*OPERATING MANUAL*

# SIGNAL TRANSMITTER
**(multi-output, PC programmable)**

MODEL **M1EXV-1**

## CONTENTS





5-2-55, Minamitsumori, Nishinari-ku, Osaka 557-0063 JAPAN
Phone: +81(6)6659-8201 Fax: +81(6)6659-8510 E-mail: info@m-system.co.jp

# BEFORE USE ....

Thank you for choosing M-System. Before use, please check contents of the package you received as outlined below.
If you have any problems or questions with the product, please contact M-System's Sales Office or representatives.

### ■ PACKAGE INCLUDES:

Signal transmitter (body) .....(1)

### ■ MODEL NO.

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

### ■ OPERATING MANUAL

This manual describes detailed operation regarding settings.
The M1EXV-1 is programmable using a PC. For detailed information on the PC configuration, refer to the M1ECFG (M1E1CFG) users manual (EM-6036).
The M1ECFG Configurator Software is downloadable at M-System's web site: http://www.m-system.co.jp

# POINTS OF CAUTION

### ■ CONFORMITY WITH EU DIRECTIVES

- The equipment must be mounted inside a panel.
- The actual installation environments such as panel configurations, connected devices, connected wires, may affect the protection level of this unit when it is integrated in a panel system. The user may have to review the CE requirements in regard to the whole system and employ additional protective measures to ensure the CE conformity.
- Install lightning surge protectors for those wires connected to remote locations.

### ■ POWER INPUT RATING & OPERATIONAL RANGE

- Locate the power input rating marked on the product and confirm its operational range as indicated below:

  24V DC rating: 24V ±10%, ≤ 5W

### ■ GENERAL PRECAUTIONS

- Before you remove the unit from its base or mount it, turn off the power supply and input signal for safety.

### ■ ENVIRONMENT

- Indoor use.
- When heavy dust or metal particles are present in the air, install the unit inside proper housing with sufficient ventilation.
- Do not install the unit where it is subjected to continuous vibration. Do not subject the unit to physical impact.
- Environmental temperature must be within -5 to +55°C (23 to 131°F) with relative humidity within 10 to 85% RH in order to ensure adequate life span and operation.
- Be sure that the ventilation slits are not covered with cables, etc.

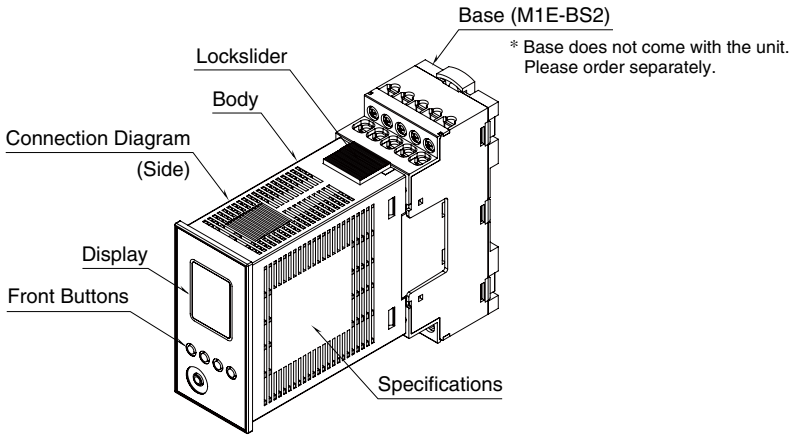
### ■ WIRING

- Do not install cables close to noise sources (relay drive cable, high frequency line, etc.).
- Do not bind these cables together with those in which noises are present. Do not install them in the same duct.

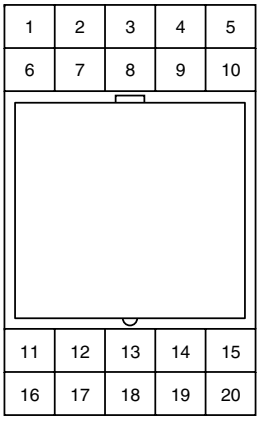
### ■ AND ....

- The unit is designed to function as soon as power is supplied, however, a warm up for 10 minutes is required for satisfying complete performance described in the data sheet.
- With voltage output, do not leave the output terminals shortcircuited for a long time. The unit is designed to endure it without breakdown, however, it may shorten appropriate life duration.

# COMPONENT IDENTIFICATION




### ■ TERMINAL ASSIGNMENTS




| No. | FUNCTION | No. | FUNCTION |
|---|---|---|---|
| 1 | Unused | 11 | Output 1 + |
| 2 | Unused | 12 | Output 1 – |
| 3 | Input voltage + | 13 | Output 4 + |
| 4 | Input current + | 14 | Output 2 + |
| 5 | Input – | 15 | Output 2 – |
| 6 | Unused | 16 | Output 3 + |
| 7 | Unused | 17 | Output 3 – |
| 8 | Unused | 18 | Output 4 – |
| 9 | Unused | 19 | Power + |
| 10 | Unused | 20 | Power – |

# INSTALLATION

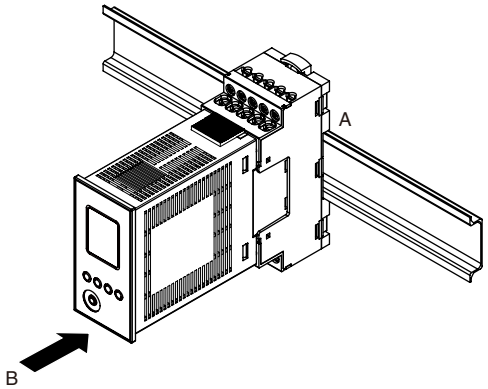
The unit can be removed from the base by pulling out while pressing the lockslider on the top thereof.
The base does not come with the unit. Please order separately.

### ■ DIN RAIL MOUNTING (PARALLEL)

**• Mounting the unit**

A) Hook the upper hook at the rear side of the base onto the DIN rail.

B) Push the lower part of the unit in the direction of the arrow until the base is firmly fixed to the DIN rail.

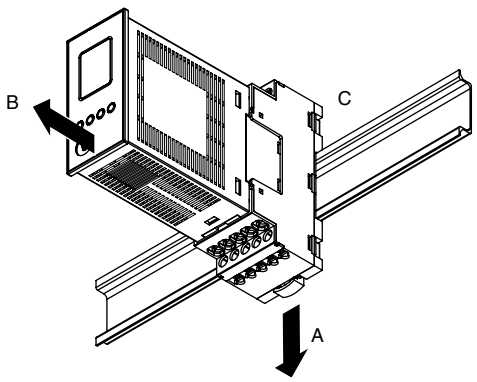



**• Removing the unit**

A) Push down the lower slider using a minus screwdriver.

B) Pull out the lower part of the unit.

C) Remove the upper part of the unit from the DIN rail.



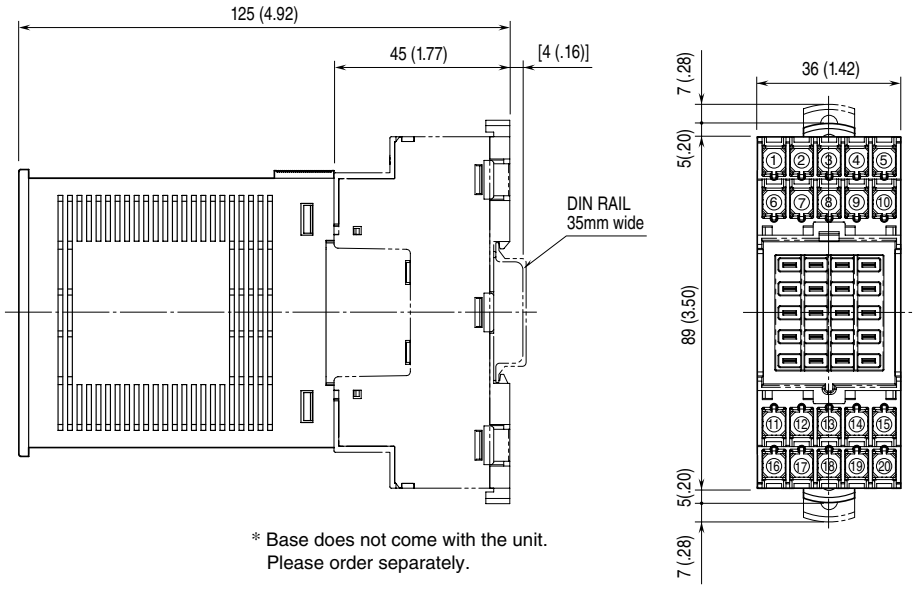

### ■ WALL MOUNTING

Refer to "MOUNTING REQUIREMENTS unit: mm (inch)" on page 4.
Pull out the upper and lower sliders from the base and fix them with M4 screws (Torque: 1.4 N·m).

# TERMINAL CONNECTIONS

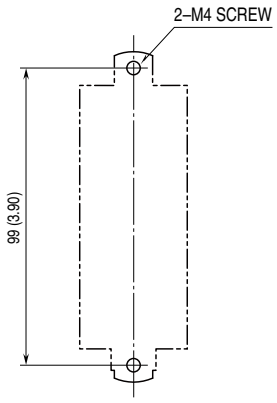
Connect the unit as in the diagram below or refer to the connection diagram on the side of the unit.
For a current input, attach the input resistor (model: REM3) together with input wiring to the input screw terminals.

### ■ EXTERNAL DIMENSIONS unit: mm (inch)



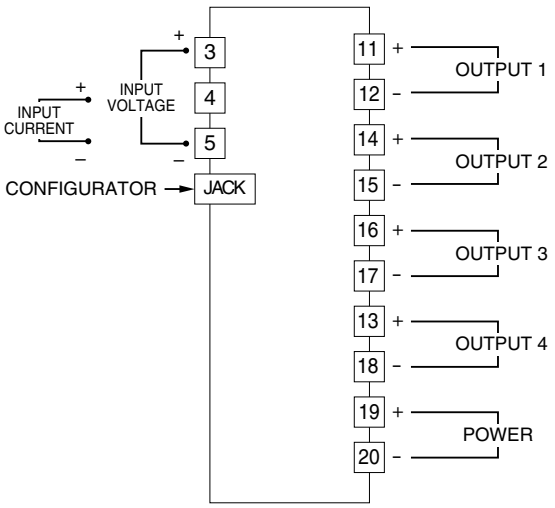

* Base does not come with the unit.
Please order separately.

### ■ MOUNTING REQUIREMENTS unit: mm (inch)

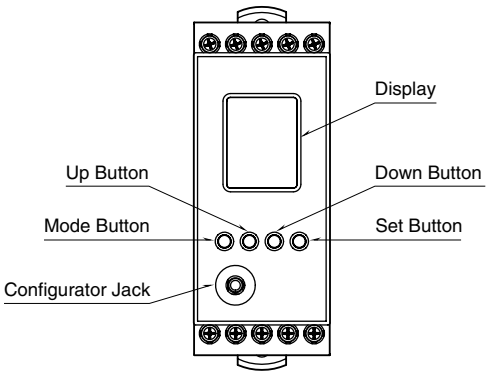



* Mounting requirements for base.

### ■ CONNECTION DIAGRAM



# EXTERNAL VIEWS




| COMPONENT | FUNCTION |
|---|---|
| Display | Indicates present values, setting values and abnormal information.<br>Two types of present values are displayed respectively at the upper and lower parts according to setting. |
| Mode button | Shifts from Measuring mode to each setting mode.<br>The destination changes depending on how long the button is held down.<br>While in each setting mode, pressing Mode button shift to the setting mode for the next channel.<br>Pressing Mode button for ≥ 2 seconds returns to Measuring mode from each setting mode.<br>In Measuring mode, shortly pressing the button shifts to the next screen. |
| Set button | Shifts the setting value of each setting parameter item to a setting changeable state.<br>When at setting changeable state, used to move through the digits of setting value and to enter (save) the setting value. |
| Up button | Shifts through setting parameter items and to increase or select the setting value. |
| Down button | Shifts through setting parameter items and to decrease or select the setting value. |
| Configurator Jack | Used to perform configuration with M1E configurator software (model: M1ECFG).<br>When using the software, set the Lockout setting of the unit to 'Lock'. |

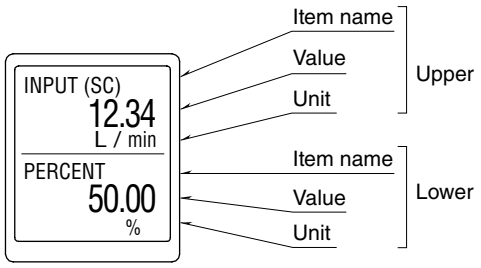
# SCREEN DISPLAY

## ■ DISPLAY IN MEASURING MODE

**• Double tiered display**

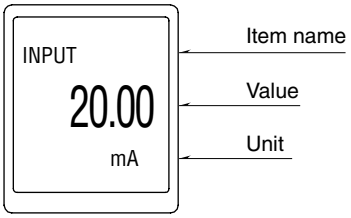
The unit can display any two items selected out of input engineering value, input scaling value, % value*, and output engineering value for each channel.

* Percent value for input.



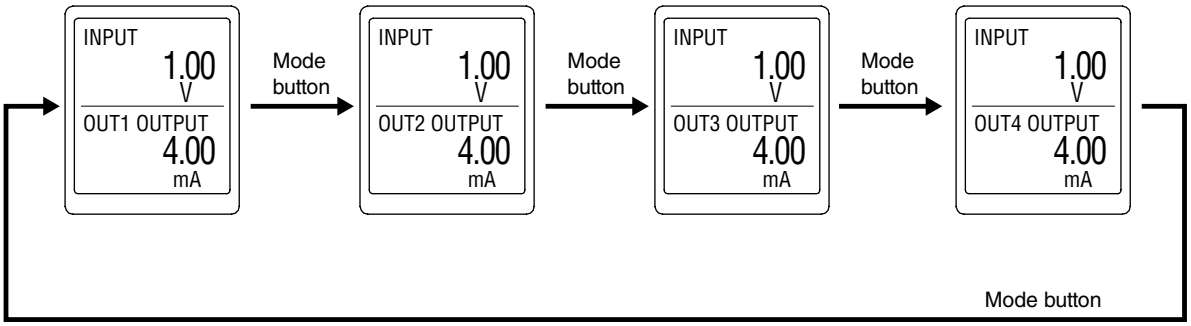

**• Single tiered display**

When there is only one item selected, the value can be displayed in large characters.



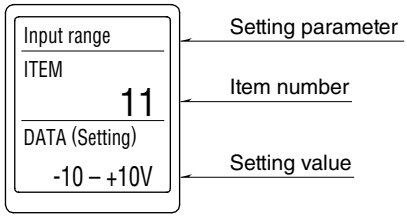

**• Screen Display for 4 channels**

The screen display is automatically switched sequentially at preset intervals.
Pressing Mode button also can switch the display.

