

Digital Panel Meters 43 Series
DC INPUT DIGITAL PANEL METER
(process meter)

Model: 43DV2

OPERATING MANUAL

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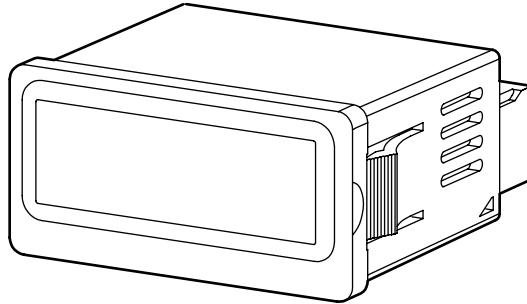
1. INTRODUCTION

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

Engineering unit sticker label sheet (1)	Instruction manual	Ordering Information Sheet																																																															
<table border="1"> <tr><td>DC</td><td>AC</td><td>mV</td></tr> <tr><td>V</td><td>kV</td><td>μA</td></tr> <tr><td>mA</td><td>A</td><td>kA</td></tr> <tr><td>mW</td><td>W</td><td>kW</td></tr> <tr><td>var</td><td>kvar</td><td>Mvar</td></tr> <tr><td>VA</td><td>Hz</td><td>Ω</td></tr> <tr><td>kΩ</td><td>MΩ</td><td>cm</td></tr> <tr><td>mm</td><td>m</td><td>m/sec</td></tr> <tr><td>mm/min</td><td>cm/min</td><td>m/min</td></tr> <tr><td>m/h</td><td>m/s²</td><td>inch</td></tr> <tr><td>l</td><td>l/s</td><td>l/min</td></tr> <tr><td>l/h</td><td>m³</td><td>m³/sec</td></tr> <tr><td>m³/min</td><td>m³/h</td><td>Nm/h</td></tr> <tr><td>N·m</td><td>N/m²</td><td>g</td></tr> <tr><td>kg</td><td>kg/h</td><td>N</td></tr> <tr><td>kN</td><td>Pa</td><td>kPa</td></tr> <tr><td>MPa</td><td>t</td><td>t/h</td></tr> <tr><td>°C</td><td>°F</td><td>%RH</td></tr> <tr><td>J</td><td>kJ</td><td>MJ</td></tr> <tr><td>rpm</td><td>SEC</td><td>min</td></tr> <tr><td>pH</td><td>%</td><td>ppm</td></tr> </table> <p>XXXXXXXX</p>	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/s ²	inch	l	l/s	l/min	l/h	m ³	m ³ /sec	m ³ /min	m ³ /h	Nm/h	N·m	N/m ²	g	kg	kg/h	N	kN	Pa	kPa	MPa	t	t/h	°C	°F	%RH	J	kJ	MJ	rpm	SEC	min	pH	%	ppm		<p>(included with the option code 'SET' only)</p>
DC	AC	mV																																																															
V	kV	μA																																																															
mA	A	kA																																																															
mW	W	kW																																																															
var	kvar	Mvar																																																															
VA	Hz	Ω																																																															
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J	kJ	MJ																																																															
rpm	SEC	min																																																															
pH	%	ppm																																																															






■ 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 cover.

- 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

- Insert the screwless spring terminal block deeply.
- Removal of the terminal block 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

- Do not remove the front cover 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

- 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.
- Provide sufficient space around the unit for heat dissipation.
- Mount the unit to a panel between 0.8 and 3.5 mm thick.
- Install the unit in a well-ventilated place in order to prevent internal temperature rise.
- Refer to "PANEL CUTOOUT" 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 benzene, 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.
- Be sure to confirm the name and polarity of each terminal before wiring to the terminal block.
- Do not connect anything to unused terminals.

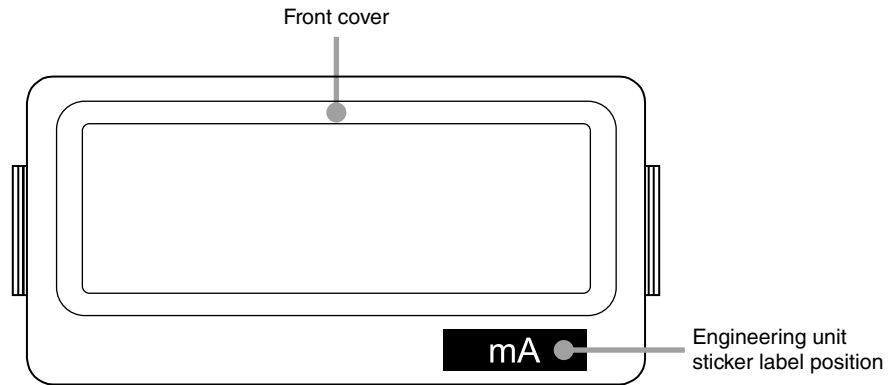
■ HANDLING CAUTIONS

- 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 benzene, 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 Cover

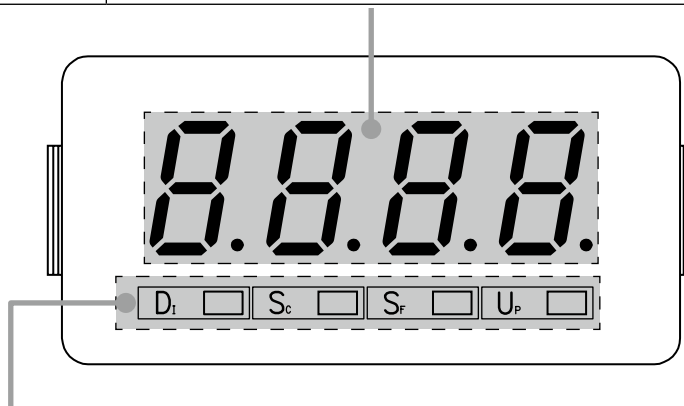


NOTE

- 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 Cover

COMPONENT	FUNCTION
4-digit display	Indicates present value, setting value and scaling error. Range: -1999 to 9999

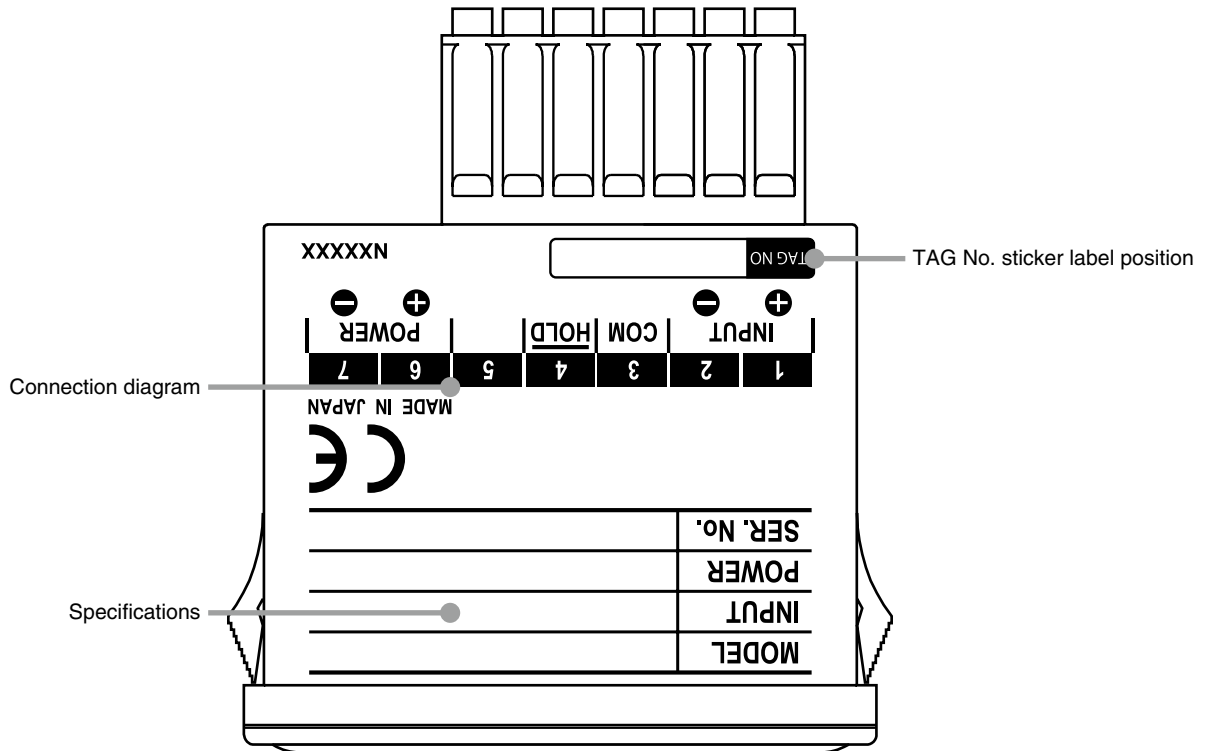


BUTTON	FUNCTION
Di	Used to move on to the display setting mode; or to shift through setting items in each setting mode.
Sc	Used to move on to the scaling setting*1 or calibration*2 mode; or to shift through setting items in each setting mode.
Sf	Used to move on to the setting standby status of each setting mode and to shift through display digits in each setting item.
Up	Used to change setting values in a setting standby mode.

*1 With input codes 'Sx' (process meter, with scaling function)

*2 With input codes 'Vx' (DC voltmeter, without scaling function)

■ 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.

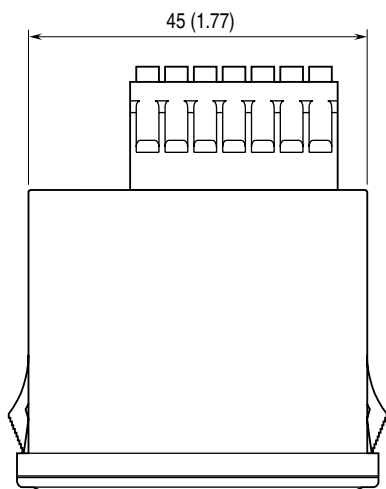
1.5 INSTALLATION

1.5.1 EXTERNAL DIMENSIONS

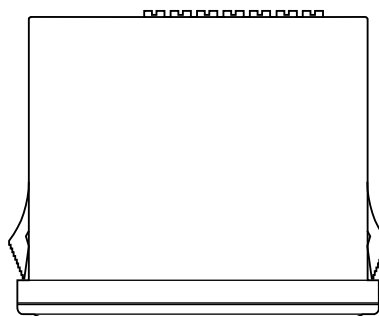
unit: mm (inch)

