

Owner's Manual

Multi-Channel, Multi-Sensor Controller [MSU] Ver. 1.3

M140821

Thank you for purchasing this Koganei product. Please read this instruction manual carefully before using the device, so that you can use it safely and correctly. In addition, keep this manual in a safe place. For product handling and precautions, refer to "Safety Precautions" and "Handling Instructions and Precautions" in "Catalog No. A5046" before using.

1. Safety precautions

 DANGER	Expresses situations that can be clearly predicted as dangerous. If the noted danger is not avoided, it could result in death or serious injury. It could also result in damage or destruction of assets.
 WARNING	Expresses situations that, while not immediately dangerous, could become dangerous. If the noted danger is not avoided, it could result in death or serious injury. It could also result in damage or destruction of assets.
 CAUTION	Expresses situations that, while not immediately dangerous, could become dangerous. If the noted danger is not avoided, it could result in light or semi-serious injury. It could also result in damage or destruction of assets.
 ATTENTION	While there is little chance of injury, this content refers to points that should be observed for appropriate use of the product.

1.1 Danger

- Do not use in locations where explosives, flammables, or other dangerous substances are present. This product is not an explosion-proof type unit. Explosion or ignition may occur.
- When any wiring, installation, or inspection work is to be carried out, make sure that the unit is disconnected from the power supply, otherwise, an accident, an electrical shock or a malfunction may be caused.
- Never attempt to remodel the product. It could result in abnormal operation leading to injury, electric shock, fire, etc.
- Do not splash water on the product. Spraying it with water, washing it, or using it underwater could result in malfunction of the product leading to injury, electric shock, fire, etc.
- If the equipment is used in a manner not specified by the KOGANEI, the protection provided by the equipment may be impaired.

1.2 Warning

- Do not use the product in excess of its specification range. Doing so creates the risk of product breakdown, loss of function, or damage. It could also drastically reduce the operating life.
- Because this product is used to detect objects, it does not have control functions meant for accident prevention or for other safety assurance purposes.

1.3 Attention

- When the product can no longer be used or is no longer necessary, dispose of the consumables appropriately as industrial waste.
- Do not touch the pressure sensor head when power supply is on.

2. Product overview

This product is a device that connects to and displays the values from sensor devices that have pressure, flow rate, and a variable 1- to 5-volt DC output. It can also receive output from sensor devices and control its output according to those values.

You can also select either the RS-232C communication type or the RS-485 communication type, depending on your use and purpose.

If any sensors except our pressure sensors (MSU-PH-□) are connected to the controller, UL authentication is limited to the controller.

3. Contents of the product set

When you receive this product, before you use it, check whether there are any missing items, and whether there were any abnormalities or damages that occurred during shipping. If there are damages, or if the product does not operate normally, contact your retailer (agent) or our nearest sales office.

3.1 Contents in the package

- The multi-channel, multi-sensor controller 1
- Owner's Manual English 1
- Owner's Manual Japanese 1
- Other accessories, cables, mounting brackets, and panel mounting parts are included according to the model.

4. Specifications

4.1 List of controller specifications

Item		Specifications	
Power supply	Voltage	12 to 24 VDC ±10% *Use a Class 2 power supply.	
	Sensor head supply voltage	12 to 24 VDC ±10% (*Depending on power supply voltage)	
	Consumption current	100 mA MAX. (Not including supply power to sensors)	
Sensor input	Number of connected sensors	4	
	Maximum consumption current for sensor head	Each channel; under 150 mA	
	Input voltage range	1.0 to 5.0 VDC	
	Input impedance	1 MΩ	
	Maximum applied voltage	5.6 V MAX.	
	Compatible sensor heads	MSU-PH-EA: -101.3 to 0.0 kPa MSU-PH-ER: -100.0 to 220.0 kPa MSU-PH-EM: -100 to 1000 kPa FS-R05: -500 to 500 mL/min FS-R3: -3.00 to 3.00 L/min FS-10: 0.00 to 10.00 L/min Any sensor (set display at 1 V and 5 V)	
	Output points	4	
External output	Output method	MSU-□ NPN open collector MSU-□-PNP PNP open collector	
	Responsiveness	5 ms (when filter function is OFF)	
	Load voltage	30 V MAX.	
	Load current	50 mA MAX.	
	Internal voltage drop	NPN : 0.3 V MAX. (when 5 mA) PNP : 2 V MAX. (when 50 mA)	
	Output mode	Hysteresis mode, window comparator mode 1, window comparator mode, high mode, low mode, output OFF mode	
	Repeatability	1% FS	
	Functions	Threshold value setting, response differential setting, output inversion, ON delay	
External input	Input points	4	
	Functions	Zero reset or import reference pressure	
Display	Display type	LCD display	
	Color	2 color display (red, green)	
	Number of digits displayed	(-) 4-digit display	
	Display resolution	MSU-PH-EA: 0.1 kPa MSU-PH-ER: 0.1 kPa MSU-PH-EM: 1 kPa FS-R05: 1 mL/min FS-R3: 0.01 L/min FS-10: 0.01 L/min (if more than 5.00 L/min, then it is 0.05 L/min)	
	Switch output confirmation LED	Lit when external output is ON (red LED)	
	Display channel confirmation LED	LED that corresponds to the currently displayed pressure lights (green LED)	
	Display accuracy	1%F.S. ±1digit (Controller stand alone)	
	Functions	Auto scan, zero adjust, display update cycle, backlight setting, setting for turning LEDs off, peak-hold, bottom-hold	
	Filter (Applicable to both SW output and display)	OFF to level 7	
Main unit keys	Up key: △ Down key: ▽ Enter key: ↵		
Communication	Communications standard	RS232C	RS485
	Communication speed	9600, 19200 bps	9600, 19200, 38400, 57600, 115200 bps
	Address settings	None	Rotary switches
	Number of daisy chain connections	Not applicable	MAX. 16

Item		Specifications	
General	Operating temperature range	-10 to 50°C; when stored: -20 to 80°C (non-condensation, non-freezing)	
	Operating humidity range	35 to 85% RH	
	Dielectric strength	500 VAC for 1 minute	
	Insulation resistance	100 MΩ MIN (at 500VDC megger)	
	Vibration resistance	Endurance: 10 to 55 Hz; secondary amplitude: 1.5 mm, 2 hours in each direction (XYZ)	
	Shock resistance	Endurance: 490 m/s ² , 5 times in each direction (XYZ) (when not electrified)	
	Materials	Surface seal: PET; case: PBT, PC; mounting screws: brass	
	Altitude	2000 m or less	
	Mass	50 g (not including other optional cables)	
	Environment	Indoor use, POLLUTION DEGREE 2	
	Standard	CE, UL (Recognition)	

Note: Only NPN type is UL compliant.

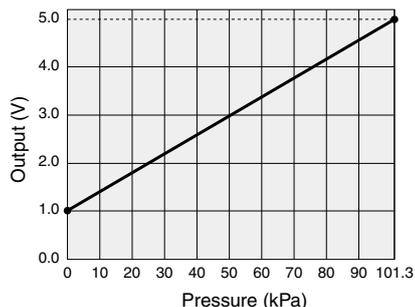
4.2 List of pressure sensor head specifications

Item	Model	Negative pressure			Compound pressure		
		MSU-PH-EA	MSU-PH-ER	MSU-PH-EM			
Media		Air or non-corrosive gas					
Power supply	Voltage	24 VDC ±10%					
	Consumption current	6 mA MAX.					
Analog output	Output voltage	1 to 5 V					
	Zero-point voltage (Vzero)	1.00 ±0.05	3.75 ±0.05	4.64 ±0.05			
	Span voltage	4.00 ±0.07 (reference value)					
	Temperature characteristics	Vzero: within ±30 mV; span: within ±2% F.S.					
	Output current	1 mA max. (load resistance of 5 kΩ or more)					
	General	Operating pressure range kPa	-101.3 to 0	-100.0 to 220.0	-100 to 1000		
Proof pressure kPa		900			1500		
Operating temperature range		0 to 50°C; when stored: -20 to 80°C (when stored: humidity of less than 65% RH, atmospheric pressure)					
Operating humidity range		35 to 85% RH					
Insulation resistance		100 MΩ MIN (at 500VDC megger)					
Dielectric strength		500 VAC 1 minute					
Altitude		2000 m or less					
Environment		Indoor use, POLLUTION DEGREE 2					
Mass		40 g					
Standard		CE, UL (Recognition, supported only when controller is connected)					

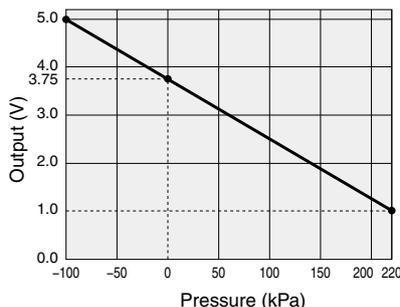
Note: UL compliant only when connected to NPN type controller.

