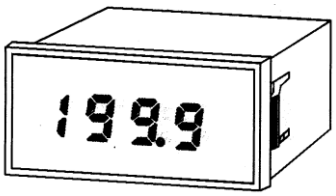
DIGITAL SCALING METER
MODEL AS-203A Series
INSTRUCTION MANUAL



■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) 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) Keep this manual, available easily anytime.

On the AS-203A,connect the control inputs (HPLD, Decimalpoint) to base-isolated devies when the input signal is 70V DC or more.

1.Outline

The Model AS-203A digital scaling meter is an extremely small $3^{1/2}$ digit display scaling meter with the scaling function which enables input signal to be displayed as its corresponding process variable. This meter is designed to be highly reliable using custom LSI. AS its power supply, an isolated voltage of 5V DC or 24V DC is available.

As its instrumentation input signals, both 1 to 5V DC and 4 to 20mA DC are available which, can be internally selected. In addition to the avobe input signals, other input signals are also available.

2.Specifications

Prior to factory shipment, the meter is adjusted so that it displayes about 1000 for the fullscale input.

●DC voltage measurement

Model No. Range Code	Measuring range	Display	Input impedance	Max. allowable input voltage
AS-203A-1V	1 to 5V	Offset ±1000 Fullscale 100 to 1999	Approx 1MΩ	±250V

Accuracy:±(0.1% of rdg +2digit)(23℃±5℃ 35 to 85% RH)

●DC current measurement

Model No. Range Code	Measuring range	Display	Input resistance	Max. allowable input current
AS-203A-2A	4 to 20mA	Offset ±1000 Fullscale 100 to 1999	51Ω	±70mA

Accuracy:±(0.1% of rdg +2digit)(23℃±5℃ 35 to 85% RH)

●DC voltage measurement

Model No. Range code	Measuring range	Display	Input impedance	Max. allowable input voltage
AS-203A-11	±199.9mV	Offset±1000 Fullscale 100 to 1999	100MΩ	±100V
AS-203A-12	±1.999V		100MΩ	±250V
AS-203A-13	±19.99V		10MΩ	±250V
AS-203A-14	±199.9V		10MΩ	±500V

Accuracy:±(0.1% of rdg +2digit)(23℃±5℃ 35 to 85% RH)

●DC current measurement

Model No. Range code	Measuring range	Display	Input resistance	Max. allowable current
AS-203A-21	±199.9μA	Offset±1000 Fullscale 100 to 1999	1kΩ	±10mA
AS-203A-22	±1.999mA		100Ω	±50mA
AS-203A-23	±19.99mA		10Ω	±150mA
AS-203A-24	±199.9mA		1Ω	±500mA
AS-203A-25	±1.999A		※0.1Ω	±3A

Accuracy:±(0.2% of rdg +2digit)(23℃±5℃ 35 to 85% RH)
However, ±(0.3% of rdg +1digit)only for AS-203A-25
The internal resistor marked with ※is externally mounted.

●Model No. Configuration EX: AS-203A-2A-4

AS-203A-□□-□
- Power supply: 3.DC 5V(Isolated), 4.DC24V(Isolated)
- Range Code: 1V.1-5V(Input), 2A.4-20mA(Input), 11.(±199.9mV), 12.(±1.999V), 13.(±19.99V), 14.(±199.9V), ※21.(±199.9μA), ※22.(±1.999mA), ※23.(±19.99mA), ※24.(±199.9mA), ※25.(±1.999A)
- Series name
- Basic Model

The range of 25 for the model of AS-203A is out of the standard for EN/IEC.

