Digital Panel Meters 40 Series

DC INPUT DIGITAL PANEL METER

(4 digits, process meter)

Model: 40DV1

OPERATING MANUAL

MG CO., LTD. www.mgco.jp
5-2-55 Minamitsumori, Nishinari-ku, Osaka 557-0063 JAPAN

CONTENTS

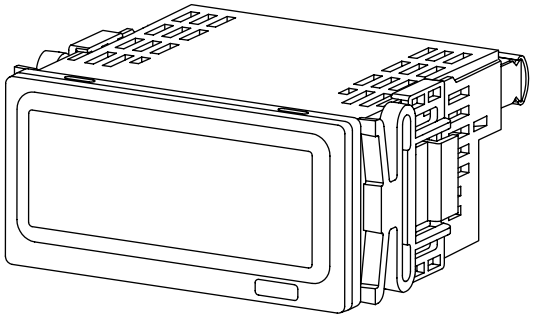
1. INTRODUCTION

1.1 BEFORE USE....

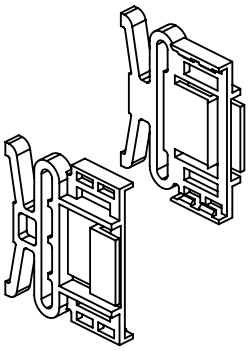
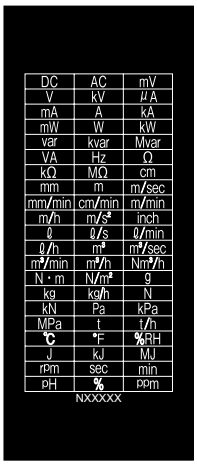
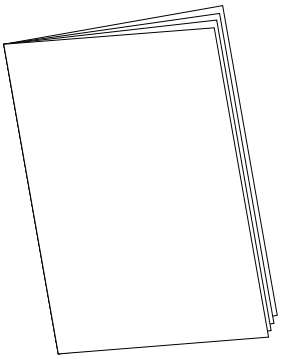
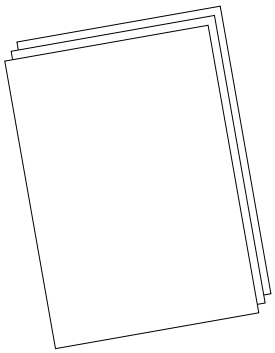
Thank you for choosing us. Before use, please check contents of the package you received as outlined below.

■ PACKAGE INCLUDES

Digital panel meter



Accessories

Mounting bracket (2) 	Engineering unit sticker label sheet (1)  DC AC mV V kV μA mA A kA mW W kW var kvar Mvar VA Hz Ω kΩ MΩ cm mm m m/sec mm/min cm/min m/min m/h m/s² inch ℓ ℓ/s ℓ/min ℓ/h m³ m³/sec m³/min m³/h Nm³/h N・m N/m² g kg kg/h N kN Pa kPa MPa t t/h ℃ °F %RH J kJ MJ rpm sec min pH % ppm NXXXXX	Instruction manual 
Ordering Information Sheet  (included with the option code '/SET' only)		

■ MODEL NO.

Confirm Model No. marking on the product to be exactly what you ordered.

1.2 **SAFETY PRECAUTIONS** (that must be observed)

The following signs are used in this manual to provide precautions required to ensure safe usage of the unit. Please understand these signs and graphic symbols, read the manual carefully and observe the description.

The following signs show seriousness of safety hazard or damage occurred when used wrongly with the signs ignored.

⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, may result in serious injury or death.
⚠ CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in injury or in property damage.

Indicates prohibitions.	Indicates mandatory cautions.	Indicates cautions.

⚠ WARNING

For safety, make sure that wiring is performed by qualified personnel only.
- Failure to do so may result in a fire, electric shock or injury.

Do not touch the terminals while the power is on.
- Doing so may result in electric shock.

Do not touch anything except for the buttons in removing the front panel.
- Doing so may result in malfunction or electric shock.

Check the connection diagram carefully before wire connection.
- Failure to do so may result in malfunction, a fire or electric shock.

Provide safety measures outside of the unit to ensure safety in the whole system if an abnormality occurs due to malfunction of the unit or another external factor affecting the unit's operation.

Do not splash water on the unit.
- Doing so may result in a fire, electric shock or injury.

Stop using the unit immediately if smokes, unusual smell or abnormal noises come(s) from it.
- Using the unit continuously may result in a fire or electric shock.

MANDATORY CAUTION

Stop using the unit if it is dropped or damaged.
- Using the unit continuously may result in a fire or electric shock.

MANDATORY CAUTION

Tighten the terminal block with a specified torque.
- Excessive fastening may result in damage of the terminal screws and loose screws may occasionally result in ignition.

PROHIBITION

Do not throw the unit into the fire.
- Doing so may result in rupture of the electronic component.

⚠ CAUTION

PROHIBITION TO DISCOMPOSE

Never discompose or remodel the unit.
- Doing so may result in electric shock, malfunction or injury.

PROHIBITION

Do not connect or remove the unit while its power is on.
- Doing so may result in electric shock, malfunction or injury.

MANDATORY CAUTION

Do not allow fine shavings or wire scraps to enter the unit in machining screws or wiring.
- Doing so may result in malfunction of the unit.

MANDATORY CAUTION

Make sure to attach the terminal cover.
- Failure to do so may result in electric shock.

MANDATORY CAUTION

Do not remove the front panel except in setting parameters.
- Doing so may result in malfunction due to mixing of foreign substances.

MANDATORY CAUTION

Be aware of static electricity in operating buttons.
- Failure to do so may result in malfunction.

PROHIBITION

Do not pull the wires connecting to the unit.
- Doing so may result in electric shock, damage of the unit or injury.

PROHIBITION

Do not use the unit in an atmosphere where combustible gas is present.
- Doing so may result in inflammation, ignition, or smoke.

PROHIBITION

Do not cover the ventilation slits with cables, etc.
- Doing so may result in malfunction or heating.

1.3 POINTS OF CAUTION

■ CONFORMITY WITH EU DIRECTIVES

- This equipment is suitable for Pollution Degree 2, Measurement Category I (input, transient voltage 1500 V) and Installation Category II (transient voltage 2500 V). Reinforced insulation (input to power: 300 V) is maintained. Prior to installation, check that the insulation class of this unit satisfies the system requirements.
- The equipment must be installed such that appropriate clearance and creepage distances are maintained to conform to CE requirements. Failure to observe these requirements may invalidate the CE conformance.
- Our products conforming to the EU Directives conforms to the standards required based on the premise that they are built into various equipment, apparatus or control panels to use. Because the EMC performance depends on the configuration, wiring or arrangement of the equipment, apparatus and control panels you build, it is necessary for you to make such equipment, apparatus or control panels to conform finally to the CE Marking by yourselves.

⚠ CAUTION

This product conforms to the EMC Directive for electrical and electronic apparatus intended for use in industrial environments. If it is used in the residential environments, it may cause radio interference, and the user is requested to take appropriate measures.

■ ENVIRONMENT

Install the unit within the installation specifications.

- Indoors use.
- Environmental temperature must be within -10 to +55°C (14 to 131°F) with relative humidity within 30 to 90% RH without condensing.
- Altitude up to 2000 meters.
- Provide sufficient space around the unit for heat dissipation.
- Mount the unit to a panel between 1.6 and 8 mm thick.
- Install the unit in a well-ventilated place in order to prevent internal temperature rise.
- Refer to “PANEL CUTOUT” to install several units. In mounting the unit with other equipment side by side, provide sufficient space between them, according to the dimensions in the panel cutout.
- Do not use the unit under the following environments:
  - Where the unit is exposed to direct sunlight, rain or wind. (The unit is not designed for outdoor use.)
  - Where condensation may occur due to extreme temperature changes.
  - Where corrosive or flammable gas is present.
  - Where heavy dust, iron powder or salt is present in the air.
  - Where organic solvent such like benzine, thinner, and alcohol, or strong alkaline materials such like ammonia and caustic soda may attach to the unit, or where such materials are present in the air.
  - Where the unit is subject to continuous vibration or physical impact.
  - Where there are high-voltage lines, high-voltage equipment, power lines, power equipment, equipment with transmission unit such like a ham radio equipment, or equipment generating large switching surges around the unit.

■ WIRING

- In order to prevent potential electric shock, wire the unit after turning off the power supply and making sure that the power is not supplied to the cable.
- In order to enable the operator to turn off the power input immediately, install a switch or a circuit breaker according to the relevant requirements in IEC 60947-2 and properly indicate it.
- Be sure to confirm the name and polarity of each terminal before wiring to the terminal block.
- Do not connect anything to unused terminals.
- Be sure to attach the terminal cover to prevent electric shock.

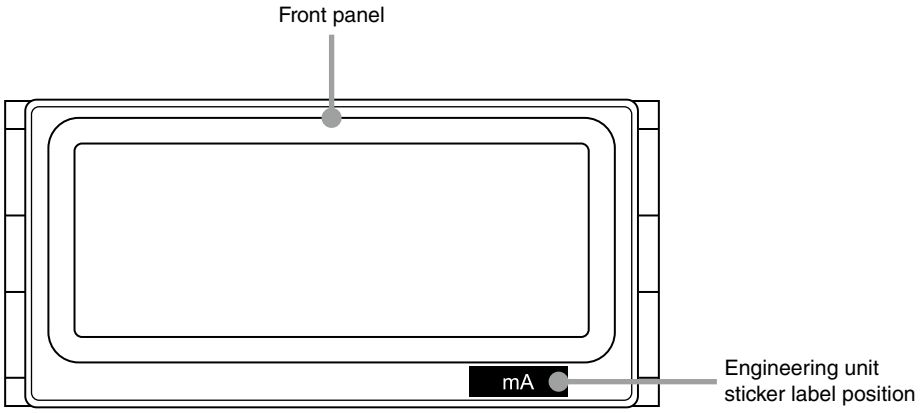
■ HANDLING CAUTIONS

- The unit is designed to function as soon as power is supplied, however, a warm up for 10 minutes is required for satisfying complete performance described in the data sheet.
- Use the unit within the noted supply power voltage and rated load.
- Clean the surface of the unit with wet soft cloth. Do not use organic solvent such like benzine, thinner and alcohol. Doing so may result in deformation or discoloration of the unit.
- When abnormality is found such like smokes, unusual smell and abnormal noises coming from the unit, immediately cut the power supply and stop using it.

1.4 COMPONENT IDENTIFICATION

■ FRONT VIEW

• With Front Panel



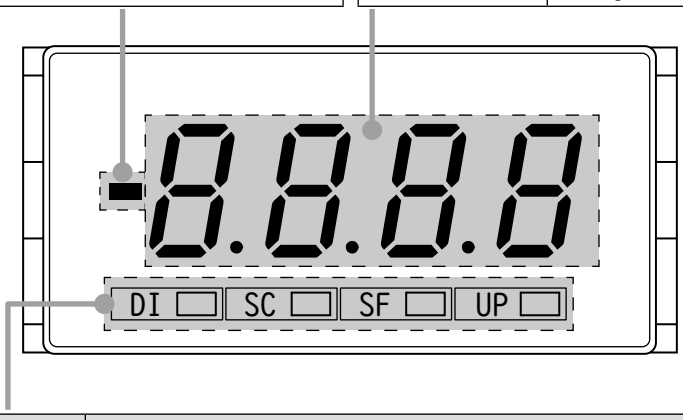
NOTE

- The engineering unit sticker label position is our recommended position.
- When an engineering unit is specified by the Ordering Information Sheet, the unit(s) will be shipped with the sticker label put on the above position.

• Without Front Panel

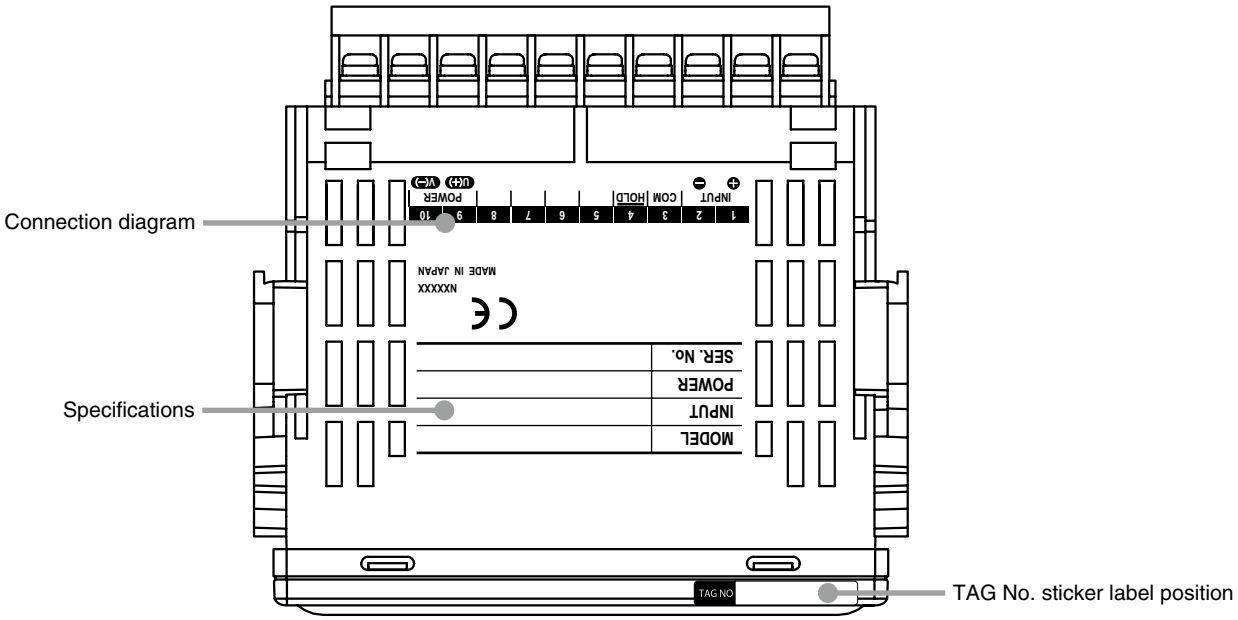
COMPONENT	FUNCTION
Polarity indicator	Turns on when negative value is displayed.