Pressure sensor head: Characteristic tables of pressure and output

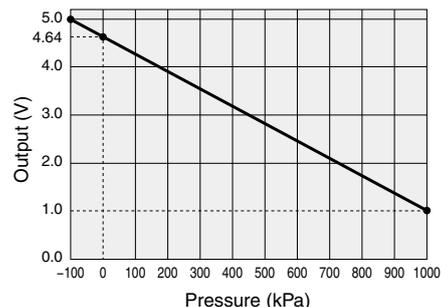
●MSU-PH-EA-□



●MSU-PH-ER-□



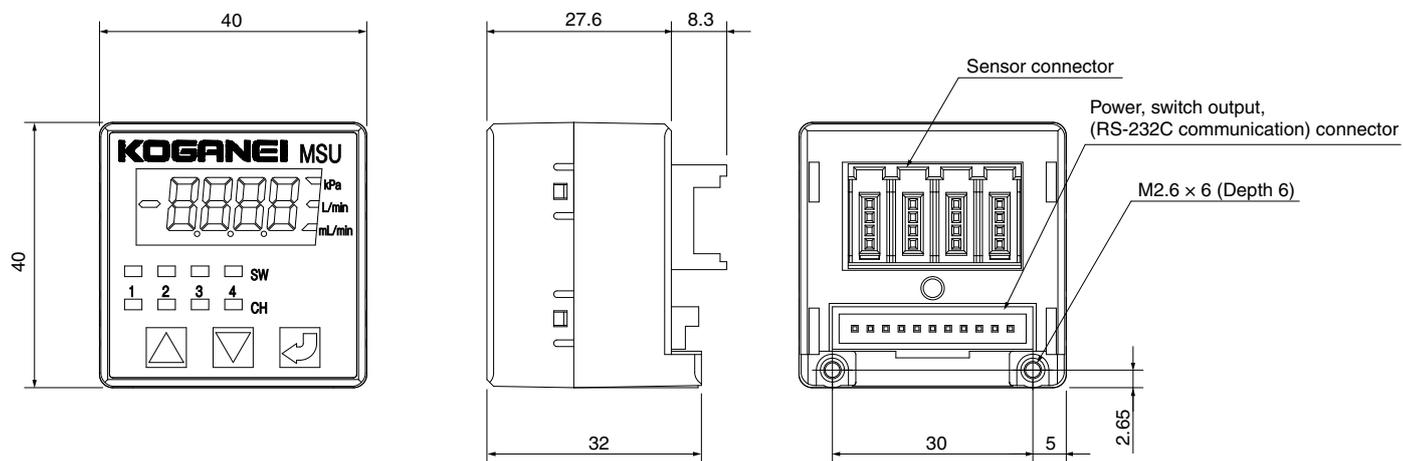
●MSU-PH-EM-□



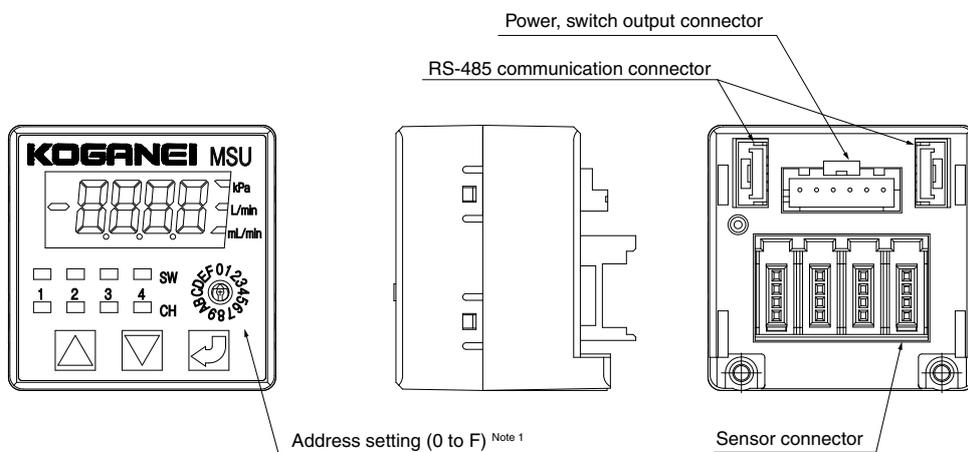
5. Exterior view and names of parts

5.1 Exterior view of the controller

No communication/RS-232C communication specification



RS-485 communication specification



Note 1: The diagram shows when the address is 0.

5.2 Wiring specifications for the controller

<MSU-□, MSU-232-□>

Wiring specifications

Connector type	Item	Specifications	
Made by JST B11B-XASK-1	Power supply	1 pin : 24V (red)	
		2 pin : 0V (black)	
	Data input and output	Switch output	3 pin : SW1 (white)
			4 pin : SW2 (green)
			5 pin : SW3 (yellow)
		RS232C ^{Note}	6 pin : SW4 (brown)
			7 pin : 0V (black)
			8 pin : RXD (white)
			9 pin : TXD (red)
			10 pin : N.C
			11 pin : N.C
Made by SUMITOMO 3M 37104-3101	Data input	1 pin : +V (brown)	
		2 pin : Sensor output (black)	
		3 pin : 0V (blue)	
		4 pin : IN	

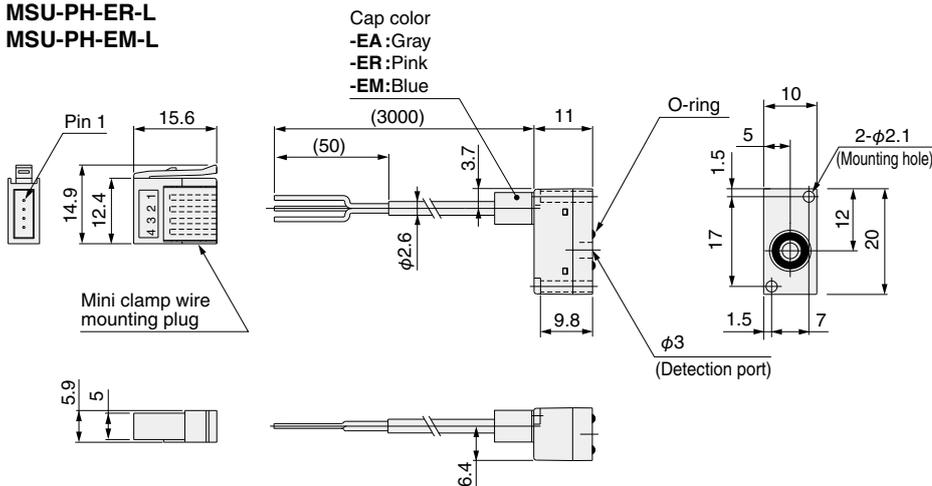
Note: MSU-232-□ only.

<MSU-485-□>

Connector type	Item	Specifications
Manufactured by JST B6B-XASK-1	Power supply	Pin 1: 24 V (red)
		Pin 2: 0 V (black)
	Switch output	Pin 3: SW1 (white)
		Pin 4: SW2 (green)
		Pin 5: SW3 (yellow)
		Pin 6: SW4 (brown)
Manufactured by Sumitomo 3M Limited 37104-3101	Data input	Pin 1: +V (brown)
		Pin 2: sensor output (black)
		Pin 3: 0 V (blue)
		Pin 4: IN
Manufactured by JST RS485	Data input/output	Pin 1: A (white)
		Pin 2: B (pink)
		Pin 3: 0 V (yellow)
		Pin 4: N.C.
		Pin 5: N.C.

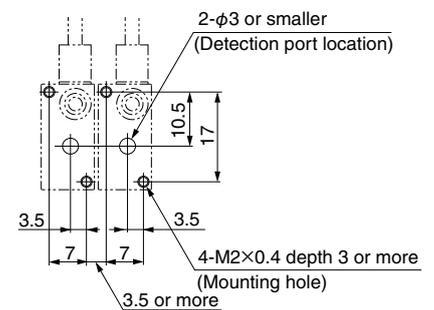
5.3 Exterior view of pressure sensor head

- MSU-PH-EA-L^{Note}
MSU-PH-ER-L
MSU-PH-EM-L

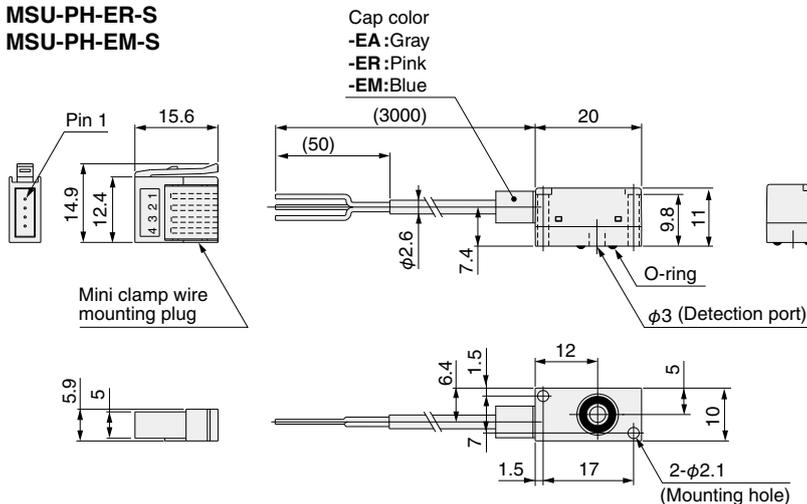


Note: The sensor head MSU-PH-□-□ comes with 2 mounting screws (M2×0.4, length 13).

- Sensor head mounting dimensions
(For 2 pcs. mounting)
Surface roughness $\sqrt{Ry6.3}$



- MSU-PH-EA-S^{Note}
MSU-PH-ER-S
MSU-PH-EM-S



Note: The sensor head MSU-PH-□-□ comes with 2 mounting screws (M2×0.4, length 13).

