

Indicator / Thumbwheel Switch Panel Meters

M4W Series

PRODUCT MANUAL

For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.

The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice.

Safety Precautions

- 'Safety Precautions' are provided to ensure safe and proper use of the product and to prevent accidents or hazards. Please make sure to follow them carefully.
- ⚠ symbol indicates a caution, warning of potential hazards under certain conditions.

⚠ Warning Failure to follow instructions may result in serious injury or death.

01. Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss. (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime / disaster prevention devices, etc.)
Failure to follow this instruction may result in personal injury, economic loss or fire.

02. Do not use or store the unit in the place where flammable / explosive / corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact or salinity may be present.
Failure to follow this instruction may result in explosion or fire.

03. Install on a device panel to use.
Failure to follow this instruction may result in fire or electric shock.

04. Do not connect, repair, or inspect the unit while connected to a power source.
Failure to follow this instruction may result in fire or electric shock.

05. Check 'Connections' before wiring.
Failure to follow this instruction may result in fire.

06. Do not disassemble or modify the unit.
Failure to follow this instruction may result in fire or electric shock.

⚠ Caution Failure to follow instructions may result in injury or product damage.

01. When connecting the power / measurement input and relay output, use AWG 24 (0.20 mm^2) to AWG 15 (1.65 mm^2) cable or over and tighten the terminal screw with a tightening torque of 0.98 to 1.18 N m.
Use the wiring suitable for the load current capacity.
Failure to follow this instruction may result in fire or malfunction due to contact failure.

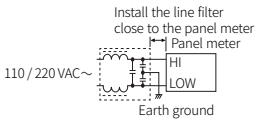
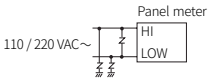
02. Use the unit within the rated specifications.
Failure to follow this instruction may result in fire or product damage.

03. Use a dry cloth to clean the unit, and do not use water or organic solvent.
Failure to follow this instruction may result in fire or electric shock.

04. Keep the product away from metal chip, dust, and wire residue which flow into the unit.
Failure to follow this instruction may result in fire or product damage.

Cautions During Use

- Follow instructions in 'Cautions during Use'.
  Otherwise, it may cause unexpected accidents.
- Install a power switch or circuit breaker in the easily accessible place for supplying or disconnecting the power.
- Keep away from high voltage lines or power lines to prevent inductive noise.
  In case installing power line and input signal line closely, use line filter or varistor at power line and shielded wire at input signal line.
  Do not use near the equipment which generates strong magnetic force or high frequency noise.

Connection with the line filter	Connection with the varistor
	

- This unit may be used in the following environments.
  - Indoors (in the environment condition rated in 'Specifications')
  - Altitude max. 2,000 m
  - Pollution degree 2
  - Installation category II

Ordering Information

This is only for reference, the actual product does not support all combinations.
For selecting the specified model, follow the Autonics website.

M 4 W ❶ - ❷ ❸ - ❹

❶ Output
No mark: Indicator
1P: Single setting
2P: Dual setting

❷ Input type
DV: DC voltage
AV: AC voltage
DA: DC current
AA: AC current
W: Power
T: Rotation
S: Speed
DI: Scaling (DC 4 - 20 mA)

❸ AC measurement method
No mark: AVG
R: RMS

❹ Measurement input
Refer to measurement input specifications.

Measurement Input Specifications

Measurement input	Input type							
	DV	AV	DA	AA	W [01]	T [02]	S [02]	DI
No mark	-	-	-	-	-	-	-	1999
1	199.9 mVDC⎓	199.9 mVAC~	199.9 μA	19.99 mA	199.9 W	1999 rpm 0 - 10 VDC⎓	1999 m / min 0 - 10 VDC⎓	-
2	1.999 VDC⎓	1.999 VAC~	1.999 mA	199.9 mA	1.999 kW	1999 rpm 0 - 10 VAC~	1999 m / min 0 - 10 VAC~	-
3	19.99 VDC⎓	19.99 VAC~	19.99 mA	1.999 A	19.99 kW	-	-	-
4	199.9 VDC⎓	199.9 VAC~	199.9 mA	19.99 A [03]	199.9 kW	-	-	-
5	300 VDC⎓	-	1.999 A	199.9 A [03]	-	-	-	-
6	-	400 VAC~	19.99 A [04]	1999 A [03]	-	-	-	-
7	-	-	199.9 A [04]	-	-	-	-	-
8	-	-	1999 A [04]	-	-	-	-	-
DX	-	-	-	-	-	DC input option		-
AX	-	-	-	-	-	AC input option		-
XX	Option	Option	Option	Option	Option	-	-	Option

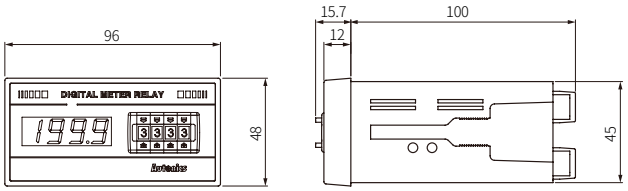
01) This specification is based on the transducer with 0 - 10 VDC⎓ output.
When the output of transducer is DC 4 - 20 mA or 1 - 5 VDC⎓, use the scaling meter.
02) This specification is based on the tacho generator with 0 - 10 VDC⎓ or 0 - 10 VAC~ output.
03) Displayed when a C.T for AC 5 A output is used.
04) Displayed when a shunt for 50 mVDC⎓ output is used.

