DC INPUT DIGITAL PANEL METER
(process meter)

MODEL **43DV2**

BEFORE USE ....

Thank you for choosing us. Before use, please check contents of the package you received as outlined below.
If you have any problems or questions with the product, please contact our sales office or representatives.

■ PACKAGE INCLUDES:

Digital panel meter ....(1)
Engineering unit sticker label sheet..................................(1)

■ MODEL NO.

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

■ INSTRUCTION MANUAL

This manual describes necessary points of caution when you use this product, including installation, connection and basic maintenance procedures.
For detailed explanations to operate and program the module, please refer to Model 43DV2 Operating Manual (EM-9422-B), downloadable at our web site.

POINTS OF CAUTION

■ CONFORMITY WITH EU DIRECTIVES

• The actual installation environments such as panel configurations, connected devices, connected wires, may affect the protection level of this unit when it is integrated in a panel system. The user may have to review the CE requirements in regard to the whole system and employ additional protective measures to ensure the CE conformity.

■ POWER INPUT RATING & OPERATIONAL RANGE

• Locate the power input rating marked on the product and confirm its operational range as indicated below:
    24V DC rating: 24V ±10%, approx. 0.15W

■ GENERAL PRECAUTIONS

• Before you remove the unit or mount it, turn off the power supply and input signal for safety.

■ ENVIRONMENT

• Indoor use.
• When heavy dust or metal particles are present in the air, install the unit inside proper housing with sufficient ventilation.
• Do not install the unit where it is subjected to continuous vibration. Do not subject the unit to physical impact.
• Environmental temperature must be within -10 to +55°C (14 to 131°F) with relative humidity within 30 to 90% RH in order to ensure adequate life span and operation.
• Be sure that the ventilation slits are not covered with cables, etc.

■ WIRING

• Make sure for safety that only qualified personnel perform the wiring.
• Do not install cables close to noise sources (high frequency line, etc.).
• Do not bind these cables together with those in which noises are present. Do not install them in the same duct.

■ EX-FACTORY SETTING (/SET)

• Activating "initialization," Ex-factory settings or user's specified parameters will be deleted and overwritten with the factory default values. Notice that after this, Ex-factory settings will be irrecoverable.

■ AND ....

• 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.
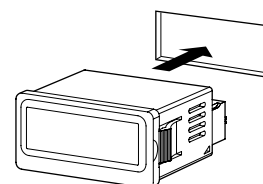
LIGHTNING SURGE PROTECTION

We offer a series of lightning surge protectors for protection against induced lightning surges. Please contact us to choose appropriate models.
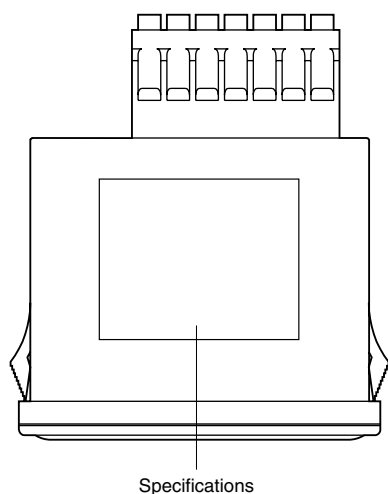
INSTALLATION

■ PANEL CUTOUT unit: mm

$45 ^{+0.6}_{-0}$

$22.2 ^{+0.3}_{-0}$

min. 35

min. 65

Panel thickness: 0.8 to 3.5 mm
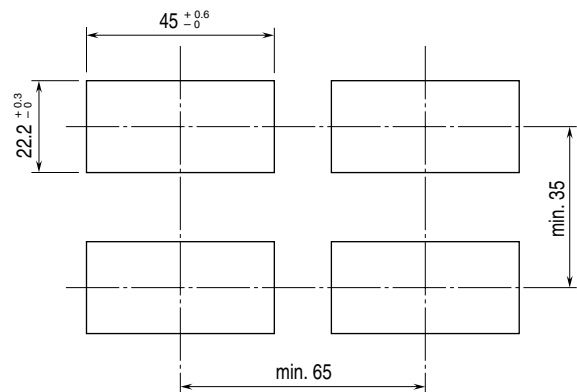
■ HOW TO MOUNT THE UNIT ON A PANEL

Just insert the meter body (snap-in method)