■ TOP VIEW

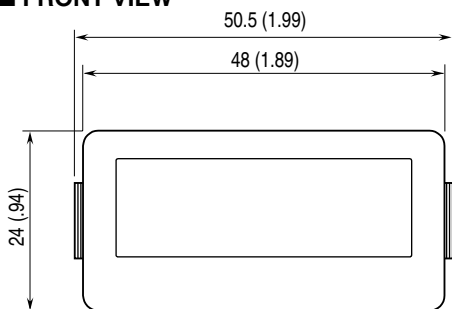
- Separable terminal



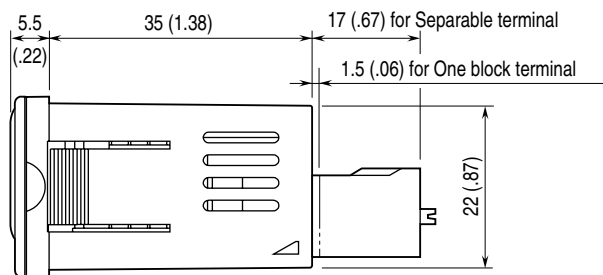
- One block terminal



■ FRONT VIEW

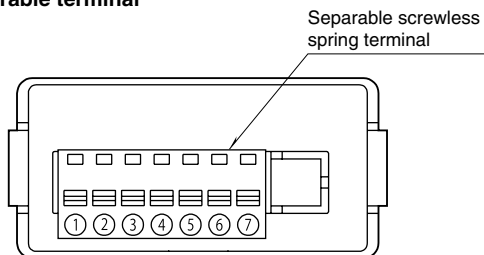


■ SIDE VIEW

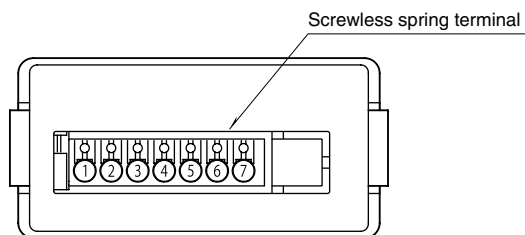


■ REAR VIEW

- Separable terminal

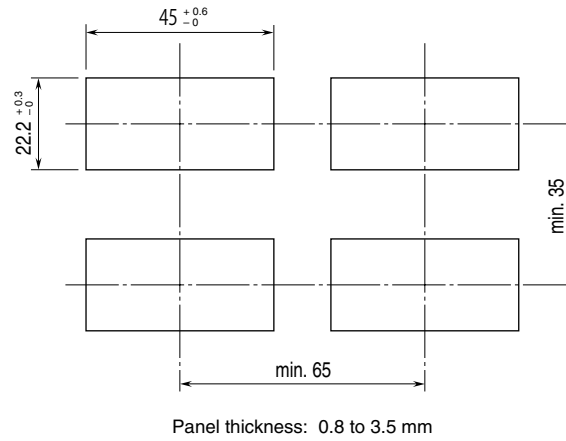


- One block terminal



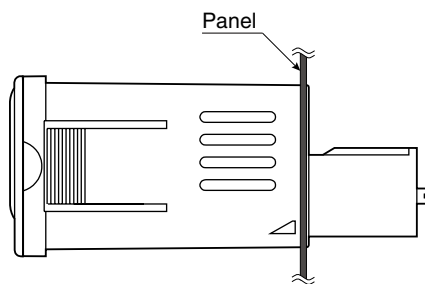
1.5.2 PANEL CUTOUT DIMENSIONS

unit: mm

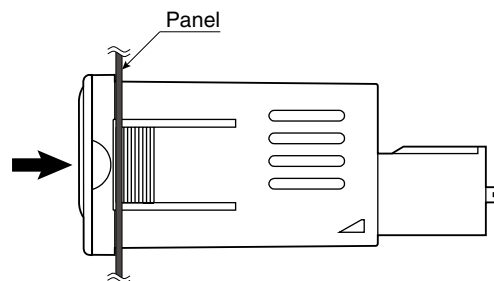


1.5.3 INSTALLATION

(1) Insert the unit into the panel cutout.



(2) Just insert the meter body into the panel (snap-in method).



1.6 WIRING INSTRUCTIONS

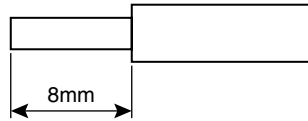
1.6.1 CAUTION IN WIRING

- 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 APPLICABLE WIRE

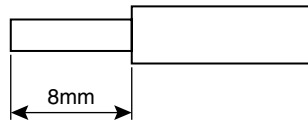
■ ONE BLOCK TERMINAL

- Applicable wire size: 1.0 – 1.3 mm²
- Stripped length: 8 mm (0.31")



■ SEPARABLE TERMINAL

- Applicable wire size: 1.0 – 1.3 mm²
- Stripped length: 8 mm (0.31")

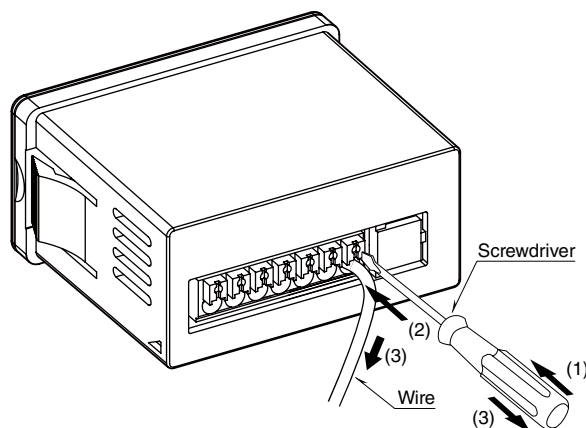


IMPORTANT

Tinning wire ends may cause contact failure and therefore is not recommended.

1.6.3 WIRING

- (1) Touch flat-blade screwdriver into the groove, and then press.
- (2) Insert a wire until touching in the back.
- (3) Pull out the minus screwdriver. Pull the wire lightly to confirm that it is not pulled off.

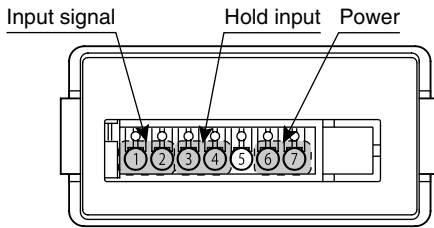


IMPORTANT

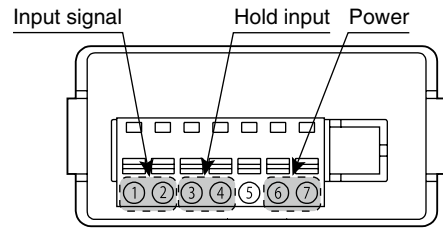
Take measures to prevent the sheath of wire from being caught in terminal(s) to avoid contact failure.

1.6.4 TERMINAL ASSIGNMENT

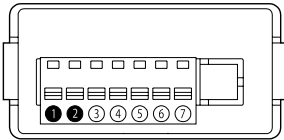
■ ONE BLOCK TERMINAL



■ SEPARABLE TERMINAL



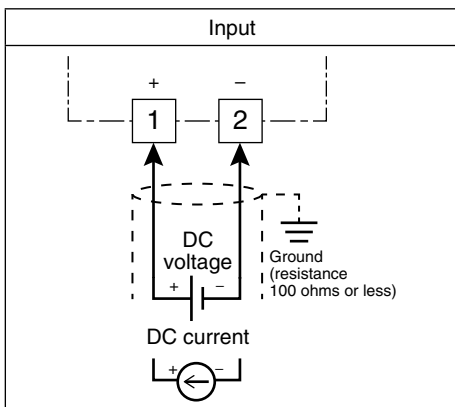
1.6.5 WIRING INPUT SIGNAL



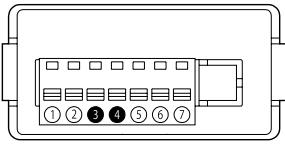
Connect DC voltage or current signal wires.

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.



1.6.6 WIRING HOLD INPUT

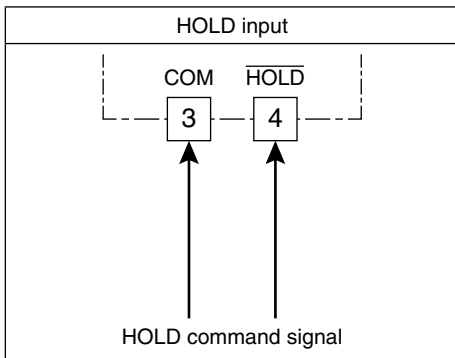


Displayed value is held with an external HOLD command input.
 Connect the contact across $\overline{\text{HOLD}}$ to COM as shown in the following figure.
 Close the contact to hold the value.

Detecting voltage	Approx. 2.1 V DC, 0.03 mA
Detecting level	$\leq 0.8 \text{ V}$

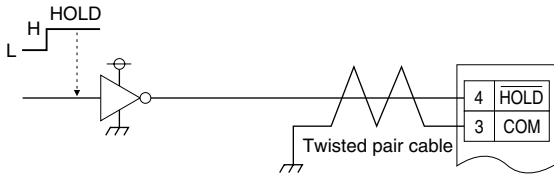
IMPORTANT

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

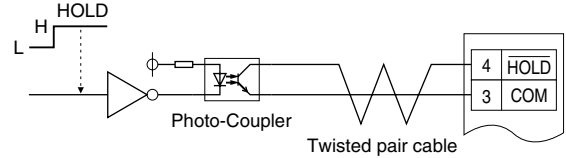


WIRING EXAMPLES

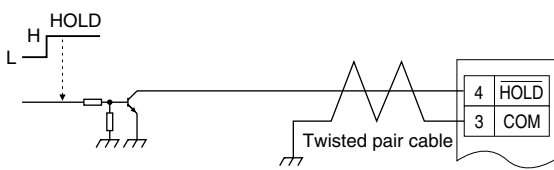
(a) 5V-CMOS, TTL



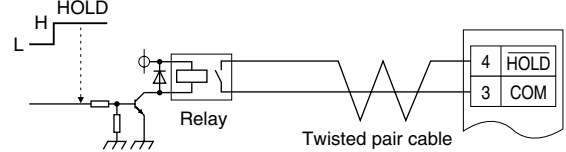
(c) Photo-Coupler



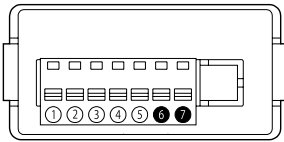
(b) Transistor



(d) Relay

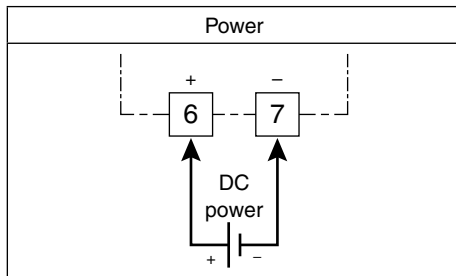


1.6.7 WIRING POWER



Connect DC power. DC power specifications are as shown in the following table.

CODE	RATING	PERMISSIBLE RANGE
R	24 V DC	±10% approx. 0.15 W



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.
- Be sure to confirm the polarity in wiring.

1.6.8 INSTALLING/SEPARATING TERMINAL BLOCK

■ INSTALLING TERMINAL BLOCK

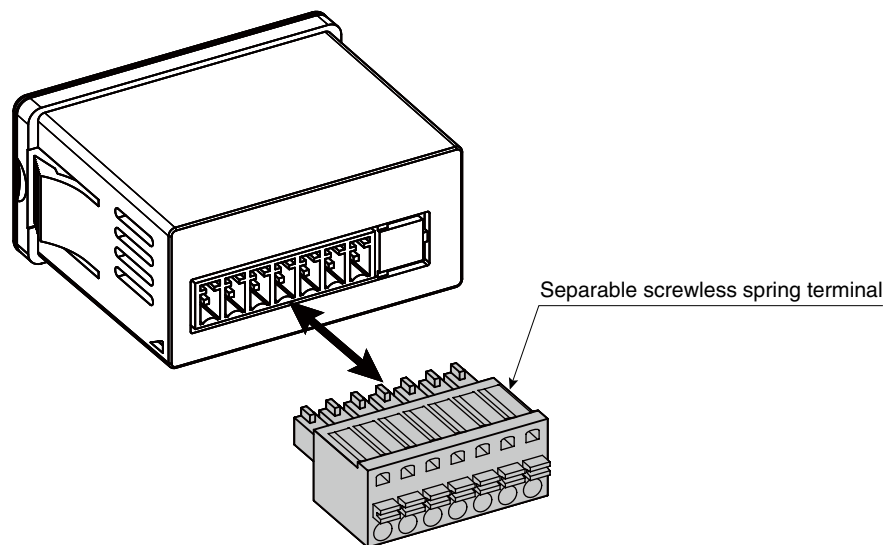
The 2-piece screwless spring terminal block is separable. Confirm the direction and insert the terminal block.

■ SEPARATING TERMINAL BLOCK

Pinch right and left sides of the terminal block to pull out, or insert the minus tip of a screwdriver into both side spaces alternately between the body and the terminal block (terminal No. 1 and 7 sides) to remove.

IMPORTANT

Be sure to turn off the power supply and input signal before installing/separating the terminal block.



