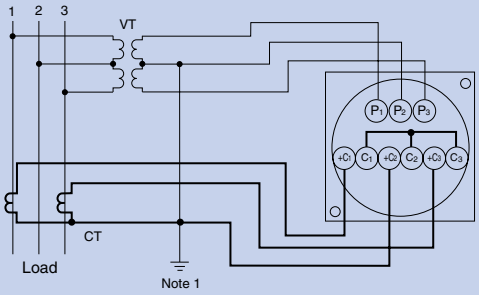


Fig. 4 YP-12NVAR and LP-110NVAR (combined with VT and CT)



●3-phase, 4-wire system

Fig. 5 YP-206NVAR, YP-208NVAR, YP-210NVAR, YP-8NVAR, YP-10NVAR and LP-80NVAR (combined with CT)

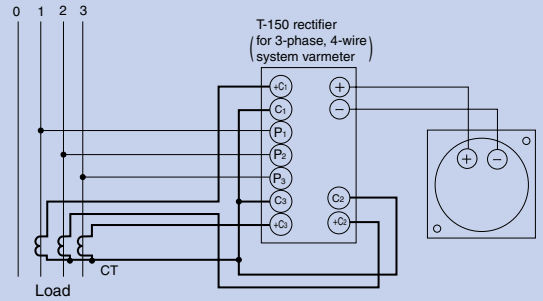


Fig. 6 YP-206NVAR, YP-208NVAR, YP-210NVAR, YP-8NVAR, YP-10NVAR and LP-80NVAR (combined with VT and CT)

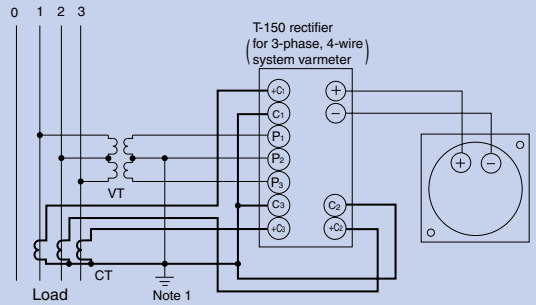


Fig. 7 YP-12NVAR and LP-110NVAR (combined with CT)

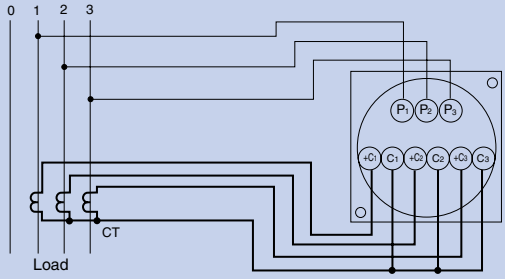
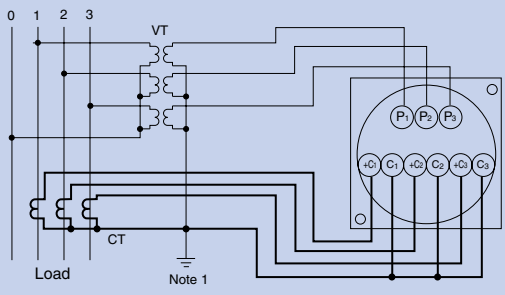


Fig. 8 YP-12NVAR and LP-110NVAR (combined with VT and CT)



Note 1. For low-voltage circuits, grounding of the secondary sides of the instrument voltage transformer and current transformer is unnecessary.

■Varmeter Scale Selection Reference Table

Although the maximum scale of a varmeter can be determined by VT ratio × CT ratio × indicator rating (Po), the following table shows the manufacturable scale values (minimum, standard and maximum) for various VT and CT ratios.
If a scale value other than the standard scale value is desired, specify a suitable scale within the manufacturable range.