COMPONENT IDENTIFICATION

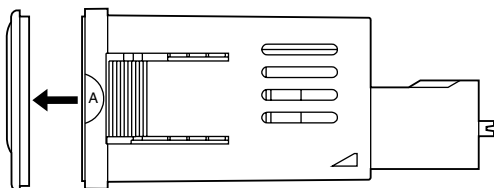## ■ TOP VIEW

Specifications
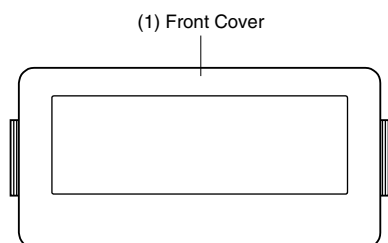
■ FRONT VIEW

• Front View without the Front Cover

(1) Front Cover

(2) 4-digit Display

(3) DI Button
(4) SC Button
(6) UP Button
(5) SF Button
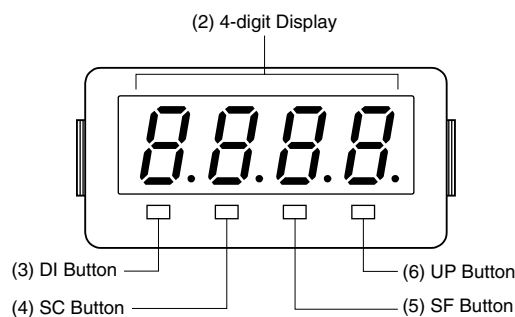
■ COMPONENT IDENTIFICATION

No.	COMPONENT	FUNCTION
(1)	Front Cover	Removed at configuration.
(2)	4-digit Display	4-digit LED display. Range: -1999 to 9999 (not including decimal point)
(3)	DI Button	Used to move on to the display setting mode; or to shift through setting items in each setting mode.
(4)	SC Button	Used to move on to the scaling setting or calibration mode; or to shift through setting items in each setting mode.
(5)	SF Button	Used to move on to the setting standby status and shift through display digits in each setting item.
(6)	UP Button	Used to select setting value.

■ HOW TO REMOVE THE FRONT COVER FOR CONFIGURATION

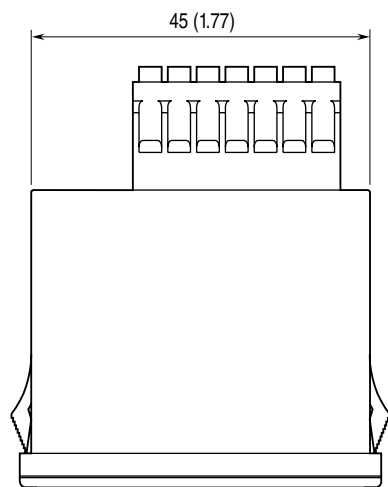Pinch the dimples at both sides (designated as A in below) and pull up at the bottom of the cover.

TERMINAL CONNECTIONS

Connect the unit as in the diagram below or refer to the connection diagram on the top of the unit.
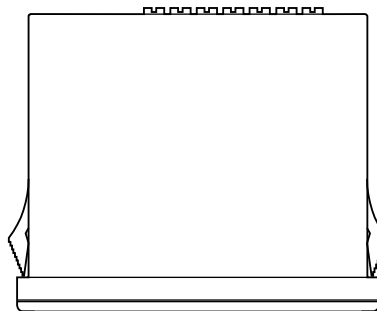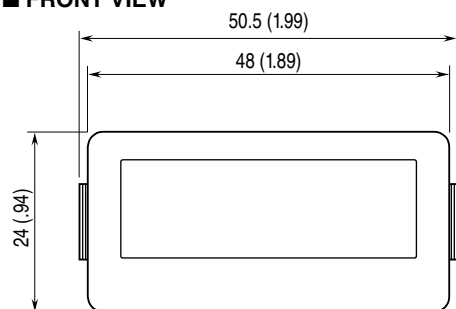
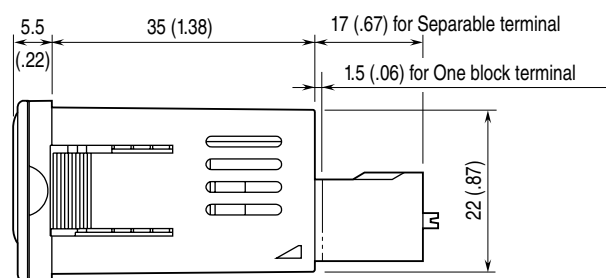## ■ EXTERNAL DIMENSIONS unit: mm (inch)