3.Common Specifications

Measuring function	: Specify one Model from among Models for DC voltage and current measurements.
Operation method	: Double integral
Input circuit	: Single-ended type Floating input(isolated power supply)
Input bias current	: 2.0nA(Typical)
Sampling speed	: 2.5 times／sec.
Noise rejection ratio	: NMR 40 dB (TYP.),50/60Hz
Temperature characteristic	: Offset displayed-value; (TYP.)±0.1-digit/℃ (MAX.)±0.3-digit/℃ Fullscale displayed-value; (TYP.)±0.1-digit/℃ (MAX.)±0.3-digit/℃
Overrange warning	: ”1999” flashes for input signal exceeding the maximum display.
Fullscale variable range	: 100 to 1999
Offset variable range	: ±1000
Span	: 2000 counts
Display	: LED(Light emitting diode)numeric element Character height-8mm,Red
Polarity display	: ”－” is automatically displayed When the measurement result is negative.
External control	: ・Scaling function: Adjusted by the fine adjuster at the front. ・External hold: Signal is HOLD by connecting the HOLD terminal with the COM terminal. ・Blanking: Signal is HOLD by connecting the BLANK terminal with the COM terminal.
Decimal point	: Can be set to any position. (By front stud pin selection)
Operating temperature/ humidity range	: 0 to 50℃,35 to 85%RH (No dew-condensing)
Power supply	: 5V DC ±5%,120mA max. 24V DC ±20%,30mA max.
Power consumption	: For 5V DC; Approx. 0.45W For 24V DC; Approx. 0.48W
Dimensions	: 48(W)×24(H)×73(D)mm
Weight	: Approx. 46g(mainframe only)
Dielectric strength	: Between power terminal(0V) and input terminal(LO);For 1 min. at 500V DC Between input terminal(LO) and mounting panel;For 1 min. at 1500V AC
Insulation resistance	: Between each terminal described above; More than 100MΩ at 500V DC
Accessories	: Connector 1Pc. Instruction manual 1 copy
Standards	: IEC1010-1, EN50082-2, EN50081-2 EN IEC 63000
Setup enviroment	: Installation category Ⅱ, pollution degree2(IEC1010-1)
Altitude	: 2000m max.

4. Operation

4-1 Preparation before operation and general cautions

1) Use this meter at a temperature of 0 to 50℃and a relative humidity of less than 85% RH.
Be careful with dew condensation.

2) Use this meter where there are no chemicals or gases harmful to electrical components, nor dust.

3) Do not apply any vibration or shock to the meter.

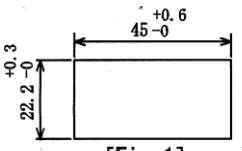
4) Noise

a) Power supply circuit
As it is practically difficult to incorporate a perfect noise prevention circuit into such a small device as this meter if this meter is used where magnet switches may be activated in the same power line or the lightning may frequently strikes, externally use a surge absorption circuit such as line filter or varistor for protecting the meter from excessive surge current.

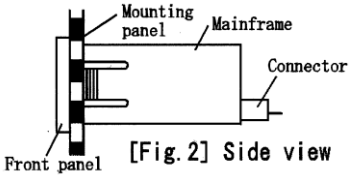
b) Shield
If noise may cause a problem, connect the 0V power terminal to the ground or an equipment grounding terminal. If space induction may cause a problem, it is effective to close the mold case of the meter with a metal cover.

4-2 Mounting

1) Mounting the meter on the panel surface Make the panel cutout as shown in Fig. 1; insert the meter into the panel cutout from the mounting panel front; then strongly push the meter in the mounting panel inside from the front.



[Fig. 1]



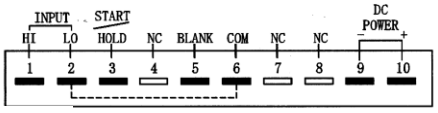
[Fig. 2] Side view

2) Removing the internal board from the case Insert a screwdriver into the hole at the bottom of the meter, then twist the blade of the screwdriver in the hole to remove the case front panel. Next, push out the internal board from the back while expanding the case front.

4-3 Terminal connection

For connecting the terminals, see Fig. 3

Lower connector



[Fig. 3]

⚠ Caution
NC indicates a vacant terminal. However, do not use it as a junction terminal.
Input LO and COM have the same potential.