●Table of manufacturable maximum scales for varmeters

□ : Scale units kv_{ar} ▨ : Scale units Mvar

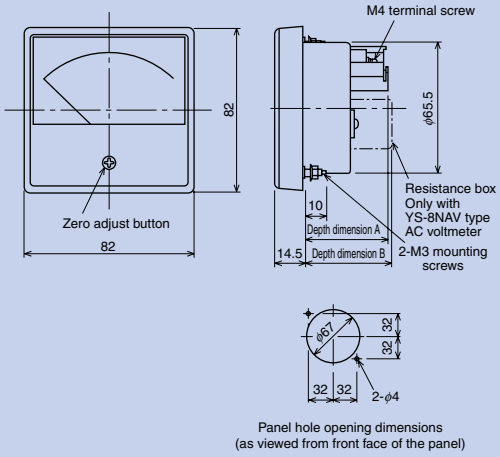
Indicator scale		When the indicator scale of a bidirectional deflection indicator is to indicate up to 1/2 of the maximum scale value (standard)								When the indicator scale of a unidirectional deflection indicator is to indicate up to the maximum scale value In the case of a bidirectional deflection indicator						
Phase-wire system		3-phase 3-wire/3-phase 4-wire (line voltage)								3-phase 3-wire/3-phase 4-wire (line voltage)						
Manufacturable range / Voltage VT ratio / CT ratio		220	440	3300	6600	11000	22000	33000	66000	220	440	3300	6600	22000	33000	66000
		220 /110	440 /110	3300 /110	6600 /110	11000 /110	22000 /110	33000 /110	66000 /110	220 /110	440 /110	3300 /110	6600 /110	22000 /110	33000 /110	66000 /110
25/5	Minimum	4	8	60	120	200	400	600	1200	8	15	120	240	800	1200	2400
	Standard	5	10	75	150	250	500	750	1500	10	20	150	300	1000	1500	3000
	Maximum	6	12	90	180	300	600	900	1800	12	25	180	350	1200	1800	3500
50/5	Minimum	8	15	120	240	400	800	1200	2400	15	30	240	450	1500	2400	4500
	Standard	10	20	150	300	500	1000	1500	3000	20	40	300	600	2000	3000	6000
	Maximum	12	24	180	350	600	1200	1800	3500	25	50	350	750	2500	3500	7500
75/5	Minimum	12	24	180	350	600	1200	1800	3500	24	45	350	700	2400	3500	7000
	Standard	15	30	220	450	750	1500	2200	4500	30	60	450	900	3000	4500	9000
	Maximum	18	35	270	500	900	1800	2700	5000	35	75	500	1000	3500	5000	10
100/5	Minimum	16	30	240	450	800	1600	2400	4500	30	60	450	900	3000	4500	9000
	Standard	20	40	300	600	1000	2000	3000	6000	40	80	600	1200	4000	6000	12
	Maximum	24	50	350	750	1200	2400	3500	7500	50	100	750	1500	5000	7500	15
150/5	Minimum	24	45	350	700	1200	2400	3500	7000	45	90	700	1400	4500	7000	14
	Standard	30	60	450	900	1500	3000	4500	9000	60	120	900	1800	6000	9000	18
	Maximum	35	75	500	1000	1800	3500	5000	10	75	150	1000	2000	7500	10	20
200/5	Minimum	30	60	450	900	1600	3000	4500	9000	60	120	900	1800	6000	9000	18
	Standard	40	80	600	1200	2000	4000	6000	12	80	160	1200	2400	8000	12	24
	Maximum	50	100	750	1500	2400	5000	7500	15	100	180	1500	3000	10	15	30
300/5	Minimum	45	90	700	1400	2400	4500	7000	14	90	180	1400	2800	9000	14	28
	Standard	60	120	900	1800	3000	6000	9000	18	120	240	1800	3600	12	18	36
	Maximum	75	150	1000	2000	3500	7500	10	20	150	300	2000	4000	15	20	40
400/5	Minimum	60	120	900	1800	3000	6000	9000	18	120	250	1800	3800	12	18	38
	Standard	80	160	1200	2400	4000	8000	12	24	160	320	2400	4800	16	24	48
	Maximum	90	180	1500	3000	5000	10	15	30	180	350	3000	6000	18	30	60
600/5	Minimum	90	180	1400	2800	4500	9000	14	28	180	380	2800	6000	18	28	60
	Standard	120	240	1800	3600	6000	12	18	36	240	480	3600	7200	24	36	72
	Maximum	150	300	2000	4000	7500	15	20	40	300	600	4000	8500	30	40	85
800/5	Minimum	120	250	1800	3800	6000	12	18	38	250	500	3800	7500	25	38	75
	Standard	160	320	2400	4800	8000	16	24	48	320	640	4800	9600	32	48	96
	Maximum	180	350	3000	6000	10	18	30	60	350	750	6000	12	35	60	120
1200/5	Minimum	180	380	2800	6000	9000	18	28	60	380	750	6000	12	38	60	120
	Standard	240	480	3600	7200	12	24	36	72	480	960	7200	14	48	72	140
	Maximum	300	600	4000	8500	15	30	40	85	600	1200	8500	18	60	85	180
1500/5	Minimum	240	450	3500	7000	12	24	35	70	450	900	7000	14	45	70	140
	Standard	300	600	4500	9000	15	30	45	90	600	1200	9000	18	60	90	180
	Maximum	350	750	5000	10	18	35	50	100	750	1500	10	20	75	100	200
2000/5	Minimum	300	600	4500	9000	16	30	45	90	600	1200	9000	18	60	90	180
	Standard	400	800	6000	12	20	40	60	120	800	1600	12	24	80	120	240
	Maximum	500	1000	7500	15	24	50	75	150	1000	1800	15	30	100	150	300
3000/5	Minimum	450	900	7000	14	24	45	70	140	900	1800	14	28	90	140	280
	Standard	600	1200	9000	18	30	60	90	180	1200	2400	18	36	120	180	360
	Maximum	750	1500	10	20	35	75	100	200	1500	3000	20	40	150	200	400