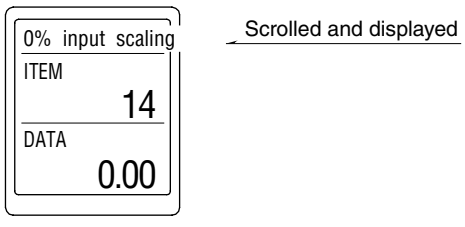



## ■ DISPLAY IN EACH SETTING MODE

In each setting mode, setting parameter item name, item No., and setting value are indicated.
During setting, '(Setting)' is indicated next to 'DATA'.
If the power is mistakenly shut down during setting, the set value is discarded and returns to the value before setting change.




The long parameter item name is scrolled and displayed.



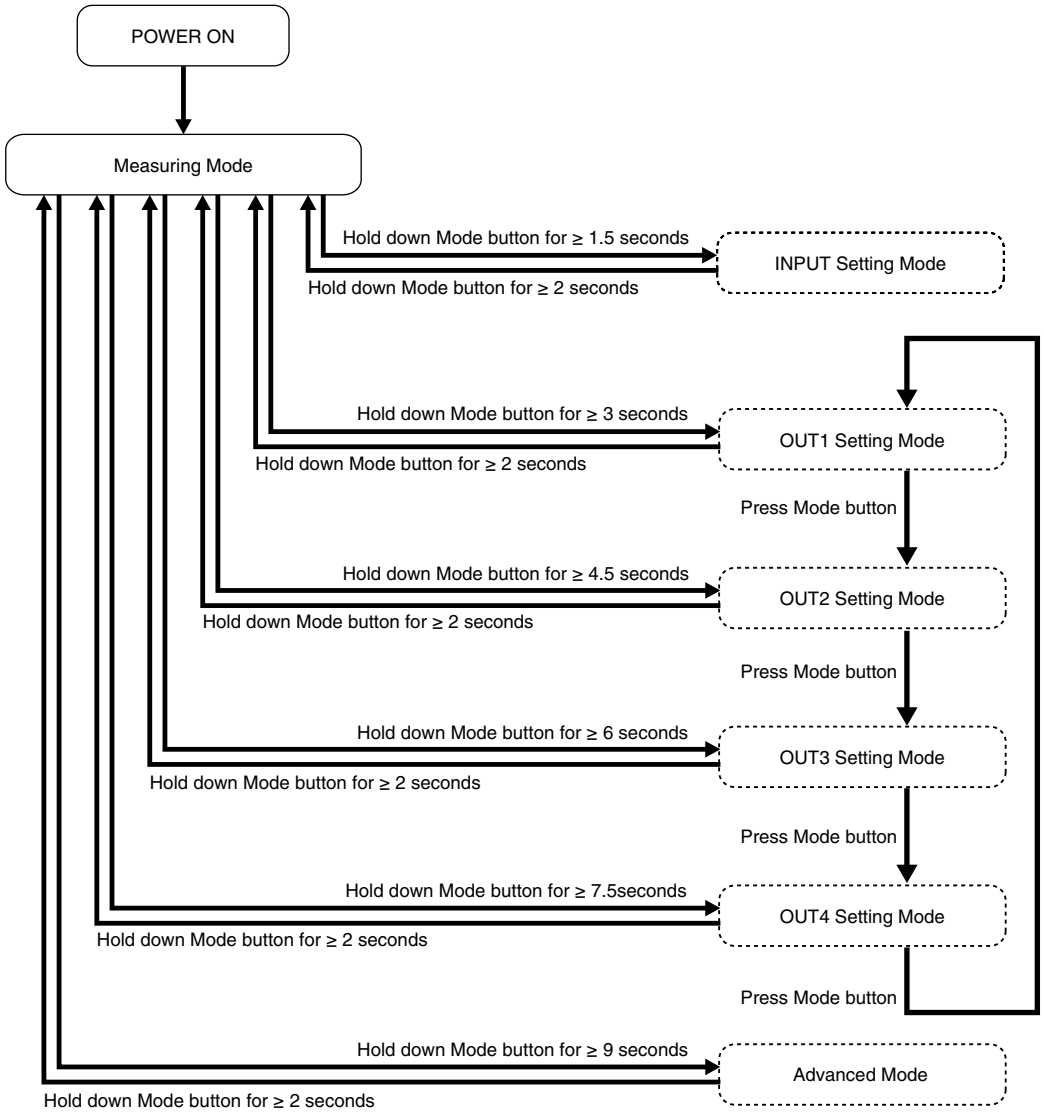

## ■ DISPLAY TIMEOUT

When there is no operation within the preset display timeout period, the display is cleared (display off).
Pressing Mode, Set, Up, or Down button or occurrence of an error restores the display from display off.
Set to '0' to keep the display 'always on'.

Refer to the settings of Advanced mode for details.

# PROGRAMMING

## ■ SETTING FLOWCHART



## ■ OPERATION IN EACH SETTING MODE

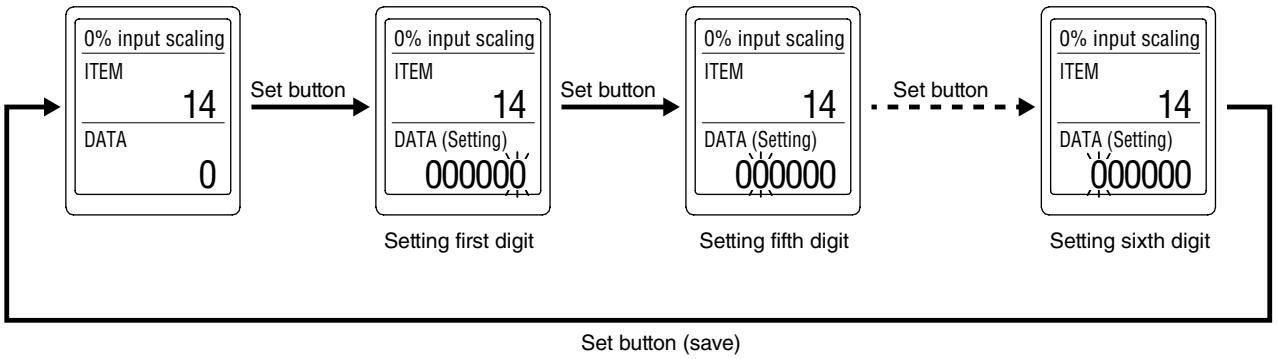
### • Basic operation

| | |
|---|---|
| Mode button: | In Measuring mode, hold down Mode button for ≥ 1.5 seconds, ≥ 3 seconds, ≥ 4.5 seconds, ≥ 6 seconds, ≥ 7.5 seconds, ≥ 9 seconds to shift to the respective setting modes.<br>In each setting mode, hold down Mode button for ≥ 2 seconds to return to Measuring mode.<br>While in each setting mode, press Mode button to shift to the setting mode for the next channel.<br>Hold down Mode button for ≥ 2 seconds during setting ( '(Setting)' is displayed next to 'DATA') to discard the set value and to return the value to the value before setting change ('(Setting)' next to 'DATA' is cleared). |
| Set button: | By pressing Set button at each setting parameter item, the setting value starts blinking and becomes changeable ('(Setting)' is indicated next to 'DATA'.).<br>During setting change, press Set button to save (enter) the setting value. and confirm that the value that was blinking turns ON. |
| Up button: | Press Up button to shift through setting parameter items.<br>During setting change, press Up button to select the setting value or increase the numerical value.<br>Keeping pressing Up button increases the value continuously. |
| Down button: | Press Down button to shift through setting parameter items.<br>During setting change, press Down button to select the setting value or decrease the numerical value.<br>Keeping pressing Down button decreases the value continuously. |

Note: DO NOT press 2 or more buttons simultaneously.

### • Setting numerical parameter

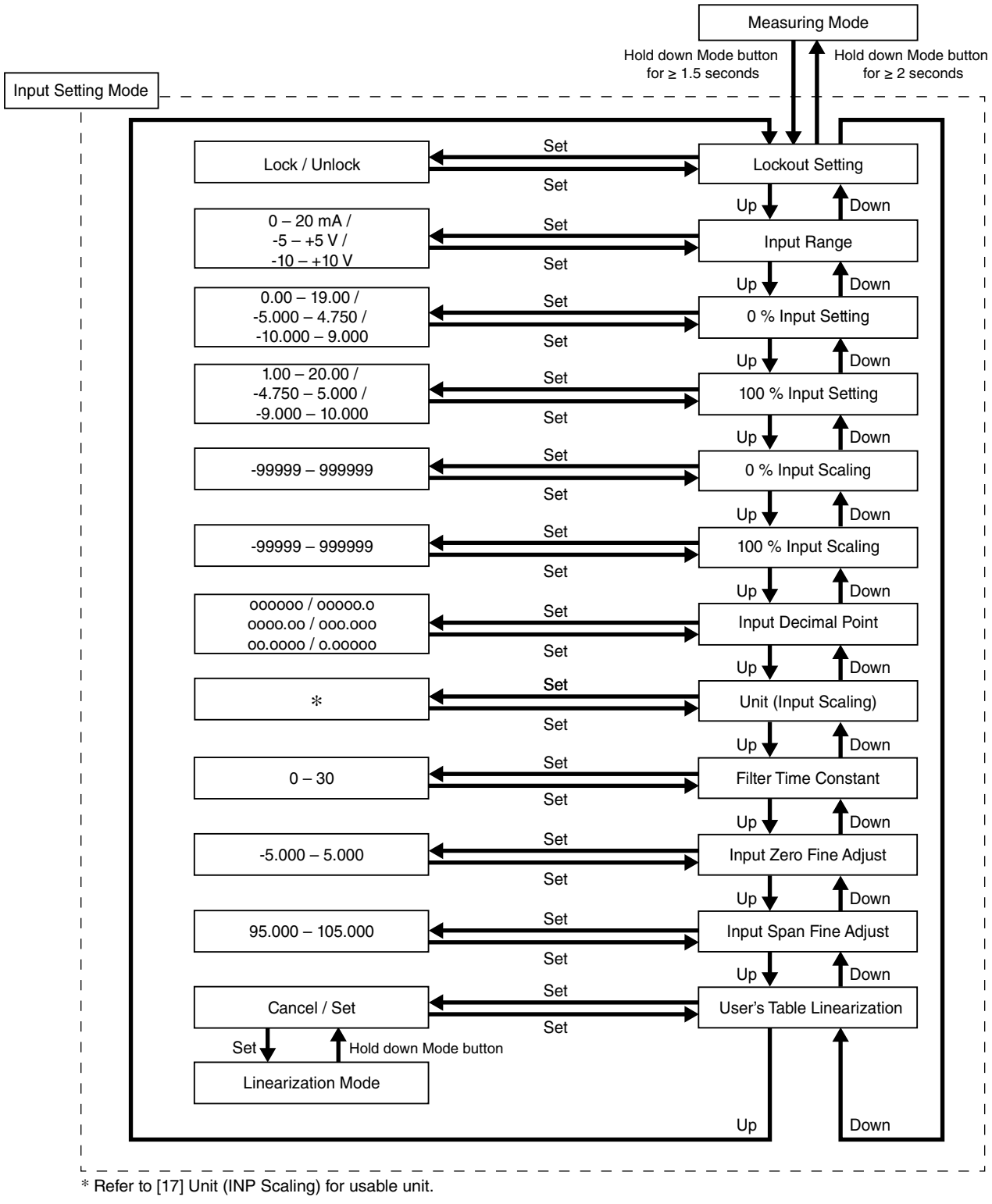
When setting a numerical parameter, the value need to be set digit by digit.
Each time Set button is pressed, the next digit starts blinking.
At the blinking digit, change the numerical value with Up and Down buttons.
By keeping pressing Up or Down button while the digit is blinking, the value of the digit continuously increases or decreases to the maximum or minimum.
Each time Set button is pressed, the blinking digit moves from the least significant to the most significant in order.
When Set button is pressed at the most significant digit, the digit that was blinking turns ON, and the setting value is saved.
During setting, to discard the setting value change, hold down Mode button for ≥ 2 seconds.




### • Lockout setting

'The unit has 'Lockout setting' function.
To disable the lockout setting, shift to the setting parameter ITEM 01 'Lockout Setting' in each setting mode and set to 'Unlock'.
To enable 'Lockout Setting' again, set to 'Lock'.
Even when 'Lockout Setting' is enabled, each setting value can be confirmed.
Confirm that 'DATA (Locked)' is indicated in such a time.

## ■ INPUT SETTING MODE




* Refer to [17] Unit (INP Scaling) for usable unit.

**• Parameters**

| MODE | ITEM | SETTING PARAMETER | RANGE | UNIT | INITIAL VALUE |
|---|---|---|---|---|---|
| Input Setting | 01 | Lockout setting | Lock / Unlock | – | Lock |
| | 11 | Input range | 0 – 20 mA<br>-5 – +5 V<br>-10 – +10 V | – | -5 – +5 V |
| | 12 | 0% Input setting | 0.00 – 19.00<br>-5.000 – 4.750<br>-10.000 – 9.000 | mA<br>V<br>V | 1.000 |
| | 13 | 100 % Input setting | 1.00 – 20.00<br>-4.750 – 5.000<br>-9.000 – 10.000 | mA<br>V<br>V | 5.000 |
| | 14 | 0 % Input scaling | -99999 – 999999 | – | 0.00 |
| | 15 | 100 % Input scaling | -99999 – 999999 | – | 100.00 |
| | 16 | Input decimal point | No decimal point<br>The number of decimal places: 1 – 5 | – | 2 places of decimals |
| | 17 | Unit (INP Scaling) | Choose from 68 types | – | % |
| | 31 | Filter time constant | 0 – 30 | sec. | 0 |
| | 41 | Input Zero fine adjust | -5.000 – 5.000 | % | 0.000 |
| | 42 | Input Span fine adjust | 95.000 – 105.000 | % | 100.000 |
| | 45 | Input User's table linearization | Cancel / Set | – | Cancel |

#### [01] Lockout setting

Enable / disable Lockout setting.

| SETTING VALUE | DESCRIPTION | INITIAL VALUE |
|---|---|---|
| Lock | Enable Lockout setting | Lock |
| Unlock | Disable Lockout setting | |

When Lockout setting is enabled, it is possible to shift to each setting mode and confirm the setting value of each setting parameter item. Each parameter item display indicates 'DATA (Locked)' when set to 'Lock', and indicates 'DATA' when set to 'Unlock'.

#### [11] Input range

Set the input range.

| SETTING VALUE | DESCRIPTION | INITIAL VALUE |
|---|---|---|
| 0 – 20 mA | Input: 0 – 20 mA DC | -5 – +5 V |
| -5 – +5 V | Input: -5 – +5 V DC | |
| -10 – +10 V | Input: -10 – +10 V DC | |

When the input range is changed, turn the power off, and change the connection to the input terminal of the unit accordingly. Note that input setting values are changed to the initial values.