■ TOP VIEW

• **Separable terminal**

45 (1.77)

• **One block terminal**

■ FRONT VIEW

50.5 (1.99)
48 (1.89)
24 (.94)

■ SIDE VIEW

5.5 (.22)　35 (1.38)　17 (.67) for Separable terminal
1.5 (.06) for One block terminal
22 (.87)

■ REAR VIEW

• **Separable terminal**

Separable screwless spring terminal

① ② ③ ④ ⑤ ⑥ ⑦

• **One block terminal**

Screwless spring terminal

① ② ③ ④ ⑤ ⑥ ⑦

■ CONNECTION DIAGRAM

INPUT
+ | 1 |
− | 2 |
COM | 3 |
$\overline{\text{HOLD}}$ | 4 |

POWER
| 6 | +
| 7 | −
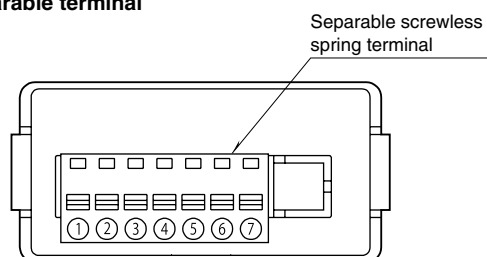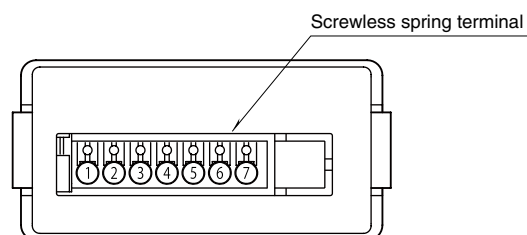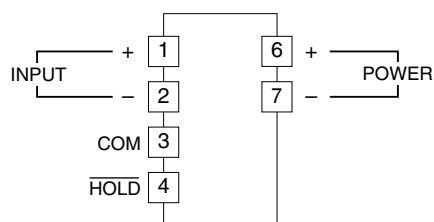
WIRING INSTRUCTIONS

■ **Terminal block "S": Screwless spring terminal**

Applicable wire size: 1.0 to 1.3 mm^2
Stripped length: 8 mm
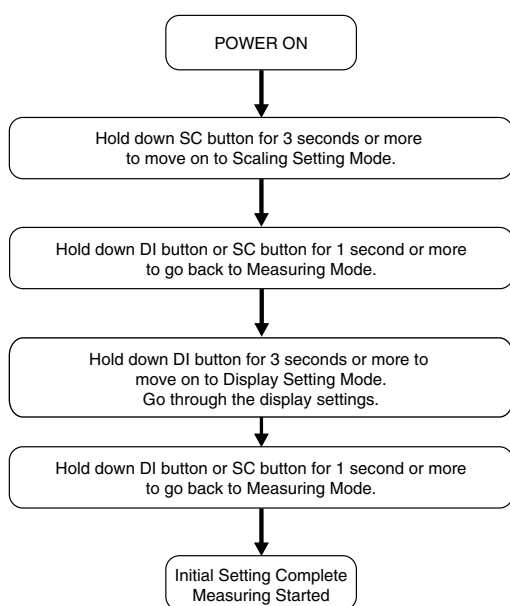
■ **Terminal block "D": Separable screwless spring terminal**
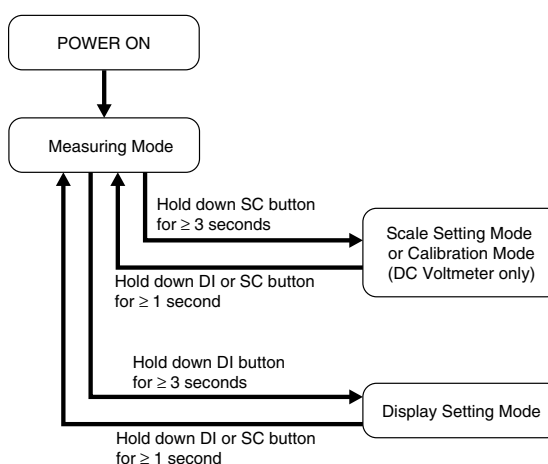
Applicable wire size: 1.0 to 1.3 mm^2
Stripped length: 8 mm

SETTING PROCEDURE

■ **INITIAL SETTING FLOWCHART**

■ **GENERAL SETTING FLOWCHART**

POWER ON

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

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

Hold down DI button for 3 seconds or more to move on to Display Setting Mode.
Go through the display settings.