Remarks (1) The standard indicator rating (Po) is 1kvar.
(2) For CT ratio scales not shown in the above table, multiply the ten-fold CT ratio scale values by 0.1 and the 1/10 CT ratio scale values by 10.

Note 1. Some of the maximum scale values in the table deviate from the VT ratio × CT ratio × adjustment range multiplying factor. This is because the best values are selected, and the values in the table are given priority.

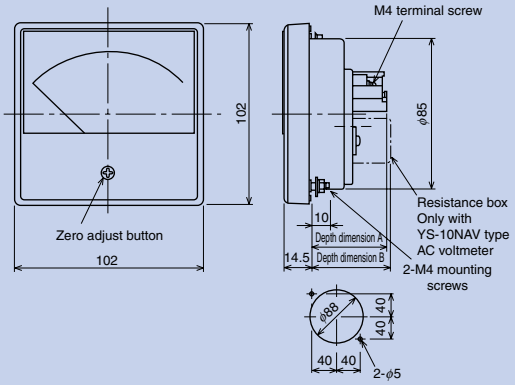
Rectangular indicators (Y-N Series)

FIG. 1 Y-8N



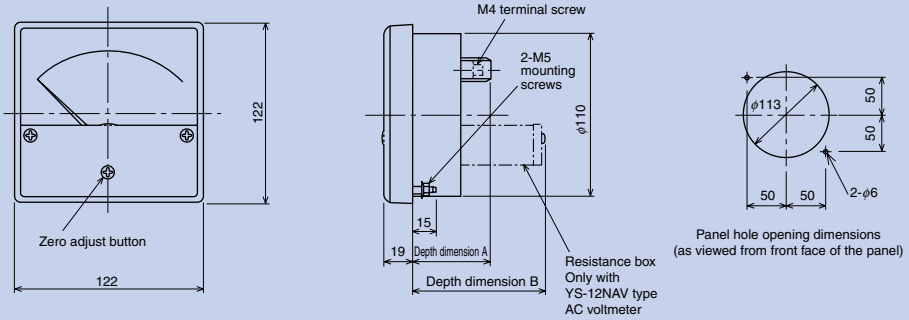
Panel hole opening dimensions
(as viewed from front face of the panel)

FIG. 2 Y-10N



Panel hole opening dimensions
(as viewed from front face of the panel)

FIG. 3 Y-12N



Panel hole opening dimensions
(as viewed from front face of the panel)