#### [12] 0 % Input setting

Set the 0 % input setting value.
Setting range differs according to input range.

| INPUT RANGE | SETTING RANGE | MIN. SPAN | INITIAL VALUE |
|---|---|---|---|
| 0 – 20 mA | 0.00 – 19.00 | 1.00 | 4.00 |
| -5 – +5 V | -5.000 – 4.750 | 0.250 | 1.000 |
| -10 – +10 V | -10.000 – 9.000 | 1.000 | -10.000 |

Set as follows.
[12] 0 % input setting < [13] 100 % input setting

#### [13] 100 % Input setting

Set the 100 % input setting value.
Setting range differs according to input range.

| INPUT RANGE | SETTING RANGE | MIN. SPAN | INITIAL VALUE |
|---|---|---|---|
| 0 – 20 mA | 1.00 – 20.00 | 1.00 | 20.00 |
| -5 – +5 V | -4.750 – 5.000 | 0.250 | 5.000 |
| -10 – +10 V | -9.000 – 10.000 | 1.000 | 10.000 |

Set as follows.
[12] 0 % input setting < [13] 100 % input setting

#### [14] 0 % Input scaling

Set the display value of 0 % input setting.

| SETTING RANGE | INITIAL VALUE |
|---|---|
| -99999 – 999999 | 0.00 |

#### [15] 100 % Input scaling

Set the display value of 100 % input setting.

| SETTING RANGE | INITIAL VALUE |
|---|---|
| -99999 – 999999 | 100.00 |

#### [16] Input decimal point

Set the decimal point position of [14] 0 % and [15] 100 % input scaling.

| SETTING VALUE | DESCRIPTION | INITIAL VALUE |
|---|---|---|
| oooooo | Decimal point: None | 2 places of decimals |
| ooooo.o | No. of decimal places: 1 | |
| oooo.oo | No. of decimal places: 2 | |
| ooo.ooo | No. of decimal places: 3 | |
| oo.oooo | No. of decimal places: 4 | |
| o.ooooo | No. of decimal places: 5 | |

**[17] Unit (INP scaling)**

Set the unit to display input scaling.
Available units are following 68 types.

| |
|---|
| DC, AC, mV, V, kV, µA, mA, A, kA, mW, W, kW, var, kvar, Mvar, VA, Hz, Ω, kΩ, MΩ, cm, mm, m, m/sec, mm/min, cm/min, m/min, m/h, $m/s^2$, inch, L, L/s, L/min, L/h, $m^3$, $m^3$/sec, $m^3$/min, $m^3$/h, $Nm^3$/h, N·m, $N/m^2$, g, kg, kg/h, N, kN, Pa, kPa, MPa, t, t/h, °C, °F, K, %RH, J, kJ, MJ, rpm, sec, min, $min^{-1}$, pH, %, ppm, deg, (blank), User |

Selecting 'User' shifts to User's unit setting display.

A unit can be created by using up to any 13 characters.*1

Shift through characters using Up and Down buttons and press Set button to select the character.
While setting, pressing Mode button deletes one character, and holding down Mode button for ≥ 2 seconds discards the set value, which returns to the value before setting change.

Hold down Set button for ≥ 2 seconds to save the setting and return to the setting display of [17] Unit (INP Scaling).

If turning power off while setting, the display returns to the setting display of [17] Unit (INP Scaling).
(The set value is discarded).

The unit is displayed in [Ch1 INPUT (Scaling)] in Measuring mode.
Initial value: %

*1. Settable characters

0 – 9 A – Z a – z ! " # $ % & ' ( ) = - + * ^ | @ ` [ ] { } ; : < > ? _ , . /

**[31] Filter time constant**

Set filter time constant of the first order lowpass filter.
The first order lowpass filter is available with setting time. When this parameter is set to '0', the first order lowpass filter is not available (Response time: ≤ 0.5 sec. (0 → 90 %)).
The setting time constant is the time taken for output to follow up to about 63 %, when input varies from 0 % to 100 %.
Settable range: 0 – 30 seconds.
Initial value: 0

**[41] Input zero fine adjust**

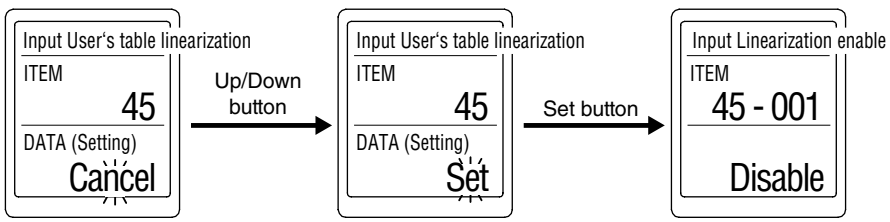
Perform fine adjustment of input signal.
Settable range: -5.000 – +5.000 %.
Initial value: 0.000

**[42] Input span fine adjust**

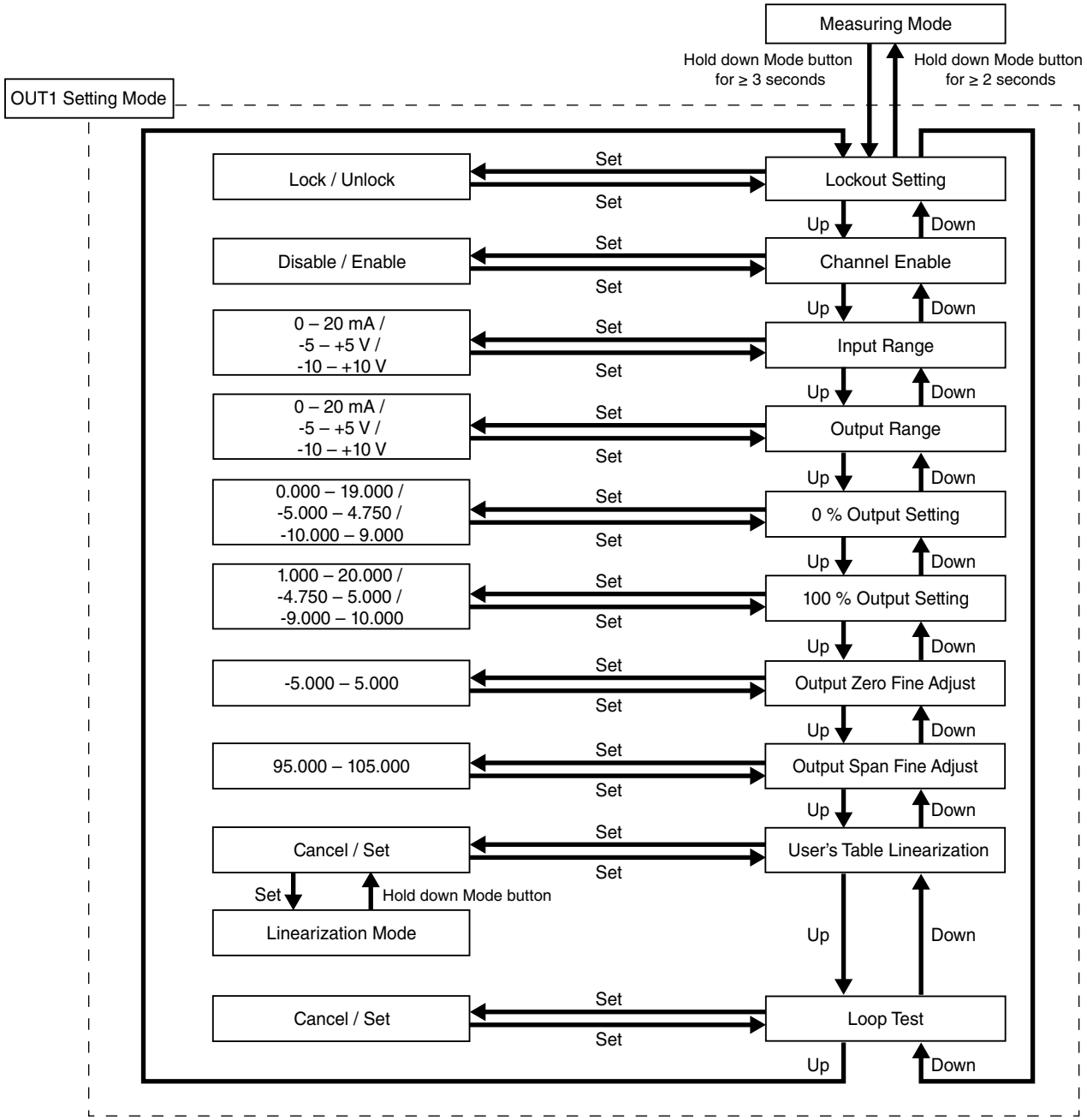
Perform fine adjustment of input signal.
Settable range: 95.000 – 105.000 %.
Initial value: 100.000

**[45] Input user's table linearization**

Enable / Disable Linearization function using a user specified table.
Press Set button and confirm that 'Cancel" is displayed with blinking.
Press Up or Down button to change to 'Set', and press Set button to shift to Ch1 Linearization mode.
Note: Be sure to set the Lockout setting to 'Unlock' before shifting to Ch1 Linearization mode.



■ **OUT1 SETTING MODE**



**• Parameters**

| MODE | ITEM | SETTING PARAMETER | RANGE | UNIT | INITIAL VALUE |
|---|---|---|---|---|---|
| Output 1 setting | 01 | Lockout setting | Lock / Unlock | – | Lock |
| | 51 | OUT1 Output enable | Disable / Enable | – | Enable |
| | 61 | OUT1 Output range | 0 – 20 mA<br>-5 – +5 V<br>-10 – +10 V | – | 0 – 20 mA |
| | 62 | OUT1 0 % Output setting | 0.000 – 19.000<br>-5.000 – 4.750<br>-10.000 – 9.000 | mA<br>V<br>V | 4.000 |
| | 63 | OUT1 100 % Output setting | 1.000 – 20.000<br>-4.750 – 5.000<br>-9.000 – 10.000 | mA<br>V<br>V | 20.000 |
| | 91 | OUT1 Output Zero fine adjust | -5.000 – 5.000 | – | 0.000 |
| | 92 | OUT1 Output Span fine adjust | 95.000 – 105.000 | – | 100.000 |
| | 95 | OUT1 User's table linearization | Cancel / Set | – | Cancel |
| | 98 | OUT1 Loop test | -5.00 – 105.00 | – | Cancel |

**[01] Lockout setting**

Enable / disable Lockout setting.

| SETTING VALUE | DESCRIPTION | INITIAL VALUE |
|---|---|---|
| Lock | Enable Lockout setting | Lock |
| Unlock | Disable Lockout setting | |

When Lockout setting is enabled, it is possible to shift to each setting mode and confirm the setting value of each setting parameter item. Each parameter item display indicates 'DATA (Locked)' when set to 'Lock', and indicates 'DATA' when set to 'Unlock'.

**[51] OUT1 Output enable**

Enable / disable output.
No output signal or present value is displayed for the disabled channel in Measuring Mode.

| SETTING VALUE | DESCRIPTION | INITIAL VALUE |
|---|---|---|
| Disable | Disable Ch2 | Enable |
| Enable | Enable Ch2 | |

Even when output is disabled, parameter settings for output can be performed.

**[61] OUT1 Input range**

Set the input range.

| SETTING VALUE | DESCRIPTION | INITIAL VALUE |
|---|---|---|
| 0 – 20 mA | Output: 0 – 20 mA DC | 0 – 20 mA DC |
| -5 – +5 V | Output: -5 – +5 V DC | |
| -10 – +10 V | Output: -10 – +10 V DC | |

When the input range is changed, turn the power off, and change the connection to the input terminal of the unit accordingly. Note that input setting values are changed to the initial values.

**[62] OUT1 0 % Input setting**

Set the 0 % input setting value.
Setting range differs according to input range.

| OUTPUT RANGE | SETTING RANGE | MIN. SPAN | INITIAL VALUE |
|---|---|---|---|
| 0 – 20 mA | 0.00 – 19.00 | 1.00 | 4.00 |
| -5 – +5 V | -5.000 – 4.750 | 0.250 | -5.000 |
| -10 – +10 V | -10.000 – 9.000 | 1.000 | -10.000 |

Set as follows.
[62] 0 % input setting < [63] 100 % input setting

**[63] OUT1 100 % Input setting**

Set the 100 % input setting value.
Setting range differs according to input range.

| OUTPUT RANGE | SETTING RANGE | MIN. SPAN | INITIAL VALUE |
|---|---|---|---|
| 0 – 20 mA | 1.00 – 20.00 | 1.00 | 20.00 |
| -5 – +5 V | -4.750 – 5.000 | 0.250 | 5.000 |
| -10 – +10 V | -9.000 – 10.000 | 1.000 | 10.000 |

Set as follows.
[62] 0 % input setting < [63] 100 % input setting

**[91] OUT1 Output zero fine adjust**

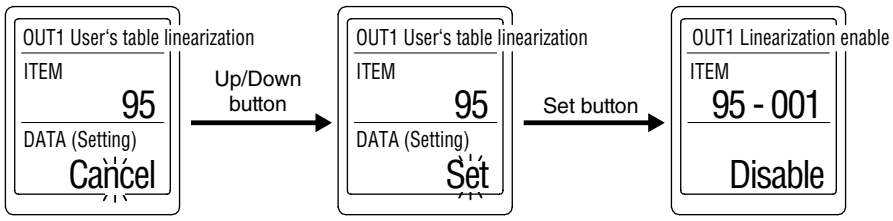
Perform fine adjustment of output signal.
Settable range: -5.000 – +5.000 %.
Initial value: 0.000

**[92] OUT1 Output span fine adjust**

Perform fine adjustment of output signal.
Settable range: 95.000 – 105.000 %.
Initial value: 100.000

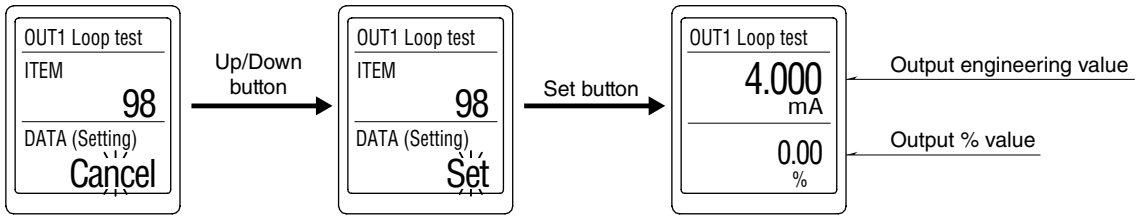
**[195] OUT1 User's table linearization**

Enable / Disable Linearization function using a user specified table.
Press Set button and confirm that 'Cancel" is displayed with blinking.
Press Up or Down button to change to 'Set', and press Set button to shift to OUT1 Linearization mode.
Note: Be sure to set the Lockout setting to 'Unlock' before shifting to OUT1 Linearization mode.



