

<b>LOOP POWERED DIGITAL PANEL METER</b> (process meter)	MODEL <b>43AL1</b>
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**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.

The unit is for use in general industrial environments, therefore may not be suitable for applications which require higher level of safety (e.g. safety or accident prevention systems) or of reliability (e.g. vehicle control or combustion control systems).

For safety, installation and maintenance of this unit must be conducted by qualified personnel.

**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 43AL1 Operating Manual (EM-9425-B), downloadable at our web site.

**POINTS OF CAUTION**

**CAUTION**

- If the unit is used in a manner not specified by this manual, the protection provided by the equipment may be impaired.

**CONFORMITY WITH EU DIRECTIVES OR UL**

- 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.

\* For example, installation of noise filters and clamp filters for the power source, input and output connected to the unit, etc.

- This unit is suitable for Pollution Degree 2.
- Altitude up to 2000 meters.
- The unit have to be connected to an isolated secondary circuit source limited to 60V DC/100W for UL.

**GENERAL PRECAUTIONS**

- Before you remove the unit or mount it, turn off 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)**

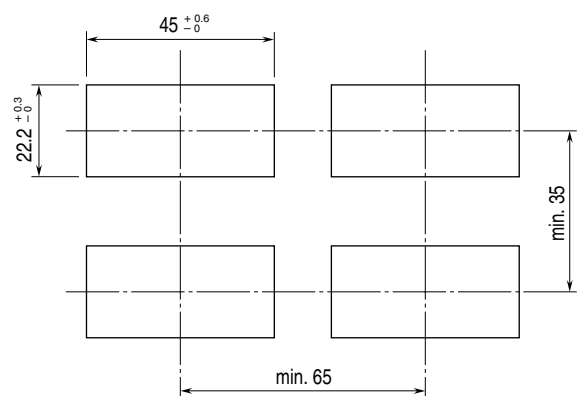
- Activating “initialization,” Ex-factory settings or user’s specified parameters will be deleted and overwritten with the factory default values. Notice that after this, Ex-factory settings will be irrecoverable.

**AND ....**

- The unit is designed to function as soon as input signal is supplied, however, a warm up for 10 minutes is required for satisfying complete performance described in the data sheet.

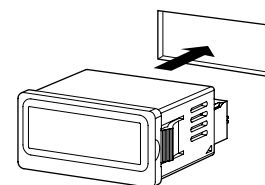
**INSTALLATION**

**PANEL CUTOUT unit: mm**



Panel thickness: 0.8 to 3.5 mm

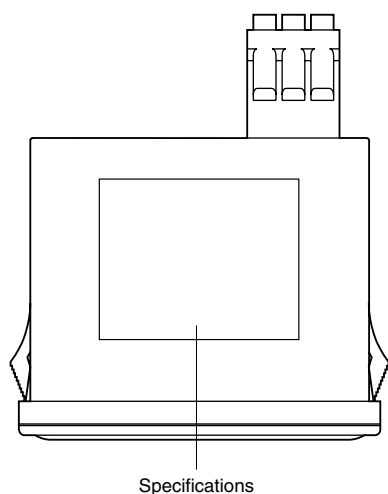
**HOW TO MOUNT THE UNIT ON A PANEL**



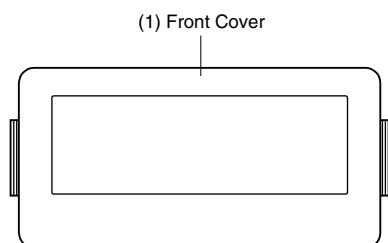
Just insert the meter body (snap-in method)

## COMPONENT IDENTIFICATION

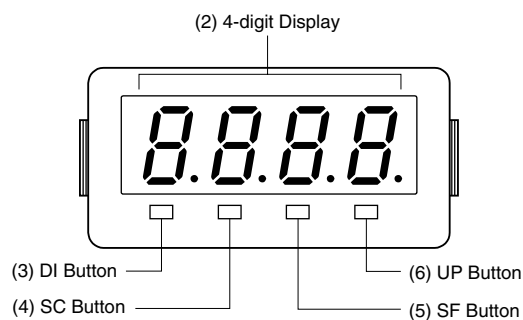
### ■ TOP VIEW



### ■ FRONT VIEW



### • Front View without the Front Cover

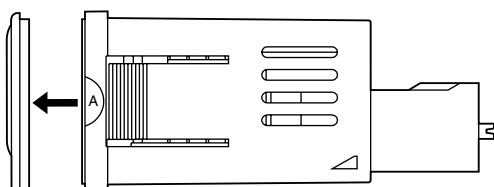


### ■ COMPONENT IDENTIFICATION

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 modes; or to shift through setting items in each setting mode.
(4)	SC Button	Used to move on to the scaling setting modes; 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.