●Depth dimension details

Indicator type			Y-8N			Y-10N			Y-12N		
			Type name	A dimension	B dimension	Type name	A dimension	B dimension	Type name	A dimension	B dimension
DC	Ammeters		YM-8NDA	41	—	YM-10NDA	41	—	YM-12NDA	50	—
	Voltmeters		YM-8NDV	41	—	YM-10NDV	41	—	YM-12NDV	50	—
AC	Ammeters		YS-8NAA	41	—	YS-10NAA	41	—	YS-12NAA	50	—
		Uniform scale	YR-8NAA	41	—	YR-10NAA	41	—	YR-12NAA	50	—
	Voltmeters		YS-8NAV	41	43	YS-10NAV	41	43	YS-12NAV	50	85
		Uniform scale	YR-8NAV	41	—	YR-10NAV	41	—	YR-12NAV	50	—
	Wattmeters		YP-8NW	41	—	YP-10NW	41	—	YP-12NW	100	—
	Varmeters		YP-8NVAR	41	—	YP-10NVAR	41	—	YP-12NVAR	100	—
	Power-factor meters	Balanced	YP-8NPF	81	—	YP-10NPF	81	—	YP-12NPF	50 Note	—
		Unbalanced	YP-8NPFU	41	—	YP-10NPFU	41	—	YP-12NPFU	100	—
	Frequency meters		YP-8NF	81	—	YP-10NF	81	—	YP-12NF	50	—
	Receiving indicators	DC indicators	YM-8NRI	41	—	YM-10NRI	41	—	YM-12NRI	50	—
		AC indicators	YR-8NRI	41	—	YR-10NRI	41	—	YR-12NRI	50	—

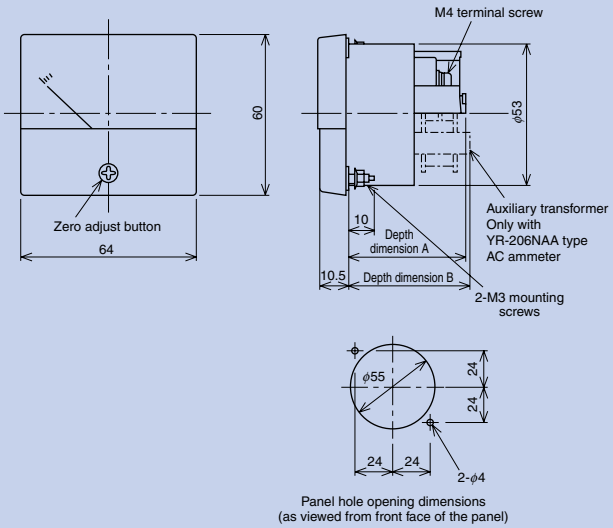
Note. 100mm in the case of a model for 1-phase 2-wire systems.

Outer Dimension Drawings

(Refer to the specification tables regarding models other than the Y-2N series, Y-N series, and L-N series.)

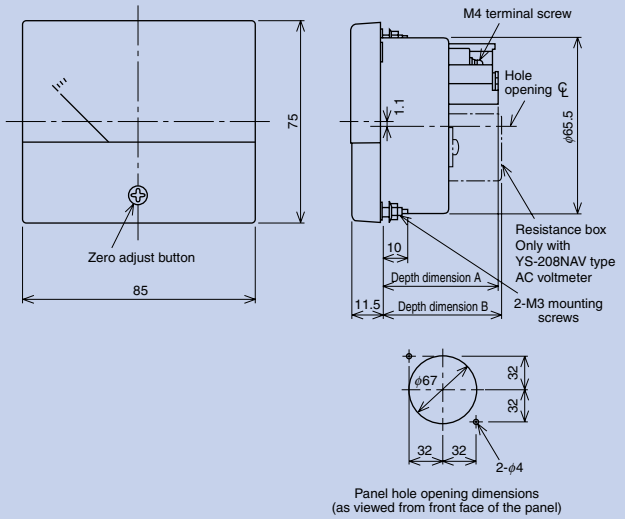
Rectangular indicators (Y-2N Series)