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

Initial Setting Complete
Measuring Started

Note: For DC Voltmeter, the initial setting is not necessary.

POWER ON

Measuring Mode

Hold down SC button for ≥ 3 seconds → Scale Setting Mode or Calibration Mode (DC Voltmeter only)

Hold down DI or SC button for ≥ 1 second

Hold down DI button for ≥ 3 seconds → Display Setting Mode

Hold down DI or SC button for ≥ 1 second

■ **OPERATIONS IN SETTING MODES**

• **Display**

4 digits numeric display (referred hereafter as 'display') shows the current settings while the panel meter is in the setting mode.

• **Shifting through setting parameters**

In any setting mode, pressing DI button shifts one parameter to the next. Pressing SC button shifts one to the previous.

• **Changing parameters**

Pressing SF button while one of the parameter settings is indicated on the display shifts the panel meter into the setting standby mode. The digit to which you can apply changes starts blinking.
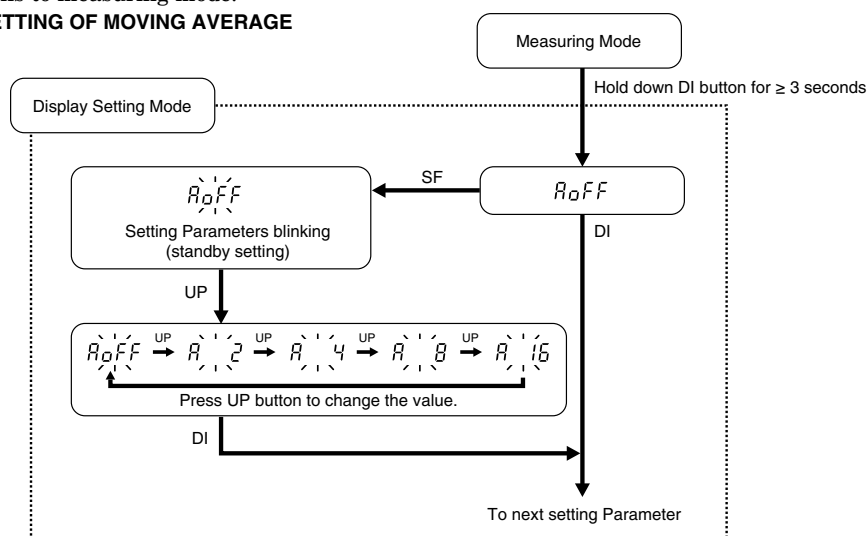Press UP button to change the blinking value.
Press SF button to go to the next digit.
Press DI or SC button to apply the new value and go to the next parameter setting.
If no operation continues more than one minute, while changing parameter is blinking setting is registered and it turns on, otherwise it returns to measuring mode.

■ **EXAMPLE OF SETTING OF MOVING AVERAGE**

Measuring Mode

Hold down DI button for ≥ 3 seconds

Display Setting Mode

AoFF ← SF ← AoFF
Setting Parameters blinking
(standby setting)

DI

UP

AoFF → A 2 → A 4 → A 8 → A 16
Press UP button to change the value.

DI → To next setting Parameter

Note: For Scaling setting mode the method for using the SF and UP button is the same as for canging the Setting Parameters.

