Digital Panel Meters 47 Series

STRAIN GAUGE INPUT DIGITAL PANEL METER

(4 1/2 digit, LED display type)

Model: 47LLC

OPERATING MANUAL

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

CONTENTS

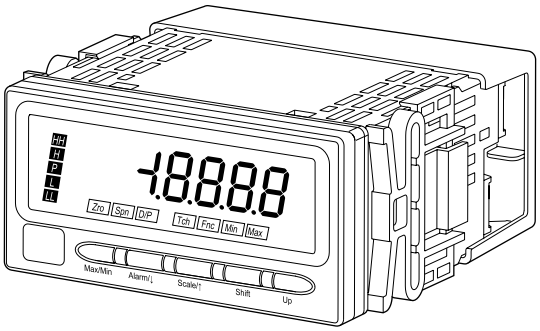
1. INTRODUCTION

1.1 BEFORE USE....

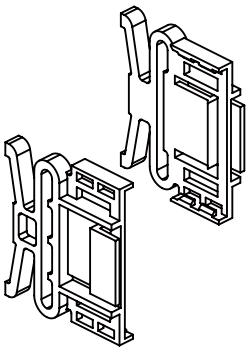
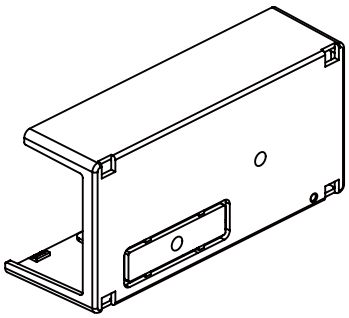
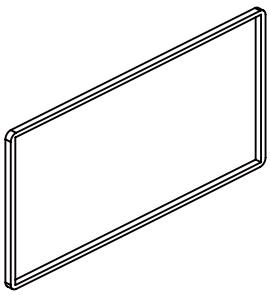
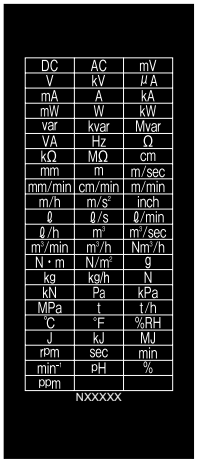
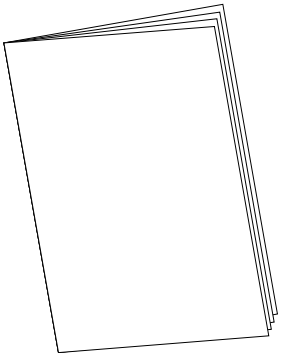
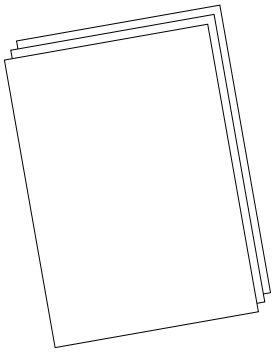
Thank you for choosing us. Before use, please check contents of the package you received as outlined below.

■ PACKAGE INCLUDES

Digital panel meter



Accessories

Mounting bracket (2) 	Terminal cover (1)  (tethered to the meter with a strap)	Watertight packing (1) 
Engineering unit sticker label sheet (1) 	Instruction manual 	Ordering Information Sheet  (included with the option code '/SET' only)

DC	AC	mV
V	kV	μA
mA	A	kA
mW	W	kW
var	kvar	Mvar
VA	Hz	Ω
kΩ	MΩ	cm
mm	m	m/sec
mm/min	cm/min	m/min
m/h	m/s²	inch
ℓ	ℓ/s	ℓ/min
ℓ/h	m³	m³/sec
m³/min	m³/h	Nm³/h
N・m	N/m²	g
kg	kg/h	N
kN	Pa	kPa
MPa	t	t/h
°C	°F	%RH
J	kJ	MJ
rPm	sec	min
min⁻¹	pH	%
ppm		

NXXXXX

■ 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


CAUTION

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.


CAUTION
ELECTRIC SHOCK

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


MANDATORY
CAUTION

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


MANDATORY
CAUTION

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.


PROHIBITION
TO BE WET

Do not splash water on the unit except for the front panel installed correctly.
- Doing so may result in a fire, electric shock or injury.


MANDATORY
CAUTION

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


MANDATORY
CAUTION

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

MANDATORY CAUTION

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

PROHIBITION

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

⚠ CAUTION

PROHIBITION TO DISCOMPOSE

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

PROHIBITION

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

MANDATORY CAUTION

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

MANDATORY CAUTION

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

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

■ ENVIRONMENT

Install the unit within the installation specifications.

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

■ WIRING

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

■ HANDLING CAUTIONS

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

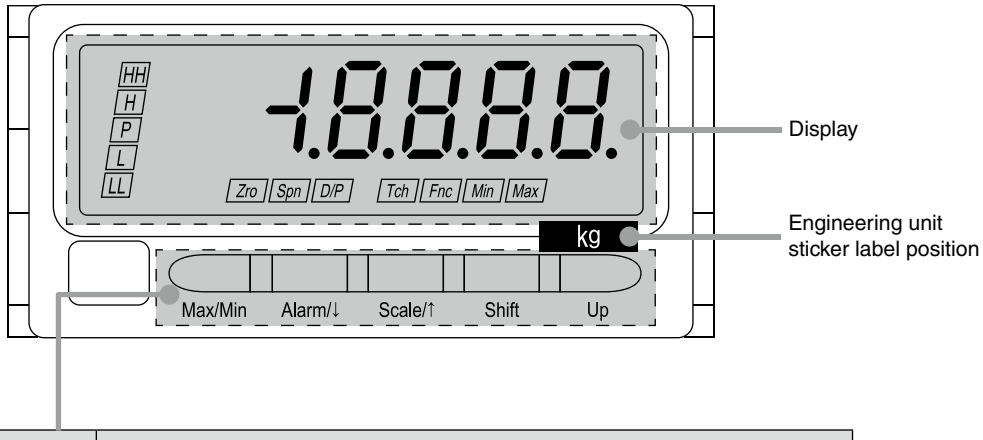
■ TO ENSURE DUSTPROOF AND WATERPROOF (degree of protection IP66)

To ensure dustproof and waterproof for front panel follow conditions below.

- Observe the designated panel cutout size (W92 × H45 mm) specified by us.
- The watertight packing included in the product package must be placed between the body and panel when installing on the panel.
- Insert the unit into the panel cutout, and fasten both mounting brackets tightly until they hit the panel.
- After installation, confirm that there are no following abnormalities.
  - The packing is contorted.
  - There are some spaces between front panel and panel.
  - The packing is run off the edge.
  - The packing is cut off.
  - There are foreign objects sticking.

1.4 COMPONENT IDENTIFICATION

■ FRONT VIEW



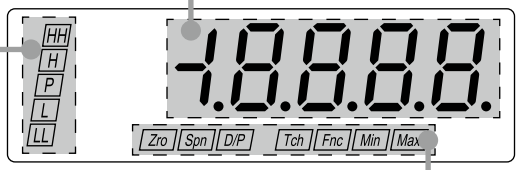
BUTTON	FUNCTION
Max/Min	Used to switch the main display to show the present value, MAX value or MIN value, and to reset the MAX and MIN values. Also used to cancel a set item.
Alarm/↓	Used to confirm the alarm setpoints, to move on to the alarm and other setting modes, or to shift through setting items in each setting mode.
Scale/↑	Used to move on to the scaling and other setting modes, or to shift through setting items in each setting mode.
Shift	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.

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.

■ **DISPLAY**

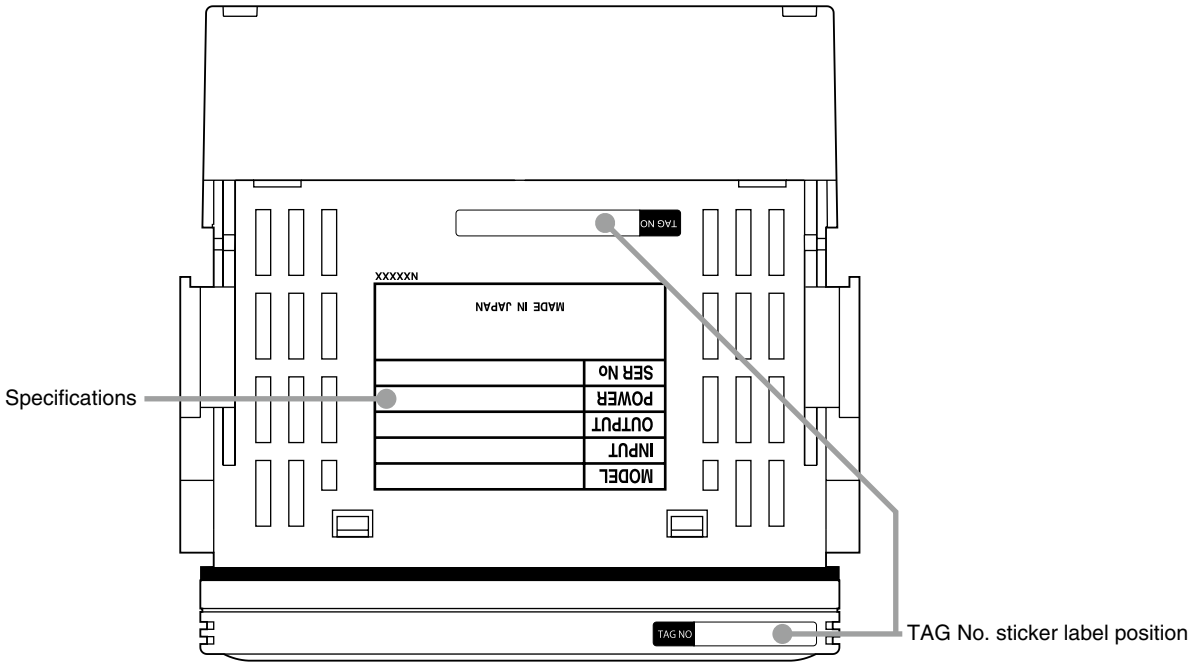
COMPONENT	FUNCTION
Main display	Indicates present, MAX and MIN values, parameters, setting values and error codes.



INDICATOR	MODE	FUNCTION
Alarm	Setting	Indicates parameters in Alarm Setting Mode. (Refer to 11. SETTING ALARM OUTPUT.)
	Confirming alarm setpoints	'HH', 'H', 'L' or 'LL' indicator blinks in confirming each alarm setpoint. (Refer to 18.1 CONFIRMING ALARM SETPOINTS.)
	Measuring	Indicates the comparison result between alarm setting values and present values. 'HH' indicator turns on when the HH alarm is tripped. 'H' indicator turns on when the H alarm is tripped. 'L' indicator turns on when the L alarm is tripped. 'LL' indicator turns on when the LL alarm is tripped. 'P' indicator turns on when none of the other alarms is tripped.

INDICATOR	MODE	FUNCTION
Function	Setting	Indicates parameters in each mode. 'Zro', 'Spn', 'D/P', 'Tch', 'Fnc', 'Min' and 'Max' indicators turn on in combination depending on the parameters.
		Teach Calibration 'Zro', 'Spn', or 'Zro' & 'Fnc' indicator(s) turn(s) on and 'Tch' indicator blinks. (Refer to 6. SETTING SCALING VALUES WITH ACTUAL LOAD and 7.2 TARE ADJUSTMENT VIA BUTTON CONTROL.)
		'Max' and 'Min' indicators blink when a parameter is within invalid range while setting.
	Measuring	Indicates MAX or MIN value. 'Max' or 'Min' indicator turns on. (Refer to 18.2 RETAINING MAX AND MIN VALUES.)

■ **TOP VIEW**

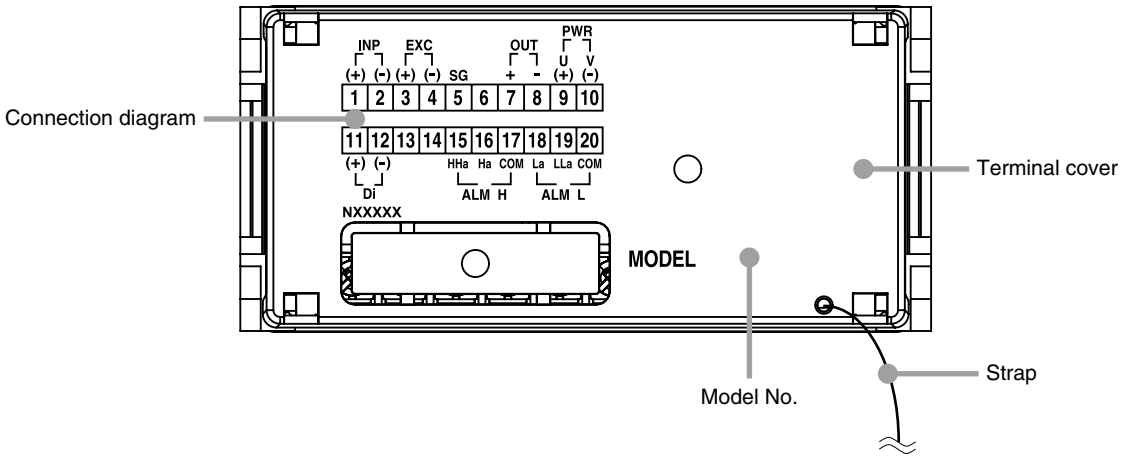


NOTE

- 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.

■ **REAR VIEW**

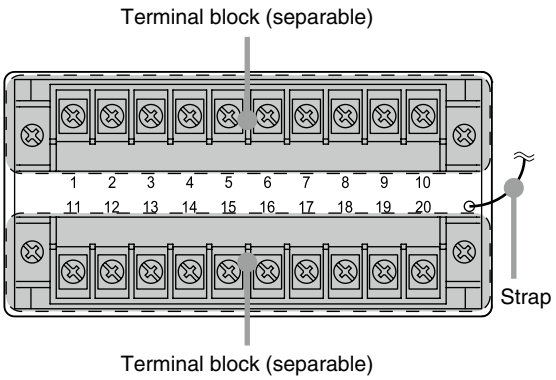
• With Terminal Cover



NOTE

- The connection diagram depends on the specifications.
- The MODEL shows the same as that in the specification label on the top of the unit.

• Without Terminal Cover

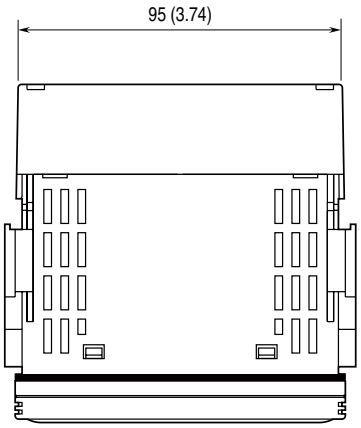


1.5 INSTALLATION

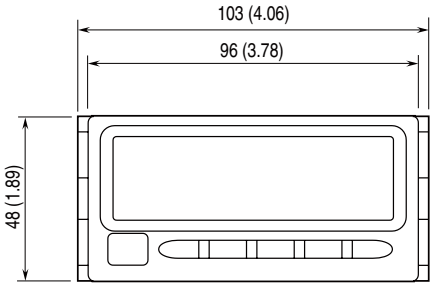
1.5.1 EXTERNAL DIMENSIONS

unit: mm (inch)

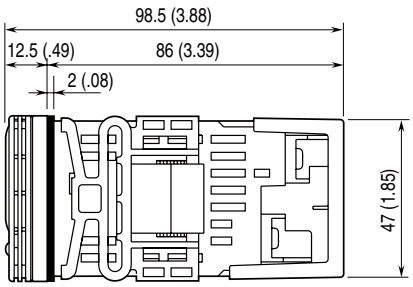
■ **TOP VIEW**



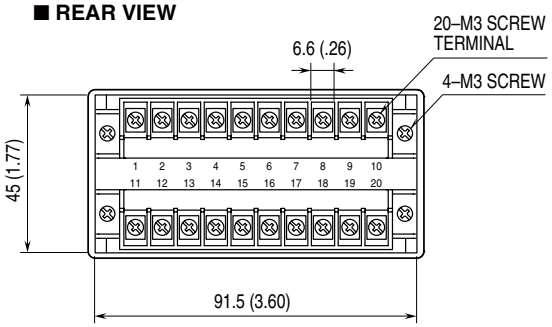
■ **FRONT VIEW**



■ **SIDE VIEW**

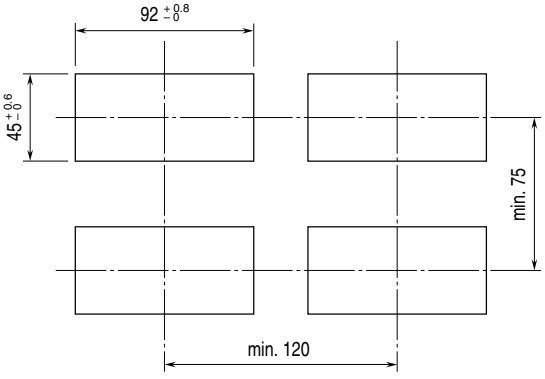


■ **REAR VIEW**



1.5.2 PANEL CUTOUT DIMENSIONS

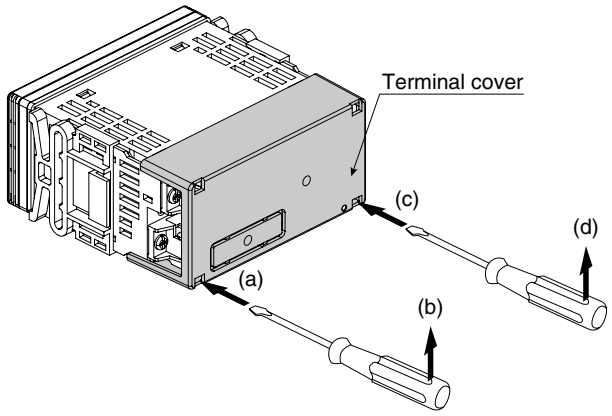
unit: mm



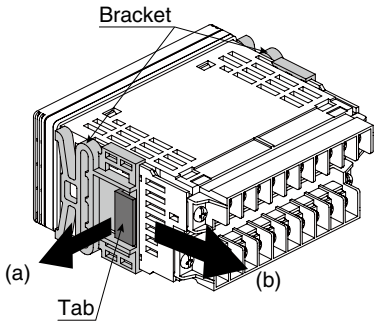
Panel thickness: 1.6 to 8.0 mm

1.5.3 INSTALLATION

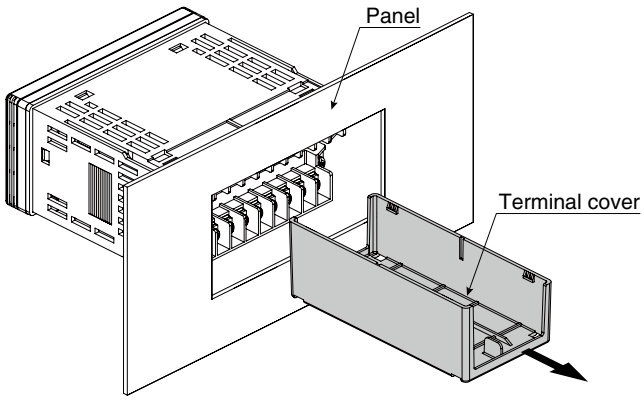
(1) Remove the terminal cover.
  (a) Insert the minus tip of a screwdriver into a hole at the lower left corner of the cover.
  (b) Pull the handle upward.
  (c) Then insert the screwdriver into a hole at the lower right corner.
  (d) Pull the handle upward to separate the terminal cover.



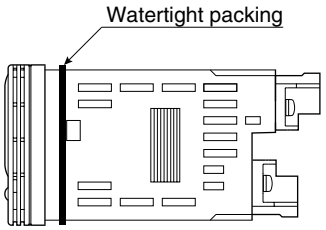
(2) Remove the mounting brackets.
  (a) Flip a tab of a bracket.
  (b) Then pull the bracket toward the terminal block to remove it.



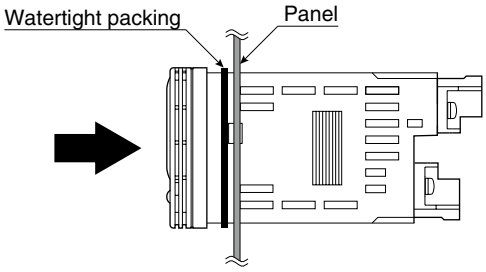
(3) Put the terminal cover through the panel cutout.



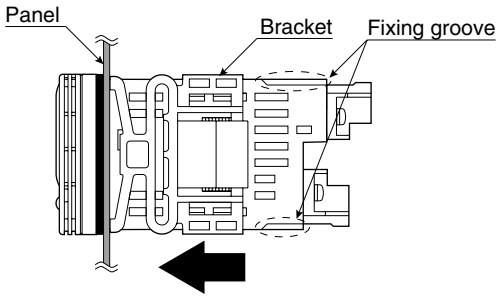
(4) Make sure that the watertight packing is placed behind the front cover regardless of necessity of water-tightness.



(5) Insert the unit into the panel cutout.



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



IMPORTANT

To conform to degree of protection IP66, confirm visually that the packing is not contorted, cut off or excessively run off the edge after installation.

1.6 WIRING INSTRUCTIONS

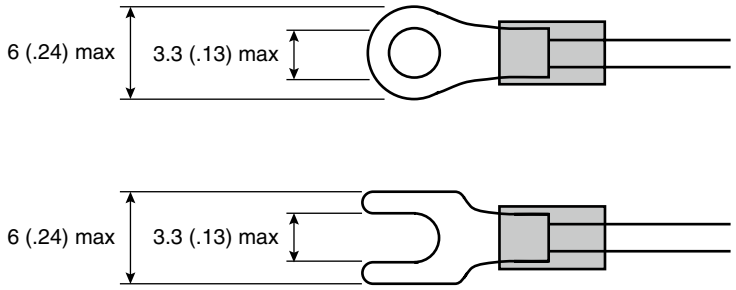
1.6.1 CAUTION IN WIRING

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

1.6.2 RECOMMENDED SOLDERLESS TERMINAL

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

unit: mm (inch)

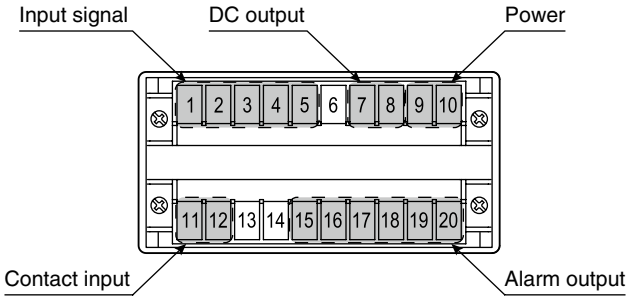


Applicable wire size: 0.25 to 1.65 mm^2
Torque: 0.6 N·m
Recommended manufacturer: Japan Solderless Terminal MFG. Co., Ltd., Nichifu Co., Ltd.

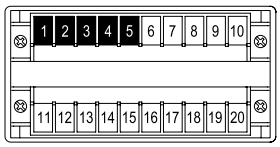
IMPORTANT

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

1.6.3 TERMINAL ASSIGNMENT



1.6.4 WIRING INPUT SIGNAL

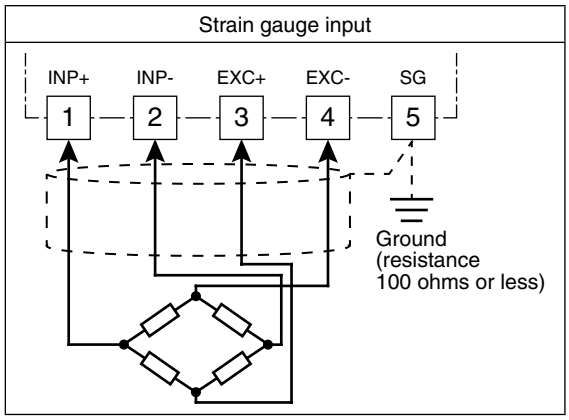


Connect (a) strain gauge(s) to measure.

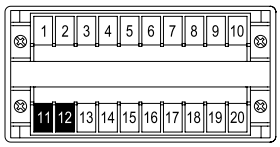
Excitation	2.5 V, 5 V, 7.5 V or 10 V
Maximum current	120 mA
Load resistance	≥ 85 Ω

IMPORTANT

- For 4-wire strain gauges. The 47LLC does not have a remote sensing function.
- Be sure to confirm the polarity of the input and excitation voltage in wiring.
- Use excitation voltage of the unit to apply to a strain gauge.
- Using recommended excitation voltage or lower voltage is recommended.
- Maximum 4 strain gauges with output resistance 350 Ω are connectable.
- Do not connect other devices to a strain gauge.
- The input signal is a minute voltage. Connect a shielded wire to the terminal SG and ground. Ground the input shield to the most stable earth to prevent noise troubles.
- Do not connect anything to unused terminals.



1.6.5 WIRING CONTACT INPUT

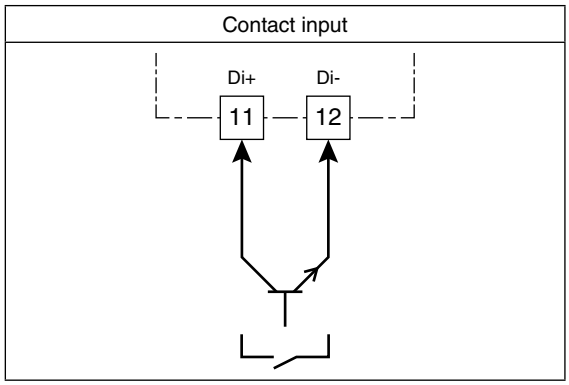


Connect a contact input for tare command.

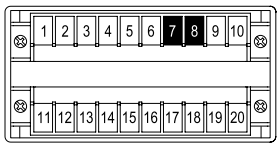
Detecting voltage	5 V
Saturation voltage	≤ 1V
Sink current	0.5 mA

IMPORTANT

- TTL level (5V-CMOS level), open collector or dry contact is connectable.
- Make sure that the saturation voltage (residual voltage) meets the detecting levels of the unit. Otherwise the tare command is disabled.
- Be sure to confirm the input polarity in wiring.
- Do not connect anything to unused terminals.



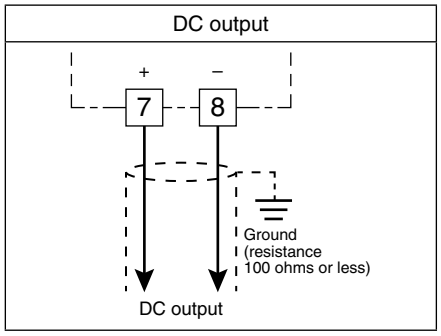
1.6.6 WIRING DC OUTPUT



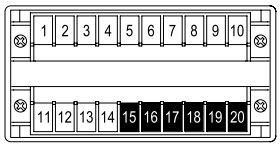
Voltage or current is output depending on the specified DC output code.

IMPORTANT

- Connect load resistance within the specifications.
- Do not connect anything with no-DC-output type.
- Take measures to reduce noise as much as possible, e.g. by using shielded twisted pair wires for the output signal. Ground the output shield to the most stable earth to prevent noise troubles.



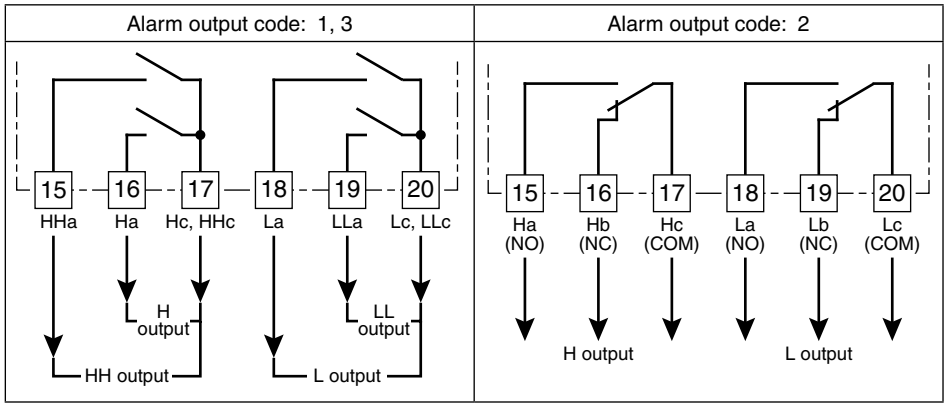
1.6.7 WIRING ALARM OUTPUT



Two or four alarm contacts are output depending on the specified alarm output code.
For four alarm contacts, photo MOSFET relays without mechanical life time are connectable.

IMPORTANT

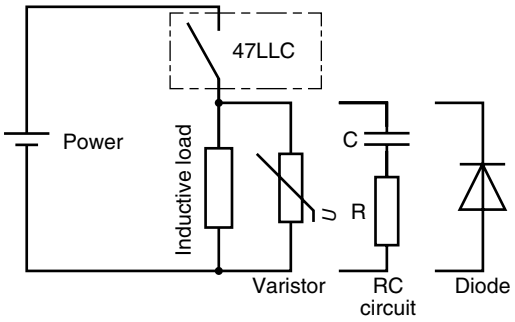
- Connect load within the specifications.
- The mechanical lifetime of the relays is 5,000,000 operations.
- With inductive load such as an external relay or a motor, insert a CR circuit (for AC or DC power), a diode (for DC power), or a varistor (for AC or DC power) in parallel to protect the contacts and eliminate noise.



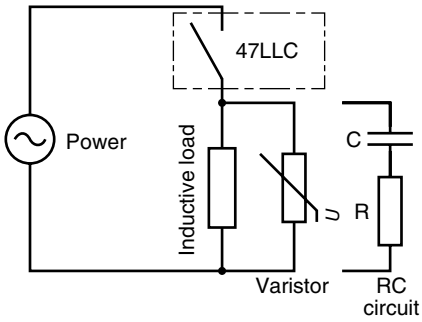
NOTE

Example of contact protection circuit with inductive load

■ **DC powered**

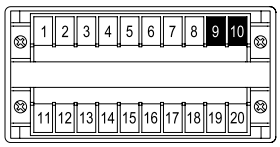


■ **AC powered**



* It is effective to connect a varistor across a load with the supply voltage 24 to 28 V, and across a contact with 100 to 200 V.

1.6.8 WIRING POWER

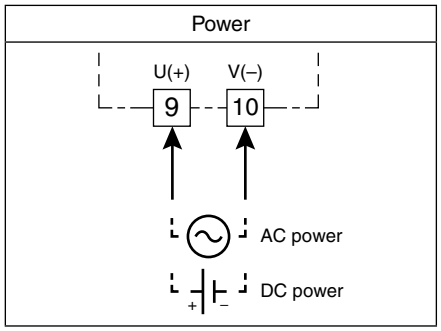


Connect power according to the power input code. The power specifications are shown in the following table.

CODE	RATING	PERMISSIBLE RANGE
M2	100 to 240 V AC	85 to 264 V AC, 50/60 Hz approx. 9 to 13 VA
R	24 V DC	±10% approx. 5 W
P	110 V DC	85 to 150 V DC approx. 5 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.
- For DC power, confirm the polarity.



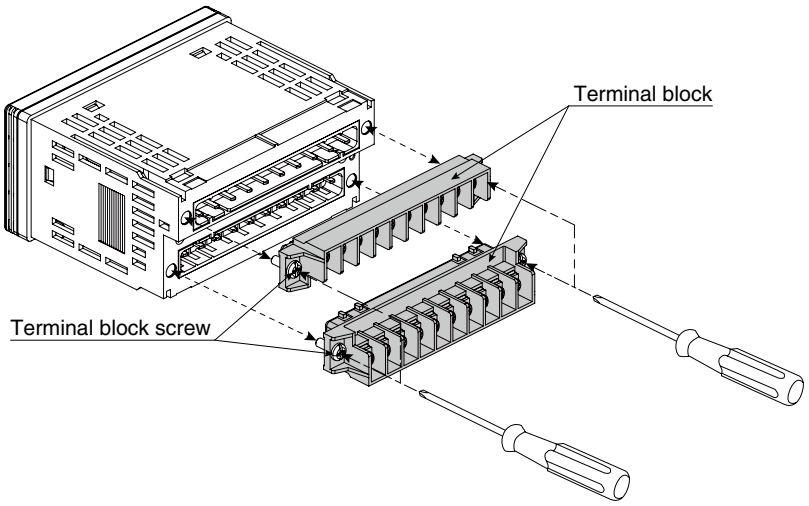
1.6.9 INSTALLING/SEPARATING TERMINAL BLOCK

The terminal block is separable in two pieces. Tighten (loosen) uniformly two screws on both sides of the terminal block to install (separate).

Torque: 0.6 N·m

IMPORTANT

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

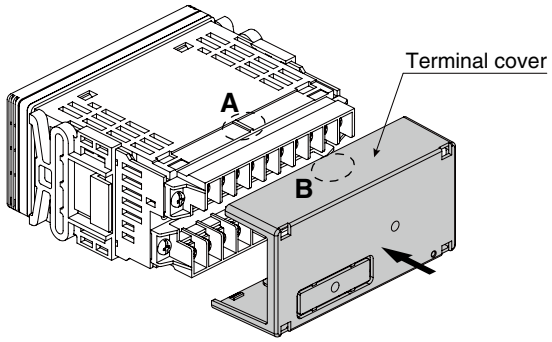


1.6.10 ATTACHING/REMOVING TERMINAL COVER

Be sure to put the terminal cover on for safety after wiring.

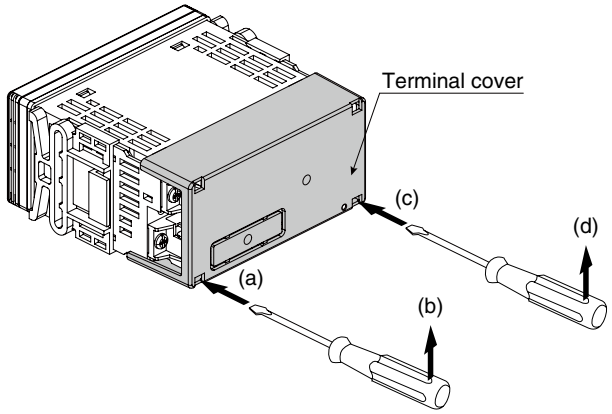
■ ATTACHING TERMINAL COVER

Fit the convex part A of the meter in the concave part B of the terminal cover and push the cover until it clicks into place.



■ **REMOVING TERMINAL COVER**

(a) Insert the minus tip of a screwdriver into a hole at the lower left corner of the cover.
(b) Pull the handle upward.
(c) Then insert the screwdriver into a hole at the lower right corner.
(d) Pull the handle upward to separate the terminal cover.



2. BASIC SETTING AND OPERATION

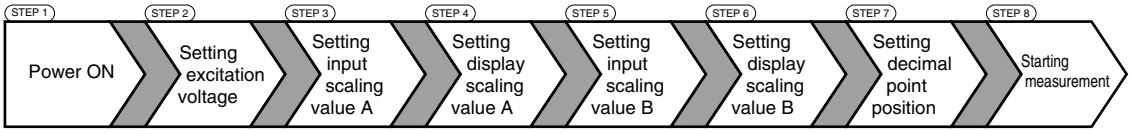
2.1 BASIC SETTING

This section describes flow and procedure of the basic setting.
The following shows the flow and procedure to set the display to 0.0 – 300.0 kg using a strain gauge with rated load 300 kg, rated output 2 mV/V and recommended excitation voltage 5 V as an example.

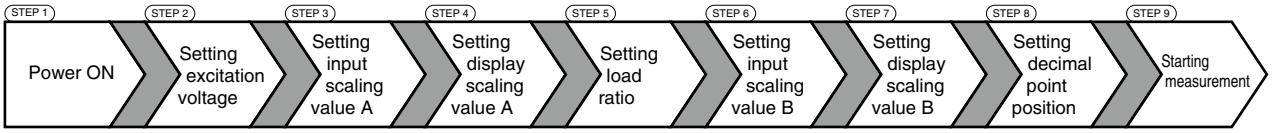
2.1.1 BASIC SETTING FLOW

The basic setting includes "setting scaling values with parameters" and "setting scaling values with actual load". Each setting is as shown in the following flowcharts.

■ SETTING SCALING VALUES WITH PARAMETERS



■ SETTING SCALING VALUES WITH ACTUAL LOAD



* Use the Teach Calibration function to set the input scaling values A and B.

2.1.2 INPUT SCALING

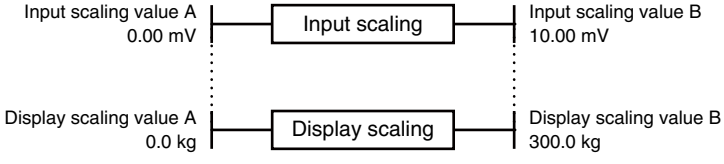
To set the input scaling, it is necessary to calculate output voltage from a strain gauge. In the above setting example, when the rated load is applied with excitation voltage 1 V, the output voltage is 2 mV.

