

SWITCHBOARD INSTRUMENTS

Yokogawa offers a complete line of switchboard instruments to meet your every needs.

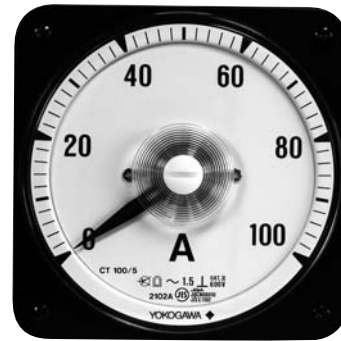
Model are available 110 mm and 80 mm square size 250° to measure all electrical quantities.

All switchboard instruments in the series feature rugged, friction free and shock resistant taut-band suspension elements.

All model of AC instruments except 80 mm size wattmeters and varmeters are self-contained transducer needless external transducer boxes.

The built-in transducer system offer many advantages including low cost, linear scales, greatly reduced volt-ampere loss.

Yokogawa switchboard instruments offer a variety Models, such as from single phase to three phase four wire instruments, as well as model for balanced and unbalanced circuits. All instruments except synchroscope are complied with JIS C 1102.



Type 2101A to 2109A

110 mm square size switchboard instruments Series. Plastic case with safety terminal protection cover.

Features

- RMS rectifier type AC instruments
- Platform scale --- No shadow on scale and readable, even from sharp angles
- Interchangeable scales save time
- Easy to read linear scales and wide deflection angles
- Taut-Band suspension --- eliminate friction and protects against shock
- Uni-framable case and terminal board
- Provide terminal protect cover for safety



Type 2181A to 2188A









80 mm square size miniature switchboard instruments series high space utility.

Specifications

In accordance with Japan Industrial Standard JIS C 1102: 2007

- Accuracy ----- See next page
- Full Scale Deflection Angle ----- 250°(360° for Synchroscope)
- Full Scale Length ----- Approx. 196mm (7.7") for 110mm SQ
140mm (5.5") for 80mm SQ
- Position of Use ----- Vertical (Scale)
- Pointer ----- Lance type Pointer, Black
- Operating Temperature Range ----- 0 to 40 °C
- Operating Humidity Range ----- 25 to 80 %RH
- Storage Temperature Range ----- -10 to 50°C
- Storage Humidity Range ----- 25 to 80 %RH
- Dielectric Strength ----- Between electrical circuit and the case: 3320V AC for 5 seconds
Between current circuit and voltage circuit: 2600V AC for 5 seconds
For Wattmeters, Varmeters and Power factormeters (2000V AC for 2185A, 2186A and 2187A)
- Insulation Resistance ----- More than 10 MΩ/500V DC between electrical circuit and the case, current circuit and voltage circuit.
More than 5MΩ/500V DC between current circuit and voltage circuit.
For Wattmeters, Varmeters and Power factormeters
- Safety Requirements ----- Structural requirements are in accordance with JIS C 1010 for safety of voltage test, insulation and other.
Reinforced insulation, between electrical circuit and case
Indoors, Altitudes up to 2000m, Pollution degree 2
Measurement category III
(Measurement category is not applied for non- JIS products.)
Maximum working voltage:600V

SWITCHBOARD INSTRUMENTS LINE UP

Name		Operating Principle	Symbol	Accuracy	Model	
					110mm SQ	80mm SQ
DC AMMETERS / VOLTMETERS		Moving coil type		1.5	2101A30	2181A00
DC SUPPRESSED METERS					2101A35,36,37	2181A35,36,37
AC AMMETERS / VOLTMETERS		RMS rectifier type		1.5	2102A30	2182A00
		Mean rectifier type		2.5	2102A31	2182A01
WATTMETERS	Single phase 2-wire			1.5	2105A31	2185A31(*1)
	Single phase 3-wire				2105A32	2185A32(*1)
	3-phase 3-wire	(Unbalanced)			2105A35	2185A35(*1)
		(Balanced)			2105A34	2185A34(*1)
	3-phase 4-wire	(Unbalanced)			2105A36	2185A36(*1)
VARMETERS	Single phase 2-wire			1.5	2106A31	2186A31(*1)
	3-phase 3-wire	(Balanced)			2106A33	2186A33(*1)
		(Unbalanced)			2106A35	2186A35(*1)
	3-phase 4-wire	(Balanced)			2106A34	2186A34(*1)
		(Unbalanced)			2106A36	2186A36(*1)
POWER FACTOR METERS	Single phase 2-wire			5.0	2107A31	2187A31
	3-phase 3-wire	(Balanced)			2107A33	2187A33
		(Unbalanced)	2107A35		2187A35(*1)	
	3-phase 4-wire	(Unbalanced)	2107A36		2187A36(*1)	
FREQUENCY METERS		Differential type		0.5 1.0	2108A30	2188A30
SYNCHRO-SCOPE (*2)	Single phase	Moving Magnet type		2.5	2109A30	—
	3-phase					

Note:

*1: Attached external transducer box.