2. BASIC SETTING OPERATION AND INSTRUCTIONS

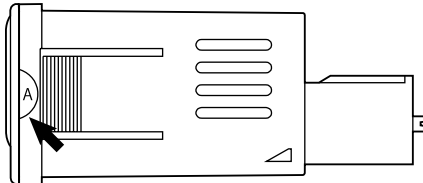
This section describes basic operation, attachment and removal of the front cover, and instructions when setting parameters.

2.1 ATTACHING/REMOVING FRONT COVER

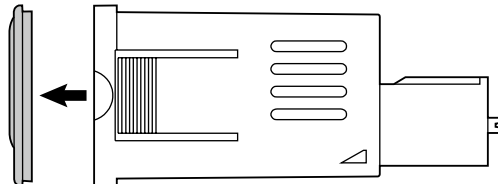
- Set parameters with the buttons inside the front cover. Remove the cover in setting.
- Attach the cover after configuration.

■ REMOVING FRONT COVER

(1) Pinch the dimples at both sides (designated as A in below).

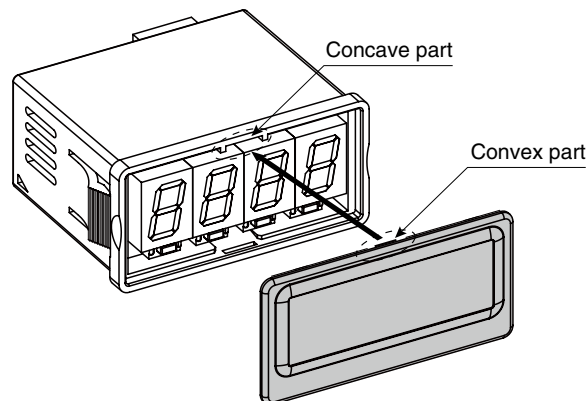


(2) Pull up at the bottom of the cover.

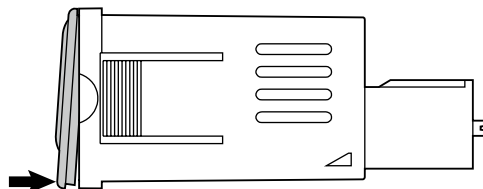


■ ATTACHING FRONT COVER

(1) Fit the convex part of the cover in the concave part of the meter.



(2) Push the cover bottom until it clicks into place.



NOTE

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

2.2 BASIC SETTING OPERATION

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

■ NUMERICAL VALUE SETTING

1 Press **S_F** button to shift the display into the setting standby mode.

- The 4th digit starts blinking.



2 Press **S_F** and **U_P** buttons to set a numerical value.

- Press **S_F** button to go to the next digit.
- Press **U_P** button to change the blinking value.



3 Press **D_I** or **S_C** button to apply the new setting.

- The next or previous parameter setting is indicated.

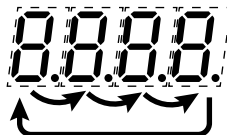


*1 Display depends on the settings.

NOTE

■ SHIFTING DIGITS

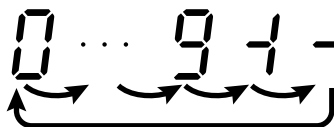
Each time pressing **S_F** button, the blinking digit moves to the right.



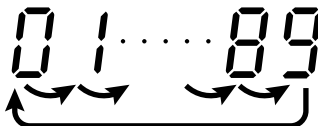
■ SETTING A NUMERICAL VALUE

- Each time pressing **U_P** button, the numeral is incremented by 1.
- The negative sign (-) must be set together with the 4th digit. For example, set '-04.0' instead of '-4.0'.

- 4th digit



- Other digits

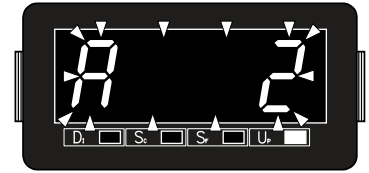


■ SETTING VALUE SELECTION

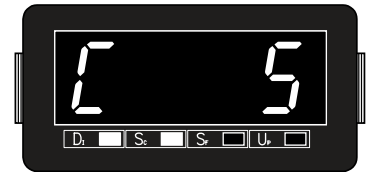
- 1** Press **S_F** button to shift the display into the setting standby mode.
 - The current set value starts blinking.



- 2** Press **U_P** button to select your desired setting value.



- 3** Press **D₁** or **S_c** button to apply the new setting.
 - The next or previous parameter setting is indicated.



*1 Display depends on the settings.

■ DECIMAL POINT POSITION SELECTION

- 1** Press **S_F** button to shift the display into the setting standby mode.
 - The current set value starts blinking.



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



- 3** Press **D₁** or **S_c** button to apply the new setting.
 - The next or previous parameter setting is indicated.

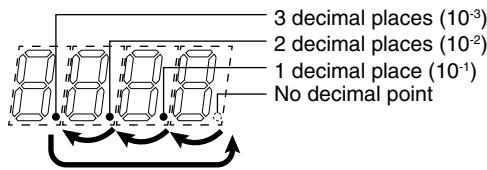


*1 Display depends on the settings.

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	SETTING VALUE	FUNCTION
{0000}	No decimal point	{0000}	2 decimal places (10^{-2})
{0000}	1 decimal place (10^{-1})	{0000}	3 decimal places (10^{-3})

2.2.1 INSTRUCTIONS ON BASIC OPERATION

■ IF THE FRONT BUTTONS ARE LEFT UNTOUCHED...

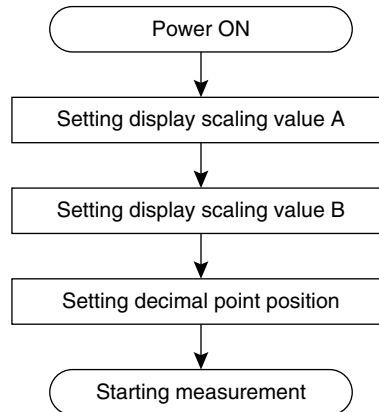
- The indication turns on with applying the last changes after approximately 1 minute while it is in the setting standby mode.
- The display goes back automatically to Measuring Mode after approximately 1 minute in one of the other modes.

■ TO ABORT A SETTING...

- Hold down SF button for 3 seconds or more to return to Measuring Mode without applying the last changes while the display is in the setting standby mode.
- If you get lost in a setting mode, you can execute initialization. Refer to 12.2 INITIALIZING SETTING VALUES.

3. DISPLAY SCALING SETTING

The display scaling setting with the input codes 'Sx' (with scaling function) (hereafter called process meter) is as shown in the following flowchart.



NOTE

With the input codes 'Vx' (without scaling function) (hereafter called DC voltmeter), the display scaling setting is not applicable. Refer to 5. OPERATION to confirm the indication, and 10.1 DC VOLTMETER CALIBRATION to correct deviation if necessary.

3.1 DISPLAY SCALING SETTING PROCEDURE WITH PROCESS METER

The following shows the procedure to set the input to 0 – 10 mA DC and the display to 0.0 – 100.0% with the input code 'SC' as an example. Set values meeting signals of equipment to use. Refer to 4. SETTING DISPLAY SCALING 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
Display scaling value A	0000*1	0% display: 0.0%
Display scaling value B	1000*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 display scaling value A.

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

3 Set display scaling value B.

- Press D_I or Sc button to apply the new setting and go to the next or previous parameter setting.
- Press S_F button to shift the display into the setting standby mode.
- Press S_F button to go to the next digit and U_P button to change the blinking value.

4 Set decimal point position.

- Press D_I or Sc button to apply the new setting and go to the next or previous parameter setting.
- Press S_F button to shift the display into the setting standby mode and U_P button to select the decimal point position.

5 Return to Measuring Mode (measurement started).

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

4. SETTING DISPLAY SCALING

■ DISPLAY SCALING

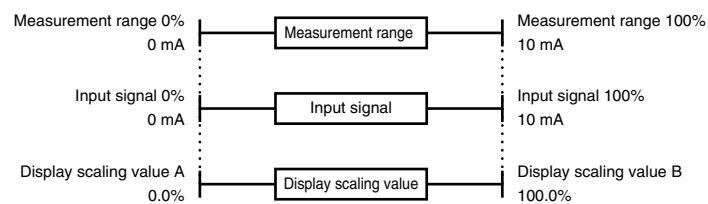
Set display scaling within the range of -1999 to 9999 for measurement range (conformance range).

The display scaling values include A and B. A decimal point can be set in any position.

- Display scaling value A is a display value for the measurement range 0%.
- Display scaling value B is a display value for the measurement range 100%.
- Decimal point position can be set in common for both display scaling value A and B.

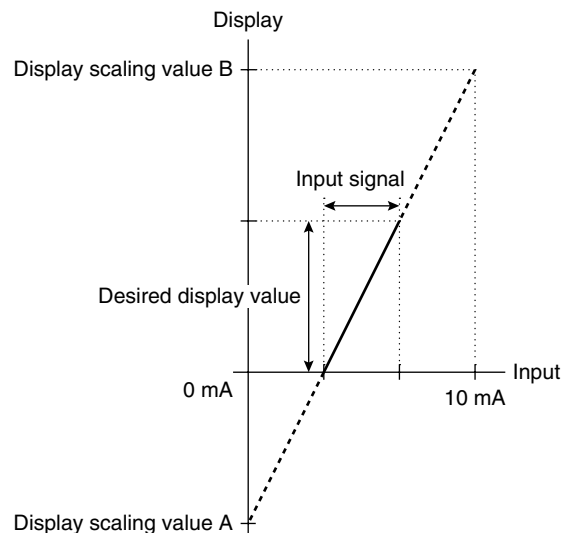
e.g. Input code 'SC' 0 – 10 mA DC, to display 0 – 10 mA DC input as 0.0 – 100.0%

Measurement range 0%	0 mA DC
Measurement range 100%	10 mA DC
Input signal 0%	0 mA DC
Input signal 100%	10 mA DC
Display scaling value A	0.0%
Display scaling value B	100.0%
Decimal point position	888.8 (1 decimal place)



■ SETTING DISPLAY SCALING (APPLICATION)

When the input signal has to be changed suddenly, the process meter can be used with simple calculation without changing the input code within the permissible input range (e.g. input code 'SC' 0 – 10 mA used for 2 – 10 mA DC). Obtain the values parallel shifted from the desired display values for the input signal to the measurement range 0% and 100%. Set the obtained values as display scaling value A and B.



IMPORTANT

- The display accuracy will be worse with smaller input span.
- Desired display values may not be available depending on the input span.

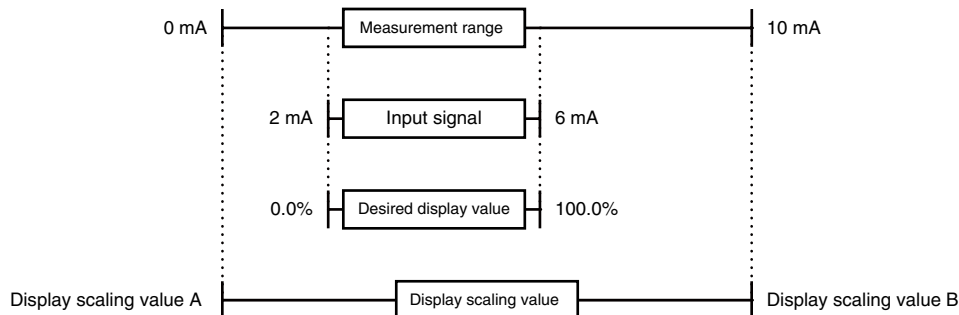
The next paragraph describes how to calculate the display scaling value A and B.

■ CALCULATION OF DISPLAY SCALING

Refer to the following example to calculate the display scaling value A and B.