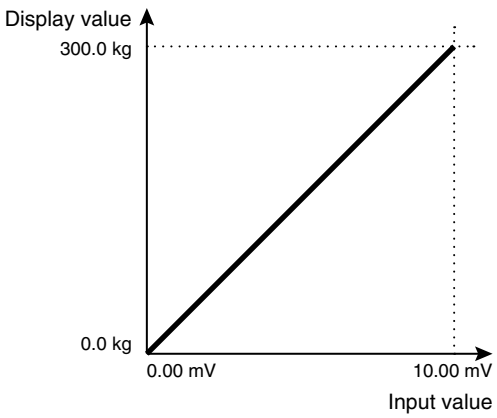
With excitation voltage 5 V,
Strain gauge output voltage = rated output × excitation voltage
2 mV/V × 5 V = 10 mV

The output voltage is 0 mV without any load. Therefore the output range from the strain gauge is 0 – 10 mV DC.
Set the input scaling as shown below.
Input scaling value A: 0.00 mV
Input scaling value B: 10.00 mV

2.1.3 RELATION BETWEEN INPUT SCALING AND DISPLAY SCALING

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





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

2.1.4 BASIC SETTING PROCEDURE TO SET SCALING VALUES WITH PARAMETERS

The following shows the procedure to set the input to 0 – 10 mV DC and the display to 0.0 – 300.0 kg using a strain gauge with the rated load 300 kg, rated output 2 mV/V and recommended excitation voltage 5 V as an example. Set values meeting signals of equipment to use. Refer to 4. SETTING EXCITATION VOLTAGE for details of setting. Adjust tare as necessary. Refer to 7. ADJUSTING TARE for details.

■ PARAMETER LIST FOR BASIC SETTING

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

PARAMETER	SETTING VALUE	FUNCTION INDICATOR	SETTING
Excitation voltage	5.0V	Fnc	5 V
Input scaling value A	00.00	Zro, Tch	0% input: 0.00 mV
Display scaling value A	0000*1	Zro, D/P	0% display: 0.0 kg
Input scaling value B	10.00	Spn, Tch	100% input: 10.00 mV
Display scaling value B	3000*1	Spn, D/P	100% display: 300.0 kg
Decimal point position	300.0	D/P	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 Scale/↑ button for 3 seconds or more.

2 **Set excitation voltage.**

- Press Alarm/↓ or Scale/↑ button to go to the next or previous parameter setting.
- Press Shift button to shift the display into the setting standby mode and Up button to select the excitation voltage.

3 **Set scaling values in the order of input scaling value A, display scaling value A, input scaling value B and display scaling value B.**

- Press Alarm/↓ or Scale/↑ button to apply the new setting and go to the next or previous parameter setting.
- Press Shift button to shift the display into the setting standby mode.
- Press Shift button to go to the next digit and Up button to change the blinking value.

4 **Set decimal point position.**

- Press Alarm/↓ or Scale/↑ button to apply the new setting and go to the next or previous parameter setting.
- Press Shift button to shift the display into the setting standby mode and Up button to select the decimal point position.

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

- Hold down Alarm/↓ or Scale/↑ button for 1 second or more to apply the new setting and return to Measuring Mode.

2.1.5 BASIC SETTING PROCEDURE TO SET SCALING VALUES WITH ACTUAL LOAD

The following shows the procedure to set the input to 0 – 10 mV DC and the display to 0.0 – 300.0 kg using a strain gauge with the rated output 2 mV/V, recommended excitation voltage 5 V, and a weight 30 kg, 10% of the rated load 300 kg as an example. Set values meeting signals of equipment to use. Refer to 4. SETTING EXCITATION VOLTAGE for details of setting. Adjust tare as necessary. Refer to 7. ADJUSTING TARE for details.

■ PARAMETER LIST FOR BASIC SETTING

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

PARAMETER	SETTING VALUE	FUNCTION INDICATOR	SETTING
Excitation voltage	5.0V	Fnc	5 V
Input scaling value A	00.00	Zro, Tch	0% input: 0.00 mV*1
Display scaling value A	0000*2	Zro, D/P	0% display: 0.0 kg
Load ratio	10.0	Spn, Fnc	10.0%
Input scaling value B	10.00	Spn, Tch	100% input: 10.00 mV*1
Display scaling value B	3000*2	Spn, D/P	100% display: 300.0 kg
Decimal point position	300.0	D/P	1 decimal place (10^{-1})

*1 Index for description. Depends on actual strain gauge output voltage.
*2 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).**

- Warm up the unit for 10 minutes or more.
- Hold down Scale/↑ button for 3 seconds or more.

2 **Set excitation voltage.**

- Press Alarm/↓ or Scale/↑ button to go to the next or previous parameter setting.
- Press Shift button to shift the display into the setting standby mode and Up button to select the excitation voltage.

3 **Set input scaling value A.**

- Press Alarm/↓ or Scale/↑ button to apply the new setting and go to the next or previous parameter setting.
- Press Up button to go to the teach calibration (ZERO) setting.
- Without any load (equivalent to input 0%), press Up button to register the present value.

4 **Set display scaling value A.**

- Press Alarm/↓ or Scale/↑ button to go to the next or previous parameter setting.
- Press Shift button to shift the display into the setting standby mode.
- Press Shift button to go to the next digit and Up button to change the blinking value.

5 **Set load ratio.**

- Press Alarm/↓ or Scale/↑ button to apply the new setting and go to the next or previous parameter setting.
- Press Shift button to shift the display into the setting standby mode.
- Press Shift button to go to the next digit and Up button to change the blinking value.

6 **Set input scaling value B.**

- Press Alarm/↓ or Scale/↑ button to apply the new setting and go to the next or previous parameter setting.
- Press Up button to go to the teach calibration (SPAN) setting.
- With 30 kg load (equivalent to input 100% × load ratio 10%), press Up button to register the present value.

7 **Set display scaling value B.**

- Press Alarm/↓ or Scale/↑ button to go to the next or previous parameter setting.
- Press Shift button to shift the display into the setting standby mode.
- Press Shift button to go to the next digit and Up button to change the blinking value.

8 **Set decimal point position.**

- Press Alarm/↓ or Scale/↑ button to apply the new setting and go to the next or previous parameter setting.
- Press Shift button to shift the display into the setting standby mode and Up button to select the decimal point position.

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

- Hold down Alarm/↓ or Scale/↑ button for 1 second or more to apply the new setting and return to Measuring Mode.

2.2 BASIC SETTING OPERATION AND INSTRUCTIONS

This section describes basic operation and instructions when setting parameters.

2.2.1 BASIC SETTING OPERATION

Parameters can be grouped into three setting types, “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 Shift button to shift the display into the setting standby mode.**

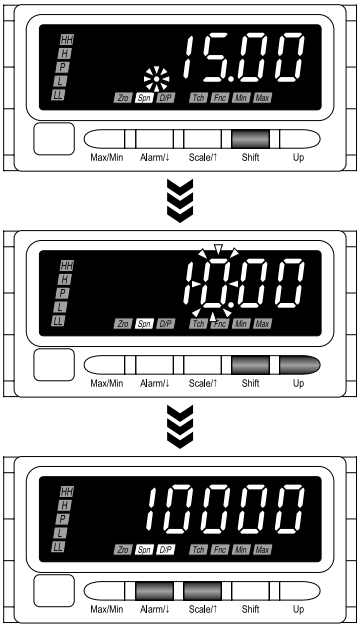
• The most significant digit starts blinking.

2 **Press Shift and Up buttons to set a numerical value.**

• Press Shift button to go to the next digit.
• Press Up button to change the blinking value.

3 **Press Alarm/↓ or Scale/↑ button to apply the new setting.**

• The next or previous parameter setting is indicated.

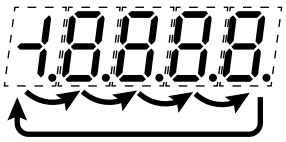


*1 Display depands on the specifications and settings.

NOTE

■ SHIFTING DIGITS

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



■ SETTING A NUMERICAL VALUE

• Each time pressing Up button, the numeral is incremented by 1. In setting an alarm setpoint, the indication following ‘9’ will be ‘-’.
• The negative sign (-) must be set to the leftmost digit. For example, set ‘-04.00’ instead of ‘-4.00’.

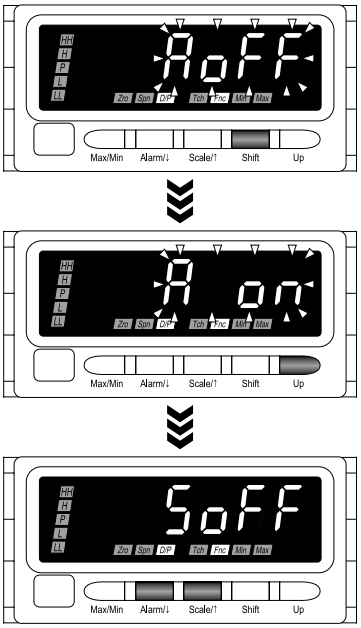
■ SETTING VALUE SELECTION

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

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

3 **Press Alarm/↓ or Scale/↑ button to apply the new setting.**

• The next or previous parameter setting is indicated.



*1 Display depands on the specifications and settings.

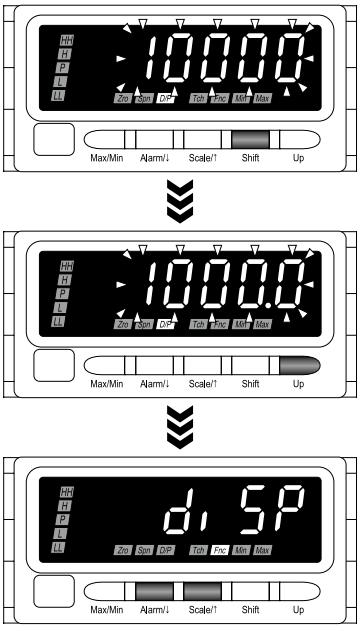
■ DECIMAL POINT POSITION SELECTION

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

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

3 **Press Alarm/↓ or Scale/↑ button to apply the new setting.**

• The next or previous parameter setting is indicated.

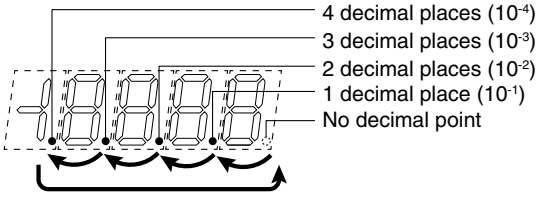


*1 Display depands on the specifications and settings.

NOTE

■ MOVING THE DECIMAL POINT

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



■ DECIMAL POINT POSITION

"No decimal point" to "4 decimal places" can be selected in the decimal point position setting.

SETTING VALUE	FUNCTION
10000	No decimal point
10000	1 decimal place (10^{-1})
10000	2 decimal places (10^{-2})

SETTING VALUE	FUNCTION
10000	3 decimal places (10^{-3})
10000	4 decimal places (10^{-4})

2.2.2 INSTRUCTIONS ON BASIC OPERATION

■ INVALID PARAMETERS

- 'Max' and 'Min' indicators start blinking when a parameter is within invalid range. Return the setting within the valid range.
- In setting an input scaling value beyond the setting range, setting 'input scaling value A ≥ input scaling value B', setting the load ratio beyond the setting range or setting the negative sign (-) to a digit other than the leftmost one, 'Max' and 'Min' indicators start blinking.

■ IF THE FRONT BUTTONS ARE LEFT UNTOUCHED…

- The indication turns on with applying the last changes after the specified time period (default: 15 sec.) while it is in the setting standby mode.
- The display goes back automatically to Measuring Mode after the specified time period (default: 15 sec.) in one of the other modes.
- This time period (automatic return time) is configurable. (Refer to 15. GOING BACK AUTOMATICALLY TO MEASURING MODE.)

■ TO ABORT A SETTING…

- Hold down Max/Min button for 1 second 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 21.2 INITIALIZING SETTING VALUES.)

■ IN MOVING ON TO EACH SETTING MODE FROM MEASURING MODE

- The last values of the DC and alarm outputs before mode transition are held.
- Some alarm indicators turn on with the function indicators in setting each parameter. The alarm indication is due to the last status before mode transition held but does not show the unit failure.

■ ORDER TO DISPLAY PARAMETERS

- Refer to 9. PARAMETER CONFIGURATION for details.

3. INPUT TYPE

Make sure that the specifications (rated output) of the connected strain gauge meet the rating per input strain gauge code, and also that the strain gauge output voltage is within the zero adjustment, span and input voltage per code. Calculate the strain gauge output voltage according to the following formula:

Strain gauge output voltage [mV] = rated output [mV/V] × excitation voltage [V]

3.1 INPUT TYPE LIST

Input strain gauge codes, also ranges of zero adjustment, span and input voltage per excitation voltage are as shown in the following tables.

■ INPUT STRAIN GAUGE CODE: S1 [MODEL: 47LLC-S1XXX-XX]

INPUT TYPE	FUNCTION	EXCITATION VOLTAGE	ZERO ADJUSTMENT	SPAN	INPUT VOLTAGE
0-1	Strain gauge rating 0.0 – 1.0 mV/V	2.5 V	-2.50 to +2.50 mV	0.25 – 2.50 mV	-2.50 to +5.00 mV
		5.0 V	-5.00 to +5.00 mV	0.50 – 5.00 mV	-5.00 to +10.00 mV
		7.5 V	-7.50 to +7.50 mV	0.75 – 7.50 mV	-7.50 to +15.00 mV
		10.0 V	-10.00 to +10.00 mV	1.00 – 10.00 mV	-10.00 to +20.00 mV

■ INPUT STRAIN GAUGE CODE: S2 [MODEL: 47LLC-S2XXX-XX]

INPUT TYPE	FUNCTION	EXCITATION VOLTAGE	ZERO ADJUSTMENT	SPAN	INPUT VOLTAGE
0-3	Strain gauge rating 0.0 – 3.0 mV/V	2.5 V	-7.50 to +7.50 mV	0.75 – 7.50 mV	-7.50 to +15.00 mV
		5.0 V	-15.00 to +15.00 mV	1.50 – 15.00 mV	-15.00 to +30.00 mV
		7.5 V	-22.50 to +22.50 mV	2.25 – 22.50 mV	-22.50 to +45.00 mV
		10.0 V	-30.00 to +30.00 mV	3.00 – 30.00 mV	-30.00 to +60.00 mV

■ INPUT STRAIN GAUGE CODE: S3 [MODEL: 47LLC-S3XXX-XX]

INPUT TYPE	FUNCTION	EXCITATION VOLTAGE	ZERO ADJUSTMENT	SPAN	INPUT VOLTAGE
0-10	Strain gauge rating 0.0 – 10.0 mV/V	2.5 V	-25.0 to +25.0 mV	2.5 – 25.0 mV	-25.0 to +50.0 mV
		5.0 V	-50.0 to +50.0 mV	5.0 – 50.0 mV	-50.0 to +100.0 mV
		7.5 V	-75.0 to +75.0 mV	7.5 – 75.0 mV	-75.0 to +150.0 mV
		10.0 V	-100.0 to +100.0 mV	10.0 – 100.0 mV	-100.0 to +200.0 mV

■ INPUT STRAIN GAUGE CODE: S4 [MODEL: 47LLC-S4XXX-XX]

INPUT TYPE	FUNCTION	EXCITATION VOLTAGE	ZERO ADJUSTMENT	SPAN	INPUT VOLTAGE
0-30	Strain gauge rating 0.0 – 30.0 mV/V	2.5 V	-75.0 to +75.0 mV	7.5 – 75.0 mV	-75.0 to +150.0 mV
		5.0 V	-150.0 to +150.0 mV	15.0 – 150.0 mV	-150.0 to +300.0 mV
		7.5 V	-225.0 to +225.0 mV	22.5 – 225.0 mV	-225.0 to +450.0 mV
		10.0 V	-300.0 to +300.0 mV	30.0 – 300.0 mV	-300.0 to +600.0 mV

IMPORTANT

- The input type is fixed per input strain gauge code. Setting is not available.
- Changing across different input strain gauge codes (code S1 to S2 for example) is not available.
- Tension and compression type strain gauges are not supported.

4. SETTING EXCITATION VOLTAGE

Voltage to apply to a strain gauge can be selected among 2.5 V, 5 V, 7.5 V and 10 V. Choose recommended excitation or lower voltage. Also choose the excitation so that the strain gauge output voltage is within the zero adjustment, span and input voltage per input strain gauge code as shown in 3.1 INPUT TYPE LIST.

■ EXCITATION VOLTAGE

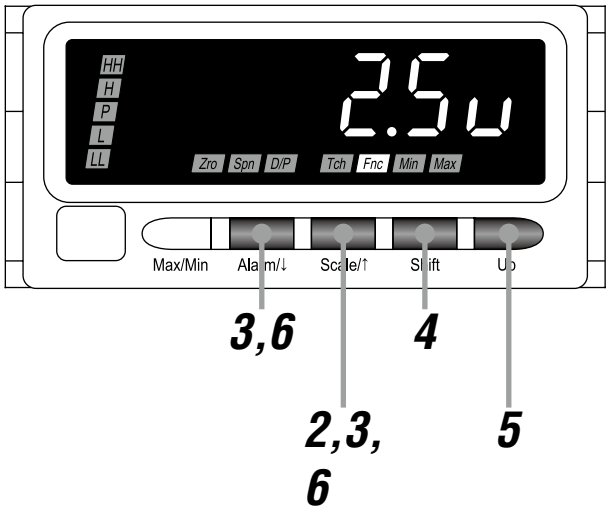
DISPLAY	FUNCTION	DEFAULT VALUE
2.5u	Excitation 2.5 V	2.5u
5.0u	Excitation 5 V	
7.5u	Excitation 7.5 V	
10.0u	Excitation 10 V	

IMPORTANT

- The input scaling values A and B are reset to the default values per excitation voltage when the excitation has been changed. Refer to 5. SETTING SCALING VALUES WITH PARAMETERS or 6. SETTING SCALING VALUES WITH ACTUAL LOAD for details.
- The tare adjustment is reset when the excitation voltage has been changed.

4.1 OPERATING PROCEDURE

Procedures to change the excitation voltage 2.5 V (default) to 5.0 V with the input strain gauge code S2 (strain gauge rating 0.0 – 3.0 mV/V) are described here.



NOTE

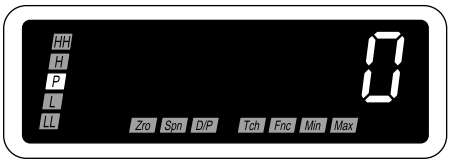
The left figure shows a display example. The display depends on the settings.

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

- All the indications turn on for approximately 1 second and then the display moves on to Measuring Mode.

■ Immediately after power on (all indicators on)

■ Measuring Mode



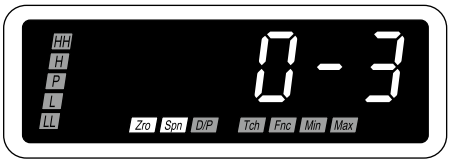
*1 Display depends on the settings and input.

NOTE

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

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

- The input type is indicated.
- 'Zro' and 'Spn' indicators turn on.

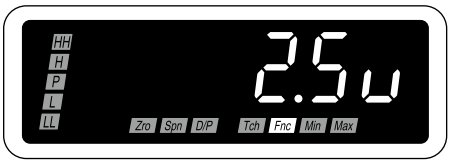


NOTE

Some alarm indicators turn on with the function indicators. The alarm indication is due to the last status before mode transition held but does not show the unit failure.

3 **Press Alarm/↓ or Scale/↑ button to go to the excitation voltage setting.**

- The excitation voltage is indicated.
- 'Fnc' indicator turns on.

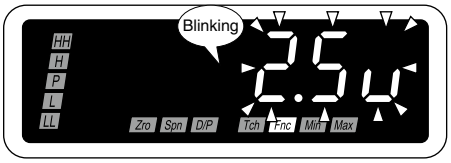


NOTE

Skip to Step 7 if the default value is acceptable.

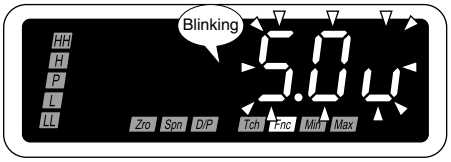
4 **Press Shift button to shift the display into the setting standby mode.**

- The indication '2.5V' starts blinking, to which you can apply changes.



5 **Press Up button to select the excitation voltage.**

- Select '5.0V' (excitation voltage 5 V).



6 **Press Alarm/↓ or Scale/↑ button to apply the new setting.**

- And the next parameter setting is indicated.

NOTE

- Press Alarm/↓ button, and the input scaling value A will be indicated.
- Press Scale/↑ button, and the input type will be indicated.

7 **■ TO GO ON TO SET THE INPUT SCALING VALUE A WITH PARAMETER,**
Skip to Step 3 in "5.1 STEP 1. INPUT SCALING VALUE A"

■ TO GO ON TO SET THE INPUT SCALING VALUE A WITH ACTUAL LOAD,
Skip to Step 3 in "6.1 STEP 1. INPUT SCALING VALUE A (ACTUAL LOAD)"

■ TO QUIT,
Hold down Alarm/↓ or Scale/↑ button for 1 second or more to return to Measuring Mode.

NOTE

■ IF THE FRONT BUTTONS ARE LEFT UNTOUCHED…

- The indication turns on with applying the last changes after the specified time period (default: 15 sec.) while it is in the setting standby mode (indication blinking in Step 4 and 5).
- The display goes back automatically to Measuring Mode after the specified time period (default: 15 sec.) in one of the other modes.
- This time period (automatic return time) is configurable. (Refer to 15. GOING BACK AUTOMATICALLY TO MEASURING MODE.)

■ TO ABORT A SETTING…

- Hold down Max/Min button for 1 second or more in the setting standby mode (indication blinking in Step 4 and 5) to return to Measuring Mode without applying the last changes.
- If you get lost in a setting mode, you can execute initialization. (Refer to 21.2 INITIALIZING SETTING VALUES.)

5. SETTING SCALING VALUES WITH PARAMETERS

■ INPUT SCALING

Input scaling means setting output voltage of a strain gauge to use as input value. The input scaling values include A and B.

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

To set the input scaling, it is necessary to calculate output voltage from a strain gauge. In the setting example, when the rated load is applied with excitation voltage 1 V, the output voltage is 2 mV.

With excitation voltage 5 V,

Strain gauge output voltage = rated output × excitation voltage
2 mV/V × 5 V = 10 mV

The output voltage is 0 mV without any load. Therefore the output range from the strain gauge is 0 – 10 mV DC.
Set the input scaling as shown below.

Input scaling value A	0 mV
Input scaling value B	10 mV

IMPORTANT

- Set 'input scaling value A < input scaling value B'.
- Setting beyond the setting range per input strain gauge code and excitation voltage is not available.
- Input scaling values can be adjusted by applying actual load. Refer to 6. SETTING SCALING VALUES WITH ACTUAL LOAD for details.
- The tare adjustment is reset when the input scaling value A or B has been changed.

■ DISPLAY SCALING

Display scaling means setting a value to display actually.
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 input scaling value A.
- Display scaling value B is a display value for the input scaling value B.
- Decimal point position can be set in common for both display scaling value A and B.

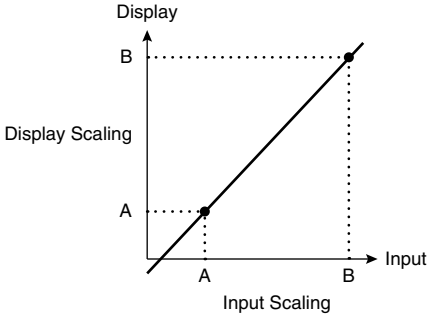
e.g. Display value 0.0 – 300.0 kg

Display scaling value A	0.0 kg
Display scaling value B	300.0 kg
Decimal point position	000.0 (1 decimal place)

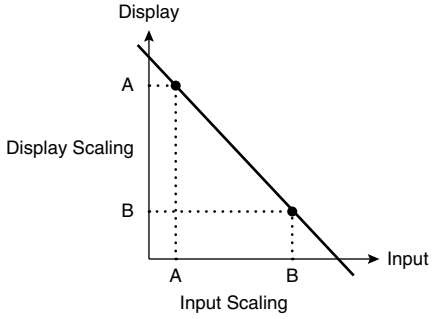
IMPORTANT

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 -19999 to 19999.

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



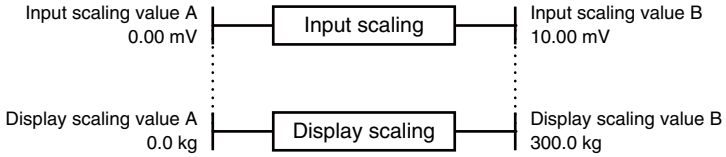
■ Inverted Scaling
The display value decreases
when the input signal increases.



■ RELATION BETWEEN INPUT SCALING AND DISPLAY SCALING

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

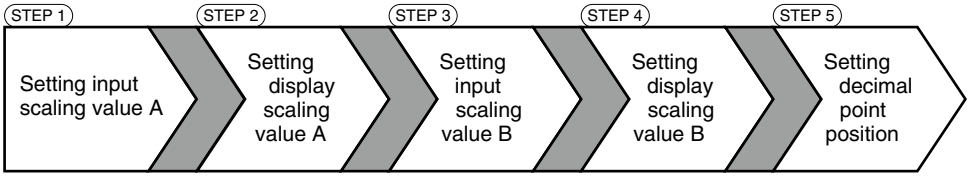
e.g. To display 0 – 10 mV DC input as 0.0 – 300.0 kg



■ PROCEDURE TO SET SCALING VALUES

• Flow in setting scaling values

5-step settings are necessary to set scaling values.



• Operating procedure to set scaling values

Following pages describe operating procedures in each step to set the input scaling to 0 – 10 mV DC, and the display scaling to 0.0 – 300.0 kg as an example.

NOTE

- A parameter “Load ratio” is indicated between STEPS 2 and 3, which is a disregarded item in setting with the parameters. Check function indicators to set each parameter correctly.
- A parameter “Tare adjustment” is indicated between STEPS 4 and 5. Check function indicators to set each parameter correctly.

5.1 STEP 1. INPUT SCALING VALUE A

5.1.1 LIST FOR INPUT SCALING VALUE A (PARAMETER)

Default values of the input scaling value A per input strain gauge code and its setting ranges per excitation voltage are as shown in the following tables.

■ INPUT STRAIN GAUGE CODE: S1 [MODEL: 47LLC-S1XXX-XX]

INPUT TYPE	EXCITATION VOLTAGE	SETTING RANGE	DEFAULT VALUE
0-1	2.5 V	-2.50 to +2.50 mV	0000
	5.0 V	-5.00 to +5.00 mV	
	7.5 V	-7.50 to +7.50 mV	
	10.0 V	-10.00 to +10.00 mV	

■ INPUT STRAIN GAUGE CODE: S2 [MODEL: 47LLC-S2XXX-XX]

INPUT TYPE	EXCITATION VOLTAGE	SETTING RANGE	DEFAULT VALUE
0-3	2.5 V	-7.50 to +7.50 mV	0000
	5.0 V	-15.00 to +15.00 mV	
	7.5 V	-22.50 to +22.50 mV	
	10.0 V	-30.00 to +30.00 mV	

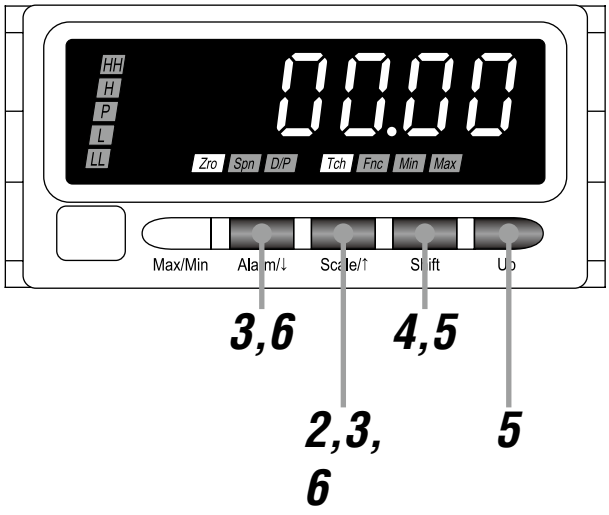
■ INPUT STRAIN GAUGE CODE: S3 [MODEL: 47LLC-S3XXX-XX]

INPUT TYPE	EXCITATION VOLTAGE	SETTING RANGE	DEFAULT VALUE
0-10	2.5 V	-25.0 to +25.0 mV	0000
	5.0 V	-50.0 to +50.0 mV	
	7.5 V	-75.0 to +75.0 mV	
	10.0 V	-100.0 to +100.0 mV	

■ INPUT STRAIN GAUGE CODE: S4 [MODEL: 47LLC-S4XXX-XX]

INPUT TYPE	EXCITATION VOLTAGE	SETTING RANGE	DEFAULT VALUE
0-30	2.5 V	-75.0 to +75.0 mV	0000
	5.0 V	-150.0 to +150.0 mV	
	7.5 V	-225.0 to +225.0 mV	
	10.0 V	-300.0 to +300.0 mV	

5.1.2 OPERATING PROCEDURE



NOTE

The left figure shows a display example (default value of input strain gauge code S2). The display depends on the settings. Refer to 5.1.1 LIST FOR INPUT SCALING VALUE A (PARAMETER) for details.

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

- All the indications turn on for approximately 1 second and then the display moves on to Measuring Mode.

■ Immediately after power on (all indicators on)

■ Measuring Mode

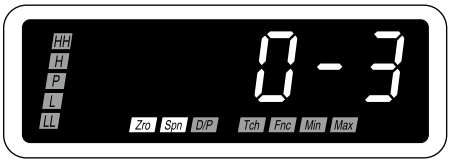
*1 Display depends on the settings and input.

NOTE

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

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

- The input type is indicated.
- 'Zro' and 'Spn' indicators turn on.

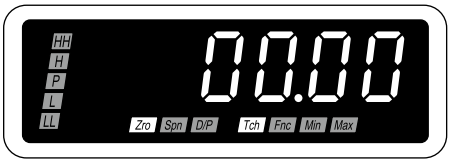


NOTE

Some alarm indicators turn on with the function indicators. The alarm indication is due to the last status before mode transition held but does not show the unit failure.

3 **Press Alarm/↓ or Scale/↑ button to go to the input scaling value A setting.**

- The input scaling value A is indicated.
- 'Zro' and 'Tch' indicators turn on.

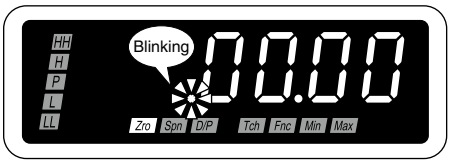


NOTE

Skip to Step 7 if the default value is acceptable.

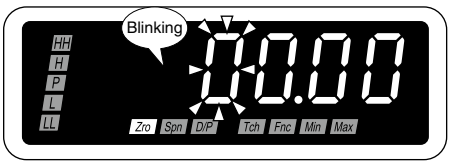
4 **Press Shift button to shift the display into the setting standby mode.**

- The fifth digit starts blinking, to which you can apply changes.
- 'Tch' indicator turns off.



5 **Press Shift and Up buttons to set to '00.00'.**

- Press Shift button to go to the next digit and Up button to change the blinking value.



NOTE

- '00.00' is a display example. Set any value within the setting range.
- 'Min' and 'Max' indicators start blinking when the set value is within invalid range. Return the setting within the valid range.

6 **Press Alarm/↓ or Scale/↑ button to apply the new setting.**

- And the next parameter setting is indicated.

NOTE

- Press Alarm/↓ button, and the display scaling value A will be indicated within the range of -19999 to 19999 depending on the setting.
- Press Scale/↑ button, and the input type will be indicated.

7 **■ TO GO ON TO SET THE DISPLAY SCALING VALUE A,**
Skip to Step 3 in "5.2 STEP 2. DISPLAY SCALING VALUE A"

■ TO QUIT,
Hold down Alarm/↓ or Scale/↑ button for 1 second or more to return to Measuring Mode.

NOTE

■ INPUT SCALING SETTING

- Do not set 'input scaling value A ≥ input scaling value B'.

■ IF THE FRONT BUTTONS ARE LEFT UNTOUCHED…

- The indication turns on with applying the last changes after the specified time period (default: 15 sec.) while it is in the setting standby mode (indication blinking in Step 4 and 5).
- The display goes back automatically to Measuring Mode after the specified time period (default: 15 sec.) in one of the other modes.
- This time period (automatic return time) is configurable. (Refer to 15. GOING BACK AUTOMATICALLY TO MEASURING MODE.)

■ TO ABORT A SETTING…

- Hold down Max/Min button for 1 second or more in the setting standby mode (indication blinking in Step 4 and 5) to return to Measuring Mode without applying the last changes.
- If you get lost in a setting mode, you can execute initialization. (Refer to 21.2 INITIALIZING SETTING VALUES.)

■ SHIFTING DIGITS

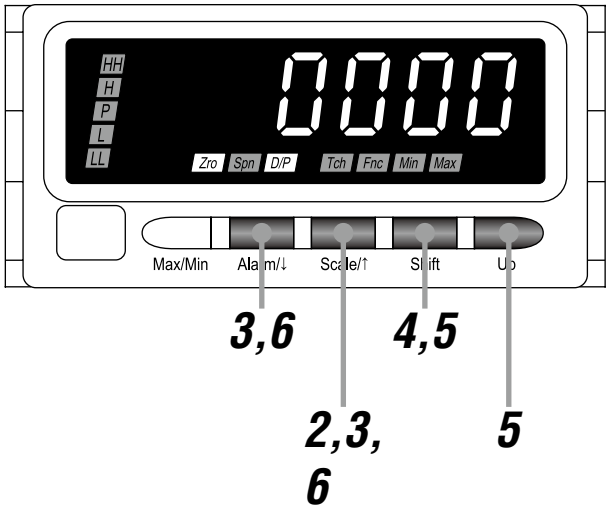
- Each time pressing Shift button, the blinking digit moves to the right.

■ SETTING A NUMERICAL VALUE

- Each time pressing Up button, the numeral is incremented by 1.

5.2 STEP 2. DISPLAY SCALING VALUE A

5.2.1 OPERATING PROCEDURE



NOTE

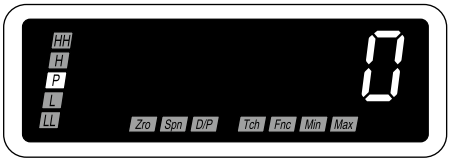
The left figure shows a display example. The display depends on the settings.

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

- All the indications turn on for approximately 1 second and then the display moves on to Measuring Mode.

■ Immediately after power on (all indicators on)

■ Measuring Mode



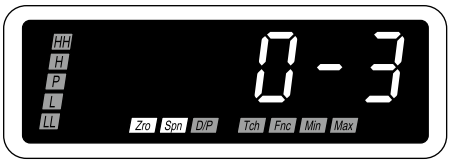
*1 Display depends on the settings and input.

NOTE

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

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

- The input type is indicated.
- 'Zro' and 'Spn' indicators turn on.

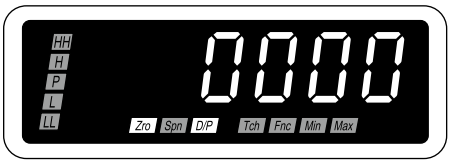


NOTE

Some alarm indicators turn on with the function indicators. The alarm indication is due to the last status before mode transition held but does not show the unit failure.

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

- The display scaling value A is indicated.
- 'Zro' and 'D/P' indicators turn on.

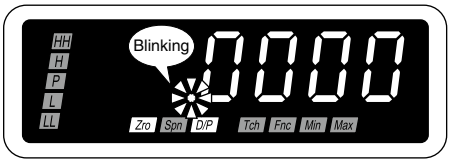


NOTE

Skip to Step 7 if the default value is acceptable.

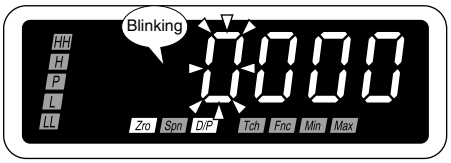
4 **Press Shift button to shift the display into the setting standby mode.**

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



5 **Press Shift and Up buttons to set to '0000'.**

- Press Shift button to go to the next digit and Up button to change the blinking value.



NOTE

- '0000' is a display example. Set any value within the range of -19999 to 19999.
- The decimal point position depends on the decimal point position setting. Disregard the decimal point here.
- The negative sign (-) must be set to the leftmost digit. For example, set '-04.00' instead of '-4.00'.

6 **Press Alarm/↓ or Scale/↑ button to apply the new setting.**

- And the next parameter setting is indicated.

NOTE

- Press Alarm/↓ button, and the load ratio will be indicated within the range of 10.0 to 100.0 depending on the setting.
- Press Scale/↑ button, and the input scaling value A will be indicated.

7 ■ **TO GO ON TO SET THE INPUT SCALING VALUE B,**
Skip to Step 3 in "5.3 STEP 3. INPUT SCALING VALUE B".

■ **TO QUIT,**
Hold down Alarm/↓or Scale/↑ button for 1 second or more to return to Measuring Mode.

NOTE

■ **IF THE FRONT BUTTONS ARE LEFT UNTOUCHED…**

- The indication turns on with applying the last changes after the specified time period (default: 15 sec.) while it is in the setting standby mode (indication blinking in Step 4 and 5).
- The display goes back automatically to Measuring Mode after the specified time period (default: 15 sec.) in one of the other modes.
- This time period (automatic return time) is configurable. (Refer to 15. GOING BACK AUTOMATICALLY TO MEASURING MODE.)

■ **TO ABORT A SETTING…**

- Hold down Max/Min button for 1 second or more in the setting standby mode (indication blinking in Step 4 and 5) to return to Measuring Mode without applying the last changes.
- If you get lost in a setting mode, you can execute initialization. (Refer to 21.2 INITIALIZING SETTING VALUES.)

■ **SHIFTING DIGITS**

- Each time pressing Shift button, the blinking digit moves to the right.

■ **SETTING A NUMERICAL VALUE**

- Each time pressing Up button, the numeral is incremented by 1.

