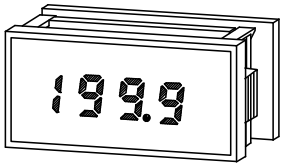
HYBRID PANEL METER
MODEL AH-231 SERIES
INSTRYCTION MANUAL



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) This 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

The AH-231 Series hybrid panel meter is a module type 3-1/2-digit display only meter which uses custom LSI in it's A/D converter and is most suitable for integration into equipment. It is driven by +5V DC.

It displays up to 1999 in red LEDs and its character height is 10.2mm.

For external control, it is also provided with a HOLD function. It is provided with a special front panel, easily facilitating panel mounting.

2. Specifications

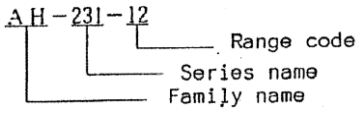
■DC voltage measurement

Model Range code	Measuring range	Max. resolution	Input impedance	Allowable max. input voltage
AH-231-11	±199.9mV	100μV	100MΩ	±100V
AH-231-12	±1.999V	1mV	100MΩ	±250V
AH-231-13	±19.99V	10mV	10MΩ	±250V
AH-231-14	±199.9V	100mV	10MΩ	±500V

Accuracy: ±(0.1% of rdg +1digit)(23℃±5℃)

■Model No. configuration

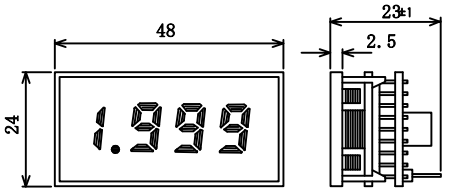
(Example)

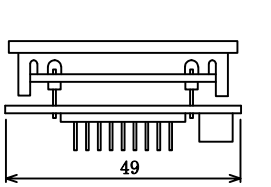


3. Common Specifications

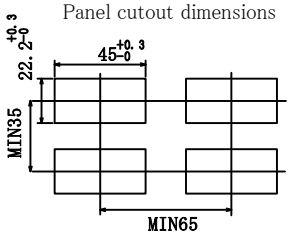
Measuring function	: DC voltage measurement
Operation method	: Double integral
Input circuit	: Single-ended type With automatic zero adjustment circuit
Input bias circuit	: 50pA(Typical)
Sampling speed	: Approx. 2.5 times/sec.
Noise rejection ratio	: NMR 40dB(Typical) 50/60Hz
Maximum display	: 1999
Overrange warning	: The display flashes at 1999 for input signal exceeding the maximum display value.
Display	: LED (Light Emitting Diode)
Polarity	: Automatic polarity selection
Polarity display	: " - " is displayed for minus input signal
External control	: Decimal point can be set at any position Decimal-point terminals 10^1, 10^2 and 10^3 are shorted with COMMON terminal. HOLD at hold (0V) HOLD terminal shorted with COMMON terminal
Operating	: 0 to 50℃ Temperature Humidity, Less than 85%
Power	: 5V DC±5% 80mA(Max.)
Power consumption	: 400mW
Dimensions	: 48mm(W)×24mm(H)×23mm(D)
Weight	: Approx. 20g

4. Dimensions and Panel cutout dimensions



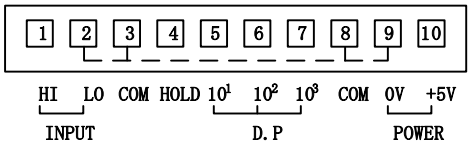


Panel cutout dimensions



Recommended panel thickness
0.8 to 3.2mm

5. Connector Connection Diagram(When Viewed from the Rear)

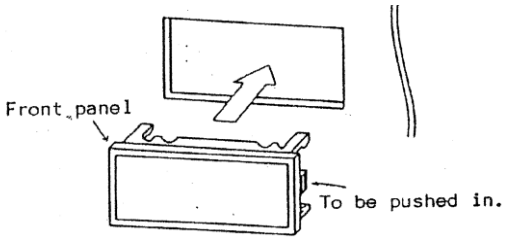


6. Handling

6-1 Preparation Prior to Operation and General Precautions

1) Use the meter at ambient temperatures from 0 ℃ to 50℃ and in humidity of up to 85%. Do not expose the meter to dew condensation.
2) Use the meter only where there is no dust, chemicals or gases harmful to electrical components and parts.
3) Do not subject the meter to vibration and shock.