Example: 43DV2-SCx-R

Measurement range 0 – 10 mA DC
 Input signal 2 – 6 mA DC
 Desired display value 0.0 – 100.0%



Calculate the display scaling value A and B with the following formulas.

$$SA = \frac{Rz \times Dspan + Dz \times Is - Ds \times Iz}{Ispan}$$

$$SB = \frac{Rs \times Dspan + Dz \times Is - Ds \times Iz}{Ispan}$$

Rz Measurement range 0%
 Rs Measurement range 100%
 Iz Input signal 0%
 Is Input signal 100%
 Dz Desired display value 0%
 Ds Desired display value 100%
 Ispan Input span (Is – Iz)
 Dspan Display span (Ds – Dz)
 SA Display scaling value A
 SB Display scaling value B

(1) Display scaling value A (SA)

In the above formulas, omit the decimal point for the desired display values.

$$Ispan = 6 - 2 = 4$$

$$Dspan = 1000 - 0 = 1000$$

$$SA = \frac{(0 \times 1000) + (0 \times 6) - (1000 \times 2)}{4}$$

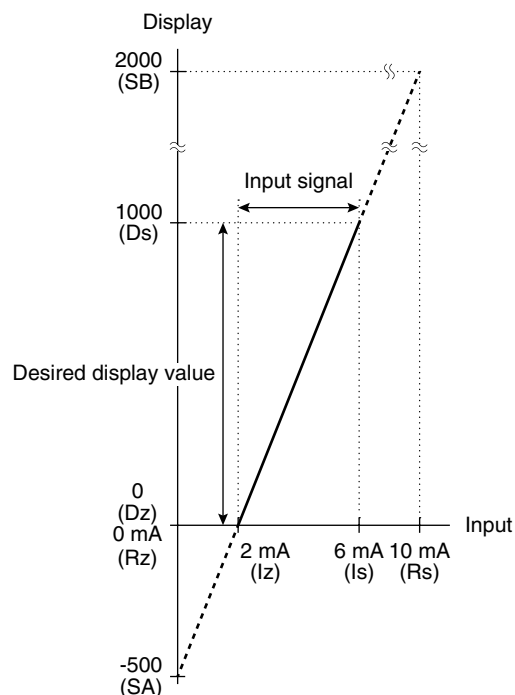
$$= \frac{0 + 0 - 2000}{4} = \frac{-2000}{4} = -500$$

(2) Display scaling value B (SB)

$$SB = \frac{(10 \times 1000) + (0 \times 6) - (1000 \times 2)}{4}$$

$$= \frac{10000 + 0 - 2000}{4} = \frac{8000}{4} = 2000$$

From the above calculations, the display scaling value A is -500, and B is 2000.



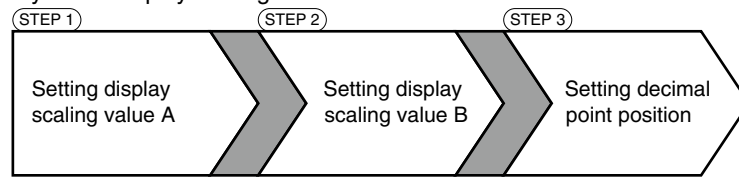
IMPORTANT

Setting the calculated display scaling value A or B below -1999 or over 9999 is not available. Change the display digit number in such a case.

■ PROCEDURE TO SET DISPLAY SCALING

• Flow in Setting Display Scaling

3-step settings are necessary to set display scaling.



• Operating Procedure to Set Display Scaling

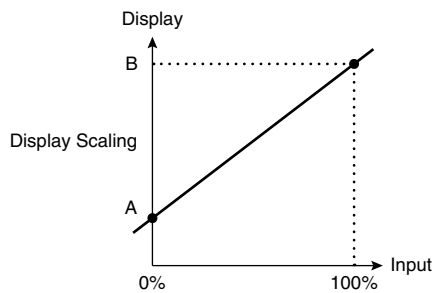
Following pages describe operating procedures in each step to set the display scaling to 0.0 – 100.0% with the input code 'SA' 4 – 20 mA DC input as an example.

IMPORTANT

- To distinguish from the display scaling value B, the first decimal point blinks in setting the display scaling value A.
- Both normal scaling (display scaling value A < display scaling value B) and inverted scaling (display scaling value A > display scaling value B) can be set within the range of -1999 to 9999.

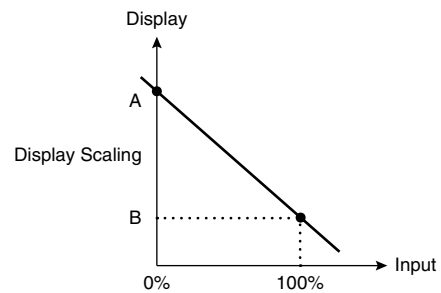
■ Normal Scaling

The display value increases when the input signal increases.



■ Inverted Scaling

The display value decreases when the input signal increases.



4.1 STEP 1. DISPLAY SCALING VALUE A

4.1.1 DISPLAY SCALING LIST

Display scaling default values per input code and setting ranges (display ranges) are as shown in the following tables.

■ VOLTAGE INPUT

INPUT SIGNAL	DEFAULT VALUE	SETTING RANGE
S4: 0 – 10 V DC	Display scaling value A: $\{0000\}$ Display scaling value B: $\{1000\}$	$\{9999\}$ to $\{9999\}$
S5: 0 – 5 V DC	Display scaling value A: $\{0000\}$ Display scaling value B: $\{0500\}$	
S6: 1 – 5 V DC	Display scaling value A: $\{0100\}$ Display scaling value B: $\{0500\}$	
S0: specify voltage	Display scaling value A: 0% of specified range Display scaling value B: 100% of specified range	

■ CURRENT INPUT

INPUT SIGNAL	DEFAULT VALUE	SETTING RANGE
SA: 4 – 20 mA DC	Display scaling value A: $\{0400\}$ Display scaling value B: $\{2000\}$	$\{9999\}$ to $\{9999\}$
SB: 0 – 20 mA DC	Display scaling value A: $\{0000\}$ Display scaling value B: $\{2000\}$	
SC: 0 – 10 mA DC	Display scaling value A: $\{0000\}$ Display scaling value B: $\{1000\}$	
SG: 0 – 1 mA DC	Display scaling value A: $\{0000\}$ Display scaling value B: $\{1000\}$	
SJ: 0 – 5 mA DC	Display scaling value A: $\{0000\}$ Display scaling value B: $\{5000\}$	
SZ: specify current	Display scaling value A: 0% of specified range Display scaling value B: 100% of specified range	

4.1.2 OPERATING PROCEDURE



NOTE

The left figure shows a display example (default value of input code 'SA'). The display depends on the specifications and settings.

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.

NOTE

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

- Immediately after power on (all indicators on)



- Measuring Mode



*1 Display depends on the settings and input.

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

- The display scaling value A is indicated.
- The first decimal point starts blinking.



NOTE

Skip to Step 6 if the default value is acceptable.

3 Press Sf button to shift the display into the setting standby mode.

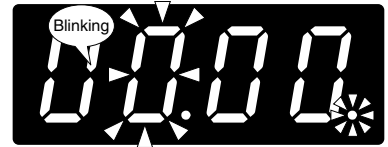
- The forth digit starts blinking, to which you can apply changes.



.....

4 Press **S_F** and **U_P** buttons to set to '00.00'.

- Press **S_F** button to go to the next digit and **U_P** button to change the blinking value.



NOTE

- '00.00' is a display example. Set any value within the range of -1999 to 9999.
- The decimal point position depends on the decimal point position setting. Disregard the decimal point here.
- The negative sign (-) must be set together with the 4th digit. For example, set '-04.0' instead of '-4.0'.

.....

5 Press **D_I** or **S_C** button to apply the new setting.

- And the next parameter setting is indicated.

NOTE

- Press **D_I** button, and the display scaling value B will be indicated.
- Press **S_C** button, and the decimal point position will be indicated.

.....

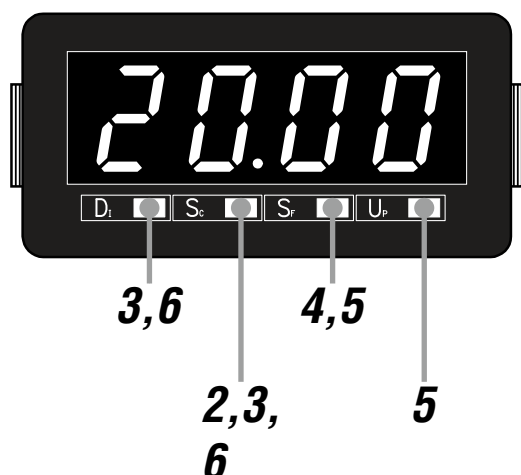
6 ■ **TO GO ON TO SET THE DISPLAY SCALING VALUE B,**
Skip to Step 3 in "4.2 STEP 2. DISPLAY SCALING VALUE B"

■ **TO QUIT,**

Hold down **D_I** or **S_C** button for 1 second or more to return to Measuring Mode.

4.2 STEP 2. DISPLAY SCALING VALUE B

4.2.1 OPERATING PROCEDURE



NOTE

The left figure shows a display example (default value of input code 'SA'). The display depends on the specifications and settings.

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.

NOTE

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

- Immediately after power on (all indicators on)



- Measuring Mode



*1 Display depends on the settings and input.

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

- The display scaling value A is indicated.
- The first decimal point starts blinking.



3 Press D_i or S_c button to go to the display scaling value B setting.

- The display scaling value B is indicated.



NOTE

Skip to Step 7 if the default value is acceptable.

4 Press **S_F** button to shift the display into the setting standby mode.

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



5 Press **S_F** and **U_P** buttons to set to '10.00'.

- Press **S_F** button to go to the next digit and **U_P** button to change the blinking value.



NOTE

- '10.00' is a display example. Set any value within the range of -1999 to 9999.
- The decimal point position depends on the decimal point position setting. Disregard the decimal point here.
- The negative sign (-) must be set together with the 4th digit. For example, set '-04.0' instead of '-4.0'.

6 Press **D_I** or **S_C** button to apply the new setting.

- And the next parameter setting is indicated.

NOTE

- Press **D_I** button, and the decimal point position will be indicated.
- Press **S_C** button, and the display scaling value A will be indicated.

7 ■ **TO GO ON TO SET THE DECIMAL POINT POSITION,**
Skip to Step 3 in "4.3 STEP 3. DECIMAL POINT POSITION".

■ **TO QUIT,**

Hold down **D_I** or **S_C** button for 1 second or more to return to Measuring Mode.

4.3 STEP 3. DECIMAL POINT POSITION

4.3.1 DECIMAL POINT POSITION LIST

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

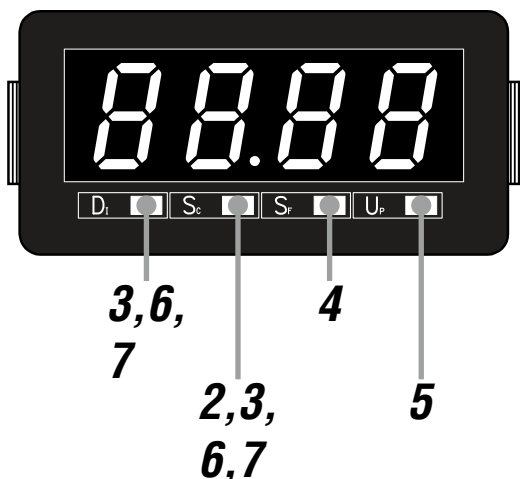
■ VOLTAGE INPUT

INPUT SIGNAL	DEFAULT VALUE
S4: 0 – 10 V DC	{0000}: 2 decimal places (10^{-2})
S5: 0 – 5 V DC	{0000}: 2 decimal places (10^{-2})
S6: 1 – 5 V DC	{0000}: 2 decimal places (10^{-2})
S0: specify voltage	Decimal point position of specified range

■ CURRENT INPUT

INPUT SIGNAL	DEFAULT VALUE
SA: 4 – 20 mA DC	{0000}: 2 decimal places (10^{-2})
SB: 0 – 20 mA DC	{0000}: 2 decimal places (10^{-2})
SC: 0 – 10 mA DC	{0000}: 2 decimal places (10^{-2})
SG: 0 – 1 mA DC	{0000}: 3 decimal places (10^{-3})
SJ: 0 – 5 mA DC	{0000}: 3 decimal places (10^{-3})
SZ: specify current	Decimal point position of specified range

4.3.2 OPERATING PROCEDURE



NOTE

The left figure shows a display example (default value of input code 'SA'). The display depends on the specifications and settings.