FIG. 1 Y-206N



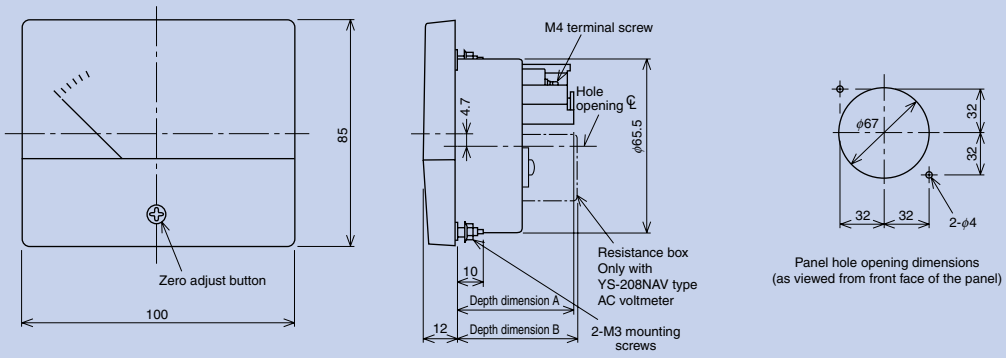
Panel hole opening dimensions (as viewed from front face of the panel)

FIG. 2 Y-208N



Panel hole opening dimensions (as viewed from front face of the panel)

FIG. 3 Y-210N



Panel hole opening dimensions (as viewed from front face of the panel)

●Depth dimension details

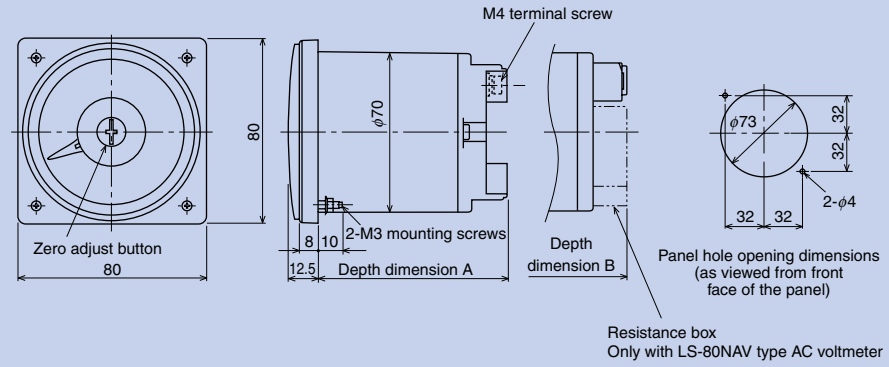
Indicator type			Y-206N			Y-208N			Y-210N		
			Type name	A dimension	B dimension	Type name	A dimension	B dimension	Type name	A dimension	B dimension
DC	Ammeters		YM-206NDA	43	—	YM-208NDA	43	—	YM-210NDA	43	—
	Voltmeters		YM-206NDV	43	—	YM-208NDV	43	—	YM-210NDV	43	—
AC	Ammeters		YS-206NAA	43	—	YS-208NAA	43	—	YS-210NAA	43	—
		Uniform scale	YR-206NAA	43	44	YR-208NAA	43	—	YR-210NAA	43	—
	Voltmeters		YS-206NAV	43	—	YS-208NAV	43	45	YS-210NAV	43	45
		Uniform scale	YR-206NAV	43	—	YR-208NAV	43	—	YR-210NAV	43	—
	Wattmeters		YP-206NW	43	—	YP-208NW	43	—	YP-210NW	43	—
	Varmeters		YP-206NVAR	43	—	YP-208NVAR	43	—	YP-210NVAR	43	—
	Power-factor meters	Balanced	YP-206NPF	43	—	YP-208NPF	43	—	YP-210NPF	43	—
		Unbalanced	YP-206NPFU	43	—	YP-208NPFU	43	—	YP-210NPFU	43	—
	Frequency meters		YP-206NF	83	—	YP-208NF	83	—	YP-210NF	83	—
	Receiving indicators	DC indicators	YM-206NRI	43	—	YM-208NRI	43	—	YM-210NRI	43	—
		AC indicators	YR-206NRI	43	—	YR-208NRI	43	—	YR-210NRI	43	—

Outer Dimensional Drawings

(Refer to the specification tables regarding models other than the Y-2N series, Y-N series, and L-N series.)