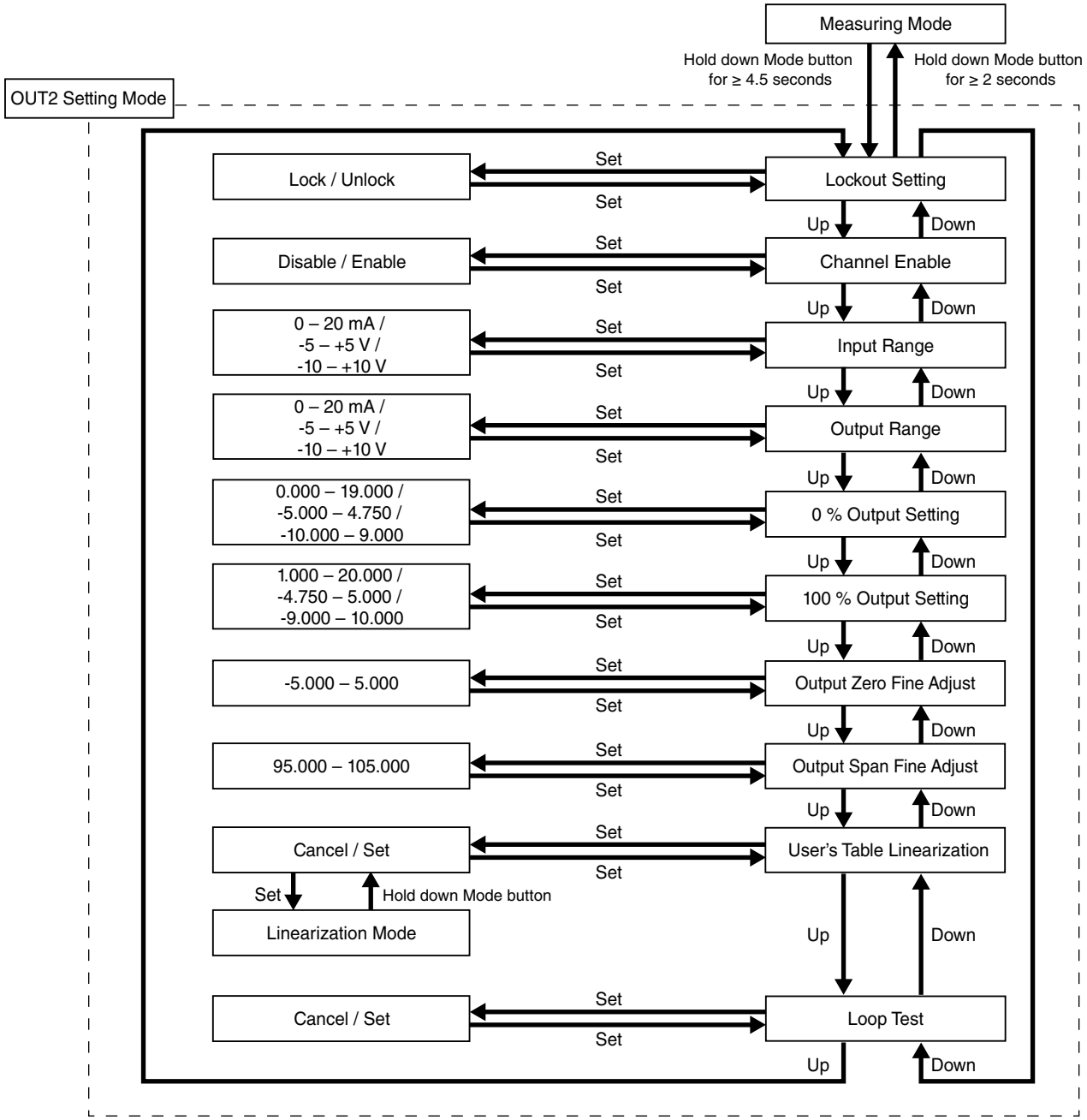

**[198] OUT1 Loop test**

Output signal can be simulated for performing loop test.
Press Set button and confirm that 'Cancel' is displayed with blinking.
Press Up or Down button to change to 'Set', and press Set button to shift to Loop test display.
The present value is indicated. Increase or decrease it by pressing Up or Down button.
Holding down each button changes the value continuously.
Hold down Mode button for ≥ 2 seconds or turn off the power to exit loop test.




Note: While the loop test is performed, all input signals are disregarded.
When 'Display timeout' is activated and the display has been cleared (display off) during loop test, press any front button to restore the display.

**■ OUT2 SETTING MODE**



**• Parameters**

| MODE | ITEM | SETTING PARAMETER | RANGE | UNIT | INITIAL VALUE |
|---|---|---|---|---|---|
| Output 2 Setting | 01 | Lockout setting | Lock / Unlock | – | Lock |
| | 151 | OUT2 Output enable | Disable / Enable | – | Enable |
| | 161 | OUT2 Output range | 0 – 20 mA<br>-5 – +5 V<br>-10 – +10 V | – | 0 – 20 mA |
| | 162 | OUT2 0 % Output setting | 0.000 – 19.000<br>-5.000 – 4.750<br>-10.000 – 9.000 | mA<br>V<br>V | 4.000 |
| | 163 | OUT2 100 % Output setting | 1.000 – 20.000<br>-4.750 – 5.000<br>-9.000 – 10.000 | mA<br>V<br>V | 20.000 |
| | 191 | OUT2 Output zero fine adjust | -5.000 – 5.000 | % | 0.000 |
| | 192 | OUT2 Output span fine adjust | 95.000 – 105.000 | % | 100.000 |
| | 195 | OUT2 User's table linearization | Cancel / Set | – | Cancel |
| | 198 | OUT2 Loop test | -5.00 – 105.00 | % | Cancel |

**[01] Lockout setting**

Enable / disable Lockout setting.

| SETTING VALUE | DESCRIPTION | INITIAL VALUE |
|---|---|---|
| Lock | Enable Lockout setting | Lock |
| Unlock | Disable Lockout setting | |

When Lockout setting is enabled, it is possible to shift to each setting mode and confirm the setting value of each setting parameter item. Each parameter item display indicates 'DATA (Locked)' when set to 'Lock', and indicates 'DATA' when set to 'Unlock'.

**[151] OUT2 Enable**

Enable / disable OUT2.
No output signal or present value is displayed for the disabled channel in Measuring Mode.

| SETTING VALUE | DESCRIPTION | INITIAL VALUE |
|---|---|---|
| Disable | Disable output | Enable |
| Enable | Enable output | |

Even when OUT2 is disabled, parameter settings for OUT2 can be performed.

**[161] OUT2 Output range**

Set the range of output signal of the unit.

| SETTING VALUE | DESCRIPTION | INITIAL VALUE |
|---|---|---|
| 0 – 20 mA | Output: 0 – 20 mA DC | 0 – 20 mA |
| -5 – +5 V | Output: -5 – +5 V DC | |
| -10 – +10 V | Output: -10 – +10 V DC | |

**[162] OUT2 0 % Output setting**

Set the 0 % output setting value.

| OUTPUT RANGE | SETTING RANGE | MIN. SPAN | INITIAL VALUE |
|---|---|---|---|
| 0 – 20 mA | 0.000 – 19.000 | 1.000 | 4.000 |
| -5 – +5 V | -5.000 – 4.750 | 0.250 | -5.000 |
| -10 – +10 V | -10.000 – 9.000 | 1.000 | -10.000 |

Set as follows.
[262] 0 % output setting < [263] 100 % output setting

**[163] OUT2 100 % Output setting**

Set the 100 % output setting value.

| OUTPUT RANGE | SETTING RANGE | MIN. SPAN | INITIAL VALUE |
|---|---|---|---|
| 0 – 20 mA | 1.000 – 20.000 | 1.000 | 20.000 |
| -5 – +5 V | -4.750 – 5.000 | 0.250 | 5.000 |
| -10 – +10 V | -9.000 – 10.000 | 1.000 | 10.000 |

Set as follows.
[262] 0 % output setting < [263] 100 % output setting

**[191] OUT2 Output zero fine adjust**

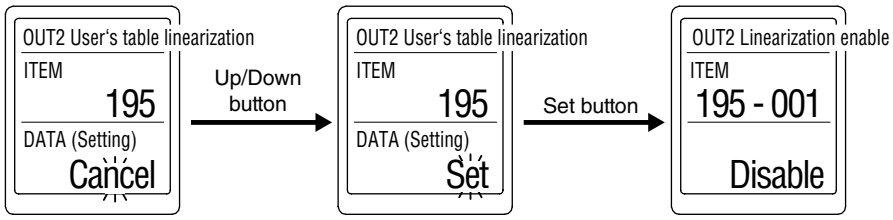
Perform fine adjustment of output signal.
Settable range: -5.000 – +5.000 %.
Initial value: 0.000

**[192] OUT2 Output span fine adjust**

Perform fine adjustment of output signal.
Settable range: 95.000 – 105.000 %.
Initial value: 100.000

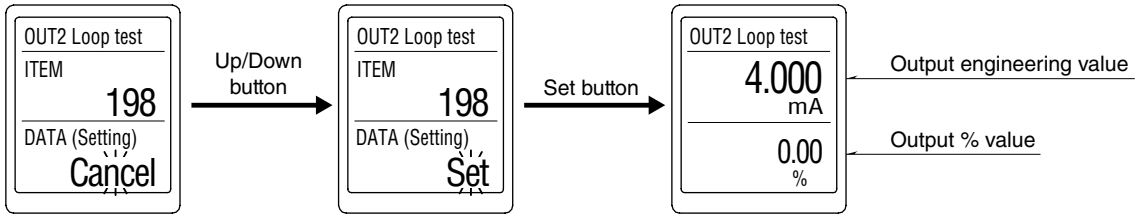
**[195] OUT2 User's table linearization**

Enable / Disable Linearization function using a user specified table.
Press Set button and confirm that 'Cancel" is displayed with blinking.
Press Up or Down button to change to 'Set', and press Set button to shift to OUT2 Linearization mode.
Note: Be sure to set the Lockout setting to 'Unlock' before shifting to OUT2 Linearization mode.



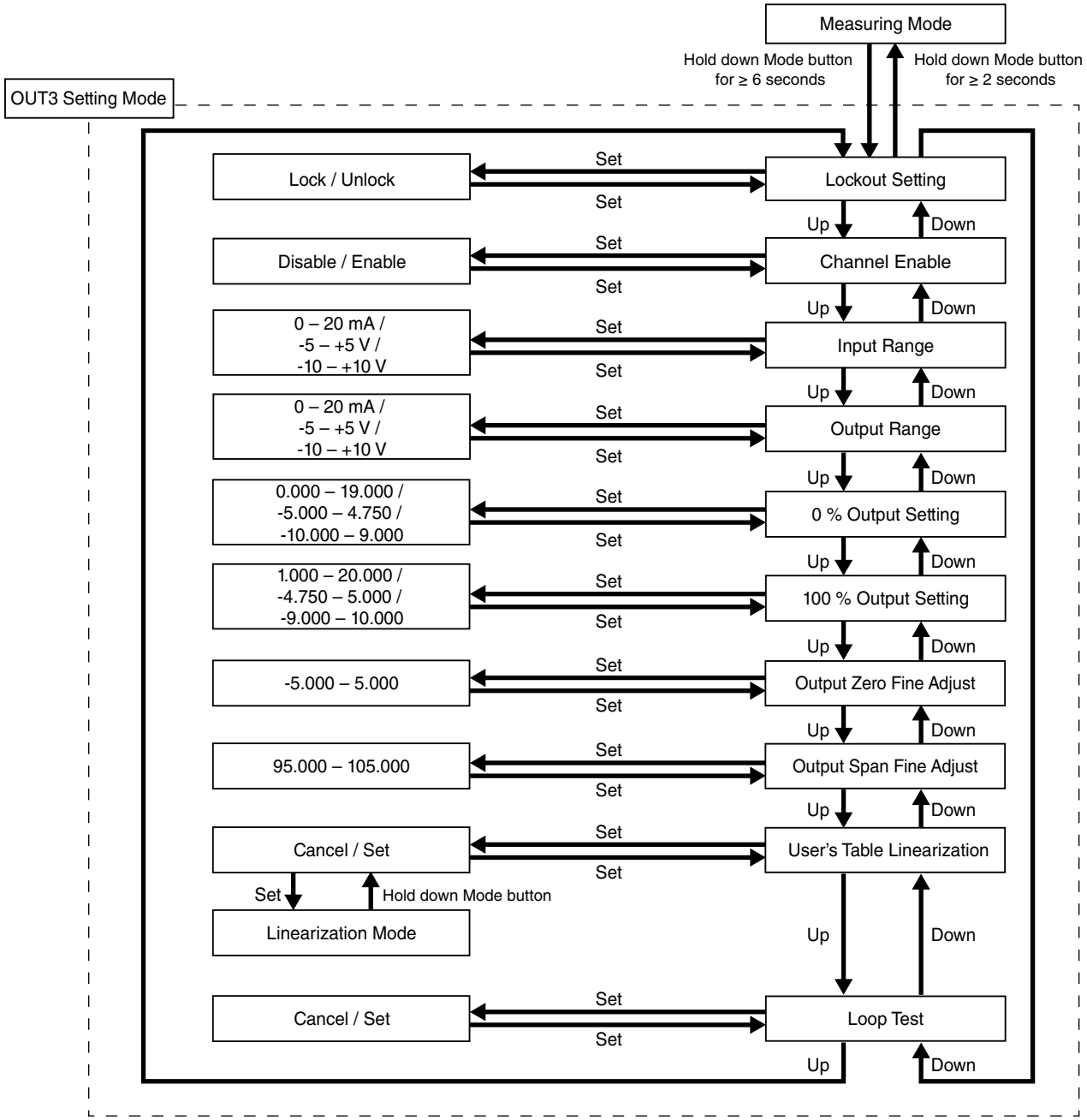

**[198] OUT2 Loop test**

Output signal can be simulated for performing loop test.
Press Set button and confirm that 'Cancel' is displayed with blinking.
Press Up or Down button to change to 'Set', and press Set button to shift to Loop test display.
The present value is indicated. Increase or decrease it by pressing Up or Down button.
Holding down each button changes the value continuously.
Hold down Mode button for ≥ 2 seconds or turn off the power to exit loop test.




Note: While the loop test is performed, all input signals are disregarded.
When 'Display timeout' is activated and the display has been cleared (display off) during loop test, press any front button to restore the display.

■ **OUT3 SETTING MODE**



**• Parameters**

| MODE | ITEM | SETTING PARAMETER | RANGE | UNIT | INITIAL VALUE |
|---|---|---|---|---|---|
| Output 3 Setting | 01 | Lockout setting | Lock / Unlock | – | Lock |
| | 251 | OUT3 Output enable | Disable / Enable | – | Enable |
| | 261 | OUT3 Output range | 0 – 20 mA<br>-5 – +5 V<br>-10 – +10 V | – | 0 – 20 mA |
| | 262 | OUT3 0 % Output setting | 0.000 – 19.000<br>-5.000 – 4.750<br>-10.000 – 9.000 | mA<br>V<br>V | 4.000 |
| | 263 | OUT3 100 % Output setting | 1.000 – 20.000<br>-4.750 – 5.000<br>-9.000 – 10.000 | mA<br>V<br>V | 20.000 |
| | 291 | OUT3 Output zero fine adjust | -5.000 – 5.000 | % | 0.000 |
| | 292 | OUT3 Output span fine adjust | 95.000 – 105.000 | % | 100.000 |
| | 295 | OUT3 User's table linearization | Cancel / Set | – | Cancel |
| | 298 | OUT3 Loop test | -5.00 – 105.00 | % | Cancel |

**[01] Lockout setting**

Enable / disable Lockout setting.

| SETTING VALUE | DESCRIPTION | INITIAL VALUE |
|---|---|---|
| Lock | Enable Lockout setting | Lock |
| Unlock | Disable Lockout setting | |

When Lockout setting is enabled, it is possible to shift to each setting mode and confirm the setting value of each setting parameter item. Each parameter item display indicates 'DATA (Locked)' when set to 'Lock', and indicates 'DATA' when set to 'Unlock'.