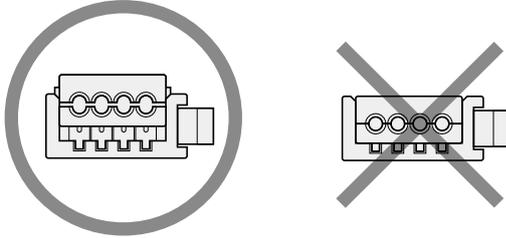
6. Installation and wiring

6.1 Installation

Sensor head and connector connection procedure

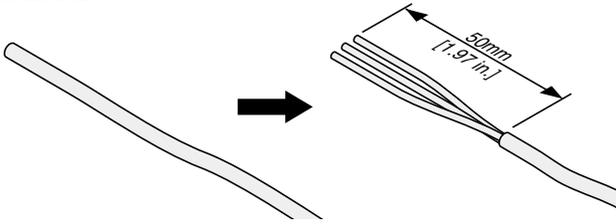
When the sensor head **MSU-PH-□-□** is supplied, the sensor head body and mini clamp connector (male) are not yet connected. Follow the procedure below to perform the connection.

1. Check that the connector cover (the part where lead wires are to be inserted) is protruding from the connector body.



It cannot be used if it's flat and placed at the same level against the body.

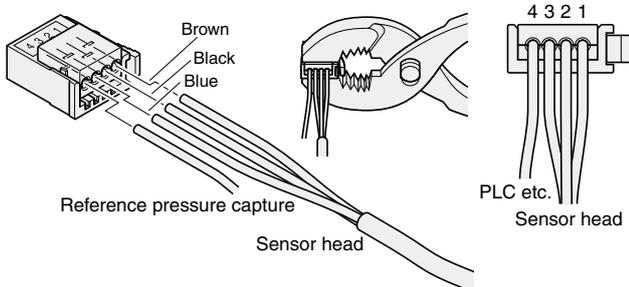
2. Cut the cable at the length required for the sensor head. Strip the cable sheath for 50 mm [1.97 in.] from the cable end, and expose the lead wires. At this time, do not take off the lead wire insulation.



3. Follow the instructions in the table below to insert the lead wires into the hole in the connector cover. Look through the top of the semi-transparent cover to check that the lead wires have been firmly inserted all the way to the back. (Insertion length is about 9 mm [0.35 in.])

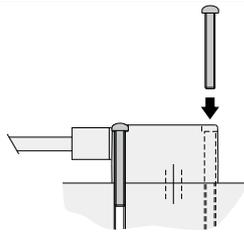
Use caution in making the connections, since switching on the power with wrong connections will damage the sensor head and controller.

No. on the connector	Signal name	Color of lead wire
1	Sensor head power supply (+)	Sensor head brown wire
2	Sensor head voltage output	Sensor head black wire
3	Sensor head power supply (0V)	Sensor head blue wire
4	Reference pressure capture	Prepared by customer AWG 24-26 (0.14-0.3sq) Insulation diameter: φ0.8-1.0 mm [0.031-0.039 in.]



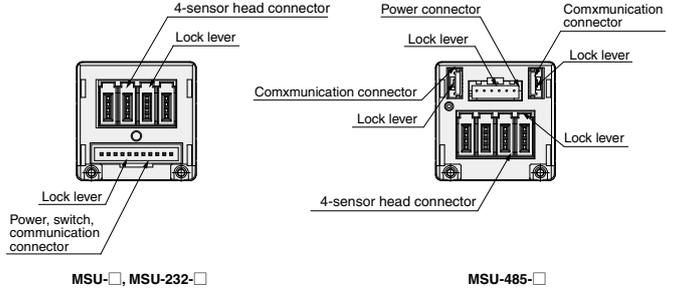
4. Taking care to avoid letting the lead wires slip out from the connector, use pliers or some other hand tool to crimp the cover and connector body, and push the cover into the connector body. Limit the crimping force to 980.7 N [220.5 lbf]. When the cover is flat and placed at the same level against the connector body, the connection is complete.
5. In the same way, handle the sensor head relay cable **PSUK-□** mini-clamp connectors (male, female).
6. Check one more time that the wiring is correct.

Sensor head body



Use the small screws provided to mount the sensor head. The tightening torque should not exceed 6.0N·cm [0.53in·lbf].

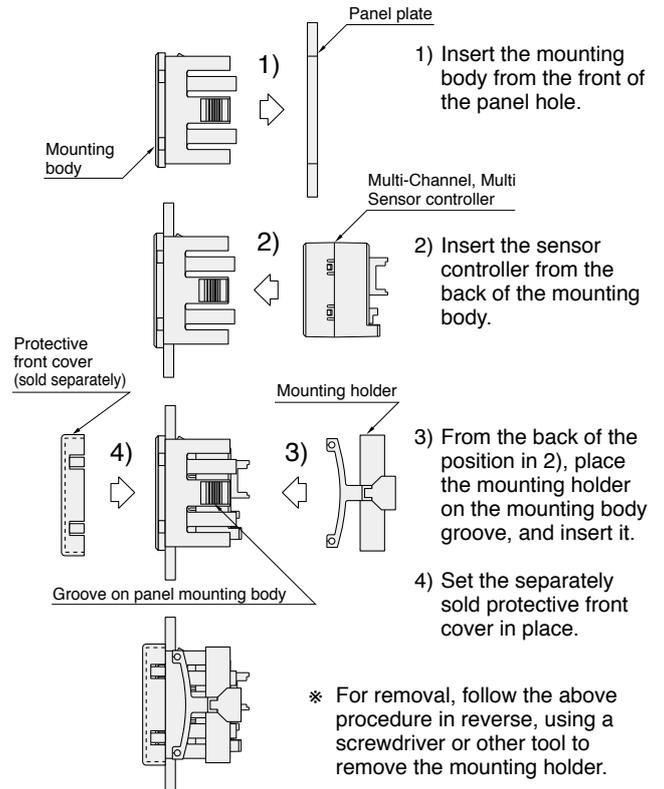
Attaching and removing of the sensor head, and the power supply, switch, and communication cable



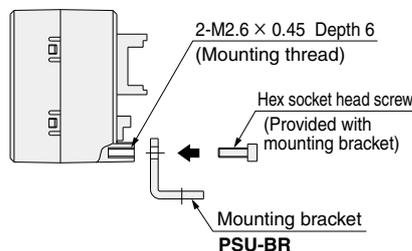
To mount the sensor head and the power supply, switch, and communication cable, align the lock lever position in the direction of the arrow as shown in the figure, and push until the lock hooks on the controller-side connector.

To remove, push down completely on the lock lever, take the connector and pull it out. At this time, be careful to avoid applying excessive force on the lead wires.

Attaching the panel mounting parts and protective front cover



Attaching the mounting bracket



Use the hex socket head screws (M2.6×0.45, length 5 mm [0.197 in.]) to mount the mounting bracket into the mounting holes on the back of the sensor controller. The tightening torque should not exceed 32 N·cm [2.83 in·lbf].

6.2 Wiring

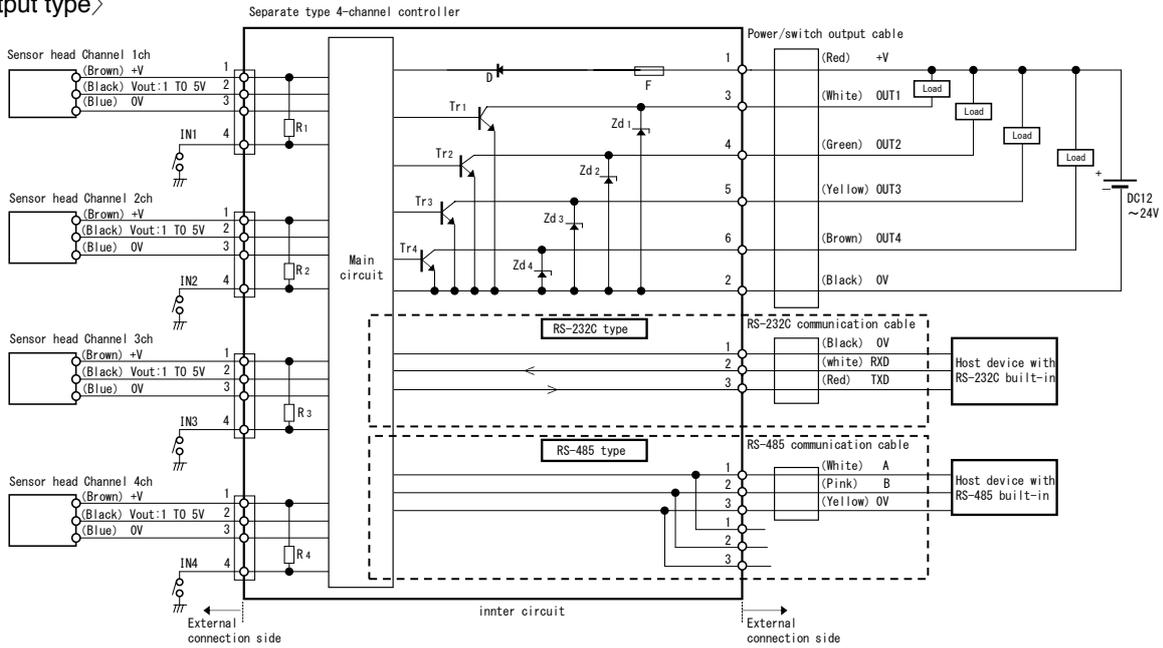
When connecting, refer to the figure below and use the provided power and signal cables.