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.

NOTE

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

- Immediately after power on (all indicators on)



- Measuring Mode



*1 Display depends on the settings and input.

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

- The display scaling value A is indicated.
- The first decimal point starts blinking.



3 Press D1 or Sc button to go to the decimal point position setting.

- The decimal point position is indicated.



NOTE

Skip to Step 7 if the default value is acceptable.

.....

4 Press **S_F** button to shift the display into the setting standby mode.

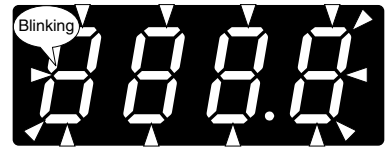
- The indication starts blinking, to which you can apply changes.



.....

5 Press **U_P** button to select the decimal point position.

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



NOTE

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

.....

6 Press **D_I** or **S_C** button to apply the new setting.

- And the next parameter setting is indicated.

NOTE

- Press **D_I** button, and the display scaling value A will be indicated.
 - Press **S_C** button, and the display scaling value B will be indicated.
-

.....

7 Hold down **D_I** or **S_C** button for 1 second or more to return to Measuring Mode.

5. 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.

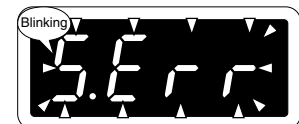


*1 Display depends on the settings and input.

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.



6. PARAMETER CONFIGURATION

■ MODE

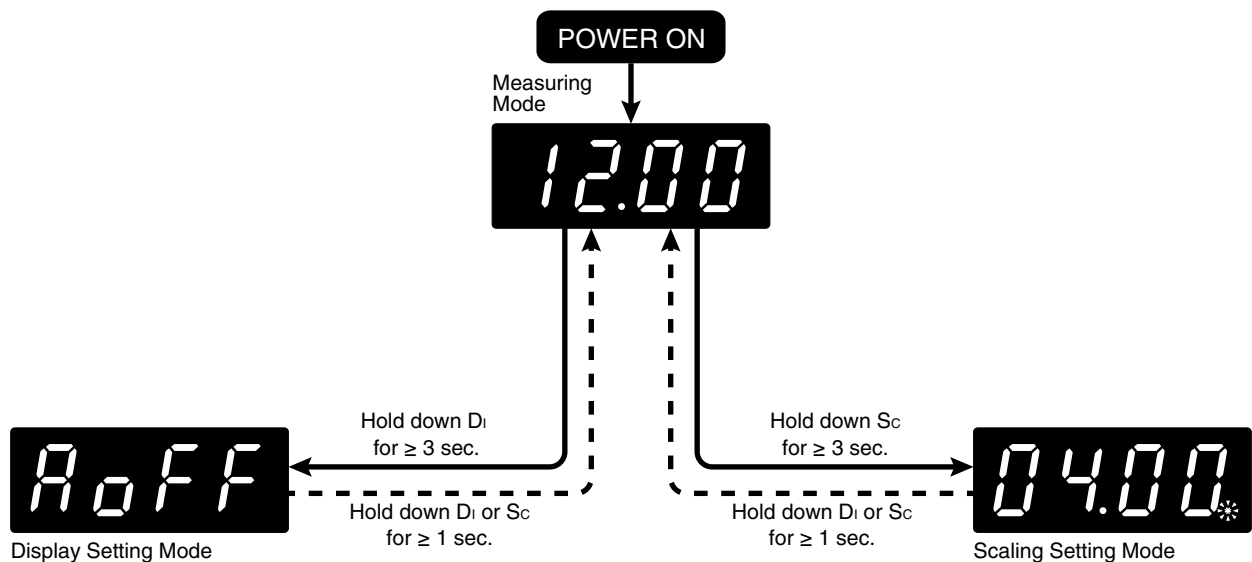
Parameters can be grouped in several modes. The 43DV2 has modes as shown in the following table. The mode transition depends on the input codes.

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*1	Basic settings such like display scaling value A and B, and decimal point position can be performed.	Measuring stopped
Calibration*2	0%, 50% and 100% input calibration can be performed.	
Display Setting	Moving average and brightness can be set. Settings can be initialized. Also the firm-ware version can be confirmed.	

*1 With process meter

*2 With DC voltmeter

■ MODE TRANSITION WITH PROCESS METER



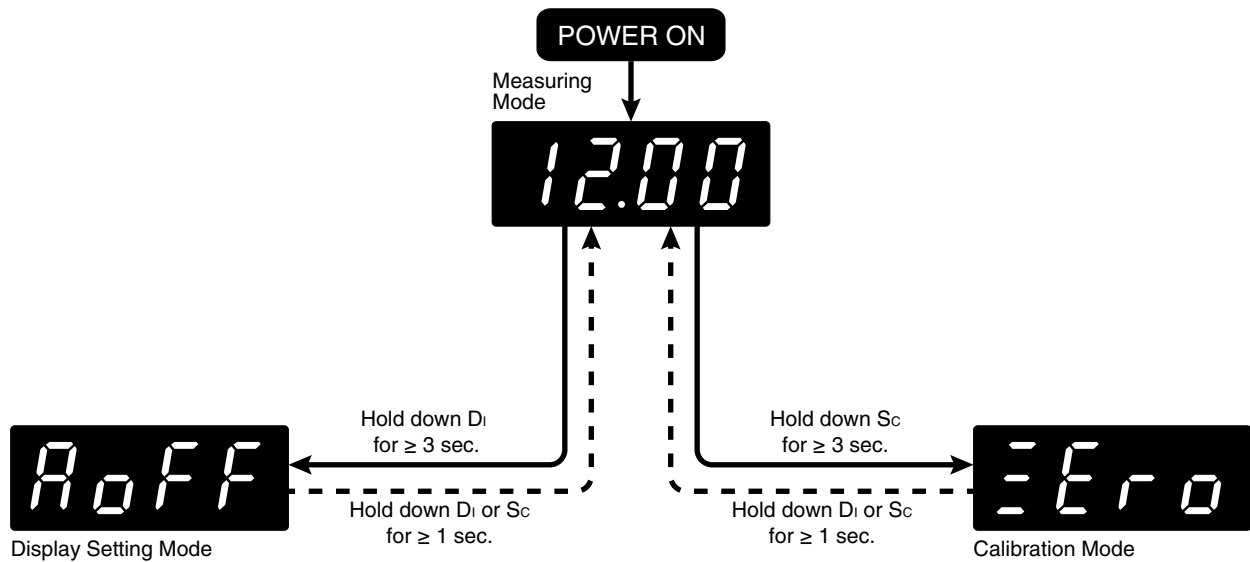
• Transition from Measuring Mode to Each Mode

To Scaling Setting Mode	Hold down S_c button for 3 seconds or more.
To Display Setting Mode	Hold down D_i button for 3 seconds or more.

• Transition from Each Mode to Measuring Mode

Hold down D_i or S_c button for 1 second or more to return to Measuring Mode.

■ MODE TRANSITION WITH DC VOLTMETER



• Transition from Measuring Mode to Each Mode

To Calibration Mode	Hold down S_c button for 3 seconds or more.
To Display Setting Mode	Hold down D_i button for 3 seconds or more.

• Transition from Each Mode to Measuring Mode

Hold down D_i or S_c button for 1 second or more to return to Measuring Mode.

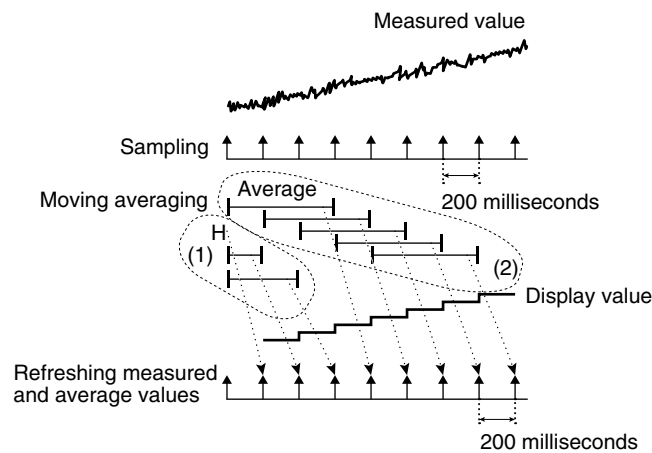
7. AVERAGING INPUT

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 (800 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

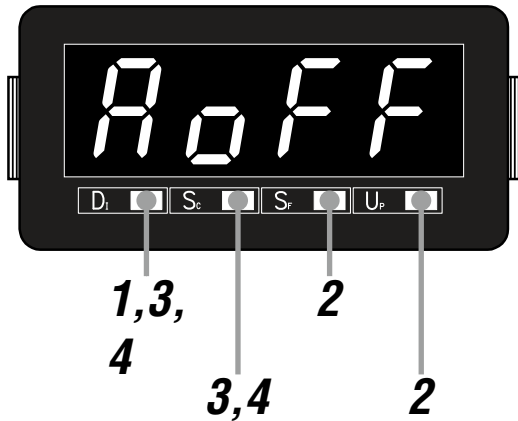
DISPLAY	FUNCTION	DEFAULT VALUE
[OFF]	No moving averaging	[OFF]
[2]	Moving average with 2 samples (400 millisecond intervals)	
[4]	Moving average with 4 samples (800 millisecond intervals)	
[8]	Moving average with 8 samples (1.6 second intervals)	
[16]	Moving average with 16 samples (3.2 second intervals)	

■ 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 200 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.

7.1 OPERATING PROCEDURE



NOTE

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

1 Hold down D₁ button for 3 seconds or more to move on to Display Setting Mode.

- The moving average sampling No. is indicated.



NOTE

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

2 Press S_F or U_P button to select.

- Select one among 'A OFF', 'A 2', 'A 4', 'A 8' and 'A 16'.



NOTE

With the version 1.00, 'A 16' is not selectable.

3 Press D₁ or S_c button to apply the new setting.

- And the next parameter setting is indicated.

NOTE

- Press D₁ button, and the brightness 'C 1', 'C 2', 'C 3', 'C 4' or 'C 5' will be indicated depending on the setting.
- Press S_c button, and the version indication will be indicated.

4 Hold down D₁ or S_c button for 1 second or more to return to Measuring Mode.

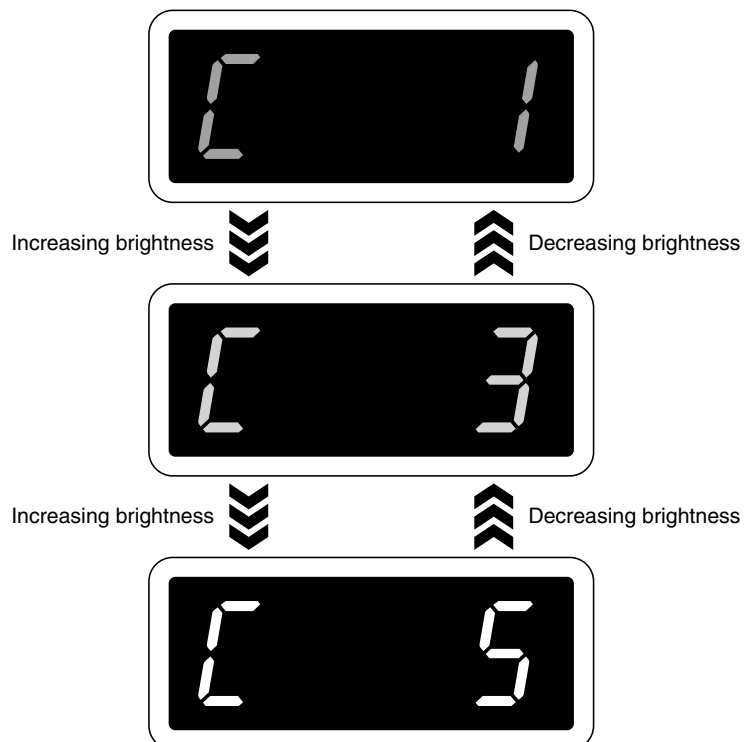
8. ADJUSTING BRIGHTNESS OF DISPLAY

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

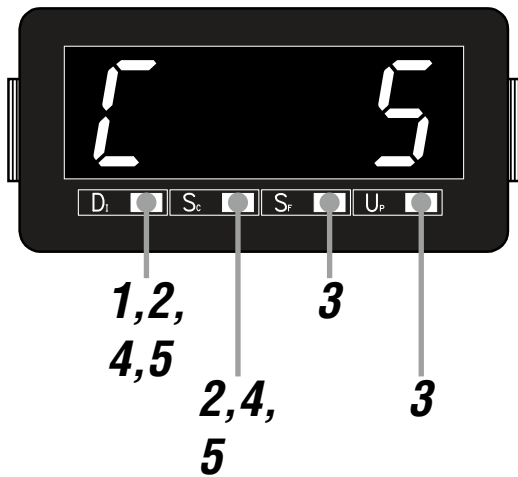
■ DISPLAY BRIGHTNESS

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

■ ADJUSTMENT IMAGE



8.1 OPERATING PROCEDURE



NOTE

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

- 1 Hold down **D₁** button for 3 seconds or more to move on to Display Setting Mode.

