OPERATING MANUAL

STRAIN GAUGE INPUT DIGITAL PANEL METER
(4 1/2 digit, LED display type)

MODEL 47LLC

BEFORE USE ....

Thank you for choosing M-System. 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 M-System's Sales Office or representatives.

■ PACKAGE INCLUDES:

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

■ MODEL NO.

Confirm that the model number described on the product is exactly what you ordered.

■ OPERATING MANUAL

This manual describes necessary points of caution when you use this product, including installation, connection, basic maintenance procedures and detailed operations.

POINTS OF CAUTION

■ POWER INPUT RATING & OPERATIONAL RANGE

Locate the power input rating marked on the product and confirm its operational range as indicated below:
   100 – 240V AC rating: 85 – 264V, 50/60 Hz,
      approx. 9VA at 100V
      approx. 12VA at 200V
      approx. 13VA at 264V
   24V DC rating: 24V ±10%, approx. 5W
   110V DC rating: 85 – 150V, approx. 5W

■ 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.

■ REQUIREMENTS TO ENSURE IP 66

• Observe the designated panel cutout size (W92 × H45 mm).
• The watertight packing included in the product package must be placed behind the front cover.
• Both mounting brackets must be fastened tightly until they hit the panel.
• Confirm visually that the packing is not contorted or excessively run off the edge after installation.

■ WIRING

• Make sure for safety that only qualified personnel perform the wiring.
• Do not install cables (power supply, input and output) 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.
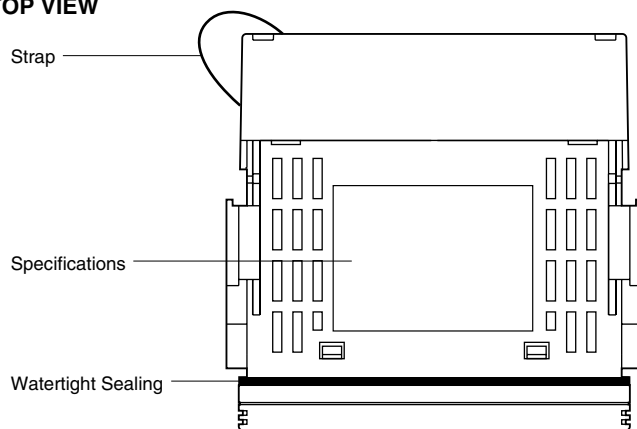
■ EX-FACTORY SETTING (/SET)

• Activating "initialization" of Lockout Setting Mode, 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.
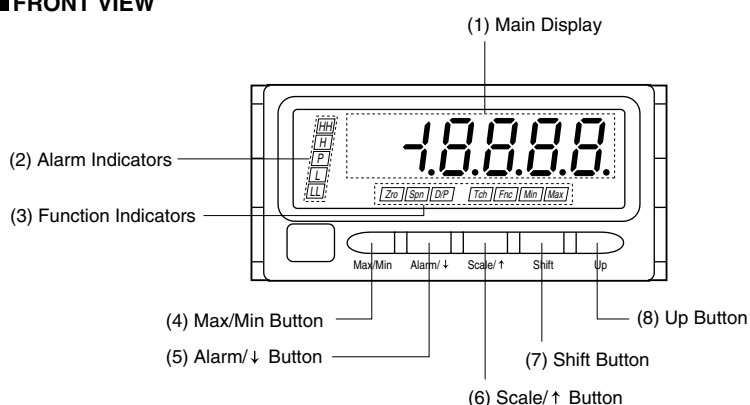
■ AND ....

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.
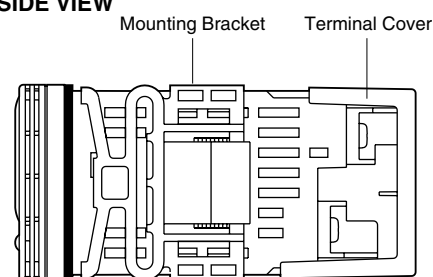
COMPONENT IDENTIFICATION

■**TOP VIEW**

Strap

Specifications

Watertight Sealing

■**FRONT VIEW**

(1) Main Display

(2) Alarm Indicators

(3) Function Indicators

(4) Max/Min Button

(5) Alarm/↓ Button

(6) Scale/↑ Button

(7) Shift Button

(8) Up Button

■**SIDE VIEW**

Mounting Bracket   Terminal Cover

• **COMPONENT IDENTIFICATION**

No.	COMPONENT	FUNCTION
(1)	Main display	Indicates present values and setting values.
(2)	Alarm indicators [*1]	Indicate alarm status of the input signal. LL turns on when the LL alarm is tripped. L turns on when the L alarm is tripped. H turns on when the H alarm is tripped. HH turns on when the HH alarm is tripped. P turns on when none of the other alarms is tripped.
(3)	Function indicators	Indicate the device status.
(4)	Max/Min button	Used to switch the main display to show the present values, maximum values or minimum values.
(5)	Alarm/↓ button	Used to move on to the alarm setpoint and other setting modes; or to shift through setting items in each setting mode.
(6)	Scale/↑ button	Used to move on to the scaling and other setting modes; or to shift through setting items in each setting mode.
(7)	Shift button	Used to move on to the setting standby status and shift through display digits in each setting item.
(8)	Up button	Used to select setting values.

*1. Only the 'P' indicator turns on with 'no alarm output' option. For dual alarm type, 'LL' or 'HH' does not turn on.

INSTALLATION

■ PANEL CUTOUT unit: mm

$92 ^{+0.8}_{-0}$

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

min. 75

min. 120
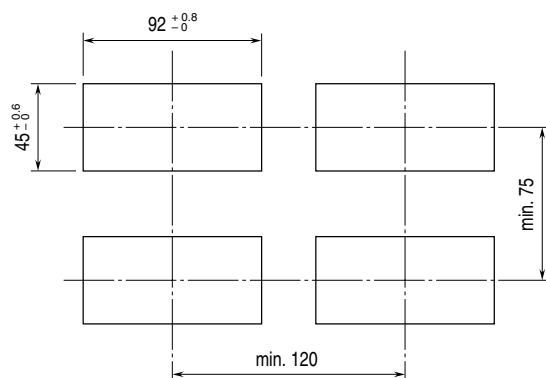
Panel thickness: 1.6 to 8.0 mm

■ HOW TO MOUNT THE UNIT ON A PANEL

The watertight packing must be in place to hold the meter. Do not remove it.

1) Insert the unit into the panel cutout.
2) Push the mounting brackets into the grooves on both sides of the rear module, until they hit the panel's rear side.

Watertight packing   Panel   Mounting Bracket
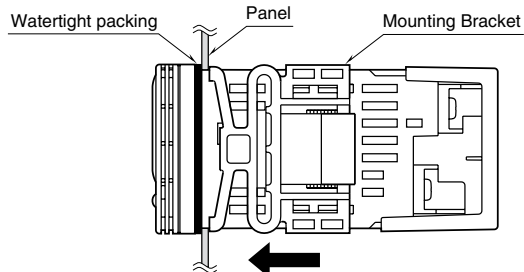
TERMINAL CONNECTIONS

Connect the unit as in the diagram in the following page or refer to the connection diagram on the terminal cover.

■ EXTERNAL DIMENSIONS unit: mm (inch)

■ TOP VIEW

95 (3.74)

■ FRONT VIEW

103 (4.06)

96 (3.78)

48 (1.89)

■ SIDE VIEW

98.5 (3.88)

12.5 (.49)   86 (3.39)

2 (.08)

47 (1.85)

■ REAR VIEW

20–M3 SCREW TERMINAL

4–M3 SCREW

45 (1.77)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |

91.5 (3.60)

M·SYSTEM CO.,LTD.
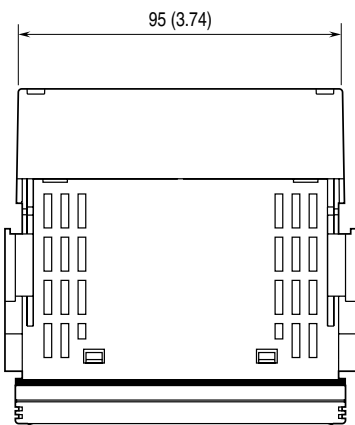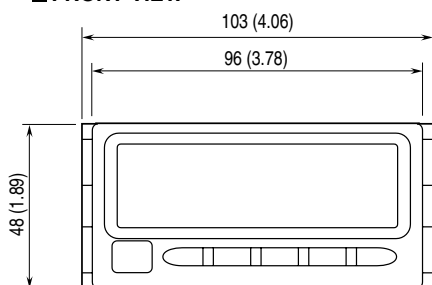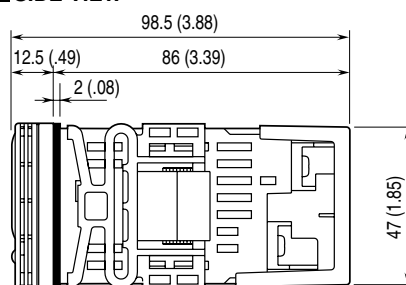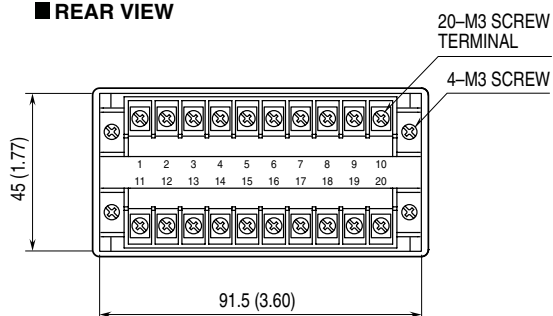
■ CONNECTION DIAGRAM