5.3 STEP 3. INPUT SCALING VALUE B

5.3.1 LIST FOR INPUT SCALING VALUE B (PARAMETER)

Default values and setting ranges of the input scaling value B per input strain gauge code and excitation voltage are as shown in the following tables.

■ INPUT STRAIN GAUGE CODE: S1 [MODEL: 47LLC-S1XXX-XX]

INPUT TYPE	EXCITATION VOLTAGE	SETTING RANGE	DEFAULT VALUE
0-1	2.5 V	Input scaling value A + [0.25 to 2.50] mV	0250
	5.0 V	Input scaling value A + [0.50 to 5.00] mV	0500
	7.5 V	Input scaling value A + [0.75 to 7.50] mV	0750
	10.0 V	Input scaling value A + [1.00 to 10.00] mV	1000

■ INPUT STRAIN GAUGE CODE: S2 [MODEL: 47LLC-S2XXX-XX]

INPUT TYPE	EXCITATION VOLTAGE	SETTING RANGE	DEFAULT VALUE
0-3	2.5 V	Input scaling value A + [0.75 to 7.50] mV	0750
	5.0 V	Input scaling value A + [1.50 to 15.00] mV	1500
	7.5 V	Input scaling value A + [2.25 to 22.50] mV	2250
	10.0 V	Input scaling value A + [3.00 to 30.00] mV	3000

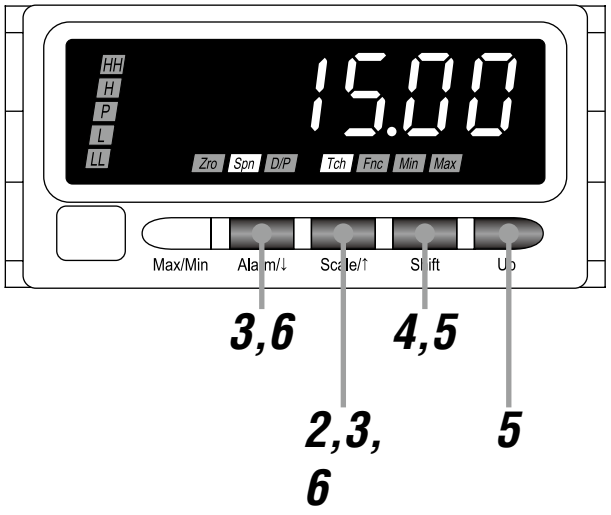
■ INPUT STRAIN GAUGE CODE: S3 [MODEL: 47LLC-S3XXX-XX]

INPUT TYPE	EXCITATION VOLTAGE	SETTING RANGE	DEFAULT VALUE
0-10	2.5 V	Input scaling value A + [2.5 to 25.0] mV	0250
	5.0 V	Input scaling value A + [5.0 to 50.0] mV	0500
	7.5 V	Input scaling value A + [7.5 to 75.0] mV	0750
	10.0 V	Input scaling value A + [10.0 to 100.0] mV	1000

■ INPUT STRAIN GAUGE CODE: S4 [MODEL: 47LLC-S4XXX-XX]

INPUT TYPE	EXCITATION VOLTAGE	SETTING RANGE	DEFAULT VALUE
0-30	2.5 V	Input scaling value A + [7.5 to 75.0] mV	0750
	5.0 V	Input scaling value A + [15.0 to 150.0] mV	1500
	7.5 V	Input scaling value A + [22.5 to 225.0] mV	2250
	10.0 V	Input scaling value A + [30.0 to 300.0] mV	3000

5.3.2 OPERATING PROCEDURE



NOTE

The left figure shows a display example (default value of input strain gauge code S2 and excitation voltage 5.0 V). The display depends on the settings. Refer to 5.3.1 LIST FOR INPUT SCALING VALUE B (PARAMETER) for details.

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

- All the indications turn on for approximately 1 second and then the display moves on to Measuring Mode.

■ Immediately after power on (all indicators on)

■ Measuring Mode

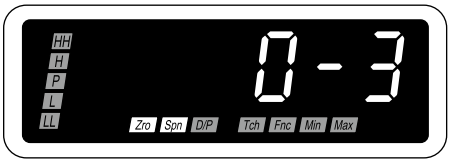
*1 Display depends on the settings and input.

NOTE

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

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

- The input type is indicated.
- 'Zro' and 'Spn' indicators turn on.



NOTE

Some alarm indicators turn on with the function indicators. The alarm indication is due to the last status before mode transition held but does not show the unit failure.

3 **Press Alarm/↓ or Scale/↑ button to go to the input scaling value B setting.**

- The input scaling value B is indicated.
- 'Spn' and 'Tch' indicators turn on.

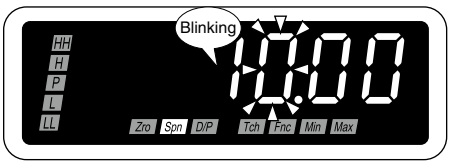
NOTE

Skip to Step 7 if the default value is acceptable.

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

- The fifth digit starts blinking, to which you can apply changes.
- 'Tch' indicator turns off.

5 **Press Shift and Up buttons to set to '10.00'.**



- Press Shift button to go to the next digit and Up button to change the blinking value.

NOTE

- '10.00' is a display example. Set any value within the setting range.
- 'Min' and 'Max' indicators start blinking when the set value is within invalid range. Return the setting within the valid range.

6 **Press Alarm/↓ or Scale/↑ button to apply the new setting.**

- And the next parameter setting is indicated.

NOTE

- Press Alarm/↓ button, and the display scaling value B will be indicated within the range of -19999 to 19999 depending on the setting.
- Press Scale/↑ button, and the load ratio will be indicated within the range of 10.0 to 100.0 depending on the setting.

7 **■ TO GO ON TO SET THE DISPLAY SCALING VALUE B,**
Skip to Step 3 in "5.4 STEP 4. DISPLAY SCALING VALUE B".

■ TO QUIT,
Hold down Alarm/↓ or Scale/↑ button for 1 second or more to return to Measuring Mode.

NOTE

■ INPUT SCALING SETTING

- Do not set 'input scaling value A ≥ input scaling value B'.

■ IF THE FRONT BUTTONS ARE LEFT UNTOUCHED…

- The indication turns on with applying the last changes after the specified time period (default: 15 sec.) while it is in the setting standby mode (indication blinking in Step 4 and 5).
- The display goes back automatically to Measuring Mode after the specified time period (default: 15 sec.) in one of the other modes.
- This time period (automatic return time) is configurable. (Refer to 15. GOING BACK AUTOMATICALLY TO MEASURING MODE.)

■ TO ABORT A SETTING…

- Hold down Max/Min button for 1 second or more in the setting standby mode (indication blinking in Step 4 and 5) to return to Measuring Mode without applying the last changes.
- If you get lost in a setting mode, you can execute initialization. (Refer to 21.2 INITIALIZING SETTING VALUES.)

■ SHIFTING DIGITS

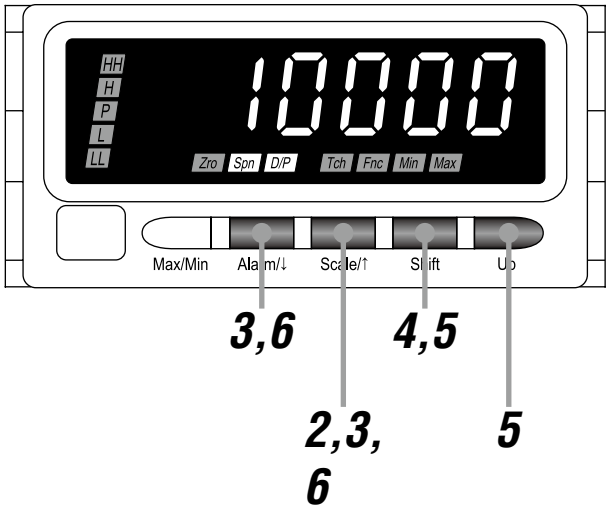
- Each time pressing Shift button, the blinking digit moves to the right.

■ SETTING A NUMERICAL VALUE

- Each time pressing Up button, the numeral is incremented by 1.

5.4 STEP 4. DISPLAY SCALING VALUE B

5.4.1 OPERATING PROCEDURE



NOTE

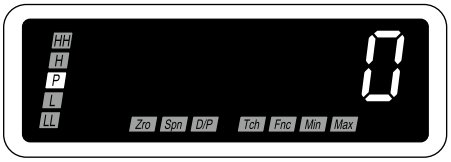
The left figure shows a display example. The display depends on the settings.

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

- All the indications turn on for approximately 1 second and then the display moves on to Measuring Mode.

■ Immediately after power on (all indicators on)

■ Measuring Mode



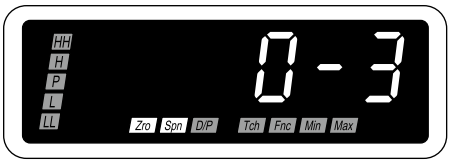
*1 Display depends on the settings and input.

NOTE

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

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

- The input type is indicated.
- 'Zro' and 'Spn' indicators turn on.

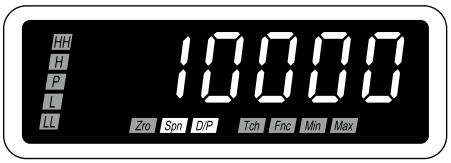


NOTE

Some alarm indicators turn on with the function indicators. The alarm indication is due to the last status before mode transition held but does not show the unit failure.

3 **Press Alarm/↓ or Scale/↑ button to go to the display scaling value B setting.**

- The display scaling value B is indicated.
- 'Spn' and 'D/P' indicators turn on.

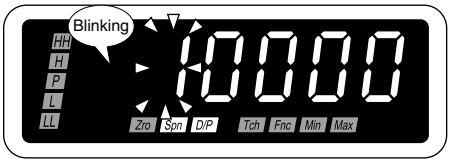


NOTE

Skip to Step 7 if the default value is acceptable.

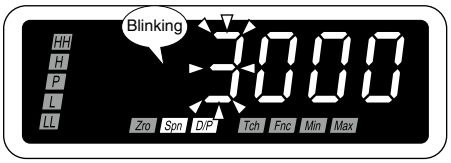
4 **Press Shift button to shift the display into the setting standby mode.**

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



5 **Press Shift and Up buttons to set to '3000'.**

- Press Shift button to go to the next digit and Up button to change the blinking value.



NOTE

- '3000' is a display example. Set any value within the range of -19999 to 19999.
- The decimal point position depends on the decimal point position setting. Disregard the decimal point here.
- The negative sign (-) must be set to the leftmost digit. For example, set '-04.00' instead of '-4.00'.

6 **Press Alarm/↓ or Scale/↑ button to apply the new setting.**

- And the next parameter setting is indicated.

NOTE

- Press Alarm/↓ button, and the tare adjustment will be indicated.
- Press Scale/↑ button, and the input scaling value B will be indicated.

7 ■ **TO GO ON TO SET THE DECIMAL POINT POSITION,**
Skip to Step 3 in "5.5 STEP 5. DECIMAL POINT POSITION".

■ **TO QUIT,**
Hold down Alarm/↓ or Scale/↑ button for 1 second or more to return to Measuring Mode.

NOTE

■ **IF THE FRONT BUTTONS ARE LEFT UNTOUCHED…**

- The indication turns on with applying the last changes after the specified time period (default: 15 sec.) while it is in the setting standby mode (indication blinking in Step 4 and 5).
- The display goes back automatically to Measuring Mode after the specified time period (default: 15 sec.) in one of the other modes.
- This time period (automatic return time) is configurable. (Refer to 15. GOING BACK AUTOMATICALLY TO MEASURING MODE.)

■ **TO ABORT A SETTING…**

- Hold down Max/Min button for 1 second or more in the setting standby mode (indication blinking in Step 4 and 5) to return to Measuring Mode without applying the last changes.
- If you get lost in a setting mode, you can execute initialization. (Refer to 21.2 INITIALIZING SETTING VALUES.)

■ **SHIFTING DIGITS**

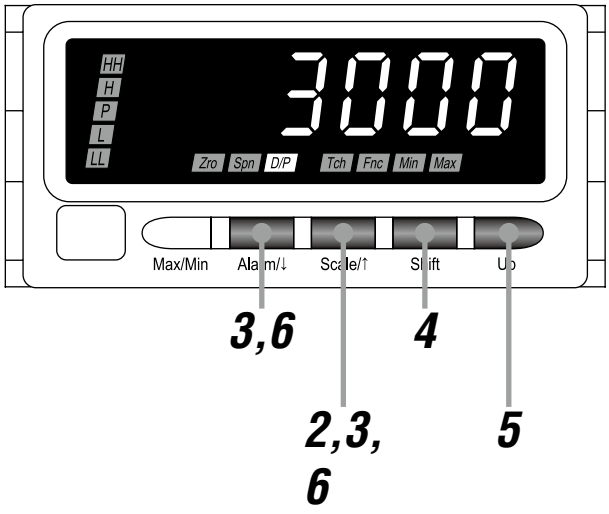
- Each time pressing Shift button, the blinking digit moves to the right.

■ **SETTING A NUMERICAL VALUE**

- Each time pressing Up button, the numeral is incremented by 1.

5.5 STEP 5. DECIMAL POINT POSITION

5.5.1 OPERATING PROCEDURE



NOTE

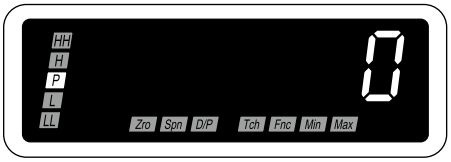
The left figure shows a display example (display scaling value B). The display depends on the settings.

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

- All the indications turn on for approximately 1 second and then the display moves on to Measuring Mode.

■ Immediately after power on (all indicators on)

■ Measuring Mode



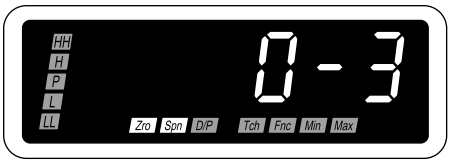
*1 Display depends on the settings and input.

NOTE

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

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

- The input type is indicated.
- 'Zro' and 'Spn' indicators turn on.

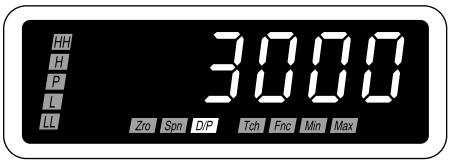


NOTE

Some alarm indicators turn on with the function indicators. The alarm indication is due to the last status before mode transition held but does not show the unit failure.

3 **Press Alarm/↓ or Scale/↑ button to go to the decimal point position setting.**

- The decimal point position is indicated.
- 'D/P' indicator turns on.

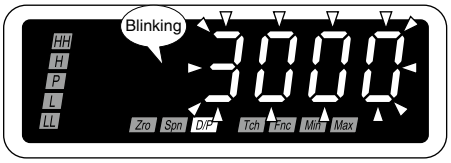


NOTE

Skip to Step 7 if the default value is acceptable.

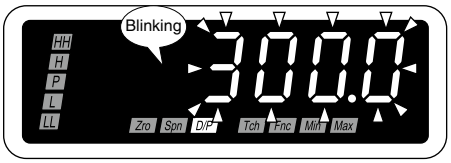
4 **Press Shift button to shift the display into the setting standby mode.**

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



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

- Select 1 decimal place (10^{-1}).
- Press Up 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 "4 decimal places".

6 **Press Alarm/↓ or Scale/↑ button to apply the new setting.**

- And the next parameter setting is indicated.

NOTE

- Press Alarm/↓ button, and the input type will be indicated. Or with DC output, the analog output function mode 'DISP' or 'SCLE' will be indicated depending on the setting.
- Press Scale/↑ button, and the tare adjustment will be indicated.

7 ■ **TO GO ON TO SET THE ANALOG OUTPUT FUNCTION MODE,**
Skip to Step 2 in "10. SETTING ANALOG OUTPUT FUNCTION".

■ **TO QUIT,**
Hold down Alarm/↓ or Scale/↑ button for 1 second or more to return to Measuring Mode.

NOTE

■ **IF THE FRONT BUTTONS ARE LEFT UNTOUCHED…**

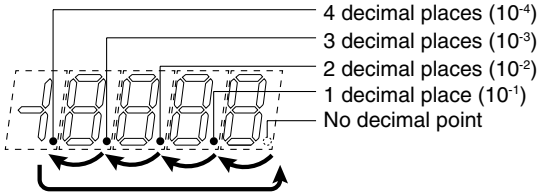
- The indication turns on with applying the last changes after the specified time period (default: 15 sec.) while it is in the setting standby mode (indication blinking in Step 4 and 5).
- The display goes back automatically to Measuring Mode after the specified time period (default: 15 sec.) in one of the other modes.
- This time period (automatic return time) is configurable. (Refer to 15. GOING BACK AUTOMATICALLY TO MEASURING MODE.)

■ **TO ABORT A SETTING…**

- Hold down Max/Min button for 1 second or more in the setting standby mode (indication blinking in Step 4 and 5) to return to Measuring Mode without applying the last changes.
- If you get lost in a setting mode, you can execute initialization. (Refer to 21.2 INITIALIZING SETTING VALUES.)

■ **MOVING THE DECIMAL POINT**

- Pressing Up button moves the decimal point one place to the left.



■ **DECIMAL POINT POSITION**

- "No decimal point" to "4 decimal places" can be selected in the decimal point position setting.

SETTING VALUE	FUNCTION
10000	No decimal point
10000	1 decimal place (10^{-1})
10000	2 decimal places (10^{-2})

SETTING VALUE	FUNCTION
10000	3 decimal places (10^{-3})
10000	4 decimal places (10^{-4})

6. SETTING SCALING VALUES WITH ACTUAL LOAD

■ INPUT SCALING

Teach Calibration means setting an input value with actual load. The calibrated value is called input scaling value. The input scaling values include A and B.

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

To set the input scaling, it is necessary to calculate output voltage from a strain gauge. In the setting example, when the rated load is applied with excitation voltage 1 V, the output voltage is 2 mV.

With excitation voltage 5 V,

Strain gauge output voltage = rated output × excitation voltage
2 mV/V × 5 V = 10 mV

The output voltage is 0 mV without any load. Therefore the output range from the strain gauge is 0 – 10 mV DC.
Set the input scaling as shown below.

Input scaling value A	0 mV
Input scaling value B	10 mV

■ LOAD RATIO

Load ratio is a ratio to set the input scaling value B with small load, without applying rated load of a strain gauge. For example, to set the input scaling value B with a weight 30 kg while the rated load is 300 kg,

Load ratio = weight ÷ rated load × 100
30 kg ÷ 300 kg × 100 = 10%

Set the load ratio to 10.0 and carry out the teach calibration (SPAN) with a weight 30 kg to set the input scaling value B.

IMPORTANT

- Set 'input scaling value A < input scaling value B'.
- Setting beyond the setting range per input strain gauge code and excitation voltage is not available.
- Input scaling values can be adjusted without applying actual load. Refer to 5. SETTING SCALING VALUES WITH PARAMETERS for details.
- The tare adjustment is reset when the input scaling value A or B has been changed,.

■ DISPLAY SCALING

Display scaling means setting a value to display actually.
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 input scaling value A.
- Display scaling value B is a display value for the input scaling value B.
- Decimal point position can be set in common for both display scaling value A and B.

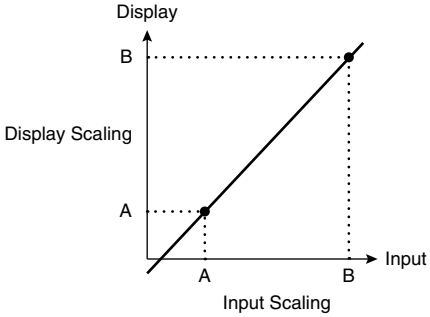
e.g. Display value 0.0 – 300.0 kg

Display scaling value A	0.0 kg
Display scaling value B	300.0 kg
Decimal point position	000.0 (1 decimal place)

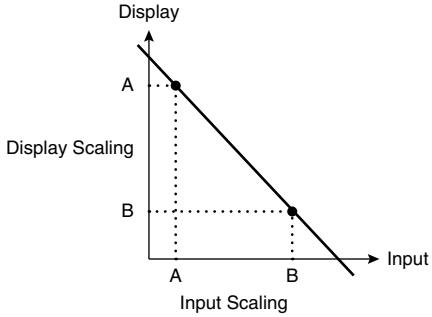
IMPORTANT

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 -19999 to 19999.

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



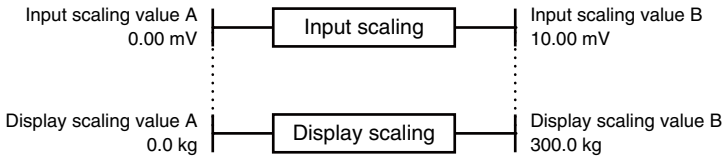
■ Inverted Scaling
The display value decreases
when the input signal increases.



■ RELATION BETWEEN INPUT SCALING AND DISPLAY SCALING

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

e.g. To display 0 – 10 mV DC input as 0.0 – 300.0 kg

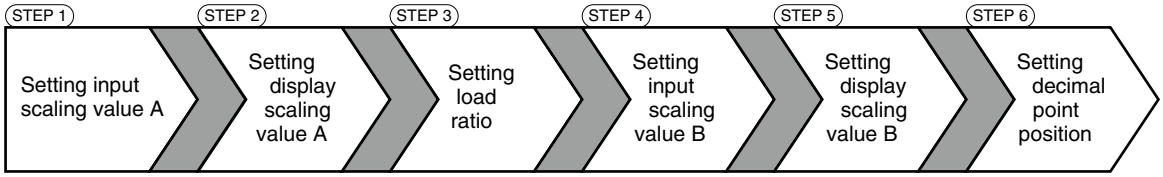


■ PROCEDURE TO SET SCALING VALUES

• Flow in setting scaling values

6-step settings are necessary to set scaling values.

To set the input scaling values A and B, actual input signals are used. It is necessary to apply load to (a) strain gauge(s) of the equipment or device on site. You can set the display scaling values A and B, and the decimal point position first, and then set the input scaling values A and B, applying load to the strain gauge(s).



• Operating procedure to set scaling values

Following pages describe operating procedures in each step to set the input scaling to 0 – 10 mV, and the display scaling to 0.0 – 300.0 kg without the rated load applied but with a weight 30 kg, 10% of the load as an example.

NOTE

A parameter “Tare adjustment” is indicated between STEPS 5 and 6. Check function indicators to set each parameter correctly.

6.1 STEP 1. INPUT SCALING VALUE A (ACTUAL LOAD)

6.1.1 LIST FOR INPUT SCALING VALUE A (ACTUAL LOAD)

Default values of the input scaling value A per input strain gauge code and its setting ranges per excitation voltage are as shown in the following tables.

■ INPUT STRAIN GAUGE CODE: S1 [MODEL: 47LLC-S1XXX-XX]

INPUT TYPE	EXCITATION VOLTAGE	SETTING RANGE	DEFAULT VALUE
0-1	2.5 V	-2.50 to +2.50 mV	0000
	5.0 V	-5.00 to +5.00 mV	
	7.5 V	-7.50 to +7.50 mV	
	10.0 V	-10.00 to +10.00 mV	

■ INPUT STRAIN GAUGE CODE: S2 [MODEL: 47LLC-S2XXX-XX]

INPUT TYPE	EXCITATION VOLTAGE	SETTING RANGE	DEFAULT VALUE
0-3	2.5 V	-7.50 to +7.50 mV	0000
	5.0 V	-15.00 to +15.00 mV	
	7.5 V	-22.50 to +22.50 mV	
	10.0 V	-30.00 to +30.00 mV	

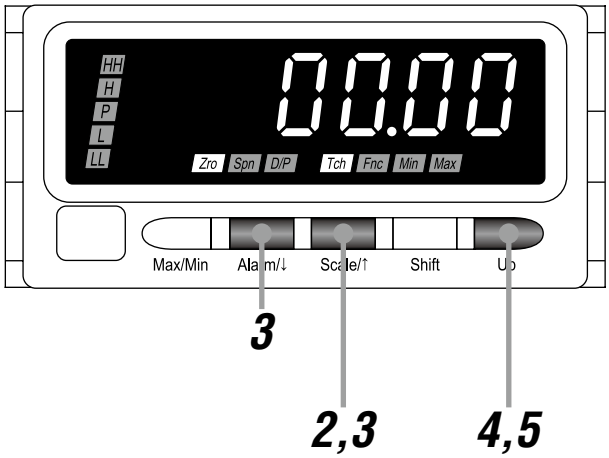
■ INPUT STRAIN GAUGE CODE: S3 [MODEL: 47LLC-S3XXX-XX]

INPUT TYPE	EXCITATION VOLTAGE	SETTING RANGE	DEFAULT VALUE
0-10	2.5 V	-25.0 to +25.0 mV	0000
	5.0 V	-50.0 to +50.0 mV	
	7.5 V	-75.0 to +75.0 mV	
	10.0 V	-100.0 to +100.0 mV	

■ INPUT STRAIN GAUGE CODE: S4 [MODEL: 47LLC-S4XXX-XX]

INPUT TYPE	EXCITATION VOLTAGE	SETTING RANGE	DEFAULT VALUE
0-30	2.5 V	-75.0 to +75.0 mV	0000
	5.0 V	-150.0 to +150.0 mV	
	7.5 V	-225.0 to +225.0 mV	
	10.0 V	-300.0 to +300.0 mV	

6.1.2 OPERATING PROCEDURE



NOTE

The left figure shows a display example (default value of input strain gauge code S2). The display depends on the settings. Refer to 6.1.1 LIST FOR INPUT SCALING VALUE A (ACTUAL LOAD) for details.

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

- All the indications turn on for approximately 1 second and then the display moves on to Measuring Mode.

■ Immediately after power on (all indicators on)

■ Measuring Mode

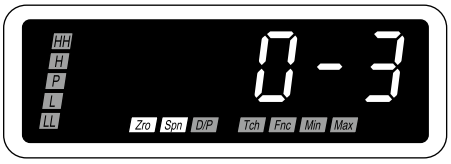
*1 Display depends on the settings and input.

NOTE

- Warm up the unit for 10 minutes or more.
- Indication 'S.ERR' may blink, which shows the input out of the measuring range and does not show the unit failure.

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

- The input type is indicated.
- 'Zro' and 'Spn' indicators turn on.



NOTE

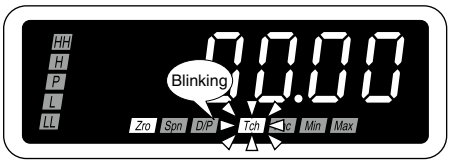
Some alarm indicators turn on with the function indicators. The alarm indication is due to the last status before mode transition held but does not show the unit failure.

3 **Press Alarm/↓ or Scale/↑ button to go to the input scaling value A setting.**

- The input scaling value A is indicated.
- 'Zro' and 'Tch' indicators turn on.

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

- The present input is indicated.
- 'Tch' indicator starts blinking.



5 **Without any load (input 0%), press Up button to register the present value.**

- The teach calibration (ZERO) is registered.
- 'Tch' indicator turns ON.

IMPORTANT

- Confirm that the input signal is stable before pressing Up button.
- Set within the setting range.

NOTE

- '00.00' is a display example. The registered input value is indicated.
- 'Min' and 'Max' indicators start blinking when the set value is within invalid range. Return the setting within the valid range.

6 **■ TO GO ON TO SET THE DISPLAY SCALING VALUE A,**
Skip to Step 3 in "6.2 STEP 2. DISPLAY SCALING VALUE A (ACTUAL LOAD)".

■ TO QUIT,
Hold down Alarm/↓ or Scale/↑ button for 1 second or more to return to Measuring Mode.

NOTE

■ IF THE FRONT BUTTONS ARE LEFT UNTOUCHED…

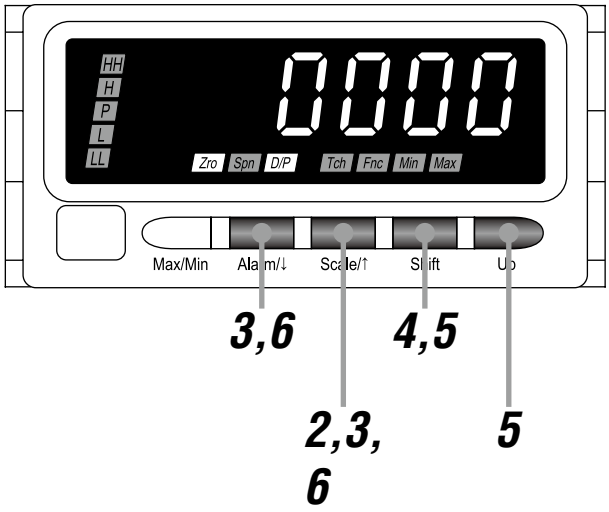
- The display goes back automatically to Measuring Mode after the specified time period (default: 15 sec.) in the steps other than Step 4.
- This time period (automatic return time) is configurable. (Refer to 15. GOING BACK AUTOMATICALLY TO MEASURING MODE.)

■ TO ABORT A SETTING…

- Hold down Max/Min button for 1 second or more in Step 4 to return to Measuring Mode without applying the last changes.
- If you get lost in a setting mode, you can execute initialization. (Refer to 21.2 INITIALIZING SETTING VALUES.)

6.2 STEP 2. DISPLAY SCALING VALUE A (ACTUAL LOAD)

6.2.1 OPERATING PROCEDURE



NOTE

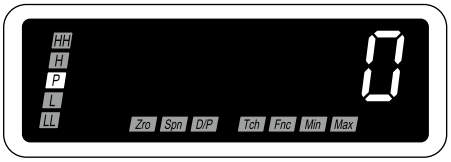
The left figure shows a display example. The display depends on the settings.

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

- All the indications turn on for approximately 1 second and then the display moves on to Measuring Mode.

■ Immediately after power on (all indicators on)

■ Measuring Mode



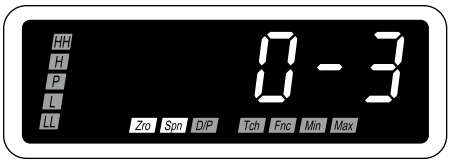
*1 Display depends on the settings and input.

NOTE

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

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

- The input type is indicated.
- 'Zro' and 'Spn' indicators turn on.

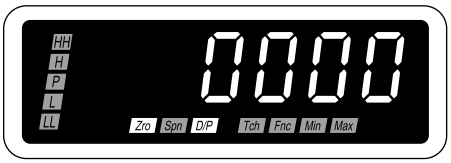


NOTE

Some alarm indicators turn on with the function indicators. The alarm indication is due to the last status before mode transition held but does not show the unit failure.

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

- The display scaling value A is indicated.
- 'Zro' and 'D/P' indicators turn on.

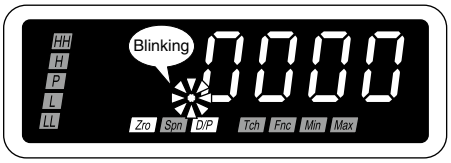


NOTE

Skip to Step 7 if the default value is acceptable.

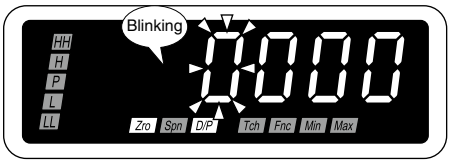
4 **Press Shift button to shift the display into the setting standby mode.**

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



5 **Press Shift and Up buttons to set to '0000'.**

- Press Shift button to go to the next digit and Up button to change the blinking value.



NOTE

- '0000' is a display example. Set any value within the range of -19999 to 19999.
- The decimal point position depends on the decimal point position setting. Disregard the decimal point here.
- The negative sign (-) must be set to the leftmost digit. For example, set '-04.00' instead of '-4.00'.

6 **Press Alarm/↓ or Scale/↑ button to apply the new setting.**

- And the next parameter setting is indicated.

NOTE

- Press Alarm/↓ button, and the load ratio will be indicated within the range of 10.0 to 100.0 depending on the setting.
- Press Scale/↑ button, and the input scaling value A will be indicated.

7 ■ **TO GO ON TO SET THE LOAD RATIO,**
Skip to Step 3 in "6.3 STEP 3. LOAD RATIO".

■ **TO QUIT,**
Hold down Alarm/↓or Scale/↑ button for 1 second or more to return to Measuring Mode.

NOTE

■ **IF THE FRONT BUTTONS ARE LEFT UNTOUCHED…**

- The indication turns on with applying the last changes after the specified time period (default: 15 sec.) while it is in the setting standby mode (indication blinking in Step 4 and 5).
- The display goes back automatically to Measuring Mode after the specified time period (default: 15 sec.) in one of the other modes.
- This time period (automatic return time) is configurable. (Refer to 15. GOING BACK AUTOMATICALLY TO MEASURING MODE.)

■ **TO ABORT A SETTING…**

- Hold down Max/Min button for 1 second or more in the setting standby mode (indication blinking in Step 4 and 5) to return to Measuring Mode without applying the last changes.
- If you get lost in a setting mode, you can execute initialization. (Refer to 21.2 INITIALIZING SETTING VALUES.)

■ **SHIFTING DIGITS**

- Each time pressing Shift button, the blinking digit moves to the right.

■ **SETTING A NUMERICAL VALUE**

- Each time pressing Up button, the numeral is incremented by 1.

6.3 STEP 3. LOAD RATIO

Load ratio is a ratio to set the input scaling value B with small load, without applying rated load of a strain gauge.

■ SETTING EXAMPLE OF LOAD RATIO

• To set the input scaling value B with a weight 30 kg while the rated load is 300 kg,

Load ratio = weight ÷ rated load × 100

30 kg ÷ 300 kg × 100 = 10%

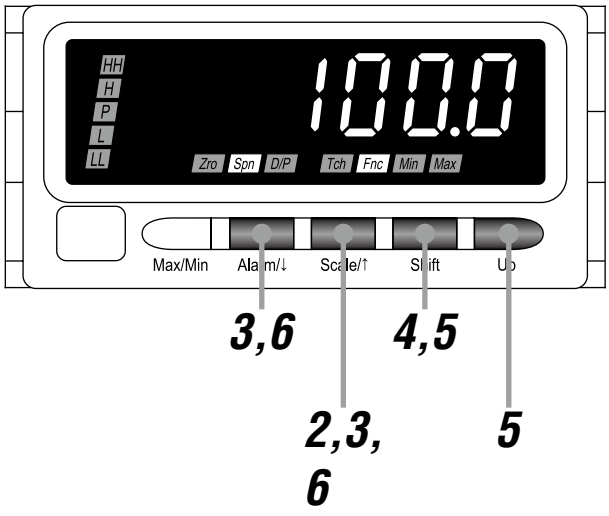
Set the load ratio to 10.0 and carry out the teach calibration (SPAN) with a weight 30 kg to set the input scaling value B.

■ SETTING RANGE OF LOAD RATIO

Load ratio can be set within the range of 10.0 to 100.0%.
The default value is 100.0.

6.3.1 OPERATING PROCEDURE

Procedures to set the load ratio are described here, not with the rated load 300 kg but with a weight 30 kg, 10% of the load.



NOTE

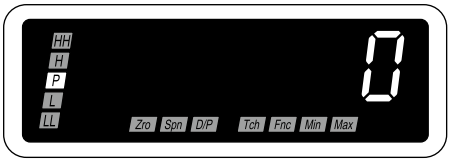
The left figure shows a display example. The display depends on the settings.

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

- All the indications turn on for approximately 1 second and then the display moves on to Measuring Mode.

■ Immediately after power on (all indicators on)

■ Measuring Mode



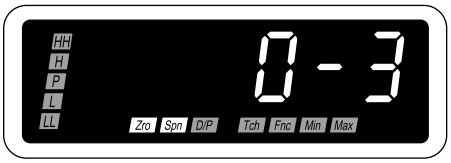
*1 Display depends on the settings and input.

NOTE

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

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

- The input type is indicated.
- 'Zro' and 'Spn' indicators turn on.

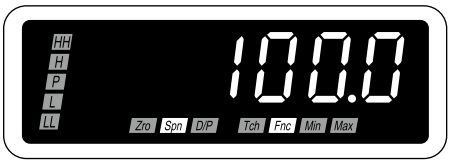


NOTE

Some alarm indicators turn on with the function indicators. The alarm indication is due to the last status before mode transition held but does not show the unit failure.

3 **Press Alarm/↓ or Scale/↑ button to go to the load ratio setting.**

- The load ratio is indicated.
- 'Spn' and 'Fnc' indicators turn on.

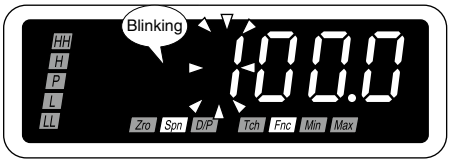


NOTE

Skip to Step 7 if the default value is acceptable.

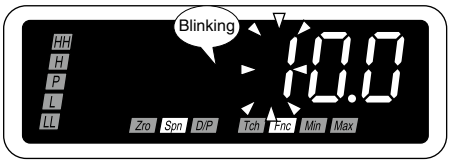
4 **Press Shift button to shift the display into the setting standby mode.**

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



5 **Press Shift and Up buttons to set to '10.0'.**

- Press Shift button to go to the next digit and Up button to change the blinking value.



NOTE

- '10.0' is a display example. Set any value within the setting range.
- 'Min' and 'Max' indicators start blinking when the set value is within invalid range. Return the setting within the valid range.

6 **Press Alarm/↓ or Scale/↑ button to apply the new setting.**

- And the next parameter setting is indicated.

NOTE

- Press Alarm/↓ button, and the input scaling value B will be indicated.
- Press Scale/↑ button, and the display scaling value A will be indicated within the range of -19999 to 19999 depending on the setting.

