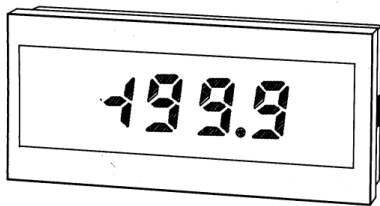


INSTRUCTION MANUAL DIGITAL PANEL METER MODEL AP-501B Series



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. OUTLINE

The AP-501B Series Digital Panel Meter is high reliability 3-1/2 digit display meter. It's design is based on a custom LSI and it is cased in a low profile light weight design. The display is made up of large 14.2mm LED's and the meter is powered by +5V DC.

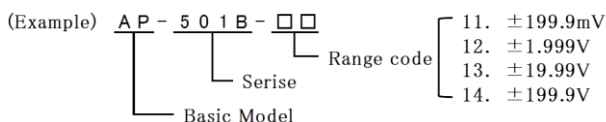
2. SPECIFICATIONS

●DC Voltage Measurement

Model	Measuring Range	Maximum Resolution	Input Impedance	Input Protection
AP-501B-11	$\pm 199.9\text{mV}$	$100\mu\text{V}$	$100\text{M}\Omega$	$\pm 100\text{V}$
AP-501B-12	$\pm 1.999\text{V}$	1mV	$100\text{M}\Omega$	$\pm 100\text{V}$
AP-501B-13	$\pm 19.99\text{V}$	10mV	$10\text{M}\Omega$	$\pm 250\text{V}$
AP-501B-14	$\pm 199.9\text{V}$	100mV	$10\text{M}\Omega$	$\pm 500\text{V}$

Accuracy: $\pm(0.1\% \text{ of rdg} + 1\text{digit}) (23^\circ\text{C} \pm 5^\circ\text{C}, 35 \text{ to } 85\% \text{ RH})$

●Model Configuration



3. COMMON SPECIFICATIONS

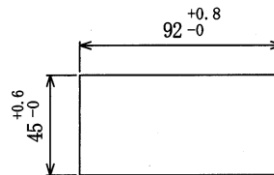
Measurement	: DC voltage measurement
Operation Method	: Dual slope A/D conversion
Input Circuit	: Single-Ended
Input Bias Current	: 50pA MAX.
Conversion Rate	: Approx. 2.5 /sec.
Noise Elimination	: NMR 40dB (TYP) 50/60Hz
Maximum Display	: 1999
Overrange Indication	: Input signals exceeding maximum Indication range will flicker 1999 or -1999
Display	: LED, height 14.2mm
Polarity Indication	: Automatic indication of minus sign(-) for negative input.
External Control	: Hold; short between COM
Decimal Point	: Can be set at desired position
Operating Temperature	: 0 to 50°C (35 to 85%RH)
Power Supply	: DC 5V $\pm 5\%$ Approx. 100mA MAX
Power Consumption	: Approx. 500mW MAX
Dimensions	: 96mm (W) \times 48mm (H) \times 34.5mm (D) DIN size
Weight (Unit only)	: Approx. 50g
Accessories	: Instruction manual, connector
Dielectric strength	: Between LO (terminal 2) and front panel, AC1500V 1min

4. HANDLING

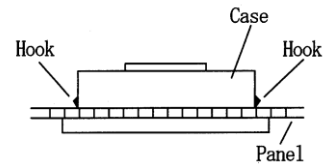
4-1 Installation

1) Mounting of Meter to Panel

Make a cutout on the panel as specified in Fig.1 and insert the meter mainframe into the cutout from the front side of the panel. (Make the panel thickness 1.0 to 3.5mm)



[Fig. 1] Panel Cutout



[Fig. 2] Upper View

2) Removal from Panel

Depress the hooks shown in Fig.2 and push the meter out the front of the panel.

4-2 Connector Connection

Insert the attached card edge connector to the rear of the meter.

The connector has contacts on only one side. Make sure the connector is not up side down.