⚠ Caution
During wiring, take the necessary measures to close each terminal with an insulation tube.

1) Power connection
Connect power to the "POWER" terminals.
As this meter is not provided with a power supply switch, it is ready to operate just when the power is connected to these terminals.

2) Input signal connection
Connect input signal(DC voltage or current) between the INPUT HI(+) and INPUT LO(-) terminals.

a) Shorten input signal wires as much as possible and separate them from other signal wires.

b) If the meter is used at a noisy location, use a shieled 2-core cable for input signal and connect the shield at one point on the LO signal source side.

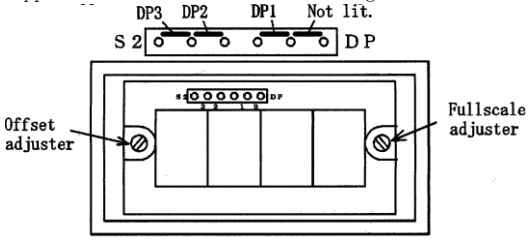
c) If input signal is superimposed with harmonic noise, use a low-pass filter on the input side. However, as a response time may be delayed by its time constant, decide its use depending on the operating condition.

d) Do not apply voltage or current exceeding the maximum allowable voltage or current to the input terminals.

e) There may be case where measured current input signal is grounded, or floated. If the signal is grounded, connect it at a low potential point as much as possible.

3) Decimal point setting

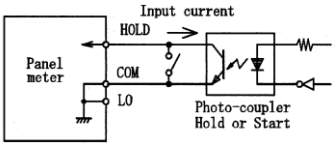
Remove the case front panel from the meter.
Set the upper S2 socket to the desired digit.



⚠ Caution
Do not touch any parts other than those specified.

4) Hold and Start

By shorting the HOLD terminal with the COM terminal(or by setting the HOLD terminal to level "0"), the displayed value just after shorting (or setting to level "0") is held.
In addition, by opening these terminals(or setting the HOLD terminal to level "1") at the necessary timing, measurement starts. (Positive pulse of ±5V for more than 1ms from 0V or contact signal(open))
The minimum time required for one measurement is approx, 400ms.
As the input(LO) and COM terminals are connected but not DC-separated nor isorated, perform control using mechanical contact signal such as relay, switch, etc. as much as possible.
If control is performed by TTL or transistor, externally add a circuit shown in Fig. 4. (For floating input this circuit is always necessary for isolation.)
"1" Level 3.5 to 5V, "0" Level 0 to 1.5V, Input current -0.5mA



[Fig. 4]

4-4 Scaling

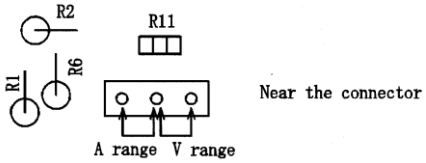
1) Offset display adjustment
Apply an input of 1V(or 4mA) to the input terminals, then turn the offset adjuster until the display unit shows the desired offset value.

2) Fullscale display adjustment
Apply an input of 5V(or 20mA) to the input terminals, then turn the fullscale adjuster until the display unit shows the desired fullscale value.

*Never reverse the above order for scaling adjustment.

4-5 Range change

The "A" range can be changed to the "V" range and vice varsa.
Remove the internal board from the case, then change the position of the 2-leg shorting socket located near the connector.
Then, make the adjustment in item 4-4.



5. Caution for maintenance

Store the meter at a storage temperature of -10℃ to +70℃ and a relative humidity of less than 60% RH. If the mete is used especially at a dusty location, occasionally remove the internal board from the case, then remove dust accumulated on it.
(A rise in temperatures of internal parte may shorten a meter service life.) AS the case and panel of this meter are molded by plastics, do not remove stains from them using a volatile liquid such as thinner.

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.

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/