OPERATING MANUAL

SIGNAL TRANSMITTER
(2 channel, PC programmable)

MODEL **M1EXV-2**

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BEFORE USE ....

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

■ 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-2 is programmable using a PC. For detailed information on the PC configuration, refer to the M1ECFG users manual (EM-5981).
The M1ECFG Configurator Software is downloadable at our web site.

POINTS OF CAUTION

■ CONFORMITY WITH EU DIRECTIVES

- This equipment is suitable for Pollution Degree 2 and Installation Category II (transient voltage 2500V). Reinforced insulation (signal input or output to power input: 300V) is maintained. Prior to installation, check that the insulation class of this unit satisfies the system requirements.
- Altitude up to 2000 meters.
- The equipment must be mounted inside a panel.
- The equipment must be installed such that appropriate clearance and creepage distances are maintained to conform to CE requirements. Failure to observe these requirements may invalidate the CE conformance.
- The actual installation environments such as panel configurations, connected devices, connected wires, may affect the protection level of this unit when it is integrated in a panel system. The user may have to review the CE requirements in regard to the whole system and employ additional protective measures* to ensure the CE conformity.
  * For example, installation of noise filters and clamp filters for the power source, input and output connected to the unit, etc.
- 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:

  100 – 240V AC rating: 85 – 264V, 47 – 66 Hz,
  ≤ 7VA at 100V AC
  ≤ 10VA at 200V AC
  ≤ 12VA at 264V AC
  24V DC rating: 24V ±10%, ≤ 4W
  110V DC rating: 85 – 150V, ≤ 4W

■ 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.

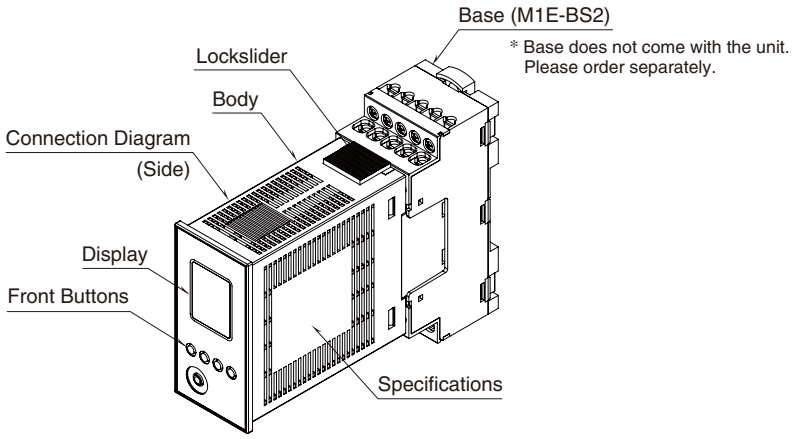
■ WIRING

- 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.

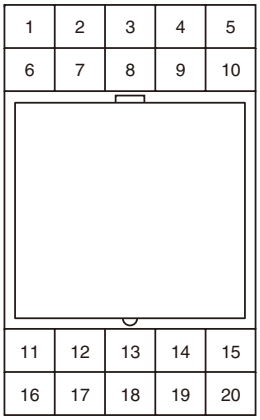
■ AND ....

- 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	Ch1 Output +
2	Unused	12	Ch1 Output –
3	Ch1 Input voltage +	13	Unused
4	Ch1 Input current +	14	Ch2 Output +
5	Ch1 Input –	15	Ch2 Output –
6	Unused	16	Unused
7	Unused	17	Unused
8	Ch2 Input voltage +	18	Unused
9	Ch2 Input current +	19	Power U (+)
10	Ch2 Input –	20	Power V (–)

INSTALLATION

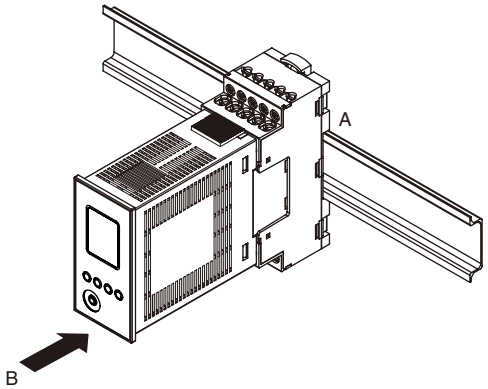
The unit can be removed from the base by pulling out while pressing the lockslider on the top thereof.
The base does not come with the unit. Please order separately.

■ 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.

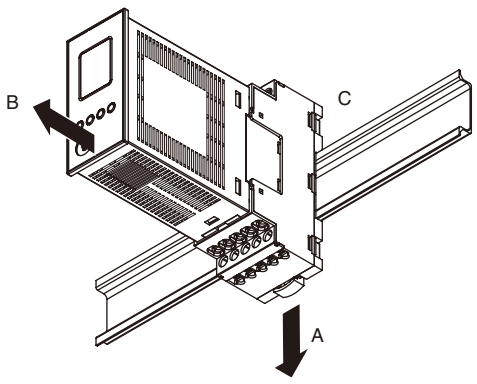


• Removing the unit

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.