⚠ CAUTION

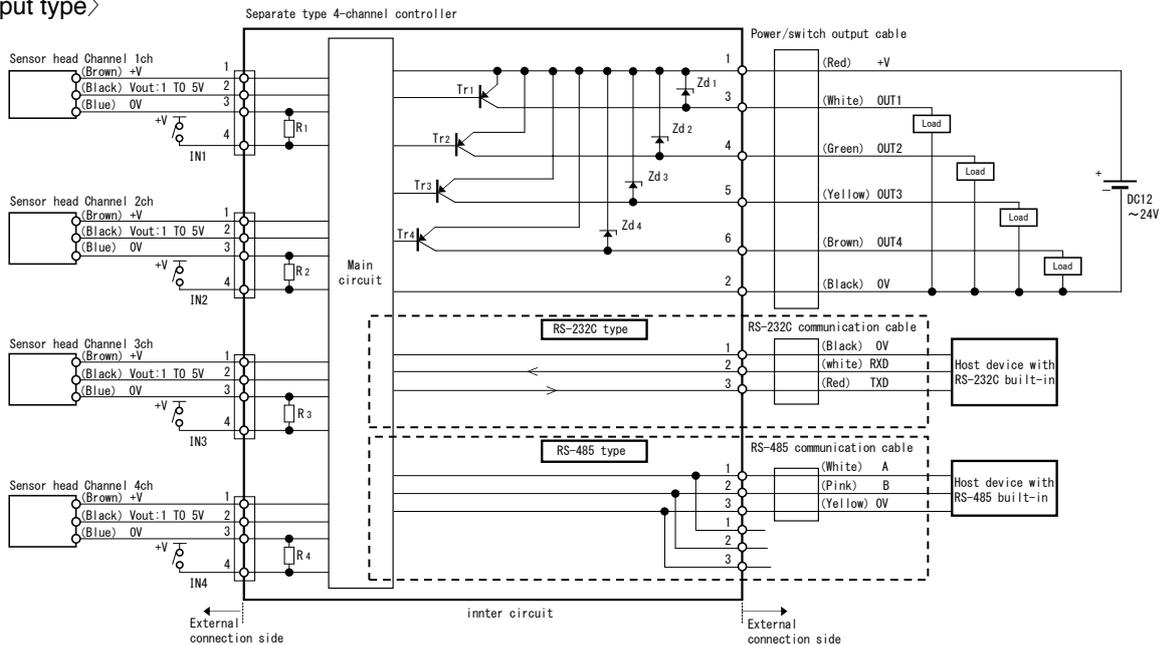
- In case noise generating equipment (switching regulator, inverter motor, etc.) is used in the vicinity of this sensor, connect the frame ground (F.G.) terminal of the equipment to an actual ground. Additionally, when selecting a power supply, choose one that is Class 2.
- Securely insert the connector.
- After completing wiring work, check to make sure that all connections are correct.
- Use a mechanical switch, photo coupler, or relay for external input. If the grounding potential of the external device to be used and the grounding potential of this product are different, the external device should have an insulated on/off procedure for the 0V line.
- Verify that the supply voltage variation is within the rating.

Circuit Diagram

〈NPN output type〉



〈PNP output type〉



7. Functions

External input

Do assignments for functions (zero adjust or import reference) in settings (main unit operations or communications settings) when using external input (settings unused as factory default).

〈NPN Type〉

The external input terminal (pin number 4 for sensor input) should be L level (less than 0.5 V, more than 10 ms) when executing external input.

Do not connect the external input terminal to anything when you are not using external input (it is pulled up by the power supply voltage).

〈PNP Type〉

The external input terminal (pin number 4 for sensor input) should be H level (+V−0.5V or more, 10ms or more) when executing external input.

Do not connect the external input terminal to anything when you are not using external input (it is pulled down to 0V).

Compatibility settings (RS232C type only)

Do these settings if compatibility with an older product's communications format is required.

The sensor head type, threshold settings, and zero adjust settings are initialized (returned to the factory default settings for the format of the product being changed) after these settings are changed.

Note that because this compatibility function relates to transmitting commands and response formats, it is not for response timing, etc.

Furthermore, because this is not compatible in regards to the operation of the main unit, follow the operation procedures of this product (MSU) to do main unit operations.

0: MSU format

1: PSU format

2: FSU format

3: PSU-36W format

4: PSU-40W format

Sensor head type settings

Select a sensor head type to connect to each channel.

0: Any sensor (set display at 1 V and 5 V)

1: MSU-PH-EA (-101.3 to 0.0 kPa)

2: MSU-PH-ER (-100.0 to 220.0 kPa)

3: MSU-PH-EM (-100 to 1000 kPa)

4: FS-R05 (-500 to 500 mL/min)

5: FS-R3 (-3.00 to 3.00 L/min)

6: FS-10 (0.00 to 10.00 L/min)

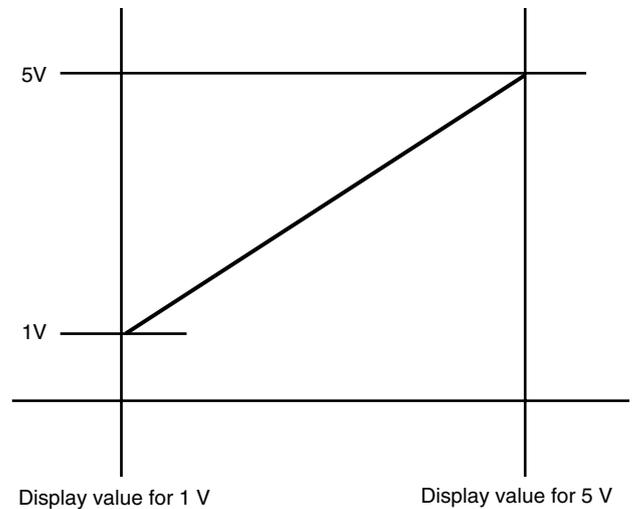
* After changing the sensor head type, the threshold value is initialized to the value of the display range (maximum value + minimum value)/2.

Any sensor settings

You can use a 1 to 5 V linear output sensor by setting the display value at 5 V and display value at 1 V.

Size correlations, as well as positive/negative, are irrelevant for display value at 5 V and display value at 1 V.

When using an optional sensor, do the various settings for the optional sensor, and then set the sensor head type to optional sensor.



Note: The span of the increments for the display are as below, according to the span of the display range (the set value is displayed, regardless of increments, for the display at 5 V and the display at 1 V).

Span of display range = |display value at 5 V - display value at 1 V|

Span of display range 1 to 2000: increments of 1

Span of display range 2001 to 4000: increments of 2

Span of display range 4001 to 10000: increments of 5

Span of display range 10001 to 19998: increments of 10

- Display value at 5 V
Set between -9999 and 9999
Initial value: 1000
- Display value at 1 V
Set between -9999 and 9999
Initial value: -1000
- Decimal point position
0: no decimal point [0000]
1: first digit [000.0]
2: second digit [00.00]
3: third digit [0.000]
- Unit display
0: none
1: kPa
2: mL/min
3: L/min

Output mode settings

Set the output mode for each channel.

0: Output OFF mode

Always output OFF

1: Hysteresis mode

Mode for setting the ON point and OFF point

2: Window comparator mode 1 (output cut when rising)

Mode for turning output ON within the set value range for L1 and L2 (OFF point depends on response differential setting)

Does not turn on when entering range while rising

3: Window comparator mode

Mode for turning output ON within the set value range for L1 and L2 (OFF point depends on response differential setting)

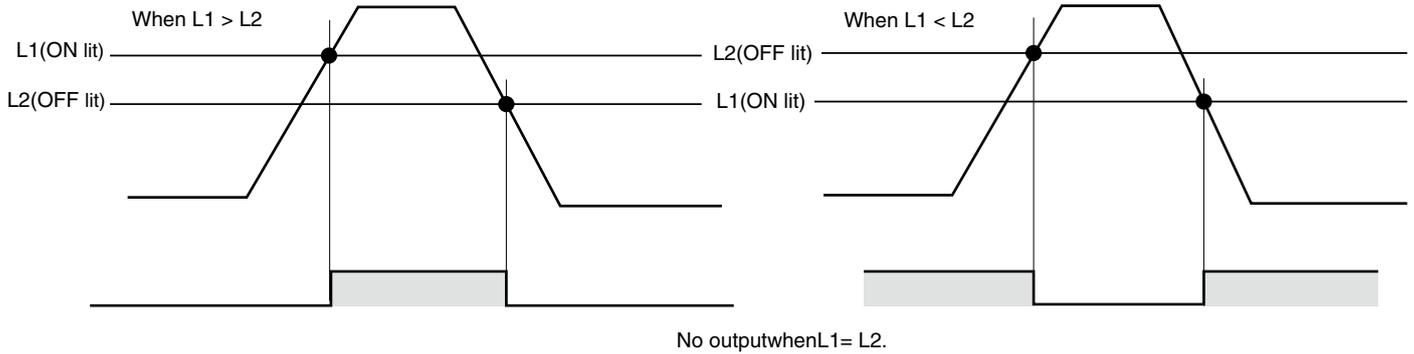
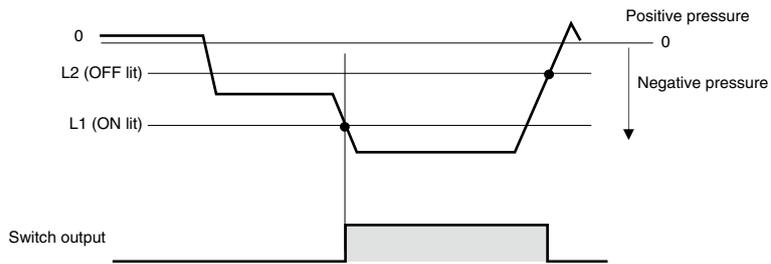
4: High mode