**[251] OUT3 Enable**

Enable / disable OUT3.
No output signal or present value is displayed for the disabled channel in Measuring Mode.

| SETTING VALUE | DESCRIPTION | INITIAL VALUE |
|---|---|---|
| Disable | Output Disable | Enable |
| Enable | Output Enable | |

Even when OUT3 is disabled, parameter settings for OUT3 can be performed.

**[261] OUT3 Output range**

Set the range of output signal of the unit.

| SETTING VALUE | DESCRIPTION | INITIAL VALUE |
|---|---|---|
| 0 – 20 mA | Output: 0 – 20 mA DC | 0 – 20 mA |
| -5 – +5 V | Output: -5 – +5 V DC | |
| -10 – +10 V | Output: -10 – +10 V DC | |

**[262] OUT3 0 % Output setting**

Set the 0 % output setting value.

| OUTPUT RANGE | SETTING RANGE | MIN. SPAN | INITIAL VALUE |
|---|---|---|---|
| 0 – 20 mA | 0.000 – 19.000 | 1.000 | 4.000 |
| -5 – +5 V | -5.000 – 4.750 | 0.250 | -5.000 |
| -10 – +10 V | -10.000 – 9.000 | 1.000 | -10.000 |

Set as follows.
[262] 0 % output setting < [263] 100 % output setting

**[263] OUT3 100 % Output setting**

Set the 100 % output setting value.

| OUTPUT RANGE | SETTING RANGE | MIN. SPAN | INITIAL VALUE |
|---|---|---|---|
| 0 – 20 mA | 1.000 – 20.000 | 1.000 | 20.000 |
| -5 – +5 V | -4.750 – 5.000 | 0.250 | 5.000 |
| -10 – +10 V | -9.000 – 10.000 | 1.000 | 10.000 |

Set as follows.
[262] 0 % output setting < [263] 100 % output setting

**[291] OUT3 Output zero fine adjust**

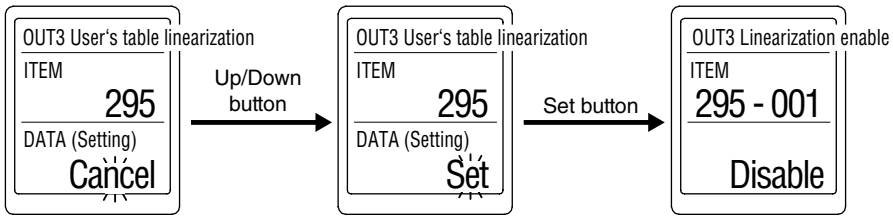
Perform fine adjustment of output signal.
Settable range: -5.000 – +5.000 %.
Initial value: 0.000

**[292] OUT3 Output span fine adjust**

Perform fine adjustment of output signal.
Settable range: 95.000 – 105.000 %.
Initial value: 100.000

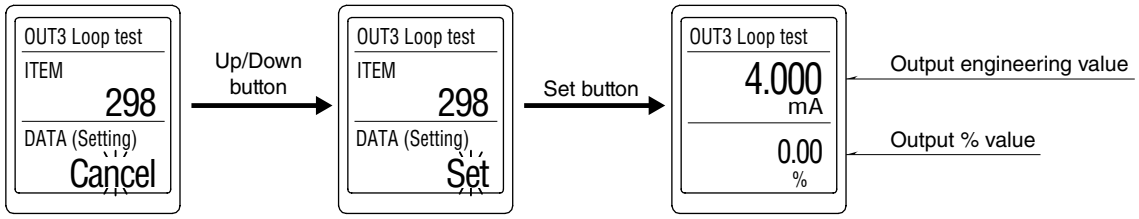
**[295] OUT3 User's table linearization**

Enable / Disable Linearization function using a user specified table.
Press Set button and confirm that 'Cancel" is displayed with blinking.
Press Up or Down button to change to 'Set', and press Set button to shift to OUT3 Linearization mode.
Note: Be sure to set the Lockout setting to 'Unlock' before shifting to OUT3 Linearization mode.



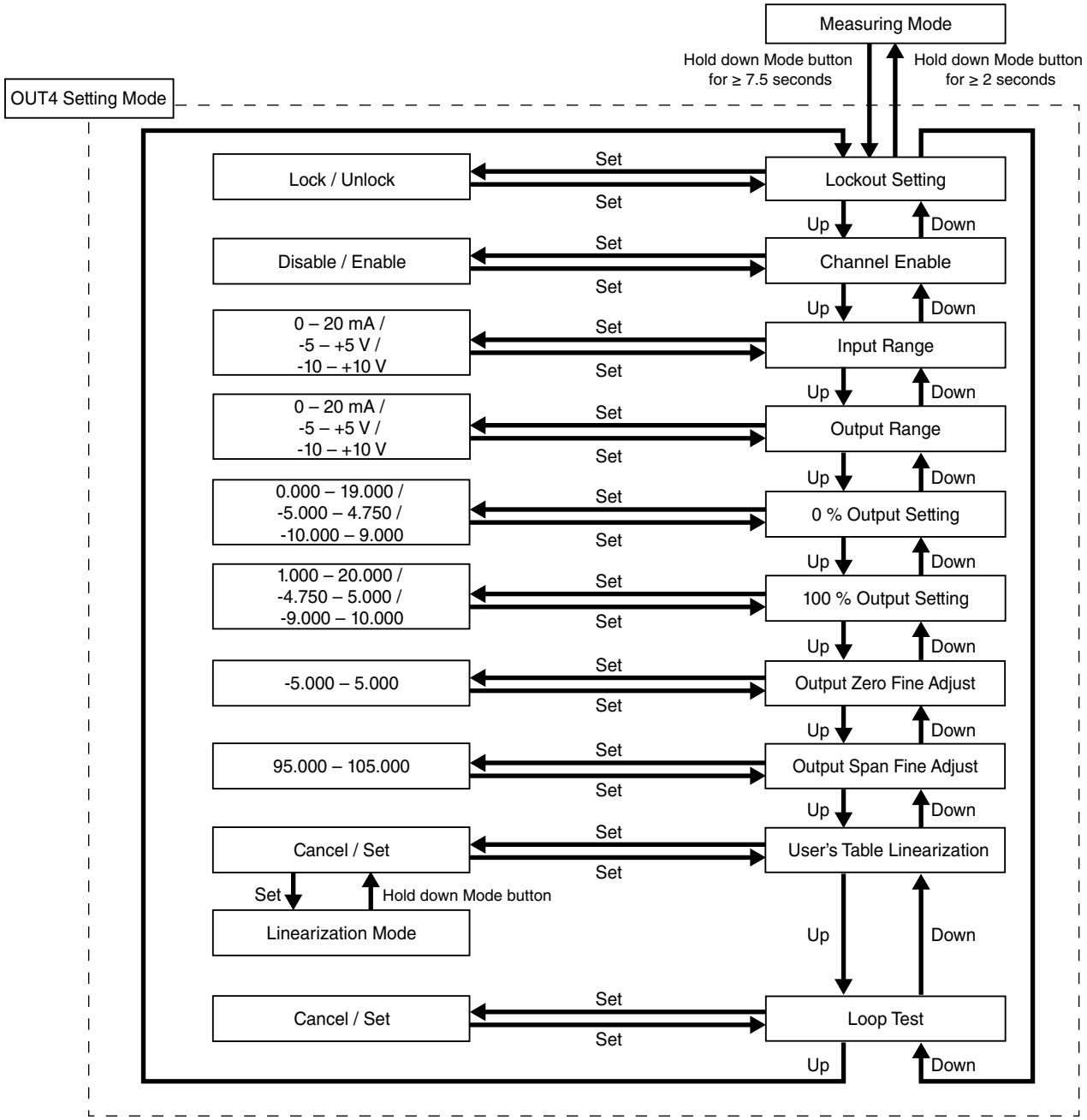

**[298] OUT3 Loop test**

Output signal can be simulated for performing loop test.
Press Set button and confirm that 'Cancel' is displayed with blinking.
Press Up or Down button to change to 'Set', and press Set button to shift to Loop test display.
The present value is indicated. Increase or decrease it by pressing Up or Down button.
Holding down each button changes the value continuously.
Hold down Mode button for ≥ 2 seconds or turn off the power to exit loop test.




Note: While the loop test is performed, all input signals are disregarded.
When 'Display timeout' is activated and the display has been cleared (display off) during loop test, press any front button to restore the display.

**■ OUT4 SETTING MODE**



**• Parameters**

| MODE | ITEM | SETTING PARAMETER | RANGE | UNIT | INITIAL VALUE |
|---|---|---|---|---|---|
| Output 4 Setting | 01 | Lockout setting | Lock / Unlock | – | Lock |
| | 351 | OUT4 Output enable | Disable / Enable | – | Enable |
| | 361 | OUT4 Output range | 0 – 20 mA<br>-5 – +5 V<br>-10 – +10 V | – | 0 – 20 mA |
| | 362 | OUT4 0 % Output setting | 0.000 – 19.000<br>-5.000 – 4.750<br>-10.000 – 9.000 | mA<br>V<br>V | 4.000 |
| | 363 | OUT4 100 % Output setting | 1.000 – 20.000<br>-4.750 – 5.000<br>-9.000 – 10.000 | mA<br>V<br>V | 20.000 |
| | 391 | OUT4 Output zero fine adjust | -5.000 – 5.000 | % | 0.000 |
| | 392 | OUT4 Output span fine adjust | 95.000 – 105.000 | % | 100.000 |
| | 395 | OUT4 User's table linearization | Cancel / Set | – | Cancel |
| | 398 | OUT4 Loop test | -5.00 – 105.00 | % | Cancel |

**[01] Lockout setting**

Enable / disable Lockout setting.

| SETTING VALUE | DESCRIPTION | INITIAL VALUE |
|---|---|---|
| Lock | Enable Lockout setting | Lock |
| Unlock | Disable Lockout setting | |

When Lockout setting is enabled, it is possible to shift to each setting mode and confirm the setting value of each setting parameter item. Each parameter item display indicates 'DATA (Locked)' when set to 'Lock', and indicates 'DATA' when set to 'Unlock'.

**[351] OUT4 Enable**

Enable / disable OUT4.
No output signal or present value is displayed for the disabled channel in Measuring Mode.

| SETTING VALUE | DESCRIPTION | INITIAL VALUE |
|---|---|---|
| Disable | Output Disable | Enable |
| Enable | Output Enable | |

Even when OUT4 is disabled, parameter settings for OUT4 can be performed.

**[361] OUT4 Output range**

Set the range of output signal of the unit.

| SETTING VALUE | DESCRIPTION | INITIAL VALUE |
|---|---|---|
| 0 – 20 mA | Output: 0 – 20 mA DC | 0 – 20 mA |
| -5 – +5 V | Output: -5 – +5 V DC | |
| -10 – +10 V | Output: -10 – +10 V DC | |

**[362] OUT4 0 % Output setting**

Set the 0 % output setting value.

| OUTPUT RANGE | SETTING RANGE | MIN. SPAN | INITIAL VALUE |
|---|---|---|---|
| 0 – 20 mA | 0.000 – 19.000 | 1.000 | 4.000 |
| -5 – +5 V | -5.000 – 4.750 | 0.250 | -5.000 |
| -10 – +10 V | -10.000 – 9.000 | 1.000 | -10.000 |

Set as follows.
[362] 0 % output setting < [363] 100 % output setting

**[363] OUT4 100 % Output setting**

Set the 100 % output setting value.

| OUTPUT RANGE | SETTING RANGE | MIN. SPAN | INITIAL VALUE |
|---|---|---|---|
| 0 – 20 mA | 1.000 – 20.000 | 1.000 | 20.000 |
| -5 – +5 V | -4.750 – 5.000 | 0.250 | 5.000 |
| -10 – +10 V | -9.000 – 10.000 | 1.000 | 10.000 |

Set as follows.
[362] 0 % output setting < [363] 100 % output setting

**[391] OUT4 Output zero fine adjust**

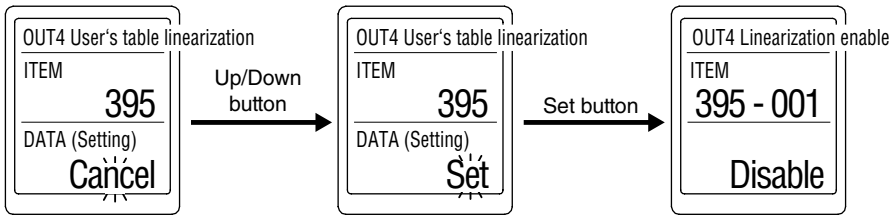
Perform fine adjustment of output signal.
Settable range: -5.000 – +5.000 %.
Initial value: 0.000

**[392] OUT4 Output span fine adjust**

Perform fine adjustment of output signal.
Settable range: 95.000 – 105.000 %.
Initial value: 100.000

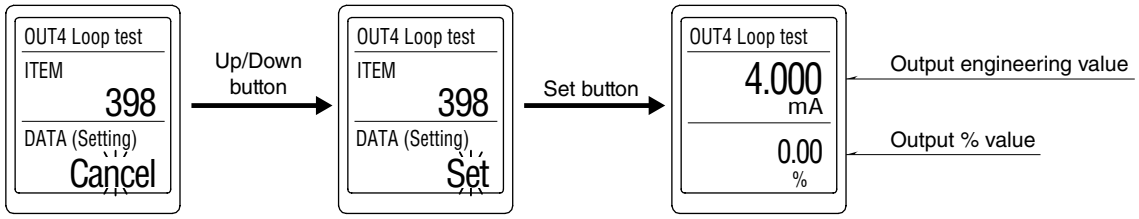
**[395] OUT4 User's table linearization**

Enable / Disable Linearization function using a user specified table.
Press Set button and confirm that 'Cancel" is displayed with blinking.
Press Up or Down button to change to 'Set', and press Set button to shift to OUT4 Linearization mode.
Note: Be sure to set the Lockout setting to 'Unlock' before shifting to OUT4 Linearization mode.