Wide-angle indicators (L-N Series)

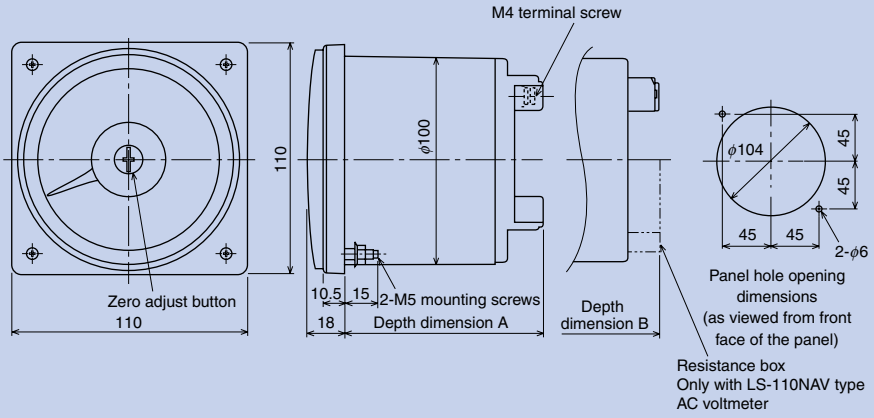
FIG. 1 L-80N



●Depth dimension details

Indicator type			L-80N Type name	A dimension	B dimension
DC	Ammeters		LM-80NDA	81	—
	Voltmeters		LM-80NDV	81	—
AC	Ammeters		LS-80NAA	—	81
		Uniform scale	LR-80NAA	81	—
	Voltmeters		LS-80NAV	—	81
		Uniform scale	LR-80NAV	81	—
	Wattmeters		LP-80NW	81	—
	Varmeters		LP-80NVAR	81	—
	Power-factor meters	Balanced	LP-80NPF	92	—
		Unbalance	LP-80NPFU	81	—
	Frequency meters		LP-80NF	92	—
Receiving indicators		DC indicators	LM-80NRI	81	—
		AC indicators	LR-80NRI	81	—

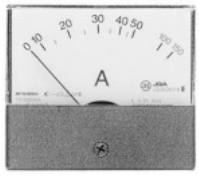
FIG. 2 L-110N



●Depth dimension details

Indicator type			L-110N Type name	A dimension	B dimension
DC	Ammeters		LM-110NDA	92	—
	Voltmeters		LM-110NDV	92	—
AC	Ammeters		LS-110NAA	—	92
		Uniform scale	LR-110NAA	92	—
	Voltmeters		LS-110NAV	—	92
		Uniform scale	LR-110NAV	92	—
	Wattmeters		LP-110NW	100	—
	Varmeters		LP-110NVAR	100	—
	Power-factor meters	Balanced	LP-110NPF	92	—
		Unbalance	LP-110NPFU	100	—
	Frequency meters		LP-110NF	92	—
Receiving indicators		DC indicators	LM-110NRI	92	—
		AC indicators	LR-110NRI	92	—

■Covers

Cover specification	Classification	Y-2N Series	Y-N Series	L-N Series
B design cover (Munsell N 1.5 semi-gloss)	◎			
G design cover (all transparent)	○			——
F design cover Note 1 (special color coating)	△			
Cover with red needle (can be manufactured for B, G, and F designs)	○			

Remarks The B design cover is standard specification. The G and F design covers and covers with red needles can be manufactured if required.
Note 1. When ordering the F-design cover, please use F as the cover code and specify the color coating. Munsell 7.5BG 4/1.5 will be used for orders with no color coating specified.