Mode for turning output ON when above the ON point (OFF point depends on response differential setting)

5: Low mode

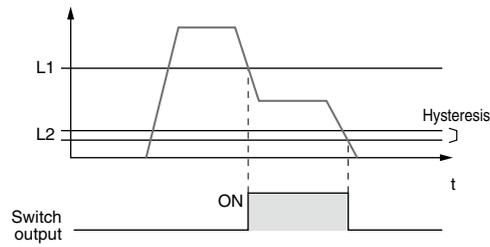
Mode for turning output ON when below the ON point (OFF point depends on response differential setting)

Hysteresis Mode

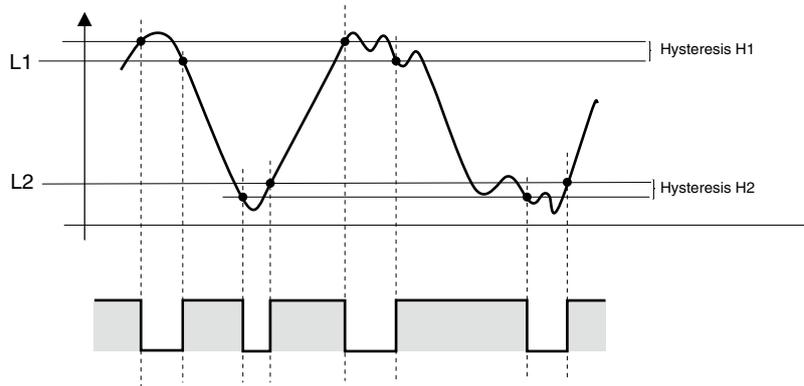


■ **Window comparator mode 1 (mode that does not turn on when between L1 and L2 while rising)**

- Mode for freely setting L1 and L2.
Note, however, that switch output does not go ON while flow rate is increasing.

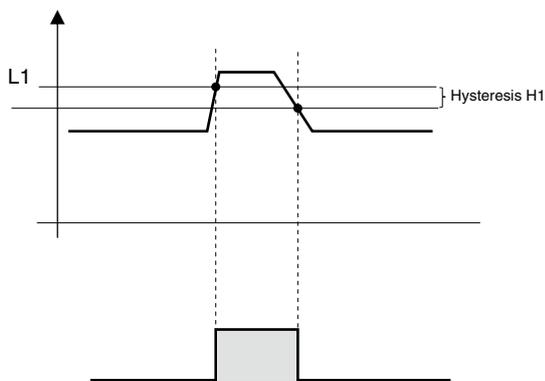


■ **Window comparator mode**

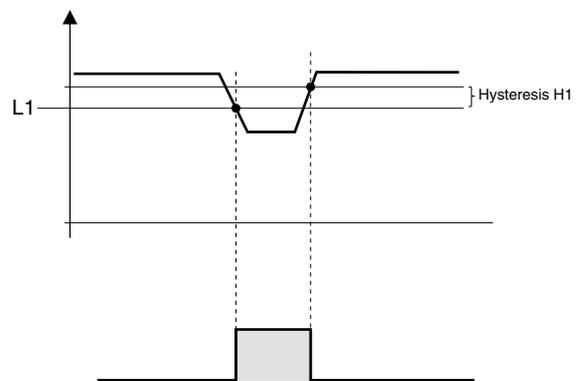


- To use Window Comparator Mode 1 and Window Comparator Mode, setting must be $L1 > L2$.

■ **High Mode**



■ **Low Mode**



■ **Output inversion settings**

Inversion or no inversion of the switch output.

0: no inversion

1: Inversion

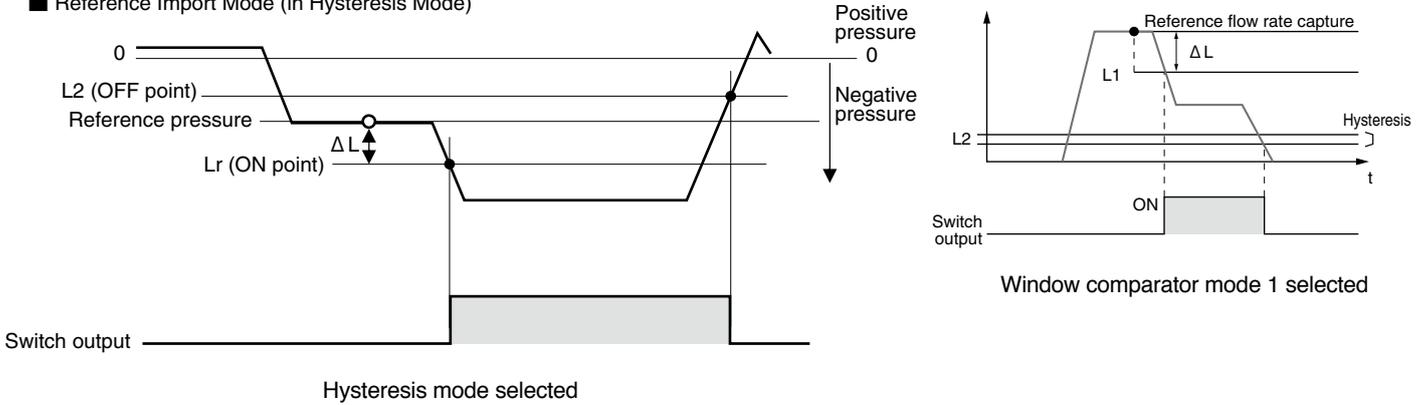
■ **Threshold value settings**

	During hysteresis mode	During window comparator mode	High mode/Low mode
L1:	OFF point/ON point	Threshold value upper limit	ON point
L2:	ON point/OFF point	Threshold value lower limit	Unused

■ **Import reference mode settings**

- 0: import reference mode OFF
- 1: import reference mode ON

■ **Reference Import Mode (in Hysteresis Mode)**



*Operate the threshold value L1 as Lr, the same as when used in window comparator mode, High mode, and Low mode.

■ **ΔL settings**

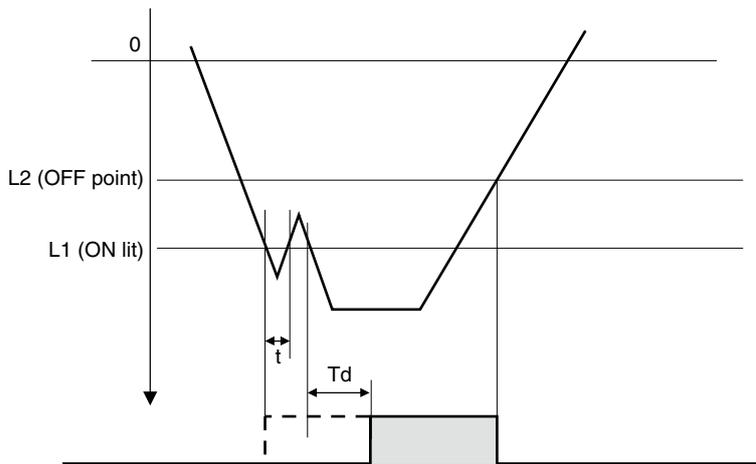
- ΔL settings in import reference mode
- Threshold value Lr is set by importing a reference.
- Threshold value Lr = reference value - ΔL

■ **Response differential settings**

- Response differential settings for window comparator mode, as well as High and Low mode
- H1: response differential for threshold value L1
ON point L1, OFF point = L1 + H1
- H2: response differential for threshold value L2 (not used in High mode or Low mode)
ON point L2, OFF point = L2 - H2

■ **ON delay settings**

- ON delay for preventing chattering of switch output
- Not being turned ON prevents chattering, etc. when the time ON is shorter than the time for ON delay (T_d).



Time settings for ON delay:

- 0: none
- 1: 5 ms
- 2: 10 ms
- 3: 50 ms
- 4: 100 ms
- 5: 500 ms
- 6: 1000 ms

■ Zero adjust settings

Calibrating the zero-point shifts the value of the display value when implemented to show zero.

Do not do zero adjust when settings do not include a zero point in the other sensor settings (display 5000 at 5 V, display 1000 at 1 V, etc.).

Settings can be done via the adjust retention settings for whether or not zero adjust is retained at power OFF (factory default is set to delete at power OFF).

Settings for deleting or retaining calibrated values at power OFF

Clear calibrated values

0: delete

1: retain

■ Backlight settings

0: Always backlight OFF

1: red when switch output ON, green when OFF (linked to the switch output for the display channel)

2: green when switch output ON, red when OFF (linked to the switch output for the display channel)

3: Always green

4: Always red

■ LED lighting settings

0: CH LED and SW LED unlit

1: CH LED and SW LED lit

2: CH LED unlit, SW LED lit

3: CH LED lit, SW LED unlit

■ Key lock settings

When the key lock is ON, operations using main unit buttons other than key lock release cannot be done.

0: key lock OFF

1: key lock ON

■ Display channel

0: Auto scan display

(The pressure values that the LCD displays switch every second from channel 1 → channel 2 → channel 3 → channel 4 → channel 1.)

1: Channel 1 display

2: Channel 2 display

3: Channel 3 display

4: Channel 4 display

■ Display update cycle

Set the update cycle for the LCD display (only applicable for measurement mode).

1: 125 ms

2: 250 ms

3: 500 ms

4: 1000 ms

■ Input channel

Do settings to assign sensor input channels.

Set if output settings for 2 or more points via 1 input sensor are required.

1: IN1

2: IN2

3: IN3

4: IN4

<Initial value>

CH1: IN1

CH2: IN2

CH3: IN3

CH4: IN4

■ Hold settings

Do hold settings for display values.