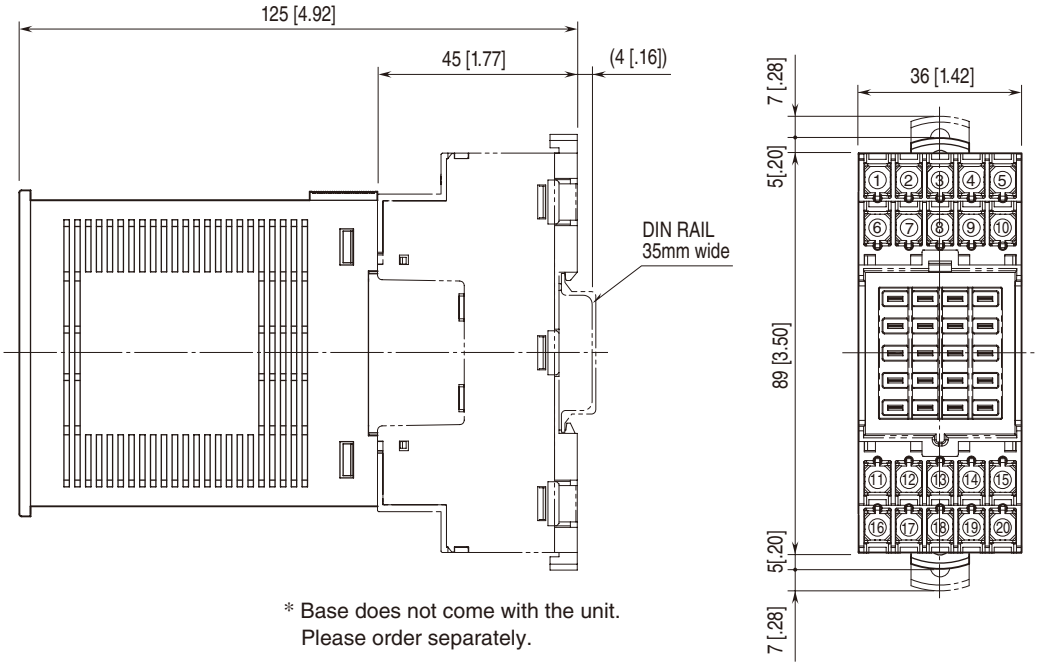
■ WALL MOUNTING

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

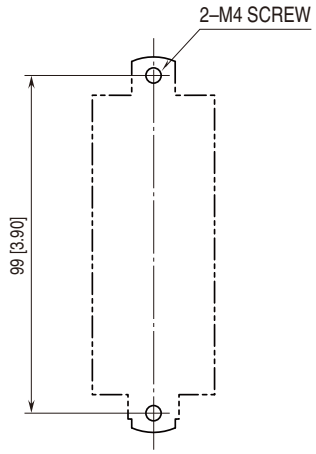
Connect the unit as in the diagram below or refer to the connection diagram on the side of the unit.

■ EXTERNAL DIMENSIONS unit: mm [inch]



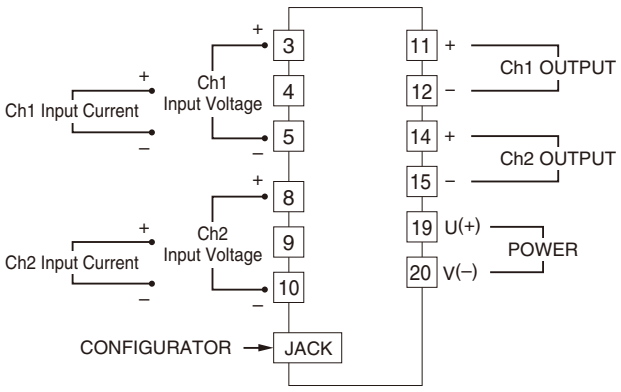
* Base does not come with the unit.
Please order separately.

■ MOUNTING REQUIREMENTS unit: mm [inch]

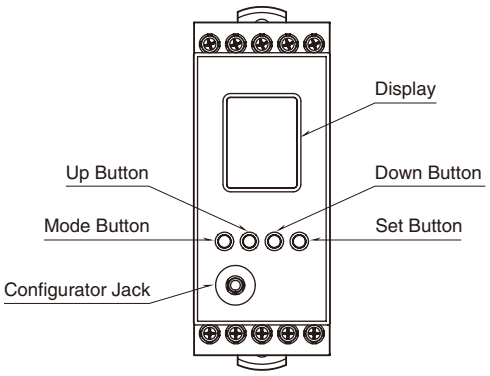


* Mounting requirements for base.

■ CONNECTION DIAGRAM



EXTERNAL VIEWS



COMPONENT	FUNCTION
Display	Indicates present values, setting values and abnormal information. 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. The destination changes depending on how long the button is held down. Pressing Mode button for ≥ 2 seconds returns to Measuring mode from each setting mode.
Set button	Shifts the setting value of each setting parameter item to a setting changeable state. 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). When using the software, set the Lockout setting of the unit to 'Lock'.

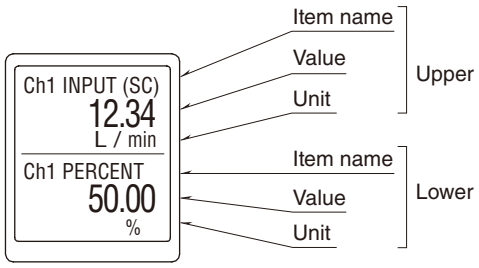
SCREEN DISPLAY

■ DISPLAY IN MEASURING MODE

• Double tiered display

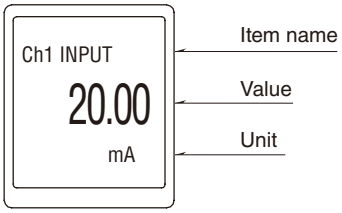
The unit can display any two items selected out of input engineering value, input scaling value, % value*, and output engineering value for each channel.

* Percent value for input.



• Single tiered display

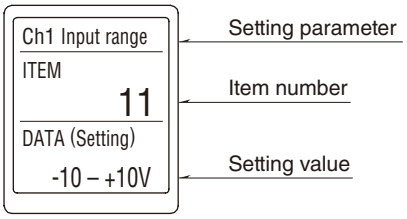
When there is only one item selected, the value can be displayed in large characters.



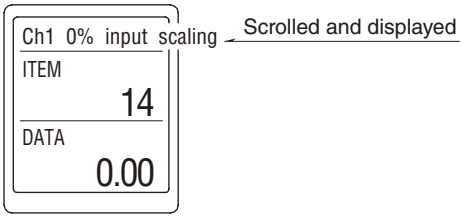
Refer to the settings of Advanced mode for details.

■ 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.