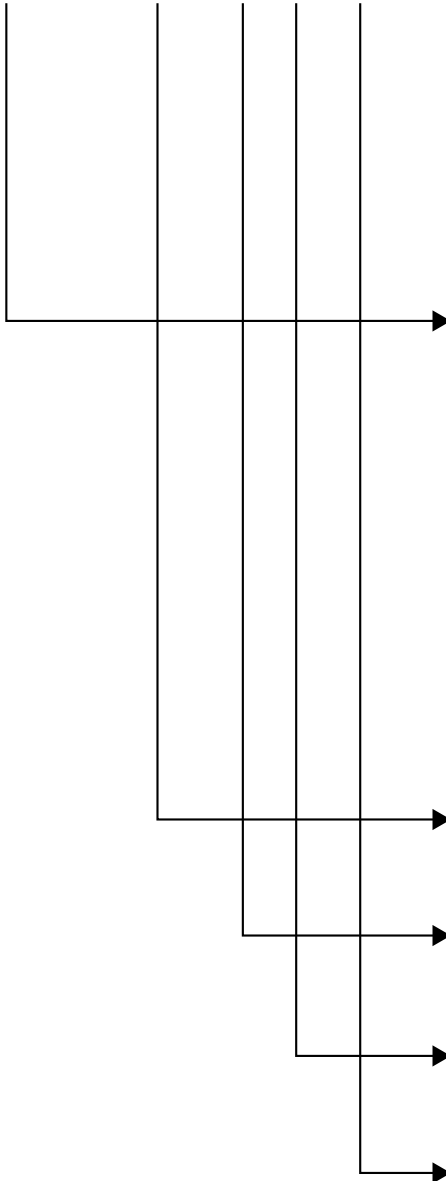
*2: not complied with JIS standard.

KEY TO SWITCHBOARD NUMBERING SYSTEM

[Model/Suffix Code]

21□□(A)□□ - □□□□ - □ - L - □□

* Specify Full scale value and Unit



Model		
110 SQUARE	80 SQUARE	
2101A 30	2181A 00	DC AMMETERS,DC VOLTMETERS
2101A 35	2181A 35	DC AMMETERS ,VOLTMETERS SUPPRESSED METER
36	36	
37	37	
2102A 30	2182A 00	AC AMMETERS ,VOLTMETERS RMS rectifier type
2102A 31	2182A 01	AC AMMETERS ,VOLTMETERS Mean rectifier type
2105A 31	2185A 31	WATTMETERS
32	32	
34	34	
35	35	
36	36	
2106A 31	2186A 31	VARMETERS
33	33	
34	34	
35	35	
36	36	
2107A 31	2187A 31	POWER FACTOR METERS
33	33	
35	35	
36	36	
2108A 30	2188A 30	FREQUENCY METERS
2109A 30		SYNCHROSCOPE

Rating	
Refer to Suffix Code	

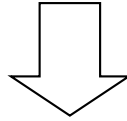
Designation of Frequency Used	
N	Always "N" or 50/60Hz Common
A	50Hz
B	60Hz
C	400Hz

Pointer	
L	Lance type pointer

Cover color and Set pointer	
BL	Munsell N1.5
BG	Munsell 7.5BG4/1.5
BS	Munsell N1.5 with Set pointer (red color)
GS	Munsell 7.5BG4/1.5 with Set pointer (red color)

[EX.]