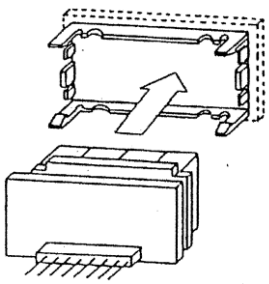
6-2 Front Panel Mounting onto Panel Surface



6-3 Mainframe Mounting

Panel rear

The mainframe is pushed in from the panel rear until a clicking sound is produced.



6-4 Connector Connection

Connect the attached connector to the rear of the panel meter. No numbers are affixed to the connector, but they are No.1 to No.10 from the left side to the right side.

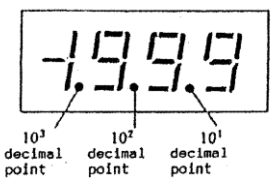
1) Input Connection

Connect an input signal (DC voltage) between terminals No.1 and No.2. Use a 2-core shielded connection cable whose shield should be connected at one point on the input Lo side of signal source.

2) Decimal-Point Setting

A decimal point can be set at any position with the following connector terminals connected.

Prior to meter shipment, any of the following terminals are not connected. Therefore, connect then at the site according to the desired decimal-point position.



Decimal point to be lit	Connector terminal Nos. to be connected.
10^1	5 – 8
10^2	6 – 8
10^3	7 – 8

3) Power Connection

Connect 5V DC power to +5V (No.10) and 0V, to (No.9).

Use 5V DC ±5% power supply.

(Since this meter is not provided with a power switch. It is ready to operate as soon as it is connected to the power.)

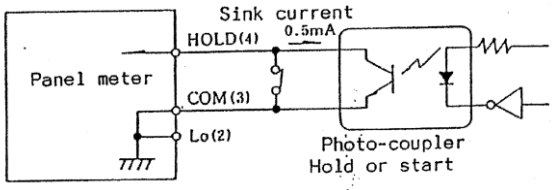
4) HOLD and External Start

With the hold terminal (No.4) and COMMON (NO.3) shorted, the displayed content just after the shorting is hold.

Measurement also starts by opening these terminal at the necessary timing. The minimum time required for one measurement of {+5V positive pulse of more than 1ms from 0V or contact signal (open)} is less than 400ms.

The input terminal (LO) and COMMON (3) of this meter are connected and they are not DC-isolated. Therefore, conduct control as much as possible by using a mechanical contact signal such as relay , switch, etc.

For control by TTL or transistor, add externally the circuit shown in Figure 3. (This circuit is always required for floating input.)



(Figure 3)

5) COMMON Terminals

They are digital circuit common terminals. (No.3) and (No.8). They are internally connected to the input Lo terminal (No.2). but do not contact the digital side wiring to the Lo terminal sine this may cause measurement error.

7. Maintenance and Inspection

7-1 Storage

Store the meter at a location where the ambient temperature is from -10℃ to +60℃ and humidity is less than 60%.

7-2. Calibration

◎In order to maintain and prolong the initial accuracy. It is recommended that periodic calibration be conducted.

◎Conduct calibration as follows:

(1) Connect the power to the meter to warm up the meter for more than 10 minutes, then conduct calibration.

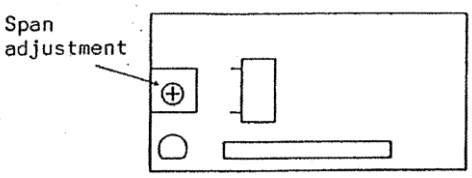
(2) Zero Check

Short the input terminals Hi and Lo to verify that the display shows 000.

(3) Span Adjustment

Apply + polarity voltage corresponding to the full scale (1900) to the input terminals., then turn the span adjustment VR until the display shows 1900. (See Figure 4.)

Next. Apply-polarity voltage to verify that the display shows -1900±0.1% rdg. ±1 digit.



(Figure 4)

8. Warranty

The warranty period is for one year from the day it was delivered. Trouble occurring in this period and considered to be our fault will be remedied free of charge.

9. After-Sale Service

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

Please send the faulty meter together with details of the trouble in writing.

watanabe
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