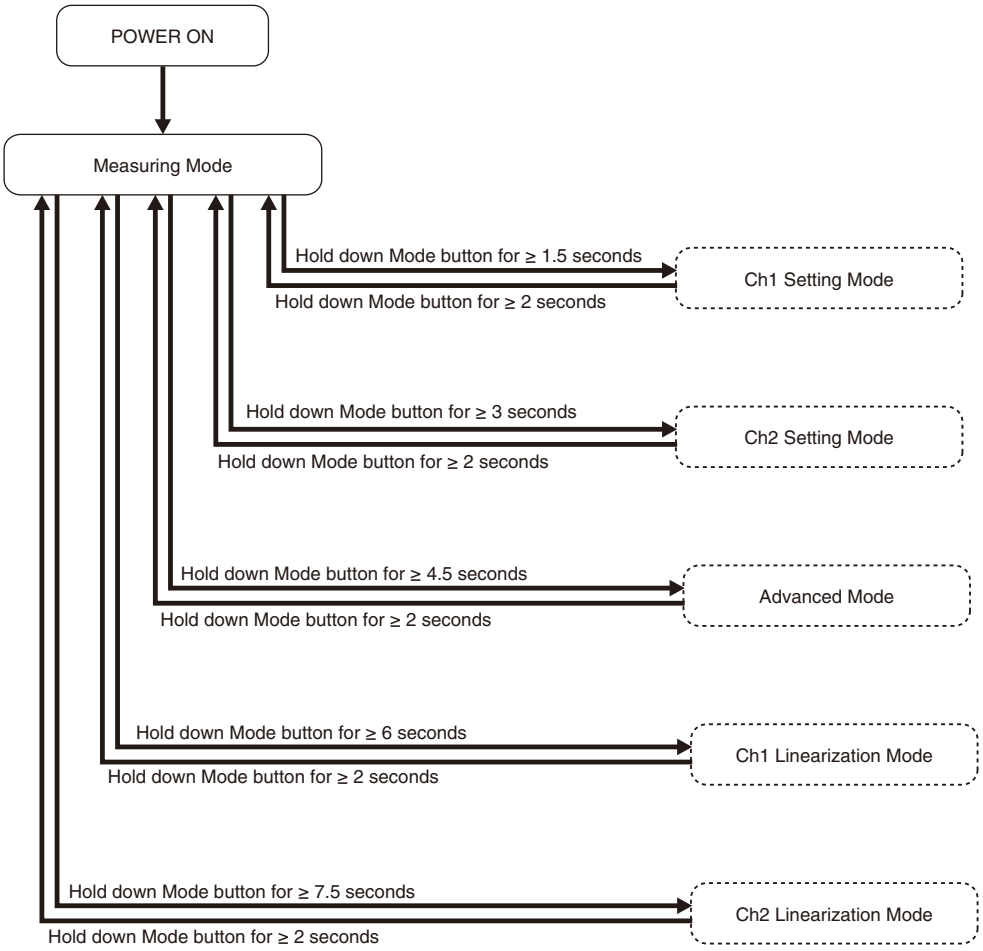


■ DISPLAY TIMEOUT

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'.

PROGRAMMING

■ SETTING FLOWCHART



■ OPERATION IN EACH SETTING MODE

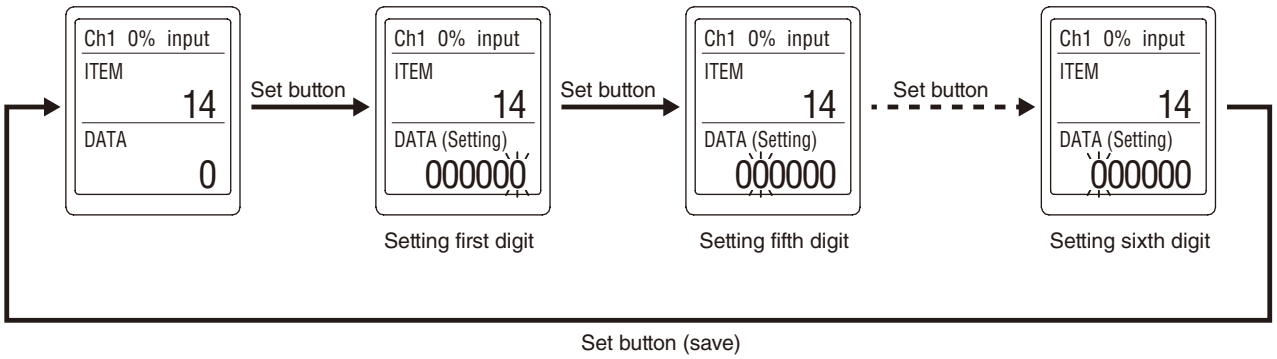
• Basic operation

Mode button:	In Measuring mode, hold down Mode button for ≥ 1.5 seconds, ≥ 3 seconds, ≥ 4.5 seconds, ≥ 6 seconds, or ≥ 7.5 seconds to shift to the respective setting modes. In each setting mode, hold down Mode button for ≥ 2 seconds to return to Measuring mode. While in each setting mode, press Mode button to shift to the setting mode for the next channel. 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'.). 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. During setting change, press Up button to select the setting value or increase the numerical value. Keeping pressing Up button increases the value continuously.
Down button:	Press Down button to shift through setting parameter items. During setting change, press Down button to select the setting value or decrease the numerical value. Keeping pressing Down button decreases the value continuously.

Note: DO NOT press 2 or more buttons simultaneously.

• Setting numerical parameter

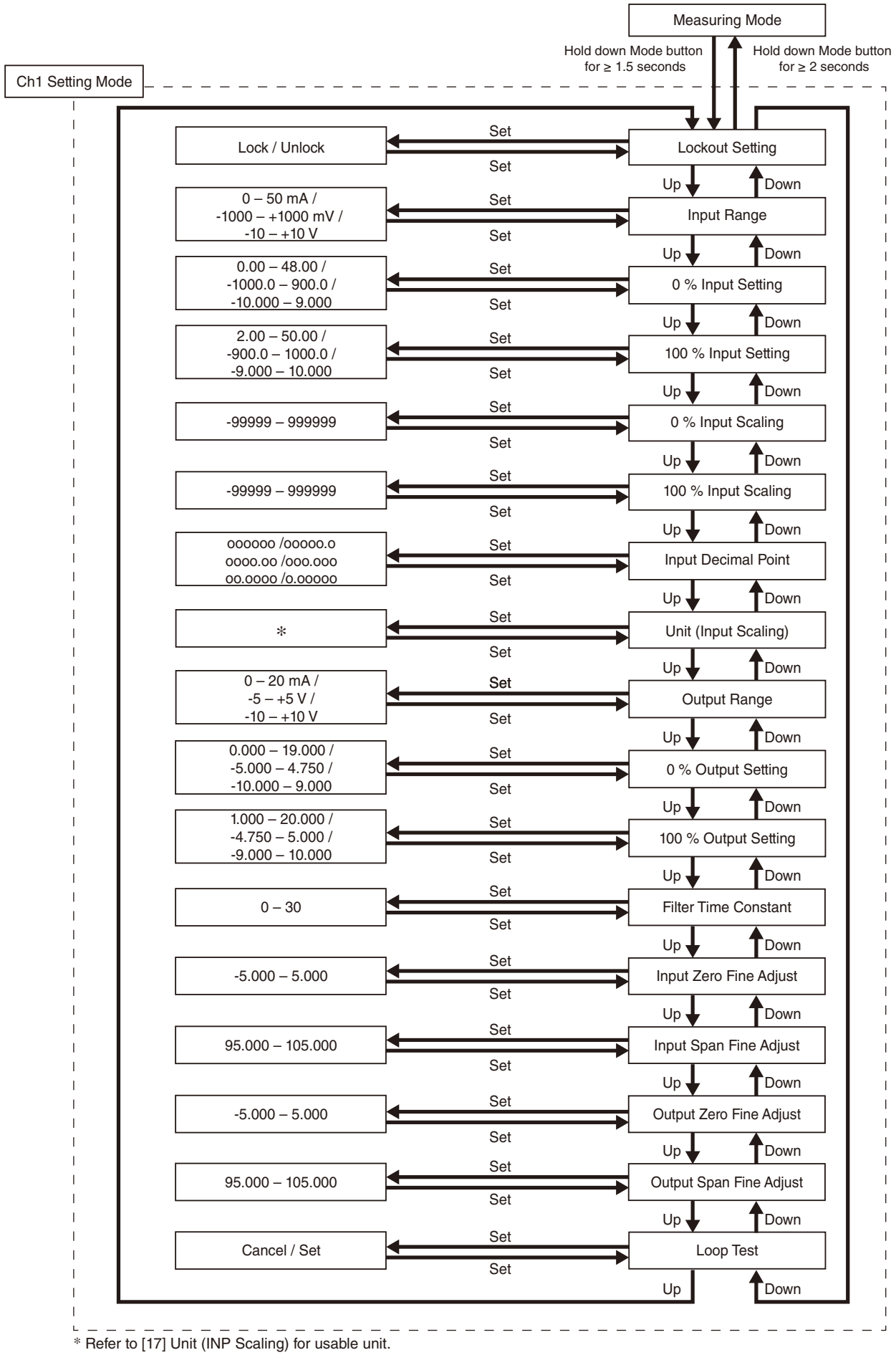
When setting a numerical parameter, the value need to be set digit by digit.
Each time Set button is pressed, the next digit starts blinking.
At the blinking digit, change the numerical value with Up and Down buttons.
By keeping pressing Up or Down button while the digit is blinking, the value of the 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.