Model	Rating	Full scale value and Unit	Designation of Frequency Used	Pointer	Cover color and Set pointer
110 SQUARE AC AMMETERS	0 to 5A	0 to 100A	50/60Hz Common	Lance type pointer	Munsell N1.5



2102A30-A42-N-L-BL	0 to 100A
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ACCESSORIES AND PARTS

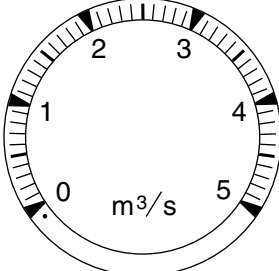
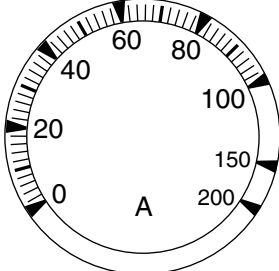
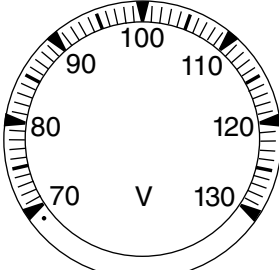
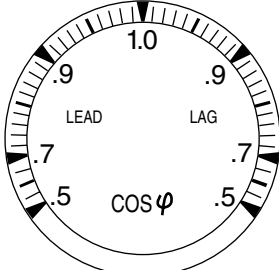
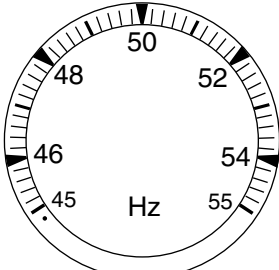
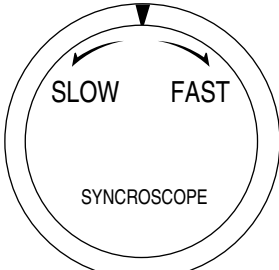
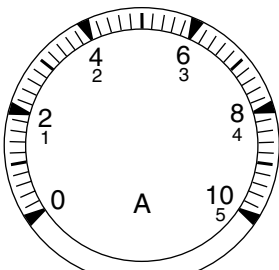
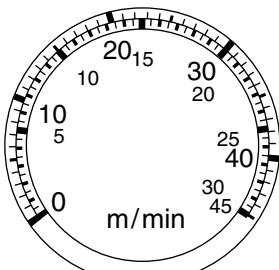
Model			Descriptions	
Standard Scale Plate			219900	1set (Specify Model and suffix codes, Full scale value and unit, VT ratio and CT ratio) EX.: 2101A36-AHE-N-L-BL 0 to 250kPa
Blank Scale Plate (With YOKOGAWA mark)			219900/001	1set (Specify Model and suffix codes, and Blank scale) EX.: 2101A36-AHE-N-L-BL Blank scale
110 SQUARE	Cover	(Black)	219930-11	1 pce
		(Blue Green)	219930-12	1 pce
	Cover with Set pointer	(Black)	219930-13	1 pce (Set pointer is red)
		(Blue Green)	219930-14	1 pce (Set pointer is red)
80 SQUARE	Cover	(Black)	219930-31	1 pce
		(Blue Green)	219930-32	1 pce
	Cover with Set pointer	(Black)	219930-33	1 pce (Set pointer is red)
		(Blue Green)	219930-34	1 pce (Set pointer is red)
Terminal Cover (6 Terminal)			219930-22	10 sheets (up side)
Terminal Cover (5 Terminal)			219930-21	10 sheets (down side)
Terminal Cover (3 Terminal):(For 80 SQUARE)			219930-23	10 sheets
Shunt lead			219930-24	Round Resits 0.05Ω less, For M4 terminal, 1.5m 1set

SCALE FORMS AND DIVISIONS

Maximum scale value	Divisions	Maximum scale value	Divisions	Maximum scale value	Divisions
3.5 35 350 3500	35 Division	7.5 75 750 7500	37.5 Division	4 40 400 4000	40 Division A
7 70 700 7000				8 80 800 8000	
				±2 ±20 ±200 ±2000	
				±4 ±40 ±400 ±4000	
2 20 200 2000	40 Division B	4.5 45 450 4500	45 Division	1 10 100 1000	50 Division A
±1 ±10 ±100 ±1000		9 90 900 9000		5 50 500 5000	
2.5 25 250 2500	50 Division B	±2.5 ±25 ±250 ±2500	50 Division C	1.2 12 120 1200	60 Division A
		±5 ±50 ±500 ±5000		6 60 600 6000	
				±3 ±30 ±300 ±3000	
				±6 ±60 ±600 ±6000	
3 30 300 3000	60 Division B	1.5 15 150 1500	75 Division For 210□A 110mm only	1.5 15 150 1500	30 Division For 218□A 80mm only
±1.5 ±15 ±150 ±1500					