■ ALARM SUFFIX CODE: No alarm output

STRAIN GAUGE
INPUT + |1|
INPUT − |2|
EXC. + |3|
EXC. − |4|
SG |5|

|7| + DC OUTPUT
|8| −
|9| U(+) POWER
|10| V(−)

CONTACT INPUT (Di) + |11|
CONTACT INPUT (Di) − |12|
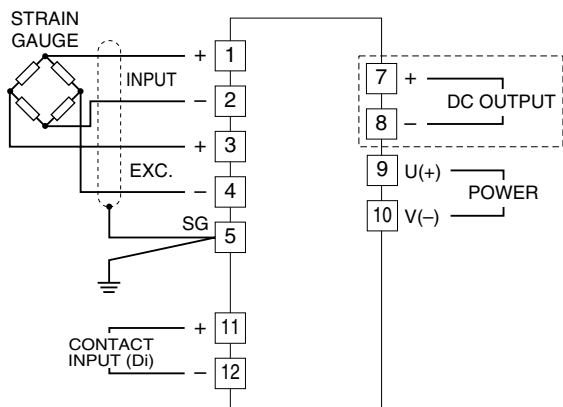
■ ALARM SUFFIX CODE: N.O. contact, 4 points / Photo MOSFET relay, 4 points

STRAIN GAUGE
INPUT + |1|
INPUT − |2|
EXC. + |3|
EXC. − |4|
SG |5|

|7| + DC OUTPUT
|8| −

|15| HHa — HH OUTPUT
|16| Ha — H OUTPUT
|17| Hc, HHc

|18| La — L OUTPUT
|19| LLa — LL OUTPUT
|20| Lc, LLc

|9| U(+) POWER
|10| V(−)

CONTACT INPUT (Di) + |11|
CONTACT INPUT (Di) − |12|
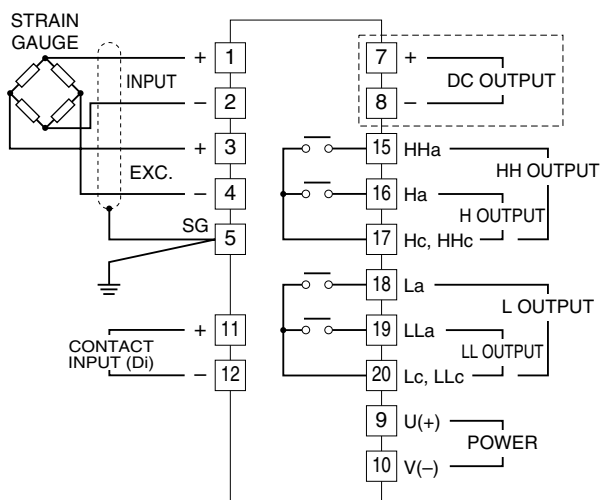
■ ALARM SUFFIX CODE: SPDT contact, 2 points

STRAIN GAUGE
INPUT + |1|
INPUT − |2|
EXC. + |3|
EXC. − |4|
SG |5|

|7| + DC OUTPUT
|8| −

|15| Ha (NO)
|16| Hb (NC) — H OUTPUT
|17| Hc (COM)

|18| La (NO)
|19| Lb (NC) — L OUTPUT
|20| Lc (COM)

|9| U(+) POWER
|10| V(−)

CONTACT INPUT (Di) + |11|
CONTACT INPUT (Di) − |12|
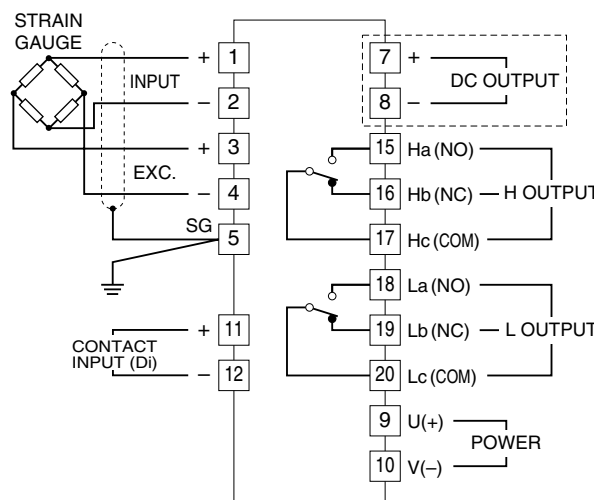
Note: The section enclosed by broken line is only with DC output option.

■ Relay Protection

• AC Powered

Inductive Load (Coil)
LOAD
Varistor or CR Circuit

• DC Powered

Inductive Load (Coil)
LOAD
Diode, Varistor or CR Circuit
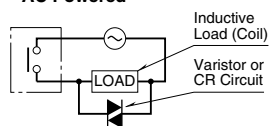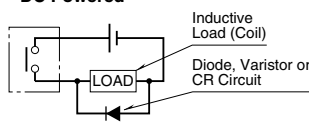
■ TERMINAL BLOCK

• How to remove the terminal block cover

Insert the minus tip of a screwdriver into each hole at the four corners of the cover and pull it to the direction as indicated below to separate the terminal block cover.

Terminal Cover
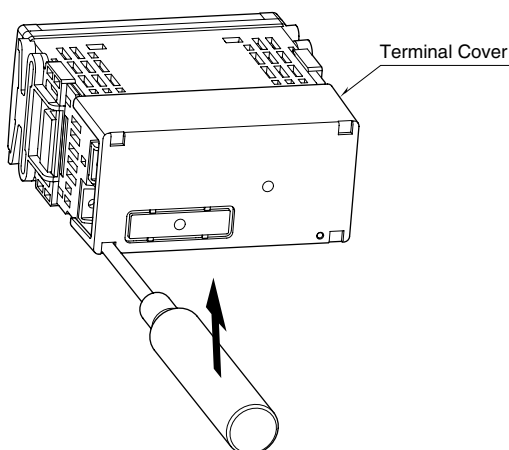
• How to remove the terminal block

The terminal block is separable in two pieces. Loosen two screws on both sides of the terminal block to separate.

Be sure to turn off the power supply, input signal and power supply to the output relays before separating the terminal block.

Terminal Block
Separable
Terminal Block Screw

M·SYSTEM CO.,LTD.
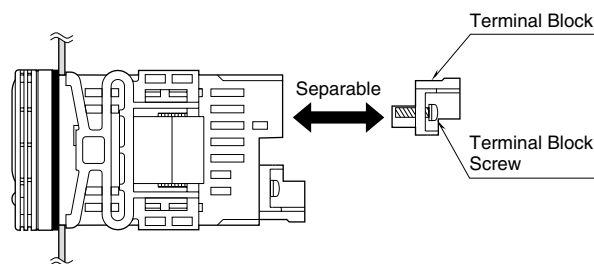
SETTING PROCEDURE

■ INITIAL SETTING FLOWCHART

POWER ON

↓

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

↓

Hold down Alarm/↓ button for 3 seconds or more to move on to Alarm Setting Mode.
Go through the alarm settings.

↓

Hold down Alarm/↓ + Scale/↑ buttons at once for 3 seconds or more
to move on to Advanced Setting Mode. Go through the advanced settings.   *1

↓

If necessary, hold down Max/Min button + Alarm/↓ buttons at once
for a preset time duration to enter Lockout Setting Mode.
Go through the lockout settings.

↓

Hold down Alarm/↓ button or Scale/↑ button for 1 second or more
to go back to Measuring Mode.