■ CH1 SETTING MODE



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

• Parameters

MODE	ITEM	SETTING PARAMETER	RANGE	UNIT	INITIAL VALUE
Ch1 Setting	01	Lockout setting	Lock/Unlock	–	Lock
	11	Ch1 Input range	0 – 50 mA -1000 – +1000 mV -10 – +10 V	–	0 – 50 mA
	12	Ch1 0 % Input setting	0.00 – 48.00 -1000.0 – 900.0 -10.000 – 9.000	mA mV V	4.00
	13	Ch1 100 % Input setting	2.00 – 50.00 -900.0 – 1000.0 -9.000 – 10.000	mA mV V	20.00
	14	Ch1 0 % Input scaling	-99999 – 999999	–	0.00
	15	Ch1 100 % Input scaling	-99999 – 999999	–	100.00
	16	Ch1 Input decimal point	No decimal point The number of decimal places: 1 – 5	–	2 places of decimals
	17	Ch1 Unit (INP Scaling)	Choose from 68 types*	–	%
	18	Ch1 Output range	0 – 20 mA -5 – +5 V -10 – +10 V	–	0 – 20 mA
	19	Ch1 0 % Output setting	0.000 – 19.000 -5.000 – 4.750 -10.000 – 9.000	mA V V	4.000
	20	Ch1 100 % Output setting	1.000 – 20.000 -4.750 – 5.000 -9.000 – 10.000	mA V V	20.000
	79	Ch1 Filter time constant	0 – 30	sec.	0
	80	Ch1 Input zero fine adjust	-5.000 – 5.000	%	0.000
	81	Ch1 Input span fine adjust	95.000 – 105.000	%	100.000
	82	Ch1 Output zero fine adjust	-5.000 – 5.000	%	0.000
	83	Ch1 Output span fine adjust	95.000 – 105.000	%	100.000
	89	Ch1 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'.

[11] Ch1 Input range

Set the input range.

SETTING VALUE	DESCRIPTION	INITIAL VALUE
0 – 50 mA	Input: 0 – 50 mA DC	0 – 50 mA
-1000 – +1000 mV	Input: -1000 – +1000 mV 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] Ch1 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 – 50 mA	0.00 – 48.00	2.00	4.00
-1000 – +1000 mV	-1000.0 – 900.0	100.0	-1000.0
-10 – +10 V	-10.000 – 9.000	1.000	-10.000

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

[13] Ch1 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 – 50 mA	2.00 – 50.00	2.00	20.00
-1000 – +1000 mV	-900.0 – 1000.0	100.0	1000.0
-10 – +10 V	-9.000 – 10.000	1.000	10.000

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

[14] Ch1 0 % Input scaling

Set the display value of 0 % input setting.

SETTING RANGE	INITIAL VALUE
-99999 – 999999	0.00

[15] Ch1 100 % Input scaling

Set the display value of 100 % input setting.

SETTING RANGE	INITIAL VALUE
-99999 – 999999	100.00

[16] Ch1 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	Number of decimal places: 1	
oooo.oo	Number of decimal places: 2	
ooo.ooo	Number of decimal places: 3	
oo.oooo	Number of decimal places: 4	
o.ooooo	Number of decimal places: 5	

[17] Ch1 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 ! " # $ % & ' ( )
= - + * ^ | @ ` [ ] { } ; : < > ?
_ , . /

[18] Ch1 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	

[19] Ch1 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.
[19] 0 % output setting < [20] 100 % output setting

[20] Ch1 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.
[19] 0 % output setting < [20] 100 % output setting

[79] Ch1 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

[80] Ch1 Input zero fine adjust

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

[81] Ch1 Input span fine adjust

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

[82] Ch1 Output zero fine adjust

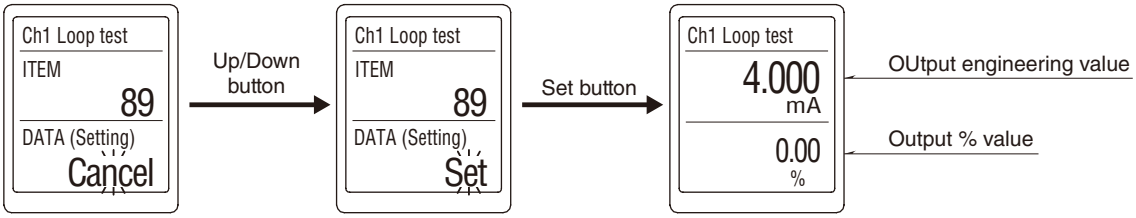
Perform fine adjustment of output signal.
Settable range: -5.000 – +5.000 %.
Initial value: 0.000