COMPONENT	FUNCTION
4-digit display	Indicates present value, setting value and scaling error. Range: 0 to 9999



BUTTON	FUNCTION
DI	Used to move on to the display setting mode; or to shift through setting items in each setting mode.
SC	Used to move on to the scaling setting mode; or to shift through setting items in each setting mode.
SF	Used to move on to the setting standby status of each setting mode and to shift through display digits in each setting item.
UP	Used to change setting values in a setting standby mode.

■ **TOP VIEW**



NOTE

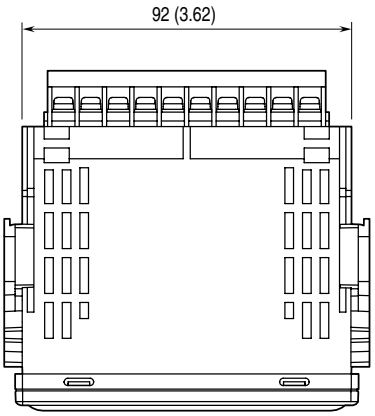
- Contents of the specification label depend on the specifications.
- The tag No. label sticker position is our recommended position.
- When a tag No. is specified, the unit(s) will be shipped with the tag No. sticker label put on the above position. Max. 17 alphanumeric characters can be specified. Please consult us.

1.5 INSTALLATION

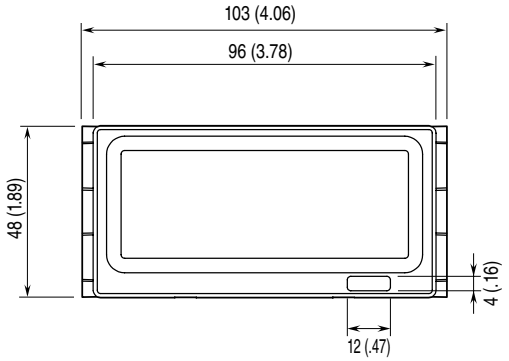
1.5.1 EXTERNAL DIMENSIONS

unit: mm (inch)

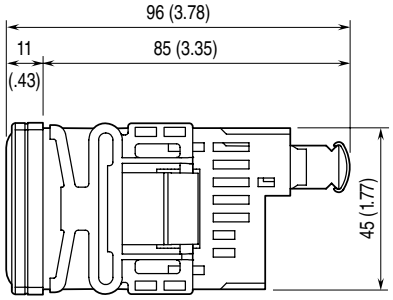
■ **TOP VIEW**



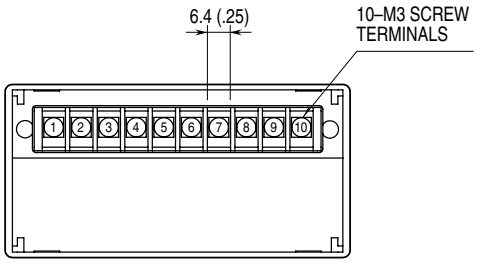
■ **FRONT VIEW**



■ **SIDE VIEW**

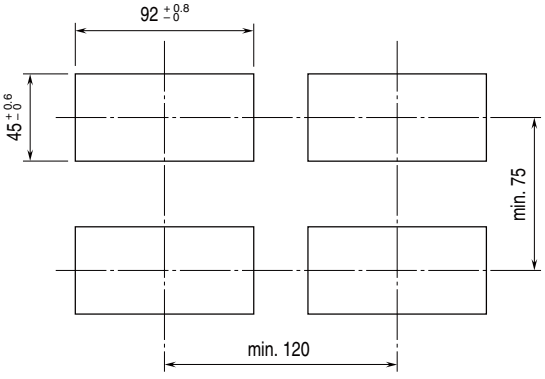


■ **REAR VIEW**



1.5.2 PANEL CUTOUT DIMENSIONS

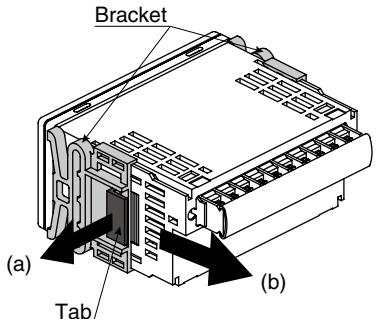
unit: mm



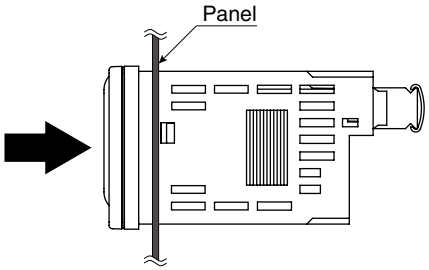
Panel thickness: 1.6 to 8.0 mm

1.5.3 INSTALLATION

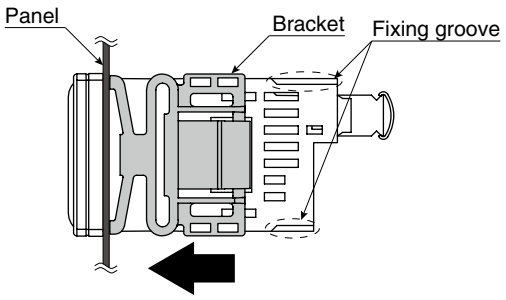
(1) Remove the mounting brackets.
   (a) Flip a tab of a bracket.
   (b) Then pull the bracket toward the terminal block to remove it.



(2) Insert the unit into the panel cutout.



(3) Push the mounting brackets into the grooves on both sides of the rear module, until they hit the panel's rear side.



1.6 WIRING INSTRUCTIONS

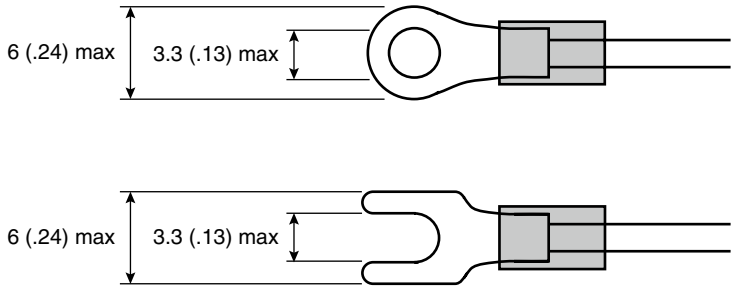
1.6.1 CAUTION IN WIRING

- For safety, make sure that wiring is performed by qualified personnel only.
- In order to prevent potential electric shock, wire the unit after turning off the power supply and making sure that the power is not supplied to the cable.
- Be sure to confirm the name and polarity of each terminal before wiring to it.
- Do not connect anything to unused terminals.
- We offer a series of lightning surge protectors for protection against induced lightning surges. Please contact us to choose appropriate models.

1.6.2 RECOMMENDED SOLDERLESS TERMINAL

- Use solderless terminals for M3. Refer to the drawings below.

unit: mm (inch)

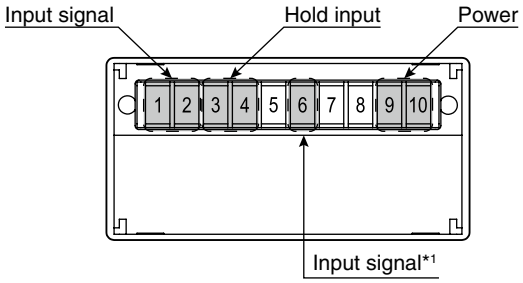


Applicable wire size: 0.25 to 1.65 mm^2
Torque: 0.6 N·m
Recommended manufacturer: Japan Solderless Terminal MFG. Co., Ltd., Nichifu Co., Ltd.

IMPORTANT

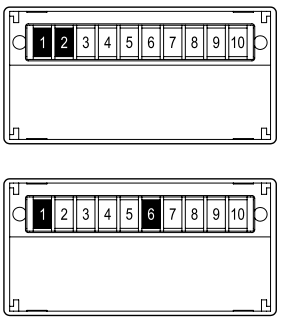
- Insulated solderless terminals are recommended.
- In using non-insulated solderless terminals, cover them with insulating caps or tubes.
- Ring tongue terminals are recommended rather than spade tongue terminals to prevent from falling off.

1.6.3 TERMINAL ASSIGNMENT



*1. Use when A4 (±199.9mA DC), V4 (±199.9V DC) or V5 (±600V DC) is selected.

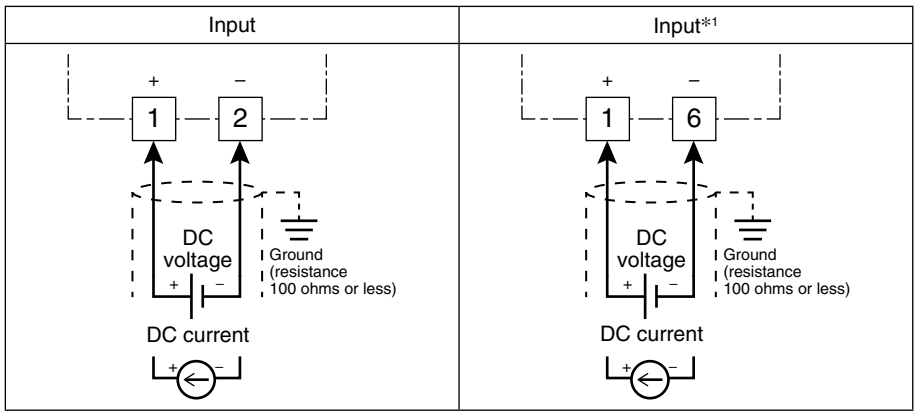
1.6.4 WIRING INPUT SIGNAL



Connect DC voltage or current signal wires.

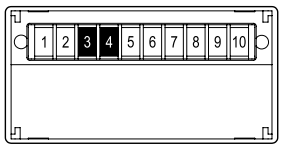
IMPORTANT

- Be sure to confirm the input polarity in wiring. Wrong connection may result in malfunction of the unit.
- In order to prevent potential electric shock, wire the unit after cutting the input signal and making sure that the power is not supplied to the cable.
- Take measures to reduce noise as much as possible, e.g. by using shielded twisted pair wires for the input signal. Ground the input shield to the most stable earth to prevent noise troubles.
- Do not connect anything to unused terminals.



*1. Use when A4 (±199.9 mA DC), V4 (± 199.9 V DC), or V5 (± 600 V DC) is selected.

1.6.5 WIRING HOLD INPUT

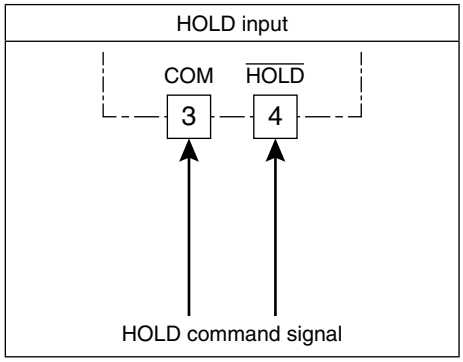


Displayed value is held with an external HOLD command input.
Connect the contact across $\overline{\text{HOLD}}$ to COM as shown in the following figure.
Close the contact to hold the value.
Buttons cannot be operated in the HOLD state.

Detecting level voltage/resistance	Hi level: ≥ 2.1 V / 73.8 kΩ Lo level: ≤ 0.7 V / ≤ 16.8 kΩ HOLD at Lo level

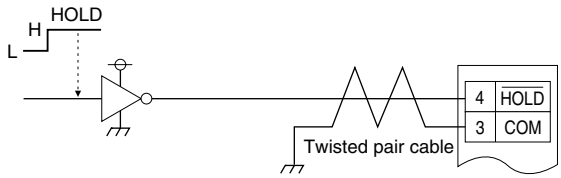
IMPORTANT

- Be sure to confirm the input polarity in wiring.
- The HOLD input is not isolated from the internal circuit.