↓

Initial Setting Complete
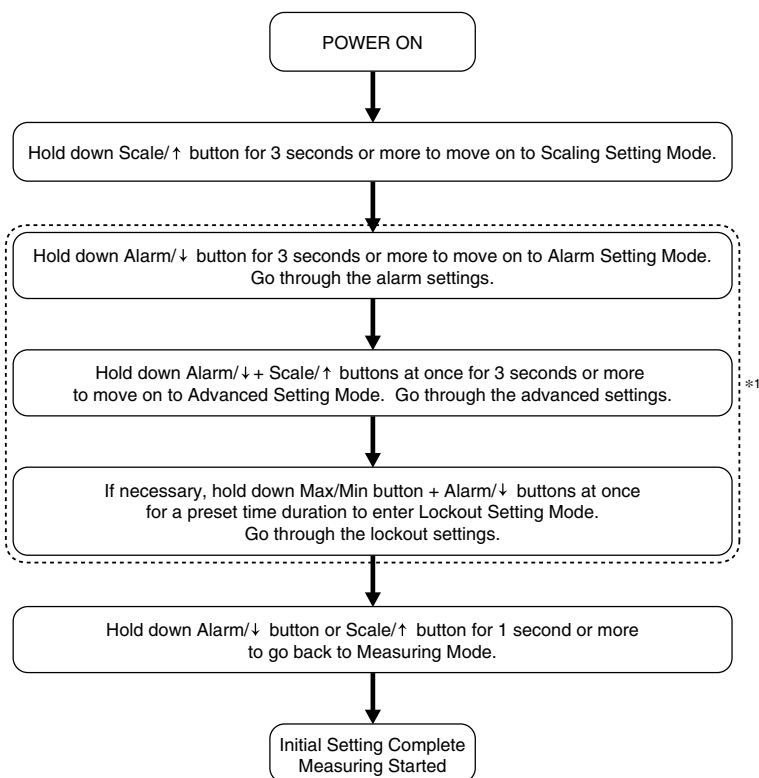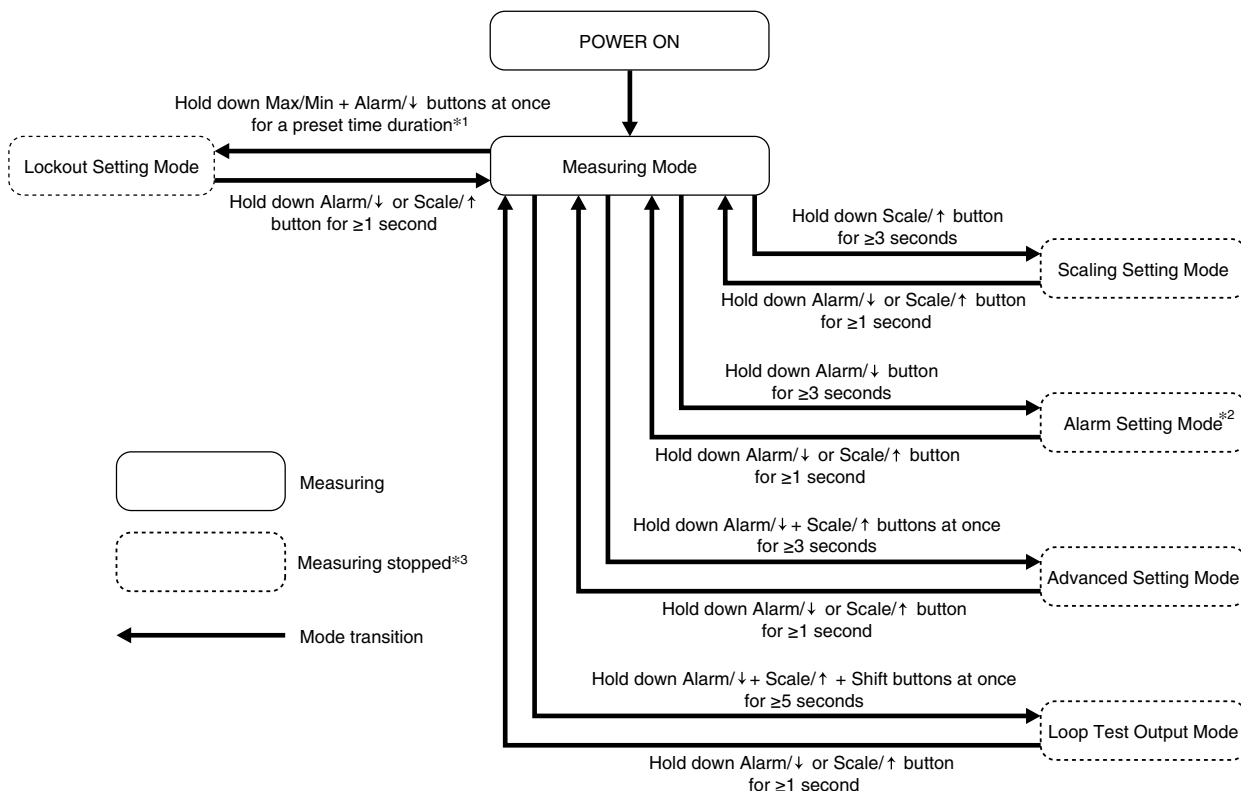Measuring Started

*1. Optional settings for parameters in a broken-line section.
    Alarm Setting Mode is locked with no-alarm-output type.

■ GENERAL SETTING FLOWCHART

POWER ON

Hold down Max/Min + Alarm/↓ buttons at once
for a preset time duration*1

Lockout Setting Mode   Measuring Mode

Hold down Alarm/↓ or Scale/↑
button for ≥1 second

Hold down Scale/↑ button
for ≥3 seconds
→ Scaling Setting Mode

Hold down Alarm/↓ or Scale/↑ button
for ≥1 second

Hold down Alarm/↓ button
for ≥3 seconds
→ Alarm Setting Mode*2

Hold down Alarm/↓ or Scale/↑ button
for ≥1 second

Hold down Alarm/↓ + Scale/↑ buttons at once
for ≥3 seconds
→ Advanced Setting Mode

Hold down Alarm/↓ or Scale/↑ button
for ≥1 second

Hold down Alarm/↓ + Scale/↑ + Shift buttons at once
for ≥5 seconds
→ Loop Test Output Mode

Hold down Alarm/↓ or Scale/↑ button
for ≥1 second

Measuring

Measuring stopped*3

Mode transition

*1. Preset time can be specified with "Transition Time to Lockout Setting Mode" in Advanced Setting Mode.
*2. Alarm Setting Mode is locked with no-alarm-output type.
*3. The last measured values or status are held for DC and alarm outputs while the measuring is stopped.
    (Except the analog output adjustments during the loop test and the scaling setting)
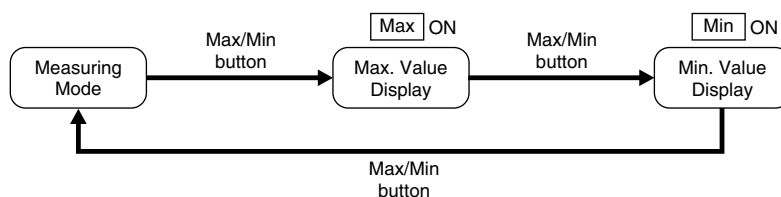
■ **OPERATIONS IN MEASURING MODE**

• **Switching the main display to MAX or MIN values**

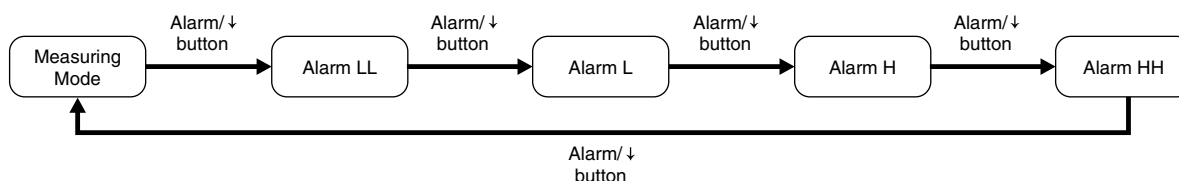Press Max/Min button to switch the main display to MAX or MIN values.

'Max' or 'Min' indicator turns on during the MAX/MIN display mode.

Press Max/Min button again for 1 second or more, or turn the power supply off and on to cancel the MAX/MIN display mode.

```
                Max/Min          | Max | ON      Max/Min        | Min | ON
                button                            button
┌───────────┐           ┌──────────────┐              ┌──────────────┐
│ Measuring │  ──────▶  │  Max. Value  │   ──────▶    │  Min. Value  │
│   Mode    │           │   Display    │              │   Display    │
└───────────┘           └──────────────┘              └──────────────┘
      ▲                                                      │
      └──────────────────────────────────────────────────────┘
                          Max/Min
                          button
```

• **Confirming alarm setpoints**

Press Alarm/↓ button to confirm alarm setpoints.

```
              Alarm/↓          Alarm/↓           Alarm/↓          Alarm/↓
              button           button            button           button
┌──────────┐         ┌──────────┐       ┌─────────┐       ┌─────────┐       ┌──────────┐
│Measuring │ ──────▶ │ Alarm LL │ ────▶ │ Alarm L │ ────▶ │ Alarm H │ ────▶ │ Alarm HH │
│   Mode   │         └──────────┘       └─────────┘       └─────────┘       └──────────┘
└──────────┘                                                                      │
     ▲                                                                            │
     └────────────────────────────────────────────────────────────────────────────┘
                                   Alarm/↓
                                   button
```

■ **OPERATIONS IN SETTING MODES**

• **Main display**

The main display shows the current settings while the panel meter is in the setting mode.