[83] Ch1 Output span fine adjust

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

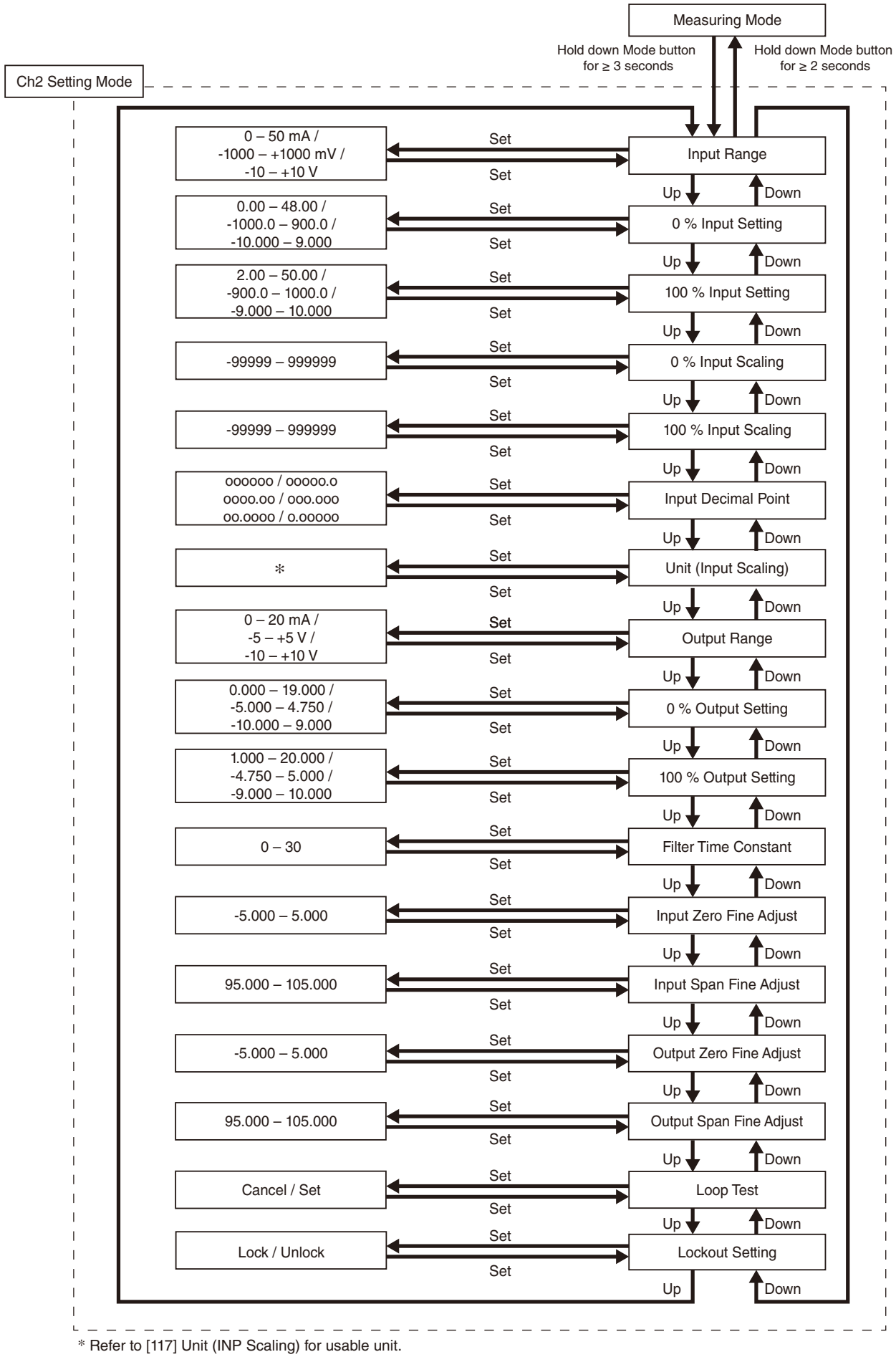
[89] Ch1 Loop test

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 loop test is performed, actual input is 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.

■ CH2 SETTING MODE



* Refer to [117] Unit (INP Scaling) for usable unit.

• Parameters

MODE	ITEM	SETTING PARAMETER	RANGE	UNIT	INITIAL VALUE
Ch2 Setting	111	Ch2 Input range	0 – 50 mA -1000 – +1000 mV -10 – +10 V	–	0 – 50 mA
	112	Ch2 0 % input setting	0.00 – 48.00 -1000.0 – 900.0 -10.000 – 9.000	mA mV V	4.00
	113	Ch2 100 % input setting	2.00 – 50.00 -900.0 – 1000.0 -9.000 – 10.000	mA mV V	20.00
	114	Ch2 0 % input scaling	-99999 – 999999	–	0.00
	115	Ch2 100 % input scaling	-99999 – 999999	–	100.00
	116	Ch2 Input decimal point	No decimal point The number of decimal places: 1 – 5	–	2 places of decimals
	117	Ch2 Unit (INP Scaling)	Choose from 68 types*	–	%
	118	Ch2 Output range	0 – 20 mA -5 – +5 V -10 – +10 V	–	0 – 20 mA
	119	Ch2 0 % output setting	0.000 – 19.000 -5.000 – 4.750 -10.000 – 9.000	mA V V	4.000
	120	Ch2 100 % output setting	1.000 – 20.000 -4.750 – 5.000 -9.000 – 10.000	mA V V	20.000
	179	Ch2 Filter time constant	0 – 30	sec.	0
	180	Ch2 Input zero fine adjust	-5.000 – 5.000	%	0.000
	181	Ch2 Input span fine adjust	95.000 – 105.000	%	100.000
	182	Ch2 Output zero fine adjust	-5.000 – 5.000	%	0.000
	183	Ch2 Output span fine adjust	95.000 – 105.000	%	100.000
	189	Ch2 Loop test	-5.00 – 105.00	%	Cancel
	01	Lockout setting	Lock/Unlock	–	Lock

[111] Ch2 Input range

Set the input range.

SETTING VALUE	DESCRIPTION	INITIAL VALUE
0 – 50 mA	Input: 0 – 50 mA DC	0 – 50 mA
-1000 – +1000 mV	Input: -1000 – +1000 mV 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.

[112] Ch2 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 – 50 mA	0.00 – 48.00	2.00	4.00
-1000 – +1000 mV	-1000.0 – 900.0	100.0	-1000.0
-10 – +10 V	-10.000 – 9.000	1.000	-10.000

Set as follows.
[112] 0 % input setting < [113] 100 % input setting

[113] Ch2 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 – 50 mA	2.00 – 50.00	2.00	20.00
-1000 – +1000 mV	-900.0 – 1000.0	100.0	1000.0
-10 – +10 V	-9.000 – 10.000	1.000	10.000

Set as follows.
[112] 0 % input setting < [113] 100 % input setting

[114] Ch2 0 % Input scaling

Set the display value of 0 % input setting.

SETTING RANGE	INITIAL VALUE
-99999 – 999999	0.00

[115] Ch2 100 % Input scaling

Set the display value of 100 % input setting.

SETTING RANGE	INITIAL VALUE
-99999 – 999999	100.00

[116] Ch2 Input decimal point

Set the decimal point position of [114] 0 % and [115] 100 % input scaling.

SETTING VALUE	DESCRIPTION	INITIAL VALUE
oooooo	Decimal point: None	2 places of decimals
ooooo.o	Number of decimal places: 1	
oooo.oo	Number of decimal places: 2	
ooo.ooo	Number of decimal places: 3	
oo.oooo	Number of decimal places: 4	
o.ooooo	Number of decimal places: 5	

[117] Ch2 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 [117] Unit (INP Scaling).

If turning power off while setting, the display returns to the setting display of [117] Unit (INP Scaling).
(The set value is discarded).