7 ■ **TO GO ON TO SET THE INPUT SCALING VALUE B,**
Skip to Step 3 in "6.4 STEP 4. INPUT SCALING VALUE B (ACTUAL LOAD)".

■ **TO QUIT,**
Hold down Alarm/↓or Scale/↑ button for 1 second or more to return to Measuring Mode.

NOTE

■ **IF THE FRONT BUTTONS ARE LEFT UNTOUCHED…**

- The indication turns on with applying the last changes after the specified time period (default: 15 sec.) while it is in the setting standby mode (indication blinking in Step 4 and 5).
- The display goes back automatically to Measuring Mode after the specified time period (default: 15 sec.) in one of the other modes.
- This time period (automatic return time) is configurable. (Refer to 15. GOING BACK AUTOMATICALLY TO MEASURING MODE.)

■ **TO ABORT A SETTING…**

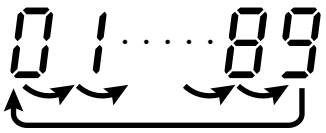
- Hold down Max/Min button for 1 second or more in the setting standby mode (indication blinking in Step 4 and 5) to return to Measuring Mode without applying the last changes.
- If you get lost in a setting mode, you can execute initialization. (Refer to 21.2 INITIALIZING SETTING VALUES.)

■ **SHIFTING DIGITS**

- Each time pressing Shift button, the blinking digit moves to the right.

■ **SETTING A NUMERICAL VALUE**

- Each time pressing Up button, the numeral is incremented by 1. In setting the forth digit, the indication following '9' will be none.



6.4 STEP 4. INPUT SCALING VALUE B (ACTUAL LOAD)

6.4.1 LIST FOR INPUT SCALING VALUE B (ACTUAL LOAD)

Default values and setting ranges of the input scaling value B per input strain gauge code and excitation voltage are as shown in the following tables.

■ INPUT STRAIN GAUGE CODE: S1 [MODEL: 47LLC-S1XXX-XX]

INPUT TYPE	EXCITATION VOLTAGE	SETTING RANGE	DEFAULT VALUE
0-1	2.5 V	Input scaling value A + [0.25 to 2.50] mV	0250
	5.0 V	Input scaling value A + [0.50 to 5.00] mV	0500
	7.5 V	Input scaling value A + [0.75 to 7.50] mV	0750
	10.0 V	Input scaling value A + [1.00 to 10.00] mV	1000

■ INPUT STRAIN GAUGE CODE: S2 [MODEL: 47LLC-S2XXX-XX]

INPUT TYPE	EXCITATION VOLTAGE	SETTING RANGE	DEFAULT VALUE
0-3	2.5 V	Input scaling value A + [0.75 to 7.50] mV	0750
	5.0 V	Input scaling value A + [1.50 to 15.00] mV	1500
	7.5 V	Input scaling value A + [2.25 to 22.50] mV	2250
	10.0 V	Input scaling value A + [3.00 to 30.00] mV	3000

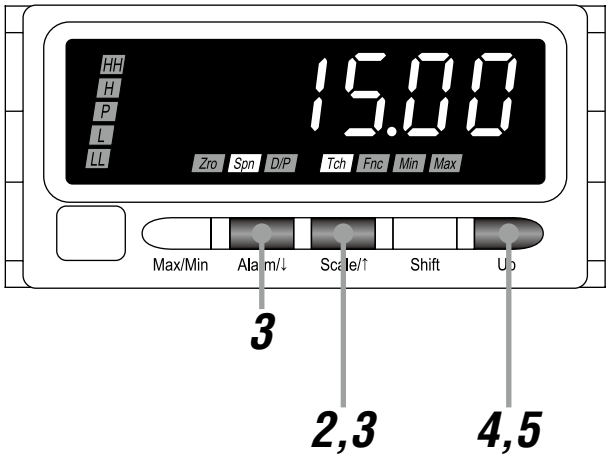
■ INPUT STRAIN GAUGE CODE: S3 [MODEL: 47LLC-S3XXX-XX]

INPUT TYPE	EXCITATION VOLTAGE	SETTING RANGE	DEFAULT VALUE
0-10	2.5 V	Input scaling value A + [2.5 to 25.0] mV	0250
	5.0 V	Input scaling value A + [5.0 to 50.0] mV	0500
	7.5 V	Input scaling value A + [7.5 to 75.0] mV	0750
	10.0 V	Input scaling value A + [10.0 to 100.0] mV	1000

■ INPUT STRAIN GAUGE CODE: S4 [MODEL: 47LLC-S4XXX-XX]

INPUT TYPE	EXCITATION VOLTAGE	SETTING RANGE	DEFAULT VALUE
0-30	2.5 V	Input scaling value A + [7.5 to 75.0] mV	0750
	5.0 V	Input scaling value A + [15.0 to 150.0] mV	1500
	7.5 V	Input scaling value A + [22.5 to 225.0] mV	2250
	10.0 V	Input scaling value A + [30.0 to 300.0] mV	3000

6.4.2 OPERATING PROCEDURE



NOTE

The left figure shows a display example (default value of input strain gauge code S2 and excitation voltage 5.0 V). The display depends on the settings. Refer to 6.4.1 LIST FOR INPUT SCALING VALUE B (ACTUAL LOAD) for details.

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

- All the indications turn on for approximately 1 second and then the display moves on to Measuring Mode.

■ Immediately after power on (all indicators on)

■ Measuring Mode

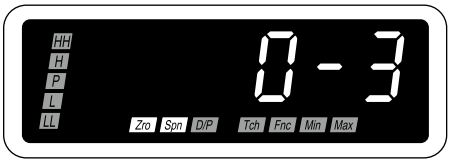
*1 Display depends on the settings and input.

NOTE

- Warm up the unit for 10 minutes or more.
- Indication 'S.ERR' may blink, which shows the input out of the measuring range and does not show the unit failure.

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

- The input type is indicated.
- 'Zro' and 'Spn' indicators turn on.



NOTE

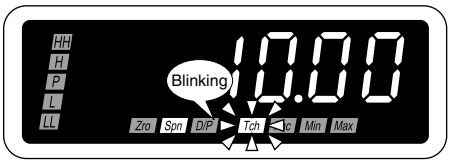
Some alarm indicators turn on with the function indicators. The alarm indication is due to the last status before mode transition held but does not show the unit failure.

3 **Press Alarm/↓ or Scale/↑ button to go to the input scaling value B setting.**

- The input scaling value B is indicated.
- 'Spn' and 'Tch' indicators turn on.

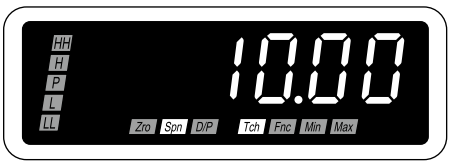
4 Press Up button to go to the teach calibration (SPAN) setting.

- The input after the load ratio operation is indicated.
- 'Tch' indicator starts blinking.



5 Apply load and press Up button to register the present value.

- The teach calibration (SPAN) is registered.
- 'Tch' indicator turns ON.



IMPORTANT

- Confirm that the input signal is stable before pressing Up button.
- Set within the setting range.

NOTE

- '10.00' is a display example. The registered input value is indicated.
- 'Min' and 'Max' indicators start blinking when the set value is within invalid range. Return the setting within the valid range.

6 ■ TO GO ON TO SET THE DISPLAY SCALING VALUE B,

Skip to Step 3 in "6.5 STEP 5. DISPLAY SCALING VALUE B (ACTUAL LOAD)".

■ TO QUIT,

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

NOTE

■ IF THE FRONT BUTTONS ARE LEFT UNTOUCHED…

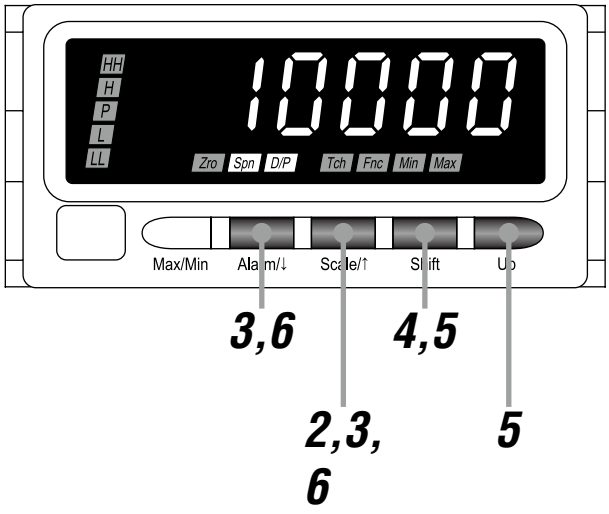
- The display goes back automatically to Measuring Mode after the specified time period (default: 15 sec.) in the steps other than Step 4.
- This time period (automatic return time) is configurable. (Refer to 15. GOING BACK AUTOMATICALLY TO MEASURING MODE.)

■ TO ABORT A SETTING…

- Hold down Max/Min button for 1 second or more in Step 4 to return to Measuring Mode without applying the last changes.
- If you get lost in a setting mode, you can execute initialization. (Refer to 21.2 INITIALIZING SETTING VALUES.)

6.5 STEP 5. DISPLAY SCALING VALUE B (ACTUAL LOAD)

6.5.1 OPERATING PROCEDURE



NOTE

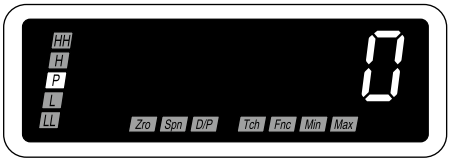
The left figure shows a display example. The display depends on the settings.

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

- All the indications turn on for approximately 1 second and then the display moves on to Measuring Mode.

■ Immediately after power on (all indicators on)

■ Measuring Mode



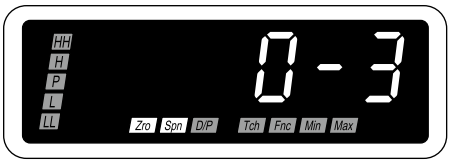
*1 Display depends on the settings and input.

NOTE

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

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

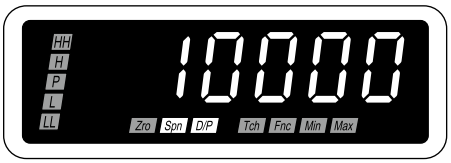
- The input type is indicated.
- 'Zro' and 'Spn' indicators turn on.



NOTE

Some alarm indicators turn on with the function indicators. The alarm indication is due to the last status before mode transition held but does not show the unit failure.

3 **Press Alarm/↓ or Scale/↑ button to go to the display scaling value B setting.**

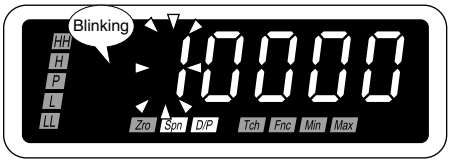


- The display scaling value B is indicated.
- 'Spn' and 'D/P' indicators turn on.

NOTE

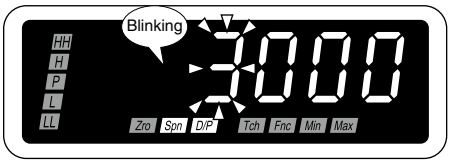
Skip to Step 7 if the default value is acceptable.

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



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

5 **Press Shift and Up buttons to set to '3000'.**



- Press Shift button to go to the next digit and Up button to change the blinking value.

NOTE

- '3000' is a display example. Set any value within the range of -19999 to 19999.
- The decimal point position depends on the decimal point position setting. Disregard the decimal point here.
- The negative sign (-) must be set to the leftmost digit. For example, set '-04.00' instead of '-4.00'.

6 **Press Alarm/↓ or Scale/↑ button to apply the new setting.**

- And the next parameter setting is indicated.

NOTE

- Press Alarm/↓ button, and the tare adjustment will be indicated.
- Press Scale/↑ button, and the input scaling value B will be indicated.

7 ■ **TO GO ON TO SET THE DECIMAL POINT POSITION,**
Skip to Step 3 in "6.6 STEP 6. DECIMAL POINT POSITION (ACTUAL LOAD)".

■ **TO QUIT,**
Hold down Alarm/↓ or Scale/↑ button for 1 second or more to return to Measuring Mode.

NOTE

■ **IF THE FRONT BUTTONS ARE LEFT UNTOUCHED…**

- The indication turns on with applying the last changes after the specified time period (default: 15 sec.) while it is in the setting standby mode (indication blinking in Step 4 and 5).
- The display goes back automatically to Measuring Mode after the specified time period (default: 15 sec.) in one of the other modes.
- This time period (automatic return time) is configurable. (Refer to 15. GOING BACK AUTOMATICALLY TO MEASURING MODE.)

■ **TO ABORT A SETTING…**

- Hold down Max/Min button for 1 second or more in the setting standby mode (indication blinking in Step 4 and 5) to return to Measuring Mode without applying the last changes.
- If you get lost in a setting mode, you can execute initialization. (Refer to 21.2 INITIALIZING SETTING VALUES.)

■ **SHIFTING DIGITS**

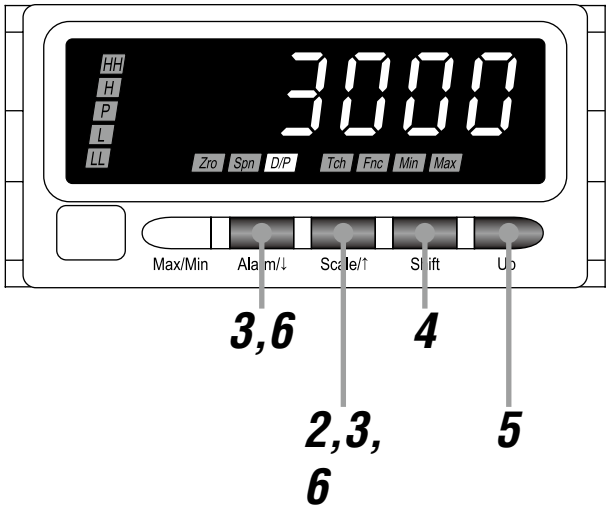
- Each time pressing Shift button, the blinking digit moves to the right.

■ **SETTING A NUMERICAL VALUE**

- Each time pressing Up button, the numeral is incremented by 1.

6.6 STEP 6. DECIMAL POINT POSITION (ACTUAL LOAD)

6.6.1 OPERATING PROCEDURE



NOTE

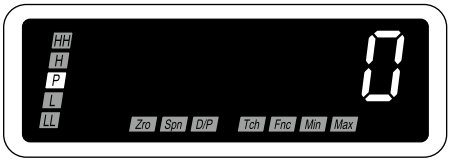
The left figure shows a display example (display scaling value B). The display depends on the settings.

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

- All the indications turn on for approximately 1 second and then the display moves on to Measuring Mode.

■ Immediately after power on (all indicators on)

■ Measuring Mode



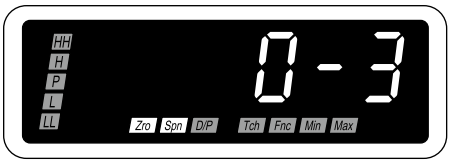
*1 Display depends on the settings and input.

NOTE

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

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

- The input type is indicated.
- 'Zro' and 'Spn' indicators turn on.

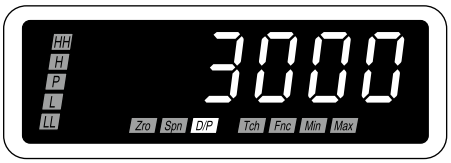


NOTE

Some alarm indicators turn on with the function indicators. The alarm indication is due to the last status before mode transition held but does not show the unit failure.

3 **Press Alarm/↓ or Scale/↑ button to go to the decimal point position setting.**

- The decimal point position is indicated.
- 'D/P' indicator turns on.

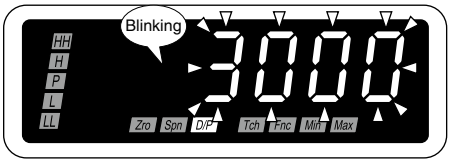


NOTE

Skip to Step 7 if the default value is acceptable.

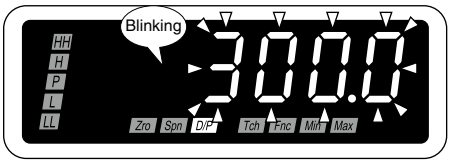
4 **Press Shift button to shift the display into the setting standby mode.**

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



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

- Select 1 decimal place (10^{-1}).
- Press Up 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 "4 decimal places".

6 **Press Alarm/↓ or Scale/↑ button to apply the new setting.**

- And the next parameter setting is indicated.

NOTE

- Press Alarm/↓ button, and the input type will be indicated. Or with DC output, the analog output function mode 'DISP' or 'SCLE' will be indicated depending on the setting.
- Press Scale/↑ button, and the tare adjustment will be indicated.

7 ■ **TO GO ON TO SET THE ANALOG OUTPUT FUNCTION MODE,**
Skip to Step 2 in "10. SETTING ANALOG OUTPUT FUNCTION".

■ **TO QUIT,**
Hold down Alarm/↓ or Scale/↑ button for 1 second or more to return to Measuring Mode.

NOTE

■ **IF THE FRONT BUTTONS ARE LEFT UNTOUCHED…**

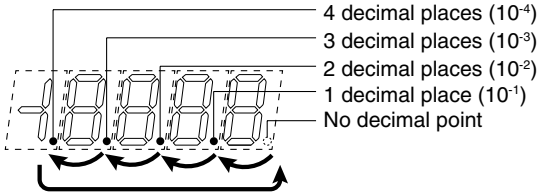
- The indication turns on with applying the last changes after the specified time period (default: 15 sec.) while it is in the setting standby mode (indication blinking in Step 4 and 5).
- The display goes back automatically to Measuring Mode after the specified time period (default: 15 sec.) in one of the other modes.
- This time period (automatic return time) is configurable. (Refer to 15. GOING BACK AUTOMATICALLY TO MEASURING MODE.)

■ **TO ABORT A SETTING…**

- Hold down Max/Min button for 1 second or more in the setting standby mode (indication blinking in Step 4 and 5) to return to Measuring Mode without applying the last changes.
- If you get lost in a setting mode, you can execute initialization. (Refer to 21.2 INITIALIZING SETTING VALUES.)

■ **MOVING THE DECIMAL POINT**

- Pressing Up button moves the decimal point one place to the left.



■ **DECIMAL POINT POSITION**

- "No decimal point" to "4 decimal places" can be selected in the decimal point position setting.

SETTING VALUE	FUNCTION
10000	No decimal point
10000	1 decimal place (10^{-1})
10000	2 decimal places (10^{-2})

SETTING VALUE	FUNCTION
10000	3 decimal places (10^{-3})
10000	4 decimal places (10^{-4})

7. ADJUSTING TARE

7.1 TARE ADJUSTMENT

Tare adjustment is to deduct the weight of a vessel from gross weight to obtain net weight. Tare adjustment is available via the front button control or by the external contact input.

7.1.1 TARE ADJUSTMENT LIST

The tare adjustment range depends upon the input strain gauge codes and the excitation voltage as shown in the following tables.

■ INPUT STRAIN GAUGE CODE: S1 [MODEL: 47LLC-S1XXX-XX]

INPUT TYPE	EXCITATION VOLTAGE	TARE ADJUSTMENT RANGE	DEFAULT VALUE
0-1	2.5 V	Input scaling value A + [-2.00 to +2.00] mV	0.0.0.
	5.0 V	Input scaling value A + [-4.00 to +4.00] mV	
	7.5 V	Input scaling value A + [-6.00 to +6.00] mV	
	10.0 V	Input scaling value A + [-8.00 to +8.00] mV	

■ INPUT STRAIN GAUGE CODE: S2 [MODEL: 47LLC-S2XXX-XX]

INPUT TYPE	EXCITATION VOLTAGE	TARE ADJUSTMENT RANGE	DEFAULT VALUE
0-3	2.5 V	Input scaling value A + [-6.00 to +6.00] mV	0.0.0.
	5.0 V	Input scaling value A + [-12.00 to +12.00] mV	
	7.5 V	Input scaling value A + [-18.00 to +18.00] mV	
	10.0 V	Input scaling value A + [-24.00 to +24.00] mV	

■ INPUT STRAIN GAUGE CODE: S3 [MODEL: 47LLC-S3XXX-XX]

INPUT TYPE	EXCITATION VOLTAGE	TARE ADJUSTMENT RANGE	DEFAULT VALUE
0-10	2.5 V	Input scaling value A + [-20.0 to +20.0] mV	0.0.0.
	5.0 V	Input scaling value A + [-40.0 to +40.0] mV	
	7.5 V	Input scaling value A + [-60.0 to +60.0] mV	
	10.0 V	Input scaling value A + [-80.0 to +80.0] mV	

■ INPUT STRAIN GAUGE CODE: S4 [MODEL: 47LLC-S4XXX-XX]

INPUT TYPE	EXCITATION VOLTAGE	TARE ADJUSTMENT RANGE	DEFAULT VALUE
0-30	2.5 V	Input scaling value A + [-60.0 to +60.0] mV	0.0.0.
	5.0 V	Input scaling value A + [-120.0 to +120.0] mV	
	7.5 V	Input scaling value A + [-180.0 to +180.0] mV	
	10.0 V	Input scaling value A + [-240.0 to +240.0] mV	

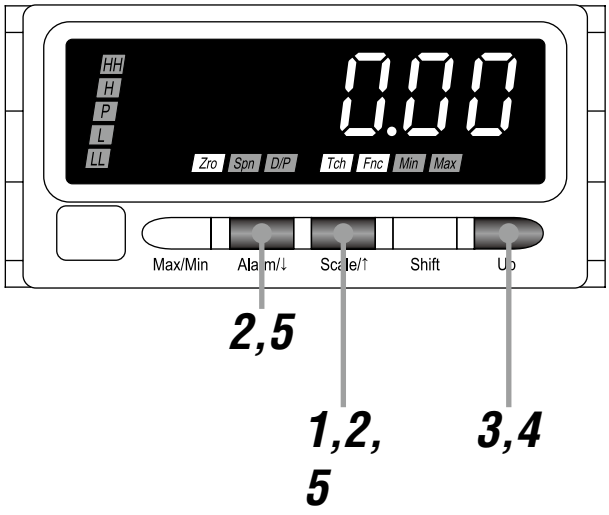
IMPORTANT

- The tare adjustment is reset when the excitation voltage, input scaling value A or B (including Teach Calibration) has been changed.
- The tare input is stored when the power is turned off.

7.2 TARE ADJUSTMENT VIA BUTTON CONTROL

Procedures to adjust the vessel weight 30.0 kg via front button control are described here with the input scaling 0 – 10 mV DC and display scaling 0.0 – 300.0 kg.

7.2.1 OPERATING PROCEDURE

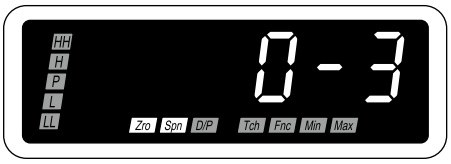


NOTE

The left figure shows a display example. The display depends on the tare adjustment.

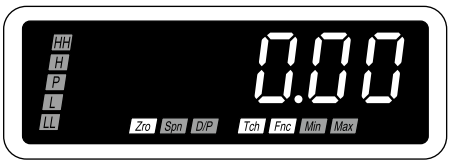
1 **Hold down Scale/↑ button for 3 seconds or more to move on to Scaling Setting Mode.**

- The input type is indicated.
- 'Zro' and 'Spn' indicators turn on.



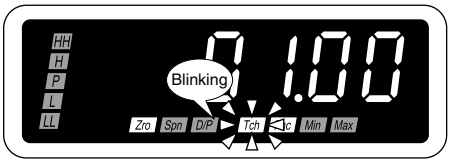
2 **Press Alarm/↓ or Scale/↑ button to go to the tare adjustment.**

- The tare adjustment is indicated.
- 'Zro', 'Tch' and 'Fnc' indicators turn on.



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

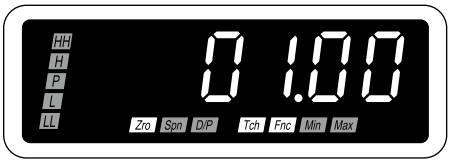
- 'Tch' indicator starts blinking.



IMPORTANT

The value added to the input scaling value A is indicated. In this example, the vessel weight is equivalent to 10% of the display scaling. The strain gauge output voltage is 1 mV, equivalent to 10% of 10 mV. Therefore '01.00', 1 mV added to the input scaling value A, is indicated.

4 **Put the empty vessel on the strain gauge, and press Up button to register the present value.**



- The teach calibration (TARE) is registered.
- 'Tch' indicator turns ON.

IMPORTANT

- Confirm that the input signal is stable before pressing Up button.
- Set within the tare adjustment range.

NOTE

'Min' and 'Max' indicators start blinking when the set value is within invalid range. Review the vessel.

5 **Hold down Alarm/↓ or Scale/↑ button for 1 second or more to return to Measuring Mode.**

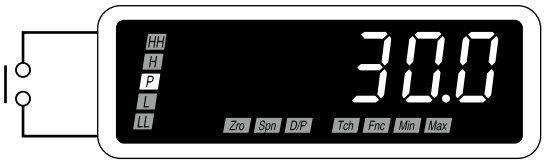
7.3 TARE ADJUSTMENT VIA EXTERNAL CONTACT INPUT

Procedures to adjust the vessel weight 30.0 kg via external contact input are described here with the display scaling 0.0 – 300.0 kg.

7.3.1 OPERATING PROCEDURE

1 **With the contact input OFF (open), put the empty vessel on the strain gauge.**

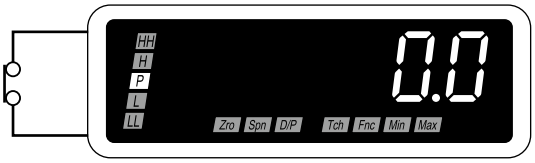
• The vessel weight is indicated.



*1 Display depends on the settings and input.

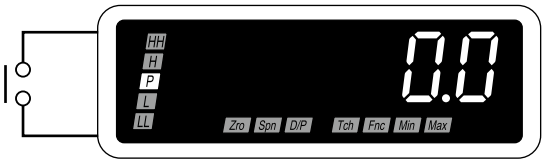
2 **Confirm that the indication is stable, and turn ON (close) the contact input to adjust the tare.**

• The value equivalent to the display scaling value A is indicated.



3 **Confirm that the indication is stable, and turn OFF (open) the contact input.**

• The tare input is registered.



IMPORTANT

- Turning ON the contact input executes tare adjustment even while in setting other parameters. Turn OFF the contact input except in adjusting tare.
- The tare adjustment resets the alarm and DC outputs to 0%, corresponding to the display scaling value A.
- Even while 'S.ERR' is indicated, the tare is adjustable within the valid range. Adjusting beyond the range is not available. Review the vessel in such a case.
- Once registered, the tare input is indicated in setting the tare adjustment as voltage equivalent to the vessel weight + input scaling value A.

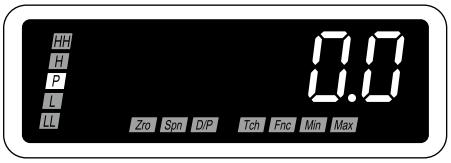
8. OPERATION

Make sure that 0.0 – 300.0 kg is correctly indicated with the actual load applied.

IMPORTANT

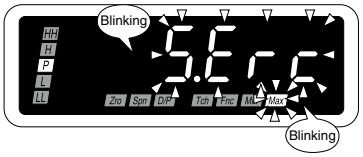
Before operating, make sure that the wiring is correct, the input, the excitation voltage and the power supply are within the specification range.

1 **With no load applied or the empty vessel put on the strain gauge, make sure that 0.0 kg is indicated.**



*1 Display depends on the settings and input.

NOTE



■ **WHEN THE INDICATION IS SHIFTED…**

- When the indication is shifted without any load, not using the vessel, carry out the Teach Calibration. (Refer to 6. SETTING SCALING VALUES WITH ACTUAL LOAD.)
- When the indication is shifted with the empty vessel put on, adjust the tare. (Refer to 7. ADJUSTING TARE.)

■ **WHEN THE FOLLOWING IS INDICATED…**

- When 'S.ERR' is indicated, the input is not applied correctly. Check the input wiring, equipment, signal and excitation voltage. When 'Min' indicator blinks, the input signal is under the specification voltage. And when 'Max' indicator blinks, the input is over the specification voltage.

■ **ALARM INDICATORS**

- The status of the alarm indicators depends on the alarm setpoints. The above display example shows 'P' indicator on.

2 **With 300 kg load applied, make sure that 300.0 kg is indicated.**

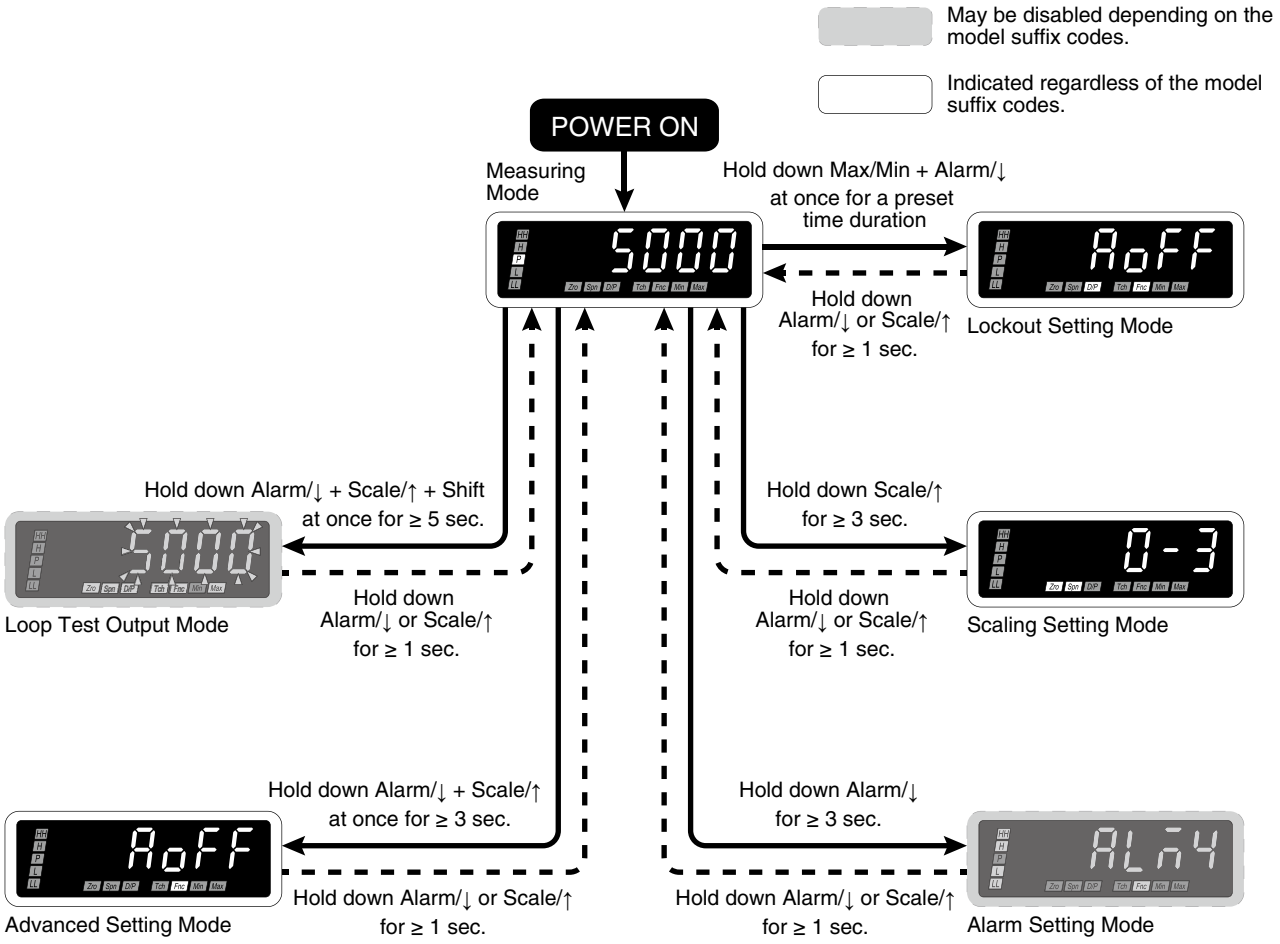
9. PARAMETER CONFIGURATION

■ MODE

Parameters can be grouped in several modes.
The 47LLC has modes as shown in the following table.

MODE	FUNCTION	MEASUREMENT
Measuring	Normal measurement state where the unit takes in input and provides alarms. Present value, MAX and MIN values, alarm setpoints can be indicated in Measuring Mode. Also the tare adjustment can be executed in this mode. When the power is supplied, the unit operates in Measuring Mode.	Measuring
Scaling Setting	Basic settings such like excitation voltage, input scaling, display scaling and tare adjustment, and also Teach Calibration, analog output function and analog output adjustments can be performed.	Measuring stopped
Alarm Setting	Alarm setpoints, trip action, deadband and ON delay time can be set.	
Advanced Setting	Moving average, low-end cutout and brightness can be set. Also the firmware version can be confirmed.	
Lockout Setting	Settings to prevent inadvertent button operation can be performed. Mode transition and set values can be locked.	
Loop Test Output	Simulated measured value can be set to perform output test.	

■ MODE TRANSITION



■ TRANSITION FROM MEASURING MODE TO EACH MODE

To Scaling Setting Mode	Hold down Scale/↑ button for 3 seconds or more.
To Alarm Setting Mode	Hold down Alarm/↓ button for 3 seconds or more.
To Advanced Setting Mode	Hold down Alarm/↓ + Scale/↑ buttons at once for 3 seconds or more.
To Lockout Setting Mode	Hold down Max/Min + Alarm/↓ buttons at once for a preset time duration.
To Loop Test Output	Hold down Alarm/↓ + Scale/↑ + Shift buttons at once for 5 seconds or more.

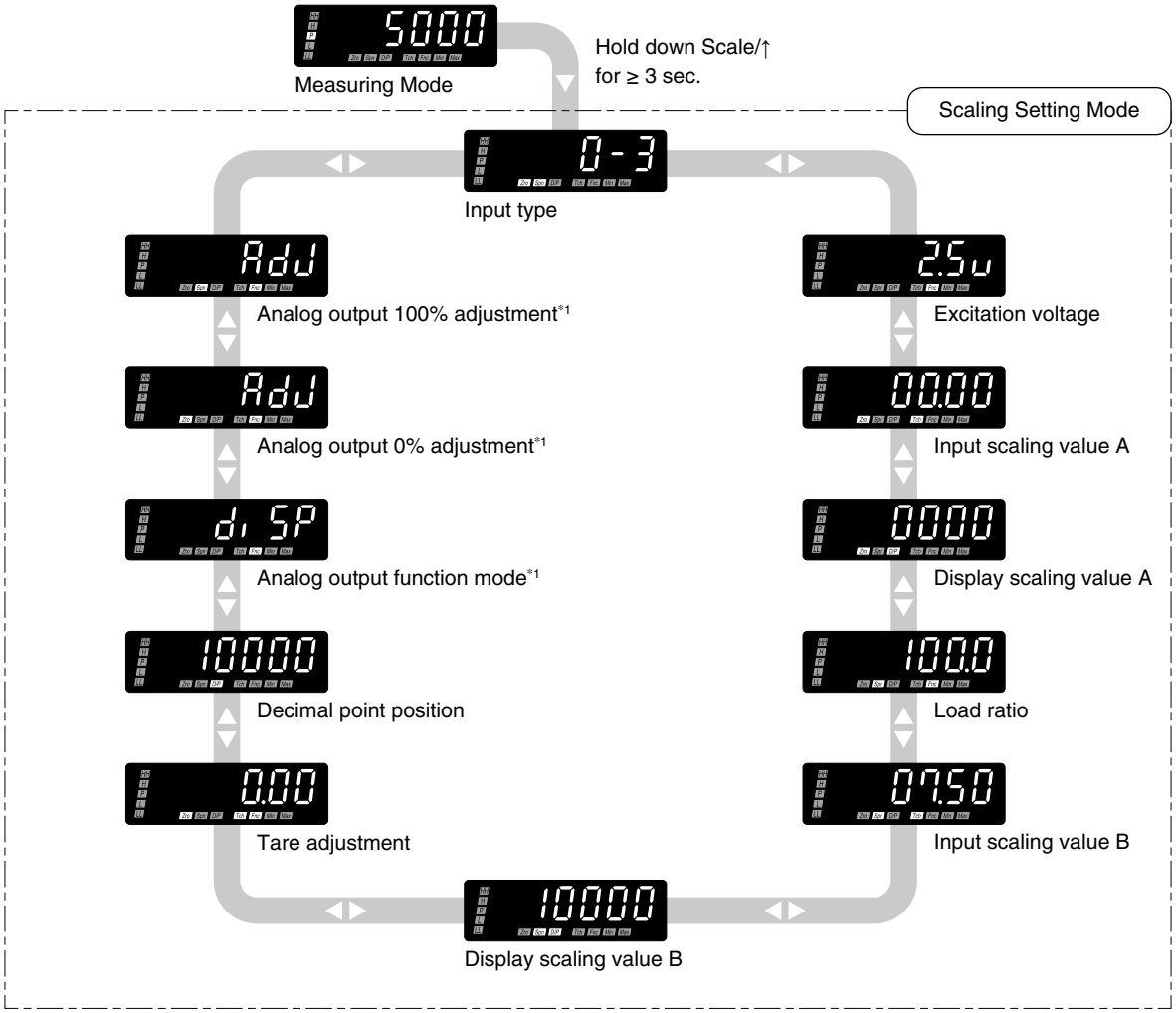
■ TRANSITION FROM EACH MODE TO MEASURING MODE

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

■ SHIFTING THROUGH SETTING PARAMETERS

(1) Parameter shifting in Scaling Setting Mode

In Scaling Setting Mode, pressing Alarm/↓ button shifts one parameter to the next (clockwise in the following figure). Pressing Scale/↑ button shifts one to the previous (counterclockwise).