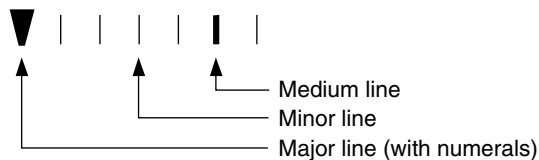
- Note
1. This standard scale divisions are applied to 2101A, 2102A, 2105A, 2106A, 2181A, 2182A, 2185A and 2186A.
 2. Numerals are indicated to the major line (▼).
 3. All scales divisions are linear distribution.
 4. To be applied this standard scale division, when specify special maximum value.
 - not standard maximum scale value (Ex.) 2300 --- 46 divisions
 - minimum scale value are not zero (Ex.) 50 to 100 --- 50 divisions

SCALE FORMS AND DIVISIONS

<p>For Suppressed meter 2101A, 2181A</p>		<p>Extended scale Ammeters 2102A, 2182A (Ex.) 100A 2 times</p> <p>Red line and numerals for extended portion (Ex. 2 Times 150 and 200A) 3 Times -- 2 and 3 Times 5 Times -- 3 and 5 Times</p>	
<p>For Expanded scale 2102A, 2182A voltmeter</p> <p>Ex. 70 to 130V=245°</p>		<p>For Power Factor meter 2107A, 2187A</p>	
<p>For Frequency meter 2108A, 2188A</p> <p>Ex. 45 to 55Hz</p>		<p>For Synchroscope 2109A</p>	
<p>Single division/Double numerals Ex. 0 to 5/0 to 10A (50 Div.) All div.line and numerals are black. Size of numerals are different high. Apply same division only.</p>		<p>Double division/Double numerals Ex. 0 to 300/0 to 450 m/min (60 Div./45 Div.) Outer -- Black line and numerals Inner -- Red line and numerals</p>	

Kinds of division lines

1. Kinds of division lines

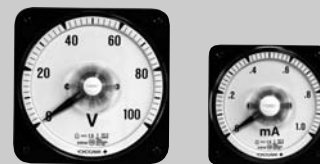


2. 3 characters, standard.

EX. (1) 1200V → 1.2kV

(2) 20000rpm → 20 × 1000rpm

2101A/2181A



DC AMMETERS

Model	Suffix Codes	Descriptions
2101A 30		110 SQUARE Class 1.5
2181A 00		80 SQUARE Class 1.5
Rating	-AEG -AEM -AFA -AFN -AFX -AGZ -AHM -AHY -AJR -AKG -AKM -ALA -ALC -ALE -ALJ -ALS -AMF -AMT -AND -ANG -ANL -A00 -D00 -A01 -A04 -A05 -D00 -A06	0 to 300 microA 0 to 500 microA 0 to 1mA 0 to 3mA 0 to 5mA 0 to 10mA 0 to 30mA 0 to 50mA 0 to 100mA 0 to 300mA 0 to 500mA 0 to 1A 0 to 1.5A 0 to 2A 0 to 3A 0 to 5A 0 to 7.5A 0 to 10A 0 to 15A 0 to 20A 0 to 30A 0 to (300 microA to 1A), Optional intermediate rating -a to 0 to +b where a or less 72% × (a+b), a+b=1mA to 2A For zero-center and similar scale meter 0 to 50mV, For external shunt use 0 to 60mV } 0 to 100mV } Specify scale range (No shunt is manufactured) -a to 0 to +b (b=50mV) where a or less 50mV, For zero-center and similar scale meter 0 to 50mV, Meter with VR, 0 to 2 ohm Variable (Voltage Drop : 50mV)
Designation of Frequency Used	-N	Always "-N"
Pointer	-L	Lance type pointer (Black), Always "-L"
Cover color and Set pointer	-BL	Munsell N1.5
	-BG	Munsell 7.5BG4/1.5
	-BS	Munsell N1.5 with Set pointer (red color)
	-GS	Munsell 7.5BG4/1.5 with Set pointer (red color)

SPECIFY THE FOLLOWING WHEN ORDERING

- (1) Model and Suffix codes
- (2) Full scale value and unit
- (3) For suffix code A00 or D00, specify rating and full scale value.

Notes :

- (1) Scale other than Yokogawa' standard format will be special order.
- (2) For each meter with the rating of 50mV,60mV or 100mV, one-pair(1.5m) of shunt leads are supplied.
- (3) External shunts are not supplied.