• **Shifting through setting parameters**

In any setting mode, pressing Alarm/↓ button shifts one parameter to the next. Pressing Scale/↑ button shifts one to the previous.

• **Changing parameters**

Pressing Shift 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 Shift button to go to the next digit.

Press Alarm/↓ or Scale/↑ button to apply the new value and go to the next or previous parameter setting.

• **Invalid parameters**

'Max' and 'Min' indicators start blinking when a parameter is within invalid range while setting. Return the setting within the valid range or abort it by holding down Max/Min button for 1 second or more.
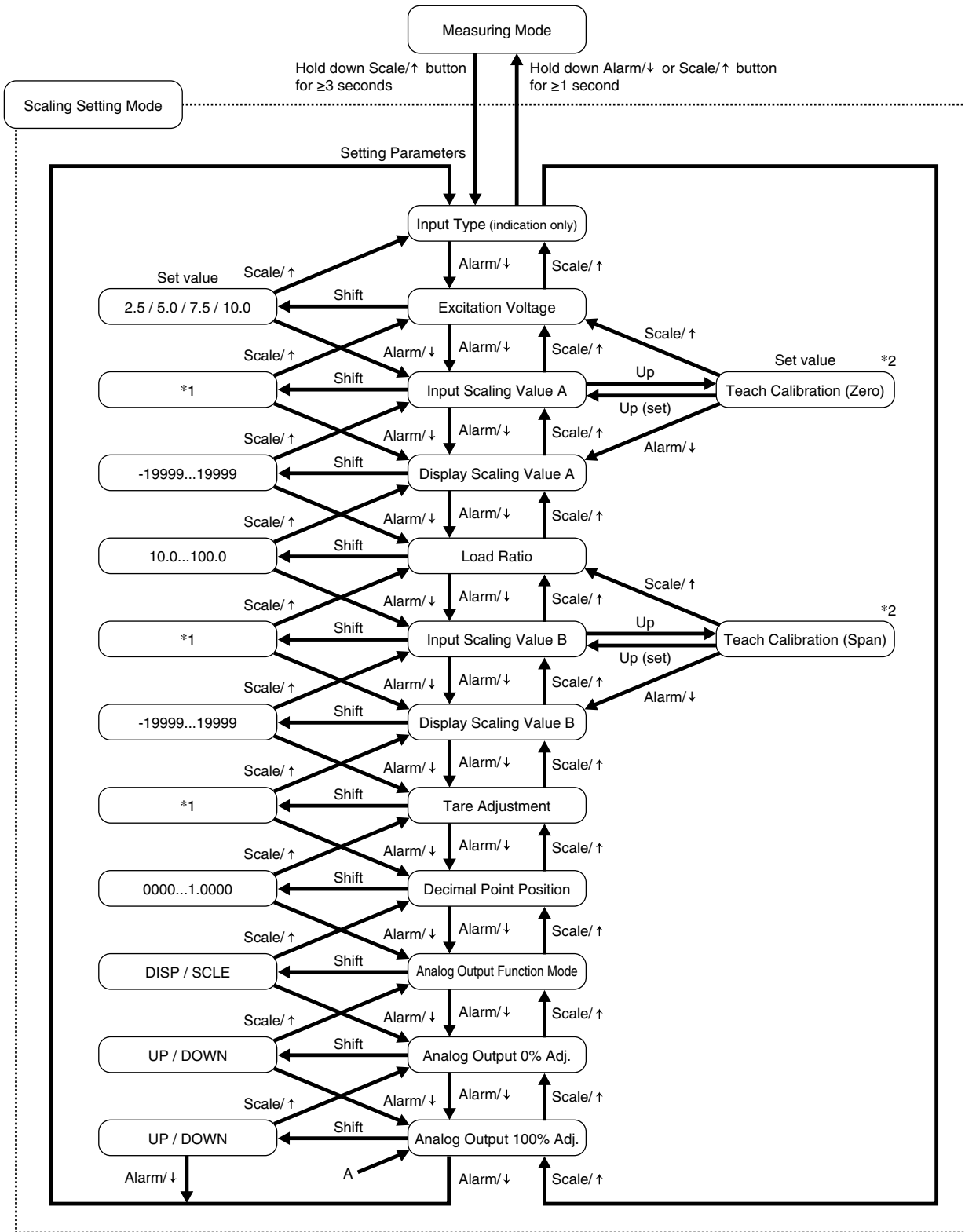
• **Negative reading setting**

The negative sign (–) must be set to the fifth digit. For example, set '-050.0' instead of '-50.0.'

• **If you get lost...**

Hold down Max/Min button for 1 second or more to return to the measuring mode without applying the last changes.

(Those which have been already applied by pressing Alarm/↓ or Scale/↑ button are not cancelled.)

■ **SCALING SETTING MODE**

Measuring Mode

Hold down Scale/↑ button for ≥3 seconds

Hold down Alarm/↓ or Scale/↑ button for ≥1 second

Scaling Setting Mode

Setting Parameters

Input Type (indication only)

Set value 2.5 / 5.0 / 7.5 / 10.0 — Excitation Voltage

*1 — Input Scaling Value A — Teach Calibration (Zero) Set value *2 — Up / Up (set)

-19999...19999 — Display Scaling Value A

10.0...100.0 — Load Ratio

*1 — Input Scaling Value B — Teach Calibration (Span) *2 — Up / Up (set)

-19999...19999 — Display Scaling Value B

*1 — Tare Adjustment

0000...1.0000 — Decimal Point Position

DISP / SCLE — Analog Output Function Mode

UP / DOWN — Analog Output 0% Adj.

UP / DOWN — Analog Output 100% Adj.

Scale/↑, Alarm/↓, Shift, A

*1. Depends upon model suffix code. Refer to the following parameter list.
*2. Refer to Teach Calibration for detailed procedures.

PARAMETER	INDICATORS		DISPLAY		FUNCTION	DEFAULT VALUE
Input type (indication only)	Zro Spn	S1	*0 - 1*		Strain gauge rating 0.0 – 1.0mV/V	*0 - 1*
		S2	*0 - 3*		Strain gauge rating 0.0 – 3.0mV/V	*0 - 3*
		S3	*0 - 10*		Strain gauge rating 0.0 – 10.0mV/V	*0 - 10*
		S4	*0 - 30*		Strain gauge rating 0.0 – 30.0mV/V	*0 - 30*
Excitation voltage	Fnc		*2.5u*		Excitation 2.5V	*2.5u*
			5.0u		Excitation 5V	
			7.5u		Excitation 7.5V	
			10.0u		Excitation 10V	
Input scaling value A See next page.	Zro Tch	S1	*- 10.00 ...*	*10.00*	Input value for Zero point (mV): Set to a specific value by using the buttons, or by Teach Calibration	*00.00*
		S2	*- 30.00 ...*	*30.00*		*00.00*
		S3	*- 100.0 ...*	*100.0*		*000.0*
		S4	*- 300.0 ...*	*300.0*		*000.0*
Display scaling value A	Zro D/P		*- 19999 ...*	*19999*	Display value for Input Scaling Value A	*0000*
Load ratio	Spn Fnc		*10.0 ...*	*100.0*	Load ratio (%)	*100.0*
Input scaling value B See next page.	Spn Tch	S1	*- 09.00 ...*	*20.00*	Input value for Full-scale point (mV): Set to a specific value by using the buttons, or by Teach Calibration	*02.50*
		S2	*- 27.00 ...*	*60.00*		*07.50*
		S3	*- 090.0 ...*	*200.0*		*025.0*
		S4	*- 270.0 ...*	*600.0*		*075.0*
Display scaling value B	Spn D/P		*- 19999 ...*	*19999*	Display value for Input Scaling Value B	*10000*
Tare adjustment See next page.	Zro Tch Fnc	S1	*- 08.00 ...*	*8.00*	Tare input voltage (mV): Set to a specific value by an external contact input or by Teach Calibration	*0.00*
		S2	*- 24.00 ...*	*24.00*		*0.00*
		S3	*- 080.0 ...*	*80.0*		*0.0*
		S4	*- 240.0 ...*	*240.0*		*0.0*
Decimal point position	D/P	4 positions or none			Decimal point position	*10000*
Analog output function mode	Fnc		*di SP*		Proportional to the display value	*di SP*
			SCLE		Proportional to the scaling value	
Analog output 0% adjustment	Zro Fnc		*UP* (increasing)		Analog output 0% adjustment: adjustable range -5 to 100%	0% output (default value)
			doun (decreasing)			
Analog output 100% adjustment	Spn Fnc		*UP* (increasing)		Analog output 100% adjustment: adjustable range 0 to 105%	100% output (default value)
			doun (decreasing)			

Scaling setting: Go through the scaling setting in the order of 'Input scaling value A' --> 'Display scaling value A' --> 'Input scaling value B' --> 'Display scaling value B,' so that the zero and the full-scale points are connected linearly as shown in the figures below. Input scaling value A < Input scaling value B.
Do not set the same value for Display scaling value A and B.