• **If you get lost...**

Hold down SF button for 3 seconds or more to return to the measuring mode without applying the last changes.
(Those which have been already applied by pressing DI or SC button are not canceled.)
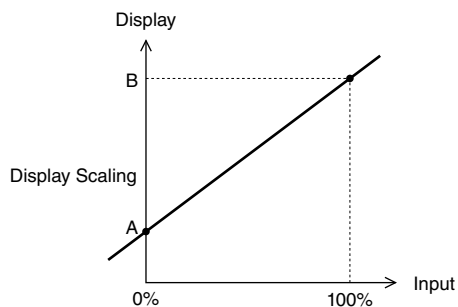
■ **SCALING SETTING MODE**
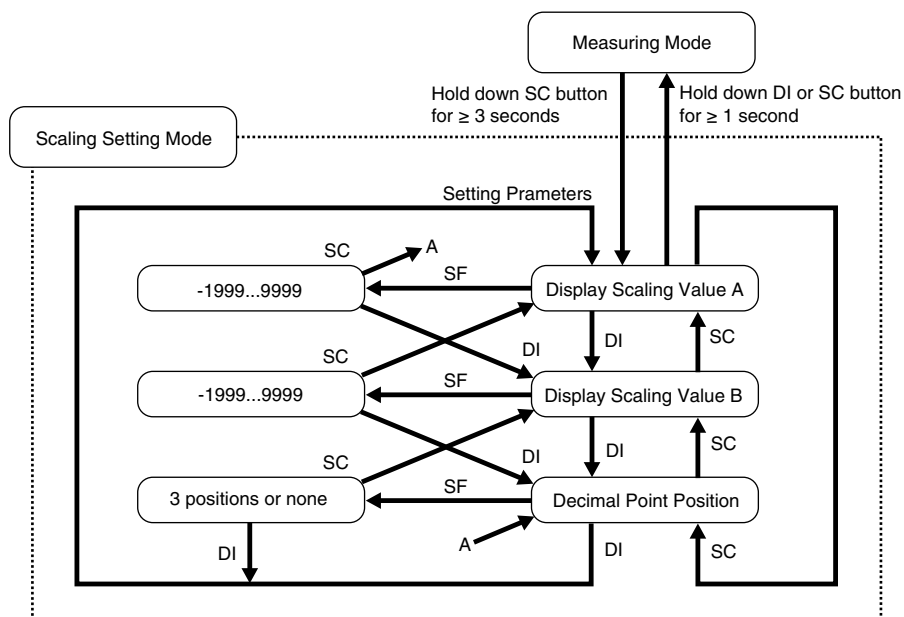
• **PARAMETER LIST**

PARAMETER	DISPLAY	FUNCTION	MEASURING RANGE	DEFAULT VALUE
Display Scaling Value A	*-1999 ... 9999*	Display value for 0% input [1] To distinguish from B, the first decimal point is blinking.	S4	*00.00*
			S5	*00.00*
			S6	*0 1.00*
			S0	[2]
			SA	*04.00*
			SB	*00.00*
			SC	*00.00*
			SG	*0.000*
			SJ	*0.000*
			SZ	[2]
Display Scaling Value B	*-1999 ... 9999*	Display value for 100% input [1]	S4	*10.00*
			S5	*05.00*
			S6	*05.00*
			S0	[2]
			SA	*20.00*
			SB	*20.00*
			SC	*10.00*
			SG	*1.000*
			SJ	*5.000*
			SZ	[2]
Decimal Point Position	10^{-1} through 10^{-3} or none	Decimal point position	S4	*88.88*
			S5	*88.88*
			S6	*88.88*
			S0	[2]
			SA	*88.88*
			SB	*88.88*
			SC	*88.88*
			SG	*8.888*
			SJ	*8.888*
			SZ	[2]

※1. 0% input and 100% input mean the default values according to the input code.
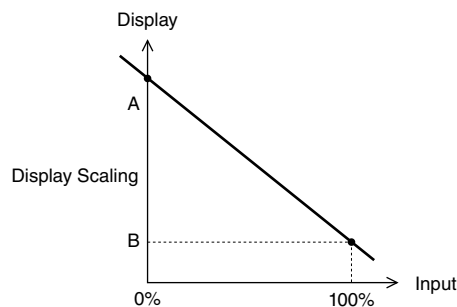※2. Specified value

• Normal Scaling

The display value increases when the input signal increases.

• Inverted Scaling

The display value decreases when the input signal increases.

The decimal point position can be set to any digit. Set it according to the 100% value.

• Scaling settings

Set scaling the range between -1999 to 9999 for measurement range (conformance range). Display scaling value has two types, A and B. Decimal point can be set at any place.
 · Display scaling A is the display value for measurement range 0 % (min. value).
 · Display scaling B is the display value for measurement range 100 % (max. value).
 · Set display scaling decimal point commonly for the display scaling value A and B.