0: hold OFF

1: peak hold

2: bottom hold

■ Filter settings

Do the low pass filter process for sensor input.

The larger the numbers for the filter settings, the stronger the filter and the slower the response.

0: filter OFF

1: FL-1

2: FL-2

3: FL-3

4: FL-4

5: FL-5

6: FL-6

7: FL-7

■ External input function settings

Set the function assignment for external input terminals (pin 4 for sensor input).

0: Unused

1: Import reference

2: Zero adjust

■ Communications speed settings

Set the communications speed (baud rate) for serial communications (RS232C or RS485).

These settings support main unit operations only.

<RS232C type>

1: 9600 bps

2: 19200 bps

<RS485 type>

1: 9600 bps

2: 19200 bps

3: 38400 bps

4: 57600 bps

5: 115200 bps

■ Address settings (RS485 type only)

0 to F

<Error display>

HHHH ... Out of sensor voltage range (Displayed when 5.1 V or higher.)

LLLL ... Out of sensor voltage range (Displayed when 0.9 V or lower.)

---- ... Sensor heard disconnect (Displayed when 0.2 V or lower.)

Sensor voltages between 0.9 and 1.0 V display the value 1.0 V. Sensor voltages between 5.0 and 5.1 V display the value 5.0 V.

Display	Meaning	Required action
$\bar{E} - / \square_n$ (n is relevant ch)	Outside the import reference range	Release by pressing and holding the $\bar{\Delta}$ button for more than 1 second. Execute again after checking the values for the import reference settings (ΔL) and for the time of import.
$\bar{E} - \bar{L} \square_n$ (n is relevant ch)	Over voltage occurring to sensor input	Reconnect after removing the sensor and checking that the wiring, etc., for the sensor input is correct and that the output voltage range for the sensor is correct.
$\bar{E} - \bar{J} \square_n$ (n is relevant ch)	Over voltage being applied to switch output	After correcting the error, release by pressing and holding the $\bar{\Delta}$ button for more than 1 second. Reconnect after check the wiring, load, etc.

* The LCD backlight is red while an error, " $\bar{E} - /$ " to " $\bar{E} - \bar{J}$ ", is displayed.
However, it is always green when set to green, and the back light is OFF when the backlight is set to OFF.

8. Operations

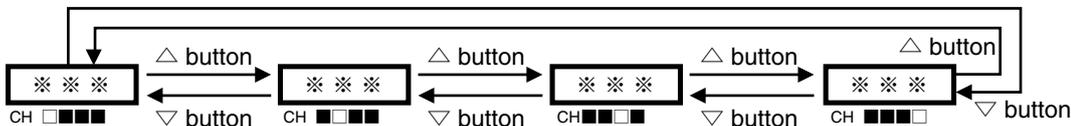
<Measurement mode>

Buttons that are pressed simultaneously for main unit operations are considered to be pressed until after all the buttons are released.

<Switching display channels>

Switch display channels by using the Δ or ∇ buttons.

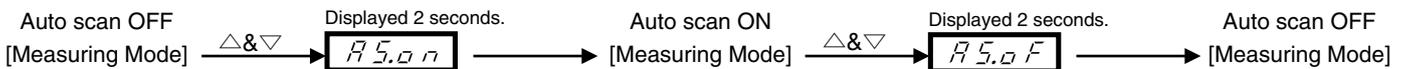
The CH LED lights during display.



<Auto scan mode>

Start or release auto scan mode by simultaneously pressing the $\Delta + \nabla$ buttons.

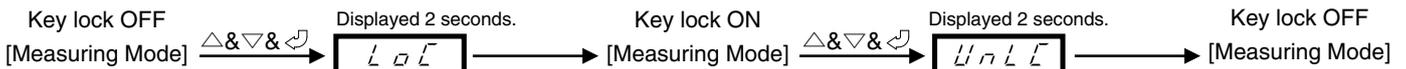
Display channels cannot be switched via the Δ or ∇ buttons while auto scan is running.



<Key lock mode>

Start or release key lock mode by simultaneously pressing the $\Delta + \nabla + \bar{\Delta}$ buttons.

When key lock is enabled, all buttons are disabled except for key lock release.

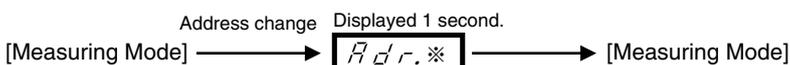


<Change address (*only for RS485 type)>

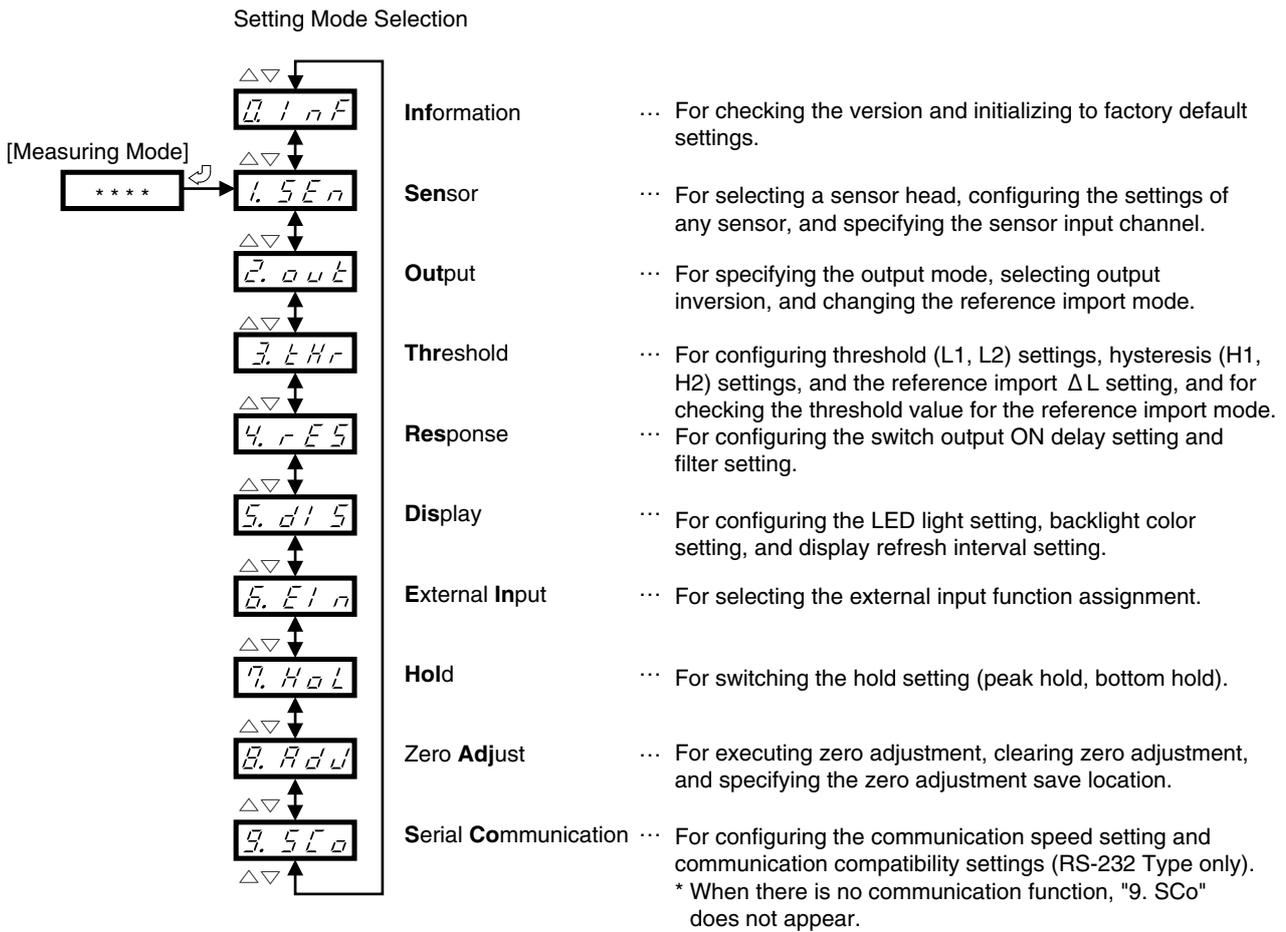
Changing the address for RS485 communications is done using the rotary switches built into the controller.

Set an address so that there are no duplicates using hexadecimal 0 through F (if there are duplicates, communications may not be done correctly due to conflicting replies).

The address that was changed appears for 1 second after it is changed.



<Settings mode>



*** Pressing and holding the button on the setting mode selection screen takes you back to measurement mode.**

<Selecting channels in settings mode>

If "CH1" to "CH4" is selected, do the settings for the channel you want.

If "SEQU" is selected, choose channel 1 through channel 4 in order using the button. When you have finished up to channel 4, return to the settings mode selection screen.

If "ALL" is selected, do settings with the same values for all channels 1 through 4. In this case, the current value to be referenced is channel 1.