The unit is displayed in [Ch2 INPUT (Scaling)] in Measuring mode.
Initial value: %

*1. Settable characters

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

[118] Ch2 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	

[119] Ch2 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.
[119] 0 % output setting < [120] 100 % output setting

[120] Ch2 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.
[119] 0 % output setting < [120] 100 % output setting

[179] Ch2 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

[180] Ch2 Input zero fine adjust

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

[181] Ch2 Input span fine adjust

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

[182] Ch2 Output zero fine adjust

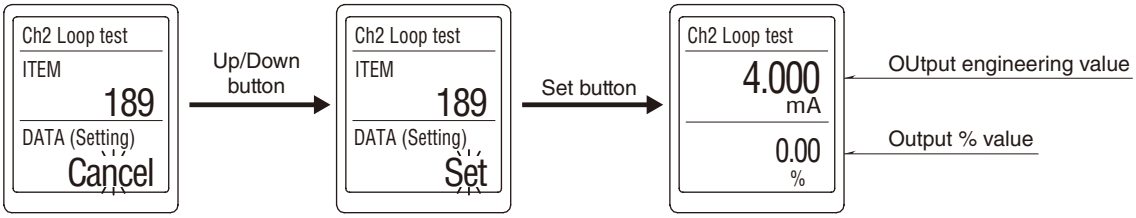
Perform fine adjustment of output signal.
Settable range: -5.000 – +5.000 %.
Initial value: 0.000

[183] Ch2 Output span fine adjust

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

[189] Ch2 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 loop test is performed, actual input is 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.

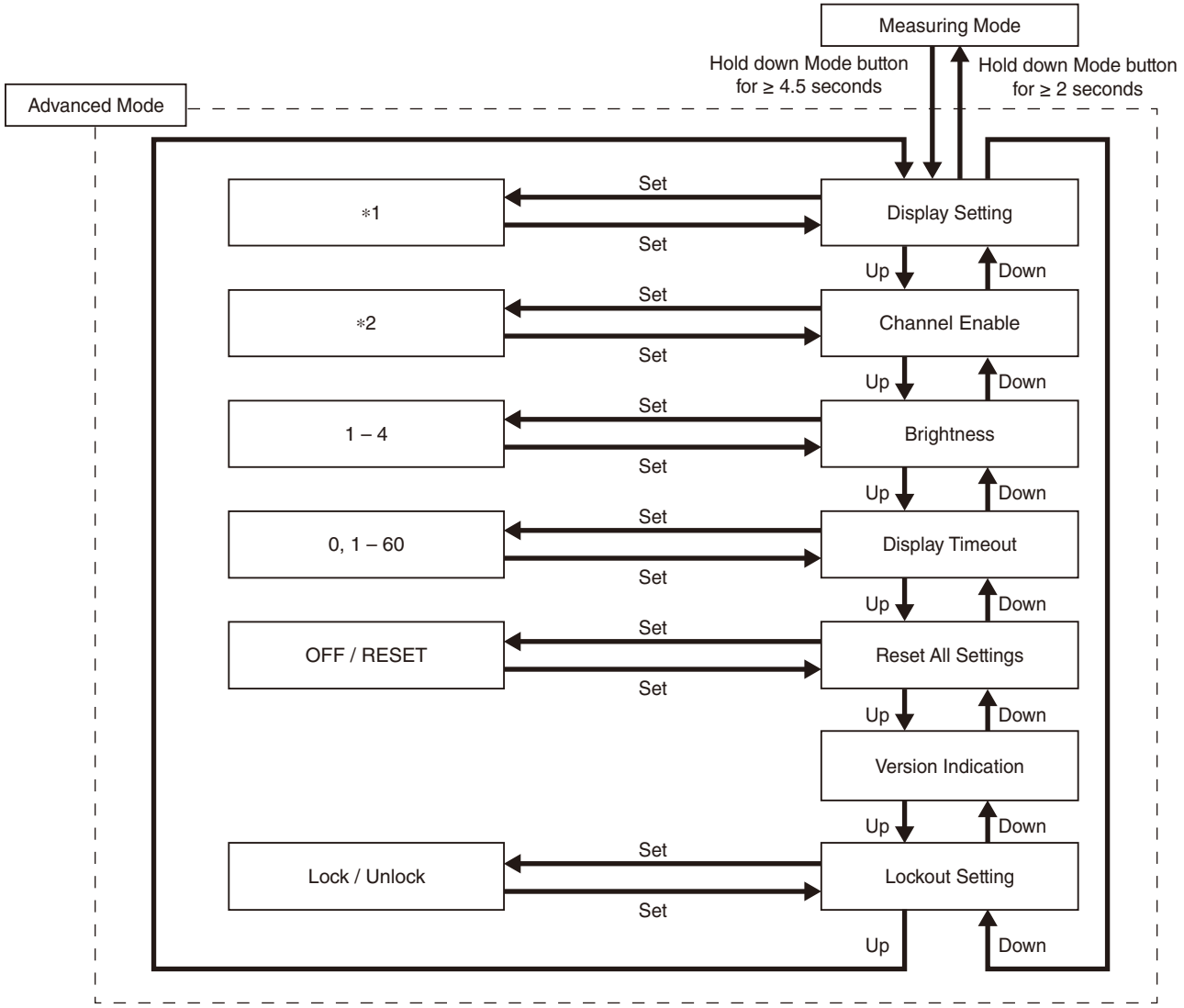
[01] Lockout setting

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'.

■ ADVANCED MODE



∗1. For detail, refer to [201] display setting.
∗2. For detail, refer to [202] channel enable.

• Parameters

MODE	ITEM	SETTING PARAMETER	RANGE	UNIT	INITIAL VALUE
Advanced	201	Display setting	Upper: choose from 5 types Lower: choose from 6 types	—	Upper: INPUT Lower: PERCENT
	202	Channel enable	Choose from 3 types	—	Ch1 enable Ch2 enable
	203	Brightness	1 (darkest) – 4 (brightest)	—	4
	204	Display timeout	0 (always on), 1 – 60	min.	10
	205	Reset all settings	OFF / RESET	—	OFF
	206	Version indication	—	—	—
	01	Lockout setting	Lock / Unlock	—	Lock

[201] Display 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.

Upper

SETTING VALUE	DESCRIPTION	INITIAL VALUE
Ch1 INPUT	Ch1 Input engineering unit value	Ch1 INPUT (engineering value)
Ch1 INPUT (Scaling)*1	Ch1 Input scaling	
Ch1 PERCENT	Ch1 Percent value*2	
Ch1 OUTPUT	Ch1 Output engineering unit value	
Ch2 INPUT	Ch2 Input engineering unit value	
Ch2 INPUT (Scaling)*1	Ch2 Input scaling	
Ch2 PERCENT	Ch2 Percent value*2	
Ch2 OUTPUT	Ch2 Output engineering unit value	

Lower

SETTING VALUE	DESCRIPTION	INITIAL VALUE
Ch1 INPUT	Ch1 Input engineering unit value	Ch2 INPUT (engineering value)
Ch1 INPUT (Scaling)*1	Ch1 Input scaling	
Ch1 PERCENT	Ch1 Percent value*2	
Ch1 OUTPUT	Ch1 Output engineering unit value	
Ch2 INPUT	Ch2 Input engineering unit value	
Ch2 INPUT (Scaling)*1	Ch2 Input scaling	
Ch2 PERCENT	Ch2 Percent value*2	
Ch2 OUTPUT	Ch2 Output engineering unit value	
None	No display	

*1. In measuring mode, for Ch1, Ch1 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.