●Cover codes

Cover specifications	Without red needle	With red needle
B design	B	BR*1
G design	G	GR
F design	F	FR

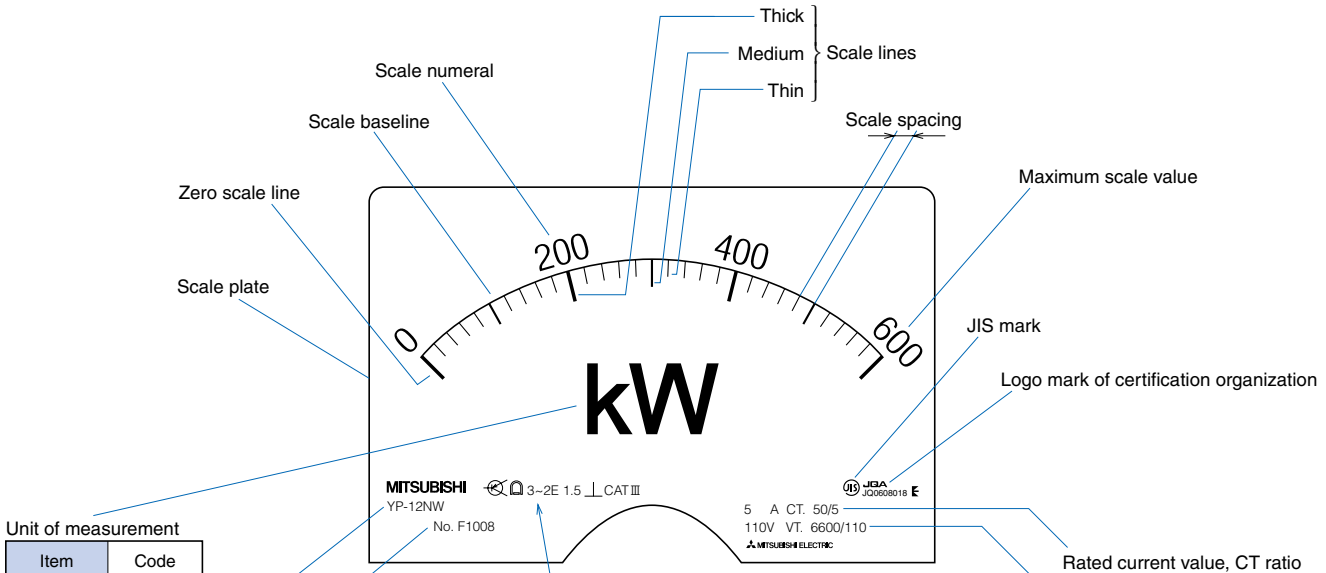
Remarks For the Y-N Series, a B cover with two red needles (BRR cover) can be manufactured depending on the model (please inquire for details).

●Accessories

Nuts for mounting screws are provided with all models. T-150 and other special accessories are indicated in the specification columns of the respective indicator types.

Common Specifications

■Scale plate components and items indicated



Item	Code
Ampere	A
Volt	V
Watt	W
Var	var
Power factor	cos ϕ or cos ψ
Hertz	Hz
Prefix	
Mega 10^6	M
Kilo 10^3	k
Milli 10^{-3}	m

3~2E 1.5 ⊥ CAT Ⅲ

Auxiliary symbols

Item	Symbol
Shunt	
Serial resistor	R
Accessory	

Operation principle

Item	Symbol
Permanent magnet/movable coil	
Movable iron core	
Bimetal	
Electronic device in measurement circuit	
Electronic device in auxiliary circuit	
Rectifier	

Type of measurement and number of elements measured

Item	Symbol
DC circuit	⎓
AC circuit	~
3-phase AC circuit	3~
Single element for 3-wire circuit	3~1E
Two elements for unbalanced load 3-wire circuit	3~2E
Two elements for unbalanced load 4-wire circuit	3N~2E
Three elements for unbalanced load 4-wire circuit	3N~3E

Accuracy class

Class index	Code
Class 0.5	0.5
Class 1	1
Class 1.5	1.5
Class 2.5	2.5
Class 5	5
Class 1.5 in the case where the base value corresponds to the span	|1.5|
Class 2.5 in the case where the base value corresponds to the span	|2.5|

