TOYO KEIKI

Pivot-type Fixed Meter 110mm Angle

[JIS C 1102-2007, RoHS Compatible Products]

Wide Angle Meter

■VF-11M Series

東洋計器株式会社

CAT. NO. VF-11M-03

About Model Names

L ..... With Lamp Lighting
E ..... With EL Plate Lighting
V..... When equipped with resistor for instruction adjustment

11 ..... Front Dimensions 110 × 110

VF ..... Design Shape Wide Angle Shape

Indicates the type of input electric quantity

D ..... Direct current or voltage
Se..... Alternating current or voltage (R.M.S.-Response type)
S ..... Alternating current or voltage (Mean value rectifier type)
A..... Alternating current or voltage (Moving-iron type)
E ..... 1P or 3P power
R ..... 1P or 3P varmeter power
U ..... 1P or 3P balanced power rate
Uu..... 3P unbalanced power rate
F..... Frequency
C.....Tachometer

VF-11M SERIES

Details of Changes from Previous Product (□VF-11 Series)

1. Mounting screws at the four corners of the meter changed from M6 to M5 size.
2. Meter terminal screws changed as follows.
   Ammeter, voltmeter, frequency meter
   M6 screws → M4 screws
   Wattmeter, Varmeter, Power Factor Meter
   1P, 3P3W: M4 screws → M4 screws
   3P4W : M3 screws → M4 screws
3. Scale characteristics of the electronic device type (M.R.S.-Response type) AC ammeter have been improved from non-linear wiring to linear wiring.

Features

1. A long scale meter for indicating wide angles.
2. A stepped scale plate is used to remove any level difference between the scale and tip of the needle, resulting in accurate readings.
3. Meter that has a bright scale due to the wide cover lighting surface.
4. It is not affected by steel panels.
5. Can be manufactured with EL board (Electro-Luminescence Board) lighting.
6. Terminal cover is now equipped as standard.
7. It is now compatible with multi-setting set pointer models.

VF-1 1M Series List

Applicable Standards: JIS C 1102-1, 2, 3, 4, 5, 9

Part Name		□VF–11M			Notes Page
		Model Name	Operating Principles	Accuracy Class	
Direct Current	Ammeter	DVF–11M	Permanent magnet Moving-coil type	1.5	5
	Voltmeter				6
	Reception Meter				5/6
Alternating Current	Ammeter	SVF–11M	Rectifier type	2.5	7
	Voltmeter				8
	Ammeter	SeVF–11M	Electronic device type	1.5	9
	Voltmeter				10
	Ammeter	AVF–11M	Moving-iron type	1.5	11
	Voltmeter				12
	Reception Meter	SVF–11M	Rectifier type	2.5	7/8
	1P Wattmeter	EVF–11M	Electronic device type	1.5	13
	3P Wattmeter				
	3P4W Wattmeter				
	1P Varmeter	RVF–11M	Electronic device type	1.5	13
	3P Varmeter				
	3P4W Varmeter				
	1P Power Factor Meter	UVF–11M	Electronic device type	5.0	14
	3P Balanced Power Rate Meter				
	3P Unbalanced Power Factor Meter	UuVF–11M			
	3P4W Power Factor Meter				
	Frequency Meters	FVF–11M	Electronic device type	0.5	18

Production Standards

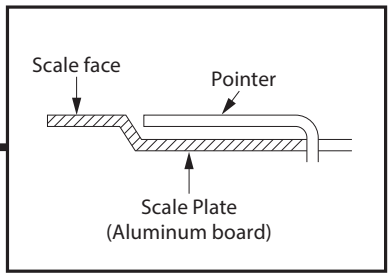
☆Can be manufactured to 80×80 (mm) or 120×120 (mm) sizes. Please contact us for more details.

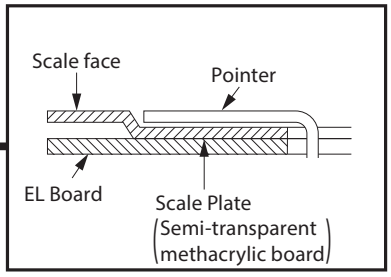
Model Name	□VF–11M
Front Dimensions (Horizontal × Vertical) (mm)	110×110
JIS Symbol (JISC1103)	KW3a
Scale Length (mm)	170
Blur Angle	237°
Accuracy/Class	Refer to □VF-11 M Series List Table (Upper Table)
Mounting Posture	Vertical (Other than vertical: Specification required, e.g. ⁄30°)
Recommended No. of Scale Divisions	Division 35 to division 75
Pointer Shape	VF Standard Pointer (See Next page)
Cover Material	Methacrylic Resin
Cover Frame Color	●Black (Munsell symbol: N-1.5) ●Blue/green color according to specifications (Munsell symbol: 7.5BG 4/1.5)
Base Material	Body: ABS resin Terminals: PBT resin
Scale Plate	Aluminum plate with white coating (Scale lines and numbers are black)

Note) See p.26 for details on the recommended scale divisions.