[202] Channel enable

Enable / disable Ch1 and Ch2.
No output signal or present value is displayed for the disabled channel in Measuring Mode.

SETTING VALUE	DESCRIPTION	INITIAL VALUE
Enable Ch1 Enable Ch2	Enable Ch1 Enable Ch2	Enable Ch1 Enable Ch2
Enable Ch1 Disable Ch2	Enable Ch1 Disable Ch2	
Disable Ch1 Enable Ch2	Disable Ch1 Enable Ch2	

Even when Ch2 is disabled, parameter settings for Ch2 can be performed.

[203] Brightness

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

[204] 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

[205] 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).

[206] Version indication

Indicates firmware version.

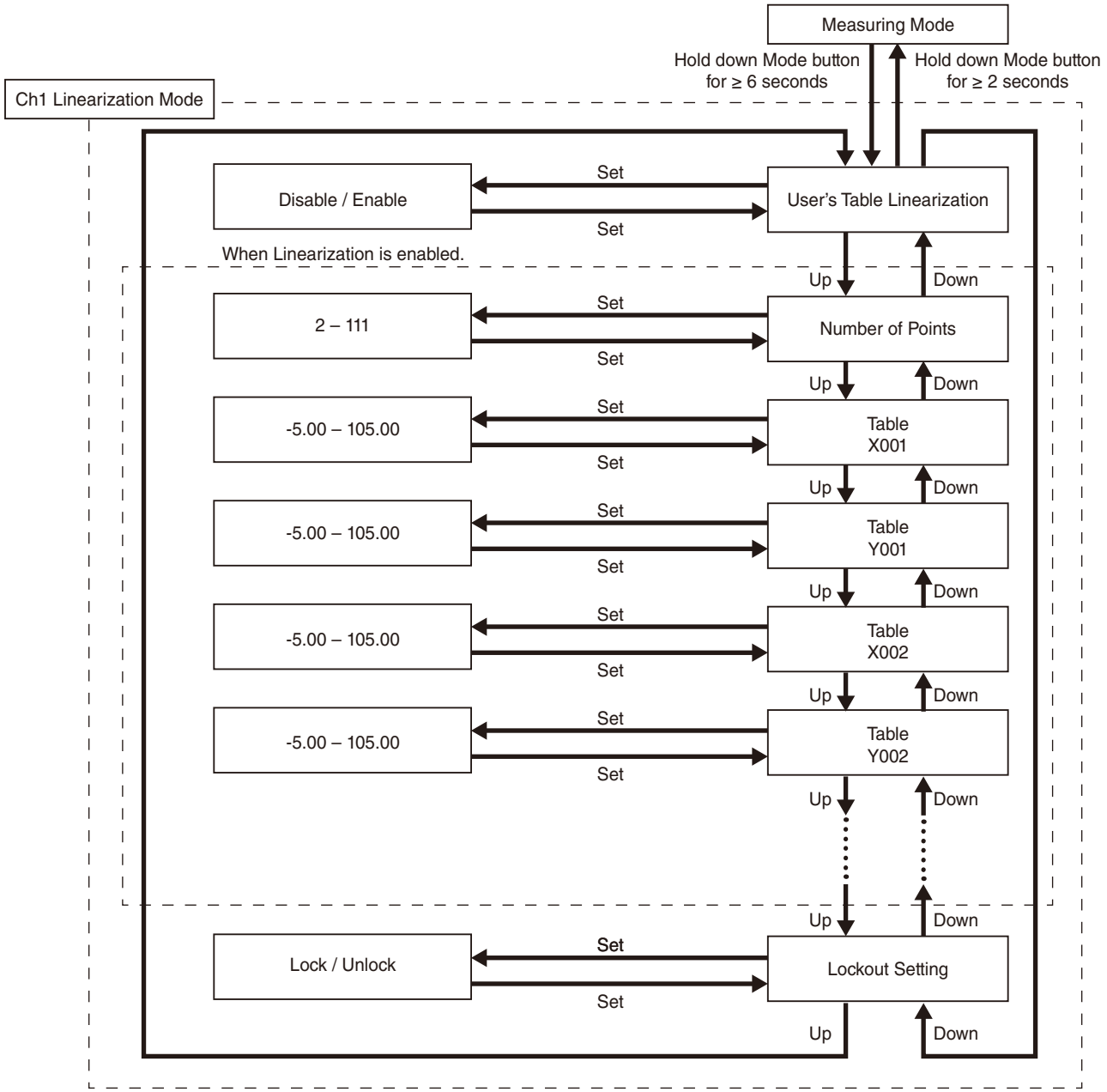
[01] Lockout setting

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'.

■ CH1 LINEARIZATION MODE



• Parameters

MODE	ITEM	SETTING PARAMETER	RANGE	UNIT	INITIAL VALUE
Ch1 Linearization	210	Ch1 User's table linearization	Disable / Enable	—	Disable
	276	Ch1 Number of points	2 – 111	—	2
	277 – 498	Ch1 Table	-5.00 – 105.00	%	X001 -5.00 Y001 -5.00 X002 105.00 Y002 105.00
	01	Lockout setting	Lock / Unlock	—	Lock

[210] Ch1 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.

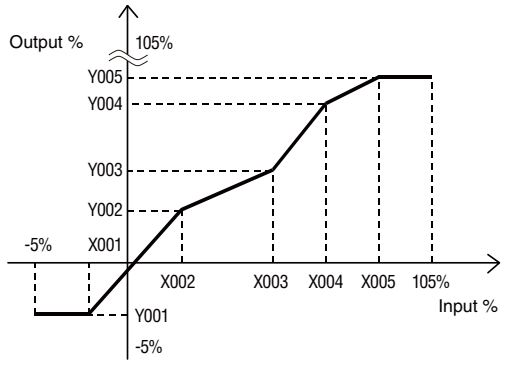
[276] Ch1 Number of points

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

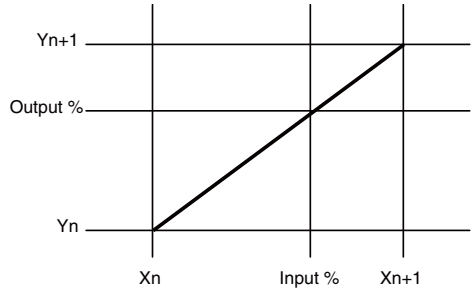
[277 – 498] Ch1 Table

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 between -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.