Mounting attitude

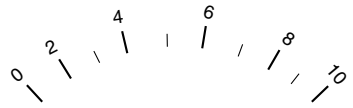
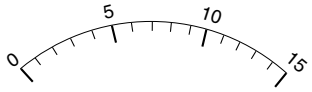
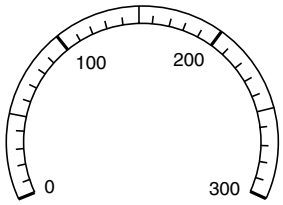
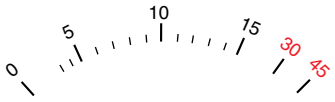
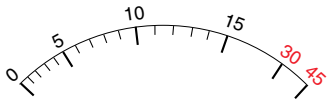
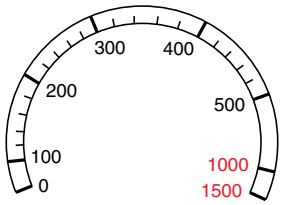
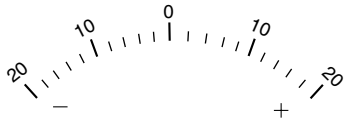
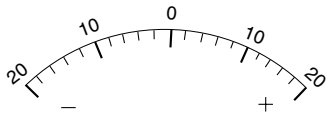
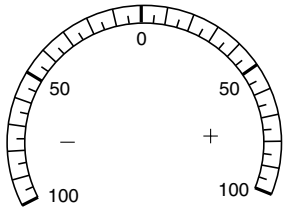
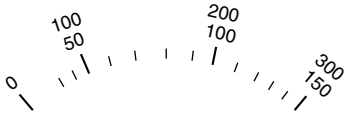
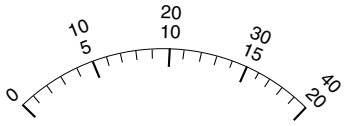
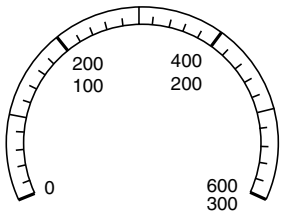
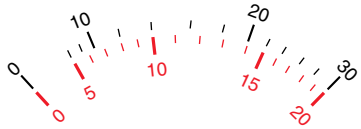
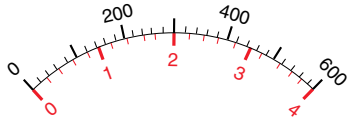
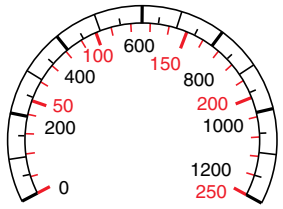
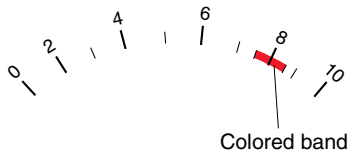
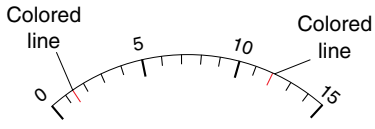
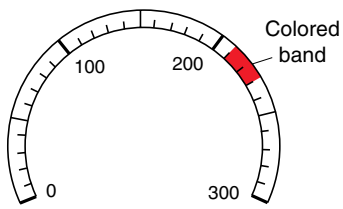
Item	Symbol
Instrument used with scale plate set vertically	⊥
Instrument used with scale plate set horizontally	⌐
Instrument used with scale plate set at a position inclined from the horizontal surface (example: 60°)	∠60°

Measurement category

Classification	Code
Measurement category Ⅲ	CAT Ⅲ

■Scale plate indications

The following tables show the scales, including numerals, colored lines, bands and colors, used as standard specifications.
Red, blue, green and yellow are used for the colored lines/bands.

	Y-2N Series	Y-N Series	L-N Series
Standard scale			
Expanded scale (expanded by 3 times)			
Positive/ Negative scale			
Single scale with double stamp			
Double scale with double stamp			
Colored lines Colored bands			

Remarks (1) See the “Standard Scale Diagrams” on pp.31 to 34 regarding the scale division with respect to the maximum scale value.
(2) Special scales can also be manufactured.