- The moving average sampling No. is indicated.

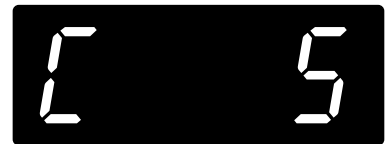


NOTE

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

- 2 Press **D₁** or **S_c** button to go to the brightness setting.

- The brightness is indicated.



NOTE

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

- 3 Press **S_F** or **U_P** button to select.

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



.....

4 Press D₁ or Sc button to apply the new setting.

- And the next parameter setting is indicated.

NOTE

- Press D₁ button, and the initialization 'ROFF' will be indicated.
 - Press Sc button, and the moving average sampling No. 'AOFF', 'A 2', 'A 4', 'A 8' or 'A 16' will be indicated depending on the setting.
-

.....

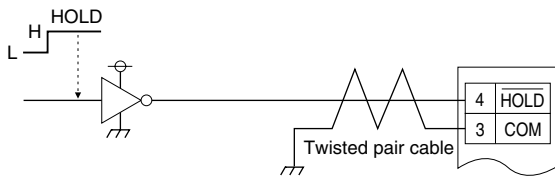
5 Hold down D₁ or Sc button for 1 second or more to return to Measuring Mode.

9. HOLDING DISPLAY

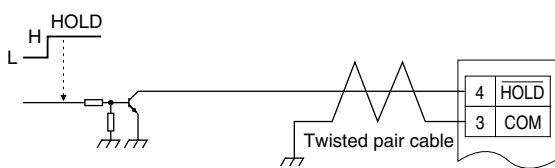
Displayed value is held with an external HOLD command input. Connect the contact across $\overline{\text{HOLD}}$ to COM as shown in the following figures. Close the contact to hold the value.

■ WIRING EXAMPLES

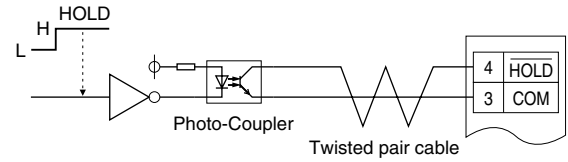
(a) 5V-CMOS, TTL



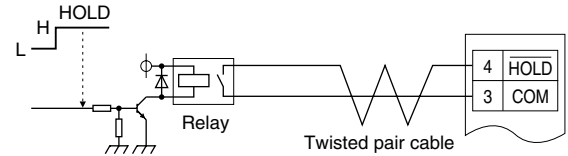
(b) Transistor



(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.

10. USER CALIBRATION

User calibration is calibration by a customer using customer's measuring instruments and standards. The input calibration (adjustment) depends on the input codes. The unit is calibrated correctly at shipment and therefore there is normally no need for customers to calibrate it.

■ DC VOLTMETER

The DC voltmeter has Calibration Mode to calibrate the input signal, where 0%, 50% and 100% inputs are calibrated. Refer to 10.1 DC VOLTMETER CALIBRATION for the details of calibration procedure. Prepare signal sources and standards by yourselves. Please note that we does not warrant the result of your own calibration. 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.

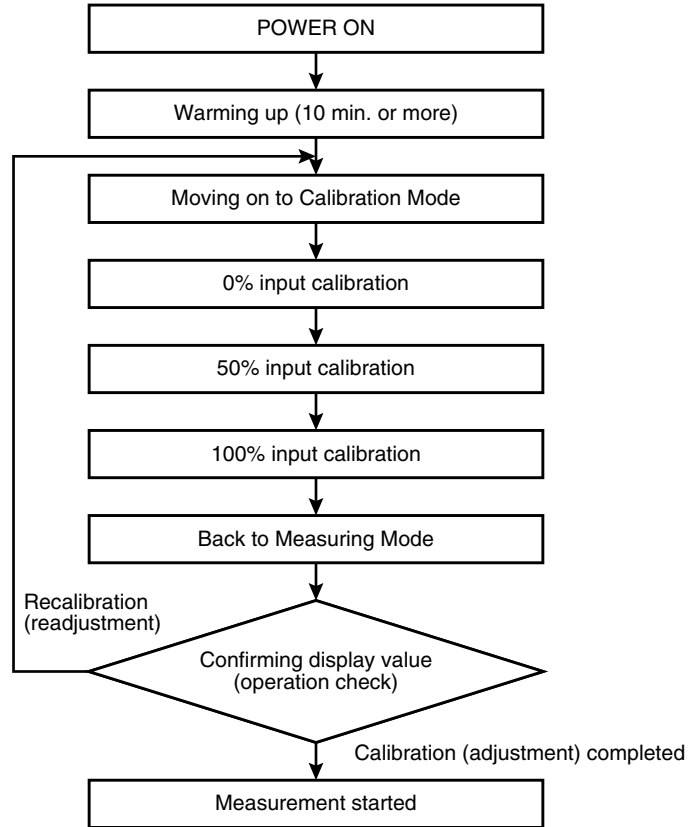
■ PROCESS METER

The process meter does not have a function to calibrate the input signal. Set the display scaling to compensate the display deviation. Calculate the correction values first and then set the display scaling. Refer to 10.2 CORRECTION OF DISPLAY SCALING to calculate the correction values.

10.1 DC VOLTMETER CALIBRATION

10.1.1 DC VOLTMETER CALIBRATION FLOW

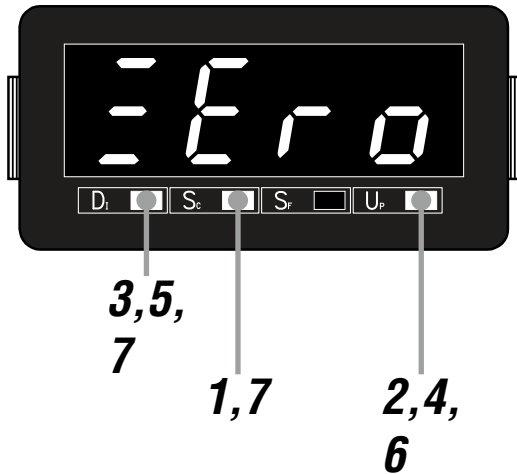
The calibration of the DC voltmeter is carried out as shown in the following flowchart.



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.
- Carry out the calibration within the permissible input range. Set '0% input calibration < 50% input calibration < 100% input calibration'.

10.1.2 OPERATING PROCEDURE



1 Hold down S_c button for 3 seconds or more to move on to Calibration Mode.

- 0% input calibration is indicated.



NOTE

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

2 Apply 0% input and press U_p button to register the value.

- 0% input calibration is registered.

IMPORTANT

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

3 Press D₁ button to go to the 50% input calibration.

- 50% input calibration is indicated.



4 Apply 50% input and press U_p button to register the value.

- 50% input calibration is registered.

IMPORTANT

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

.....
5 Press **D_I** button to go to the 100% input calibration.

- 100% input calibration is indicated.



.....
6 Apply 100% input and press **U_P** button to register the value.

- 100% input calibration is registered.

IMPORTANT

Confirm that the input signal is stable before pressing **U_P** button.

.....
7 Hold down **D_I** or **S_C** button for 1 second or more to return to Measuring Mode.

10.2 CORRECTION OF DISPLAY SCALING

Calculate the display scaling values using the correction values. Refer to 4. SETTING DISPLAY SCALING to set them.

Correction value 0% = desired display value 0% – actual display value 0% + desired display value 0%

Correction value 100% = desired display value 100% – actual display value 100% + desired display value 100%

Example 1: setting the display to 0.0 – 100.0% for the input 4 – 20 mA DC with the input code 'SA' Actual display 0.2 – 99.8%.

Calculate correction value 0 and 100%.

Correction value 0% = 0 – 2 + 0 = -2

Correction value 100% = 1000 – 998 + 1000 = 1002

As the measurement range is the same as the input, set the display scaling as follows:

Display scaling value A = -002

Display scaling value B = 1002

Example 2: setting the display to 0.0 – 100.0% for the input 6 – 16 mA DC with the input code 'SA' Actual display 0.2 – 99.8%.

Calculate correction value 0 and 100%.

Correction value 0% = 0 – 2 + 0 = -2

Correction value 100% = 1000 – 998 + 1000 = 1002

As the measurement range is different from the input, calculate the display scaling value A and B. Replace the desired display values and the display span with the correction values and their span.

$$\begin{aligned} SA &= \frac{4 \times 1004 + (-2) \times 16 - 1002 \times 6}{10} \\ &= \frac{4016 - 32 - 6012}{10} = \frac{-2028}{10} = -202.8 \approx -203 \end{aligned}$$

$$\begin{aligned} SB &= \frac{20 \times 1004 + (-2) \times 16 - 1002 \times 6}{10} \\ &= \frac{20080 - 32 - 6012}{10} = \frac{14036}{10} = 1403.6 \approx 1404 \end{aligned}$$

From the above calculations, set the display scaling as follows:

Display scaling value A = -203

Display scaling value B = 1404

11. INSPECTION / CLEANING

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

- When the front cover 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.
- Make sure periodically that the wires are not disconnected from the terminal block. For safety, interrupt electricity to the power and input.
- Check the installation periodically. Loosened installation may cause drop of the unit.
- Make sure periodically that the screwless spring terminal block is not separated. For safety, interrupt electricity to the power and input.

12. TROUBLESHOOTING

12.1 ERROR MESSAGES

DISPLAY	ERROR MESSAGE	WHAT TO DO
S.ERR blinking	The input signal is out of the permissible range.*1	Set the input signal within the permissible range.
9999 or -9999 blinking	The value after scaling is out of the permissible display range.*2	Set the input signal within the permissible range.

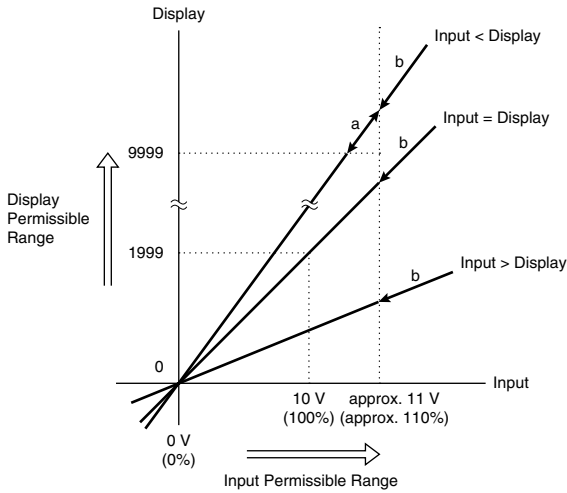
*1 In case of voltmeter, S.ERR blinks when the input exceeds measurement range.