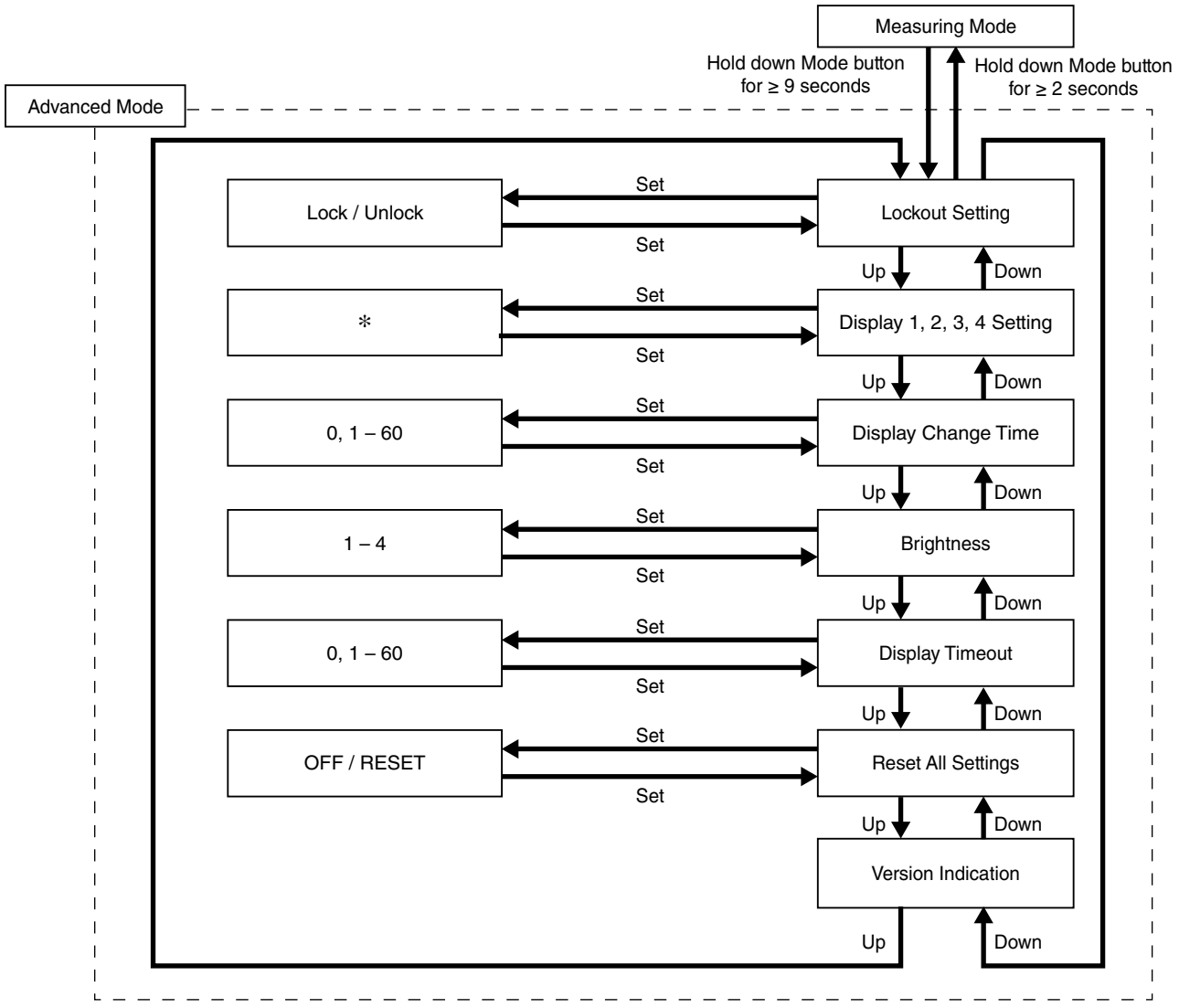

**[398] OUT4 Loop test**

Output signal can be simulated for performing loop test.
Press Set button and confirm that 'Cancel' is displayed with blinking.
Press Up or Down button to change to 'Set', and press Set button to shift to Loop test display.
The present value is indicated. Increase or decrease it by pressing Up or Down button.
Holding down each button changes the value continuously.
Hold down Mode button for ≥ 2 seconds or turn off the power to exit loop test.




Note: While the loop test is performed, all input signals are disregarded.
When 'Display timeout' is activated and the display has been cleared (display off) during loop test, press any front button to restore the display.

## ■ ADVANCED MODE




* For detail, refer to [401] display1 setting / [402] display2 setting / [403] display3 setting / [404] display4 setting.

**Parameters**

| MODE | ITEM | SETTING PARAMETER | RANGE | UNIT | INITIAL VALUE |
|---|---|---|---|---|---|
| Advanced | 01 | Lockout setting | Lock / Unlock | – | Lock |
| | 401 | Display1 setting | Upper: choose from 7 types<br>Lower: choose from 8 types | – | Upper: INPUT<br>Lower: OUTPUT 1 |
| | 402 | Display2 setting | Upper: choose from 8 types<br>Lower: choose from 8 types | – | Upper: INPUT<br>Lower: OUTPUT 2 |
| | 403 | Display3 setting | Upper: choose from 8 types<br>Lower: choose from 8 types | – | Upper: INPUT<br>Lower: OUTPUT 3 |
| | 404 | Display4 setting | Upper: choose from 8 types<br>Lower: choose from 8 types | – | Upper: INPUT<br>Lower: OUTPUT 4 |
| | 405 | Display change time | 0 (fixed), 1 – 60 | sec. | 3 |
| | 406 | Brightness | 1 (darkest) – 4 (brightest) | – | 4 |
| | 407 | Display timeout | 0 (always on), 1 – 60 | min. | 10 |
| | 408 | Reset all settings | OFF / RESET | – | OFF |
| | 409 | Version indication | – | – | – |

**[01] Lockout setting**

Enable / disable lockout setting.

| SETTING VALUE | DESCRIPTION | INITIAL VALUE |
|---|---|---|
| Lock | Enable Lockout setting | Lock |
| Unlock | Disable Lockout setting | |

When Lockout setting is enabled, it is possible to shift to each setting mode and confirm the setting value of each setting parameter item. Each parameter item display indicates 'DATA (Locked)' when set to 'Lock', and indicates 'DATA' when set to 'Unlock'.

**[401] Display1 setting / [402] Display2 setting / [403] Display3 setting / [404] Display4 setting**

Set the screen display for Measuring mode.
The display can be divided into upper and lower parts and items to be displayed can be respectively selected.
Press Set button once to set an item for the upper part.
Press Set button again, to set an item for the lower part.
Press Set button once more to save the settings.
The display will be blank in Measuring mode if both the upper and lower parts are set to 'None'.

**Upper**

| SETTING VALUE | DESCRIPTION |
|---|---|
| INPUT | Input engineering unit value |
| INPUT (Scaling)*1 | Input scaling |
| PERCENT | Percent value*2 |
| OUTPUT 1 | Output 1 engineering unit value |
| OUTPUT 2 | Output 2 engineering unit value |
| OUTPUT 3 | Output 3 engineering unit value |
| OUTPUT 4 | Output 4 engineering unit value |
| None*3 | No display |

**Lower**

| SETTING VALUE | DESCRIPTION |
|---|---|
| INPUT | Input engineering unit value |
| INPUT (Scaling)*1 | Input scaling |
| PERCENT | Percent value*2 |
| OUTPUT | Output engineering unit value |
| OUTPUT | Output engineering unit value |
| OUTPUT | Output engineering unit value |
| OUTPUT | Output engineering unit value |
| None | No display |

*1. In Measuring mode, INPUT (Scaling) is displayed as Ch1 INPUT (SC).
*2. The value displayed is the value converted into 0.00 to 100.00% based on the input setting value.
*3. The upper part of [401] cannot be set to 'None'.

**[405] Display change time**

The display switches at preset time intervals.
Pressing Up or Down button also can switch the display.
Settable range: 0 – 60 seconds.
Set to '0' when the display need not switch automatically.
Initial value: 3

**[406] Brightness**

Adjust brightness of the display.
Settable range: 1 (darkest) – 4 (brightest).
Initial value: 4

**[407] Display timeout**

Set a timeout period to turn off the display when there is no operation within a certain time period.
Settable range: 0 – 60 minutes.
To keep the display always on, set to 0.
When an error occurs at display off, the display is restored from display off.
Initial value: 10

**[408] Reset all settings**

Reset settings to initial values.

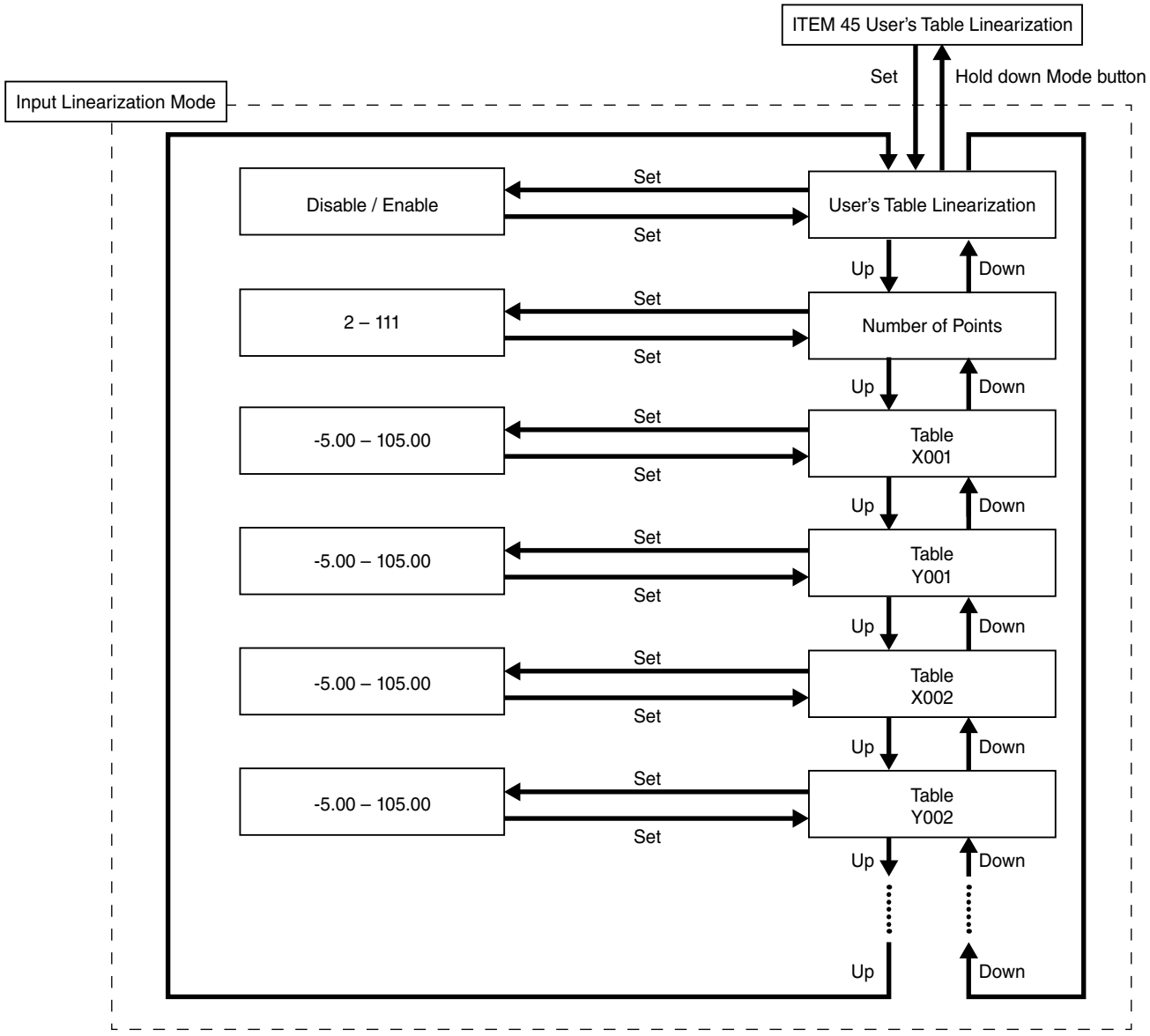
| SETTING VALUE | DESCRIPTION |
|---|---|
| OFF | Not initialized. |
| RESET | Initialize all settings.*1 |

*1. When 'Reset all settings' is activated, each parameter currently set is overwritten with the initial value.
'COMPLETE' is indicated when initialization of setting values is completed.
Note that the values do not return to the setting values specified by the option Ex-factory setting (/SET).

**[409] Version indication**

Indicates firmware version.

## ■ INPUT LINEARIZATION MODE




**• Parameters**

| MODE | ITEM | SETTING PARAMETER | RANGE | UNIT | INITIAL VALUE |
|---|---|---|---|---|---|
| Input Linearization | 45-001 | User's table linearization | Disable / Enable | — | Disable |
| | 45-002 | Number of points | 2 – 111 | — | 2 |
| | 45-003 to 45-224 | Linearize Table | -5.00 – 105.00 | % | X001 -5.00<br>Y001 -5.00<br>X002 105.00<br>Y002 105.00 |

**[45-001] User's table linearization**

| SETTING VALUE | DESCRIPTION | INITIAL VALUE |
|---|---|---|
| Disable | Disable Linearization | Disable |
| Enable | Enable Linearization | |

When 'Enable' is selected, input is converted to output based on a user specified table.

**[45-002] Number of points**

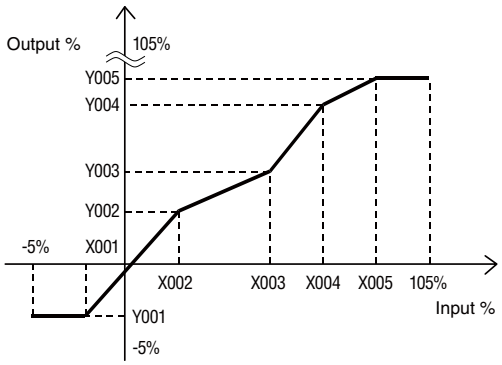
Set the number of points for the user's table.
Settable range: 2 – 111 points.
Initial value: 2

**[45-003 to 45-224] Table**

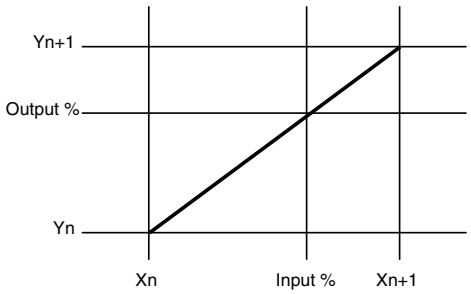
Conversion is performed based on the user specified table in which values of X corresponding to input (unit: %) and values of Y corresponding to output (unit: %) are paired, respectively.
The table is searched for an X value that matches the input to be converted and a Y value paired with the X value is outputted.
X values and Y values can be set within the range of -5 to +105 (%).
X values need to be set in ascending order from X001. Otherwise conversion cannot be correctly performed.