Product Components

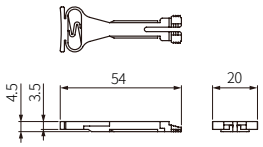
- Product (+ bracket)
- Instruction manual

Dimensions

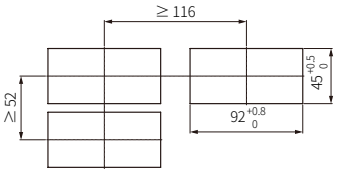
- Unit: mm, For the detailed drawings, follow the Autonics website.
- Following items are based on single setting model.



■ Bracket

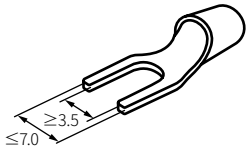


■ Panel cut-out



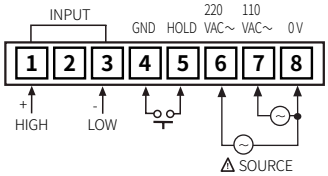
Cautions during Wiring

- Unit: mm, Use terminals of size specified below.

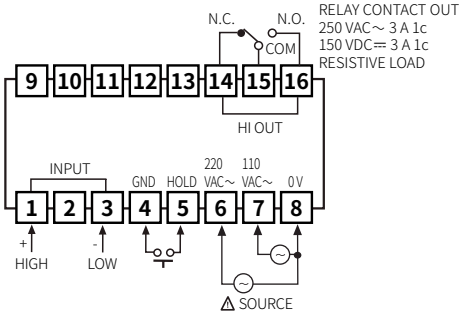


Connections

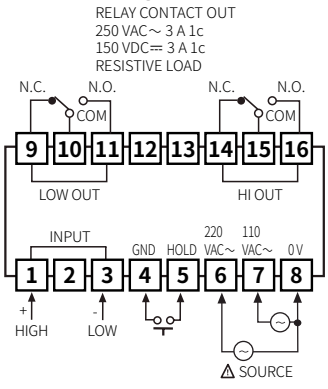
■ Indicator



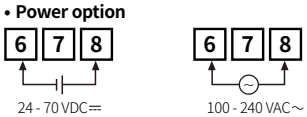
■ Single setting



■ Dual setting



• Power option



Specifications

Input type	DC voltage	AC voltage	DC current	AC current	Power	Rotation, speed	Scaling
Max. allowable input	≤ 300 VDC⎓	≤ 400 VAC~	≤ DC 2 A	≤ AC 5 A	≤ 10 VDC⎓	≤ 10 VDC⎓ ≤ 10 VAC~	DC 4 - 20 mA
	≈ 150 % F.S. for each measured input range [01]						
Display method	7-segment (red) LED (character height: 14 mm)						
Display accuracy	Dependent on the input type						
DC input	± 0.2 % F.S. rdg ± 1-digit					± 0.3 % F.S. rdg ± 1-digit	
AC input	± 0.5 % F.S. rdg ± 1-digit						
Display scale	1999						
Display rate	2.5 times / sec						
Response speed	≈ 2 sec (0 to 1999)						
Sampling cycle	300 ms						
Operation method	Dual integral method						
Unit weight	Dependent on the output type						
Indicator	≈ 168 g						
Single setting	≈ 253 g						
Dual setting	≈ 278 g						
Certification	EAC						

01) At 400 VAC~ input: ≈ 120 % F.S. for each measured input range

Output type	Indicator	Single setting	Dual setting
Power supply [01]	110 / 220 VAC~ 50 / 60 Hz		
Permissible voltage range	90 to 110 % of rated voltage		
Power consumption	Dependent on the input type		
DC input	2 W	3 W	3 W
AC input	4 VA	5 VA	5 VA
Contact capacity	-	250 VAC~ 3 A, 150 VDC⎓ 3 A	250 VAC~ 3 A, 150 VDC⎓ 3 A
Contact composition	-	1c × 1	1c × 2
Insulation resistance	≥ 100 MΩ (500 VDC⎓ megger)		
Dielectric strength	Between the charging part and the case: 3,000 VAC~ 50 / 60 Hz for 1 min		
Noise immunity	± 1 kV square wave noise (pulse width: 1 μs) by the noise simulator		
Vibration	0.75 mm double amplitude at frequency of 10 to 55 Hz in each X, Y, Z direction for 1 hour		
Vibration (malfunction)	0.5 mm double amplitude at frequency of 10 to 55 Hz in each X, Y, Z direction for 10 min		
Shock	300 m/s² (≈ 30 G) in each X, Y, Z direction for 3 times		
Shock (malfunction)	100 m/s² (≈ 10 G) in each X, Y, Z direction for 3 times		
Relay life cycle	Mechanical: ≥ 10,000,000 operations Electrical: ≥ 100,000 operations (250 VAC~ 3A resistive load)		
Ambient temperature	-10 to 50 °C, storage: -25 to 65 °C (no freezing or condensation)		
Ambient humidity	35 to 85 %RH, storage: 35 to 85 %RH (no freezing or condensation)		

01) Power supply 24 - 70 VDC⎓, 100 - 240 VAC~ 50 / 60 Hz options are also available to order.