*2 Process meter only.

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. 0 – 10 V input)



a: 9999 blinking

If the value to display after scaling is out of the permissible range, the maximum (9999) or minimum (-1999) value is blinking.

b: S.ERR blinking

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

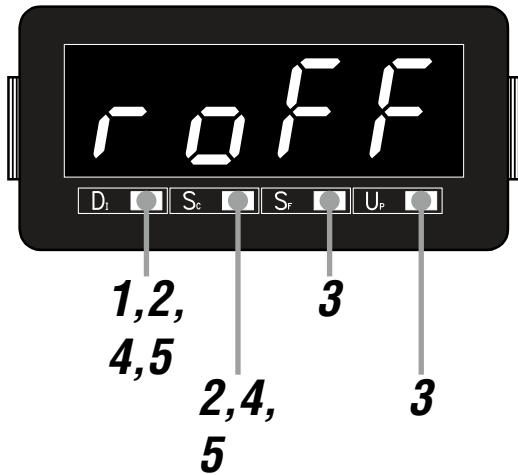
12.2 INITIALIZING SETTING VALUES

To restart setting from the default state, initialization can be used. Refer to attached 13.3 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.

12.2.1 OPERATING PROCEDURE



- 1** Hold down D₁ button for 3 seconds or more to move on to Display Setting Mode.

- The moving average sampling No. is indicated.



NOTE

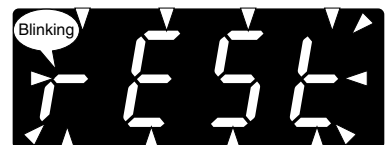
'A0FF'; 'A 2'; 'A 4'; 'A 8' or 'A 16' is indicated depending on the setting.

- 2** Press D₁ or S_c button to go to the initialization.

- 'ROFF' is indicated.



- 3** Press S_f or U_p button to select 'REST'.



.....

4 Press D₁ or Sc button to execute the initialization.

- The settings are initialized and then the next parameter setting is indicated.

NOTE

- Press D₁ button, and the version indication will be indicated.
 - Press Sc button, and the brightness 'C 5' will be indicated.
-

.....

5 Hold down D₁ or Sc button for 1 second or more to return to Measuring Mode.

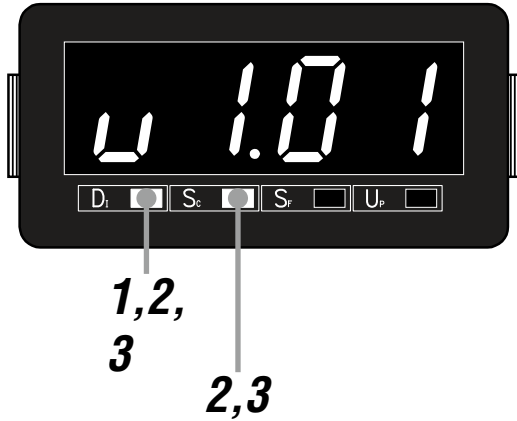
12.3 CONFIRMING FIRMWARE VERSION

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.

12.3.1 OPERATING PROCEDURE



-
- 1** Hold down D₁ button for 3 seconds or more to move on to Display Setting Mode.

- The moving average sampling No. is indicated.



NOTE

'A0FF', 'A 2', 'A 4', 'A 8' or 'A 16' is indicated depending on the setting.

-
- 2** Press D₁ or S_c button to go to the version indication.

- The firmware version number is indicated.



NOTE

The displays depend on the firmware version number.

-
- 3** Hold down D₁ or S_c button for 1 second or more to return to Measuring Mode.

13. APPENDICES

13.1 SPECIFICATIONS

■ GENERAL SPECIFICATIONS

Construction		Panel flush mounting
Connection	Terminal block "S"	Screwless spring terminal Applicable wire size 1.0 to 1.3 mm ² , stripped length 8 mm
	Terminal block "D"	Separable screwless spring terminal Applicable wire size 1.0 to 1.3 mm ² , stripped length 8 mm
Housing material		Flame-resistant resin (gray)
Isolation		Input to power
Setting (front button)	Scaling setting mode* ¹	Display scaling value A, display scaling value B, decimal point position
	Calibration mode* ²	0% calibration, 50% calibration, 100% calibration
	Display setting mode	Moving average, brightness, initialization, version indication
A/D conversion		$\Sigma - \Delta$
Sampling rate		5 times/sec. (200 msec.)
Averaging		None or moving average

*1 With process meter

*2 With DC voltmeter

■ DISPLAY

Display		4 digits of 10.2 mm (0.4 inch) height, 7-segment, red LED
Display range		-1999 to 9999
Zero indication		Higher-digit zeros are suppressed
DC voltmeter	Over-range indication	'S.ERR' blinks when out of the input range.
Process meter	Scaling range for measurement range (conformance range)	-1999 to 9999 counts
	Decimal point position	10 ⁻¹ , 10 ⁻² , 10 ⁻³ or none
	Over-range indication	'-1999' or '9999' blinking for display values out of the display range. 'S.ERR' blinks surpassing the permissible range.

■ INPUT SPECIFICATIONS

DC voltmeter	Input code: V1	Measurement range (conformance range)	±199.9 mV DC
		Input range	-219 – +219 mV
		Input resistance	≥ 1 MΩ
	Input code: V2	Measurement range (conformance range)	±1.999 V DC
		Input range	-2.19 – +2.19 V
		Input resistance	≥ 1 MΩ
	Input code: V3	Measurement range (conformance range)	±19.99 V DC
		Input range	-21.9 – +21.9 V
		Input resistance	≥ 1 MΩ

Process meter	Input code: S4	Measurement range (conformance range)	0 – 10 V DC
		Input range	-1 – +11 V
		Input resistance	≥ 1 MΩ
	Input code: S5	Measurement range (conformance range)	0 – 5 V DC
		Input range	-0.5 – +5.5 V
		Input resistance	≥ 1 MΩ
	Input code: S6	Measurement range (conformance range)	1 – 5 V DC
		Input range	0.6 – 5.4 V
		Input resistance	≥ 1 MΩ
	Input code: S0 (specify voltage)	Conformance range	DC voltage: 0 – 19.99 V DC Minimum span: 0.1 V
		Operational range	-10 – +110% of input span
		Input resistance	≥ 1 MΩ
	Input code: SA	Measurement range (conformance range)	4 – 20 mA DC
		Input range	2.4 – 21.6 mA
		Input resistance	20 Ω
	Input code: SB	Measurement range (conformance range)	0 – 20 mA DC
		Input range	-2 – +22 mA
		Input resistance	20 Ω
	Input code: SC	Measurement range (conformance range)	0 – 10 mA DC
		Input range	-1 – +11 mA
		Input resistance	40.2 Ω
	Input code: SG	Measurement range (conformance range)	0 – 1 mA DC
		Input range	-0.1 – +1.1 mA
		Input resistance	402 Ω
Input code: SJ	Measurement range (conformance range)	0 – 5 mA DC	
	Input range	-0.5 – +5.5 mA	
	Input resistance	80.6 Ω	
Input code: SZ (specify current)	Conformance range	DC current: 0 – 50 mA DC Minimum span: 1 mA	
	Operational range	-10 – +110% of input span	
	Input resistance	5 – 250 Ω ^{*3}	
Hold input	Dry contact input		
	Detecting level	≤ 0.8 V	
	Sensing	Approx. 2.1 V DC, 0.03 mA	

*3 Calculated as follows; Input resistance [Ω] = 250 ÷ Input current at 100% [mA]

■ INSTALLATION

Power consumption	DC power	24 V DC	Operational voltage range 24 V ±10% Ripple 10% p-p max. Approx. 0.15 W
Operating temperature	-10 to +55°C (14 to 131°F)		
Operating humidity	30 to 90% RH (non-condensing)		
Mounting	Panel flush mounting		
Weight	40 g (1.4 oz)		

■ PERFORMANCE

Accuracy	DC voltmeter	$\pm 0.1\% \text{ rdg} \pm 1 \text{ digit}$
	Process meter	$\pm 0.1\% \text{ rdg} \pm 1 \text{ digit} \times \text{scaling-multiple}^{*4}$ When the scaling-multiple is less than 1, rounded up to 1.
Temp. coefficient	DC voltmeter	$\pm(0.01\% \text{ rdg} + 0.3 \text{ digits})/^{\circ}\text{C}$
	Process meter	$\pm(0.01\% \text{ rdg} + 0.3 \text{ digits} \times \text{scaling-multiple}^{*4})/^{\circ}\text{C}$ When the scaling-multiple is less than 1, rounded up to 1.
Line voltage effect		$\pm 1 \text{ digit over voltage range}$
Insulation resistance		$\geq 100 \text{ M}\Omega \text{ with } 500 \text{ V DC}$
Dielectric strength		1000 V AC @ 1 minute (input to power to ground)

*4 Calculate scaling-multiple with the following formula.

Scaling-multiple = $|(\text{display scaling value B} - \text{display scaling value A}) \div (\text{default display scaling value B} - \text{default display scaling value A})|$

■ STANDARDS & APPROVALS

EU conformity	EMC Directive EMI EN 61000-6-4 EMS EN 61000-6-2 RoHS Directive
---------------	---

13.2 MODEL NUMBERING

Code number: **43DV2-[1][2]-R[3]**

[1] INPUT

DC voltmeter (without scaled range)

V1: ± 199.9 mV DC (input resistance ≥ 1 M Ω)

V2: ± 1.999 V DC (input resistance ≥ 1 M Ω)

V3: ± 19.99 V DC (input resistance ≥ 1 M Ω)

Process meter

S4: 0 – 10 V DC (input resistance ≥ 1 M Ω)

S5: 0 – 5 V DC (input resistance ≥ 1 M Ω)

S6: 1 – 5 V DC (input resistance ≥ 1 M Ω)

S0: Specify voltage (see INPUT SPECIFICATIONS)

SA: 4 – 20 mA DC (input resistance 20 Ω)

SB: 0 – 20 mA DC (input resistance 20 Ω)

SC: 0 – 10 mA DC (input resistance 40.2 Ω)

SG: 0 – 1 mA DC (input resistance 402 Ω)

SJ: 0 – 5 mA DC (input resistance 80.6 Ω)

SZ: Specify current (see INPUT SPECIFICATIONS)

[2] TERMINAL BLOCK

S: Screwless spring terminal

D: Separable screwless spring terminal

POWER INPUT

DC Power

R: 24 V DC (operational voltage range 24 V $\pm 10\%$, ripple 10% p-p max.)

[3] OPTIONS

Blank: None

/Q: With options (specify the specification)

■ SPECIFICATIONS OF OPTION: Q

EX-FACTORY SETTING

/SET: Preset according to the Ordering Information Sheet (No. ESU-9422)

13.3 PARAMETER LIST

13.3.1 PROCESS METER

MODE	PARAMETER	SETTING RANGE	DISPLAY	DEFAULT VALUE	DECIMAL POINT POSITION	UNIT
Measuring	Present value	-1999 – 9999	----	----	*1	User-defined
Scaling setting	Display scaling value A	-1999 – 9999	[1999] to [9999]	S4: [0000] S5: [0000] S6: [0.100] S0: Specify voltage SA: [0400] SB: [0000] SC: [0000] SG: [0000] SJ: [0000] SZ: Specify current	*1	User-defined
	Display scaling value B	-1999 – 9999	[1999] to [9999]	S4: [1000] S5: [0500] S6: [0500] S0: Specify voltage SA: [2000] SB: [2000] SC: [1000] SG: [1000] SJ: [5000] SZ: Specify current	*1	User-defined
	Decimal point position	No decimal point, or 10 ⁻¹ to 10 ⁻³	[0000] [0000] [0000] [0000]	S4: [0000] S5: [0000] S6: [0000] S0: Specify voltage SA: [0000] SB: [0000] SC: [0000] SG: [0000] SJ: [0000] SZ: Specify current	----	----
Display setting	Moving average	None, 2, 4, 8, 16	[OFF] [2] [4] [8] [16]	[OFF]	----	Sample
	Brightness	1 (dark) to 5 (bright)	[1] [2] [3] [4] [5]	[5]	----	----
	Initialization	OFF, initialization	[OFF] [ESE]	[OFF]	----	----
	Version indication	----	----	----	----	----

*1 Conforms to decimal point position setting.