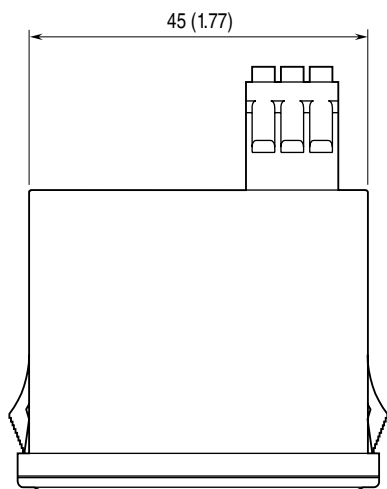
## TERMINAL CONNECTIONS

Connect the unit as in the diagram below or refer to the connection diagram on the top of the unit.

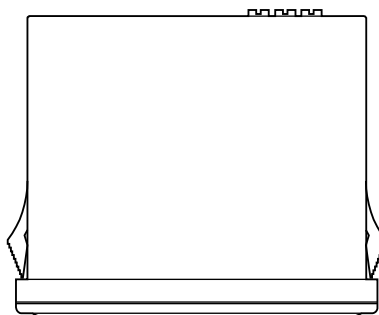
### EXTERNAL DIMENSIONS unit: mm (inch)

#### TOP VIEW

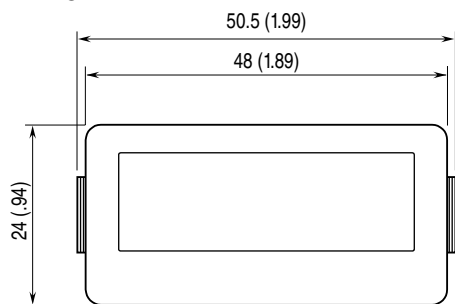
- Separable terminal



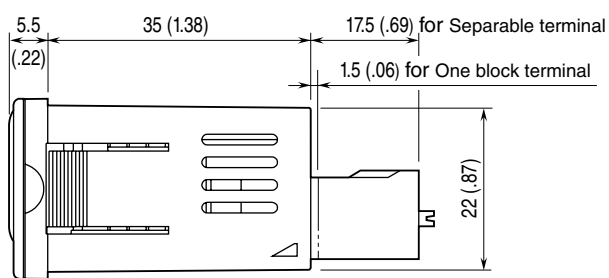
- One block terminal



#### FRONT VIEW

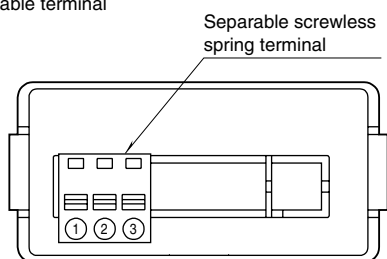


#### SIDE VIEW

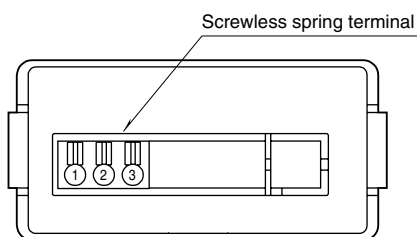


#### REAR VIEW

- Separable terminal



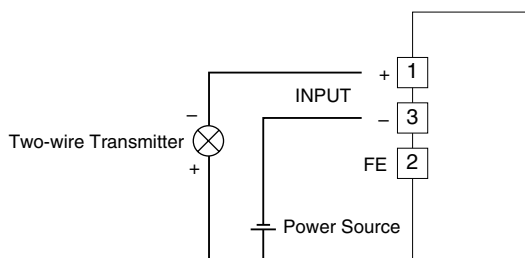
- One block terminal



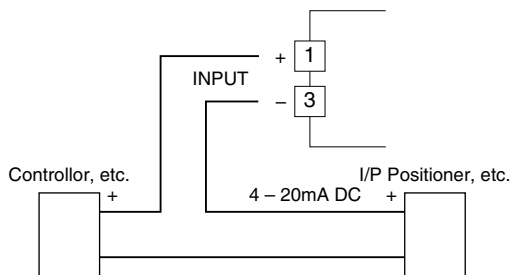
## CONNECTION DIAGRAM

Note: In order to improve EMC performance, bond the FE terminal to ground.

Caution: FE terminal is NOT a protective conductor terminal.