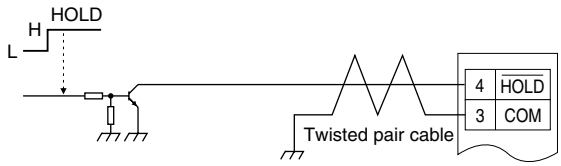


■ WIRING EXAMPLES

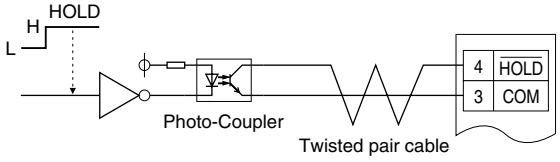
(a) 5V–CMOS, TTL



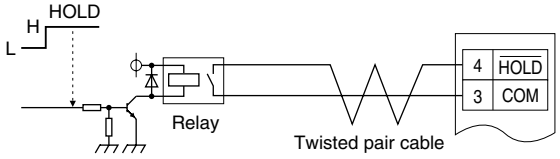
(b) Transistor



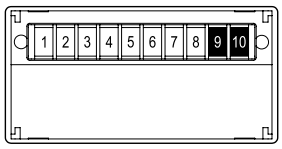
(c) Photo-Coupler



(d) Relay



1.6.6 WIRING POWER

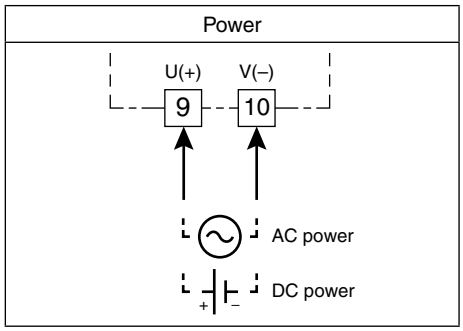


Connect power according to the power input code. The power specifications are shown in the following table.

CODE	RATING	PERMISSIBLE RANGE
M2	100 to 240 V AC, 50 to 60 Hz	85 to 264 V AC, 47 to 66 Hz
R	24 V DC	±20%

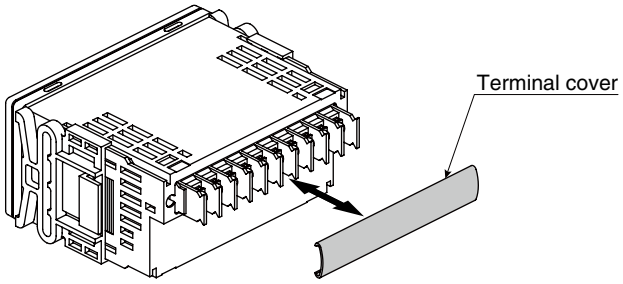
IMPORTANT

- For safety, make sure that wiring is performed by qualified personnel only.
- In order to prevent potential electric shock, wire the unit after turning off the power supply and making sure that the power is not supplied to the cable.
- Use wires as thick as possible and twist them from the end.
- For DC power, confirm the polarity.



1.6.7 ATTACHING/REMOVING TERMINAL COVER

Attach the terminal cover for safety after wiring.



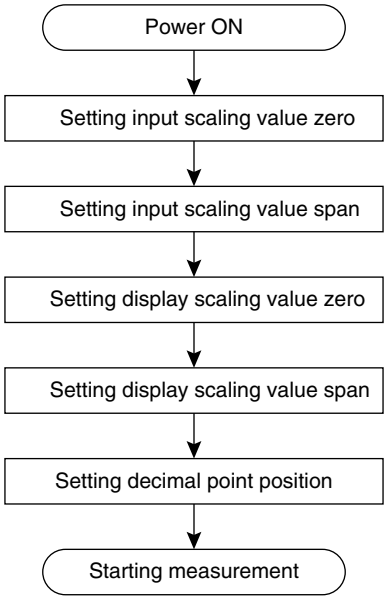
2. BASIC SETTING AND OPERATION

2.1 BASIC SETTING

This section describes flow and procedure of the basic setting.
The following shows the flow and procedure to set the input to 4 – 20 mA DC and the display to 0.0 – 100.0% as an example.

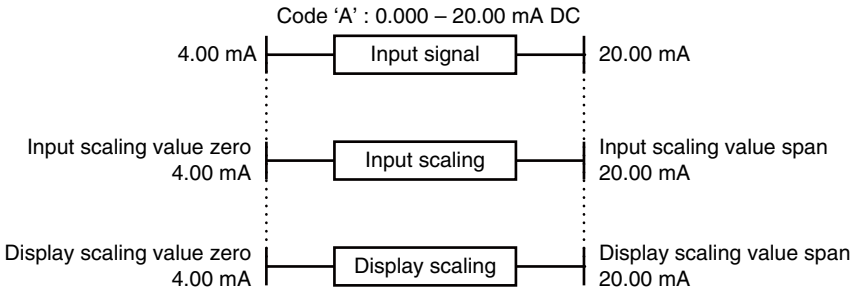
2.1.1 BASIC SETTING FLOW

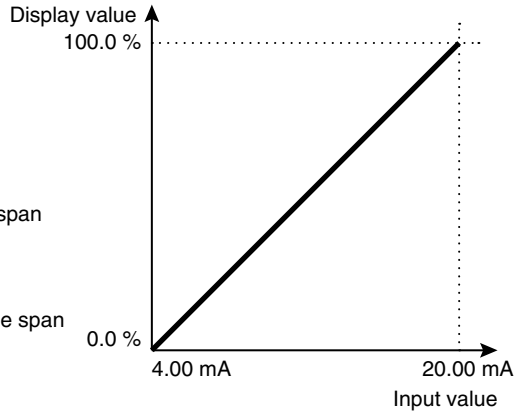
The basic setting is as shown in the following flowchart.



2.1.2 RELATION BETWEEN INPUT SCALING AND DISPLAY SCALING

The relation between input scaling and display scaling is as shown in the following figure and chart.





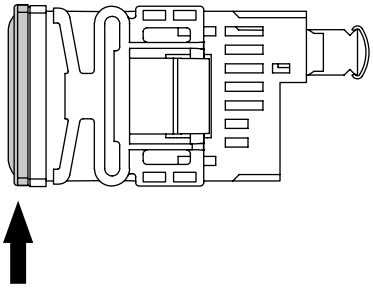
Input scaling: 0% input value (input scaling value A) and 100% input value (input scaling value B)
Display scaling: 0% display value (display scaling value A) and 100% display value (display scaling value B)

2.1.3 MOUNTING/REMOVING FRONT PANEL

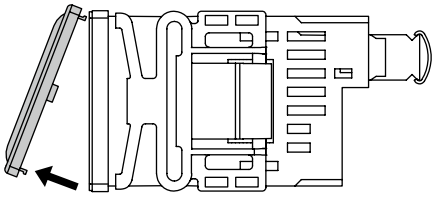
- Set parameters with the buttons inside the front panel. Remove the panel in setting.
- Mount the panel after configuration.

■ REMOVING FRONT PANEL

(1) Hold up the front panel.

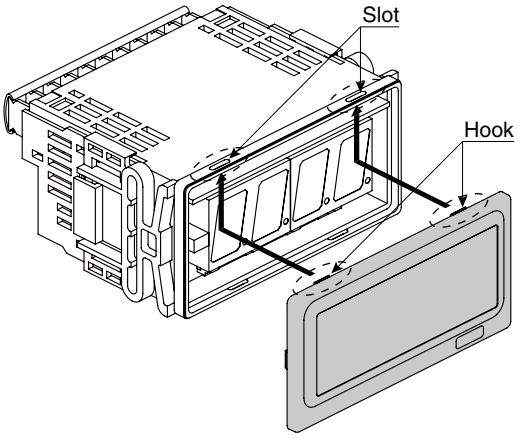


(2) Remove the panel from downside.

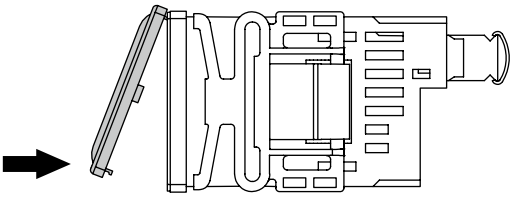


■ MOUNTING FRONT PANEL

(1) Insert the front panel hook into the case upside slots of the unit.



(2) Push the panel hook into the case downside slots of the unit.



NOTE

- Be sure to confirm the direction of the front panel in mounting.
- Make sure that there is no misalignment or space between the unit and the panel after mounting.

2.1.4 BASIC SETTING PROCEDURE

The following shows the procedure to set the display to 0.0 – 100.0% with the input code "A" 4 – 20 mA input as an example. Set values (after calculating if necessary) meeting signals of equipment to use. Refer to 3. SETTING SCALING VALUES for details of setting.

■ PARAMETER LIST FOR BASIC SETTING

Parameters used in the basic setting are as shown in the following table.

PARAMETER	SETTING VALUE	SETTING
Input scaling value zero	04.00	0% input: 4.00 mA
Input scaling value span	20.00	100% input: 20.00 mA
Display scaling value zero	04.00*1	0% display: 0.0%
Display scaling value span	20.00*1	100% display: 100.0%
Decimal point position	888.8	1 decimal place (10^{-1})

*1 The decimal point position depends on the decimal point position setting.

■ BASIC SETTING PROCEDURE

The basic setting procedure is as follows.

1 **Confirm the wiring, turn on the power and move on to Scaling Setting Mode (measurement stopped).**

- Hold down SC button for 3 seconds or more.

2 **Set input scaling value A.**

- Press DI or SC button to go to the next or previous parameter setting.
- Press SF button to show the current setting and SC button to shift the display into the setting standby mode.
- Press DI or SC button to go to the next digit and UP button to change the blinking value.
- Press SF button to apply the new setting.

3 **Set input scaling value B.**

- Press DI or SC button to go to the next or previous parameter setting.
- Press SF button to show the current setting and SC button to shift the display into the setting standby mode.
- Press DI or SC button to go to the next digit and UP button to change the blinking value.
- Press SF button to apply the new setting.

4 **Set display scaling value A.**

- Press SF button to shift the display into the setting standby mode.
- Press SF button to go to the next digit and UP button to change the blinking value.

5 **Set display scaling value B.**

- Press DI or SC button to apply the new setting and go to the next or previous parameter setting.
- Press SF button to shift the display into the setting standby mode.
- Press SF button to go to the next digit and UP button to change the blinking value.

6 **Set decimal point position.**

- Press DI or SC button to apply the new setting and go to the next or previous parameter setting.
- Press SF button to shift the display into the setting standby mode and UP button to select the decimal point position.

7 **Return to Measuring Mode (measurement started).**

- Hold down DI or SC button for 1 second or more to apply the new setting and return to Measuring Mode.

2.2 BASIC SETTING OPERATION AND INSTRUCTIONS

This section describes basic operation and instructions when setting parameters.

2.2.1 BASIC SETTING OPERATION

Parameters can be grouped into three setting types, “setting value selection”, “decimal point position selection” and “numerical value setting”. Basic operation of each type is as shown below.

■ SETTING VALUE SELECTION

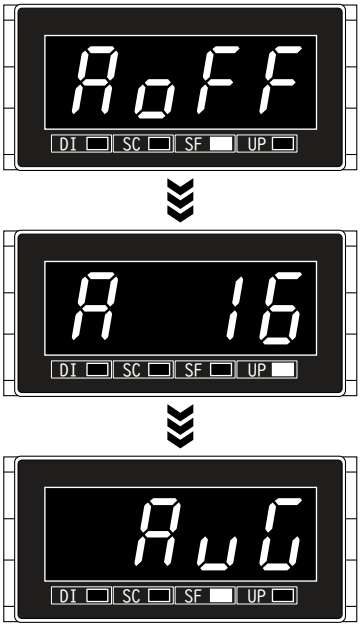
1 **Press SF button to show the setting.**

• The current set value is indicated.

2 **Press UP button to select your desired setting value.**

3 **Press SF button to apply the new setting.**

• The setting item is indicated.



*1 Display depends on the settings.

■ DECIMAL POINT POSITION SELECTION

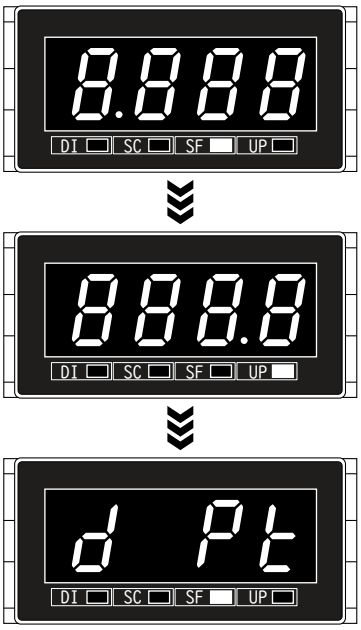
1 **Press SF button to show the setting.**

• The current set value is indicated.

2 **Press UP button to select a desired decimal point position.**

3 **Press SF button to apply the new setting.**

• The setting item is indicated.

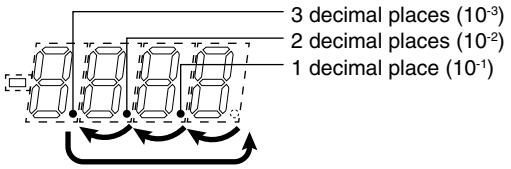


*1 Display depends on the settings.

NOTE

■ MOVING THE DECIMAL POINT

Pressing UP button moves the decimal point one place to the left.



■ DECIMAL POINT POSITION

"No decimal point" to "3 decimal places" can be selected in the decimal point position setting.

SETTING VALUE	FUNCTION
8888	No decimal point
8888	1 decimal place (10^{-1})

SETTING VALUE	FUNCTION
8888	2 decimal places (10^{-2})
8888	3 decimal places (10^{-3})

■ NUMERICAL VALUE SETTING

1 **Press SF button to show the setting.**

• The current set value is indicated.

