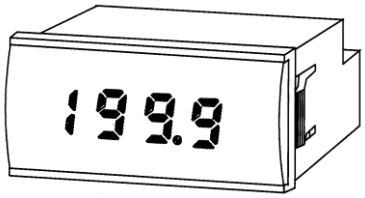
INSTRUCTION MANUAL
DIGITAL PANEL METER
MODEL AP-200 SERIES



■Key to Warning Symbols

⚠ Warning	Incorrect handling may cause death or injury.

■Attention Symbols

⚠ Attention	
⚠	The mark on the label indicates the measuring range in the specification of item 2.
	Do not disassemble or touch the interior while the power is ON. This may cause an electric shock.

⚠ Caution

(1) The application of voltage or current exceeding its maximum allowable value to the input terminals may result in instrument damage.

(2) The supply of power out of its allowable range may cause fire, electric shock or instrument failure.

(3) The content of this manual may subject to change without prior notice for product improvement.

(4) The manual is carefully prepared. However, if any question arises, or any mistake, omission or suggestion is found in the content of this manual, contact your nearest our sales agent.

(5) After read this manual, please keep it as anytime can see.

1. Introduction

This AP-200 Series digital panel meter is a mini-size, 3-1/2 digit DC voltage indicator meeting DIN external-dimention standards, and driven by 5V DC. The indicator part has medium size LEDs (light emitting diode numeric elements) whose height is 10mm and maximum indication is 1999.

2. Specifications

●DC Voltage

Model No.	Measuring range	Maximum resolution	Input impedance	Maximum Allowable Input voltage
AP-200-11	±199.9mV	100μV	100MΩ	±100V
AP-200-12	±1.999V	1mV	100MΩ	±100V
AP-200-13	±19.99V	10mV	10MΩ	±250V
AP-200-14	±199.9V	100mV	10MΩ	±500V

Accuracy: ±0.1% of rdg +1digit (at 23℃±5℃ 35 to 85% RH)

Indication stability only for AP-200-11 is maximum 2 digits.

3. Model Configuration

AP−200−□□

- Range code { 11. ±199.9mV ⋮ ⋮ 14. ±199.9V
- Series
- Basic Model

Example) AP-200-11

4. Common Specifications

Measuring function	: DC voltage measurement
Operation Principle	: Double integral method
Input bias current	: 50pA(TYP)
Sampling rate	: Approx. 2.5 times／sec.
Maximum indication	: 1999
Over range warning	: For an input signal exceeding the maximum indication, the indication 1999 or -1999 flashes. The decimal point also flashes.
Display	: LED (light emitting diode numeric element) with a height of 10mm
Polarity indication	: Automatic indication of minus sign (-) for a negative input
External control	: Signal is hold by connecting the hold terminal with the power(0V) terminal. Decimal point is set at any position by connecting the terminals provided for the decimal point
Ambient temperature	: 0 to 50℃, 35 to 85%RH (No-condensing)
Storage temperature	: −10 to 70℃, 60%RH max.
Power supply	: DC 5V ±5%
Power consumption	: 60mA(TYP)
External dimensions	: 48mm(W)×24mm(H)×39.7mm(D)
Weight	: Approx. 30g
Withstand voltage	: Between input terminal(LO) and case; For 1 min. at 1500V AC
Insulation resistance	: Between input terminal (LO) and case; More than 100MΩ at 500V DC

5. Installation

5-1 Installation

1) Panel mounting

Make a cutout on a panel as shown in Figure 1 (Panel thickness is 0.8mm to 3.5mm), and insert the meter into the cutout from the front of the panel as shown in Figure 2.

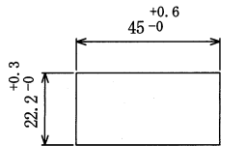


Fig. 1

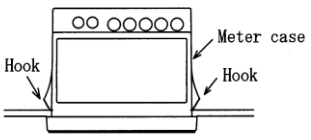


Fig. 2

5-2 Connector mounting

Insert the connector attached for input/output signals into the back of the meter. Exercise care in inserting the connector not to change the top and bottom of the connector.

1) Power suuply connection

Connect power supply to the terminals of 4(0V) and 5(+5V).

The power should be DC5V±5% (Since the meter has no power swith, the meter activates just after power is connected.)

Because the meter also has no fuse, install a fuse (for 0.1A) outside of the meter, if necessary.