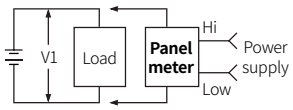
Error

- When 1999 or -1999 flashes with a certain measurement input, disconnect power supply and then check the cables.

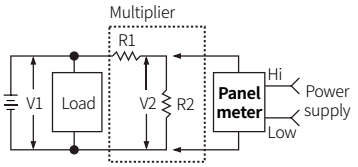
Connections of Applications

■ DC voltmeter connection

• V1 (measuring voltage): ≤ 300 VDC⎓



• V1 (measuring voltage): ≥ 300 VDC⎓

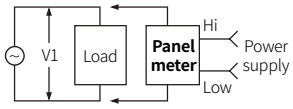


Select R1 and R2 in order to make V2 less than max. measuring voltage using multiplier.
(R1 > R2)

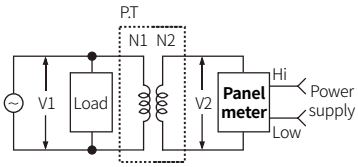
$$V2 = \frac{R2}{R1+R2} \times V1$$

■ AC voltmeter connection

• V1 (measuring voltage): ≤ 400 VAC~



• V1 (measuring voltage): ≥ 400 VAC~

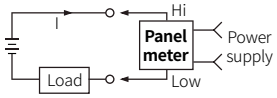


When measurement voltage is higher than 400 VAC~, use the P.T on the external.
(V2 ≤ max. measuring voltage)

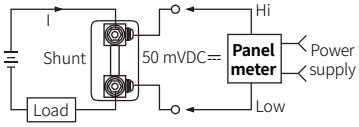
$$V2 = \frac{N2}{N1} \times V1$$

■ DC ammeter connection

• I (measuring current): ≤ DC 2 A



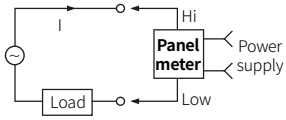
• I (measuring current): ≥ DC 2 A



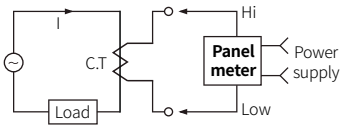
When the current is higher than DC 2 A, use shunt.
The secondary measurement value of the shunt is generally 50 mVDC⎓.

■ AC ammeter connection

• I (measuring current): ≤ AC 5 A

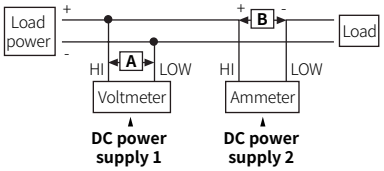


• I (measuring current): ≥ AC 5 A

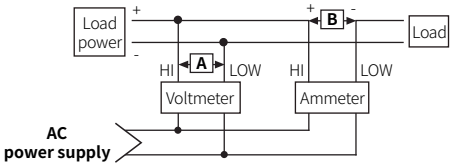


When the current is higher than AC 5 A, use C.T.

■ Simultaneous connection of voltmeter and ammeter

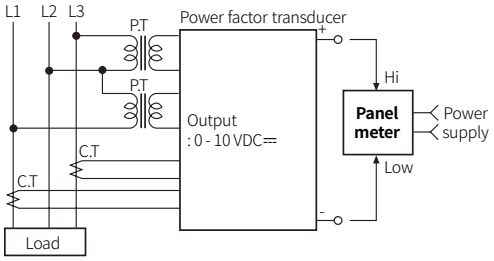


- **A**: If the measured voltage exceeds the measurement input specification, use a multiplier resistor for DC voltage or a potential transformer (P.T.) for AC voltage.
- If the supply voltage of the voltmeter or ammeter is DC, provide the supply voltage separately for each device.
- (-) terminal of the power and (-) terminal of measurement input are shorted.
  In case of using same power supply, measurement error or overcurrent may occur through the internal circuit of the DC power supply.

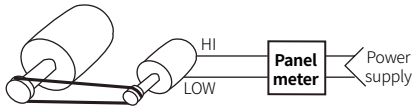


- **B**: When measuring higher current than measurement input, use a shunt for DC current and a current transformer (C.T) for AC current.

■ Power meter connection



■ Rotation / Speed meter connection



Motor Tacho generator (T.G)

- Tacho generator (T.G)
  : This generator makes a voltage in proportion to revolution speed of motor. The panel meter receives the voltage and displays the number of revolution.
  There are AC voltage and DC voltage for output voltage.

■ Scaling meter connection