2 **Press SC button to shift the display into the setting standby mode.**

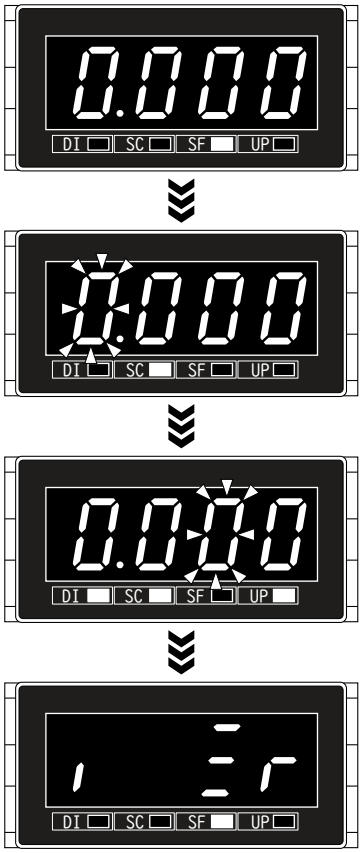
• The most significant digit starts blinking.

3 **Press DI or SC, and UP buttons to set a numerical value.**

• Press DI or SC button to go to the next digit.
• Press UP button to change the blinking value.

4 **Press SF button to apply the new setting.**

• The setting item is indicated.

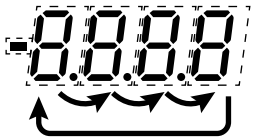


*1 Display depends on the settings.

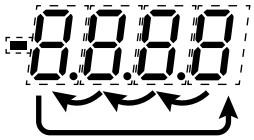
NOTE

■ SHIFTING DIGITS

• Each time pressing SC button, the blinking digit moves to the right.



• Each time pressing DI button, the blinking digit moves to the left.

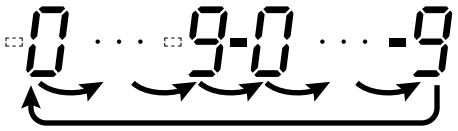


■ SETTING A NUMERICAL VALUE

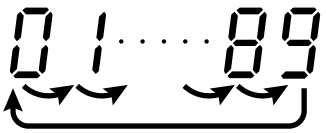
• Each time pressing UP button, the numeral is incremented by 1.

• The negative sign (-) must be set together with the 4th digit. For example, set '-004.0' instead of '-4.0'.

• 4th digit



• Other digits



2.2.2 INSTRUCTIONS ON BASIC OPERATION

■ IF THE FRONT BUTTONS ARE LEFT UNTOUCHED…

• The setting item is indicated without applying the last changes after approximately 1 minute while it is in the setting standby mode.

• The setting item is indicated after approximately 1 minute while the set value is indicated in setting a numerical value.

• The display goes back automatically to Measuring Mode after approximately 1 minute while the setting item is indicated.

■ TO ABORT A SETTING…

• If you get lost in a setting mode, you can execute initialization. Refer to 11.2 INITIALIZING SETTING VALUES.

3. SETTING SCALING VALUES

■ INPUT SCALING

Input scaling means setting an input value within the setting range (conformance range) per input code.
The input scaling values include zero and span.

- Input scaling value zero is minimum value (0%) of input signal.
- Input scaling value span is maximum value (100%) of input signal.

e.g. Input signal 4 – 20 mA DC
Input scaling value zero 4 mA
Input scaling value span 20 mA

IMPORTANT

- Set 'input scaling value A < input scaling value B'.
- Setting beyond the setting range per input code is not available.

■ DISPLAY SCALING

Display scaling means setting a value to display actually.
The display scaling values include zero and span. A decimal point can be set in any position.

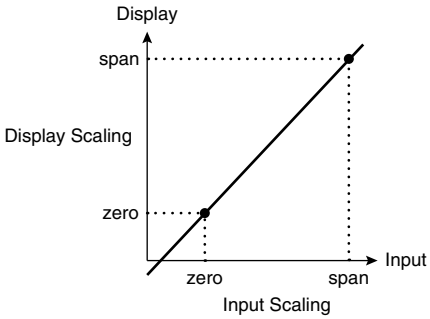
- Display scaling value zero is a display value for the input scaling value zero.
- Display scaling value span is a display value for the input scaling value span.
- Decimal point position can be set in common for both display scaling value zero and span.

e.g. Display value 0.0 – 100.0 %
Display scaling value zero 0.0 %
Display scaling value span 100.0 %
Decimal point position 888.8 (1 decimal place)

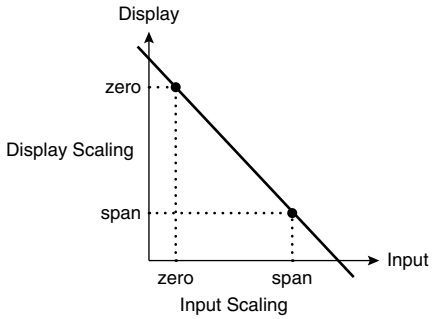
IMPORTANT

Both normal scaling (display scaling value zero < display scaling value span) and inverted scaling (display scaling value zero > display scaling value span) can be set within the range of -9999 to 9999.

■ Normal Scaling
The display value increases
when the input signal increases.



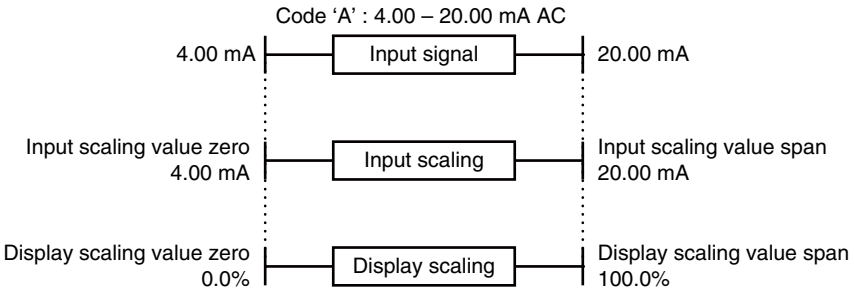
■ Inverted Scaling
The display value decreases
when the input signal increases.



■ RELATION BETWEEN INPUT SCALING AND DISPLAY SCALING

The relation between input scaling and display scaling is as shown in the following figure.

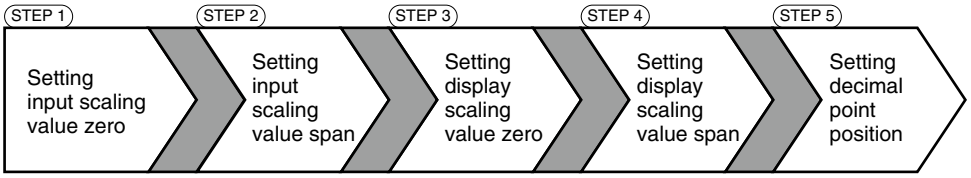
e.g. Indicates input of 4 - 20 mA with 0.0 - 100.0%.



■ PROCEDURE TO SET SCALING VALUES

• Flow in setting scaling values

5-step settings are necessary to set scaling values.



• Operating procedure to set scaling values

Following pages describe operating procedures in each step to set the input scaling to 4-20 mA DC, and the display scaling to 0.0 – 100% as an example.

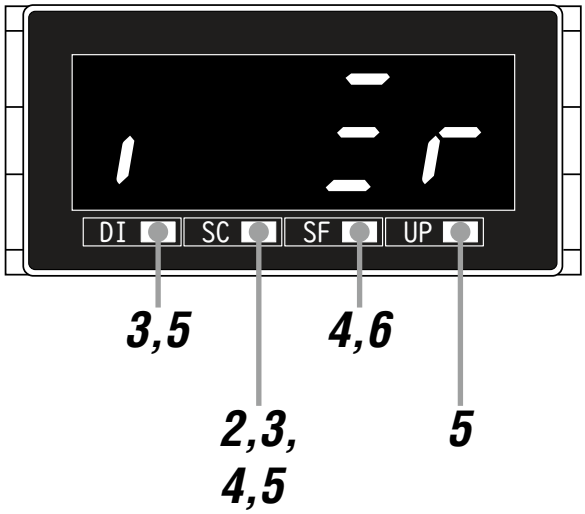
3.1 STEP 1. INPUT SCALING VALUE ZERO

3.1.1 INPUT SCALING LIST

Input scaling default values and setting ranges (conformance ranges) per input code are as shown in the following table.

INPUT SIGNAL	DEFAULT VALUE	SETTING RANGE
A1: ±199.9uA DC	Input scaling value zero: -199.9 Input scaling value span: 199.9	-199.9 to 199.9
A2: ±1.999mA DC	Input scaling value zero: -1999 Input scaling value span: 1999	-1999 to 1999
A3: ±19.99mA DC	Input scaling value zero: -1999 Input scaling value span: 1999	-1999 to 1999
A4: ±199.9mA DC	Input scaling value zero: -1999 Input scaling value span: 1999	-1999 to 1999
A: 4.00 to 20.00mA DC	Input scaling value zero: 04.00 Input scaling value span: 20.00	04.00 to 20.00
V1: ±199.9mV DC	Input scaling value zero: -1999 Input scaling value span: 1999	-1999 to 1999
V2: ±1.999V DC	Input scaling value zero: -1999 Input scaling value span: 1999	-1999 to 1999
V3: ±19.99V DC	Input scaling value zero: -1999 Input scaling value span: 1999	-1999 to 1999
V4: ±199.9V DC	Input scaling value zero: -1999 Input scaling value span: 1999	-1999 to 1999
V5: ±600V DC	Input scaling value zero: -0600 Input scaling value span: 0600	-0600 to 0600
6: 1.00 to 5.00V DC	Input scaling value zero: 01.00 Input scaling value span: 05.00	01.00 to 05.00

3.1.2 OPERATING PROCEDURE



1 **Confirm the wiring, and turn on the power.**

• All the indications turn on for approximately 3 seconds and then the display moves on to Measuring Mode.

■ Immediately after power on (all indicators on)

■ Measuring Mode

*1 Display depends on the settings and input.

NOTE

Indication 'S.ERR' may blink, which shows the input out of the permissible range and does not show the unit failure.

2 **Hold down SC button for 3 seconds or more to move on to Scaling Setting Mode.**

• The setting item 'I ZR' (input scaling value zero) is indicated.

NOTE

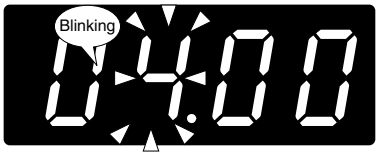
Skip to Step 7 if the default value is acceptable.

3 **Press SF button to show the setting and SC button to shift the display into the setting standby mode.**

• The forth digit starts blinking, to which you can apply changes.

4 **Press DI or SC, and UP buttons to set to '04.00'.**

• Press DI or SC button to go to the next digit, and UP button to change the blinking value.



NOTE

• '04.00' is a display example. Set any value within the setting range.
• 'ERR' starts blinking back in Measuring Mode when the set value is within invalid range, or is same as or greater than the input scaling value span. Return the setting within the valid range.

5 **Press SF button to apply the new setting.**

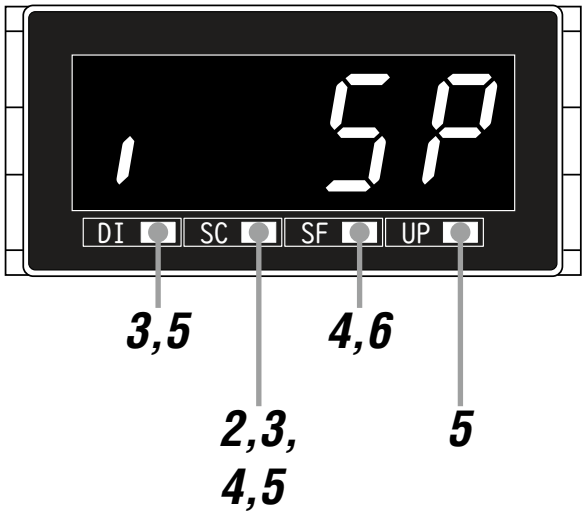
• And the setting item is indicated.

6 **■ TO GO ON TO SET THE INPUT SCALING VALUE SPAN,**
Skip to Step 3 in 3.2 STEP 2. INPUT SCALING VALUE SPAN.

■ TO QUIT,
Hold down DI or SC button for 1 second or more to return to Measuring Mode.

3.2 STEP 2. INPUT SCALING VALUE SPAN

3.2.1 OPERATING PROCEDURE



1 **Confirm the wiring, and turn on the power.**

- All the indications turn on for approximately 3 seconds and then the display moves on to Measuring Mode.

■ Immediately after power on (all indicators on)

■ Measuring Mode

*1 Display depends on the settings and input.

NOTE

Indication 'S.ERR' may blink, which shows the input out of the permissible range and does not show the unit failure.

2 **Hold down SCALE/↑ button for 3 seconds or more to move on to Scaling Setting Mode.**

- The setting item 'I ZR' (input scaling value zero) is indicated.

3 **Press DI or SC button to go to the input scaling value span setting.**

- The setting item 'I SP' (input scaling value B) is indicated.

NOTE

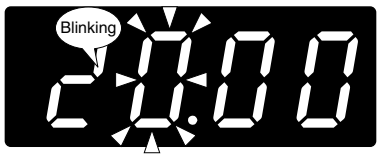
Skip to Step 7 if the default value is acceptable.

4 **Press SF button to show the setting and SC button to shift the display into the setting standby mode.**

• The forth digit starts blinking, to which you can apply changes.