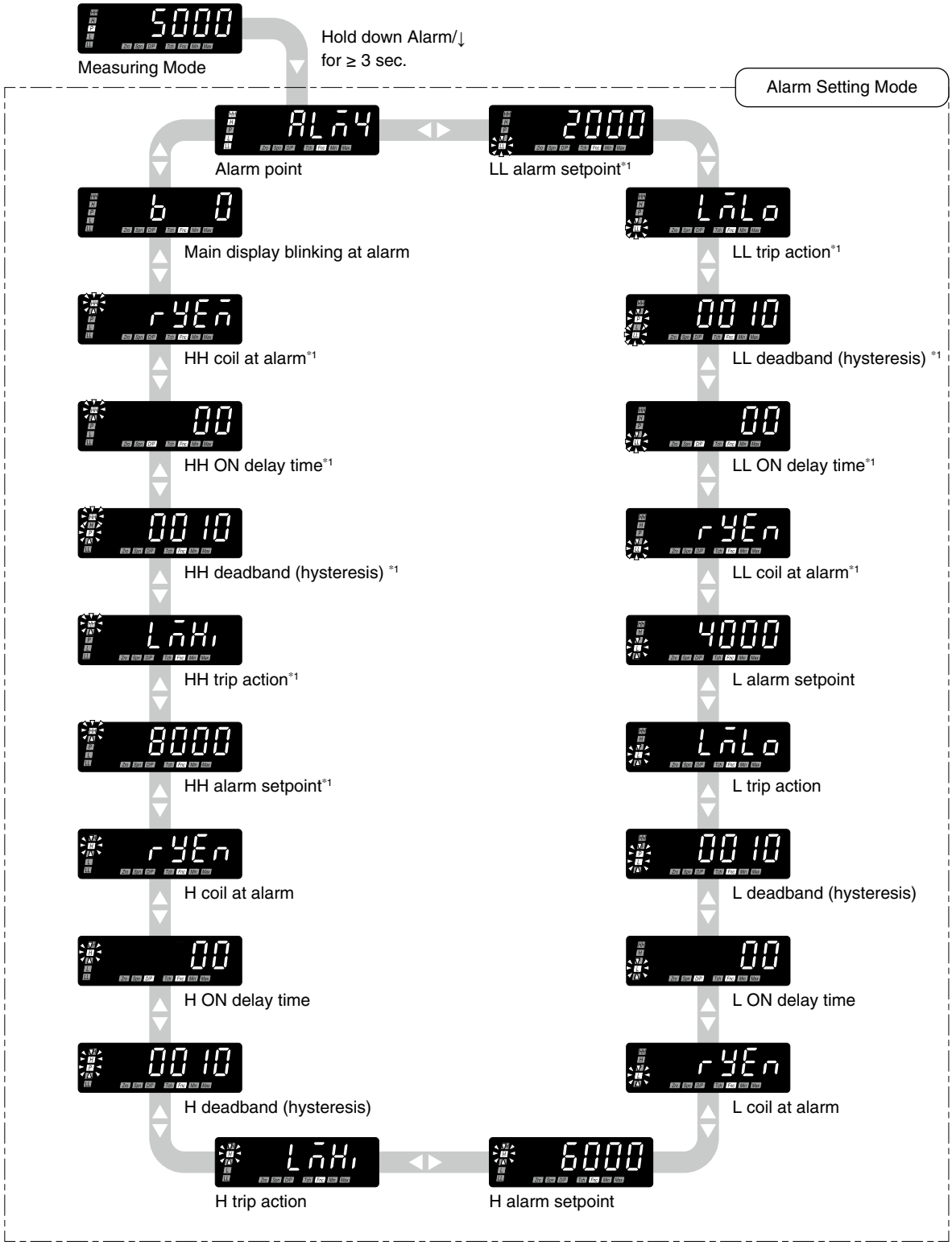
*1 Disabled with no-DC-output type.

NOTE

- The display depends on the input strain gauge code and settings. The above displays show default values with the input strain gauge code 'S2'.
- Hold down Alarm/↓ or Scale/↑ button for 1 second or more to return to Measuring Mode from each parameter.

(2) Parameter shifting in Alarm Setting Mode

In Alarm Setting Mode, pressing Alarm/↓ button shifts one parameter to the next (clockwise in the following figure). Pressing Scale/↑ button shifts one to the previous (counterclockwise).



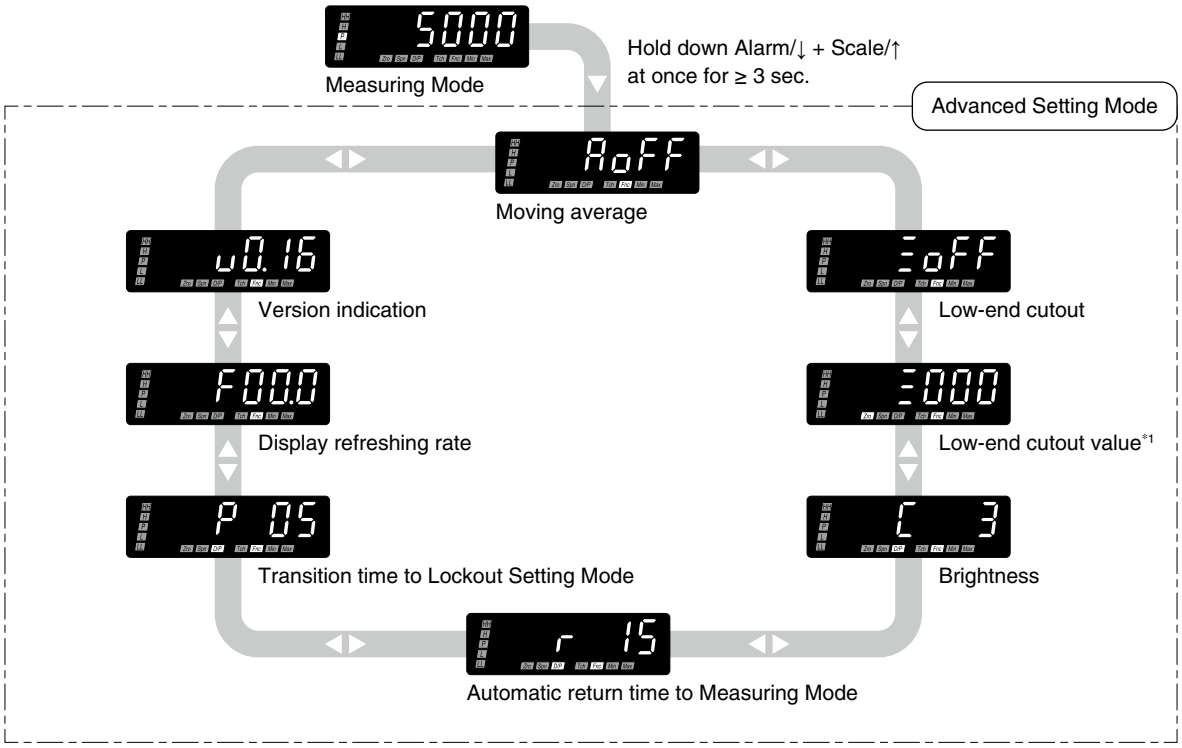
*1 Disabled with “Dual alarm” selected for the alarm point parameter.

NOTE

- The display depends on the settings. The above displays show default values with the alarm output code ‘1’ (N.O. relay contact, 4 points) and ‘3’ (photo MOSFET relay, 4 points).
- Hold down Alarm/↓ or Scale/↑ button for 1 second or more to return to Measuring Mode from each parameter.

(3) Parameter shifting in Advanced Setting Mode

In Advanced Setting Mode, pressing Alarm/↓ button shifts one parameter to the next (clockwise in the following figure). Pressing Scale/↑ button shifts one to the previous (counterclockwise).



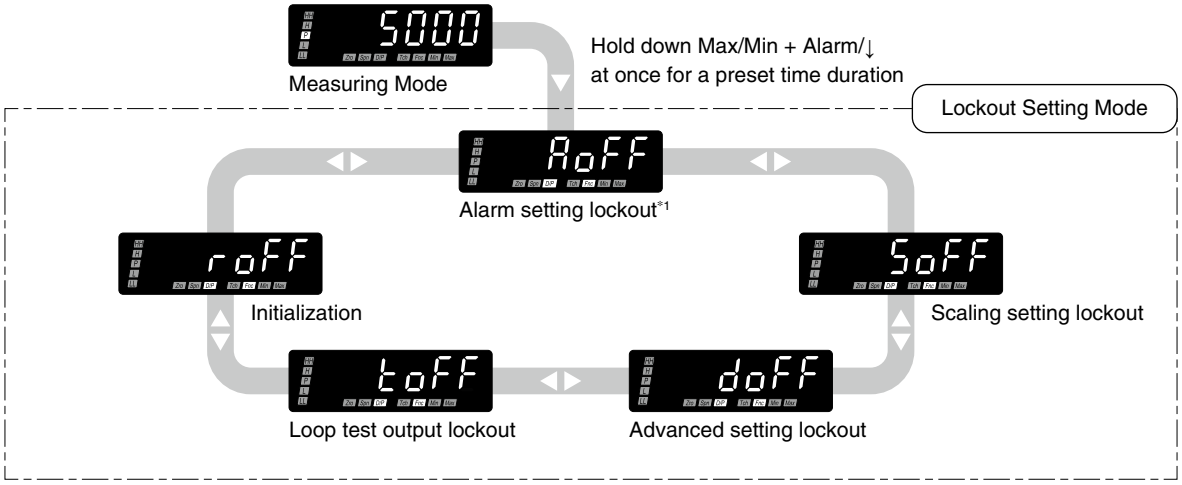
*1 With the cutout set to OFF, the low-end cutout value setting is locked.

NOTE

- The display depends on the settings. The above displays show default values.
- Hold down Alarm/↓ or Scale/↑ button for 1 second or more to return to Measuring Mode from each parameter.

(4) Parameter shifting in Lockout Setting Mode

In Lockout Setting Mode, pressing Alarm/↓ button shifts one parameter to the next (clockwise in the following figure). Pressing Scale/↑ button shifts one to the previous (counterclockwise).



*1 Disabled with no-alarm-output type.

NOTE

- The display depends on the settings. The above displays show default values.
- Hold down Alarm/↓ or Scale/↑ button for 1 second or more to return to Measuring Mode from each parameter.

(5) Parameter shifting in Loop Test Output Mode

There is no parameter shifting in this mode.

10. SETTING ANALOG OUTPUT FUNCTION

The DC output function, “proportional to the display value” as shown in Figure 1 or “proportional to the scaling value” as shown in Figure 2, can be selected.

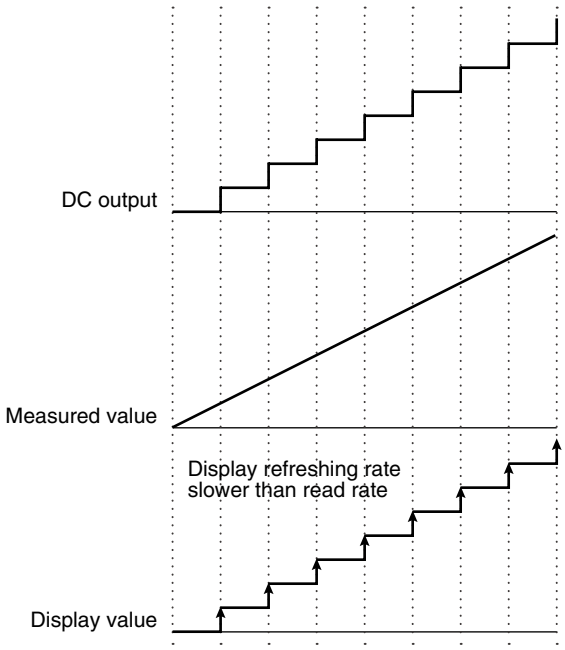
■ ANALOG OUTPUT FUNCTION

ANALOG OUTPUT	DISPLAY	FUNCTION	DEFAULT VALUE
Proportional to display value	d. SP	DC output proportional to the display value after tare adjustment, affected by moving average, low-end cutout and display refreshing rate (Figure 1).	d. SP
Proportional to scaling value	SCLE	DC output proportional to the measured value after tare adjustment (Figure 2).	

■ DIFFERENCE OF ANALOG OUTPUT FUNCTIONS

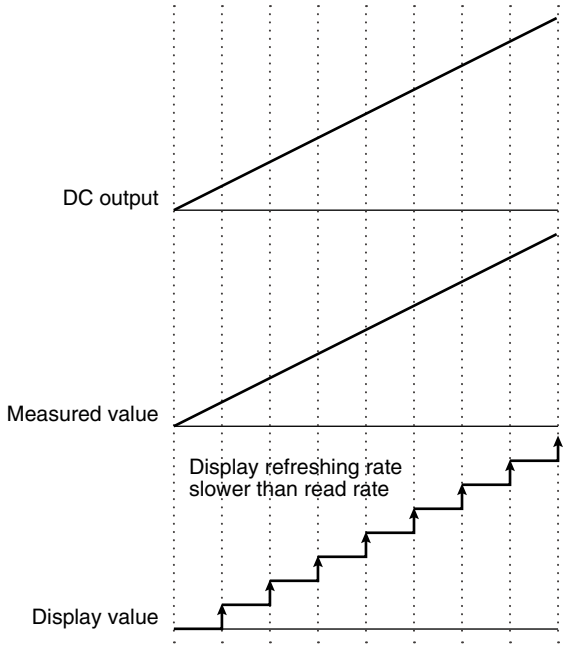
Figures 1 and 2 show the difference of DC output functions, when the display refreshing rate is set slower than the read rate.

Figure 1: DC output proportional to display value



The DC output is proportional to the display value.

Figure2: DC output proportional to scaling value

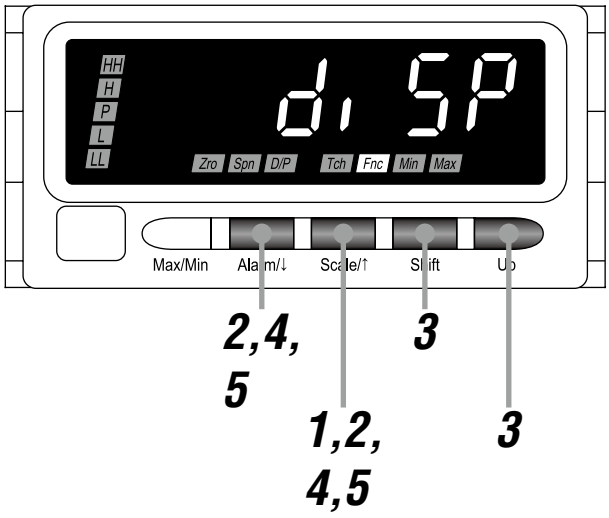


The DC output is proportional to the measured value.

IMPORTANT

- DC output signals are output as smaller display scaling value corresponds to 0% analog output and larger display scaling value corresponds to 100% analog output.
- The operational range of the DC output is -5 to +105% of the output span after analog output 0% and 100% adjustments.
- Beyond the operational range, the output is saturated at -5% or +105%.

10.1 OPERATING PROCEDURE

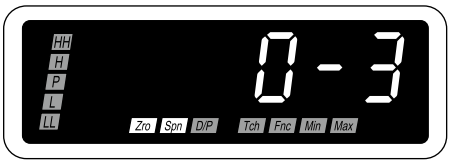


NOTE

- Procedures to change 'DISP' to 'SCLE' are described here.
- To change 'SCLE' to 'DISP', the procedures are same. Select 'DISP' in Step 3.

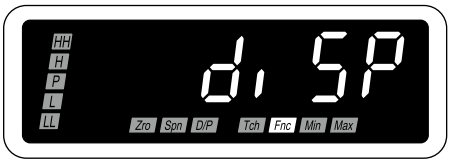
1 **Hold down Scale/↑ button for 3 seconds or more to move on to Scaling Setting Mode.**

- The input type is indicated.
- 'Zro' and 'Spn' indicators turn on.

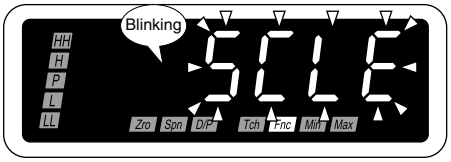


2 **Press Alarm/↓ or Scale/↑ button to go to the analog output function mode setting.**

- 'DISP' is indicated.
- 'Fnc' indicator turns on.



3 **Press Shift or Up button to select 'SCLE'.**



4 **Press Alarm/↓ or Scale/↑ button to apply the new setting.**

- And the next parameter setting is indicated.

NOTE

- Press Alarm/↓ button, and the analog output 0% adjustment 'ADJ' will be indicated.
- Press Scale/↑ button, and the decimal point position will be indicated.

5 **Hold down Alarm/↓ or Scale/↑ button for 1 second or more to return to Measuring Mode.**

11. SETTING ALARM OUTPUT

The unit compares the present value with the alarm setpoints, and provides an alarm output (relay contact or photo MOS-FET relay). You can configure parameters as alarm conditions as shown in Tables 1 and 2. Figures 1 to 5 show alarm examples using each parameter.

■ TABLE 1: ALARM OUTPUT PARAMETERS

PARAMETER	FUNCTION
Alarm point	Dual alarm or quad alarm
Alarm setpoint	Setpoint value within the range of -19999 to 19999 for the display value
Trip action	High or low trip Configuring typical L/H trip setting (Figure 1) or all trip points to high or low setting (Figure 2) is available. 'P' indicator turns on when none of the other alarms is tripped.
Deadband (hysteresis)	Once a high (low) trip alarm is ON, the alarm stays ON until the data becomes lower (higher) than the dead band value from the setpoint, which prevents the alarm output from chattering when the display value fluctuates slightly near the setpoint (Figure 3). Deadband works in the direction of increasing the display value for low trip and in the direction of decreasing it for high.
ON delay time	Alarm output is provided when the display value exceeds the setpoint and stayed for the specified time duration, which prevents the alarm output from being provided by a sudden change such like external disturbance (Figure 4).
Coil at alarm	Alarm output logic, coil energized or de-energized at alarm (Figure 5).
Main display blinking at alarm	Main display blinking interval at alarm can be selected among 5 intervals (Table 2).

■ TABLE 2: SETTING VALUES

PARAMETER	DISPLAY	FUNCTION	DEFAULT VALUE
Alarm point	AL n2	Dual alarm	Alarm output code 1, 3: AL n4
	AL n4	Quad alarm	Alarm output code 2: AL n2
Alarm setpoint	-9999 to 9999	-19999 to 19999	LL alarm setpoint: -2000 L alarm setpoint: 4000 H alarm setpoint: 6000 HH alarm setpoint: 8000
Trip action	C nLo	Lo trip	LL, L trip action: C nLo
	C nH.	Hi trip	HH, H trip action: C nH.
Deadband (hysteresis)	0001 to 9999	0001 – 9999	0010
ON delay time	00 to 99	0 – 99 seconds	00
Coil at alarm	r YEn	Coil energized at alarm	r YEn
	r Ydn	Coil de-energized at alarm	
Main display blinking at alarm	b 0	No blinking	b 0
	b 1	Blinking in 1.0 second intervals	
	b 2	Blinking in 0.5 second intervals	
	b 3	Blinking in 0.2 second intervals	
	b 4	Blinking in 0.1 second intervals	

Figure 1: Typical L/H trip setting

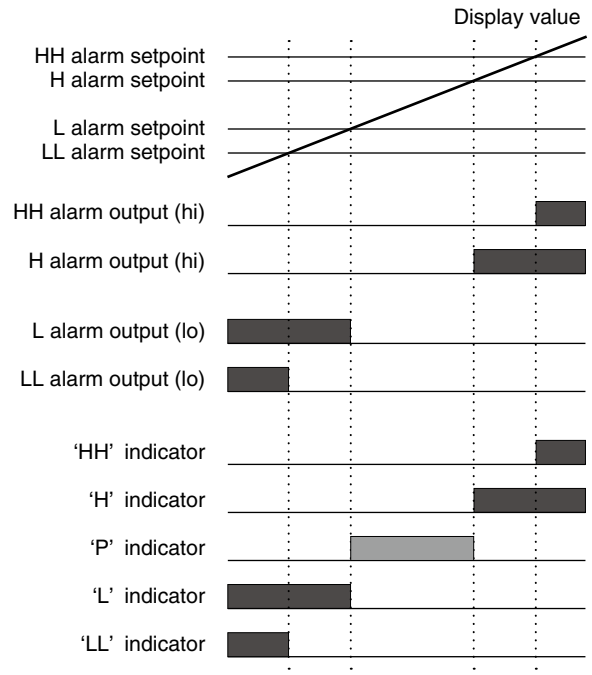
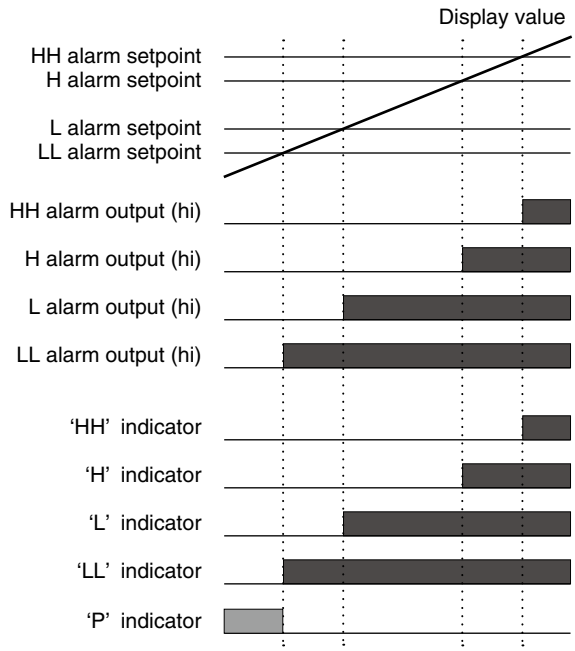


Figure 2: All trip points set to high setting



Low or high trip action can be set for each alarm output. 'LL' , 'L' , 'H' and 'HH' indicators are fixed for each setpoint. Therefore, even in case setting LL alarm output to high trip action, for example, 'LL' indicator turns on at alarm.

Figure 3: Deadband (hysteresis)

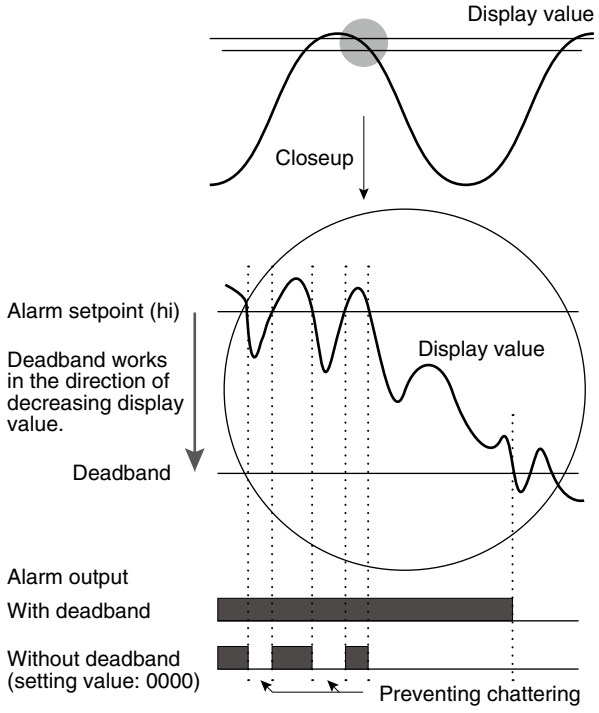
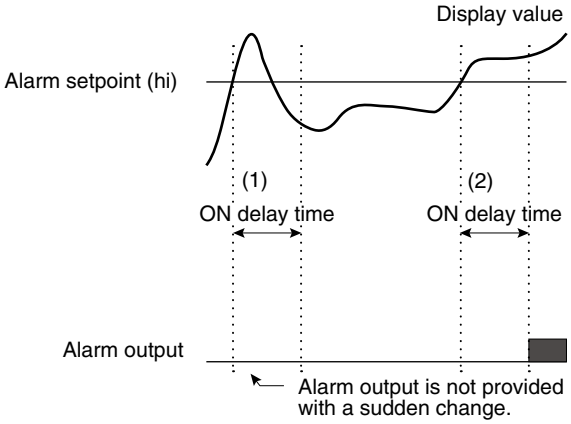


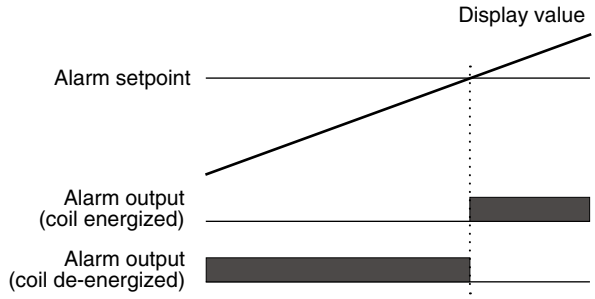
Figure 4: ON delay time



(1) The display value once exceeds the alarm setpoint but becomes below it during ON delay time period. Therefore alarm output is not provided.
(2) The display value exceeds the setpoint and stays over the ON delay time period. Therefore alarm output is provided.

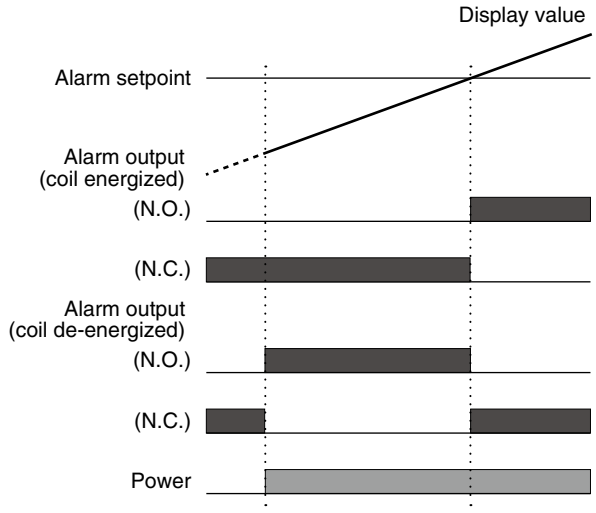
Figure 5: Coil at alarm

■ **Alarm Output Code '1' (N.O. relay contact, 4 points) and '3' (photo MOSFET relay, 4 points)**



In order to stop operation of equipment when the display value exceeds the setpoint, for instance, set reversal output logic (N.C.), "coil de-energized".

■ **Alarm Output Code '2' (SPDT relay contact, 2 points)**



In order to provide an alarm output at power OFF and at alarm, set "coil de-energized" and use the N.C. terminal.

IMPORTANT

- When indication 'S.ERR' and 'Min' indicator blink, all the low alarm outputs are provided. When indication 'S.ERR' and 'Max' indicator blink, all the high alarm outputs are provided.
- When indication '-19999' blinks, all the low alarm outputs are provided. When '19999' blinks, all the high alarm outputs are provided.
- The deadband and ON delay time are reset to the default values when the alarm point has been changed. The current setpoints are held when quad alarm is changed to dual alarm. The current L and H setpoints are held but the LL and HH setpoints are returned to the previously set values when dual alarm is changed to quad alarm. However when a current setpoint is '----', it is returned to the previous one in any case.

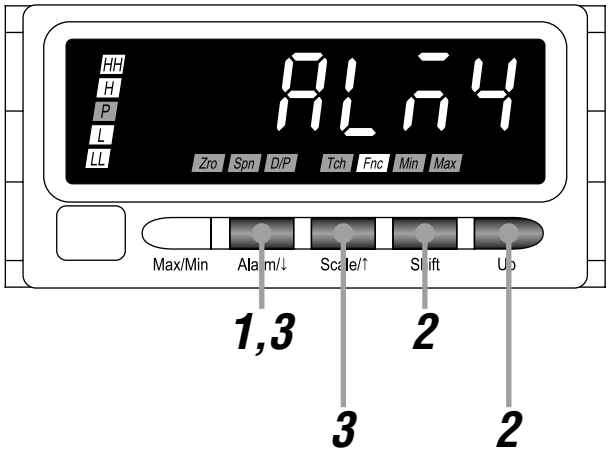
NOTE

- Alarm Setting Mode is locked with the alarm output code '0' no-alarm-output type.
- Alarm point is fixed at '2' when the alarm output code '2' is specified.

11.1 ALARM POINT

The alarm point, dual alarm 'ALM2' or quad alarm 'ALM4', can be selected. The alarm point is fixed at '2' and the setting is not necessary when the alarm output code '2' (SPDT relay contact, 2 points) is specified.

11.1.1 OPERATING PROCEDURE

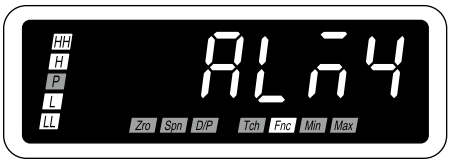


NOTE

- Procedures to change 'ALM4' to 'ALM2' are described here.
- To change 'ALM2' to 'ALM4', the procedures are same. Select 'ALM4' in Step 2.

1 **Hold down Alarm/↓ button for 3 seconds or more to move on to Alarm Setting Mode.**

- The alarm point is indicated.
- 'HH', 'H', 'L', 'LL' and 'Fnc' indicators turn on.

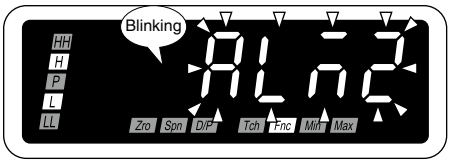


NOTE

- 'ALM2' or 'ALM4' is indicated depending on the setting.
- When "Dual alarm" is selected for the alarm point parameter, 'HH' and 'LL' indicators do not turn on.

2 **Press Shift or Up button to select 'ALM2'.**

- 'HH' and 'LL' indicators turn off.



3 **Press Alarm/↓ or Scale/↑ button to apply the new setting.**

- And the next parameter setting is indicated.

NOTE

- Press Alarm/↓ button, and the L (LL) alarm setpoint will be indicated within the range of -19999 to 19999 depending on the setting.
- Press Scale/↑ button, and the main display blinking at alarm 'B 0', 'B 1', 'B 2', 'B 3' or 'B 4' will be indicated depending on the setting.

4 ■ **TO SET THE NEXT PARAMETER,**
Skip to Step 2 in "11.2 ALARM SETPOINT".

■ **TO QUIT,**
Hold down Alarm/↓ or Scale/↑ button for 1 second or more to return to Measuring Mode.

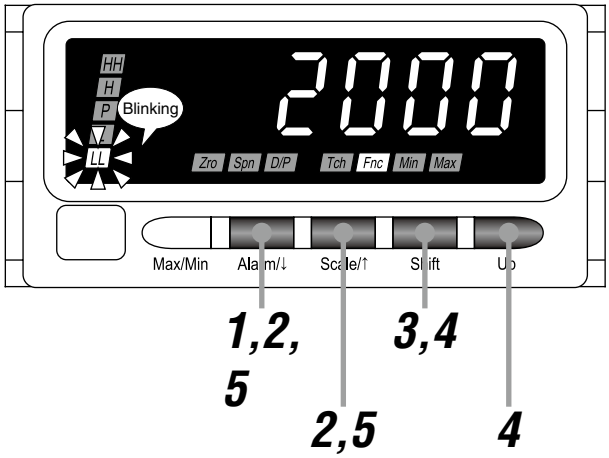
11.2 ALARM SETPOINT

Alarm setpoints can be set within the range of -19999 to 19999. However the alarm is not provided in setting the setpoint beyond the set display scaling range. Set the setpoints within the valid range.

11.2.1 ALARM SETPOINT LIST

PARAMETER	DEFAULT VALUE
LL alarm setpoint	2000
L alarm setpoint	4000
H alarm setpoint	6000
HH alarm setpoint	8000

11.2.2 OPERATING PROCEDURE



NOTE

- The following figures are display examples. The displays depend on the settings.
- With “Dual alarm” selected for the alarm point parameter, the LL and HH alarm setpoints are disabled.

1 **Hold down Alarm/↓ button for 3 seconds or more to move on to Alarm Setting Mode.**

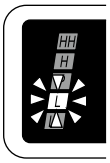
- The alarm point is indicated.
- ‘HH’, ‘H’, ‘L’, ‘LL’ and ‘Fnc’ indicators turn on.

NOTE

- ‘ALM2’ or ‘ALM4’ is indicated depending on the setting.
- When “Dual alarm” is selected for the alarm point parameter, ‘HH’ and ‘LL’ indicators do not turn on.

2 **Press Alarm/↓ or Scale/↑ button to go to the LL (L, H or HH) alarm setpoint setting.**

- The LL (L, H or HH) alarm setpoint is indicated.
- 'LL' ('L', 'H' or 'HH') indicator blinks and 'Fnc' indicator turns on.



■ L alarm setpoint

■ H alarm setpoint

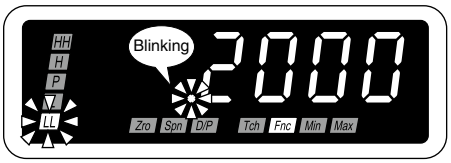
■ HH alarm setpoint

NOTE

The setpoint is indicated within the range of -19999 to 19999 depending on the setting.

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

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



4 **Press Shift and Up buttons to set the LL (L, H or HH) alarm setpoint.**

- Set within the range of -19999 to 19999.

IMPORTANT

Specify '----' to disable the alarm output.

NOTE

Set the alarm setpoint with the decimal point position set in the decimal point position setting.

5 **Press Alarm/↓ or Scale/↑ button to apply the new setting.**

- And the next parameter setting is indicated.

NOTE

- Press Alarm/↓ button, and the LL (L, H or HH) trip action 'LMLO' or 'LMHI' will be indicated depending on the setting.
- Press Scale/↑ button, and the alarm point 'ALM2' or 'ALM4' (or LL, L or H coil at alarm 'RYEN' or 'RYDN') will be indicated depending on the setting.

6 ■ **TO GO ON TO SET ANOTHER ALARM SETPOINTS,**
Repeat operation from Step 2.

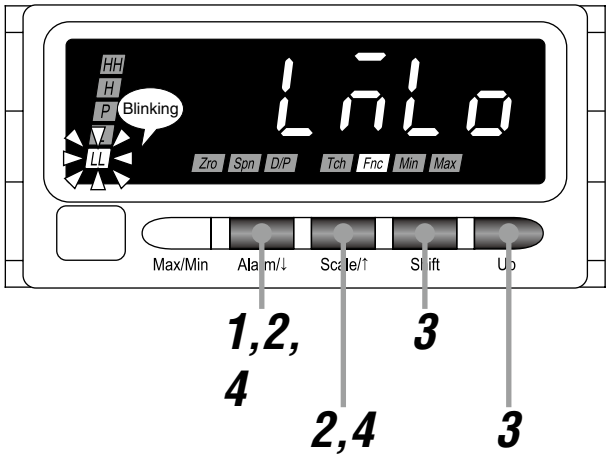
■ **TO SET THE NEXT PARAMETER,**
Skip to Step 2 in "11.3 TRIP ACTION (LO/HI)".

■ **TO QUIT,**
Hold down Alarm/↓ or Scale/↑ button for 1 second or more to return to Measuring Mode.

11.3 TRIP ACTION (LO/HI)

The trip action low 'LMLO' or high 'LMHI' can be selected. Configuring typical L/H trip setting or all trip points to high or low setting is available. The default values are "low trip" for the LL and L trip actions and "high trip" for the HH and H.

11.3.1 OPERATING PROCEDURE

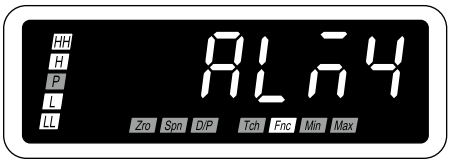


NOTE

- Procedures to change 'LMLO' to 'LMHI' are described here.
- To change 'LMHI' to 'LMLO', the procedures are same. Select 'LMLO' in Step 3.
- With "Dual alarm" selected for the alarm point parameter, the LL and HH trip actions are disabled.

1 **Hold down Alarm/↓ button for 3 seconds or more to move on to Alarm Setting Mode.**

- The alarm point is indicated.
- 'HH', 'H', 'L', 'LL' and 'Fnc' indicators turn on.

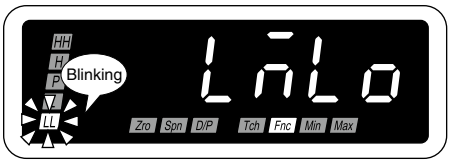


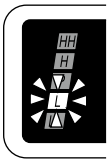
NOTE

- 'ALM2' or 'ALM4' is indicated depending on the setting.
- When "Dual alarm" is selected for the alarm point parameter, 'HH' and 'LL' indicators do not turn on.

2 **Press Alarm/↓ or Scale/↑ button to go to the LL (L, H or HH) trip action setting.**

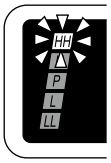
- 'LMLO' is indicated.
- 'LL' ('L', 'H' or 'HH') indicator blinks and 'Fnc' indicator turns on.