## 4-WIRE CONNECTION EXAMPLE



## WIRING INSTRUCTIONS

### Terminal block "S": Screwless spring terminal

Applicable wire size: 1.0 to 1.3 mm<sup>2</sup>

Stripped length: 8 mm

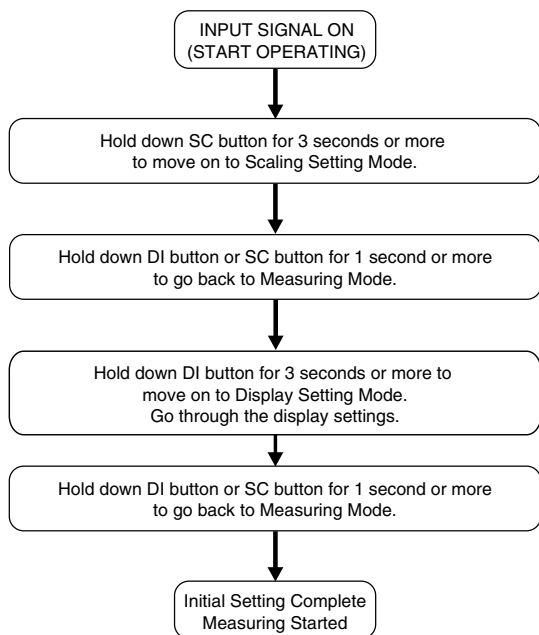
### Terminal block "D": Separable screwless spring terminal

Applicable wire size: 1.0 to 1.3 mm<sup>2</sup>

Stripped length: 8 mm

## SETTING PROCEDURE

### INITIAL SETTING FLOWCHART



Note: For 4 to 20mA DC Current meter, the initial setting is not necessary.

### OPERATIONS IN SETTING MODES

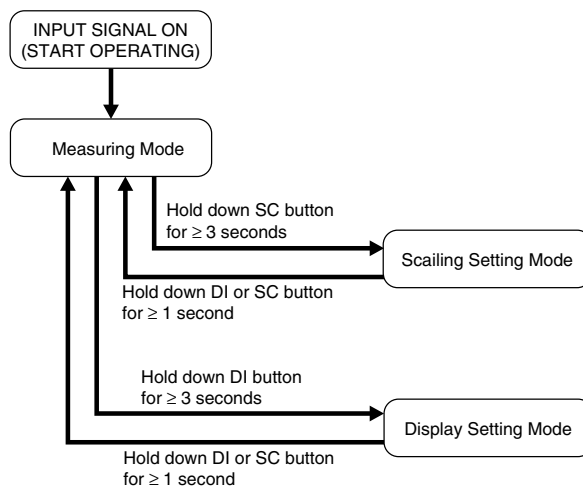
#### • Display

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.

### GENERAL SETTING FLOWCHART



#### • 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.

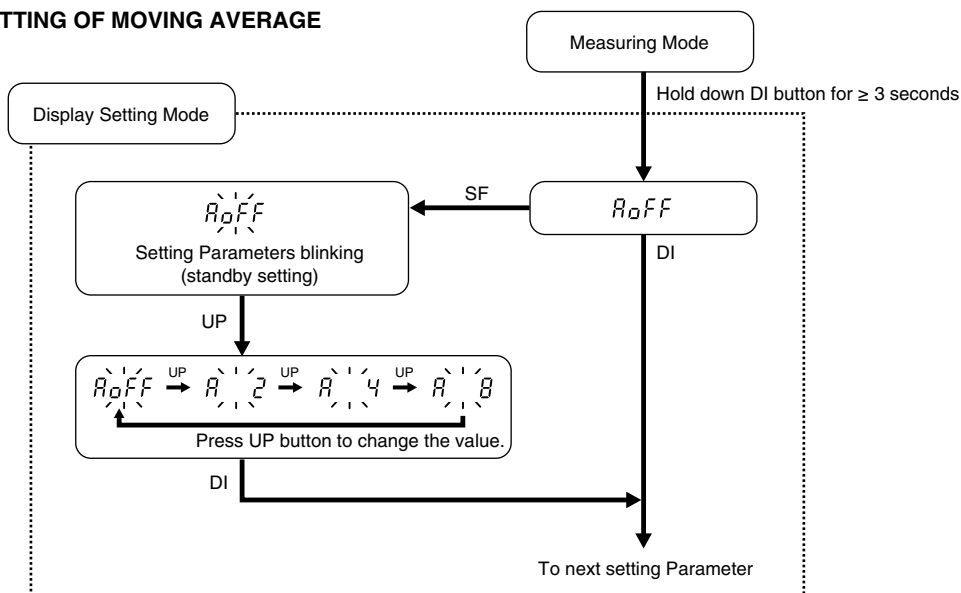
Press UP button to change the blinking value.