5 **Press DI or SC, and UP buttons to set to '20.00'.**

• Press DI or SC button to go to the next digit, and UP button to change the blinking value.



NOTE

• '20.00' is a display example. Set any value within the setting range.
• 'ERR' starts blinking back in Measuring Mode when the set value is within invalid range, or is same as or less than the input scaling value zero. Return the setting within the valid range.

6 **Press SF button to apply the new setting.**

• And the setting item is indicated.

7 **■ TO GO ON TO SET THE DISPLAY SCALING VALUE SPAN,**
Skip to Step 3 in "11.2 INITIALIZING SETTING VALUES" on page 49.

■ TO QUIT,
Hold down DO or SC button for 1 second or more to return to Measuring Mode.

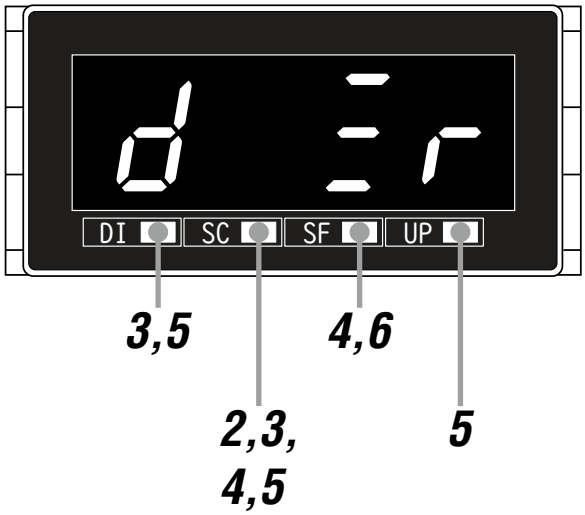
3.3 STEP 3. DISPLAY SCALING VALUE ZERO

3.3.1 DISPLAY SCALING LIST

Display scaling default values per input code and setting range (permissible display range) are as shown in the following table.

INPUT SIGNAL	DEFAULT VALUE	SETTING RANGE
A1: ±199.9uA DC	Display scaling value zero: -1999 Display scaling value span: 1999	-9999 to 9999
A2: ±1.999mA DC	Display scaling value zero: -1999 Display scaling value span: 1999	
A3: ±19.99mA DC	Display scaling value zero: -1999 Display scaling value span: 1999	
A4: ±199.9mA DC	Display scaling value zero: -1999 Display scaling value span: 1999	
A: 4.00 to 20.00mA DC	Display scaling value zero: 0400 Display scaling value span: 2000	
V1: ±199.9mV DC	Display scaling value zero: -1999 Display scaling value span: 1999	
V2: ±1.999V DC	Display scaling value zero: -1999 Display scaling value span: 1999	
V3: ±19.99V DC	Display scaling value zero: -1999 Display scaling value span: 1999	
V4: ±199.9V DC	Display scaling value zero: -1999 Display scaling value span: 1999	
V5: ±600V DC	Display scaling value zero: -0600 Display scaling value span: 0600	
6: 1.00 to 5.00V DC	Display scaling value zero: 0100 Display scaling value span: 0500	

3.3.2 OPERATING PROCEDURE



1 **Confirm the wiring, and turn on the power.**

• All the indications turn on for approximately 3 seconds and then the display moves on to Measuring Mode.

■ Immediately after power on (all indicators on)

■ Measuring Mode

*1 Display depends on the settings and input.

NOTE

Indication 'S.ERR' may blink, which shows the input out of the permissible range and does not show the unit failure.

2 **Hold down SCALE/↑ button for 3 seconds or more to move on to Scaling Setting Mode.**

• The setting item 'D PT' (decimal point position) is indicated.

3 **Press DISP/↓ or SCALE/↑ button to go to the display scaling value A setting.**

• The setting item 'D ZR' (display scaling value A) is indicated.

NOTE

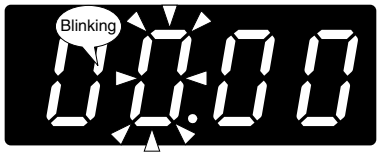
Skip to Step 7 if the default value is acceptable.

4 **Press SF button to show the setting and SC button to shift the display into the setting standby mode.**

• The forth digit starts blinking, to which you can apply changes.

5 **Press DI or SC, and UP buttons to set to '00.00'.**

• Press DI or SC button to go to the next digit, and UP button to change the blinking value.



NOTE

• '00.00' is a display example. Set any value within the range of -9999 to 9999.
• The negative sign (-) must be set together with the 4th digit. For example, set '-04.00' instead of '-4.00'.

6 **Press SF button to apply the new setting.**

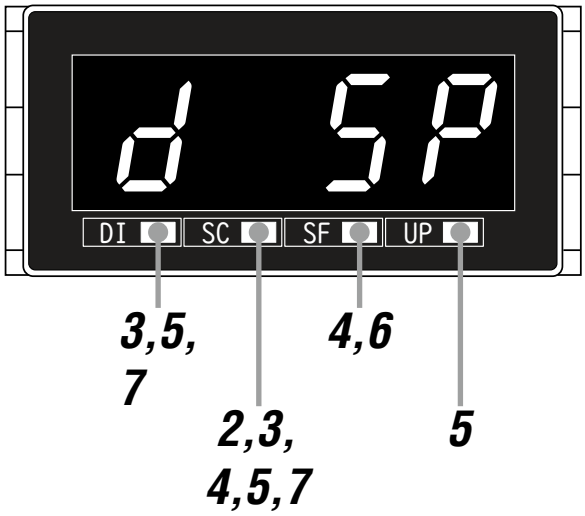
• And the setting item is indicated.

7 **■ TO GO ON TO SET THE DISPLAY SCALING VALUE SPAN,**
Skip to Step 3 in 3.4 STEP 4. DISPLAY SCALING VALUE SPAN.

■ TO QUIT,
Hold down DI or SC button for 1 second or more to return to Measuring Mode.

3.4 STEP 4. DISPLAY SCALING VALUE SPAN

3.4.1 OPERATING PROCEDURE



1 **Confirm the wiring, and turn on the power.**

- All the indications turn on for approximately 3 seconds and then the display moves on to Measuring Mode.

■ Immediately after power on (all indicators on)

■ Measuring Mode

*1 Display depends on the settings and input.

NOTE

Indication 'S.ERR' may blink, which shows the input out of the permissible range and does not show the unit failure.

2 **Hold down SC button for 3 seconds or more to move on to Scaling Setting Mode.**

- The setting item 'I ZR' (input scaling value zero) is indicated.

3 **Press DI or SC button to go to the display scaling value span setting.**

- The setting item 'D SP' (display scaling value span) is indicated.

NOTE

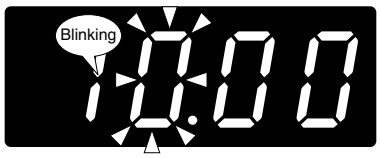
Skip to Step 7 if the default value is acceptable.

4 **Press SF button to show the setting and SC button to shift the display into the setting standby mode.**

• The forth digit starts blinking, to which you can apply changes.

5 **Press DI or SC, and UP buttons to set to '10.00'.**

• Press DI or SC button to go to the next digit, and UP button to change the blinking value.



NOTE

• '10.00' is a display example. Set any value within the range of -9999 to 9999.
• The negative sign (-) must be set together with the 4th digit. For example, set '-04.00' instead of '-4.00'.

6 **Press SF button to apply the new setting.**

• And the setting item is indicated.

7 **■ TO GO ON TO SET THE DECIMAL POSITION,**
Skip to Step 3 in 3.5 STEP 5. DECIMAL POINT POSITION.

■ TO QUIT,
Hold down DI or SC button for 1 second or more to return to Measuring Mode.

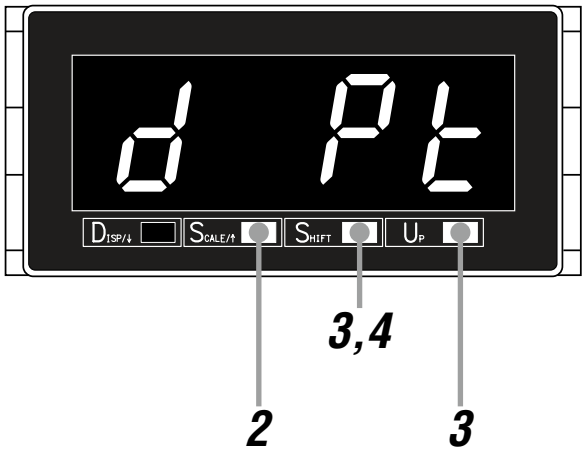
3.5 STEP 5. DECIMAL POINT POSITION

3.5.1 DECIMAL POINT POSITION LIST

Default values of decimal point position are as shown in the following tables.

INPUT SIGNAL	DEFAULT VALUE
A1: ±199.9uA DC	8.8.8.8. 1 decimal place(10^{-1})
A2: ±1.999mA DC	8.8.8.8. 3 decimal places (10^{-3})
A3: ±19.99mA DC	8.8.8.8. 2 decimal places (10^{-2})
A4: ±199.9mA DC	8.8.8.8. 1 decimal places (10^{-1})
A: 4.00 to 20.00mA DC	8.8.8.8. 2 decimal places (10^{-2})
V1: ±199.9mV DC	8.8.8.8. 1 decimal place (10^{-1})
V2: ±1.999V DC	8.8.8.8. 3 decimal places (10^{-3})
V3: ±19.99V DC	8.8.8.8. 2 decimal places (10^{-2})
V4: ±199.9V DC	8.8.8.8. 1 decimal places (10^{-1})
V5: ±600V DC	8.8.8.8. No decimal places
6: 1.00 to 5.00V DC	8.8.8.8. 2 decimal places (10^{-2})

3.5.2 OPERATING PROCEDURE



1 **Confirm the wiring, and turn on the power.**

- All the indications turn on for approximately 3 seconds and then the display moves on to Measuring Mode.

■ Immediately after power on (all indicators on)

■ Measuring Mode

*1 Display depends on the settings and input.

NOTE

Indication 'S.ERR' may blink, which shows the input out of the permissible range and does not show the unit failure.

2 **Hold down SC button for 3 seconds or more to move on to Scaling Setting Mode.**

• The setting item 'I ZR' (input scaling value zero) is indicated.

3 **Press DI or SC button to move to the decimal position.**
Display the setting parameter of decimal position.

NOTE

Skip to Step 5 if the default value is acceptable.

4 **Press SF button to show the setting and UP button to select the decimal point position.**

• Press UP button to move the decimal point. Select 1 decimal place (10^{-1}).

NOTE

The right figure shows a display example. Select one among "no decimal point", and "1 decimal place" to "3 decimal places".

5 **Press SF button to apply the new setting.**

• And the setting item is indicated.

6 **Hold down DI or SC button for 1 second or more to return to Measuring Mode.**

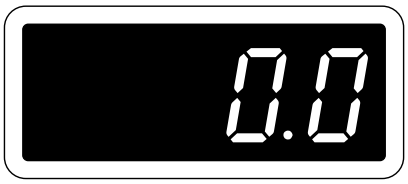
4. OPERATION

Make sure that 0.0 – 100.0% is correctly indicated according to the input 4 – 20 mA DC provided.

IMPORTANT

Before operating, make sure that the wiring is correct, the input and the power supply are within the specification range.

1 **Apply 4 mA input (0%) and make sure that 0.0% is indicated.**

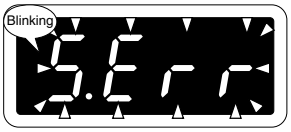


*1 Display depends on the settings and input.

NOTE

■ **WHEN THE FOLLOWING IS INDICATED…**

- When 'S.ERR' is indicated, the input is not applied correctly. Check the input wiring, equipment and signal.



2 **Apply 12 mA input (50%) and make sure that 50.0% is indicated.**

3 **Apply 20 mA input (100%) and make sure that 100.0% is indicated.**

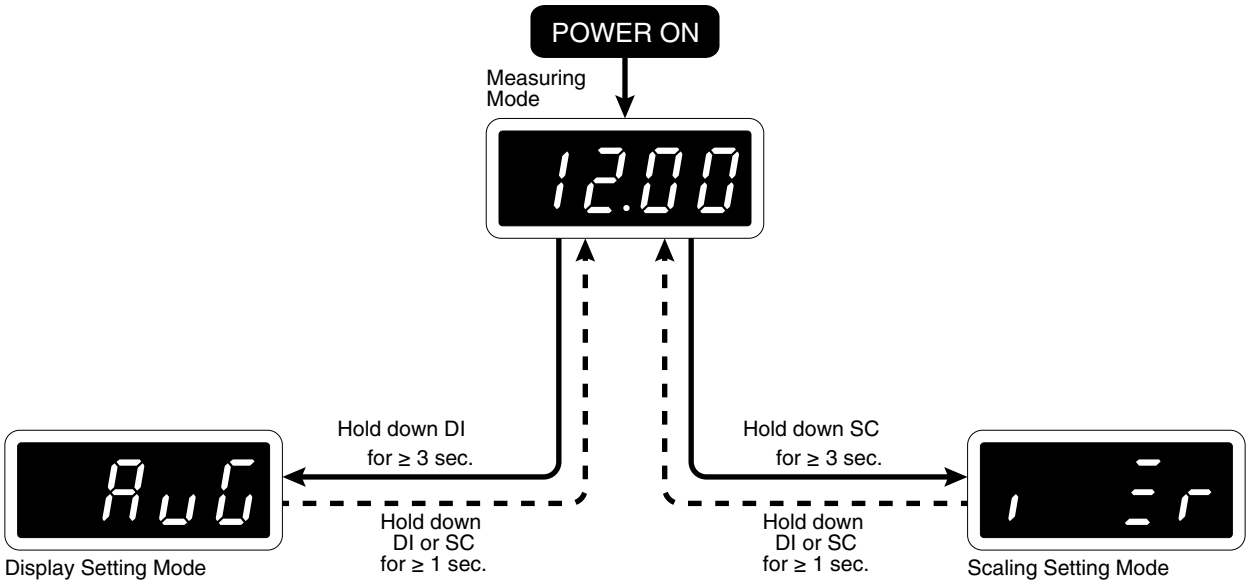
5. PARAMETER CONFIGURATION

■ MODE

Parameters can be grouped in several modes.
The 40DV1 has modes as shown in the following table.