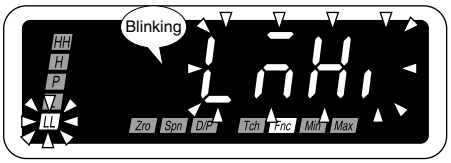
■ L trip action

■ H trip action



■ HH trip action

3 **Press Shift or Up button to select 'LMHI'.**



4 **Press Alarm/↓ or Scale/↑ button to apply the new setting.**

• And the next parameter setting is indicated.

NOTE

- Press Alarm/↓ button, and the LL (L, H or HH) deadband will be indicated within the range of 0001 to 9999 depending on the setting.
- Press Scale/↑ button, and the LL (L, H or HH) alarm setpoint will be indicated within the range of -19999 to 19999 depending on the setting.

---

5 **■ TO GO ON TO SET ANOTHER TRIP ACTIONS,**
Repeat operation from Step 2.

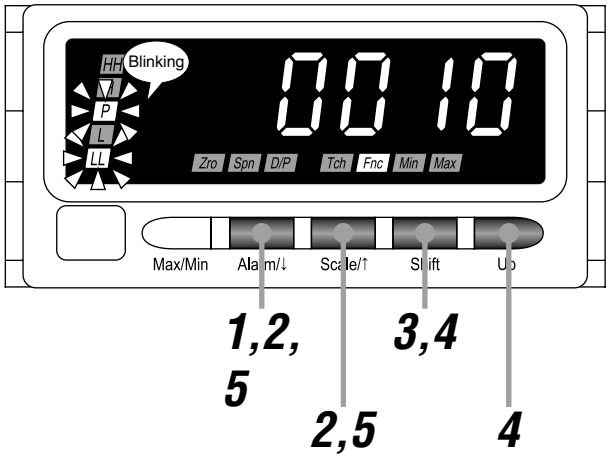
■ TO SET THE NEXT PARAMETER,
Skip to Step 2 in "11.4 DEADBAND".

■ TO QUIT,
Hold down Alarm/↓ or Scale/↑ button for 1 second or more to return to Measuring Mode.

11.4 DEADBAND

Once a high (low) trip alarm is ON, the alarm stays ON until the data becomes lower (higher) than a certain range from the setpoint, which prevents the alarm output from chattering when the display value fluctuates slightly near the setpoint. This range is called deadband (hysteresis) and can be set within the range of 0001 to 9999. The default value is 0010.

11.4.1 OPERATING PROCEDURE



NOTE

- The following figures are display examples. The displays depend on the settings.
- With "Dual alarm" selected for the alarm point parameter, the LL and HH deadbands are disabled.

1 **Hold down Alarm/↓ button for 3 seconds or more to move on to Alarm Setting Mode.**

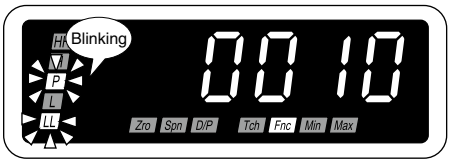
- The alarm point is indicated.
- 'HH', 'H', 'L', 'LL' and 'Fnc' indicators turn on.

NOTE

- 'ALM2' or 'ALM4' is indicated depending on the setting.
- When "Dual alarm" is selected for the alarm point parameter, 'HH' and 'LL' indicators do not turn on.

2 **Press Alarm/↓ or Scale/↑ button to go to the LL (L, H or HH) deadband setting.**

- The LL (L, H or HH) deadband is indicated.
- 'LL' ('L', 'H' or 'HH') and 'P' indicators blink and 'Fnc' indicator turns on.

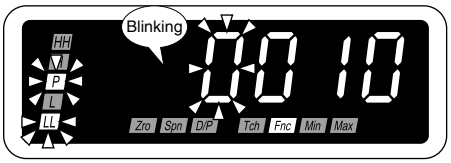


NOTE

The LL (L, H or HH) deadband is indicated within the range of 0001 to 9999 depending on the setting.

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

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



4 **Press Shift and Up buttons to set the LL (L, H or HH) deadband.**

• Set within the range of 0001 to 9999.

NOTE

• Setting the deadband to 0000 is available. However it will be changed to 0001 after the power cycle, turned OFF and ON.
• Set the deadband for the setpoint. The decimal point is not indicated.

---

5 **Press Alarm/↓ or Scale/↑ button to apply the new setting.**

• And the next parameter setting is indicated.

NOTE

• Press Alarm/↓ button, and the LL (L, H or HH) ON delay time will be indicated within the range of 00 to 99 depending on the setting.
• Press Scale/↑ button, and the LL (L, H or HH) trip action 'LMLO' or 'LMHI' will be indicated depending on the setting.

---

6 **■ TO GO ON TO SET ANOTHER DEADBANDS,**
Repeat operation from Step 2.

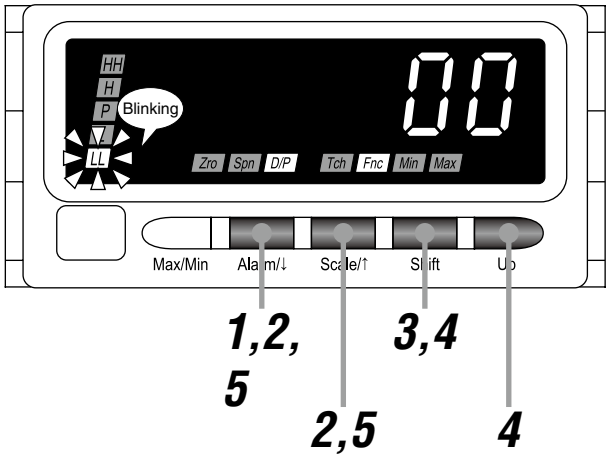
■ TO SET THE NEXT PARAMETER,
Skip to Step 2 in "11.5 ON DELAY TIME".

■ TO QUIT,
Hold down Alarm/↓ or Scale/↑ button for 1 second or more to return to Measuring Mode.

11.5 ON DELAY TIME

Alarm output is provided when the display value exceeds the setpoint and stayed for the specified time duration, which prevents the alarm output from being provided by a sudden change such like external disturbance. This time duration is called ON delay time and can be set within the range of 0 to 99 seconds. The default value is 0 second.

11.5.1 OPERATING PROCEDURE



NOTE

- The following figures are display examples. The displays depend on the settings.
- With "Dual alarm" selected for the alarm point parameter, the LL and HH ON delay times are disabled.

1 **Hold down Alarm/↓ button for 3 seconds or more to move on to Alarm Setting Mode.**

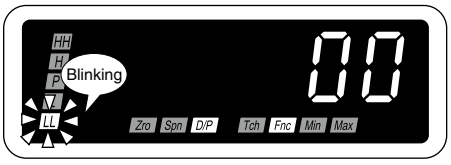
- The alarm point is indicated.
- 'HH', 'H', 'L', 'LL' and 'Fnc' indicators turn on.

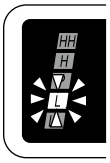
NOTE

- 'ALM2' or 'ALM4' is indicated depending on the setting.
- When "Dual alarm" is selected for the alarm point parameter, 'HH' and 'LL' indicators do not turn on.

2 **Press Alarm/↓ or Scale/↑ button to go to the LL (L, H or HH) ON delay time setting.**

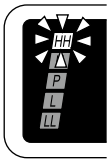
- The LL (L, H or HH) ON delay time is indicated.
- 'LL' ('L', 'H' or 'HH') indicator blinks, 'D/P' and 'Fnc' indicators turn on.





■ L ON delay time

■ H ON delay time



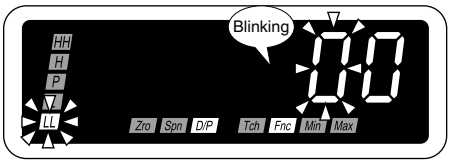
■ HH ON delay time

NOTE

The ON delay time is indicated within the range of 00 to 99 depending on the setting.

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

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



4 **Press Shift and Up buttons to set the LL (L, H or HH) ON delay time.**

• Set within the range of 00 to 99.

5 **Press Alarm/↓ or Scale/↑ button to apply the new setting.**

• And the next parameter setting is indicated.

NOTE

- Press Alarm/↓ button, and the LL (L, H or HH) coil at alarm 'RYEN' or 'RYDN' will be indicated depending on the setting.
- Press Scale/↑ button, and the LL (L, H or HH) deadband will be indicated within the range of 0001 to 9999 depending on the setting.

6 **■ TO GO ON TO SET ANOTHER ON DELAY TIMES,**
Repeat operation from Step 2.

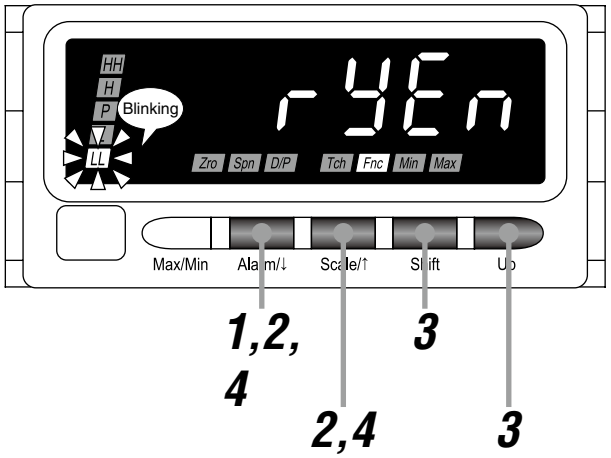
■ TO SET THE NEXT PARAMETER,
Skip to Step 2 in "11.6 ALARM OUTPUT LOGIC (coil energized or de-energized at alarm)".

■ TO QUIT,
Hold down Alarm/↓ or Scale/↑ button for 1 second or more to return to Measuring Mode.

11.6 ALARM OUTPUT LOGIC (coil energized or de-energized at alarm)

Alarm output logic can be selected. This parameter is called energizing direction and coil energized 'RYEN' or de-energized 'RYDN' at alarm can be selected. In selecting coil de-energized at alarm, the alarm output logic is inverted. The default setting is coil energized.

11.6.1 OPERATING PROCEDURE



NOTE

- Procedures to change 'RYEN' to 'RYDN' are described here.
- To change 'RYDN' to 'RYEN', the procedures are same. Select 'RYEN' in Step 3.
- With "Dual alarm" selected for the alarm point parameter, the LL and HH coil at alarms are disabled.

1 **Hold down Alarm/↓ button for 3 seconds or more to move on to Alarm Setting Mode.**

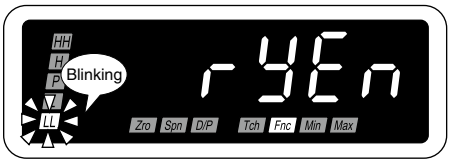
- The alarm point is indicated.
- 'HH', 'H', 'L', 'LL' and 'Fnc' indicators turn on.

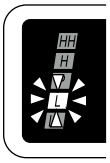
NOTE

- 'ALM2' or 'ALM4' is indicated depending on the setting.
- When "Dual alarm" is selected for the alarm point parameter, 'HH' and 'LL' indicators do not turn on.

2 **Press Alarm/↓ or Scale/↑ button to go to the setting of the LL (L, H or HH) coil at alarm.**

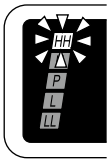
- 'RYEN' is indicated.
- 'LL' ('L', 'H' or 'HH') indicator blinks and 'Fnc' indicator turns on.





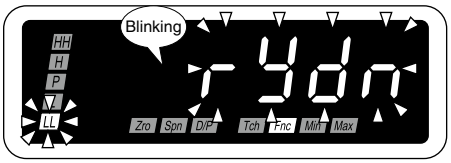
■ L coil at alarm

■ H coil at alarm



■ HH coil at alarm

3 **Press Shift or Up button to select 'RYDN'.**



4 **Press Alarm/↓ or Scale/↑ button to apply the new setting.**

• And the next parameter setting is indicated.

NOTE

- Press Alarm/↓ button, and the L (H or HH) alarm setpoint (or main display blinking at alarm) will be indicated within the range of -19999 to 19999 (or 'B 0', 'B 1', 'B 2', 'B 3' or 'B 4') depending on the setting.
- Press Scale/↑ button, and the LL (L, H or HH) ON delay time will be indicated within the range of 00 to 99 depending on the setting.

---

5 **■ TO GO ON TO SET ANOTHER COIL AT ALARMS,**
Repeat operation from Step 2.

■ TO SET THE NEXT PARAMETER,
Skip to Step 2 in "11.7 MAIN DISPLAY BLINKING AT ALARM".

■ TO QUIT,
Hold down Alarm/↓ or Scale/↑ button for 1 second or more to return to Measuring Mode.

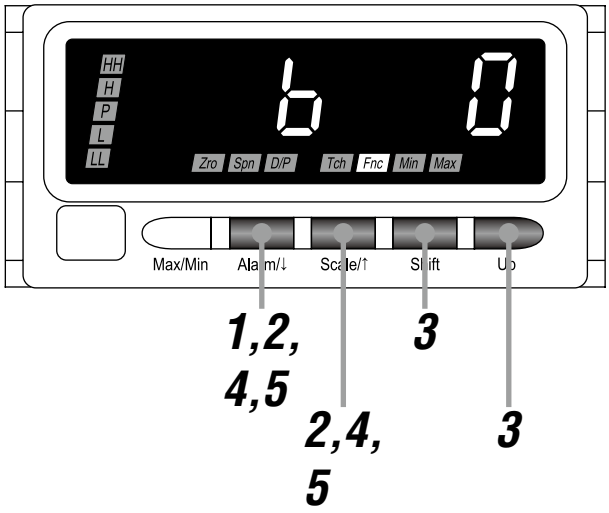
11.7 MAIN DISPLAY BLINKING AT ALARM

Main display blinking interval at alarm can be specified. The interval can be selected among those shown in the following table.

■ BLINKING INTERVAL AT ALARM

DISPLAY	FUNCTION	DEFAULT VALUE
b 0	No blinking	b 0
b 1	Blinking in 1.0 second intervals	
b 2	Blinking in 0.5 second intervals	
b 3	Blinking in 0.2 second intervals	
b 4	Blinking in 0.1 second intervals	

11.7.1 OPERATING PROCEDURE



NOTE

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

1 **Hold down Alarm/↓ button for 3 seconds or more to move on to Alarm Setting Mode.**

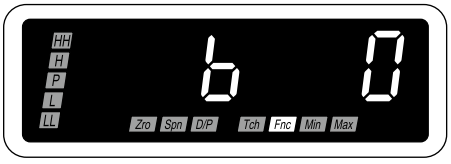
- The alarm point is indicated.
- 'HH', 'H', 'L', 'LL' and 'Fnc' indicators turn on.

NOTE

- 'ALM2' or 'ALM4' is indicated depending on the setting.
- When "Dual alarm" is selected for the alarm point parameter, 'HH' and 'LL' indicators do not turn on.

2 **Press Alarm/↓ or Scale/↑ button to go to the setting of the main display blinking at alarm.**

- The main display blinking at alarm is indicated.
- 'Fnc' indicator turns on.

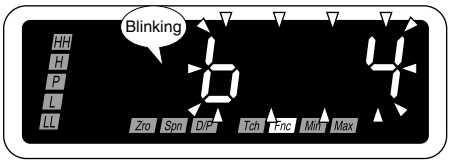


NOTE

'B 0', 'B 1', 'B 2', 'B 3' or 'B 4' is indicated depending on the setting.

3 **Press Shift or Up button to select.**

• Select one among 'B 0', 'B 1', 'B 2', 'B 3' and 'B 4'.



4 **Press Alarm/↓ or Scale/↑ button to apply the new setting.**

• And the next parameter setting is indicated.

NOTE

• Press Alarm/↓ button, and the alarm point 'ALM2' or 'ALM4' will be indicated depending on the specifications and setting.
• Press Scale/↑ button, and the HH or H coil at alarm 'RYEN' or 'RYDN' will be indicated depending on the setting.

5 **Hold down Alarm/↓ or Scale/↑ button for 1 second or more to return to Measuring Mode.**

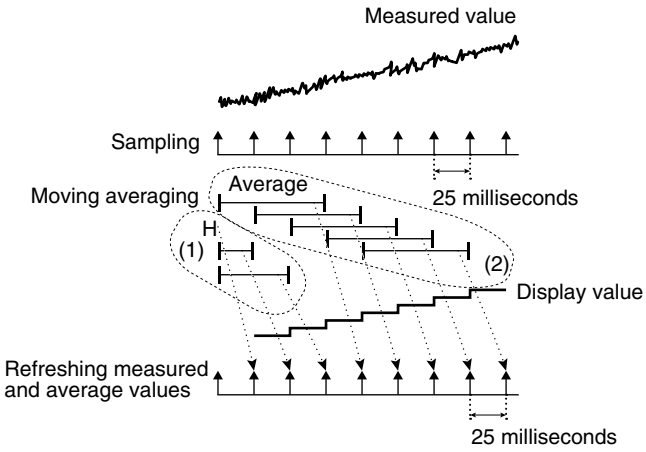
12. AVERAGING INPUT

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 (100 millisecond intervals) is repeated. Moving average is used to remove periodic varied noise superimposed on the input signal and suppress the display flickering.

■ NUMBER OF SAMPLES

DISPLAY	FUNCTION	DEFAULT VALUE
AoFF	No moving averaging	AoFF
A 2	Moving average with 2 samples (50 millisecond intervals)	
A 4	Moving average with 4 samples (100 millisecond intervals)	
A 8	Moving average with 8 samples (200 millisecond intervals)	
A 16	Moving average with 16 samples (400 millisecond intervals)	
A 32	Moving average with 32 samples (800 millisecond intervals)	
A 64	Moving average with 64 samples (1.6 second intervals)	

■ EXAMPLE OF MOVING AVERAGE WITH 4 SAMPLES

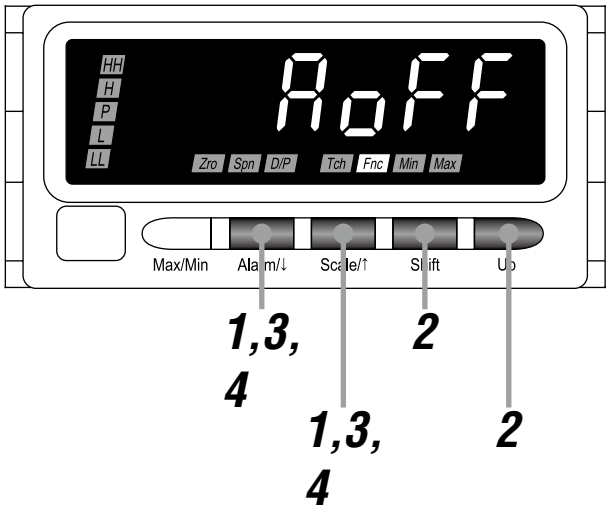


(1) The moving average operation starts immediately after the power is on or the moving average is set. Until the sampling No. reaches the set value, all samples are averaged every 25 milliseconds.
(2) After the sampling No. reaches the set value, a new sample is added to be averaged with the oldest one omitted. Such operation is repeated.

NOTE

The moving average setting affects the DC output when the analog output function mode is set to "proportional to the display value". Refer to 10. SETTING ANALOG OUTPUT FUNCTION for details.

12.1 OPERATING PROCEDURE



NOTE

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

1 **Hold down Alarm/↓ and Scale/↑ buttons at once for 3 seconds or more to move on to Advanced Setting Mode.**

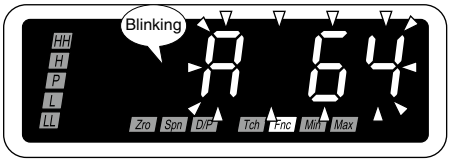
- The moving average sampling No. is indicated.
- 'Fnc' indicator turns on.

NOTE

'AOFF', 'A 2', 'A 4', 'A 8', 'A 16', 'A 32' or 'A 64' is indicated depending on the setting.

2 **Press Shift or Up button to select.**

- Select one among 'AOFF', 'A 2', 'A 4', 'A 8', 'A 16', 'A 32' and 'A 64'.



3 **Press Alarm/↓ or Scale/↑ button to apply the new setting.**

- And the next parameter setting is indicated.

NOTE

- Press Alarm/↓ button, and the low-end cutout 'ZOFF' or 'Z ON' will be indicated depending on the setting.
- Press Scale/↑ button, and the version indication will be indicated.

4 **Hold down Alarm/↓ or Scale/↑ button for 1 second or more to return to Measuring Mode.**

13. ELIMINATING FLUCTUATION AROUND “0”

A measured value less than the preset cutout value can be forcibly cut to 0 (figure below). This parameter is called low-end cutout and the value is called low-end cutout value. Enable the low-end cutout first (table below) and set the low-end cut-out value within the range of 000 to 999. The low-end cutout is effective to eliminate slippage or fluctuation of the display values near zero.

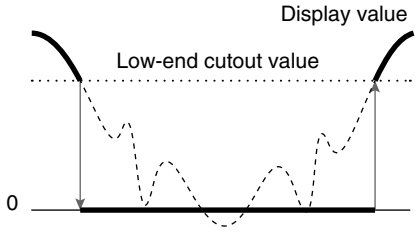
■ LOW-END CUTOUT

DISPLAY	FUNCTION	DEFAULT VALUE
EoFF	Low-end cutout OFF	EoFF
E on	Low-end cutout ON	

■ SETTING RANGE

Set the low-end cutout value for the three lowest digits of the display scaling value within the range of 000 to 999.
The default value is 000.

■ DISPLAY EXAMPLE WITH LOW-END CUTOUT ON



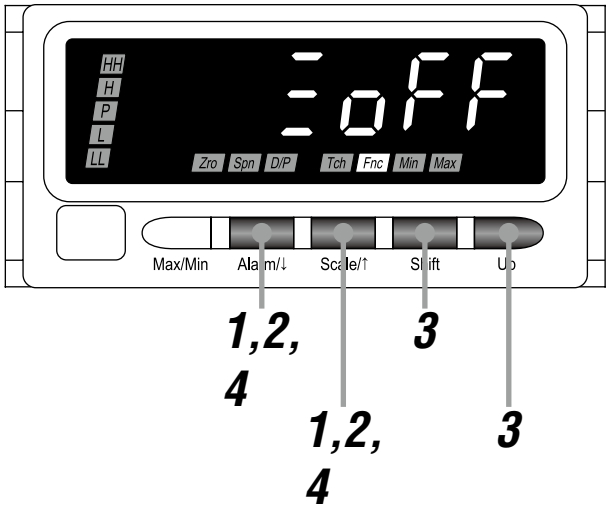
Fluctuation near 0 and negative reading can be cut to 0.

NOTE

- Set the display scaling value A to 0 when the low-end cutout is set to ON. Otherwise with the display scaling ±1000 and the low-end cutout value 100, for example, the indication with the scaling value -1000 to 99 will be cut to 0.
- The low-end cutout setting affects the DC output when the analog output function mode is set to “proportional to the display value”. Refer to 10. SETTING ANALOG OUTPUT FUNCTION for details.

13.1 LOW-END CUTOUT

13.1.1 OPERATING PROCEDURE



NOTE

- Procedures to change 'ZOFF' to 'Z ON' are described here.
- To change 'Z ON' to 'ZOFF', the procedures are same. Select 'ZOFF' in Step 3.

1 **Hold down Alarm/↓ and Scale/↑ buttons at once for 3 seconds or more to move on to Advanced Setting Mode.**

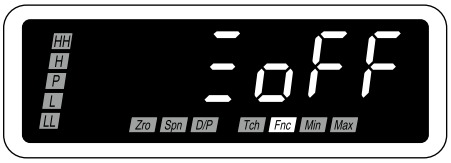
- The moving average sampling No. is indicated.
- 'Fnc' indicator turns on.

NOTE

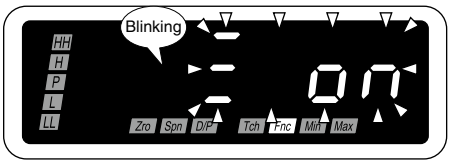
'AOFF', 'A 2', 'A 4', 'A 8', 'A 16', 'A 32' or 'A 64' is indicated depending on the setting.

2 **Press Alarm/↓ or Scale/↑ button to go to the low-end cutout setting.**

- 'ZOFF' is indicated.
- 'Fnc' indicator turns on.



3 **Press Shift or Up button to select 'Z ON'.**



4 **Press Alarm/↓ or Scale/↑ button to apply the new setting.**

• And the next parameter setting is indicated.

NOTE

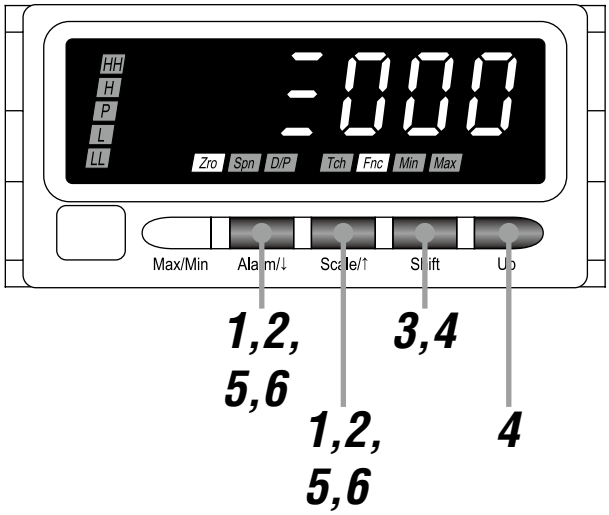
- Press Alarm/↓ button, and the low-end cutout value will be indicated within the range of 'Z000' to 'Z999' depending on the setting. When low-end cutout OFF is selected, the brightness 'C 1', 'C 2', 'C 3', 'C 4' or 'C 5' will be indicated depending on the setting.
- Press Scale/↑ button, and the moving average sampling No. 'AOFF', 'A 2', 'A 4', 'A 8', 'A 16', 'A 32' or 'A 64' will be indicated depending on the setting.

5 **■ TO GO ON TO SET THE LOW-END CUTOUT VALUE,**
Skip to Step 2 in "13.2 LOW-END CUTOUT VALUE."

■ TO QUIT,
Hold down Alarm/↓ or Scale/↑ button for 1 second or more to return to Measuring Mode.

13.2 LOW-END CUTOUT VALUE

13.2.1 OPERATING PROCEDURE



NOTE

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

1 **Hold down Alarm/↓ and Scale/↑ buttons at once for 3 seconds or more to move on to Advanced Setting Mode.**

- The moving average sampling No. is indicated.
- 'Fnc' indicator turns on.

NOTE

'AOFF', 'A 2', 'A 4', 'A 8', 'A 16', 'A 32' or 'A 64' is indicated depending on the setting.

2 **Press Alarm/↓ or Scale/↑ button to go to the low-end cutout value setting.**

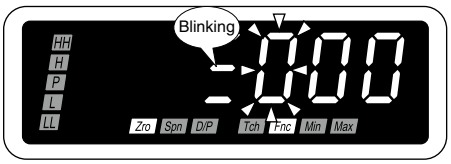
- The low-end cutout value is indicated.
- 'Zro' and 'Fnc' indicators turn on.

NOTE

The low-end cutout value is indicated within the range of 'Z000' to 'Z999' depending on the setting.

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

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



4 **Press Shift and Up buttons to set the low-end cutout value.**

• Set within the range of 'Z000' to 'Z999'.

NOTE

Set the value for the display scaling. The decimal point is not indicated.

5 **Press Alarm/↓ or Scale/↑ button to apply the new setting.**

• And the next parameter setting is indicated.

NOTE

• Press Alarm/↓ button, and the brightness 'C 1', 'C 2', 'C 3', 'C 4' or 'C 5' will be indicated depending on the setting.
• Press Scale/↑ button, and the low-end cutout 'Z ON' will be indicated.

6 **Hold down Alarm/↓ or Scale/↑ button for 1 second or more to return to Measuring Mode.**

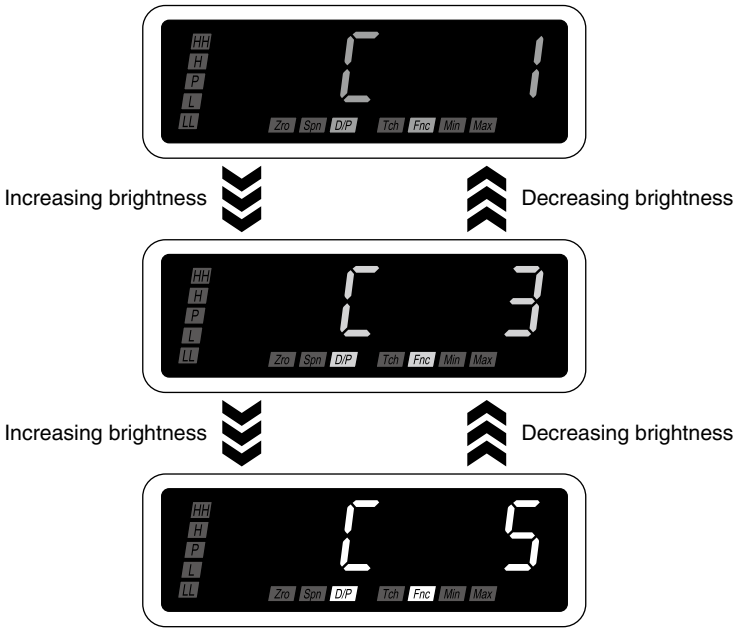
14. ADJUSTING BRIGHTNESS OF DISPLAY

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

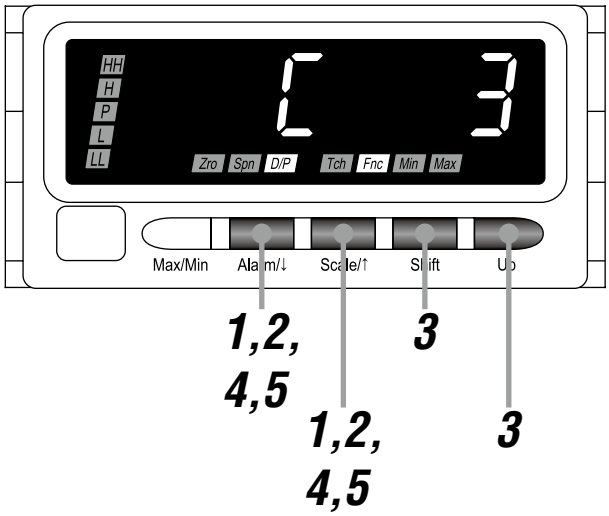
■ DISPLAY BRIGHTNESS

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

■ ADJUSTMENT IMAGE



14.1 OPERATING PROCEDURE



NOTE

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

1 **Hold down Alarm/↓ and Scale/↑ buttons at once for 3 seconds or more to move on to Advanced Setting Mode.**

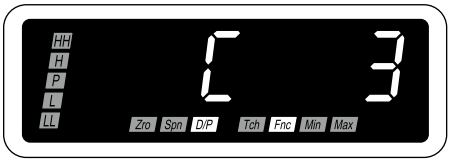
- The moving average sampling No. is indicated.
- 'Fnc' indicator turns on.

NOTE

'AOFF', 'A 2', 'A 4', 'A 8', 'A 16', 'A 32' or 'A 64' is indicated depending on the setting.

2 **Press Alarm/↓ or Scale/↑ button to go to the brightness setting.**

- The brightness is indicated.
- 'D/P' and 'Fnc' indicators turn on.

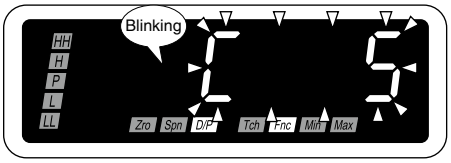


NOTE

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

3 **Press Shift or Up button to select.**

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



4 **Press Alarm/↓ or Scale/↑ button to apply the new setting.**

• And the next parameter setting is indicated.

NOTE

- Press Alarm/↓ button, and the automatic return time to Measuring Mode will be indicated within the range of 'R 00' to 'R 99' depending on the setting.
- Press Scale/↑ button, and the low-end cutout value will be indicated within the range of 'Z000' to 'Z999' depending on the setting. The low-end cutout 'ZOFF' will be indicated with the cutout set to OFF.

5 **Hold down Alarm/↓ or Scale/↑ button for 1 second or more to return to Measuring Mode.**

15. GOING BACK AUTOMATICALLY 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. This time period is called automatic return time and can be set within the range of 1 to 99 seconds (Table 1). With the value set to 'R 00', the display must always be exited manually from the setting mode. The display does not go back automatically to Measuring Mode depending on the modes (Table 2).

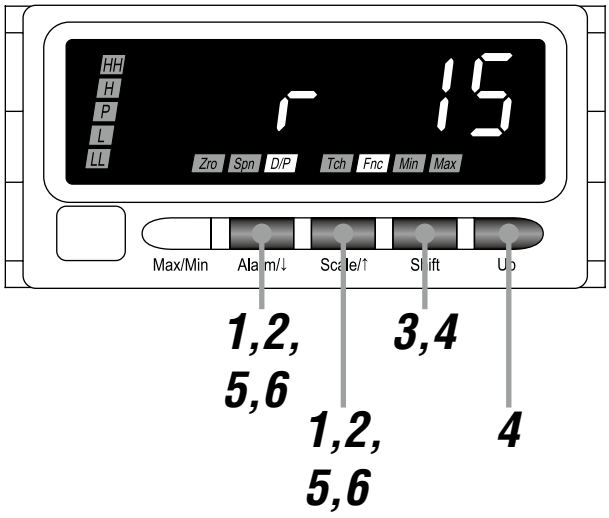
■ TABLE 1: AUTOMATIC RETURN TIME

DISPLAY	FUNCTION	DEFAULT VALUE
r 00	Automatic return disabled	r 15
r 01 to r 99	1 to 99 seconds	

■ TABLE 2: AUTOMATIC RETURN IN EACH MODE

MODE	OPERATION	SETTING TIME OUT
Measuring Mode	Confirming alarm setpoint	Enabled
	Displaying MAX or MIN value	Disabled
Scaling Setting Mode		Enabled
Alarm Setting Mode		Enabled
Advanced Setting Mode		Enabled
Lockout Setting Mode		Enabled
Loop Test Output Mode		Disabled

15.1 OPERATING PROCEDURE



NOTE

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

1 **Hold down Alarm/↓ and Scale/↑ buttons at once for 3 seconds or more to move on to Advanced Setting Mode.**

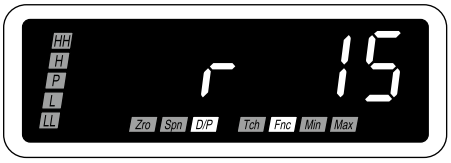
- The moving average sampling No. is indicated.
- 'Fnc' indicator turns on.

NOTE

'AOFF', 'A 2', 'A 4', 'A 8', 'A 16', 'A 32' or 'A 64' is indicated depending on the setting.

2 **Press Alarm/↓ or Scale/↑ button to go to the automatic return time to Measuring Mode setting.**

- The automatic return time to Measuring Mode is indicated.
- 'D/P' and 'Fnc' indicators turn on.

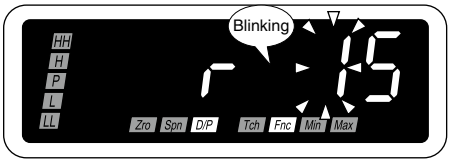


NOTE

The automatic return time to Measuring Mode is indicated within the range of 'R 00' to 'R 99' depending on the setting.

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

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



4 **Press Shift and Up buttons to set the automatic return time to Measuring Mode.**

- Set within the range of 'R 00' to 'R 99'.

5 **Press Alarm/↓ or Scale/↑ button to apply the new setting.**

• And the next parameter setting is indicated.

NOTE

• Press Alarm/↓ button, and the transition time to Lockout Setting Mode will be indicated within the range of 'P 00' to 'P 99' depending on the setting.
• Press Scale/↑ button, and the brightness 'C 1', 'C 2', 'C 3', 'C 4' or 'C 5' will be indicated depending on the setting.

6 **Hold down Alarm/↓ or Scale/↑ button for 1 second or more to return to Measuring Mode.**

16. ADJUSTING DISPLAY REFRESHING RATE

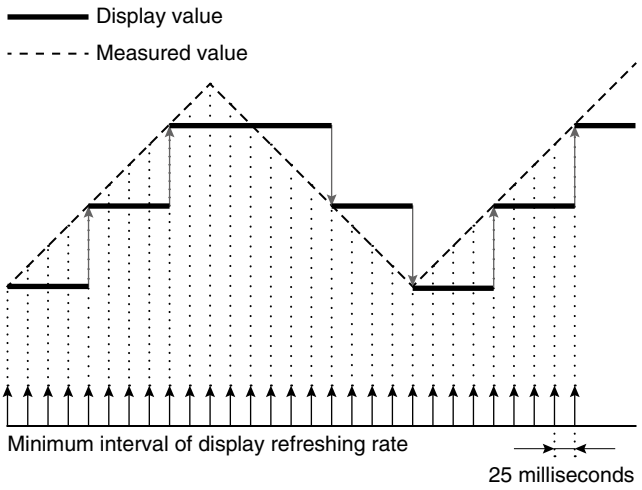
The 47LLC measures input signal at the read rate 25 milliseconds. The display refreshing rate can be slower than this rate (figure below) within the range of 0.1 to 99.9 seconds. With this value set to 00.0, the refreshing rate will be the same as the read rate (25 milliseconds) (table below). When the input signal changes rapidly, the display refreshing rate can be slowed to suppress the display flickering.