Load ratio: Load ratio is used to scale the input load used for the input scaling value B (span) setting.
For example, set 20.0 in order to apply only 20% load instead of 100%.

Decimal point position: Decimal point position is specified independently from the scaling. When you set the display scaling, include zeros for fractions (10000 to show 10.000).

Tare adjustment: External contact input is used to adjust the tare during the measuring mode. Alarm and DC output is reset to 0% when the tare command is given by the external contact.

Analog output functioin mode: Low-end cutout and display refreshing rate are applied to the display value, thus affecting the analog output when the mode is set to 'Proportional to the display value.'
The input signal directly affects the analog output with 'Proportional to the scaling value' setting.

Analog output 0% / 100% adjustment: Pressing [Shift] button switches the signal to increase or decrease, and then pressing [Up] button controls it toward the desired output value. Analog output 0% + 5% ≤ Analog output 100%
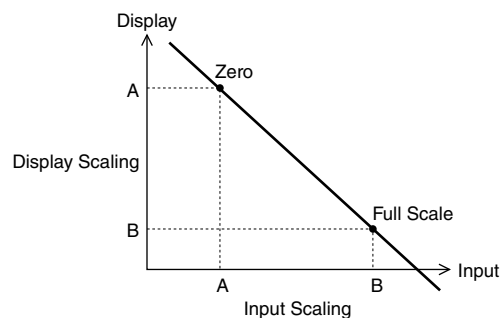
•**Normal Scaling**
The display value increases when the input signal increases.
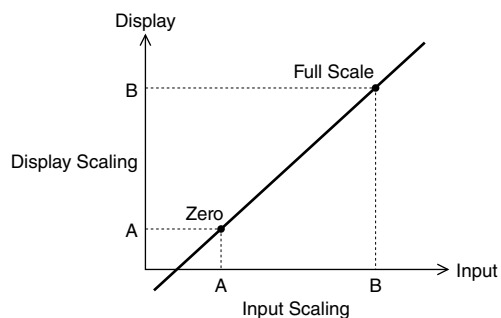
• **Inverted Scaling**
The display value decreases when the input signal increases.

• 'Teach' Calibration

'Input scaling value A' and 'Input scaling value B' can be adjusted by applying actual input signals. These settings will be lost after an initialization.

How to 'Teach' Input Values

1) Hold down Scale/↑ button for 3 seconds or more to enter the scaling setting mode.
2) Press Alarm/↓ button to move on to Input scaling value A. 'Zro' and 'Tch' indicators turn on.
3) Apply 0% input signal.
4) Zero point: Press Up button and 'Tch' indicator starts blinking.
5) Wait until the reading stabilizes.
6) Press Up button again and 'Tch' indicators returns to ON. Zero point calibration is complete.
7) Press Alarm/↓ button to move on to Display scaling value A.
8) Press Alarm/↓ button again to move on to Input scaling value B. 'Spn' and 'Tch' indicators turn on.
9) Apply 100% input signal.
10) Full-scale point: Press Up button and 'Tch' indicator starts blinking.
11) Wait until the reading stabilizes.
12) Press Up button again and 'Tch' indicators returns to ON. Full-scale point calibration is complete.

• Tare Adjustment

Tare input is available via the external contact input or by using Teach Calibration.
The input range (0% and 100% positions) defined with Input scaling values A/B shifts as shown in the example below when the tare input is applied.

[Example] Type S4 input: 0.0 – 30.0mV/V rating
         Input scaling value A: 100mV
         Input scaling value B: 200mV
         Tare input: 50mV
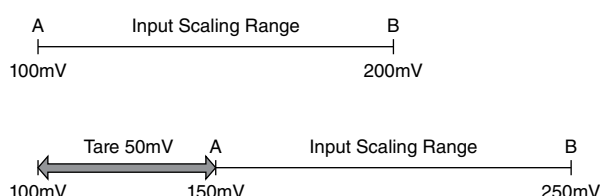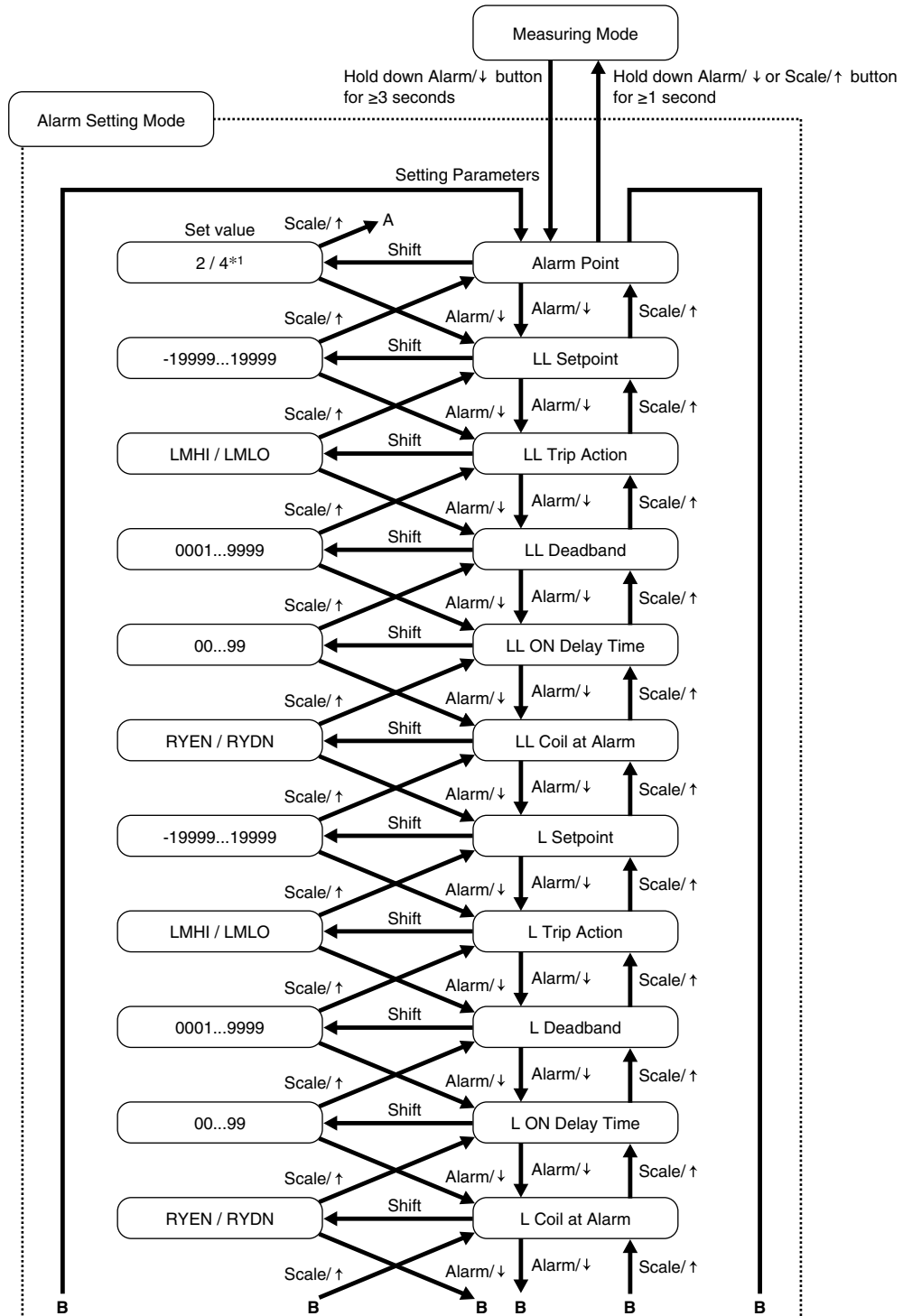
• Input Scaling Values A/B v.s. Tare Adjustment