MODE	FUNCTION	MEASUREMENT
Measuring	Normal measurement state where the unit takes in input. When the power is supplied, the unit operates in Measuring Mode.	Measuring
Scaling Setting	Basic settings such like input scaling value zero and span, display scaling value zero and span, and decimal point position can be performed.	Measuring stopped
Display Setting	Moving average and brightness can be set. Settings can be initialized. Also the firmware version can be confirmed.	

■ MODE TRANSITION



■ TRANSITION FROM MEASURING MODE TO EACH MODE

To Scaling Setting Mode	Hold down SC button for 3 seconds or more.
To Display Setting Mode	Hold down DI button for 3 seconds or more.

■ TRANSITION FROM EACH MODE TO MEASURING MODE

Hold down DI or SC button for 1 second or more to return to Measuring Mode.

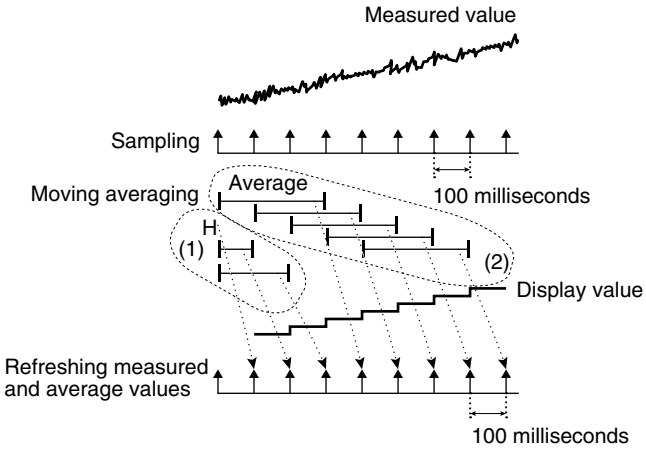
6. AVERAGING INPUT

Moving average processing of measured values is configurable. The number of samples in processing the moving average can be selected in the following table. This operation averages sampled values, and then, averages with a new sample added and the oldest one omitted. Such operation is repeated as shown in the following figure. For instance, when 'A 4' is selected, the moving average processing with 4 samples (400 millisecond intervals) is repeated. Moving average is used to remove periodic varied noise superimposed on the input signal and suppress the display flickering.

■ NUMBER OF SAMPLES

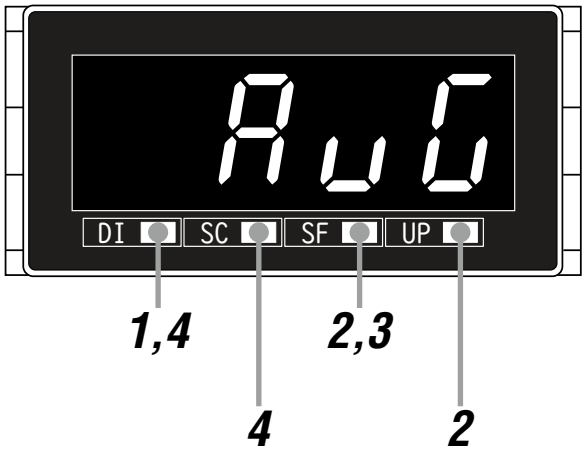
DISPLAY	FUNCTION	DEFAULT VALUE
AoFF	No moving averaging	AoFF
A 2	Moving average with 2 samples (200 millisecond intervals)	
A 4	Moving average with 4 samples (400 millisecond intervals)	
A 8	Moving average with 8 samples (800 millisecond intervals)	
A 16	Moving average with 16 samples (1600 millisecond intervals)	

■ EXAMPLE OF MOVING AVERAGE WITH 4 SAMPLES



(1) The moving average operation starts immediately after the power is on or the moving average is set. Until the sampling No. reaches the set value, all samples are averaged every 100 milliseconds.
(2) After the sampling No. reaches the set value, a new sample is added to be averaged with the oldest one omitted. Such operation is repeated.

6.1 OPERATING PROCEDURE



1 **Hold down DI button for 3 seconds or more to move on to Display Setting Mode.**

• The setting item 'AVG' (moving average sampling No.) is indicated.

2 **Press SF button to show the setting and UP button to select the moving average sampling No.**

• Select one among 'AOFF', 'A 2', 'A 4', 'A 8' and 'A 16'.

NOTE

'AOFF', 'A 2', 'A 4', 'A 8' or 'A 16' is indicated depending on the setting.

3 **Press SF button to apply the new setting.**

• And the setting item is indicated.

4 **Hold down DI or SC button for 1 second or more to return to Measuring Mode.**

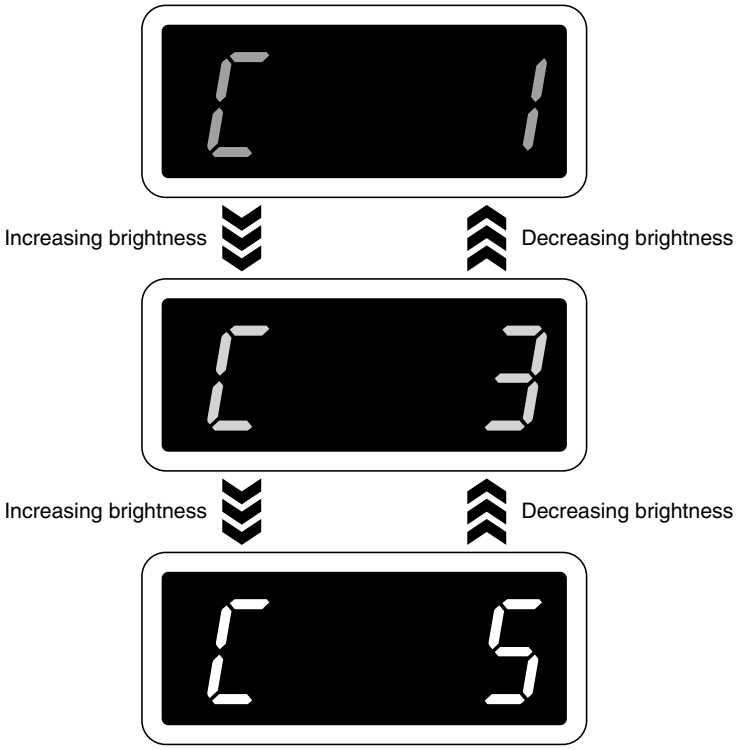
7. ADJUSTING BRIGHTNESS OF DISPLAY

The brightness of the display can be adjusted (figures below). The brightness can be selected in the following table.

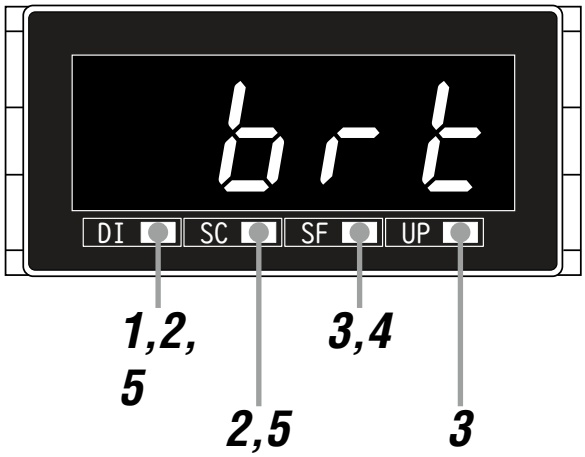
■ DISPLAY BRIGHTNESS

DISPLAY	FUNCTION	DEFAULT VALUE
C 1	Brightness level 1 (dark)	C 5
C 2	Brightness level 2	
C 3	Brightness level 3	
C 4	Brightness level 4	
C 5	Brightness level 5 (bright)	

■ ADJUSTMENT IMAGE



7.1 OPERATING PROCEDURE



1 **Hold down DI button for 3 seconds or more to move on to Display Setting Mode.**

• The setting item 'AVG' (moving average sampling No.) is indicated.

2 **Press DI or SC button to go to the brightness setting.**

• The setting item 'BRT' (brightness) is indicated.

3 **Press SF button to show the setting and UP button to select the brightness.**

• Select one among 'C 1', 'C 2', 'C 3', 'C 4' and 'C 5'.

NOTE

'C 1', 'C 2', 'C 3', 'C 4' or 'C 5' is indicated depending on the setting.

4 **Press SF button to apply the new setting.**

• And the setting item is indicated.

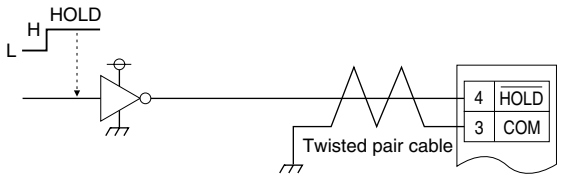
5 **Hold down DI or SC button for 1 second or more to return to Measuring Mode.**

8. HOLDING DISPLAY

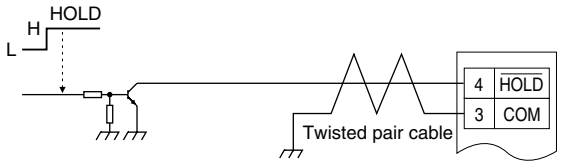
Displayed value is held with an external HOLD command input. Connect the contact across $\overline{\text{HOLD}}$ to COM as shown in the following figures. Close the contact to hold the value.

■ WIRING EXAMPLES

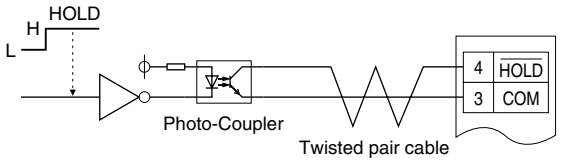
(a) 5V–CMOS, TTL



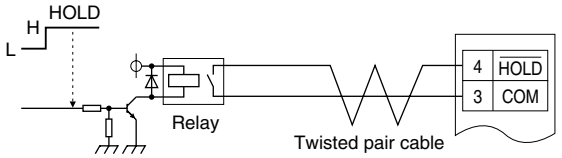
(b) Transistor



(c) Photo-Coupler



(d) Relay



NOTE

- While the HOLD command is input, the display keeps the value at the HOLD command turning on, even though the input is out of range.
- In supplying power with the HOLD command on, 0 is indicated.

9. USER CALIBRATION

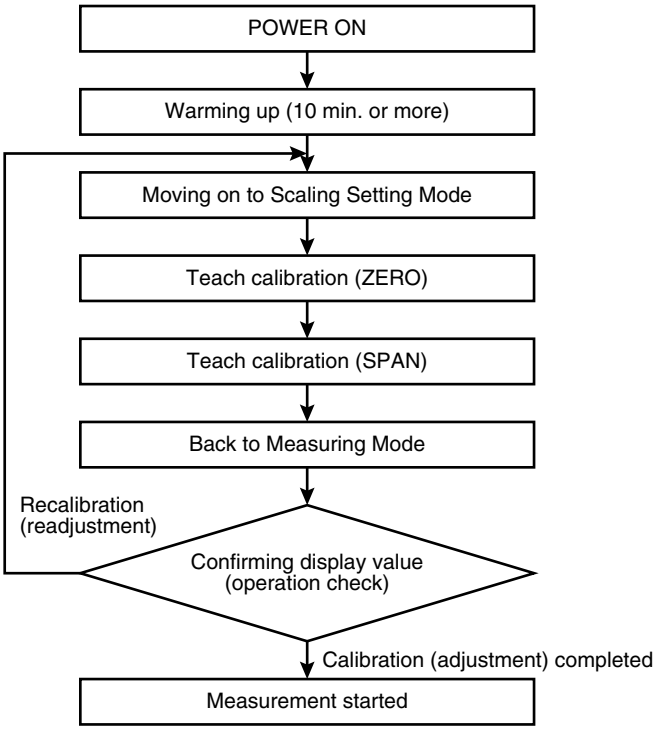
User calibration is calibration by a customer using customer's measuring instruments and standards.
To calibrate (adjust) the input signal, use "Teach Calibration" function. The unit is calibrated correctly at shipment and therefore there is normally no need for customers to calibrate it.

9.1 TEACH CALIBRATION

You can calibrate the input signal by the Teach Calibration function if you need calibration.
Input scaling value zero and span can be adjusted by applying actual input signals.
Please note that we do not warrant the result of your own calibration (adjustment).
The internal calibration data is overwritten every time the unit is calibrated and it is stored even if the power is turned off. However the data will be lost after an initialization.
Prepare measuring instruments and equipment for calibration by yourselves. Refer to each manual carefully for the instruments and equipment for information on handling them.