Example) Input signal code SA: For display value 4 to 20 mA, 0.0 to 100.0 %

Measurement range 0 %:	4 mA DC
Measurement range 100 %:	20 mA DC
Display scaling value A:	0.0%
Display scaling value B:	100.0%
Display scaling decimal point:	888.8 (one place of decimal)

When input signal is other than measurement range (e.g. input signal code SC: 0 to 10 mA DC is used for 2 to 10 mA DC), obtain the value parallel shifted from intended display value for the input signal to measurement range 0 % and 100 %. Set the obtained value as the display scaling value A and B. In next paragraph, how to calculate the display scaling value A and B when input signal is other than measurement range.

■ **SCALING EXAMPLES**

• **Example 1: 43DV2-SAD-R**
  Input: 6 – 16 mA
  Desired display value: 0.0 – 100.0
  Measurement range: 4 – 20 mA

1) Calculate "Display Scaling Value A" with following formula.

  SA = (Rz × Dspan + Dz × Is - Ds × Iz) / Ispan

  $\quad$ = [4 × (1000 - 0) + 0 × 16 -1000 × 6] / (16 - 6)

  $\quad$ = -200

  SA: Display Scaling Value A
  Iz: 0% value of input
  Is: 100% value of input
  Dz: Display value for 0% input
  Ds: Display value for 100% input
  Rz: 0% value of conformance range
  Dspan: Display span (Ds - Dz)
  Ispan: Input span (Is - Iz)

  In the above formula, decimal points are omitted as following.
    0.0 – 100.0 → 0 – 1000
  From the above calculation, the Display Scaling Value A is "-200."

2) Calculate "Display Scaling Value B" with following formula.

  SB = (Rs × Dspan + Dz × Is - Ds × Iz) / Ispan

  $\quad$ = [20 × (1000 - 0) + 0 × 16 - 1000 × 6] / (16 - 6)

  $\quad$ = 1400

  SB: Display Scaling Value B
  Rs: 100% value of conformance range

  From the above calculation, the Display Scaling Value B is "1400."

3) Set scaling with the above parameters.
  According to the display value, 0.0 – 100.0, set decimal point at the second position from LSD.

• **Example 2: 43DV2-S4S-R**
  Input: 2 – 6 V
  Desired display value: -5.00 – +5.00
  Measurement range: 0 – 10 V

1) Calculate "Display Scaling Value A" with following formula.

  SA = (Rz × Dspan + Dz × Is - Ds × Iz) / Ispan

  $\quad$ = [0 × (500 + 500) - 500 × 6 - 500 × 2] / (6 - 2)

  $\quad$ = -1000

  In the above formula, decimal points are omitted as following.
    -5.00 – +5.00 → -500 – +500

  From the above calculation, the Display Scaling Value A is "-1000."

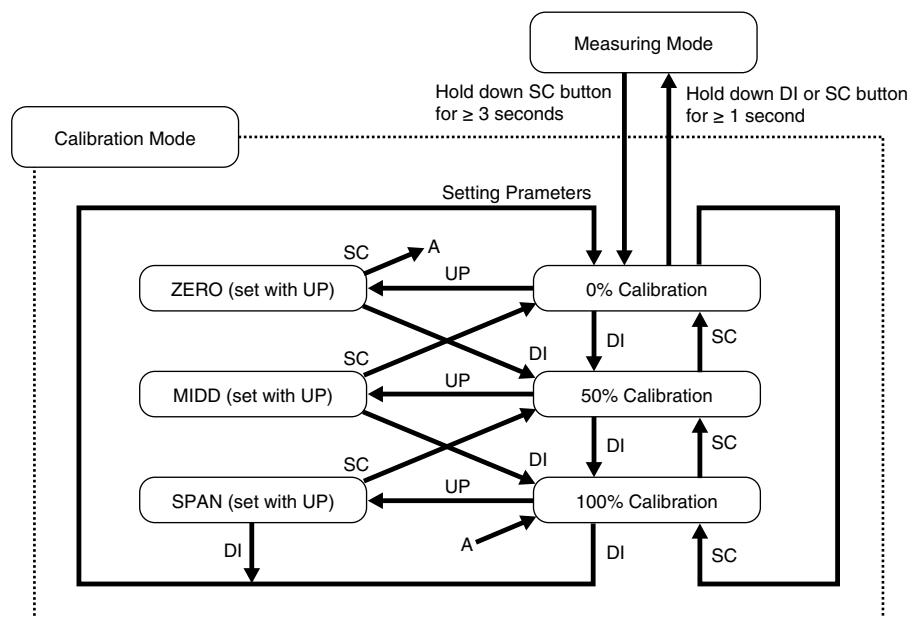2) Calculate "Display Scaling Value B" with following formula.