<Operation flow notation for CH LED and SW LED>

■ : unlit; □ : lit

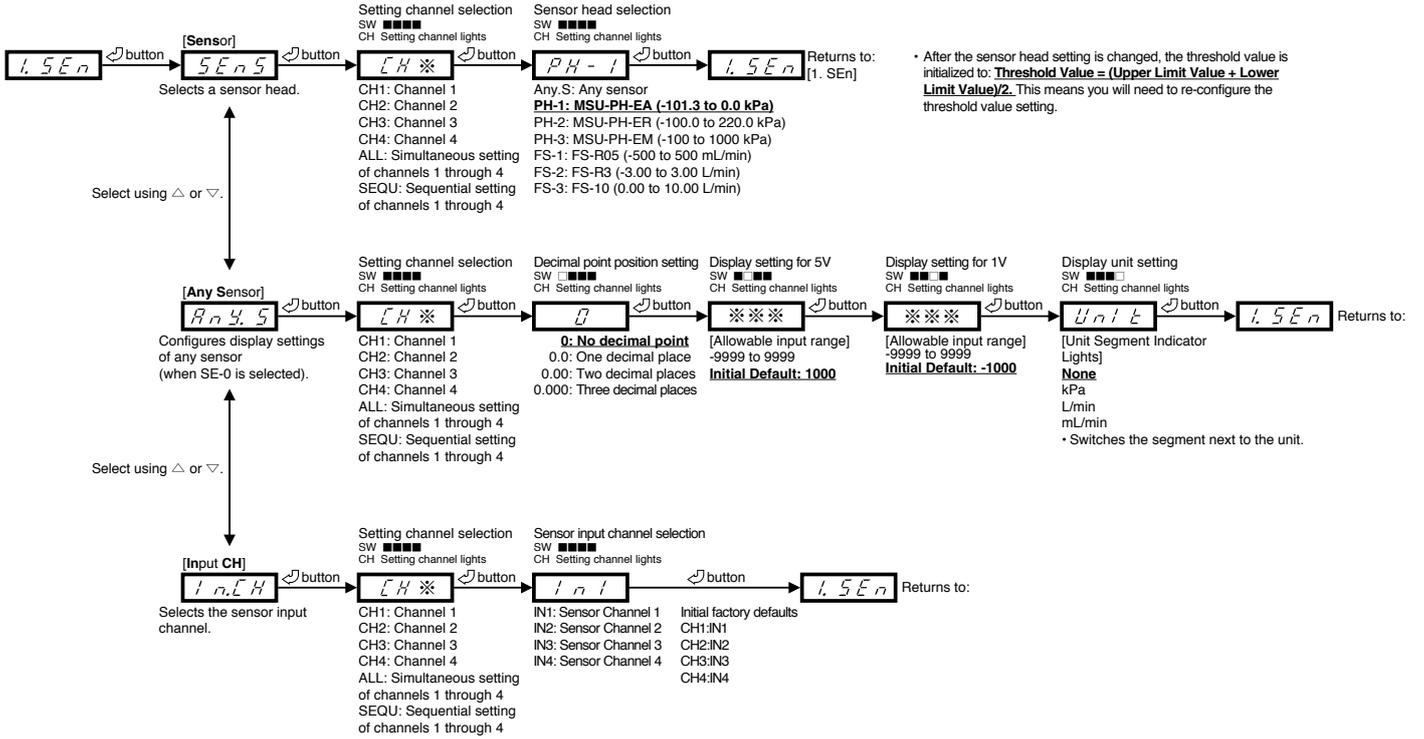
<Settings>

The setting values for the settings of each parameter are set by pressing the button.

When doing settings, pressing and holding the button takes you back to the previous screen.

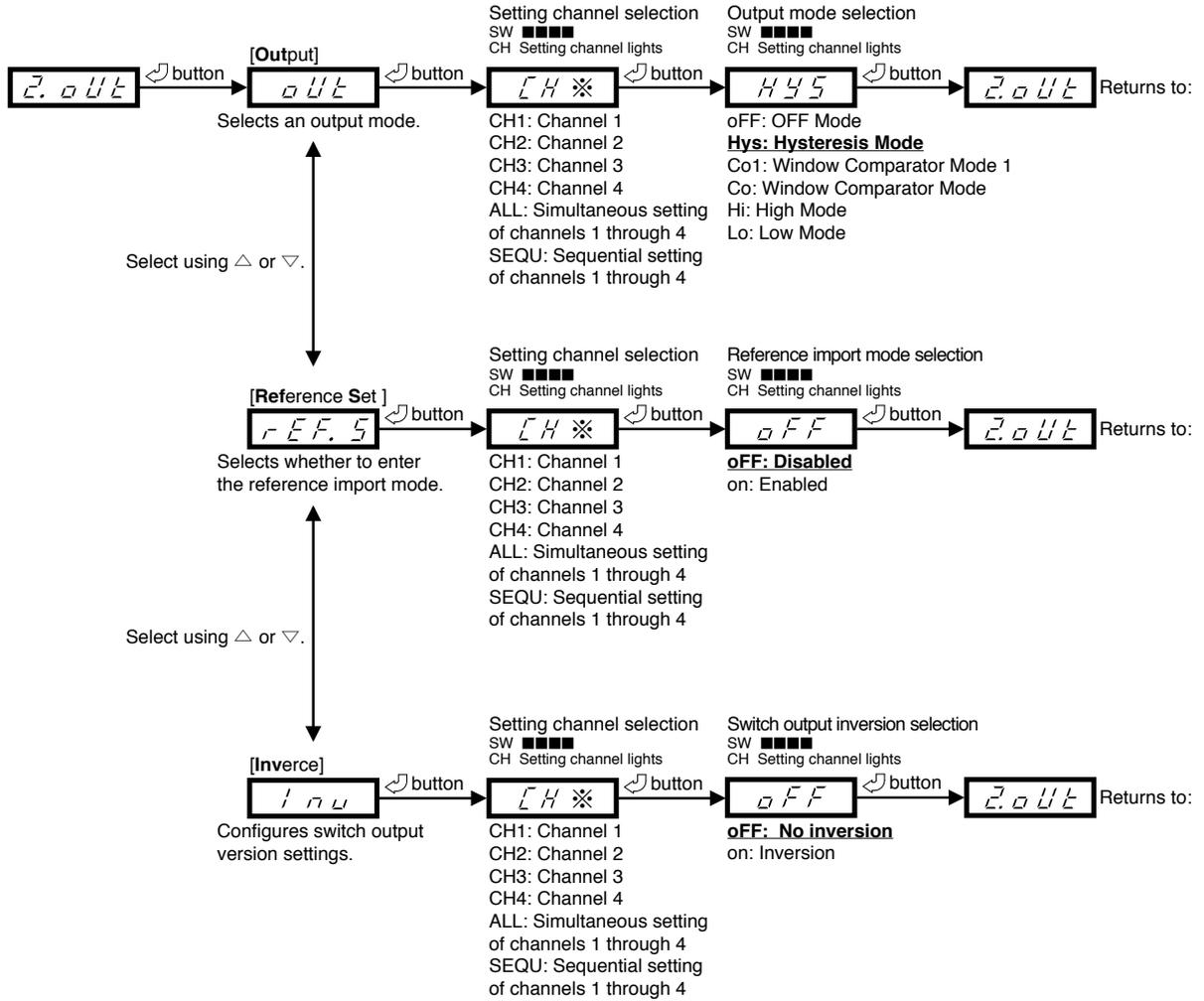
1. Sensor

Sensor head selection and configuration of the settings of any sensor.