Initial value: X001 -5.00
Y001 -5.00
X002 105.00
Y002 105.00

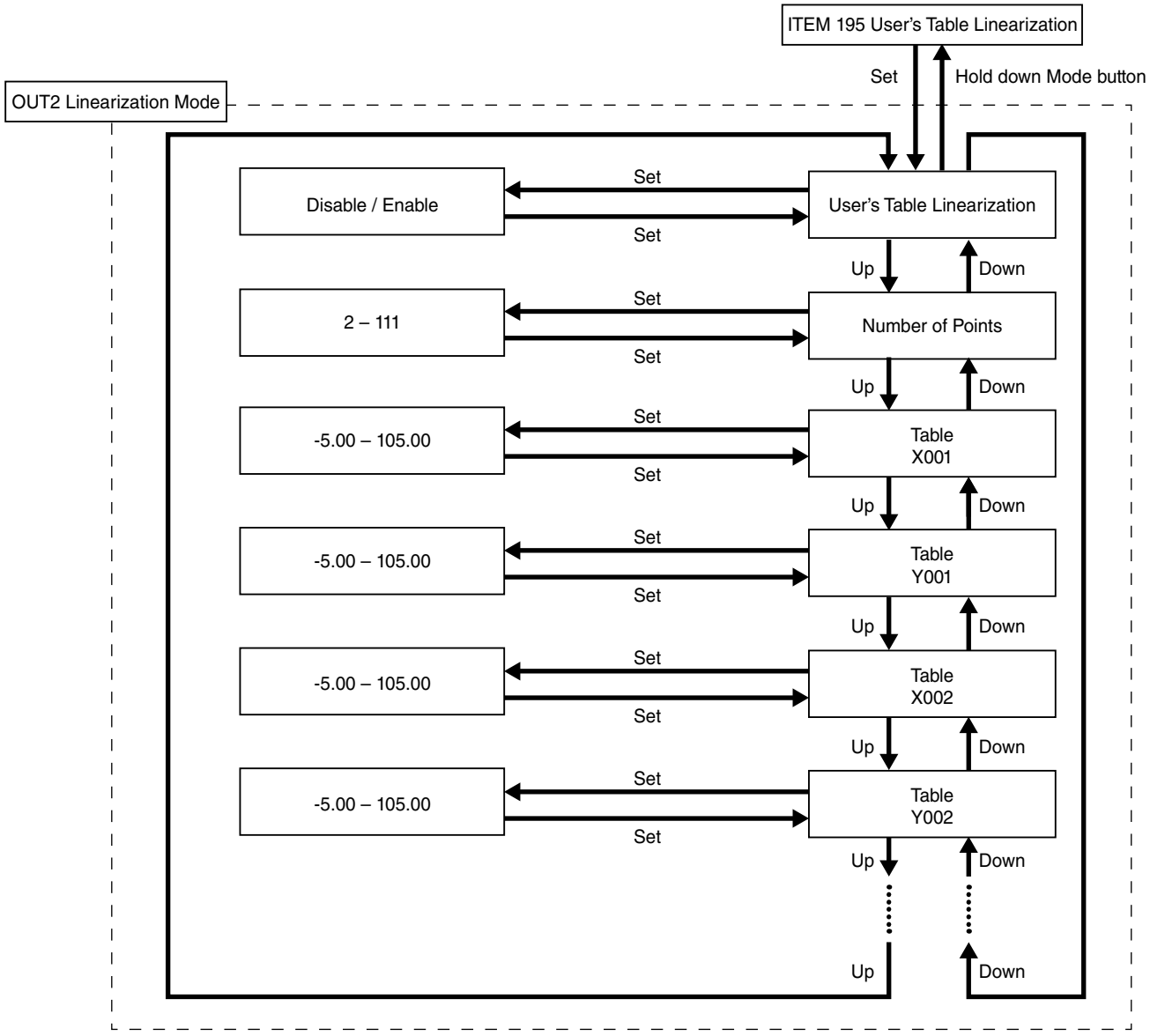
[E.g.]




When the input to be converted does not match any X value in the table, two X values which are closest to the input in positive and negative directions are selected and linearly interpolated, thereby obtaining a Y value to be outputted.



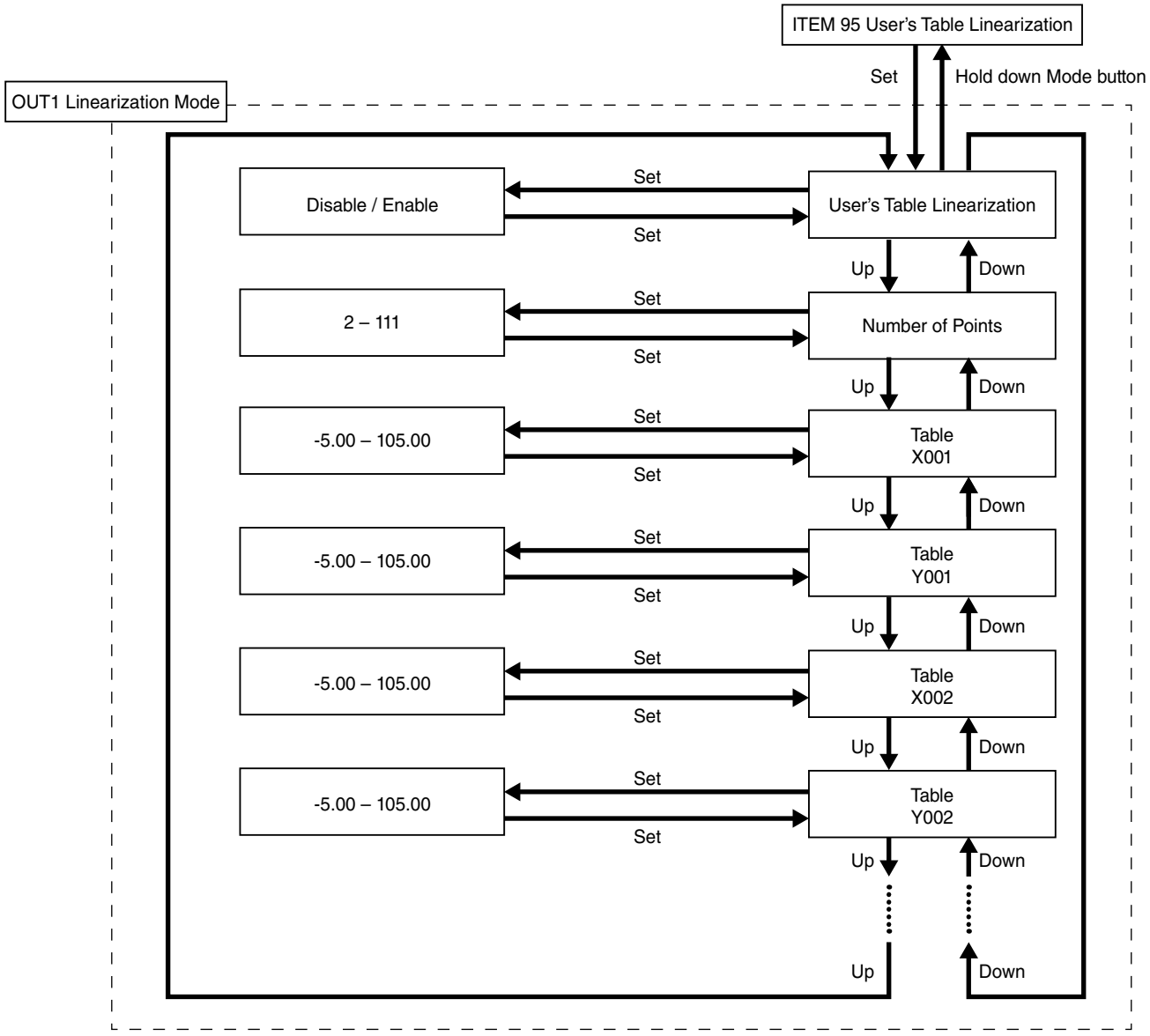
## ■ OUT2 LINEARIZATION MODE




**• Parameters**

| MODE | ITEM | SETTING PARAMETER | RANGE | UNIT | INITIAL VALUE |
|---|---|---|---|---|---|
| OUT2 Linearization | 195-001 | OUT2 User's table linearization | Disable / Enable | — | Disable |
| | 195-002 | OUT2 Number of points | 2 – 111 | — | 2 |
| | 195-003 to 195-224 | OUT2 Table | -5.00 – 105.00 | % | X001 -5.00<br>Y001 -5.00<br>X002 105.00<br>Y002 105.00 |
| | 01 | Lockout setting | Lock / Unlock | — | Lock |

## ■ OUT1 LINEARIZATION MODE




**• Parameters**

| MODE | ITEM | SETTING PARAMETER | RANGE | UNIT | INITIAL VALUE |
|---|---|---|---|---|---|
| OUT1 Linearization | 95-001 | OUT1 User's table linearization | Disable / Enable | — | Disable |
| | 95-002 | OUT1 Number of points | 2 – 111 | — | 2 |
| | 95-003 to 95-224 | OUT1 Table | -5.00 – 105.00 | % | X001 -5.00<br>Y001 -5.00<br>X002 105.00<br>Y002 105.00 |
| | 01 | Lockout setting | Lock / Unlock | — | Lock |

**[95-001] OUT1 User's table linearization**

| SETTING VALUE | DESCRIPTION | INITIAL VALUE |
|---|---|---|
| Disable | Disable Linearization | Disable |
| Enable | Enable Linearization | |

When 'Enable' is selected, input is converted to output based on a user specified table.

**[95-002] OUT1 Number of points**

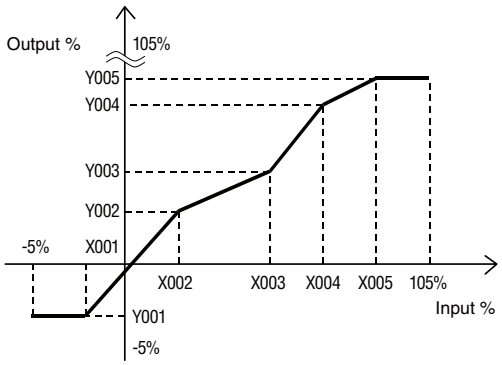
Set the number of points for the user's table.
Settable range: 2 – 111 points.
Initial value: 2

**[95-003 to 95-224] OUT1 Table**

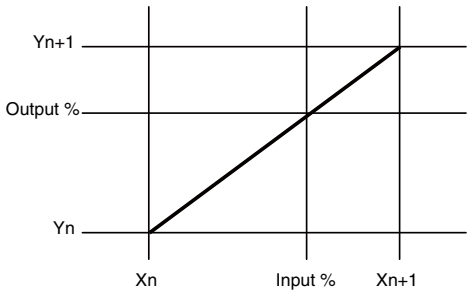
Conversion is performed based on the user specified table in which values of X corresponding to input (unit: %) and values of Y corresponding to output (unit: %) are paired, respectively.
The table is searched for an X value that matches the input to be converted and a Y value paired with the X value is outputted.
X values and Y values can be set within the range of -5 to +105 (%).
X values need to be set in ascending order from X001. Otherwise conversion cannot be correctly performed.

Initial value: X001 -5.00
Y001 -5.00
X002 105.00
Y002 105.00

[E.g.]




When the input to be converted does not match any X value in the table, two X values which are closest to the input in positive and negative directions are selected and linearly interpolated, thereby obtaining a Y value to be outputted.



**[195-001] OUT2 User's table linearization**

| SETTING VALUE | DESCRIPTION | INITIAL VALUE |
|---|---|---|
| Disable | Disable Linearization | Disable |
| Enable | Enable Linearization | |

When 'Enable' is selected, input is converted to output based on a user specified table.

**[195-002] OUT2 Number of points**

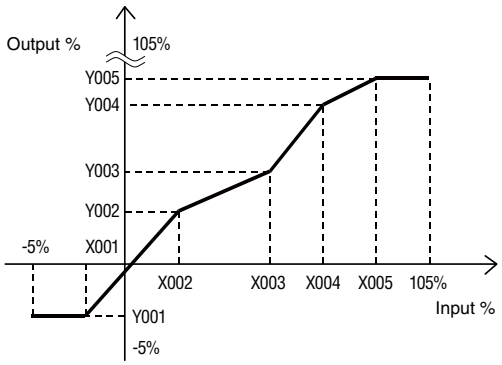
Set the number of points for the user's table.
Settable range: 2 – 111 points.
Initial value: 2

**[195-003 to 195-224] OUT2 Table**

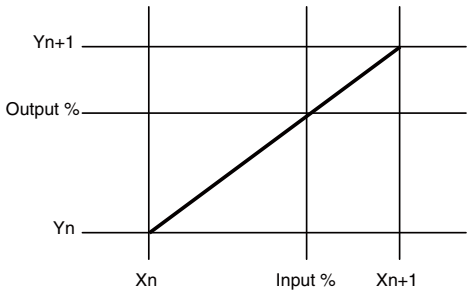
Conversion is performed based on the user specified table in which values of X corresponding to input (unit: %) and values of Y corresponding to output (unit: %) are paired, respectively.
The table is searched for an X value that matches the input to be converted and a Y value paired with the X value is outputted.
X values and Y values can be set within the range of -5 to +105 (%).
X values need to be set in ascending order from X001. Otherwise conversion cannot be correctly performed.

Initial value: X001 -5.00
Y001 -5.00
X002 105.00
Y002 105.00

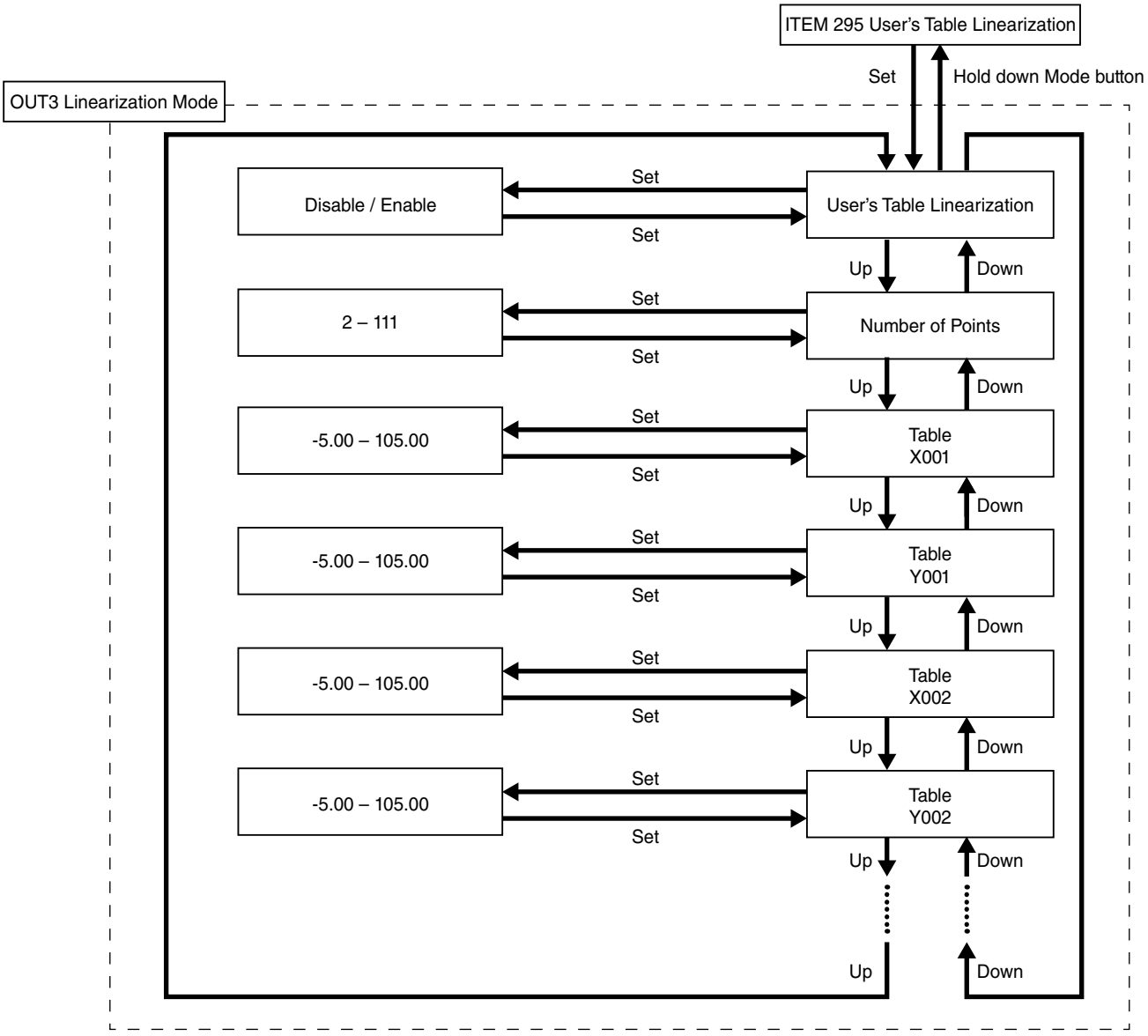
[E.g.]