  SB = (Rs × Dspan + Dz × Is - Ds × Iz) / Ispan

  $\quad$ = [10 × (500 + 500) - 500 × 6 - 500 × 2] / (6 - 2)

  $\quad$ = 1500

  From the above calculation, the Display Scaling Value B is "1500."

3) Set scaling with the above parameters.
  According to the display value, -5.00 – +5.00, set decimal point at the third position from LSD.

■ **CALIBRATION MODE (Only for DC Voltmeter)**

• **PARAMETER LIST**

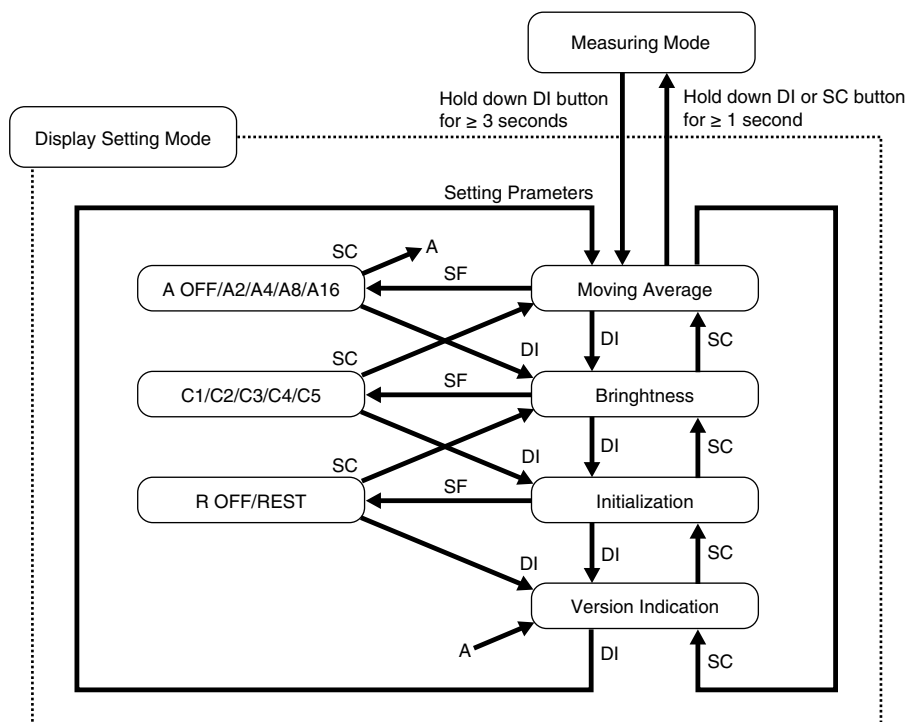| PARAMETER	DISPLAY	FUNCTION	DEFAULT VALUE
0% Calibration	$\bar{z}Er\,o$	Calibrates 0% input	
50% Calibration	$\bar{n}i\ dd$	Calibrates 50% input	Factory Calibration
100% Calibration	$5PAn$	Calibrates 100% input	

• **OPERATIONS IN CALIBRATION MODE**

In the calibration mode, 0%, 50% and 100% of conformance range of voltage input type can be calibrated to user's signal source.

However, if "initialization" is done once, these calibration data will be deleted and set to factory default values.

Operation

1) Hold down SC button for 3 seconds or more to move on to Calibration Mode. Then " $\bar{z}Er\,o$ " is shown.
2) Input 0% signal of the input code. (e.g. -199.9 mV for V1)
3) Pressing UP button, the calibration is done.
4) Pressing DI button, to calibrate 50% input. Then " $\bar{n}i\ dd$ " is shown.
5) Input 50% signal of the input code. (e.g. 0 mV for V1)
6) Pressing UP button, the calibration is done.
7) Pressing DI button, to calibrate 100% input. Then " $5PAn$ " is shown.
8) Input 100% signal of the input code. (e.g. 199.9 mV for V1)
9) Pressing UP button, the calibration is done.
10) Hold down DI or SC button for 1 second or more to finish the calibration.