2)Setting the decimal point

Prior to factory shipment, the decimal point is set to the position in each digit. Therefore when setting the decimal point to the position in the desired digit, first turn off the power supply and input; insert a screwdriver in the groove at the bottom of the front panel; and then slowly turn it in the grove to remove the front panel. Finally set the decimal point to the position in the desired digit by the decimal point setting switch located below the desired digit.

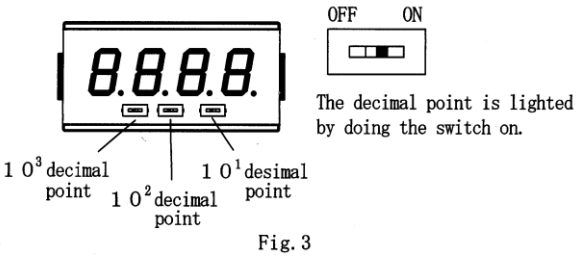


Fig.3

3)Input signal

Connect input signal lines to terminals HI(1) and LO(2).

4)Holding or starting indication by external signal

An indication is held by a short circuit between the terminals of holding (3) and the power (0V). The signal obtained just after making a short circuit is held in the display. Measurement restarts by breaking the short circuit at an arbitrary timing. The time required to update a measured value is approx. 400ms. The input terminal(LO), power terminal(0V), are not insulated from one another for direct in the meter, a mechanical contact sure as a relay switch is preferred for control signals.

To control the meter with a TTL or a transistor, will recommend isolation circuit as Fig.4.

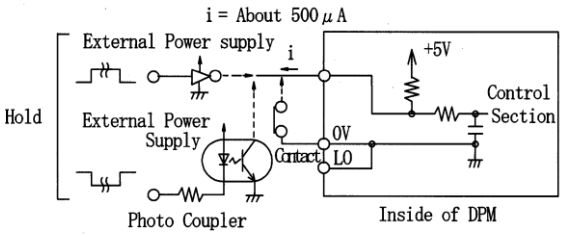
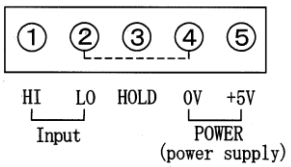


Fig.4

・Terminals on the connector



6.Maintenance

6-1 Notes on maintenance

When the meter is not used, store it in a location with an ambient temperature of -10℃ to +70℃ and humidity of less than 60%. The meter case and front panel meterials are plastic molding, thus do not appty thinner or other volatile liquids in cleaning them.

7.Warranty

This meter is warranted for a period of one year from date of delivery. Any defect which occurs in this period and is undoubtedly caused by Watanabe Electric Industry faults will be remedied free of charge. This warranty does not apply to the meter showing abuse or damage which has been altered or repaired by others except as authorized by Watanabe Electric Industry.

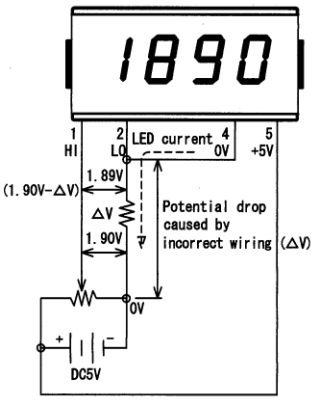
8.After-sale service

This meter is delivered after being manufactured, tested and inspected under strict quality control. However, if any problem does occur, contact your nearest Watanabe Electric Industry sales agent giving as much information on problem as possible.

9.Wiring precautions

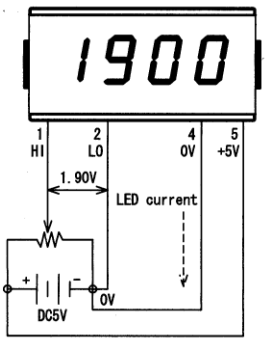
If LO(No.2) is connected to 0V(No.4) at an inappropriate point, the displayed value may vary due to a potential drop generated across both ends of the wiring or it may not be zero, as the power return current which varies with display changes caused by the formation of ground loops intrudes into the input signal line. For this reason, ground LO(No.2) and 0V(No.4) at the one point to power GND(0V) or to a point as close to the signal source as possible.

Example of causing error by ground loops



※ΔV in this example is 10mV

Correct wiring without error by ground loops



watanabe
WATANABE ELECTRIC INDUSTRY CO., LTD.
6-16-19, Jingumae, Shibuya-ku, Tokyo 150-0001, Japan
Phone: (81)3-3400-6141
Homepage http://www.watanabe-electric.co.jp/en/