9.1.1 TEACH CALIBRATION FLOW

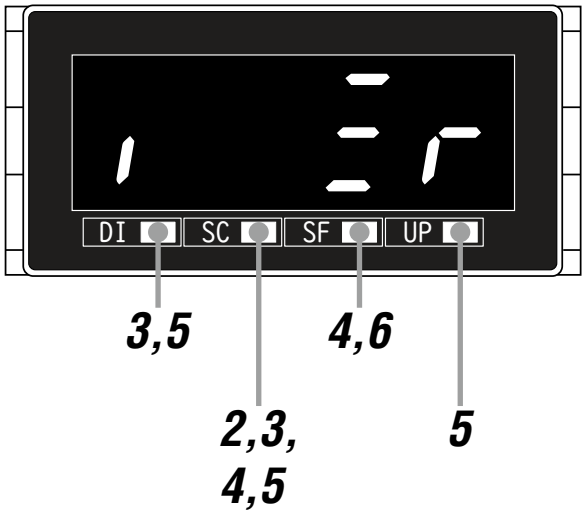
The Teach Calibration is carried out as shown in the following flowchart.



IMPORTANT

- Warm up measuring instruments, equipment and other devices on site for the time specified in each manual, and operate the unit in a stable condition.
- In setting the input scaling values using actual inputs, carry out the Teach Calibration within the operational range. Do not set 'input scaling value zero ≥ input scaling value span' in carrying out the Teach Calibration.

9.1.2 OPERATING PROCEDURE



NOTE

The following figures are display examples. The displays depend on the specifications and settings.

1 **Hold down SC button for 3 seconds or more to move on to Scaling Setting Mode.**

- The setting item 'I ZR' (input scaling value zero) is indicated.

IMPORTANT

Warm up the unit for 10 minutes or more before carrying out the Teach Calibration.

2 **Press SF button to show the setting value.**

NOTE

Skip to Step 5 when the teach calibration (ZERO) is not necessary.

3 **Press Up button to go to the teach calibration (ZERO) setting.**

- The present input is indicated.
- Unused decimal points start blinking.

4 **Apply 0% input and press UP button to register the value.**

- The teach calibration (ZERO) is registered.
- Parameter name is indicated.

IMPORTANT

Confirm that the input signal is stable before pressing Up button.

5 **Press DI button twice to go to the input scaling value span setting.**

- The setting parameter of input scaling value span is indicated.

NOTE

Skip to Step 8 when the teach calibration (SPAN) is not necessary.

6 **Press Up button to go to the teach calibration (SPAN) setting.**

- The present input is indicated.
- Unused decimal points start blinking.

7 **Apply 100% input and press Up button to register the value.**

- The teach calibration (SPAN) is registered.
- Setting parameter is indicated.

IMPORTANT

Confirm that the input signal is stable before pressing UP button.

8 **Hold down DI or SC button for 1 second or more to return to Measuring Mode.**

10. INSPECTION / CLEANING

To use the unit in the normal and best conditions, inspect and clean the unit routinely or periodically.

- When the front panel have dirt, wipe them with wet soft cloth. Do not use organic solvent such like benzine, thinner and alcohol. Doing so may result in deformation or discoloration of the unit.
- Make sure that abnormality such like smokes, unusual smell or abnormal noises is not found. Using the unit continuously with such abnormality may result in a fire or electric shock.
- Check the terminal screws periodically. In checking the screws, for safety, interrupt electricity to the power and input.
- Make sure periodically that the mounting brackets are fixed tightly. Loosened brackets may cause drop of the unit.

11. TROUBLESHOOTING

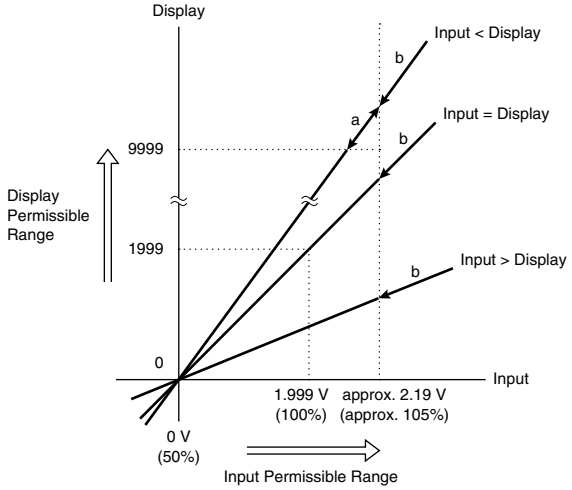
11.1 ERROR MESSAGES

DISPLAY	ERROR MESSAGE	WHAT TO DO
S.Err blinking	The input signal is out of the permissible range.	Set the input signal within the permissible range.
i.Err	Internal data error	Repair is needed if the display does not recover after the power is reset.
-9999 or 9999 blinking	The value after scaling is out of the permissible display range.	Set the input signal within the permissible range.

NOTE

While an external HOLD command is input, the display keeps the value at the HOLD command turning on, even though the input is out of range.

■ **INPUT AND ERROR CORRELATION** (e.g. ±1.999 V input)



a: 9999 blinking

If the value to display after scaling is out of the permissible range, the maximum (9999) or minimum (-9999) value is blinking.

b: S.ERR blinking

If the input signal is out of the permissible range, the indicator will blink “S.ERR”.

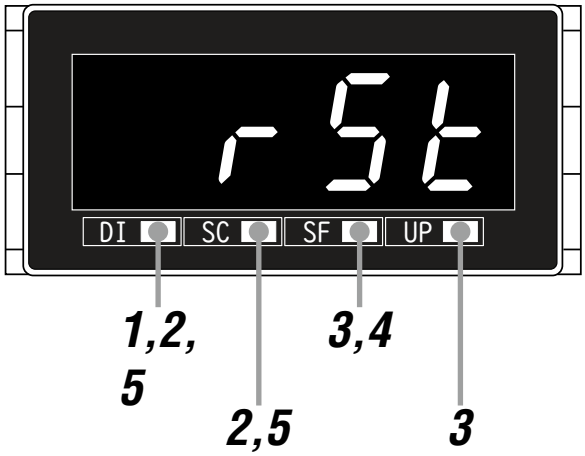
11.2 INITIALIZING SETTING VALUES

To restart setting from the default state, initialization can be used. Refer to attached 12.3 PARAMETER LIST for the default values.

IMPORTANT

- Currently set parameters will be lost after an initialization. It is recommended to record the parameters before initialization.
- Even if the unit is shipped with the specified parameters with the option code '/SET', such parameters will be lost after an initialization. Be careful that the initialization does not recover the ex-factory settings.

11.2.1 OPERATING PROCEDURE



1 **Hold down DI button for 3 seconds or more to move on to Display Setting Mode.**

- The setting item 'AVG' (moving average sampling No.) is indicated.

2 **Press DI or SC button to go to the initialization.**

- The setting item 'RST' (initialization) is indicated.

3 **Press SF button.**

- The initial value is indicated.

4 **Press UP button to select 'RST'.**

5 **Press SF button to execute the initialization.**

• The settings are initialized and then the setting item is indicated.

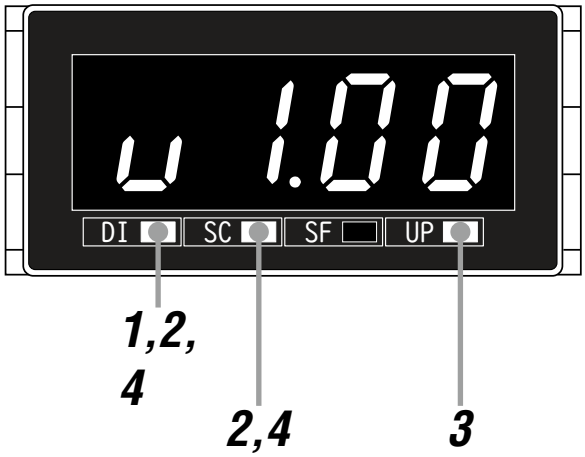
6 **Hold down DI or SC button for 1 second or more to return to Measuring Mode.**

11.3 CONFIRMING FIRMWARE VERSION

The firmware version of the unit can be confirmed.
Confirm the version in the following cases:

- The display is different from the one described in the operating manual.
- The firmware version is necessary to consult us for troubles.

11.3.1 OPERATING PROCEDURE



1 **Hold down DI button for 3 seconds or more to move on to Display Setting Mode.**

- The setting item 'AVG' (moving average sampling No.) is indicated.

2 **Press DI or SC button to go to the version indication.**

- The firmware version number is indicated.

3 **Press UP button to indicate another 4 digits of the version number.**

NOTE

- The above figures show the firmware version V1.00.0002.
- The displays depend on the firmware version number.

4 **Hold down DI or SC button for 1 second or more to return to Measuring Mode.**

12. APPENDICES

12.1 SPECIFICATIONS

■ GENERAL SPECIFICATIONS

Construction		Panel flush mounting
Connection		M3 screw terminals (torque 0.6 N·m)
Screw terminal		Nickel-plated steel
Housing material		Flame-resistant resin (gray)
Isolation		Input to power
Setting (front button)	Scaling setting mode	Input scaling valu zero, input scaling value span, display scaling value zero, display scaling value span, decimal point position
	Display setting mode	Moving average, brightness, initialization, version indication
A/D conversion		∑ – Δ
Sampling rate		10 times/sec. (100 msec.)
Averaging		None or moving average

■ DISPLAY

Display	4 digits of 20.3 mm (0.8 inch) height, 7-segment, red LED
Display range	-9999 to 9999
Scaling range for measurement range (conformance range)	-9999 to 9999 counts
Decimal point position	10^{-1}, 10^{-2}, 10^{-3} or none
Zero indication	Higher-digit zeros are suppressed
Over-range indication	'-9999' or '9999' blinking for display values out of the display range. 'S.ERR' blinks surpassing the permissible range.

■ INPUT SPECIFICATIONS

DC current	Input code: A1	Measurement range (conformance range)	±199.9 µA DC
		Input range	Approx. -219 – +219 µA
		Input resistance	1 kΩ
	Input code: A2	Measurement range (conformance range)	±1.999 mA DC
		Input range	Approx. -2.19 – +2.19 mA
		Input resistance	1 kΩ
	Input code: A3	Measurement range (conformance range)	±19.99 mA DC
		Input range	Approx. -21.9 – +21.9 mA
		Input resistance	10 Ω
	Input code: A4	Measurement range (conformance range)	±199.9 mA DC
		Input range	Approx. -219 – +219 mA
		Input resistance	1 Ω
	Input code: A	Measurement range (conformance range)	4.00 – 20.00 mA DC
		Input range	Approx. 2.4 – 21.6 mA
		Input resistance	10 Ω
DC voltage	Input code: V1	Measurement range (conformance range)	±199.9 mV DC
		Input range	Approx. -219 – +219 mV
		Input resistance	≥ 1 MΩ
	Input code: V2	Measurement range (conformance range)	±1.999 V DC
		Input range	Approx. -2.19 – +2.19 V
		Input resistance	≥ 1 MΩ
	Input code: V3	Measurement range (conformance range)	±19.99 V DC
		Input range	Approx. -21.9 – +21.9 V
		Input resistance	≥ 1 MΩ
	Input code: V4	Measurement range (conformance range)	±199.9 V DC
		Input range	Approx. -219 – +219 V
		Input resistance	≥ 4 MΩ
	Input code: V5	Measurement range (conformance range)	±600 V DC
		Input range	Approx. -659 – +659 V
		Input resistance	≥ 4 MΩ
	Input code: 6	Measurement range (conformance range)	1.00 – 5.00 V DC
		Input range	Approx. 0.6 – 5.4 V
		Input resistance	≥ 1 MΩ
Hold input		Dry contact input	
	Detecting voltage/current	Approx. 4.7 V / approx. 0.05 mA	
	Detecting level voltage/ resistance	Hi level: ≥ 2.1 V / ≥ 73.8 kΩ Lo level: ≤ 0.7 V / ≤ 16.6 kΩ HOLD at Lo level	

■ INSTALLATION

Power consumption	AC power	M2: 100 – 240 V AC, 50 – 60 Hz	Operational voltage range 85 – 264 V, 47 – 66 Hz ≤ 2.7 VA
	DC power	R: 24 V DC	Operational voltage range 24 V ±20% Ripple 10% p-p max. Approx. 0.5 W
Operating temperature		-10 to +55°C (14 to 131°F)	
Operating humidity		30 to 90% RH (non-condensing)	
Mounting		Panel flush mounting	
Weight		160 g (0.35 lb)	

■ PERFORMANCE

Accuracy (for each input code)	Input code: A1	±0.1% rdg ±1 digit
	Input code: A2	±0.1% rdg ±1 digit
	Input code: A3	±0.1% rdg ±1 digit
	Input code: A4	±0.1% rdg ±1 digit
	Input code: A	±0.1% rdg ±1 digit
	Input code: V1	±0.1% rdg ±1 digit
	Input code: V2	±0.1% rdg ±1 digit
	Input code: V3	±0.1% rdg ±1 digit
	Input code: V4	±0.1% rdg ±1 digit
	Input code: V5	±0.15% rdg ±1 digit
	Input code: 6	±0.1% rdg ±1 digit
	"1 digit" is multiplied by scaling-multiple*1. Even in case the scaling-multiple is less than 1, multiply by 1.	
Temp. coefficient	±(0.01% rdg + 0.3 digits)/°C "0.3 digits" is multiplied by scaling-multiple*1. Even in case the scaling-multiple is less than 1, multiply by 1.	
Line voltage effect	±1 digit over voltage range	
Insulation resistance	≥ 100 MΩ with 500 V DC	
Dielectric strength	1500 V AC @ 1 minute (input to power to ground)	

*1 Calculate scaling-multiple with the following formula.
Scaling-multiple = | (display scaling value span – display scaling value zero) ÷ (default display scaling value span – default display scaling value zero) |

■ STANDARDS & APPROVALS

EU conformity*2	EMC Directive EN 61326-1 Low Voltage Directive EN 61010-1 Measurement Category I (input) Installation Category II (power) Pollution degree 2 Input to power: Reinforced insulation (300 V) RoHS Directive

*2 CE is not available with the input code 'V5'.