■ DISPLAY REFRESHING RATE

DISPLAY	FUNCTION	DEFAULT VALUE
F000	25 milliseconds	F000
F001 to F999	0.1 to 99.9 seconds	

■ DISPLAY REFRESHING IMAGE

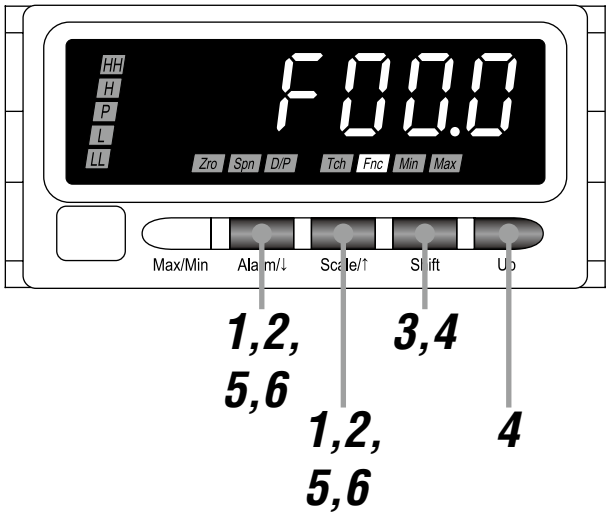
e.g. Refreshing rate 0.1 seconds



NOTE

The display refreshing rate setting affects the DC output when the analog output function mode is set to “proportional to the display value”. Refer to 10. SETTING ANALOG OUTPUT FUNCTION for details.

16.1 OPERATING PROCEDURE



NOTE

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

1 **Hold down Alarm/↓ and Scale/↑ buttons at once for 3 seconds or more to move on to Advanced Setting Mode.**

- The moving average sampling No. is indicated.
- 'Fnc' indicator turns on.

NOTE

'AOFF', 'A 2', 'A 4', 'A 8', 'A 16', 'A 32' or 'A 64' is indicated depending on the setting.

2 **Press Alarm/↓ or Scale/↑ button to go to the display refreshing rate setting.**

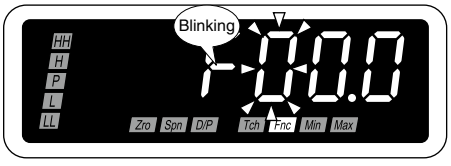
- The display refreshing rate is indicated.
- 'Fnc' indicator turns on.

NOTE

The display refreshing rate is indicated within the range of 'F00.0' to 'F99.9' depending on the setting.

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

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



4 **Press Shift and Up buttons to set the display refreshing rate.**

- Set within the range of 'F00.0' to 'F99.9'.

5 **Press Alarm/↓ or Scale/↑ button to apply the new setting.**

• And the next parameter setting is indicated.

NOTE

• Press Alarm/↓ button, and the version indication will be indicated.
• Press Scale/↑ button, and the transition time to Lockout Setting Mode will be indicated within the range of 'P 00' to 'P 99' depending on the setting.

6 **Hold down Alarm/↓ or Scale/↑ button for 1 second or more to return to Measuring Mode.**

17. LOOP TESTING

The 47LLC can provide simulated analog output with the display value manually adjusted. It is called loop test output. It is convenient to check or calibrate a receiving instrument. The alarm trip functions according to the scaling values during the loop test.

17.1 LOOP TEST OUTPUT RANGE

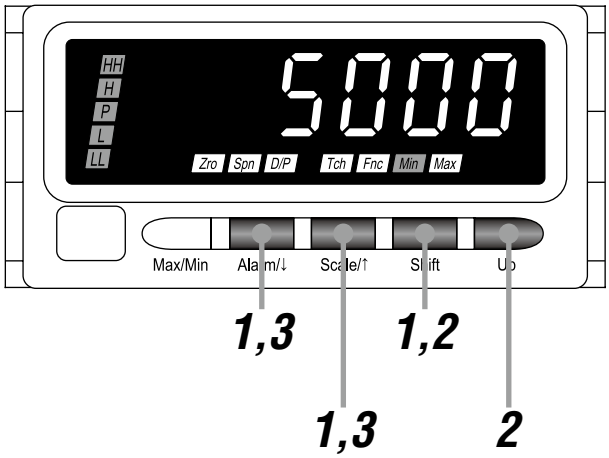
-15 to +115% of the display scaling span can be set manually. Setting below -19999 or over 19999 is not available.

e.g. With the display scaling values 0.00 to 100.00, setting manually within the range of -15.00 to 115.00 is available.

The DC output is provided within the range of -5 to +105% of the output span. Output below -5% or over +105% is saturated.

e.g. With the DC output 4 – 20 mA DC, the output can be provided within the range of 3.2 to 20.8 mA DC.

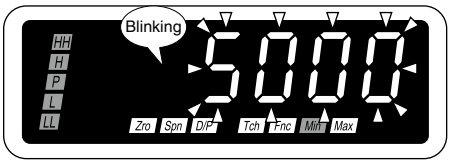
17.2 OPERATING PROCEDURE



NOTE

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

1 **Hold down Alarm/↓, Scale/↑ and Shift buttons at once for 5 seconds or more to move on to Loop Test Output Mode.**



- The measuring is stopped and the last measured values or status are held for the DC and alarm outputs.
- The current indication starts blinking, to which you can apply changes.
- 'Zro', 'Spn', 'D/P', 'Tch', 'Fnc' and 'Max' indicators turn on.

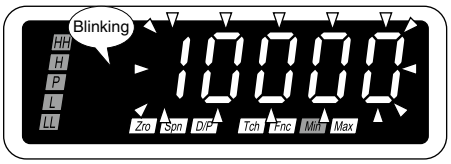
NOTE

- In moving on to Loop Test Output Mode while 'S.ERR' is indicated, -15% of the display scaling span or '-19999' is indicated when 'Min' indicator blinks, and 115% of the display scaling span or '19999' is indicated when 'Max' indicator blinks.
- In moving on to Loop Test Output Mode while '-19999' blinks, -15% of the display scaling span or '-19999' is indicated.
- In moving on to Loop Test Output Mode while '19999' blinks, 115% of the display scaling span or '19999' is indicated.
- The specified decimal point position is applied.

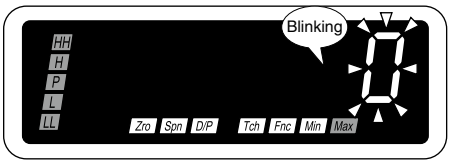
2 **Press Shift and Up buttons to adjust the display value.**

- Press Shift button to switch the signal to increase or decrease.
  Increase with 'Max' indicator on.
  Decrease with 'Min' indicator on.
- Press Up button to control it toward the desired output value.
- Hold down Up button to control at high speed.
- The DC output changes according to the display value.
- When the display value reaches the desired one, check or calibrate the receiving instrument.

■ Increasing display value



■ Decreasing display value



3 **Hold down Alarm/↓ or Scale/↑ button for 1 second or more to return to Measuring Mode.**

- The measuring is started with the loop test output reset.

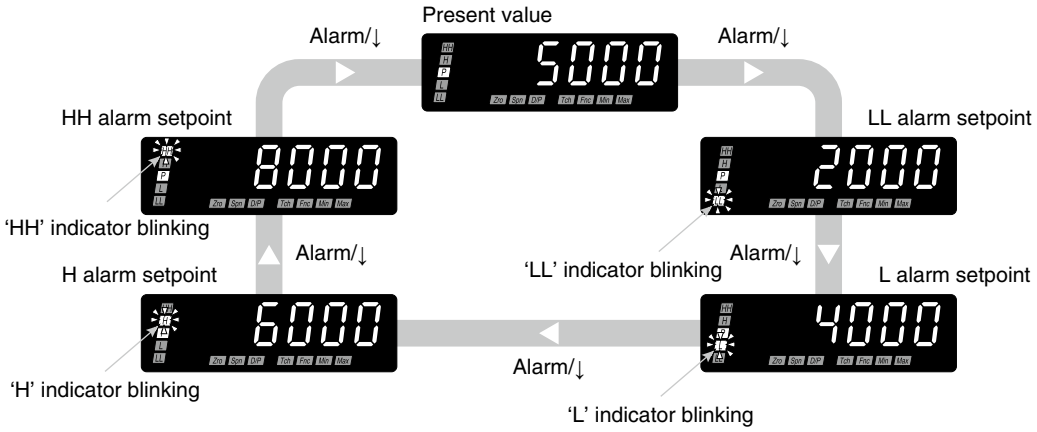
18. USEFUL FUNCTIONS

18.1 CONFIRMING ALARM SETPOINTS

The alarm setpoints set in Alarm Setting Mode can be confirmed while in Measuring Mode.
Each time pressing Alarm/↓ button during Measuring Mode, the indication is switched in the order of LL alarm setpoint to L alarm setpoint to H alarm setpoint to HH alarm setpoint and back to original indication.

■ PROCEDURE TO CONFIRM ALARM SETPOINTS

Each time pressing Alarm/↓ button in Measuring Mode, the indication is changed from the present value to LL alarm setpoint to L alarm setpoint to H alarm setpoint to HH alarm setpoint and back to present value.



*1 Display depends on the settings and input.

NOTE

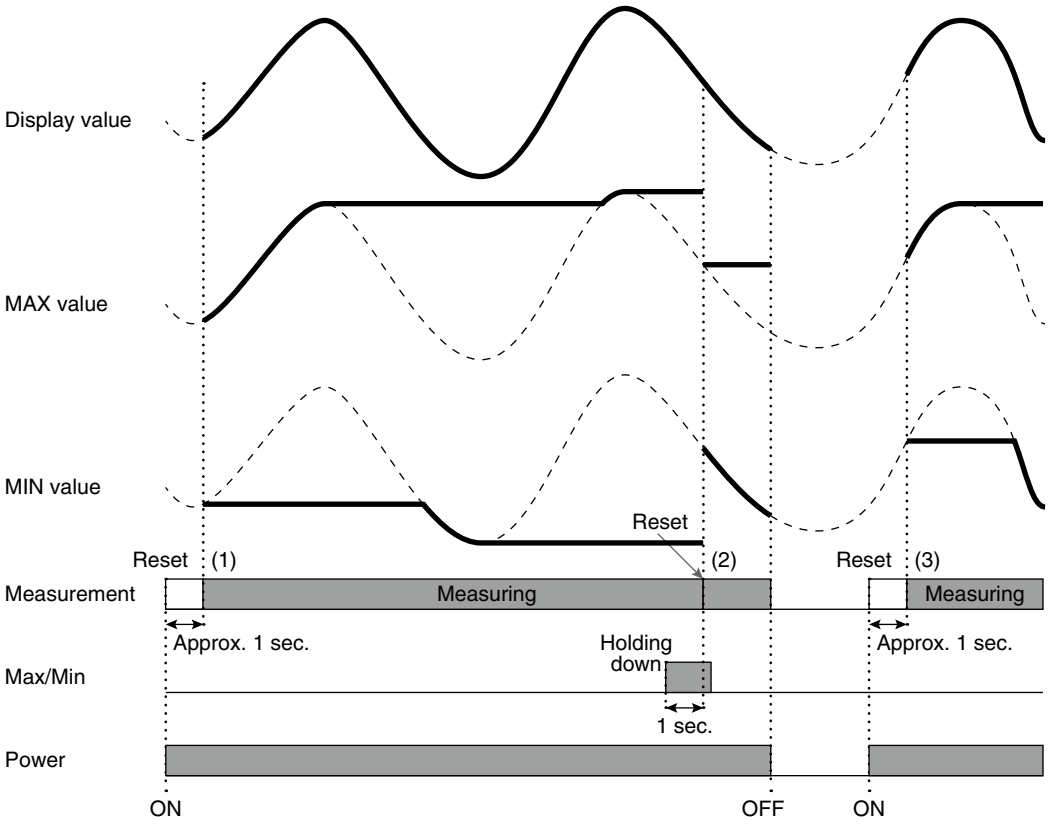
- With the alarm output code '2' (SPDT relay contact, 2 points) or "Dual alarm" selected for the alarm point parameter, the LL and HH alarm setpoints are not indicated.
- The alarm setpoints can be confirmed even when MAX or MIN value is indicated. After confirmation, the indication will be back to MAX or MIN value.

18.2 RETAINING MAX AND MIN VALUES

MAX and MIN values can be confirmed while in Measuring Mode. Each time pressing Max/Min button during Measuring Mode, the indication is switched in the order of MAX value to MIN value and back to original indication. Max. value is updated while it is indicated. Min. value is updated while it is indicated.

■ MAX AND MIN VALUES

MAX and MIN values are updated while in measuring.

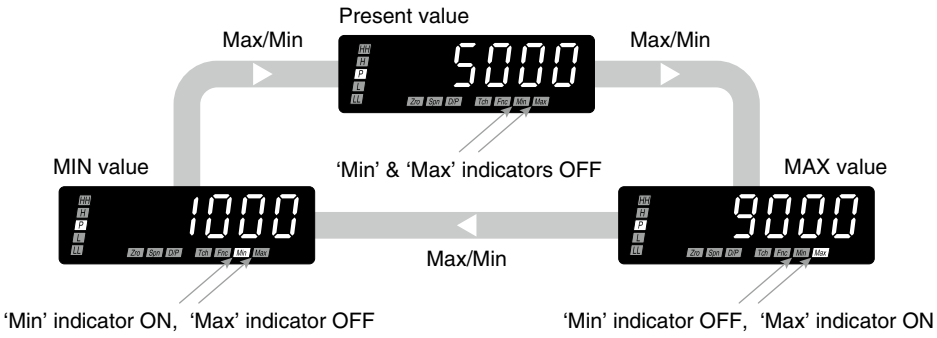


(1) The internal memory is reset for approx. 1 second after the power is on, and the unit starts to measure MAX and MIN values.
(2) Hold down Max/Min button for 1 second or more to reset the MAX and MIN values and then the unit starts to measure MAX and MIN values again.
(3) The internal memory is reset for approx. 1 second after the power is off and on again, and then the unit starts to measure MAX and MIN values again.

■ **PROCEDURE TO CONFIRM MAX OR MIN VALUE**

(1) Each time pressing Max/Min button during Measuring Mode, the indication is changed from the present value to MAX value, MIN value, and back to present value.

(2) Hold down Max/Min button for 1 second or more to reset the MAX and MIN values and indicate new MAX and MIN values. The MAX and MIN values are reset when the power is turned off.



*1 Display depends on the settings and input.

NOTE

- MAX and MIN values are not indicated while in confirming the alarm setpoints.
- MAX and MIN values are not indicated while 'S.ERR' is indicated. Increase or decrease the input signal within the measurable range and then press Max/Min button again.

18.3 LIMITING BUTTON OPERATION

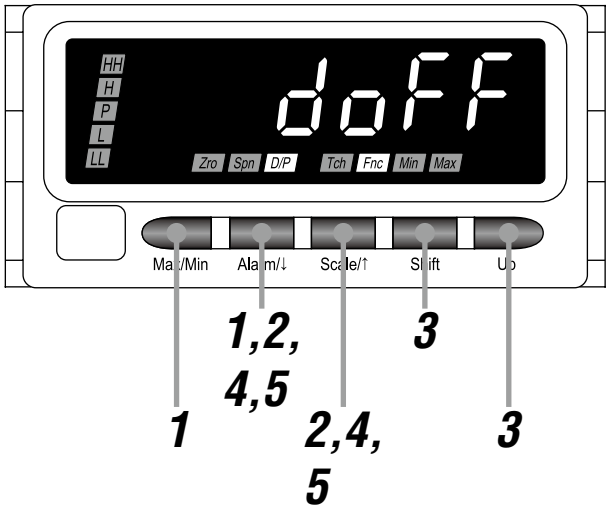
Transition from Measuring Mode to each setting mode or Loop Test Output Mode can be limited. With this setting, the transition to each mode by holding down the buttons will be disabled. In Lockout Setting Mode, the lockout per mode is selectable.

■ LOCKOUT SETTING

Following 4 lockout settings are available.

PARAMETER	INDICATORS	DISPLAY	FUNCTION	DEFAULT VALUE
Alarm setting lockout	D/P, Fnc	AoFF	Unlock Alarm Setting Mode	AoFF
		A on	Lock Alarm Setting Mode	
Scaling setting lockout		SoFF	Unlock Scaling Setting Mode	SoFF
		S on	Lock Scaling Setting Mode	
Advanced setting lockout		doFF	Unlock Advanced Setting Mode	doFF
		d on	Lock Advanced Setting Mode	
Loop test output lockout		toFF	Unlock Loop Test Output Mode	toFF
		t on	Lock Loop Test Output Mode	

18.3.1 OPERATING PROCEDURE



NOTE

- Procedures to lock the advanced setting mode are described here. The procedures to lock other setting modes are same. Select your desired mode to lock in Step 2.
- To cancel the limitation, select 'xOFF' in Step 3.

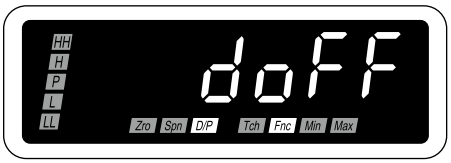
1 **Hold down Max/Min and Alarm/↓ buttons at once for a preset time duration to move on to Lockout Setting Mode.**

- The alarm setting lockout is indicated.
- 'D/P' and 'Fnc' indicators turn on.

NOTE

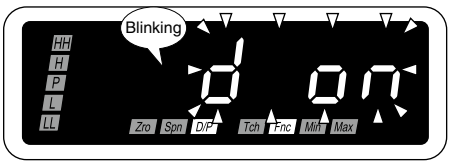
- 'AOFF' or 'A ON' is indicated depending on the setting.
- With no-alarm-output type, the scaling setting lockout 'SOFF' or 'S ON' is indicated depending on the setting.

2 **Press Alarm/↓ or Scale/↑ button to go to the advanced setting lockout setting.**



- 'DOFF' is indicated.
- 'D/P' and 'Fnc' indicators turn on.

3 **Press Shift or Up button to select 'D ON'.**



4 **Press Alarm/↓ or Scale/↑ button to apply the new setting.**

- And the next parameter setting is indicated.

NOTE

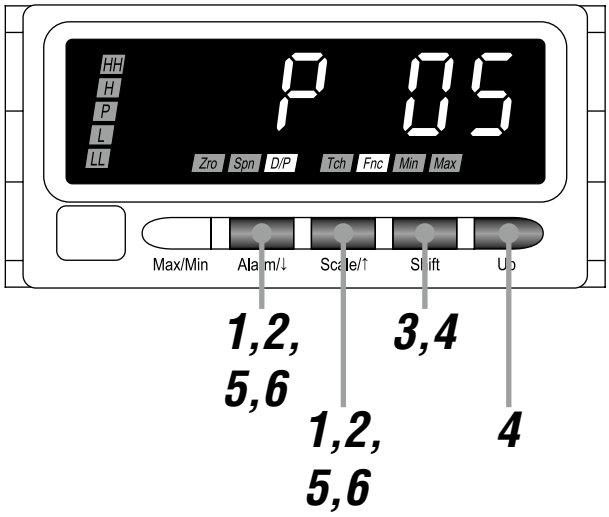
- Press Alarm/↓ button, and the loop test output lockout 'TOFF' or 'T ON' will be indicated depending on the setting.
- Press Scale/↑ button, and the scaling setting lockout 'SOFF' or 'S ON' will be indicated depending on the setting.

5 **Hold down Alarm/↓ or Scale/↑ button for 1 second or more to return to Measuring Mode.**

18.4 TRANSITION TIME TO LOCKOUT SETTING MODE

Time duration to hold down the buttons for transition to Lockout Setting Mode can be set within the range of 0 to 99 seconds. The default value is 5 seconds.

18.4.1 OPERATING PROCEDURE

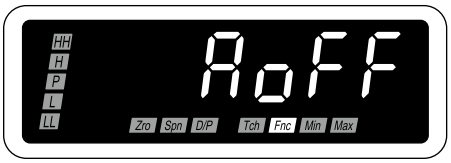


NOTE

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

1 **Hold down Alarm/↓ and Scale/↑ buttons at once for 3 seconds or more to move on to Advanced Setting Mode.**

- The moving average sampling No. is indicated.
- 'Fnc' indicator turns on.

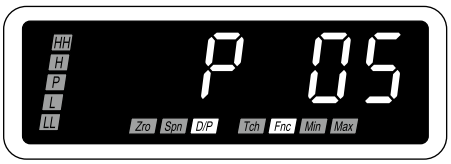


NOTE

'AOFF', 'A 2', 'A 4', 'A 8', 'A 16', 'A 32' or 'A 64' is indicated depending on the setting.

2 **Press Alarm/↓ or Scale/↑ button to go to the setting of the transition time to Lockout Setting Mode.**

- The transition time to Lockout Setting Mode is indicated.
- 'D/P' and 'Fnc' indicators turn on.

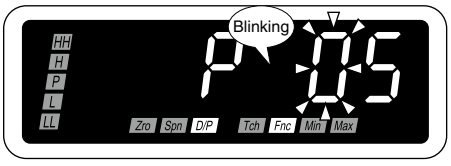


NOTE

The transition time is indicated within the range of 'P 00' to 'P 99' depending on the setting.

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

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



4 **Press Shift and Up buttons to set the transition time to Lockout Setting Mode.**

• Set within the range of 'P 00' to 'P 99'.

5 **Press Alarm/↓ or Scale/↑ button to apply the new setting.**

• And the next parameter setting is indicated.

NOTE

- Press Alarm/↓ button, and the display refreshing rate will be indicated within the range of 'F00.0' to 'F99.9' depending on the setting.
- Press Scale/↑ button, and the automatic return time to Measuring Mode will be indicated within the range of 'R 00' to 'R 99' depending on the setting.

6 **Hold down Alarm/↓ or Scale/↑ button for 1 second or more to return to Measuring Mode.**

19. USER CALIBRATION

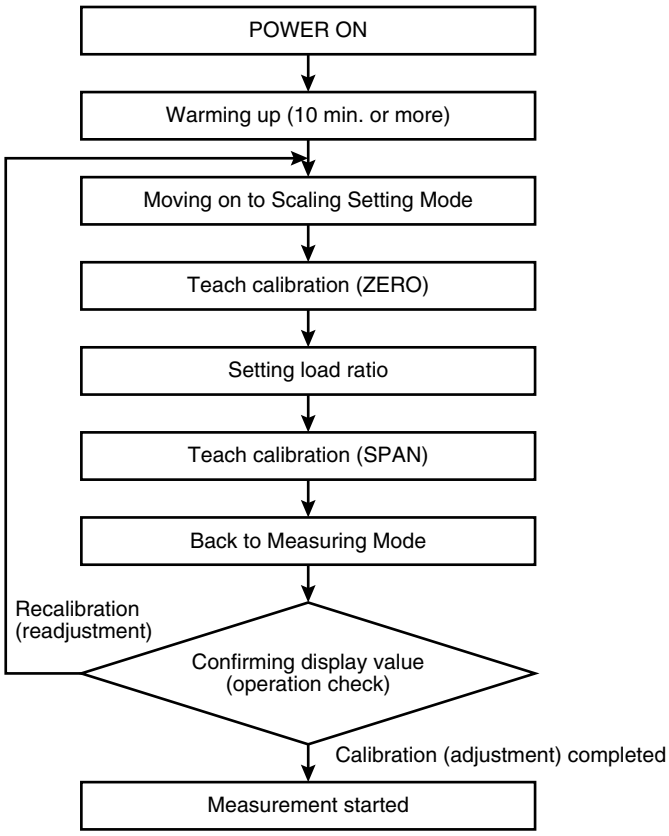
User calibration is calibration by a customer using customer's measuring instruments and standards.
To calibrate (adjust) the input signal, use "Teach Calibration" function. To compensate deviation between the DC output and a device on site, use "Analog Output Adjustment" function.
The unit is calibrated correctly at shipment and therefore there is normally no need for customers to calibrate it.

19.1 TEACH CALIBRATION

You can calibrate the input signal by the Teach Calibration function if you need calibration. Input scaling value A and B can be adjusted by applying actual load.
The internal calibration data is overwritten every time the unit is calibrated and it is stored even if the power is turned off. However the data will be lost after an initialization.
Prepare measuring instruments and equipment for calibration by yourselves. Refer to each manual carefully for the instruments and equipment for information on handling them.

19.1.1 TEACH CALIBRATION FLOW

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



IMPORTANT

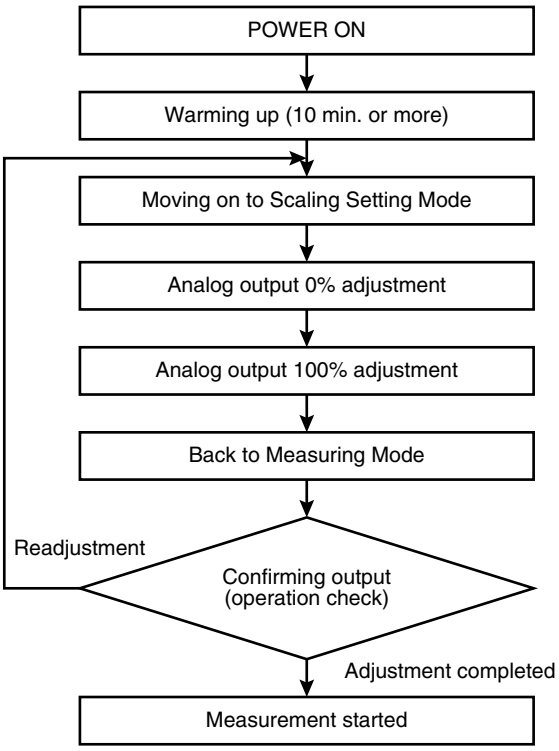
- Refer to 6. SETTING SCALING VALUES WITH ACTUAL LOAD to carry out the Teach Calibration with actual load.
- Setting the load ratio enables the Teach Calibration even when the rated load is not ready. Refer to 6. SETTING SCALING VALUES WITH ACTUAL LOAD for details.
- Close across the terminals 2 and 4 to carry out the Teach Calibration with measuring instruments.
- Warm up measuring instruments for the time specified in each manual, and operate the unit in a stable condition.
- The procedures to carry out the Teach Calibration using measuring instruments are same as those described in 6. SETTING SCALING VALUES WITH ACTUAL LOAD.

19.2 ANALOG OUTPUT ADJUSTMENT

You can compensate deviation between the DC output and a device on site by the Analog Output Adjustment function. Please note that we does not warrant the result of your own adjustment.
The internal adjustment data is overwritten every time the unit is adjusted and it is stored even if the power is turned off. However the data will be lost after an initialization.

19.2.1 ANALOG OUTPUT ADJUSTMENT FLOW

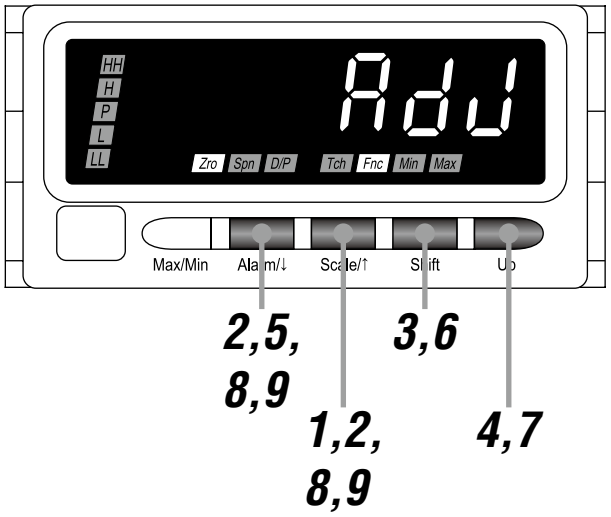
The Analog Output Adjustment is carried out as shown in the following flowchart.



IMPORTANT

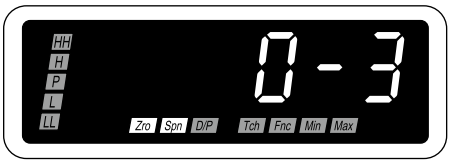
- Warm up measuring instruments, equipment and other devices on site for the time specified in each manual, and operate the unit in a stable condition.
- Adjustable ranges:
  Analog output 0% adjustment -5 to +100%
  Analog output 100% adjustment 0 to 105%
- Adjust analog output 100% in the following condition:
  Analog output 0% + 5% of output span ≤ Analog output 100%

19.2.2 OPERATING PROCEDURE



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

- The input type is indicated.
- 'Zro' and 'Spn' indicators turn on.

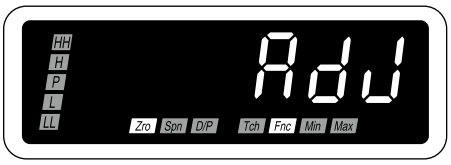


IMPORTANT

Warm up the unit for 10 minutes or more before carrying out the Analog Output Adjustment.

2 **Press Alarm/↓ or Scale/↑ button to go to the analog output 0% adjustment.**

- The analog output 0% adjustment is indicated.
- 'Zro' and 'Fnc' indicators turn ON.

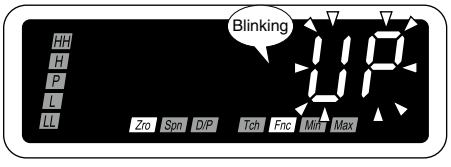


NOTE

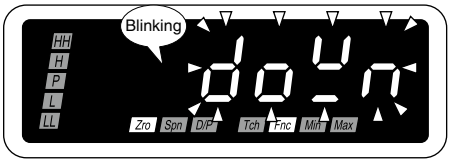
Skip to Step 5 when the analog output 0% adjustment is not necessary.

3 **Press Shift button to switch the signal to increase (indication 'UP') or decrease ('DOWN').**

■ Increasing output



■ Decreasing output

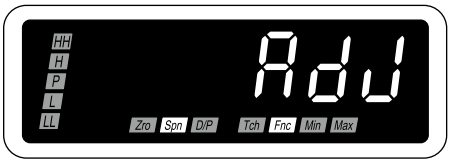


4 **Press Up button until the desired output value.**

IMPORTANT

- Confirm that the output signal is stable before pressing Up button while in checking it with a receiving instrument or a tester.
- Adjustable range is -5 to +100%.

5 **Press Alarm/↓ button to register the analog output 0% adjustment and go to the analog output 100% adjustment.**



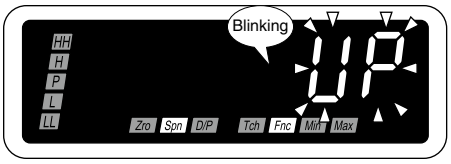
- The analog output 0% adjustment is registered.
- The analog output 100% adjustment is indicated.
- 'Spn' and 'Fnc' indicators turn on.

NOTE

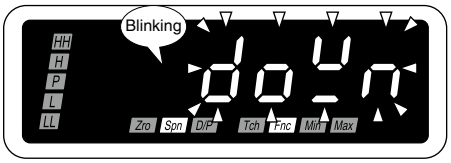
Skip to Step 9 when the analog output 100% adjustment is not necessary.

6 **Press Shift button to switch the signal to increase (indication 'UP') or decrease ('DOWN').**

■ Increasing output



■ Decreasing output



7 **Press Up button until the desired output value.**

IMPORTANT

- Confirm that the output signal is stable before pressing Up button while in checking it with a receiving instrument or a tester.
- Adjustable range is 0 to 105%.

8 **Press Alarm/↓ or Scale/↑ button to register the analog output 100% adjustment.**

- The analog output 100% adjustment is registered.
- The next parameter is indicated.

NOTE

- Press Alarm/↓ button, and the input type will be indicated.
- Press Scale/↑ button, and the analog output 0% adjustment 'ADJ' will be indicated.

9 **Hold down Alarm/↓ or Scale/↑ button for 1 second or more to return to Measuring Mode.**

20. INSPECTION / CLEANING

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

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

21. TROUBLESHOOTING

21.1 ERROR MESSAGES

MAIN DISPLAY	ERROR MESSAGE	WHAT TO DO
SErr	Input error, Out of the measuring range	Increase/decrease the input signal until it is back within the measuring range.
i.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
uErr	Non-volatile memory error (writing)	

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

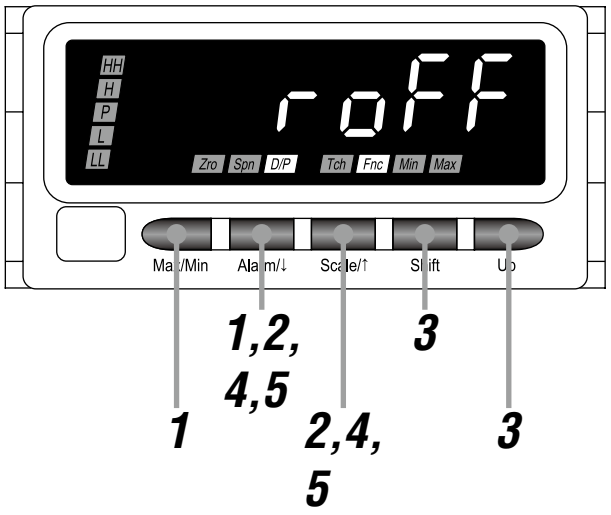
21.2 INITIALIZING SETTING VALUES

To restart setting from the default state, initialization can be used. Refer to attached 22.3 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.

21.2.1 OPERATING PROCEDURE



1 **Hold down Max/Min and Alarm/↓ buttons at once for a preset time duration to move on to Lockout Setting Mode.**

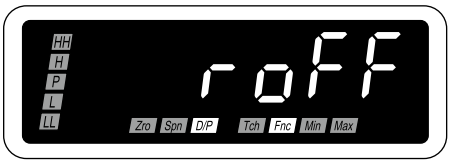
- The alarm setting lockout is indicated.
- 'D/P' and 'Fnc' indicators turn on.

NOTE

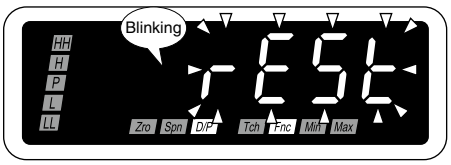
- 'AOFF' or 'A ON' is indicated depending on the setting.
- With no-alarm-output type, the scaling setting lockout 'SOFF' or 'S ON' is indicated depending on the setting.

2 Press Alarm/↓ or Scale/↑ button to go to the initialization.

- 'ROFF' is indicated.
- 'D/P' and 'Fnc' indicators turn on.



3 Press Shift or Up button to select 'REST'.



4 Press Alarm/↓ or Scale/↑ button to execute the initialization.

- All the indications turn on for approximately 3 seconds and then the next parameter setting is indicated.

NOTE

- Press Alarm/↓ button, and the alarm setting lockout 'AOFF' will be indicated, or the scaling setting lockout 'SOFF' will be indicated with no-alarm-output type.
- Press Scale/↑ button, and the loop test output lockout 'TOFF' will be indicated.

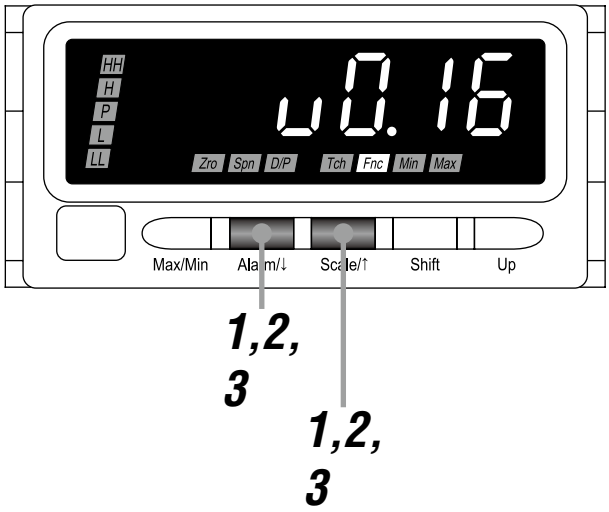
5 Hold down Alarm/↓ or Scale/↑ button for 1 second or more to return to Measuring Mode.

21.3 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.

21.3.1 OPERATING PROCEDURE



1 **Hold down Alarm/↓ and Scale/↑ buttons at once for 3 seconds or more to move on to Advanced Setting Mode.**

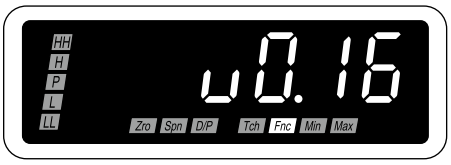
- The moving average sampling No. is indicated.
- 'Fnc' indicator turns on.

NOTE

'AOFF', 'A 2', 'A 4', 'A 8', 'A 16', 'A 32' or 'A 64' is indicated depending on the setting.

2 **Press Alarm/↓ or Scale/↑ button to go to the version indication.**

- The firmware version number is indicated.
- 'Fnc' indicator turns on.



NOTE

The displays depend on the firmware version number.