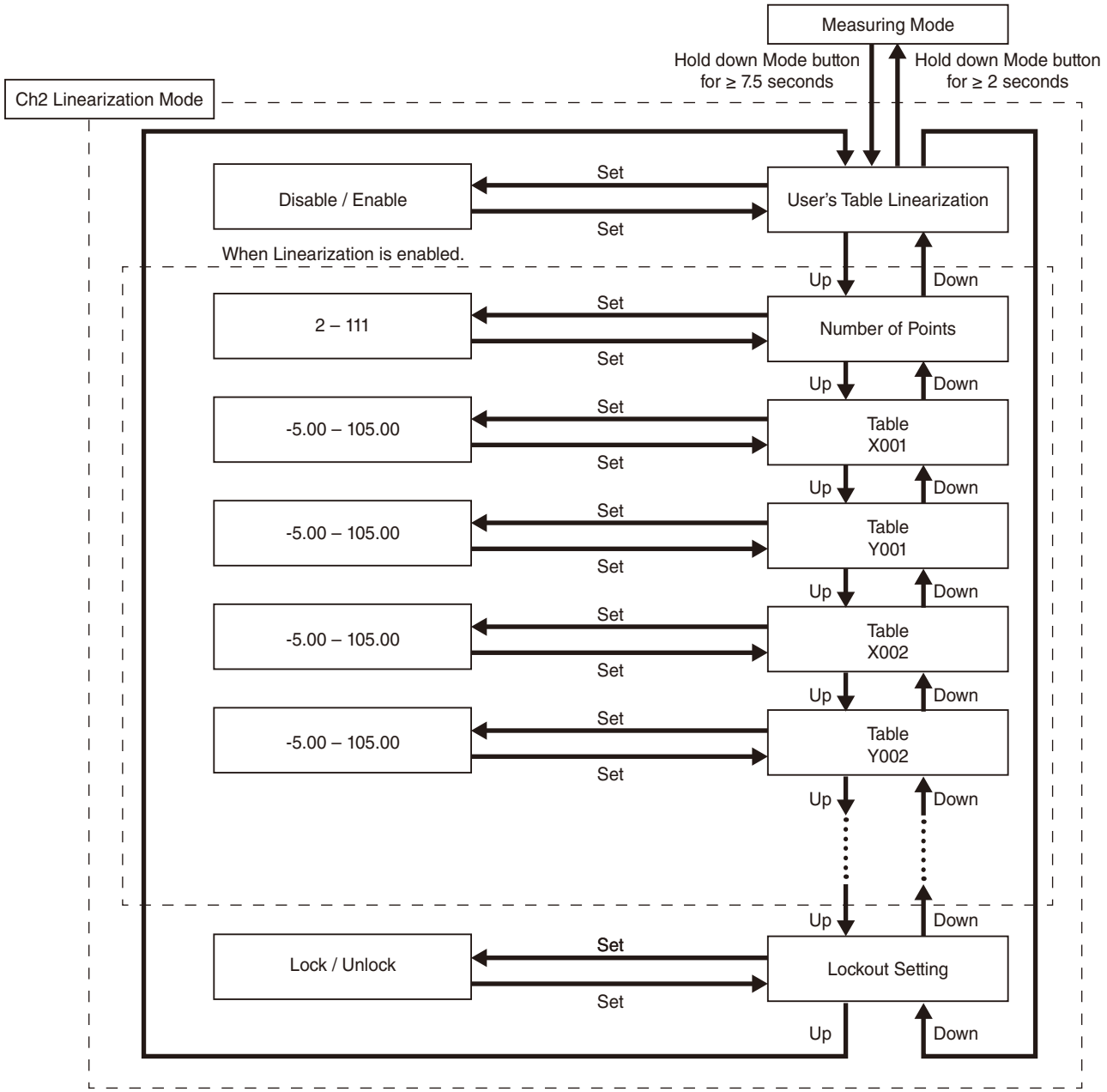
[01] Lockout setting

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'.

■ CH2 LINEARIZATION MODE



• Parameters

MODE	ITEM	SETTING PARAMETER	RANGE	UNIT	INITIAL VALUE
Ch2 Linearization	510	Ch2 User's table linearization	Disable / Enable	—	Disable
	576	Ch2 Number of points	2 – 111	—	2
	577 – 798	Ch2 Table	-5.00 – 105.00	%	X001 -5.00 Y001 -5.00 X002 105.00 Y002 105.00
	01	Lockout setting	Lock / Unlock	—	Lock

[510] Ch2 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.

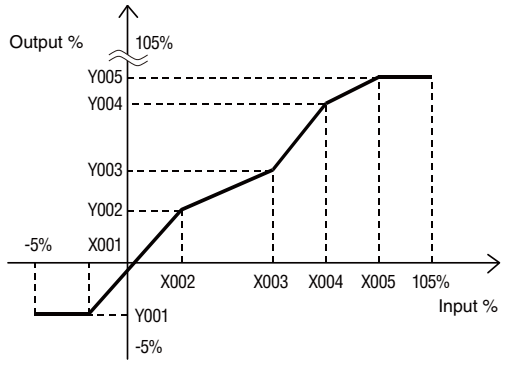
[576] Ch2 Number of points

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

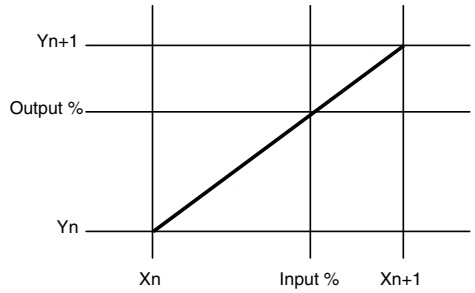
[577 – 798] Ch2 Table

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 between -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.



[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'.

ERROR MESSAGES

DISPLAY	ERROR DESCRIPTION	WHAT TO DO
OVER RANGE U	The input exceeds 105 %.	Adjust the input signal so as not to exceed 105 %.
OVER RANGE D	The input exceeds lower limit of -5 %.	Adjust the input signal so as 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 so as not to exceed 999999.
SCALING ERROR D	Input or output scaling value exceeds -99999 (downward).	Adjust the input signal for the input scaling so as not to be lower than -99999.
EEPROM I ERROR	Internal data error	Repair is needed if the display does not recover after the power is reset.
EEPROM R ERROR	Memory reading error	Activate 'Reset all settings' in advanced mode.*1
EEPROM W ERROR	Memory writing error	Activate 'Reset all settings' in advanced mode.*1

*1. All setting parameters are initialized. A repair is needed if it does not recover.

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)			
	EEPROM I ERROR	✓		
	EEPROM R ERROR			
	EEPROM W ERROR			

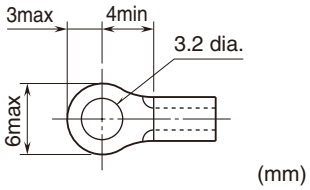
WIRING INSTRUCTIONS FOR BASE

■ 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 mm²



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 [80]/[180] Input Zero fine adjust.
2) Set the input signal to 100 %, and adjust the displayed input value to 100 % by [81]/[181 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 [82]/[182] Output Zero fine adjust.
2) Set the input signal to 100 %, and adjust the output signal to 100 % by [83]/[183] 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

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