NOTE 1: S4, S5, S6, S0, SA, SB, SC, SG, SJ and SZ in the column of DEFAULT VALUE in Scaling Setting Mode show input codes.

NOTE 2: The default values of the input codes S0 and SZ in Scaling Setting Mode depends on the specified range.

13.3.2 DC VOLTMETER

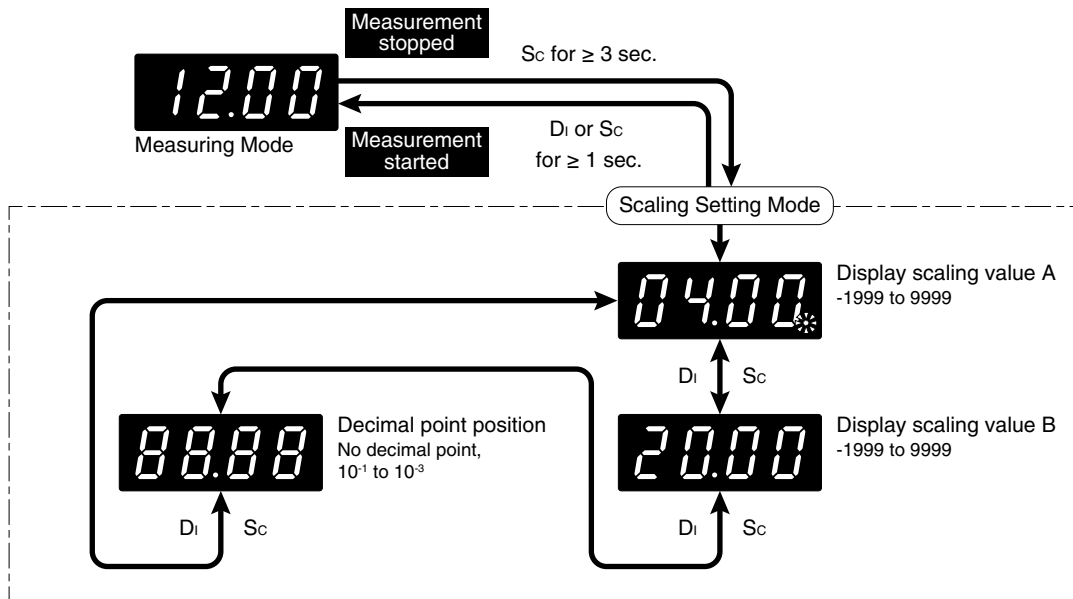
MODE	PARAMETER	SETTING RANGE	DISPLAY	DEFAULT VALUE	DECIMAL POINT POSITION	UNIT
Measuring	Present value	-1999 – 1999	----	----	*2	mV DC V DC
Calibration	0% calibration	----	[E.Er.a]	----	----	----
	50% calibration	----	[a..dd]	----	----	----
	100% calibration	----	[SPR.n]	----	----	----
Display setting	Moving average	None, 2, 4, 8, 16	[R.oFF], [R..2], [R..4], [R..8], [R..16]	[R.oFF]	----	Sample
	Brightness	1 (dark) to 5 (bright)	[C...1], [C...2], [C...3], [C...4], [C...5]	[C...5]	----	----
	Initialization	OFF, initialization	[c.oFF], [c.ESE]	[c.oFF]	----	----
	Version indication	----	----	----	----	----

*2 Fixed depending on the input.

13.4 PARAMETER MAP

13.4.1 PROCESS METER

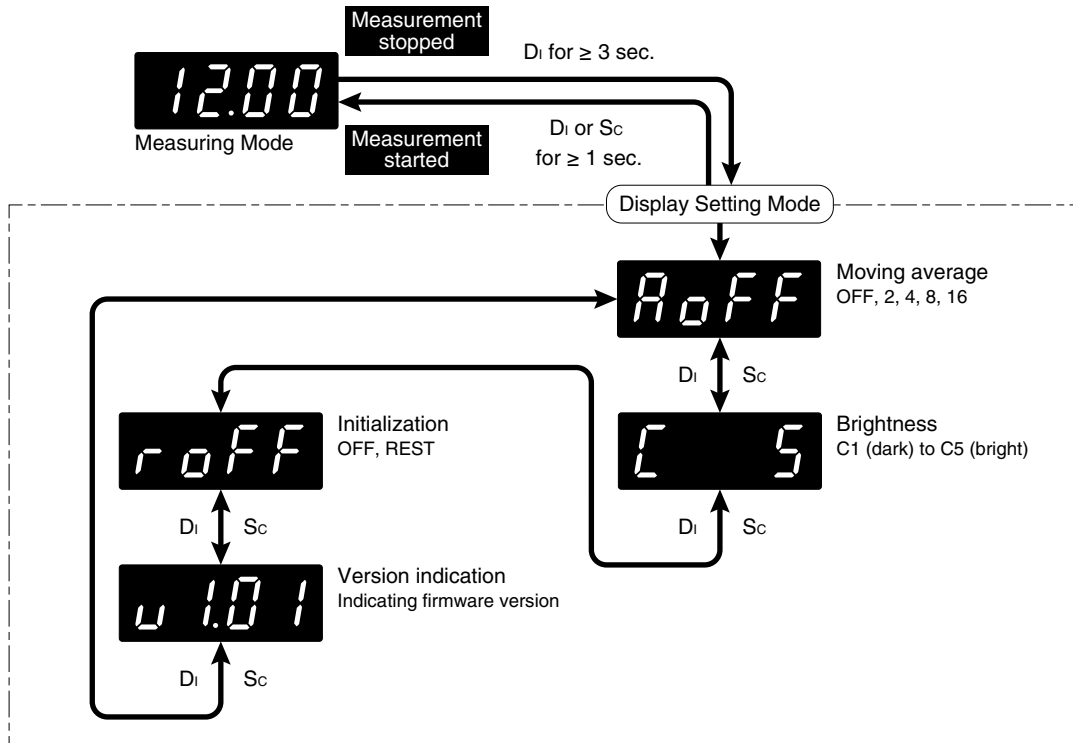
■ SCALING SETTING MODE



NOTE

The display depends on the specifications, settings and input.

■ DISPLAY SETTING MODE

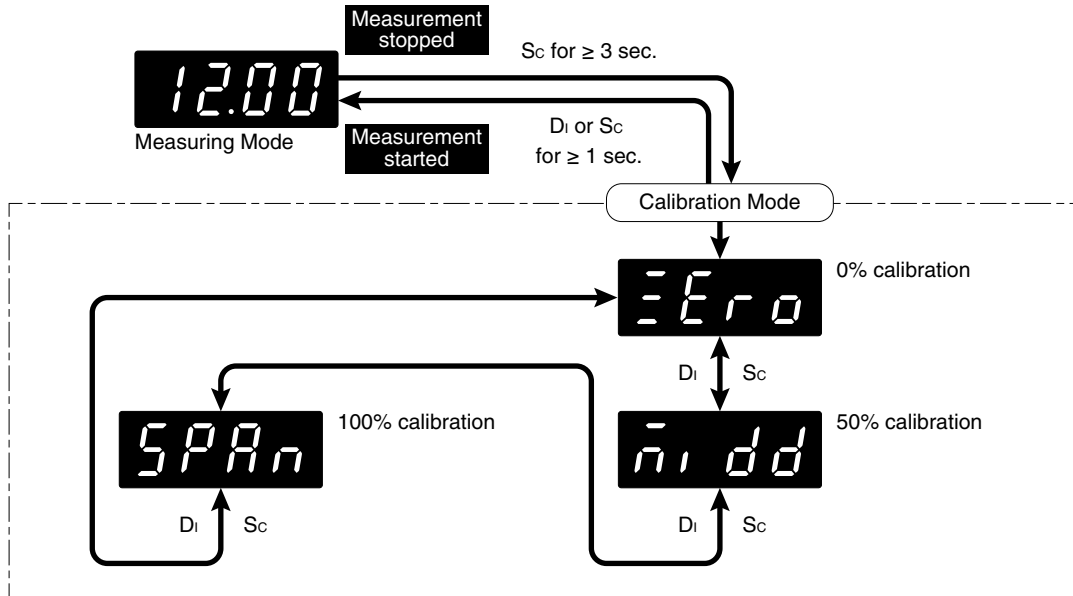


NOTE

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

13.4.2 DC VOLTMETER

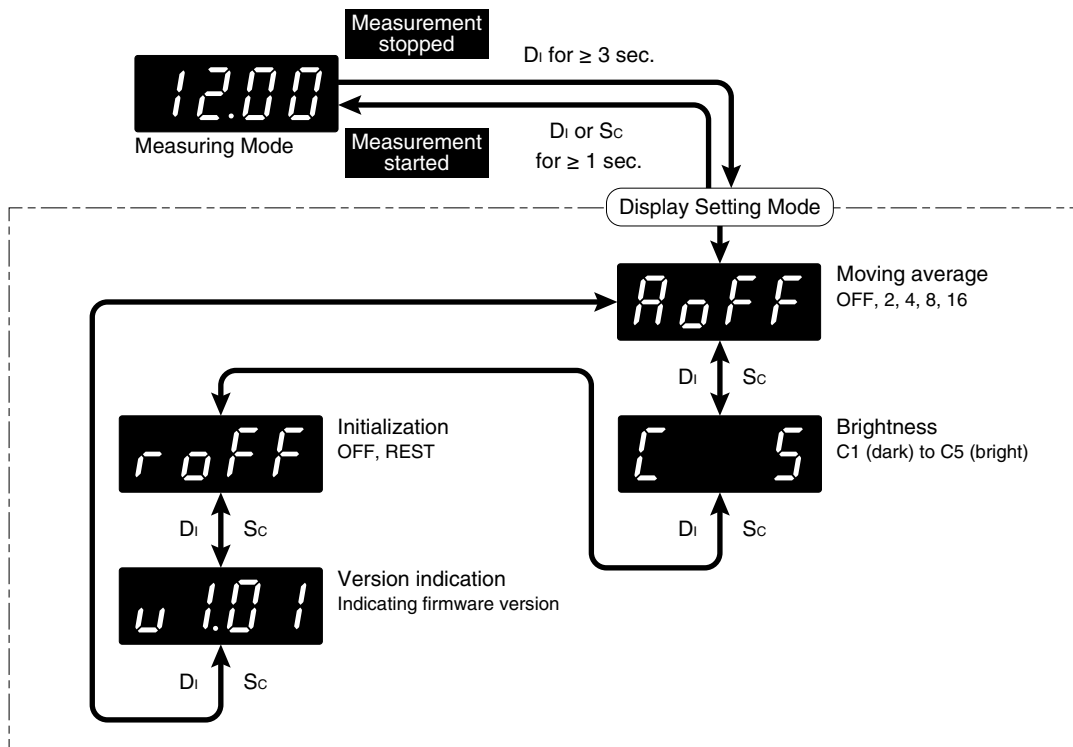
■ CALIBRATION MODE



NOTE

The display depends on the specifications and input.

■ DISPLAY SETTING MODE



NOTE

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

13.5 CHARACTER SET

■ NUMERALS AND NEGATIVE SIGN

0	1	2	3	4	5	6	7	8	9
-	-1*1								

*1 Indication when the forth digit is '-1':

■ 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				

13.6 DIFFERENCES IN FIRMWARE VERSIONS

A setting depends on the firmware versions.

13.6.1 ADDED SETTING

A setting added since the firmware version 1.01 is shown in the following table.

MODE	PARAMETER	SETTING
Display Setting	Moving average	16 samples