Selectable ranges of Input Scaling Values A/B and Tare Adjustment depend upon the excitation voltage. Refer to the table below.
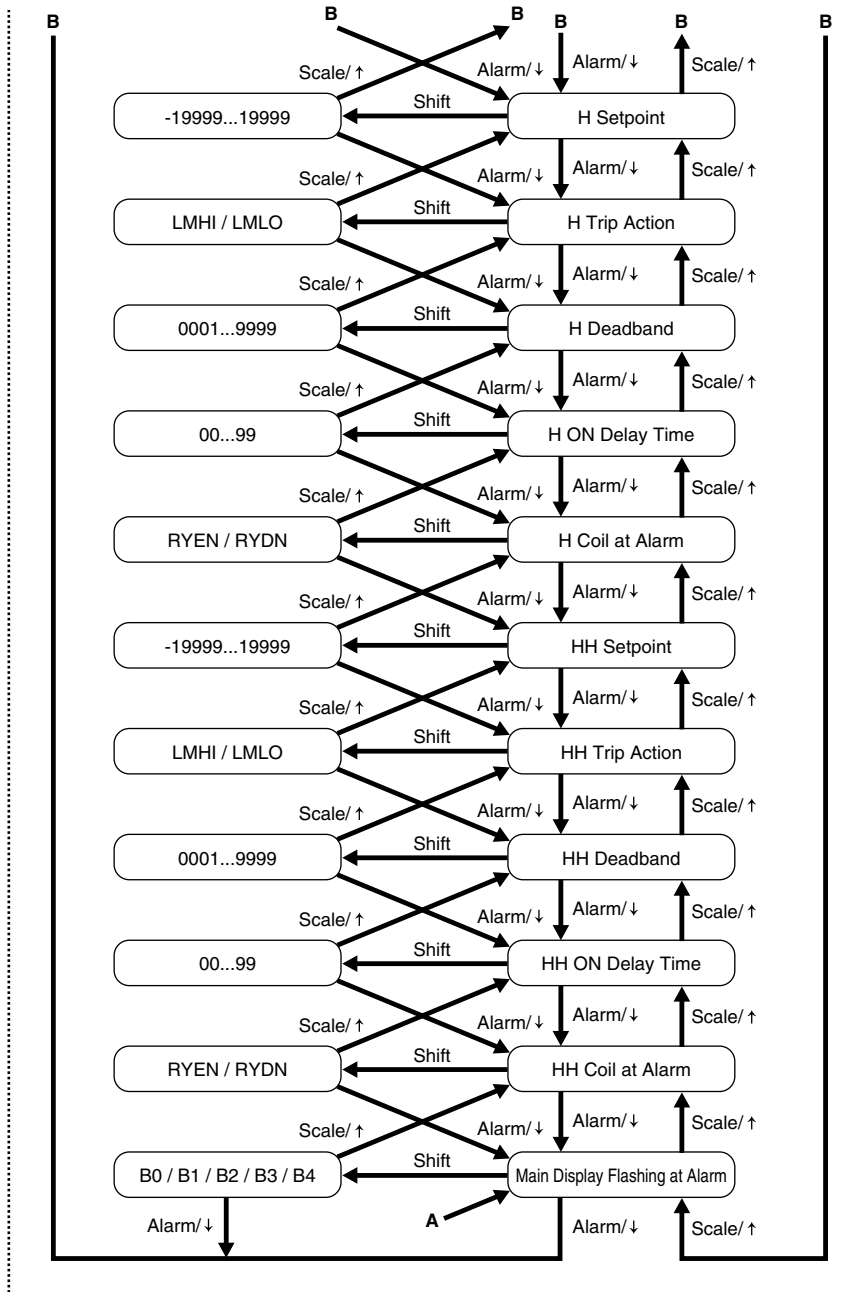
TYPE	STRAIN GAUGE	EXCITATION	SELECTABLE RANGES (mV)		
			INPUT SCALING VALUE A	INPUT SCALING VALUE B	TARE ADJ. (bias added to A)
S1	0 – 1mV/V	2.5V	-2.50 to 2.50	A + [0.25 to 2.50]	-2.00 to 2.00
		5V	-5.00 to 5.00	A + [0.50 to 5.00]	-4.00 to 4.00
		7.5V	-7.50 to 7.50	A + [0.75 to 7.50]	-6.00 to 6.00
		10V	-10.00 to 10.00	A + [1.00 to 10.00]	-8.00 to 8.00
S2	0 – 3mV/V	2.5V	-7.50 to 7.50	A + [0.75 to 7.50]	-6.00 to 6.00
		5V	-15.00 to 15.00	A + [1.50 to 15.00]	-12.00 to 12.00
		7.5V	-22.50 to 22.50	A + [2.25 to 22.50]	-18.00 to 18.00
		10V	-30.00 to 30.00	A + [3.00 to 30.00]	-24.00 to 24.00
S3	0 – 10mV/V	2.5V	-25.0 to 25.0	A + [2.5 to 25.0]	-20.0 to 20.0
		5V	-50.0 to 50.0	A + [5.0 to 50.0]	-40.0 to 40.0
		7.5V	-75.0 to 75.0	A + [7.5 to 75.0]	-60.0 to 60.0
		10V	-100.0 to 100.0	A + [10.0 to 100.0]	-80.0 to 80.0
S4	0 – 30mV/V	2.5V	-75.0 to 75.0	A + [7.5 to 75.0]	-60.0 to 60.0
		5V	-150.0 to 150.0	A + [15.0 to 150.0]	-120.0 to 120.0
		7.5V	-225.0 to 225.0	A + [22.5 to 225.0]	-180.0 to 180.0
		10V	-300.0 to 300.0	A + [30.0 to 300.0]	-240.0 to 240.0

The 47LLC will alert you by the following actions if you have selected conflicting values during setting:

• External tare command input: The main display shows 'S.ERR' (blinking). The previously-set value is recovered when the contact is turned off.
• Scaling and Teach Calibration setting is not available, "Min' and 'Max' are blinking.

■ **ALARM SETTING MODE**

B   B   B   B   B   B

Scale/↑   Alarm/↓   Alarm/↓   Scale/↑

| -19999...19999 | —Shift→ | H Setpoint |

Scale/↑   Alarm/↓   Alarm/↓   Scale/↑

| LMHI / LMLO | —Shift→ | H Trip Action |

Scale/↑   Alarm/↓   Alarm/↓   Scale/↑

| 0001...9999 | —Shift→ | H Deadband |

Scale/↑   Alarm/↓   Alarm/↓   Scale/↑

| 00...99 | —Shift→ | H ON Delay Time |

Scale/↑   Alarm/↓   Alarm/↓   Scale/↑

| RYEN / RYDN | —Shift→ | H Coil at Alarm |

Scale/↑   Alarm/↓   Alarm/↓   Scale/↑

| -19999...19999 | —Shift→ | HH Setpoint |

Scale/↑   Alarm/↓   Alarm/↓   Scale/↑

| LMHI / LMLO | —Shift→ | HH Trip Action |

Scale/↑   Alarm/↓   Alarm/↓   Scale/↑

| 0001...9999 | —Shift→ | HH Deadband |

Scale/↑   Alarm/↓   Alarm/↓   Scale/↑

| 00...99 | —Shift→ | HH ON Delay Time |

Scale/↑   Alarm/↓   Alarm/↓   Scale/↑

| RYEN / RYDN | —Shift→ | HH Coil at Alarm |

Scale/↑   Alarm/↓   Alarm/↓   Scale/↑

| B0 / B1 / B2 / B3 / B4 | —Shift→ | Main Display Flashing at Alarm |

Alarm/↓   A   Alarm/↓   Scale/↑

*1. Alarm point is fixed at "2" when the alarm model suffix code 2 is specified.