12.2 MODEL NUMBERING

Code number: **40DV1–[1]–[2][3]**

[1] INPUT

Current

A1: ±199.9 µA DC (input resistance 1 kΩ)
A2: ±1.999 mA DC (input resistance 1 kΩ)
A3: ±19.99 mA DC (input resistance 10 Ω)
A4: ±199.9 mA DC (input resistance 1 Ω)
A: 4.00 – 20.00 mA DC (input resistance 10 Ω)

Voltage

V1: ±199.9 mV DC (input resistance ≥ 1 MΩ)
V2: ±1.999 V DC (input resistance ≥ 1 MΩ)
V3: ±19.99 V DC (input resistance ≥ 1 MΩ)
V4: ±199.9 V DC (input resistance ≥ 4 MΩ)
V5: ±600 V DC (input resistance ≥ 4 MΩ) (CE not available)
6: 1.00 – 5.00 V DC (input resistance ≥ 1 MΩ)

[2] POWER INPUT

AC Power

M2: 100 – 240 V AC, 50 – 60 Hz (operational voltage range 85 – 264 V, 47 – 66 Hz)
R: 24 V DC (operational voltage range 24 V ±20%, ripple 10% p-p max.)

[3] OPTIONS

Blank: None
/Q: With options (specify the specification)

■ SPECIFICATIONS OF OPTION: Q

COATING (For the detail, refer to our web site.)
Moving parts and indicators are not coated.

/C01: Silicone coating
/C02: Polyurethane coating
/C03: Rubber coating

EX-FACTORY SETTING

/SET: Preset according to the Ordering Information Sheet (No. ESU-9539)

12.3 PARAMETER LIST

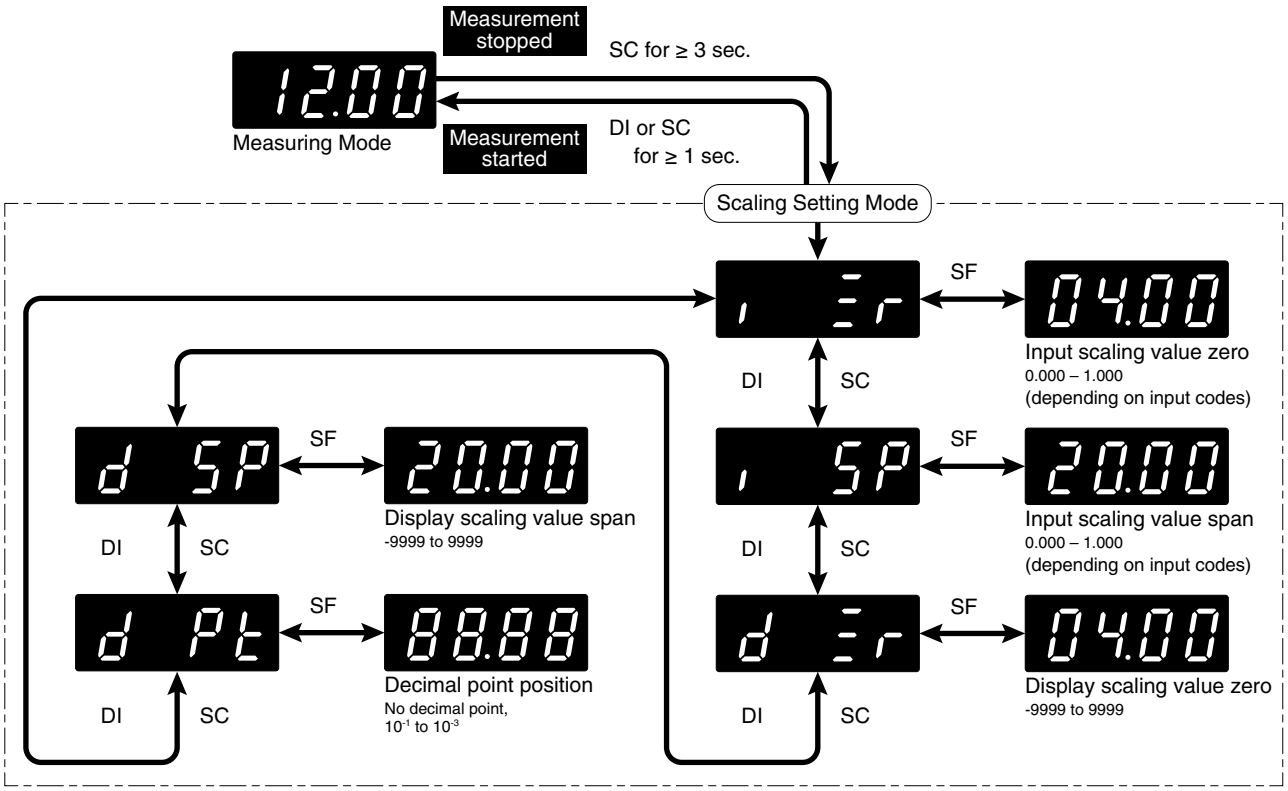
MODE	PARAMETER	SETTING PARAMETER	RANGE	DISPLAY	DEFAULT VALUE	DECIMAL POINT	UNIT	SETTING VALUE
Measuring	Present value	-	-9999 - 9999	-	-	*1	User-defined	
Scaling setting	Input scaling value zero	i Zr	A1: -199.9 - 199.9	-1999 - 1999	1999	-	uA DC	
			A2: -1.999 - 1.999	-1999 - 1999	1999		mA DC	
			A3: -19.99 - 19.99	-1999 - 1999	1999			
			A4: -199.9 - 199.9	-1999 - 1999	1999			
			A: 04.00 - 20.00	0400 - 2000	2000		mA DC	
			V1: -199.9 - 199.9	-1999 - 1999	1999		mV DC	
			V2: -1.999 - 1.999	-1999 - 1999	1999		V DC	
			V3: -19.99 - 19.99	-1999 - 1999	1999			
			V4: -199.9 - 199.9	-1999 - 1999	1999			
			6: 01.00 - 05.00	0100 - 0500	0500			
	Input scaling value span	i SP	A1: -199.9 - 199.9	-1999 - 1999	1999	-	uA DC	
			A2: -1.999 - 1.999	-1999 - 1999	1999		mA DC	
			A3: -19.99 - 19.99	-1999 - 1999	1999			
			A4: -199.9 - 199.9	-1999 - 1999	1999			
			A: 04.00 - 20.00	0400 - 2000	2000		mA DC	
			V1: -199.9 - 199.9	-1999 - 1999	1999		mV DC	
			V2: -1.999 - 1.999	-1999 - 1999	1999		V DC	
			V3: -19.99 - 19.99	-1999 - 1999	1999			
			V4: -199.9 - 199.9	-1999 - 1999	1999			
			V5: -0600 - 0600	-0600 - 0600	0600			
			6: 01.00 - 05.00	0100 - 0500	0500			
	Display scaling value zero	d Zr	-9999 - 9999	-9999 - 9999	A1: -1999	*1	User-defined	
					A2: -1999			
					A3: -1999			
					A4: -1999			
					A: 0400			
					V1: -1999			
					V2: -1999			
					V3: -1999			
					V4: -1999			
					V5: -0600			
					6: 0100			
	Display scaling value span	d SP	-9999 - 9999	-9999 - 9999	A1: 1999	*1	User-defined	
					A2: 1999			
					A3: -1999			
					A4: 1999			
					A: 2000			
					V1: 1999			
					V2: 1999			
					V3: -1999			
					V4: 1999			
					V5: 0600			
					6: 0500			

MODE	PARAMETER	SETTING PARAMETER	RANGE	DISPLAY	DEFAULT VALUE	DECIMAL POINT	UNIT	SETTING VALUE
	Decimal point	d PE	No decimal point, or 10^{-1} to 10^{-3}	0000 0000 0000 0000	A1: 0000 A2: 0000 A3: 0000 A4: 0000 A: 0000 V1: 0000 V2: 0000 V3: 0000 V4: 0000 V5: 0000 6: 0000	-	-	-
Display setting	Moving average	AVG	None, 2, 4, 8 ,16	AOFF A 2 A 4 A 8 A 16	AOFF	-	sample	
	Brightness	brt	1 (dark) - 5 (bright)	C 1 C 2 C 3 C 4 C 5	C 5	-	-	
	Initialization	rSt	OFF, reset	oFF on	oFF	-	-	
	Version indication	-	-	-	-	-	-	

*1 Conforms to decimal point position setting.

12.4 PARAMETER MAP

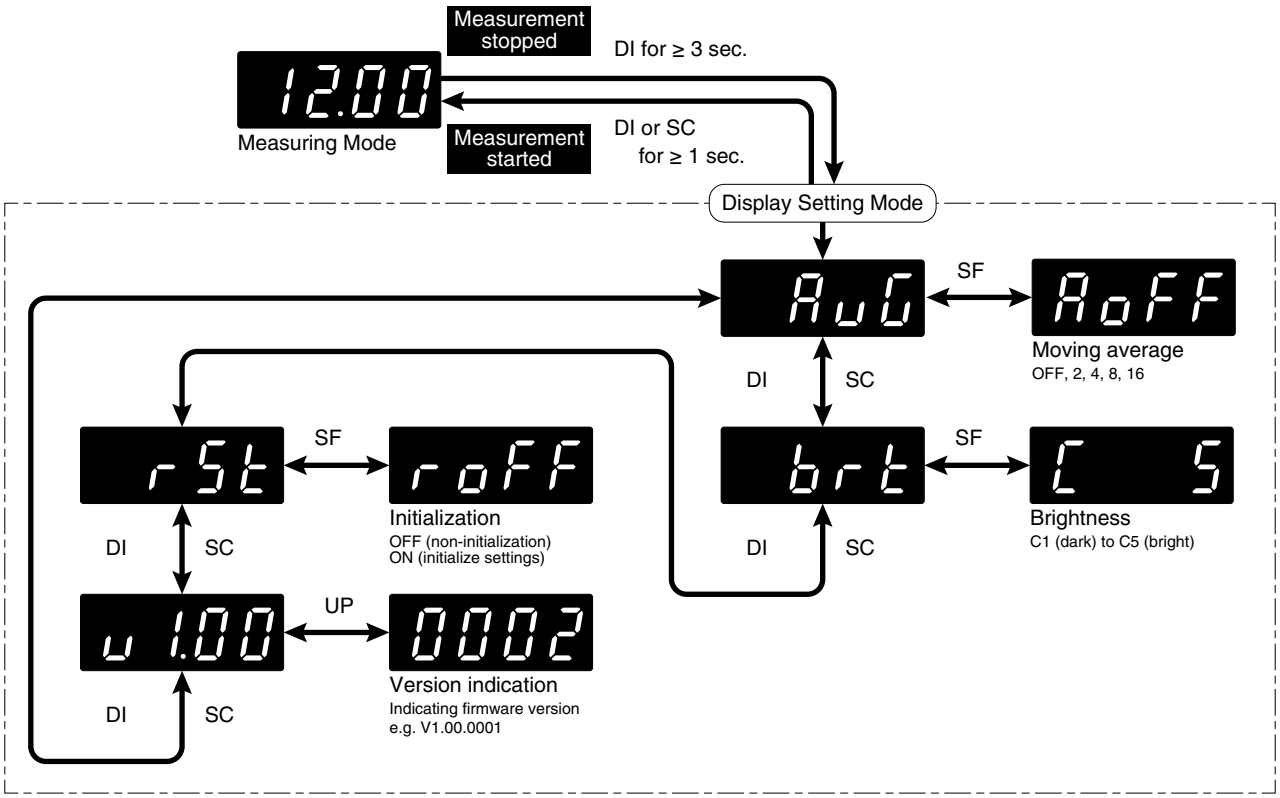
12.4.1 SCALING SETTING MODE



NOTE

The display depends on the specifications, settings and input.

12.4.2 DISPLAY SETTING MODE

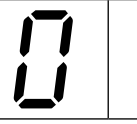


NOTE

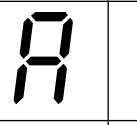
- The display depends on the specifications, settings and input.
- Version indication is for indication only, not for setting.

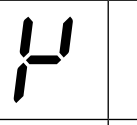
12.5 CHARACTER SET

■ **NUMERALS**

0	1	2	3	4	5	6	7	8	9
									

■ **ALPHABET**

A	B	C	D	E	F	G	H	I	J
									

K	L	M	N	O	P	Q	R	S	T
									

U	V	W	X	Y	Z