When the input to be converted does not match any X value in the table, two X values which are closest to the input in positive and negative directions are selected and linearly interpolated, thereby obtaining a Y value to be outputted.



## ■ OUT3 LINEARIZATION MODE




**• Parameters**

| MODE | ITEM | SETTING PARAMETER | RANGE | UNIT | INITIAL VALUE |
|---|---|---|---|---|---|
| OUT3 Linearization | 295-001 | OUT3 User's table linearization | Disable / Enable | — | Disable |
| | 295-002 | OUT3 Number of points | 2 – 111 | — | 2 |
| | 295-003 to 295-224 | OUT3 Table | -5.00 – 105.00 | % | X001 -5.00<br>Y001 -5.00<br>X002 105.00<br>Y002 105.00 |
| | 01 | Lockout setting | Lock / Unlock | — | Lock |

**[295-001] OUT3 User's table linearization**

| SETTING VALUE | DESCRIPTION | INITIAL VALUE |
|---|---|---|
| Disable | Disable Linearization | Disable |
| Enable | Enable Linearization | |

When 'Enable' is selected, input is converted to output based on a user specified table.

**[295-002] OUT3 Number of points**

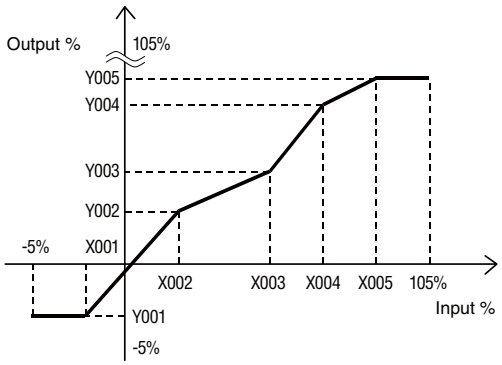
Set the number of points for the user's table.
Settable range: 2 – 111 points.
Initial value: 2

**[295-003 to 295-224] OUT3 Table**

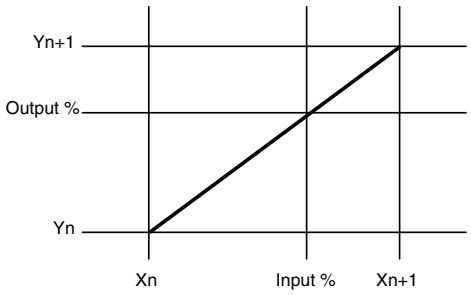
Conversion is performed based on the user specified table in which values of X corresponding to input (unit: %) and values of Y corresponding to output (unit: %) are paired, respectively.
The table is searched for an X value that matches the input to be converted and a Y value paired with the X value is outputted.
X values and Y values can be set within the range of -5 to +105 (%).
X values need to be set in ascending order from X001. Otherwise conversion cannot be correctly performed.

Initial value: X001 -5.00
Y001 -5.00
X002 105.00
Y002 105.00

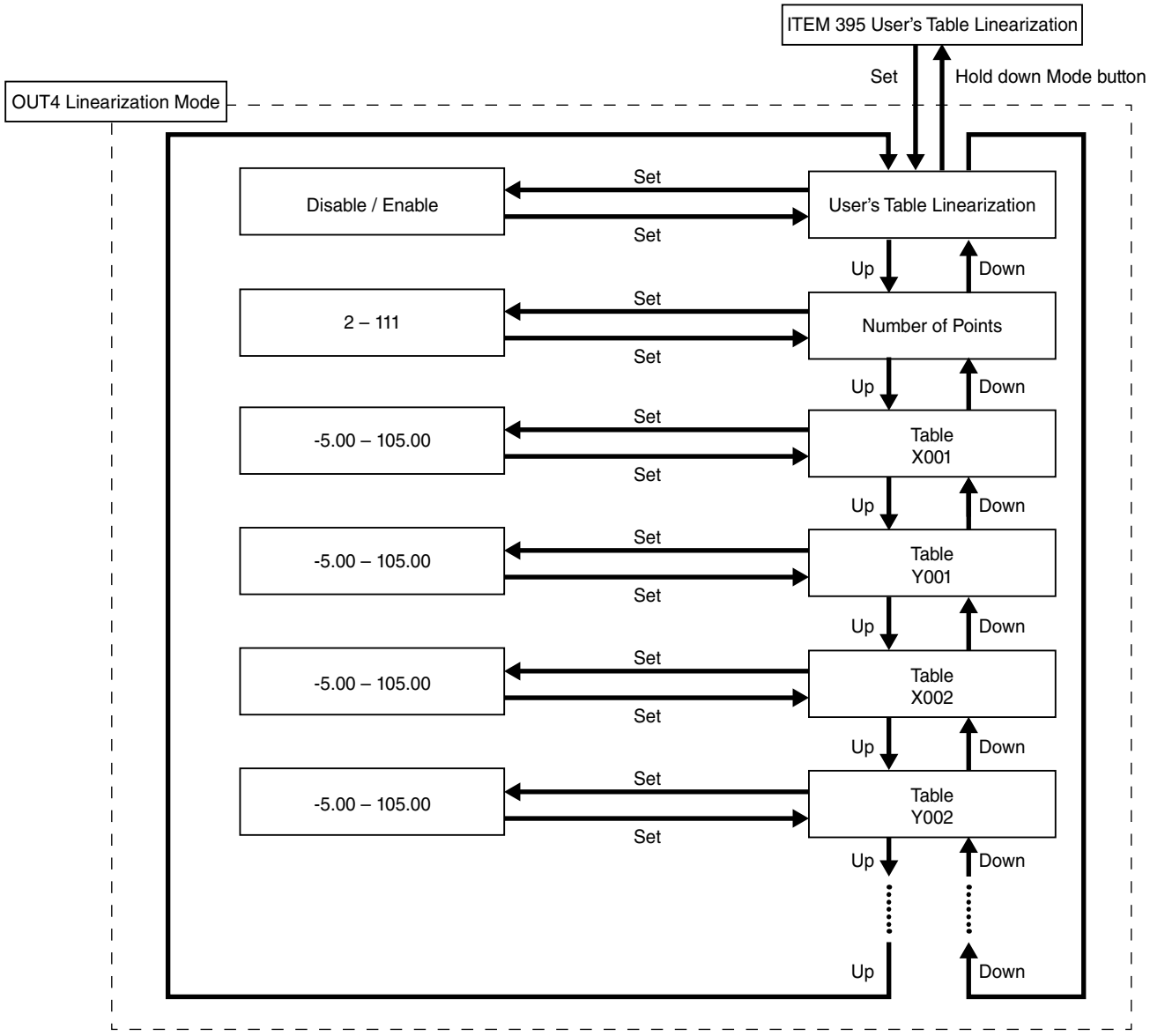
[E.g.]




When the input to be converted does not match any X value in the table, two X values which are closest to the input in positive and negative directions are selected and linearly interpolated, thereby obtaining a Y value to be outputted.



## ■ OUT4 LINEARIZATION MODE




**• Parameters**

| MODE | ITEM | SETTING PARAMETER | RANGE | UNIT | INITIAL VALUE |
|---|---|---|---|---|---|
| OUT4 Linearization | 395-001 | OUT4 User's table linearization | Disable / Enable | — | Disable |
| | 395-002 | OUT4 Number of points | 2 – 111 | — | 2 |
| | 395-003 to 395-224 | OUT4 table | -5.00 – 105.00 | % | X001 -5.00<br>Y001 -5.00<br>X002 105.00<br>Y002 105.00 |
| | 01 | Lockout setting | Lock / Unlock | — | Lock |

**[395-001] OUT4 User's table linearization**

| SETTING VALUE | DESCRIPTION | INITIAL VALUE |
|---|---|---|
| Disable | Disable Linearization | Disable |
| Enable | Enable Linearization | |

When 'Enable' is selected, input is converted to output based on a user specified table.

**[395-002] OUT4 Number of points**

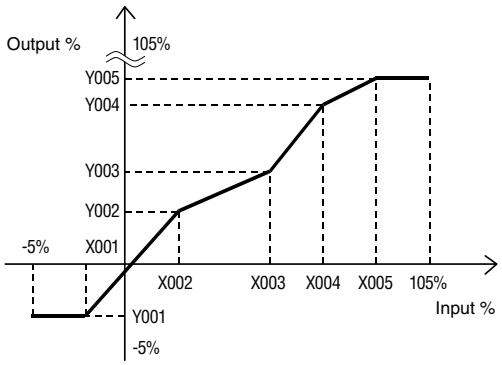
Set the number of points for the user's table.
Settable range: 2 – 111 points.
Initial value: 2

**[395-003 to 395-224] OUT4 Table**

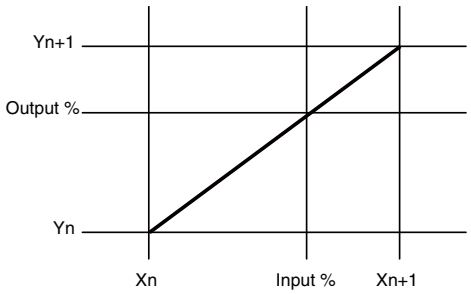
Conversion is performed based on the user specified table in which values of X corresponding to input (unit: %) and values of Y corresponding to output (unit: %) are paired, respectively.
The table is searched for an X value that matches the input to be converted and a Y value paired with the X value is outputted.
X values and Y values can be set within the range of -5 to +105 (%).
X values need to be set in ascending order from X001. Otherwise conversion cannot be correctly performed.

Initial value: X001 -5.00
Y001 -5.00
X002 105.00
Y002 105.00

[E.g.]




When the input to be converted does not match any X value in the table, two X values which are closest to the input in positive and negative directions are selected and linearly interpolated, thereby obtaining a Y value to be outputted.



## ERROR MESSAGES

| DISPLAY | ERROR DESCRIPTION | WHAT TO DO |
|---|---|---|
| OVER RANGE U | The input exceeds 105 %. | Adjust the input signal in order not to exceed 105%. |
| OVER RANGE D | The input exceeds lower limit of -5 %. | Adjust the input signal in order not to be lower than -5%. |
| SCALING ERROR U | Input or output scaling value exceeds 999999 (upward). | Adjust the input signal for the input scaling not to exceed 999999. |
| SCALING ERROR D | Input or output scaling value exceeds -99999 (downward). | Adjust the input signal for the input scaling not to be lower than -99999. |
| INTERNAL ERROR | Internal error | First, reset the power.<br>If the error is not corrected, activate 'Reset all settings" to reset all settings to the initial values.<br>If the error is still not corrected, the unit needs a repair. |

Indicated errors vary as follows depending on the setting values of display setting.
Error is indicated with blinking at the upper or lower part of the display.
When multiple errors occur, only the highest-priority error is displayed.
The order of priority is EEPROM ERROR, OVER RANGE, SCALING ERROR in descending order.

| | | DISPLAY SETTING | | |
|---|---|---|---|---|
| | | INPUT ENGINEERING UNIT VALUE | INPUT SCALING VALUE | PERCENT VALUE |
| ERROR MESSAGES | OVER RANGE U | ✓ | ✓ | — |
| | OVER RANGE D | | | |
| | SCALING ERROR U (INPUT) | ✓ | ✓ | — |
| | SCALING ERROR D (INPUT) | | | |
| | INTERNAL ERROR | ✓ | | |

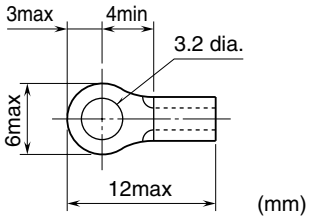
## WIRING INSTRUCTIONS FOR BASE

### ■ SCREW TERMINAL

Torque: 0.5 N·m

### ■ SOLDERLESS TERMINAL

Refer to the drawing below for recommended ring tongue terminal size. Spade tongue type is also applicable.
Recommended manufacturer: Japan Solderless Terminal MFG.Co.Ltd, Nichifu Co.,ltd (Solderless terminals with insulation sleeve do not fit)
Applicable wire size: 0.25 to 1.65 $mm^2$




## CHECKING

1) Terminal wiring: Check that all cables are correctly connected according to the connection diagram.
2) Power input voltage: Check voltage across the terminal 19 – 20 with a multimeter.
3) Input: Check that the input signal is within 0 – 100% of the full-scale.
4) Output: Check that the load resistance meets the described specifications.

# MAINTENANCE

Regular calibration procedure is explained below:

### ■ CALIBRATION

Without linearization, warm up the unit for at least 10 minutes. Apply 0%, 25%, 50%, 75% and 100% input signals in this order. Check that the output signals for the respective input signals remain within accuracy described in the data sheet.
When the output signal is out of accuracy, perform input fine adjustment if the displayed input value is out of accuracy and perform output fine adjustment if the displayed input value is correct.

To perform the input fine adjustment or the output fine adjustment, take the following steps with referring to this operating manual when adjusting with front buttons or referring to the M1ECFG users manual (EM-5981) when adjusting with M1E Configurator Software (model: M1ECFG).

#### • INPUT FINE ADJUSTMENT

1) Set the input signal to 0 %, and adjust the displayed input value to 0 % by [41] Input Zero fine adjust.
2) Set the input signal to 100 %, and adjust the displayed input value to 100 % by [42] Input Span fine adjust.
3) Again set the input signal to 0 %, confirm the displayed input value.
4) If the input signal is shifted, repeat the procedure from 1) to 3).

#### • OUTPUT FINE ADJUSTMENT

1) Set the input to 0 %, and adjust the output signal to 0 % by [91]/[191]/[291]/[391] Output Zero fine adjust.
2) Set the input signal to 100 %, and adjust the output signal to 100 % by [92]/[192]/[292]/[392] Output Span fine adjust.
3) Again set the input signal to 0 %, confirm the output signal.
4) If the output signal is shifted, repeat the procedure from 1) to 3).

# LIGHTNING SURGE PROTECTION

M-System offers a series of lightning surge protector for protection against induced lightning surges. Please contact M-System to choose appropriate models.