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

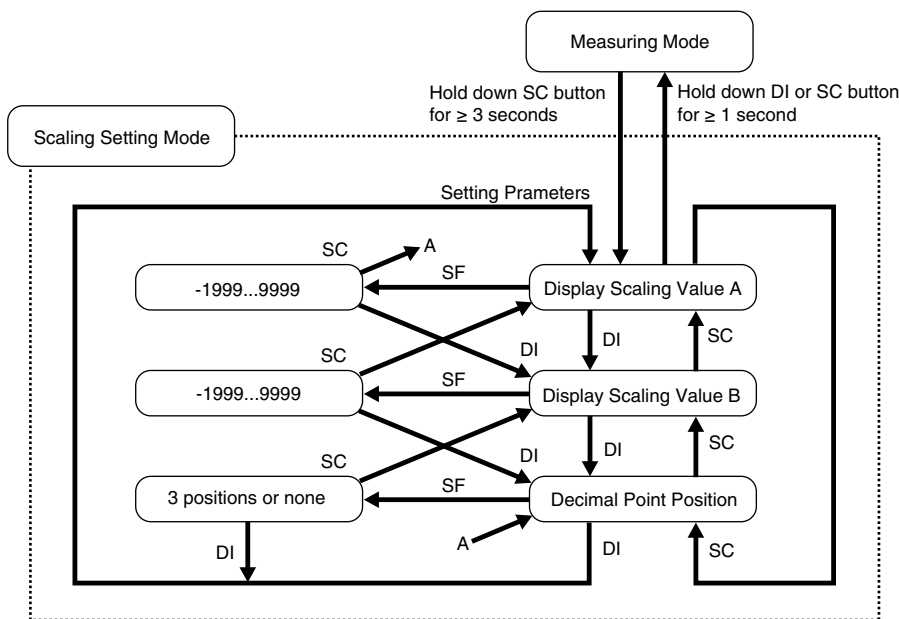


Note: For Scaling setting mode the method for using the SF and UP button is the same as for changing the Setting Parameters.

• 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

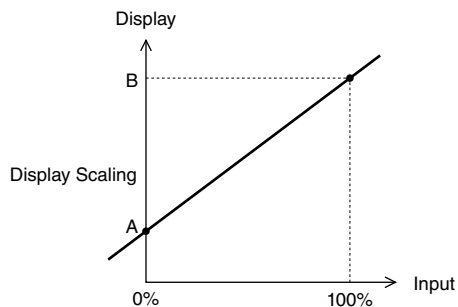


• PARAMETER LIST

PARAMETER	DISPLAY	FUNCTION	DEFAULT VALUE
Display Scaling Value A	-1999 ... 9999	Display value for 4mA input To distinguish from B, the first decimal point is blinking.	0400
Display Scaling Value B	-1999 ... 9999	Display value for 20mA input	2000
Decimal Point Position	10 <sup>-1</sup> through 10 <sup>-3</sup> or none	Decimal point position	8888

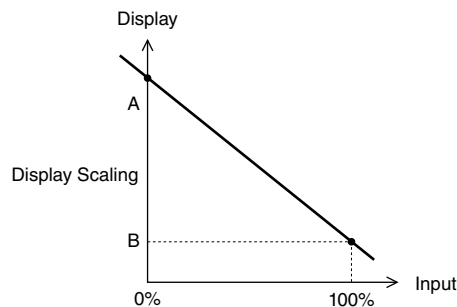
### • Normal Scaling

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 4 to 20 mA DC. 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 4 mA.
- Display scaling B is the display value for 20 mA.
- Set display scaling decimal point commonly for the display scaling value A and B.

**Example)** For display value 0.0 to 100.0% at input 4 to 20 mA DC.

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)

In case other than 4 to 20 mA DC (e.g. used in 6 to 20 mA DC), obtain the value when intended display value for the input signal is extended to 4 to 20 mA. 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 used in other than 4 to 20 mA DC is explained.

### ■ SCALING EXAMPLES

#### Example)

Input: 6 – 16 mA

Desired display value: -5.00 – +5.00

Measurement range: 4 – 20 mA

- 1) Calculate “Display Scaling Value A” with following formula.

$$SA = (Rz \times Dspan + Dz \times Is - Ds \times Iz) / Ispan$$

$$= [4 \times (500 + 500) - 500 \times 16 - 500 \times 6] / (16 - 6)$$

$$= -700$$

In the above formula, decimal points are omitted as following.

$$-5.00 - +5.00 \rightarrow -500 - +500$$

From the above calculation, the Display Scaling Value A is “-700.”