3 **Hold down Alarm/↓ or Scale/↑ button for 1 second or more to return to Measuring Mode.**

22. APPENDICES

22.1 SPECIFICATIONS

■ GENERAL SPECIFICATIONS

Construction		Panel flush mounting
Degree of protection		IP66; Applicable to the front of the panel meter mounted according to the specified panel cutout.
Connection		M3 separable screw terminal (torque 0.6 N·m)
Screw terminal		Nickel-plated steel (standard) or stainless steel
Housing material		Flame-resistant resin (gray)
Isolation		Strain gauge input or excitation or contact input or SG to DC output to HH output or H output to L output or LL output to power
Excitation		2.5 V, 5 V, 7.5 V or 10 V selectable (front button)
Tare adjustment		Via the front button control or by the external contact input
Setting (front button)	Scaling setting mode	Excitation voltage, input scaling value A and B, display scaling value A and B, decimal point position, load ratio, tare adjustment, analog output function mode, analog output 0% adjustment, analog output 100% adjustment
	Alarm setting mode	Alarm point, HH, H, L and LL alarm setpoint, HH, H, L and LL trip action, HH, H, L and LL deadband (hysteresis), HH, H, L and LL ON delay time, HH, H, L and LL coil at alarm, main display blinking at alarm
	Advanced setting mode	Moving average, low-end cutout, low-end cutout value, brightness, automatic return time to Measuring Mode, transition time to Lockout Setting Mode, display refreshing rate, version indication
	Lockout setting mode	Alarm setting lockout, scaling setting lockout, advanced setting lockout, loop test output lockout, initialization
	Loop test output	----
Read rate		40 times/sec. (25 msec.)
Averaging		None or moving average
Lockout setting		Prohibiting certain operations; protecting settings

■ DISPLAY

Display		16 mm (.63) high, 4 ½ digits, 7-segment LED
Display range		-19999 to 19999
Decimal point position		10^{-1}, 10^{-2}, 10^{-3}, 10^{-4}, or none
Zero indication		Higher-digit zeros are suppressed
Over-range indication		'-19999' or '19999' blinking for display values out of the display range 'S.ERR' and 'Min' or 'Max' blinking when the input signal is out of the usable range
Alarm status indication	LL indicator	Green turns on when the LL alarm is tripped
	L indicator	Green turns on when the L alarm is tripped
	H indicator	Red turns on when the H alarm is tripped
	HH indicator	Red turns on when the HH alarm is tripped
	P indicator	Amber turns on when none of the other alarms is tripped Only 'P' turns on with no-alarm-output type. 'LL' or 'HH' does not turn on with dual-alarm-output type. All setpoints can be independently set either for Hi or Lo alarm trip.
Function indicators		Zro, Spn, D/P, Tch, Fnc, Min, Max Display mode status and operation status, amber ON or blink

■ INPUT SPECIFICATIONS

Input strain gauge	Strain gauge rating	Input type: S1	0.0 – 1.0 mV/V
		Input type: S2	0.0 – 3.0 mV/V
		Input type: S3	0.0 – 10.0 mV/V
		Input type: S4	0.0 – 30.0 mV/V
	Zero adjustment	Input type: S1	-10.00 – +10.00 mV
		Input type: S2	-30.00 – +30.00 mV
		Input type: S3	-100.0 – +100.0 mV
		Input type: S4	-300.0 – +300.0 mV
	Span	Input type: S1	1.00 – 10.00 mV
		Input type: S2	3.00 – 30.00 mV
		Input type: S3	10.0 – 100.0 mV
		Input type: S4	30.0 – 300.0 mV
	Input voltage	Input type: S1	-10.00 – +20.00 mV
		Input type: S2	-30.00 – +60.00 mV
		Input type: S3	-100.0 – +200.0 mV
		Input type: S4	-300.0 – +600.0 mV
Excitation	Excitation voltage	2.5 V, 5 V, 7.5 V or 10 V selectable	
	Maximum current	120 mA	
	Load resistance	≥ 85 Ω	
Tare command input		TTL level (5V-CMOS level), open collector or dry contact (saturation voltage ≤ 1 V, sink current 0.5 mA)	

■ OUTPUT SPECIFICATIONS

DC output	DC current	Load resistance (output range)	4 – 20 mA DC: ≤ 550 Ω 0 – 20 mA DC: ≤ 550 Ω
		Operational range	-5 – +105%
	DC voltage	Load resistance (output range)	0 – 10 V DC: ≥ 10 kΩ 0 – 5 V DC: ≥ 5000 Ω 1 – 5 V DC: ≥ 5000 Ω -10 – +10 V DC: ≥ 10 kΩ
		Operational range	-5 – +105%
Alarm output	Relay contact	Rated load: 250 V AC @ 3 A (cos ø = 1) 30 V DC @ 3 A (resistive load) Maximum switching voltage: 250 V AC, 30 V DC Maximum switching power: 750 VA, 90 W (resistive load) Minimum load: 5 V DC @ 10 mA Mechanical life: ≥ 5×10^6 cycles (rate 180 cycles/min.)	
	Photo MOSFET Relay	Rating: 120 V AC/DC @ 80 mA (resistive load) ON resistance: ≤ 30 Ω Permissible: 250 mW	

■ INSTALLATION

Power consumption	AC power	100 – 240 V AC	Operational voltage range 85 – 264 V AC, 50/60 Hz Approx. 9 VA at 100 V Approx. 12 VA at 200 V Approx. 13 VA at 264 V
	DC power	24 V DC	Operational voltage range 24 V DC ±10% Ripple 10% p-p max. Approx. 5 W
		110 V DC	Operational voltage range 85 – 150 V DC Ripple 10% p-p max. Approx. 5 W
Operating temperature		-10 to +55°C (14 to 131°F)	
Operating humidity		30 to 90% RH (non-condensing)	
Mounting		Panel flush mounting	
Weight		300 g (0.66 lb)	

■ PERFORMANCE

Accuracy	Display	±0.1% ±1 digit
	Output	±0.25 % (DC output = display + output)
Temp. coefficient		±0.015%/°C (±0.008%/°F)
Input resolution		Max. 20 bits
Output resolution		Max. 16 bits
Response time		≤ 0.5 sec. (alarm output: 0 – 100% at 90% setpoint) ≤ 0.5 sec. (DC output: 0 – 90%)
Excitation		Set value ±250 mV
Line voltage effect		±0.1% over voltage range
Insulation resistance		≥ 100 MΩ with 500 V DC
Dielectric strength		2000 V AC @ 1 minute (strain gauge input or excitation or contact input or SG to DC output to HH output or H output to L output or LL output to power to ground)

22.2 MODEL NUMBERING

Code number: **47LLC–[1][2][3][4]–[5][6]**

[1] INPUT STRAIN GAUGE

S1: 0.0 – 1.0 mV/V
S2: 0.0 – 3.0 mV/V
S3: 0.0 – 10.0 mV/V
S4: 0.0 – 30.0 mV/V

[2] DC OUTPUT

0: Without
Current
A: 4 – 20 mA DC (load resistance 550 Ω max.)
D: 0 – 20 mA DC (load resistance 550 Ω max.)
Voltage
4: 0 – 10 V DC (load resistance 10 kΩ min.)
5: 0 – 5 V DC (load resistance 5000 Ω min.)
6: 1 – 5 V DC (load resistance 5000 Ω min.)
4W: -10 – +10 V DC (load resistance 10 kΩ min.)

[3] ALARM OUTPUT

0: None
1: N.O. relay contact, 4 points
2: SPDT relay contact, 2 points
3: Photo MOSFET relay, N.O., 4 points

[4] DISPLAY COLOR

R: Red
YR: Orange
G: Green
BG: Bluegreen
B: Blue
W: White

[5] POWER INPUT

AC Power
M2: 100 – 240 V AC (operational voltage range 85 – 264 V, 50/60 Hz)
DC Power
R: 24 V DC (operational voltage range 24 V ±10%, ripple 10% p-p max.)
P: 110 V DC (operational voltage range 85 – 150 V, ripple 10% p-p max.)

[6] OPTIONS

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

■ SPECIFICATIONS OF OPTION: Q

COATING (For the detail, refer to our web site.)
Moving parts and indicators are not coated.
/C01: Silicone coating
/C02: Polyurethane coating
/C03: Rubber coating
TERMINAL SCREW MATERIAL
/S01: Stainless steel
EX-FACTORY SETTING
/SET: Preset according to the Ordering Information Sheet (No. ESU-9505)

22.3 PARAMETER LIST

MODE	PARAMETER	SETTING RANGE	INDICATOR	DISPLAY	DEFAULT VALUE	DECIMAL POINT POSITION	UNIT
Measuring	Present value	-19999 – 19999	HH, H, P, L, LL	----	----	*1	User-defined
	MAX value	-19999 – 19999	Max	----	----	*1	User-defined
	MIN value	-19999 – 19999	Min	----	----	*1	User-defined
	LL alarm setpoint	-19999 – 19999	LL	----	----	*1	User-defined
	L alarm setpoint	-19999 – 19999	L	----	----	*1	User-defined
	H alarm setpoint	-19999 – 19999	H	----	----	*1	User-defined
	HH alarm setpoint	-19999 – 19999	HH	----	----	*1	User-defined
Scaling setting	Input type	S1: 0.0 – 1.0	Zro, Spn	0-1	0-1	----	mV/V
		S2: 0.0 – 3.0		0-3	0-3		
		S3: 0.0 – 10.0		0-10	0-10		
		S4: 0.0 – 30.0		0-30	0-30		
	Excitation voltage	2.5, 5, 7.5, 10	Fnc	2.5v, 5.0v, 7.5v, 10.0v	2.5v	----	V DC
	Input scaling value A	S1: -10.00 – 10.00	Zro, Tch	-10.00 to 10.00	0.000	----	mV DC
		S2: -30.00 – 30.00		-30.00 to 30.00	0.000		
		S3: -100.0 – 100.0		-100.0 to 100.0	0.000		
		S4: -300.0 – 300.0		-300.0 to 300.0	0.000		
	Display scaling value A	-19999 – 19999	Zro, D/P	-19999 to 19999	0000	*1	User-defined
	Load ratio	10.0 – 100.0	Spn, Fnc	10.0 to 100.0	100.0	----	%
	Input scaling value B	S1: -9.00 – 20.00	Spn, Tch	-09.00 to 20.00	02.50	----	mV DC
		S2: -27.00 – 60.00		-27.00 to 60.00	07.50		
		S3: -90.0 – 200.0		-090.0 to 200.0	02.50		
		S4: -270.0 – 600.0		-270.0 to 600.0	07.50		
	Display scaling value B	-19999 – 19999	Spn, D/P	-19999 to 19999	10000	*1	User-defined
	Tare adjustment	S1: -8.00 – 8.00	Zro, Tch, Fnc	-08.00 to 08.00	0.00	----	mV DC
		S2: -24.00 – 24.00		-24.00 to 24.00	0.00		
		S3: -80.0 – 80.0		-080.0 to 080.0	0.00		
		S4: -240.0 – 240.0		-240.0 to 240.0	0.00		
	Decimal point position	No decimal point, or 10^{-1} to 10^{-4}	D/P	19999, 19999, 19999, 19999, 19999	10000	----	----
	Analog output function mode	Proportional to the display value, Proportional to the scaling value	Fnc	d.SP, SCLE	d.SP	----	----
	Analog output 0% adjustment	Adjustable range -5 to +100%	Zro, Fnc	AdJ: UP (increasing) doWn (decreasing)	0% output	----	----
	Analog output 100% adjustment	Adjustable range 0 to 105%	Spn, Fnc	AdJ: UP (increasing) doWn (decreasing)	100% output	----	----

*1 Conforms to decimal point position setting.

NOTE 1: Indicators with the present value in Measuring Mode depend on the set alarm trip action.
NOTE 2: INDICATOR: □ = ON, [ ] = Blinking
NOTE 3: S1 through S4 in the columns of SETTING RANGE in Scaling Setting Mode show input strain gauge codes.

MODE	PARAMETER	SETTING RANGE	INDICATOR	DISPLAY	DEFAULT VALUE	DECIMAL POINT POSITION	UNIT
Scaling setting	Teach calibration (ZERO)	----	Zro, Tch	----	----	----	----
	Teach calibration (SPAN)	----	Spn, Tch	----	----	----	----
	Teach calibration (TARE)	----	Zro, Tch, Fnc	----	----	----	----
Alarm setting	Alarm point	1: Quad alarm	HH, H, L, LL, Fnc (H, L, Fnc)	AL.n4, AL.n2	AL.n4	----	----
		2: Dual alarm	H, L, Fnc	AL.n2	AL.n2		
		3: Quad alarm	HH, H, L, LL, Fnc (H, L, Fnc)	AL.n4, AL.n2	AL.n4		
	LL alarm setpoint	-19999 – 19999	LL, Fnc	-19999 to 19999	2000	*1	User-defined
	LL trip action	High trip, low trip	LL, Fnc	LoH., LoLo	LoLo	----	----
	LL deadband (hysteresis)	0001 – 9999	P, LL, Fnc	0001 to 9999	0010	----	User-defined
	LL ON delay time	00 – 99	LL, D/P, Fnc	00 to 99	00	----	Second
	LL coil at alarm	Coil energized at alarm, de-energized at alarm	LL, Fnc	n.En, n.dn	n.En	----	----
	L alarm setpoint	-19999 – 19999	L, Fnc	-19999 to 19999	4000	*1	User-defined
	L trip action	High trip, low trip	L, Fnc	LoH., LoLo	LoLo	----	----
	L deadband (hysteresis)	0001 – 9999	P, L, Fnc	0001 to 9999	0010	----	User-defined
	L ON delay time	00 – 99	L, D/P, Fnc	00 to 99	00	----	Second
	L coil at alarm	Coil energized at alarm, de-energized at alarm	L, Fnc	n.En, n.dn	n.En	----	----
	H alarm setpoint	-19999 – 19999	H, Fnc	-19999 to 19999	6000	*1	User-defined
	H trip action	High trip, low trip	H, Fnc	LoH., LoLo	LoH.	----	----
	H deadband (hysteresis)	0001 – 9999	H, P, Fnc	0001 to 9999	0010	----	User-defined
	H ON delay time	00 – 99	H, D/P, Fnc	00 to 99	00	----	Second
	H coil at alarm	Coil energized at alarm, de-energized at alarm	H, Fnc	n.En, n.dn	n.En	----	----
	HH alarm setpoint	-19999 – 19999	HH, Fnc	-19999 to 19999	8000	*1	User-defined
	HH trip action	High trip, low trip	HH, Fnc	LoH., LoLo	LoH.	----	----
	HH deadband (hysteresis)	0001 – 9999	HH, P, Fnc	0001 to 9999	0010	----	User-defined
	HH ON delay time	00 – 99	HH, D/P, Fnc	00 to 99	00	----	Second
	HH coil at alarm	Coil energized at alarm, de-energized at alarm	HH, Fnc	n.En, n.dn	n.En	----	----
	Main display blinking at alarm	No blinking, blinking in 1.0, 0.5, 0.2, 0.1 sec. intervals	Fnc	b 0, b 1, b 2, b 3, b 4	b 0	----	Second

*1 Conforms to decimal point position setting.

NOTE 2: INDICATOR: □ = ON, ▯ = Blinking
NOTE 4: 1 through 3 in the column of Alarm point in Alarm Setting Mode show alarm output codes.
NOTE 5: The indicators in parentheses in the column of Alarm point in Alarm Setting Mode show those with dual alarm selected.

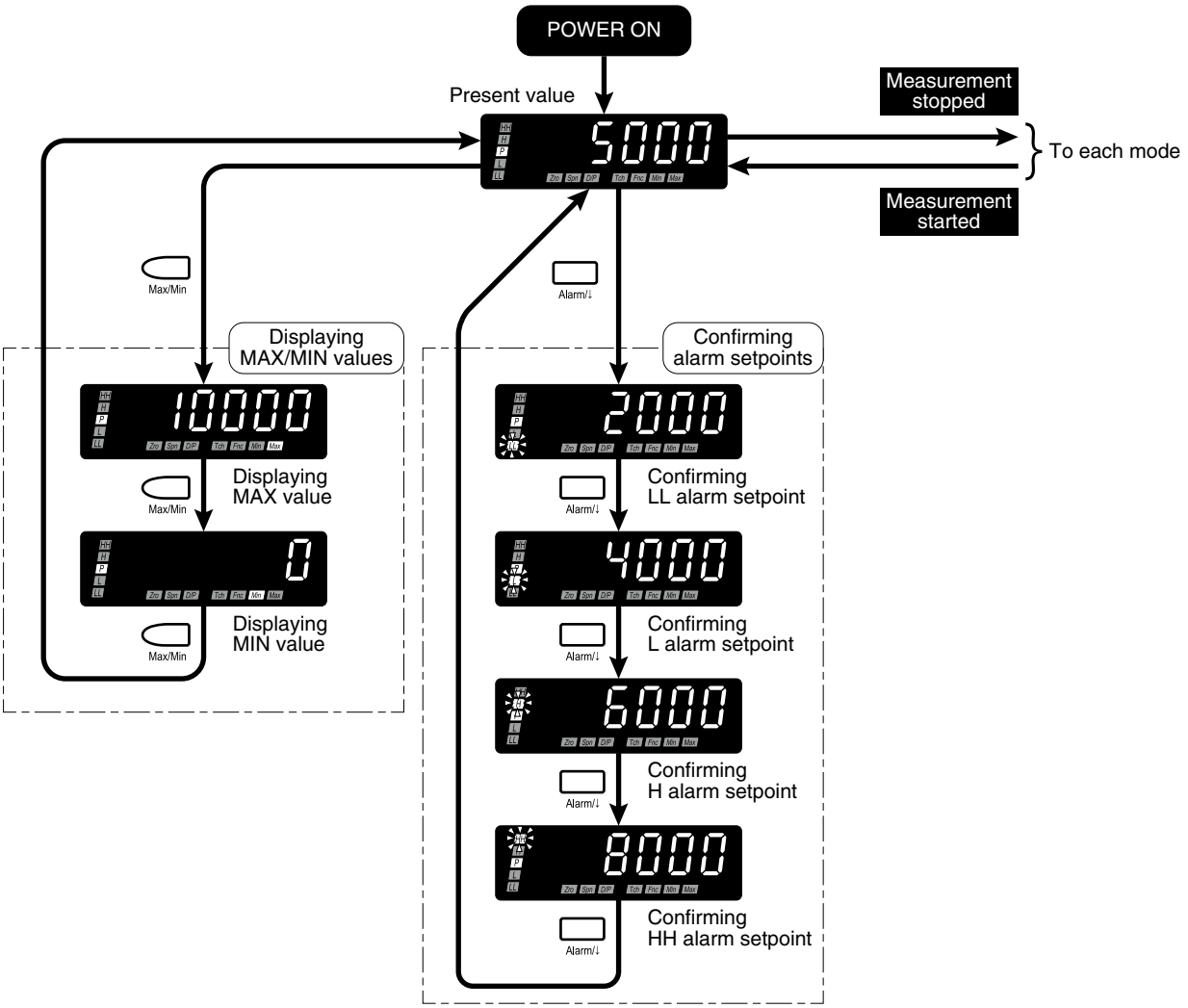
MODE	PARAMETER	SETTING RANGE	INDICATOR	DISPLAY	DEFAULT VALUE	DECIMAL POINT POSITION	UNIT
Advanced setting	Moving average	None, 2, 4, 8, 16, 32, 64	Fnc	AoFF, A 2, A 4, A 8, A 16, A 32, A 64	AoFF	----	Sample
	Low-end cutout	OFF, ON	Fnc	CoFF, C on	CoFF	----	----
	Low-end cutout value	000 – 999	Zro, Fnc	C000 to C999	C000	----	User-defined
	Brightness	1 (dark) to 5 (bright)	D/P, Fnc	C 1, C 2, C 3, C 4, C 5	C 3	----	----
	Automatic return time to Measuring Mode	00 (automatic return disabled) 01 – 99	D/P, Fnc	r 00 to r 99	r 15	----	Second
	Transition time to Lock-out Setting Mode	00 – 99	D/P, Fnc	P 00 to P 99	P 05	----	Second
	Display refreshing rate	00.0 – 99.9	Fnc	F000 to F999	F000	----	Second
	Version indication	----	Fnc	----	----	----	----
Lockout setting	Alarm setting lockout	OFF, ON	D/P, Fnc	AoFF, A on	AoFF	----	----
	Scaling setting lockout	OFF, ON	D/P, Fnc	SoFF, S on	SoFF	----	----
	Advanced setting lockout	OFF, ON	D/P, Fnc	doFF, d on	doFF	----	----
	Loop test output lockout	OFF, ON	D/P, Fnc	toFF, t on	toFF		
	Initialization	OFF, initialization	D/P, Fnc	roFF, rESt	roFF	----	----
Loop test output	Loop test output	-19999 – 19999	Zro, Spn, D/P, Tch, Fnc, Max / Min	-9999 to 19999 (display blinking)	----	*1	User-defined

*1 Conforms to decimal point position setting.

NOTE 2: INDICATOR: ▭ = ON, [ ] = Blinking

22.4 PARAMETER MAP

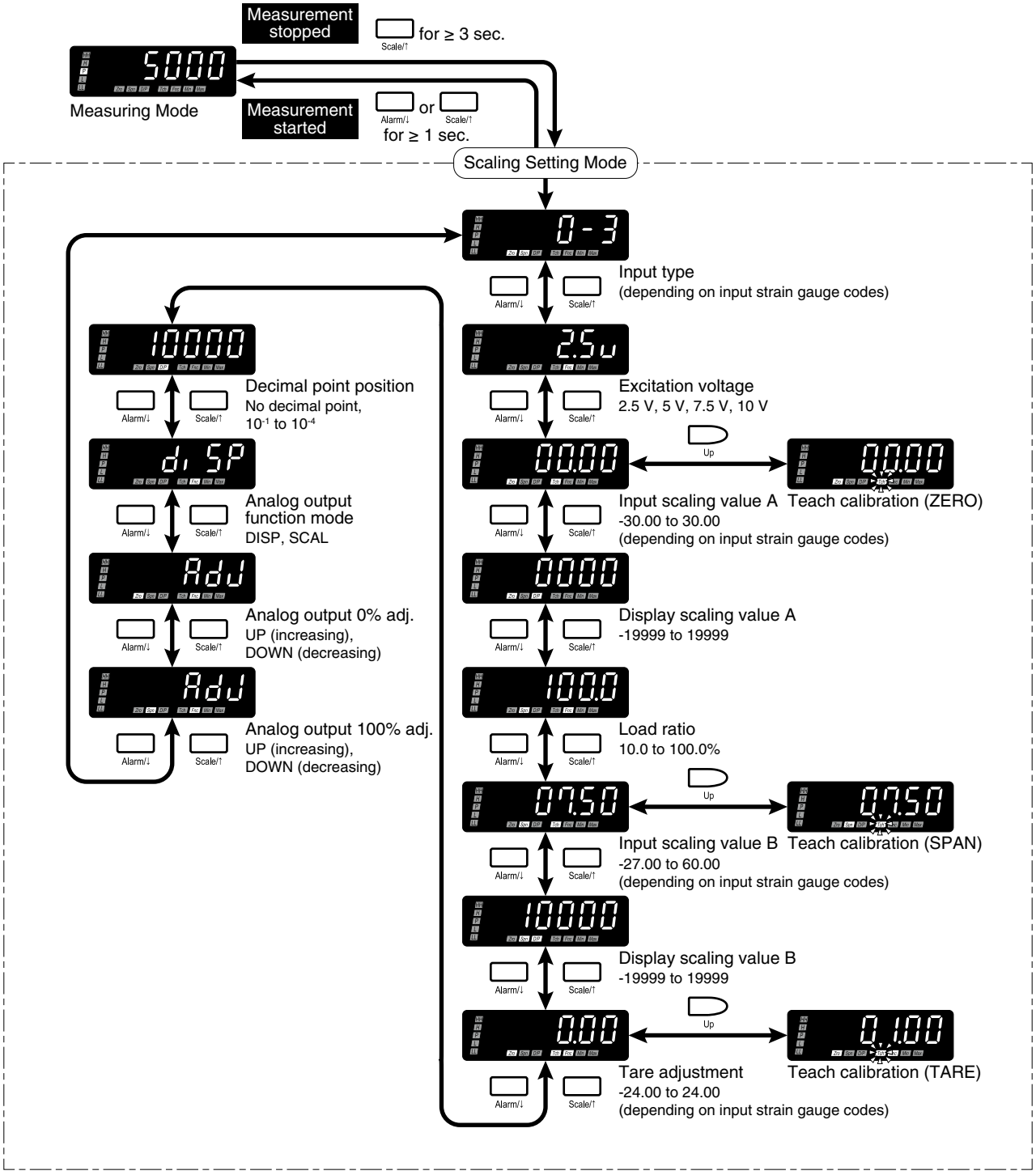
22.4.1 OPERATION IN MEASURING MODE



NOTE

- The display depends on the settings and input.
- Alarm setpoints cannot be confirmed with no-alarm-output type.
- When the alarm output code '2' (SPDT relay contact, 2 points) or "Dual alarm" for the alarm point parameter is selected, the LL and HH alarm setpoints are not indicated.

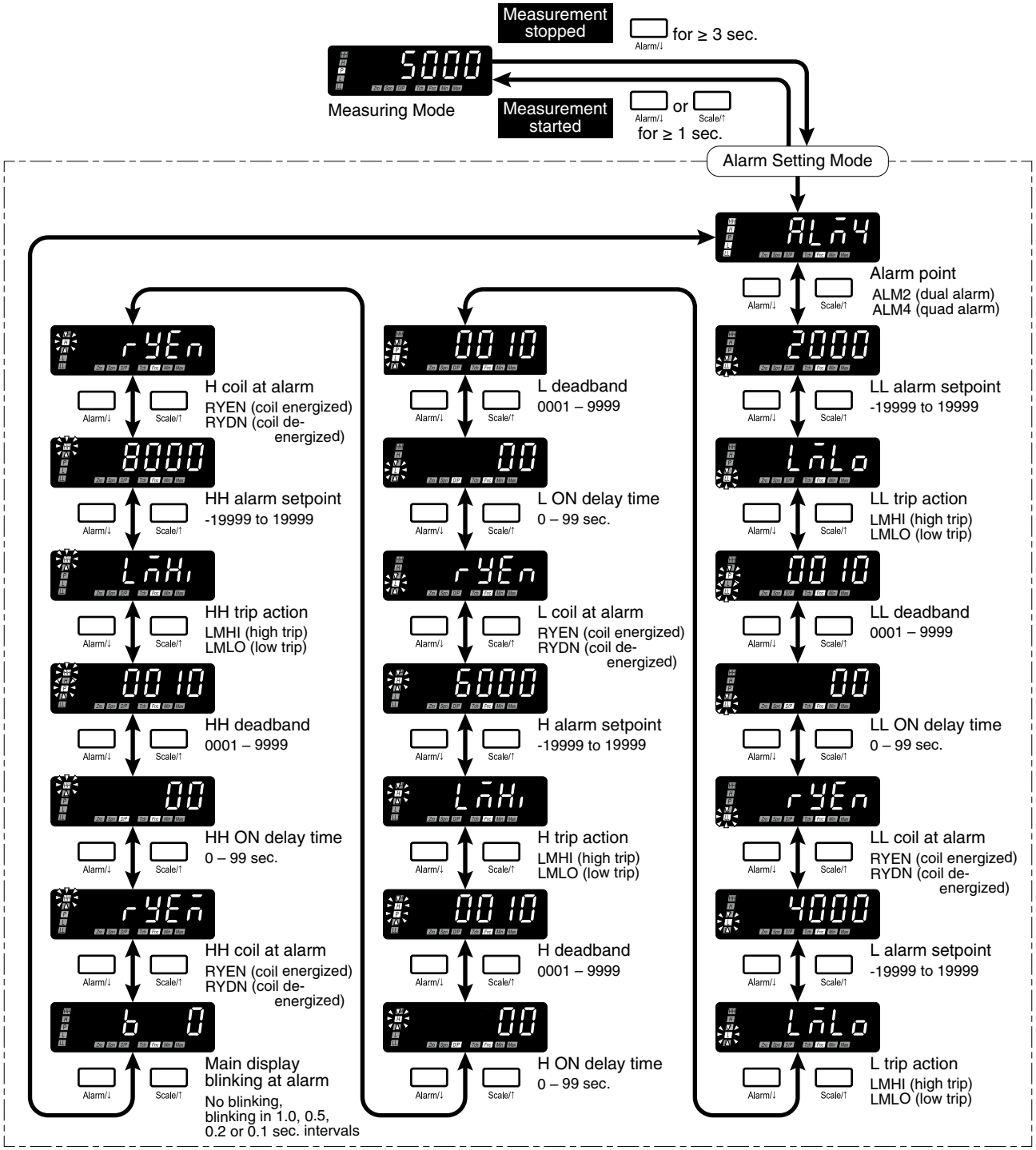
22.4.2 SCALING SETTING MODE



NOTE

- The display depends on the specifications, settings and input.
- The analog output parameters are not indicated with no-DC-output type.
- The input type is for indication only, not for setting.

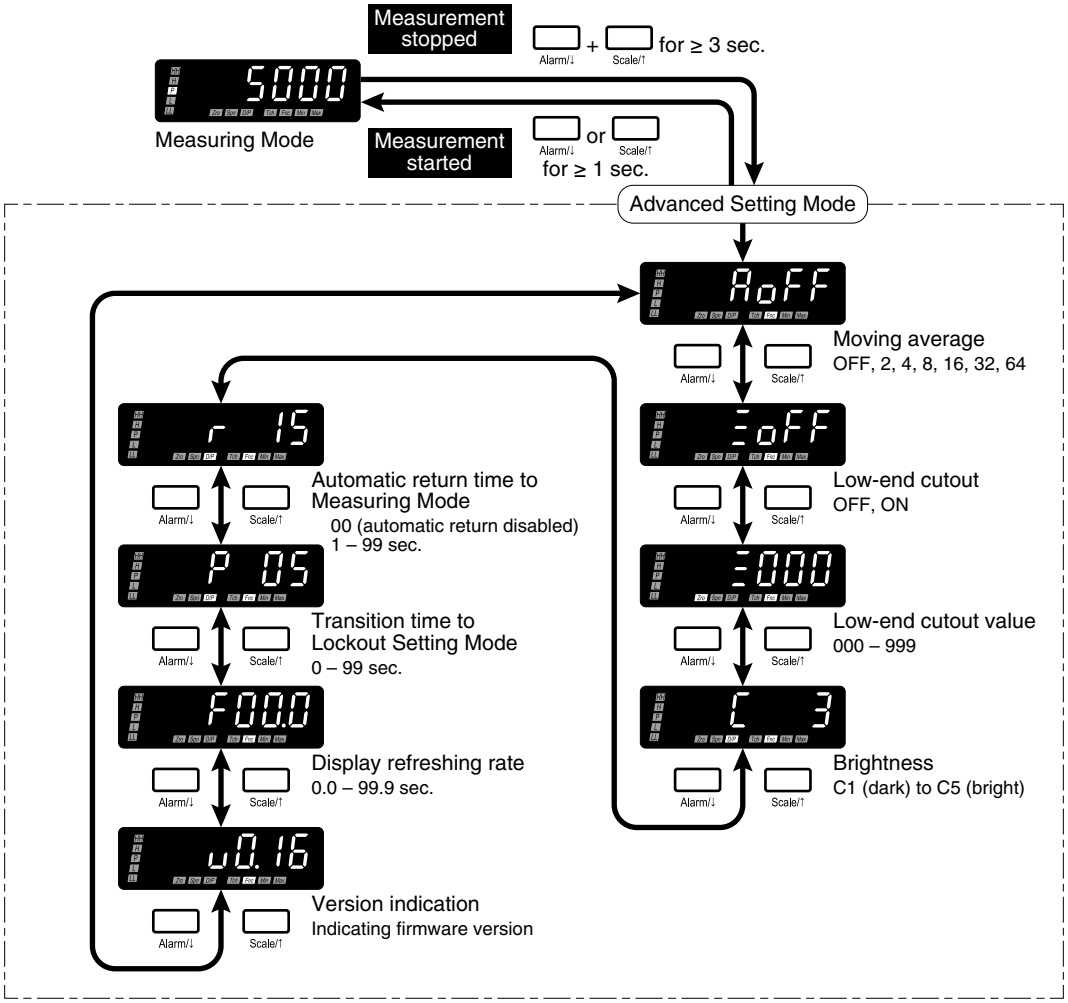
22.4.3 ALARM SETTING MODE



NOTE

- The display depends on the settings and input.
- Alarm Setting Mode is locked with no-alarm-output type.
- When the alarm output code '2' (SPDT relay contact, 2 points) or "Dual alarm" for the alarm point parameter is selected, the LL and HH parameters are disabled.

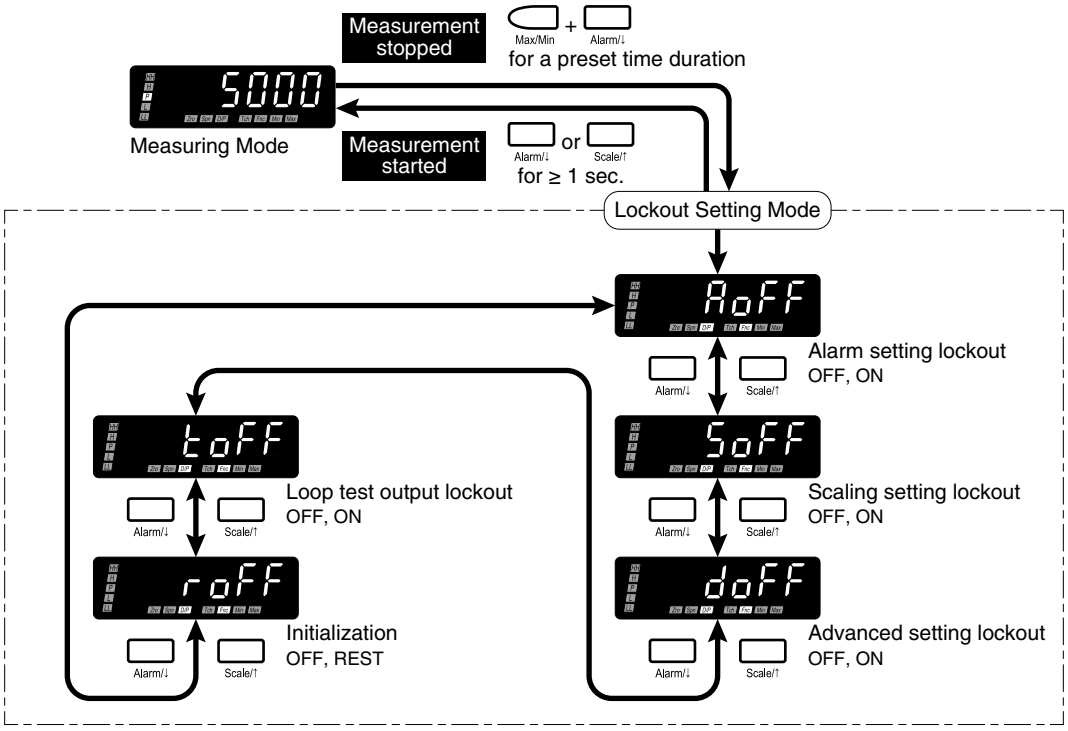
22.4.4 ADVANCED SETTING MODE



NOTE

- The display depends on the settings and input.
- With the low-end cutout set to OFF, the low-end cutout value setting is locked.
- Version indication is for indication only, not for setting.

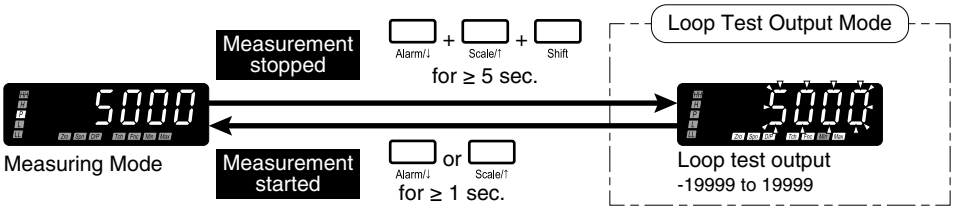
22.4.5 LOCKOUT SETTING MODE



NOTE

- The display depends on the settings and input.
- The alarm setting lockout is not indicated with no-alarm-output type. Instead, the scaling setting lockout is indicated first after shifted to Lockout Setting Mode.

22.4.6 LOOP TEST OUTPUT MODE

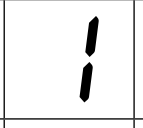
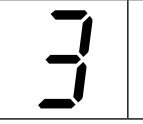
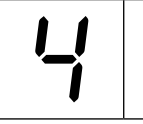
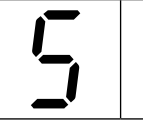
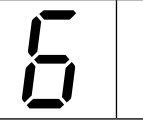
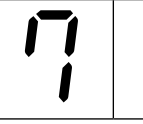
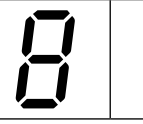


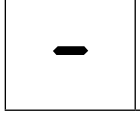
NOTE

The display depends on the settings and input.

22.5 CHARACTER SET

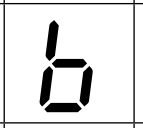
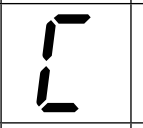
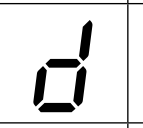
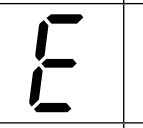
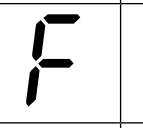
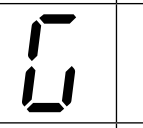
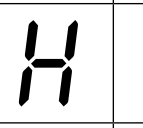
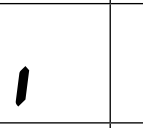
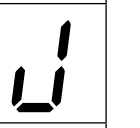
■ NUMERALS AND NEGATIVE SIGN

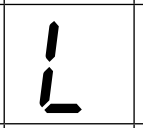
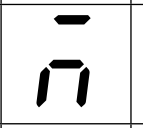
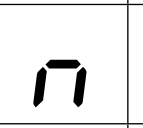
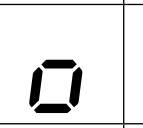
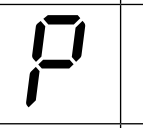
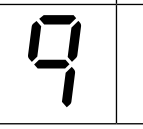
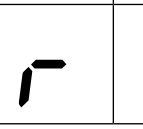
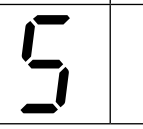
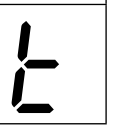
0	1	2	3	4	5	6	7	8	9
									

-	-1*1
	

*1 Indication when the fifth 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