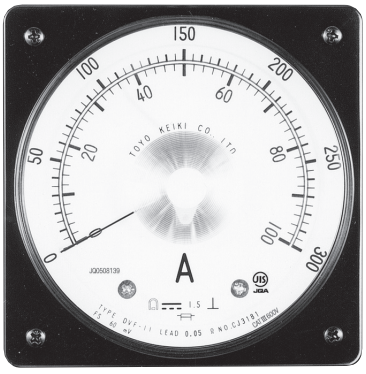
Insulation Test Between all circuits in a batch and outer casing …More than 10 MΩ (500V mega tester)
Between current circuit and voltage circuit …More than 5M (at 500V mega)

Voltage Test Between all measurement circuits in a batch and outer casing, and between current circuit and voltage circuit ...
maximum usable circuit voltage up to 600V. AC3320V for 5 seconds: CAT III 600V displayed at the bottom right of the scale plate.
If the maximum usable circuit voltage of 600V is exceeded, (2E+1000) V (E: Maximum usable circuit voltage [V])





Pointer Shape



VF Standard Pointer
(Single scale and
Single scale double printing)

Rod Pointer
(for Multiple Scale)

Operating Environment

Operating Temperature Limits	–10°C to+50°C, Accuracy Assurance Range: +5°C to +40°C
Storage Temperature	–20°C to +60°C
Relative Humidity	Less than 80%
Operating Environment	Indoor
Installation Height	2000m or less (See p.23 for details)

Special Specifications

(Can be manufactured to the following special specification by request.)

★Mounting posture other than vertical (Specification of installation angle required)

★With Red Set Pointer Single Setting Type, Multiple Setting Type (See P.21 for details)

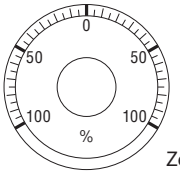
★Special Scale: Conversion scale, zero center scale, colored scale, multiple scale, magnifed scale, specific symbol display, scale division increase in lines

★Rod pointer (Rod pointer is used for multiple scales.)

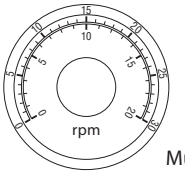
★EL plate lighting (Color: green or orange) (See below)

★Special processing (heat processing, etc.)

★Other special specifications



Zero Center Scale



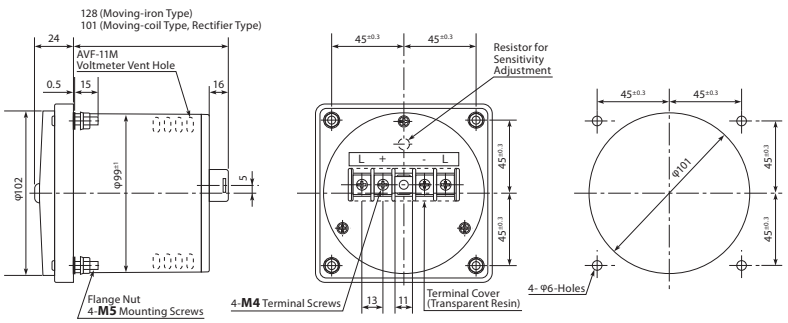
Multiple Scale

Common Specifications for Meter with EL Plate Lighting

EL plate impressed voltage: 100/110V AC (Please contact us for uses with 200/220V AC and 100/110V DC.)

Outside Dimensions

☐VF-11ME



Note) Accessories are attached externally as shown below for meters with EL plate lighting.
(Unmarked items have accessories built-in, and the wiring method is as standard.
See the following pages for details on the outside dimensions of accessories and the wiring methods.

Specifications	Accessories
AC Voltmeter (Moving-iron Type)	M-4 A Series Resistor
Wattmeter	ERG-3 Converter
Varmeter	RRG-3 Converter
Power Factor Meter	URG-3 Converter Or UuRG-3 Converter

VF SERIES

DC Ammeter (Moving-coil Type)

Model Name DVF-11M

Specifications

Measurement Range Value	DVF-11M	
	Internal Resistance	Distributor
200 μA	1.9 kΩ	Not Required
500 μA	1.1 kΩ	
1 mA	380 Ω	
2 mA	125 Ω	
5 mA	21 Ω	
10 mA	8 Ω	
20 mA	3 Ω	
50 mA 100 mA 500 mA 1 A 5 A 10 A 15 A 20 A 30 A	Voltage drop: 100mV Sensitivity: Approx. 10mA	Built-in
40 A ≀ 5 kA	Voltage drop: 60mV Sensitivity: Approx. 10mA	External
Weight	Approx. 0.45kg	