PARAMETER	INDICATORS	DISPLAY	FUNCTION	DEFAULT VALUE
Alarm points	[H] [L] [Fnc]	*ALm2*	Dual alarm: L, H	*ALm2*
	[HH] [H] [L] [LL] [Fnc]	*ALm4*	Quad alarm: LL, L, H, HH	*ALm4*
LL setpoint	[LL] [Fnc]	*-19999 ... 19999*	LL: Setpoint value	*2000*
LL trip action	[LL] [Fnc]	*LmHi*	LL: Hi trip	*LmLo*
		LmLo	LL: Lo trip	
LL deadband (hysteresis)	[P] [LL] [Fnc]	*0001 ... 9999*	LL: Deadband (hysteresis) value	*0010*
LL ON delay time	[LL] [D/P] [Fnc]	*00 ... 99*	LL: ON delay time (seconds)	*00*
LL coil at alarm	[LL] [Fnc]	*rYEn*	LL: Coil energized at alarm	*rYEn*
		rYdn	LL: Coil de-energized at alarm	
L setpoint	[L] [Fnc]	*-19999 ... 19999*	L: Setpoint value	*4000*
L trip action	[L] [Fnc]	*LmHi*	L: Hi trip	*LmLo*
		LmLo	L: Lo trip	
L deadband (hysteresis)	[P] [L] [Fnc]	*0001 ... 9999*	L: Deadband (hysteresis) value	*0010*
L ON delay time	[L] [D/P] [Fnc]	*00 ... 99*	L: ON delay time (seconds)	*00*
L coil at alarm	[L] [Fnc]	*rYEn*	L: Coil energized at alarm	*rYEn*
		rYdn	L: Coil de-energized at alarm	
H setpoint	[H] [Fnc]	*-19999 ... 19999*	H: Setpoint value	*6000*
H trip action	[H] [Fnc]	*LmHi*	H: Hi trip	*LmHi*
		LmLo	H: Lo trip	
H deadband (hysteresis)	[P] [H] [Fnc]	*0001 ... 9999*	H: Deadband (hysteresis) value	*0010*
H ON delay time	[H] [D/P] [Fnc]	*00 ... 99*	H: ON delay time (seconds)	*00*
H coil at alarm	[H] [Fnc]	*rYEn*	H: Coil energized at alarm	*rYEn*
		rYdn	H: Coil de-energized at alarm	
HH setpoint	[HH] [Fnc]	*-19999 ... 19999*	HH: Setpoint value	*8000*
HH trip action	[HH] [Fnc]	*LmHi*	HH: Hi trip	*LmHi*
		LmLo	HH: Lo trip	
HH deadband (hysteresis)	[P] [HH] [Fnc]	*0001 ... 9999*	HH: Deadband (hysteresis) value	*0010*
HH ON delay time	[HH] [D/P] [Fnc]	*00 ... 99*	HH: ON delay time (seconds)	*00*
HH coil at alarm	[HH] [Fnc]	*rYEn*	HH: Coil energized at alarm	*rYEn*
		rYdn	HH: Coil de-energized at alarm	
Main display blinking at alarm	[Fnc]	*b 0*	No blinking	*b 0*
		b 1	Blinking in 1.0 sec. intervals	
		b 2	Blinking in 0.5 sec. intervals	
		b 3	Blinking in 0.2 sec. intervals	
		b 4	Blinking in 0.1 sec. intervals	

Note 1: Alarm Setting Mode is locked with no-alarm-output type.
　　　　Alarm points depend upon the model suffix code. LL and HH setpoints are usable only for quad alarm type.
Note 2: LED status: ☐ = ON, ⬚ = Blinking
Note 3: Specify setpoint and deadband in the scaled range values. Alarm is disabled when ' − − − − ' is specified for the setpoint.
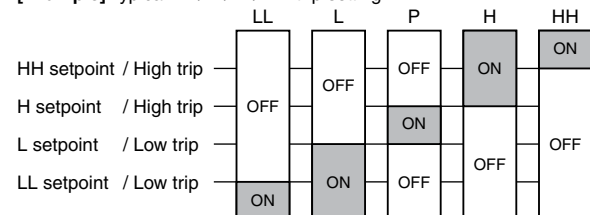Note 4: Decimal point is not indicated when setting deadband values.
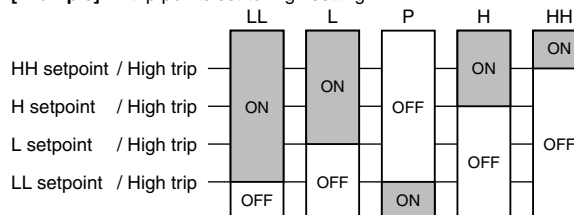
• Alarm output pattern
Alarm trips according to the setpoint and the trip action (direction) setting.
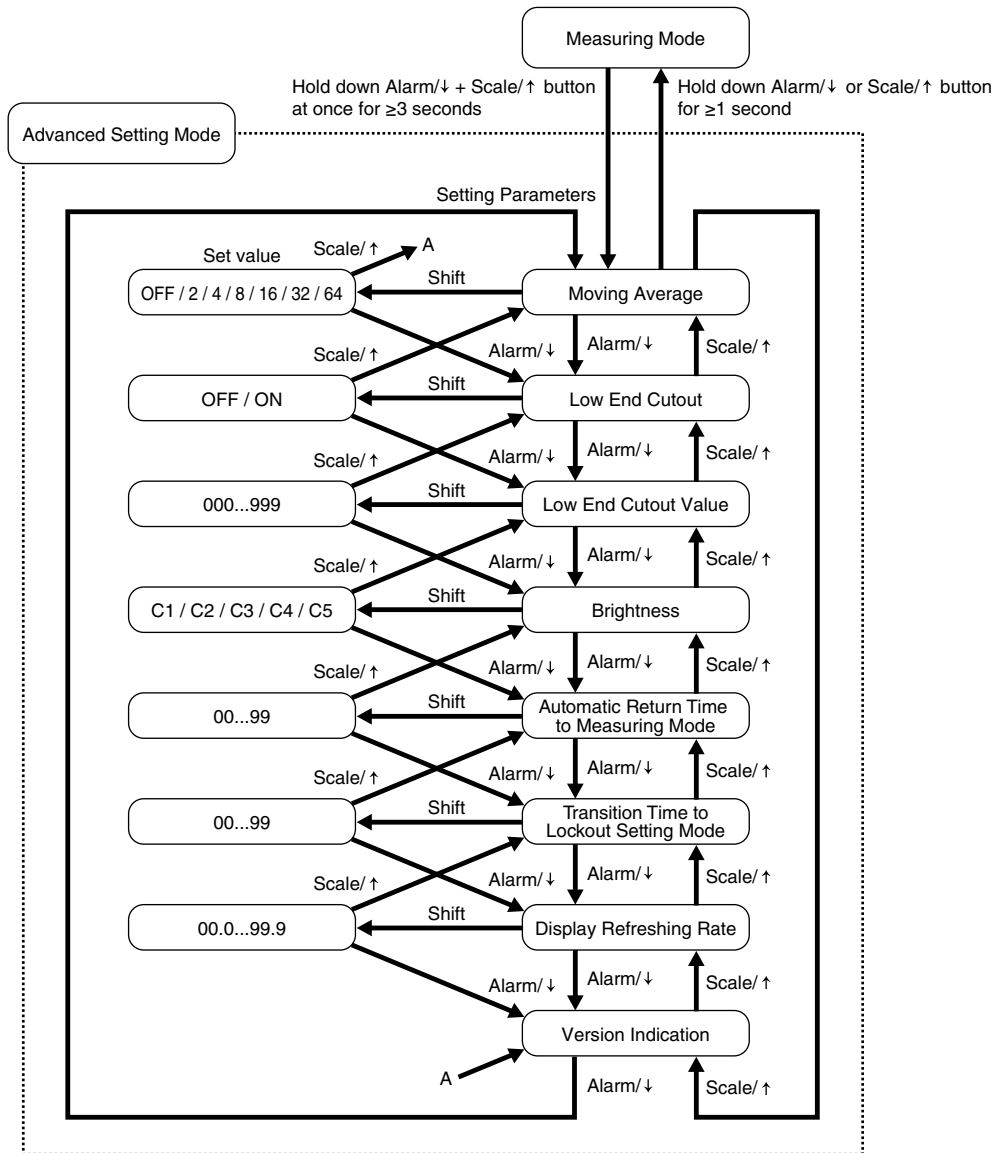P indicator turns on when all other alarm indicators are off.

[Example] Typical LL / L / H / HH trip setting

	LL	L	P	H	HH
HH setpoint / High trip	OFF	OFF	OFF / ON	ON	ON
H setpoint / High trip					
L setpoint / Low trip		ON	ON	OFF	OFF
LL setpoint / Low trip	ON		OFF		

[Example] All trip points set to High setting

	LL	L	P	H	HH
HH setpoint / High trip	ON	ON	OFF	ON	ON
H setpoint / High trip					
L setpoint / High trip		OFF	ON	OFF	OFF
LL setpoint / High trip	OFF				