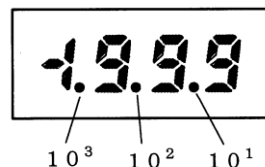
1) Power Connection

Connect the power supply between the 0V (terminal 9) and +5V (terminal 10) of the connector.

Use a DC voltage of 5V $\pm 5\%$ as the power supply. (Note that because this instrument is not provided with a power supply switch, it starts operating when power is supplied.) No fuse is also provided in the instrument. If the fuse is required for safety reason, install a 0.2A fuse outside the instrument.

2) Decimal point setting

The decimal point can be set to any position when the following connector terminals are shorted. However, because the decimal point is not set prior to shipment, it must be set at the appropriate position by the customer.



Decimal Point Lit	Connector Terminal No. Connected
10^1	8-4
10^2	7-4
10^3	6-4

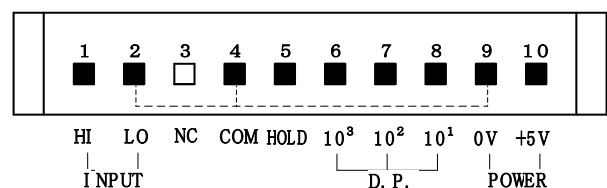
3) Input connection

Connect an input signal (DC voltage) to HI (terminal 1) and LO (terminal 2).

Use a 2-core shielded cable and connect the shield to the input side LO (terminal 2) at one point near a signal source.

●Connector Connection Diagram

In this product, LO (terminal 2) and COM (terminal 4) and 0V (terminal 9) are internally connected. (Non-insulated type).



4) Hold and External Start

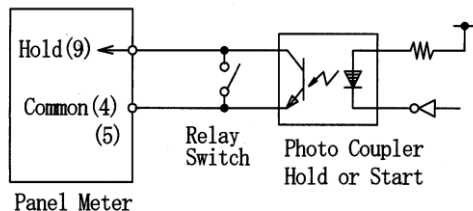
Displayed value is held to the value just after the HOLD (terminal 5) and COM (terminal 4) are shorted (or level "0").

In addition, measurement starts when these terminals are opened (or level "1") at the necessary timing. The minimum time required to measure a contact signal (open) is about 400ms.

Level "1" 3.5 to 5V, Level "0" 0 to 1.5V, Input current: -0.5mA

In addition, the L0 (terminal 2), 0V (terminal 9) and COM (terminal 4) are connected and not DC-isolated, so that control can be achieved using mechanical contact signal such as a relay or switch.

When controlling by TTL or transistor, add the external circuit in Fig3. (This is absolutely necessary for isolation when the input is floated.)



[Fig. 3]

5. MAINTENANCE AND INSPECTION

5-1 Caution for Maintenance

The storage temperature of this instrument should be within the range of -10°C to $+70^{\circ}\text{C}$ with relative humidity not higher than 60%.

If the instrument is used at a dusty location, withdraw the meter assembly from the case at certain intervals of time and brush off dust. (The combination of dust and high temperature will shorten the life of meter parts)

As the instrument case and bezel are molded plastic, do not use a volatile liquid such as thinner to clean them.

5-2 Calibration

- To maintain the initial accuracy of this instrument over an extended period, it is recommended that it be calibrated periodically by a standard reference device with an accuracy of 0.01%.
- Calibrate the meter by taking the following steps.
 - (1) Detach the front bezel.
 - (2) Connect the power supply and after running for at least 20 minutes, start adjusting the instrument as instructed below.
 - (3) Zero Adjustment
Short input terminal HI (terminal 1) and L0 (terminal 2) and check the display shows 000.
 - (4) Span Adjustment
Apply Voltage (current) with "+" polarity corresponding to the fullscale (1990) to the input terminals and turn the span adjustment VR to display 1990.
Next, apply voltage (current) with "-" polarity to check that display shows $-1990 \pm 0.1\%$ of rdg +1 digit.



6. 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.

7. 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 or Watanabe Electric Industry directly giving as much information on problem as possible.