Reception Meter Meter Input	DVF-11M	
	Internal Resistance	Distributor
4~20 mA	7Ω	Not Required
10~50 mA	3Ω	
Weight	Approx. 0.45kg	

Note 1) Internal resistance value tolerance: ±30% (at 23°C)

Remarks

Connection to Shunt

1. Connect the shunt to the wires on the earth side.
2. See P.19 for details on the outside dimensions of the shunt.

Instrument Lead

Instrument lead is **not included**.

Instrument Lead Resistance

1. Meters externally attached to shunts are normally adjusted to an **instrument lead resistance of 0.05Ω**.
   (Indicate LEAD 0.05Ω on the scale plate)
   Therefore, use wiring that is equivalent to 0.05Ω for the instrument lead.
2. Please provide separate instructions if the instrument lead resistance is to be a value other than 0.05Ω.
   When combining with a 60mV rated shunt, the instrument lead resistance can be manufactured up to 1.0Ω specifications.
   If the wiring exceeds 1.0Ω, combine with a high mV shunt.
3. If the instrument lead resistance is not clearly specified, the meter can be manufactured with a sensitivity adjustment variable resistor (VR).
   The adjustable range is up to 1.0Ω for a 60mV meter.

   Note) The model name of an meter equipped with VR is the same as the normal model name with V appended.
   E.g. DVF-11MV

Note Zero center meters and multiple-scale meters can also be manufactured. 50mV and 100mV meters with externally attached shunts can also be manufactured.

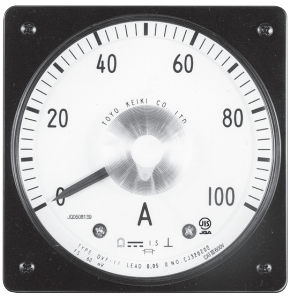
Reference Table of Instrument Lead Resistance

[Unit Ω (at 20℃)]

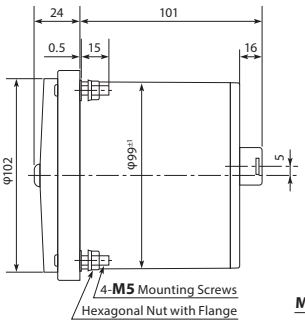
Wire Diameter \ Length	1 m	2 m	3 m	4 m	5 m	10 m	20 m	Conductor Resistance Ω/km
0.75 mm²	0.05	0.1	0.15	0.2	0.25	0.5	1.0	24.4
1.25 mm²	0.03	0.06	0.09	0.12	0.15	0.3	0.6	14.7
2.0 mm²	0.02	0.04	0.06	0.08	0.1	0.2	0.4	9.50
3.5 mm²	0.01	0.02	0.03	0.04	0.05	0.1	0.2	5.09
5.5 mm²	0.0066	0.0132	0.0198	0.0264	0.033	0.066	0.132	3.27

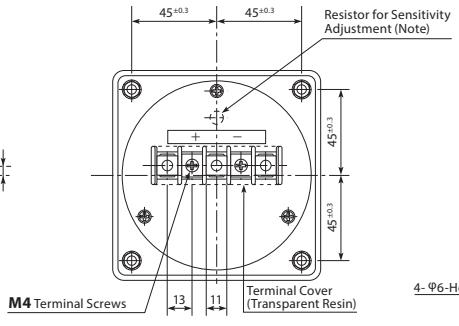
Note) 1. The resistance values in the table above are applicable when the prescribed length of vinyl wire for wiring electric devices is installed as return wiring.
2. If the wiring exceeds 20m, calculate from the conductor resistance value column. E.g. For 2.0mm² 36m, $2\times9.50\times\frac{36}{1000}\fallingdotseq0.68\Omega$

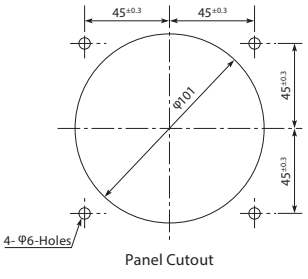
Outside Dimensions



DVF-11M





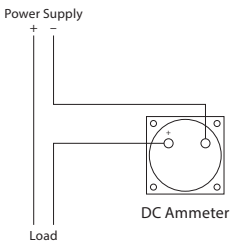


Panel Cutout

Note) The DVF-11MV model resistor for sensitivity adjustment must be used.

Connection Diagram

When the shunt is built-in and not required



When the shunt is externally attached