- 2) Calculate “Display Scaling Value B” with following formula.

$$SB = (Rs \times Dspan + Dz \times Is - Ds \times Iz) / Ispan$$

$$= [20 \times (500 + 500) - 500 \times 16 - 500 \times 6] / (16 - 6)$$

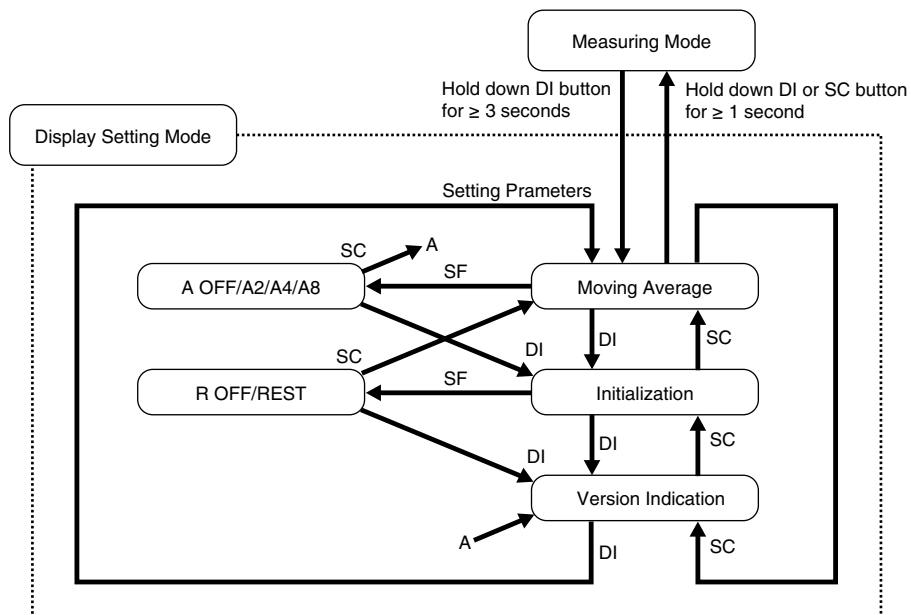
$$= 900$$

From the above calculation, the Display Scaling Value B is “900.”

- 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.

## ■ DISPLAY SETTING MODE



### • PARAMETER LIST

PARAMETER	DISPLAY	FUNCTION	DEFAULT VALUE
Moving Average	<i>R OFF</i>	No moving averaging	<i>R OFF</i>
	<i>R 2</i>	Moving average with 2 samples	
	<i>R 4</i>	Moving average with 4 samples	
	<i>R 8</i>	Moving average with 8 samples	
Initialization	<i>r OFF</i>	Non-initialization	<i>r OFF</i>
	<i>r SET</i>	Initialize settings (change to factory settings) *1	
Version Indication	-	Version number, indication only	-

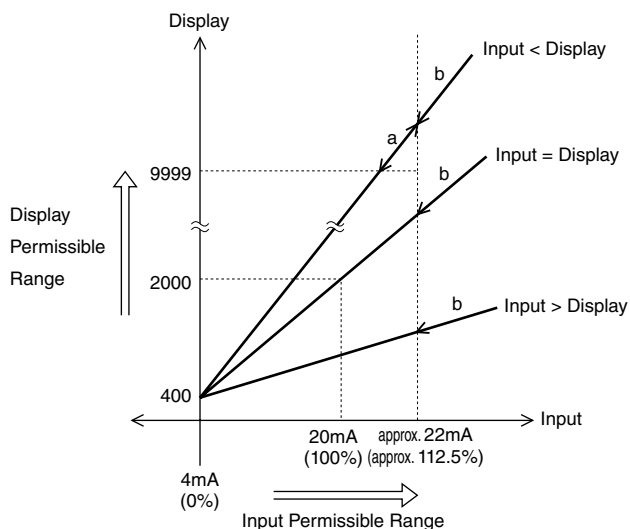
\*1. While "*r SET*" is shown, pressing **DI** button or **SC** button initializes settings.

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.

## ERROR MESSAGES

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

### INPUT AND ERROR CORRELATION



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
0	1	2	3	4	5	6	7	8	9	-	A	b	c	d	E	F	G	H	,	J	K	L	ñ	o	P	q	r	S	t	U	v	y	ü	ý	ÿ	

## LIGHTNING SURGE PROTECTION

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