■ ADVANCED SETTING MODE

Measuring Mode

Hold down Alarm/↓ + Scale/↑ button
at once for ≥3 seconds

Hold down Alarm/↓ or Scale/↑ button
for ≥1 second

Advanced Setting Mode

Setting Parameters

| Set value | Scale/↑ → A | | |
| OFF / 2 / 4 / 8 / 16 / 32 / 64 | Shift | Moving Average | |

| | Scale/↑ | Alarm/↓ | Alarm/↓ | Scale/↑ |
| OFF / ON | Shift | Low End Cutout | |

| | Scale/↑ | Alarm/↓ | Alarm/↓ | Scale/↑ |
| 000...999 | Shift | Low End Cutout Value | |

| | Scale/↑ | Alarm/↓ | Alarm/↓ | Scale/↑ |
| C1 / C2 / C3 / C4 / C5 | Shift | Brightness | |

| | Scale/↑ | Alarm/↓ | Alarm/↓ | Scale/↑ |
| 00...99 | Shift | Automatic Return Time to Measuring Mode | |

| | Scale/↑ | Alarm/↓ | Alarm/↓ | Scale/↑ |
| 00...99 | Shift | Transition Time to Lockout Setting Mode | |

| | Scale/↑ | Alarm/↓ | Alarm/↓ | Scale/↑ |
| 00.0...99.9 | Shift | Display Refreshing Rate | |

| | Alarm/↓ | Alarm/↓ | Scale/↑ |
| | | Version Indication | |

A

Alarm/↓   Scale/↑

PARAMETER	INDICATORS	DISPLAY	FUNCTION	DEFAULT VALUE
Moving average	Fnc	*RoFF*	No moving averaging	*RoFF*
		R 2	Moving average with 2 samples	
		R 4	Moving average with 4 samples	
		R 8	Moving average with 8 samples	
		R 16	Moving average with 16 samples	
		R 32	Moving average with 32 samples	
		R 64	Moving average with 64 samples	
Low-end cutout	Fnc	*EoFF*	Low-end cutout OFF	*EoFF*
		E on	Low-end cutout ON	
Low-end cutout value	Zro Fnc	*E000 ... E999*	Low-end cutout value setting	-
Brightness	D/P Fnc	*C 1*	Brightness level 1 (dark)	*C 3*
		C 2	Brightness level 2	
		C 3	Brightness level 3	
		C 4	Brightness level 4	
		C 5	Brightness level 5 (bright)	
Automatic return time to Measuring Mode	D/P Fnc	*r 00 ... r 99*	Specify in seconds	*r 15*
Transition time to Lockout Setting Mode	D/P Fnc	*P 00 ... P 99*	Specify in seconds	*P 05*
Display refreshing rate [*1]	Fnc	*F00.0 ... F99.9*	Specify in seconds	*F00.0*
Version indication	Fnc	N/A	Version number, indication only	N/A

Low-end cutout: Input signal below the preset cutout value is forcibly cut to 0.
Set for the three lowest digits of the scaled range (disregarding the decimal point)
With the cutout set to OFF, the low-end cutout value setting is locked.

Automatic return time to Measuring Mode: The display goes back automatically to Measuring Mode if the front buttons are left untouched for the specified time period while it is in one of the setting modes (except the loop test output mode).
With this value set to 0, the display must always be exited manually from the setting mode.

Transition time to Lockout Setting Mode: The display goes to Lockout Setting Mode only when the designated buttons are pressed for the specified time duration.

[*1]. F00.0 = 25 msec. refreshing rate

■ LOCKOUT SETTING MODE
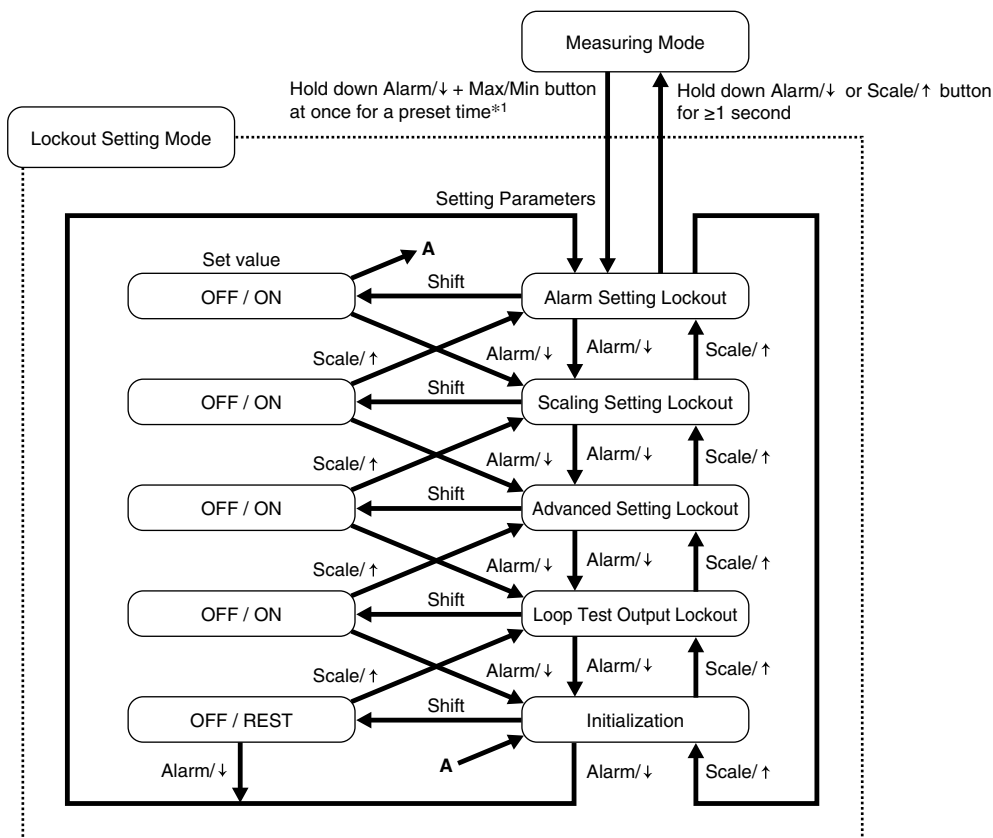
*1. Preset time can be specified with "Transition Time to Lockout Setting Mode" in Advanced Setting Mode.

PARAMETER	INDICATORS	DISPLAY	FUNCTION	DEFAULT VALUE
Alarm setting lockout	D/P Fnc	$RoFF$	Unlock Alarm Setting Mode	$RoFF$
		$R\ on$	Lock Alarm Setting Mode	
Scaling setting lockout	D/P Fnc	$SoFF$	Unlock Scaling Setting Mode	$SoFF$
		$S\ on$	Lock Alarm Setting Mode	
Advanced setting lockout	D/P Fnc	$doFF$	Unlock Advance Setting Mode	$doFF$
		$d\ on$	Lock Advanced Setting Mode	
Loop test output lockout	D/P Fnc	$toFF$	Unlock Loop Test Output Mode	$toFF$
		$t\ on$	Lock Loop Test Output Mode	
Initialization	D/P Fnc	$roFF$	Initialization prohibited	$roFF$
		$rESt$	Execute Initialization*	

*Activating "initialization" of Lockout Setting Mode, Ex-factory settings (/SET) or user's specified parameters will be deleted and overwritten with the factory default values. Notice that after this, Ex-factory settings with will be irrecoverable.

■ **LOOP TEST OUTPUT MODE**
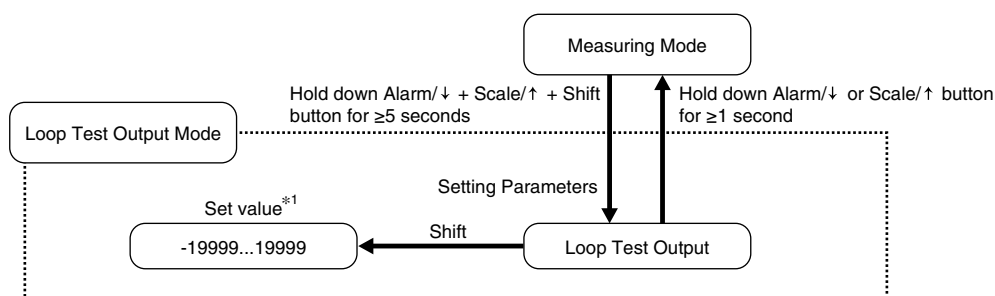
*1. Hold down Alarm/↓ or Scale/↑ button for ≥1 second to return to the measuring mode while setting parameters.

PARAMETER	INDICATORS	DISPLAY	FUNCTION	DEFAULT VALUE
Loop test output	Zro Spn D/P Tch Fnc Min / Max	- *19999* ... *19999*[1] (display blinking)	Scaling value for the loop test output	N/A

Loopt test output: Pressing [Shift] button switches the signal to increase (Max ON) or decrease (Min ON), and then pressing [Up] button controls it toward the desired output value.
Loop test value is paralel to scaling value. Alarm trip functions according to the loop test output value.
Loop test output mode is locked with the no-output type (no DC output, no alarm).
*1. The specified decimal point position is applied to the loop test output value. -19999 to 19999 when 'No decimal fraction' is specified.

ERROR MESSAGES

MAIN DISPLAY	ERROR MESSAGE	WHAT TO DO
5.Err	Input error, Out of the measuring range	Increase/decrease the input signal until it is back within the measuring range.
1.Err	Non-volatile memory error (reading)	While the error message is on the display, press Up button for 3 seconds or more, go to the lockout setting mode and initialize the unit to its factory default status.*1
4.Err	Non-volatile memory error (writing)	

*1. If the unit does not recover its function after the initialization, repairing in the factory may be required.

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