■ **DISPLAY SETTING MODE**

• **PARAMETER LIST**

PARAMETER	DISPLAY	FUNCTION	DEFAULT VALUE
Moving Average	$AoFF$	No moving averaging	$AoFF$
	$A\ 2$	Moving average with 2 samples	
	$A\ 4$	Moving average with 4 samples	
	$A\ 8$	Moving average with 8 samples	
	$A\ 16$	Moving average with 16 samples	
Brightness	$C\ 1$	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)	
Initialization	$roFF$	Non-initialization	$roFF$
	$rESt$	Initialize settings (change to factory settings) *1	
Version Indication	–	Version number, indication only	–

*1. While "$rESt$" is shown, pressing DI button or SC button initializes settings.
If "Initialization" is done once, all current parameters will be deleted and overwritten with factory default values. Notice that after this, Ex-factory settings with "/SET" option will be irrecoverable.
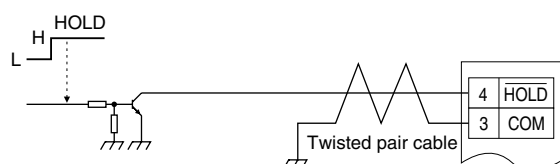
DISPLAY HOLD COMMAND

Displayed value is held with an external HOLD command input. Connect the contacts across HOLD to COM.
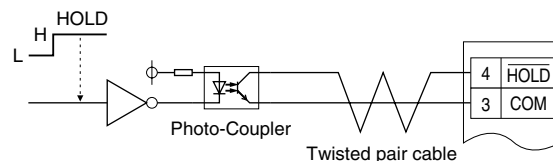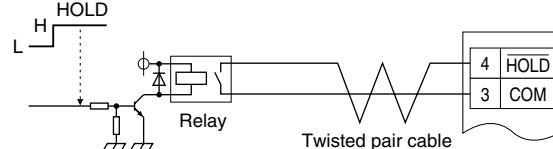
• **WIRING EXAMPLES**

(a) 5V–CMOS, TTL
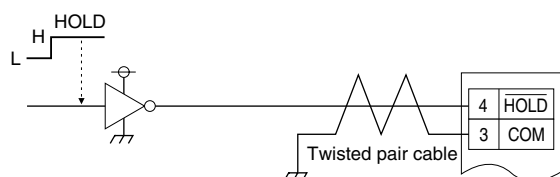
(c) Photo-Coupler

(b) Transistor

(d) Relay

Terminals 3 and 4 are NOT isolated from the internal circuit.

ERROR MESSAGES

DISPLAY	ERROR MESSAGE	WHAT TO DO
5.Err blinking	The input signal is out of the permissible range.[1]	Set the input signal within the permissible range.
-1999 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 DC 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 – 10V input)**
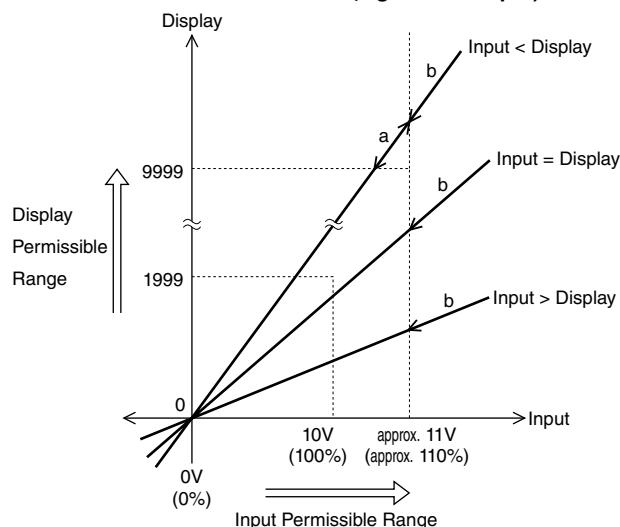
a: 9999 blinking
If the value to display after scaling is out of the permissible range, the maximum (9999) or minimum (-1999) value is blinking.

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

CHARACTER SET

0	1	2	3	4	5	6	7	8	9	-	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