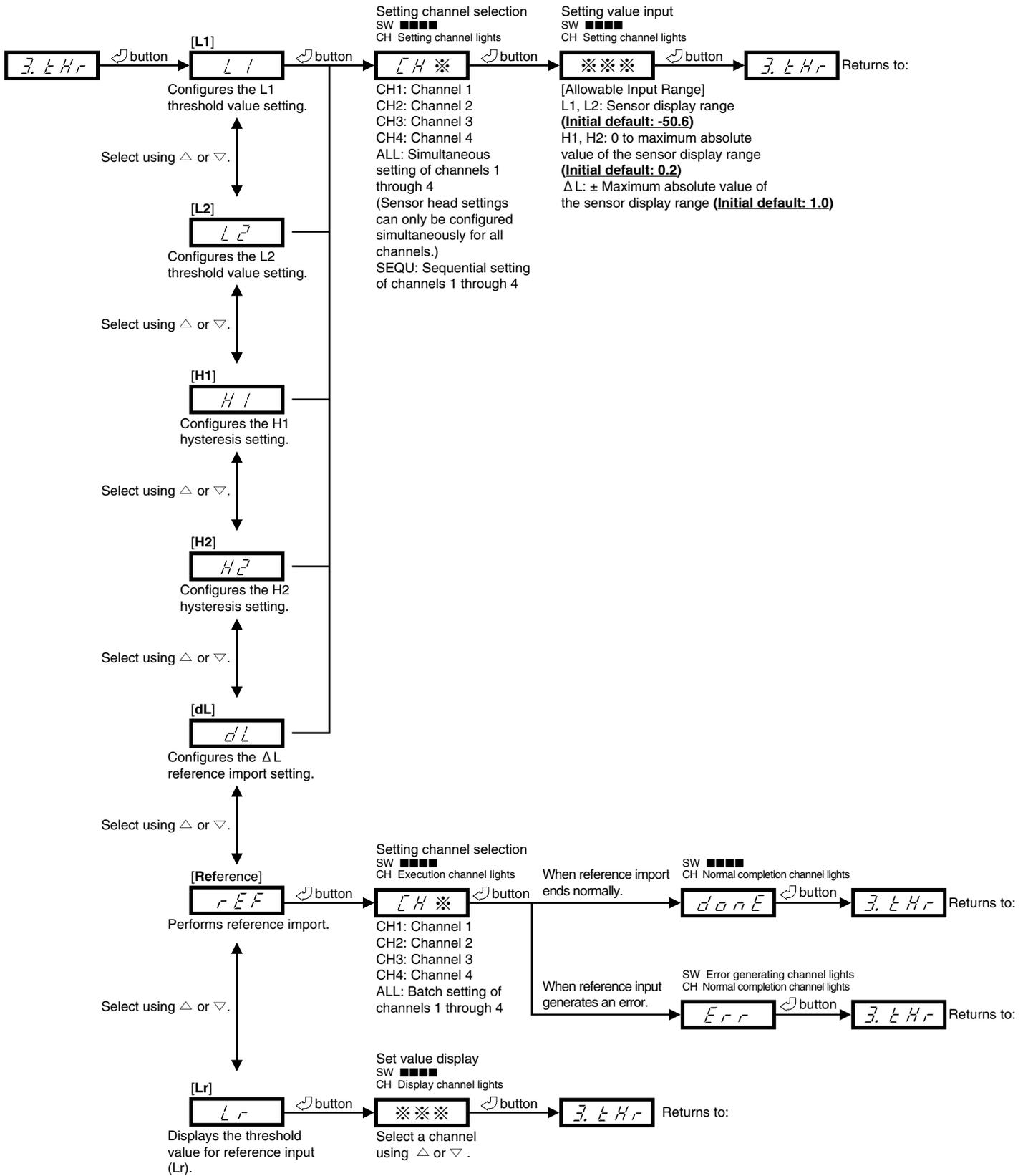
2. Output

Output mode setting, reference import mode setting, output inversion setting



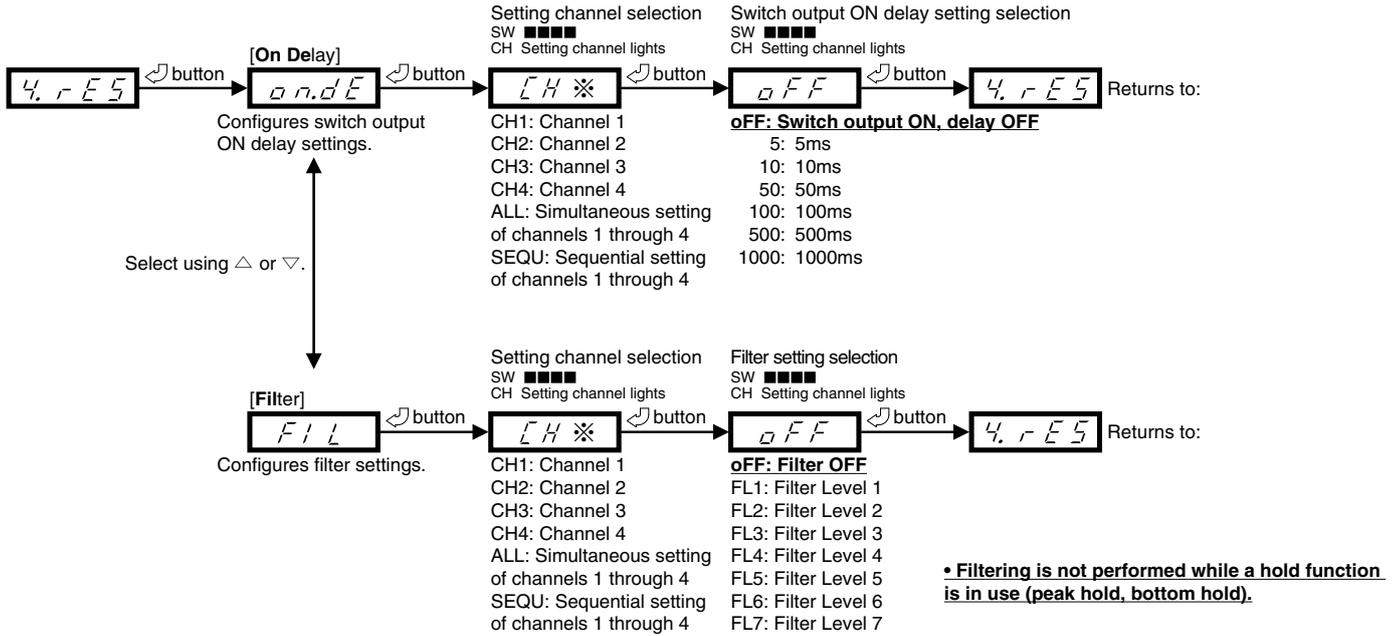
3. Threshold

Threshold (L1, L2) setting, hysteresis (H1, H2) setting, and reference import ΔL setting configuration, and checking of the threshold value for the reference import mode



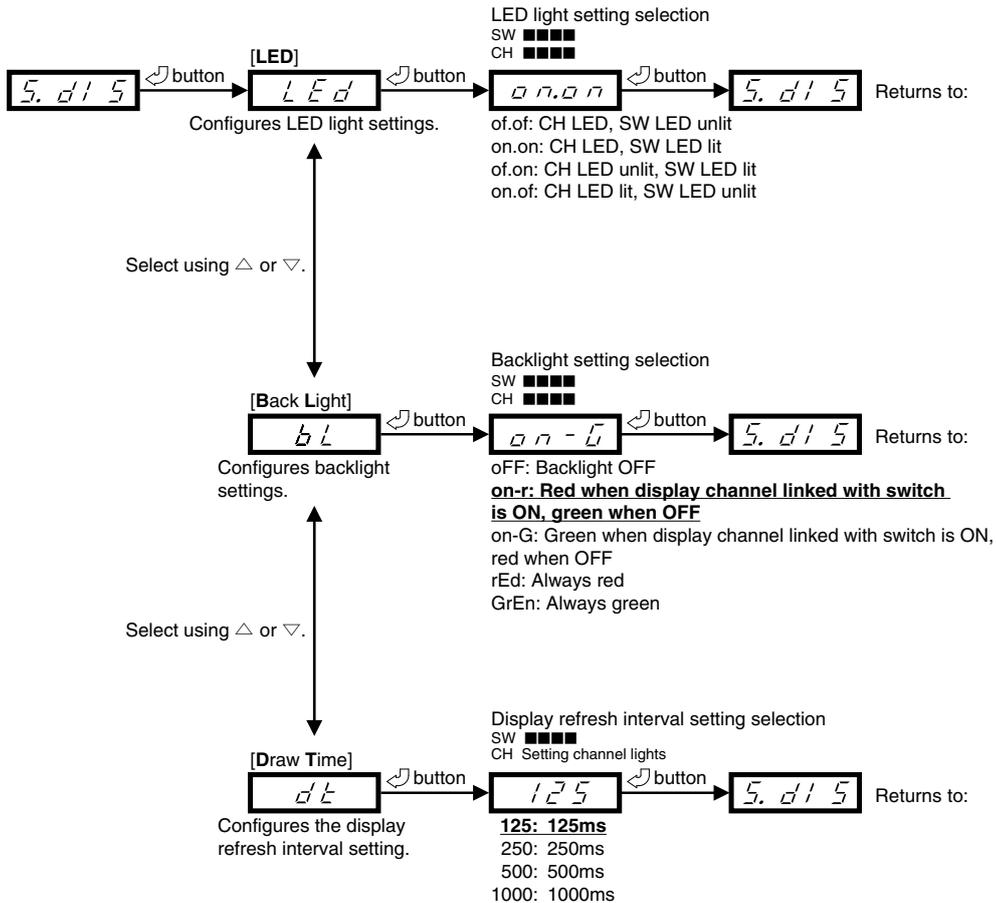
4. Response

Switch output ON delay setting, filter setting



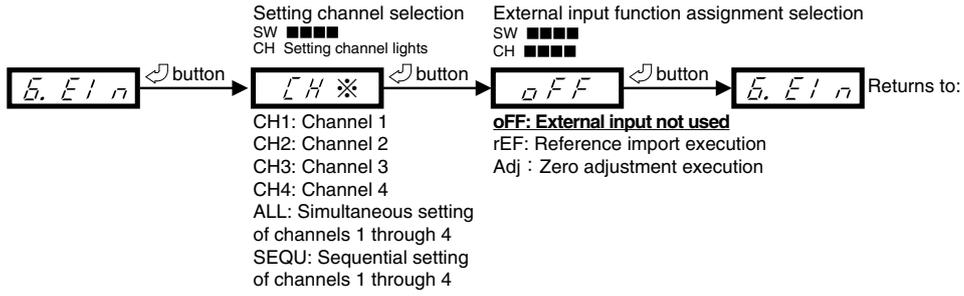
5. Display

LED light setting, backlight setting, display refresh interval setting



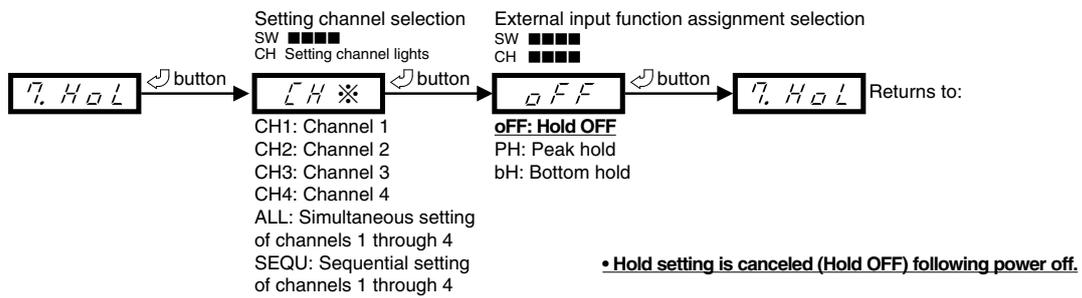
6. External Input

External input function assignment



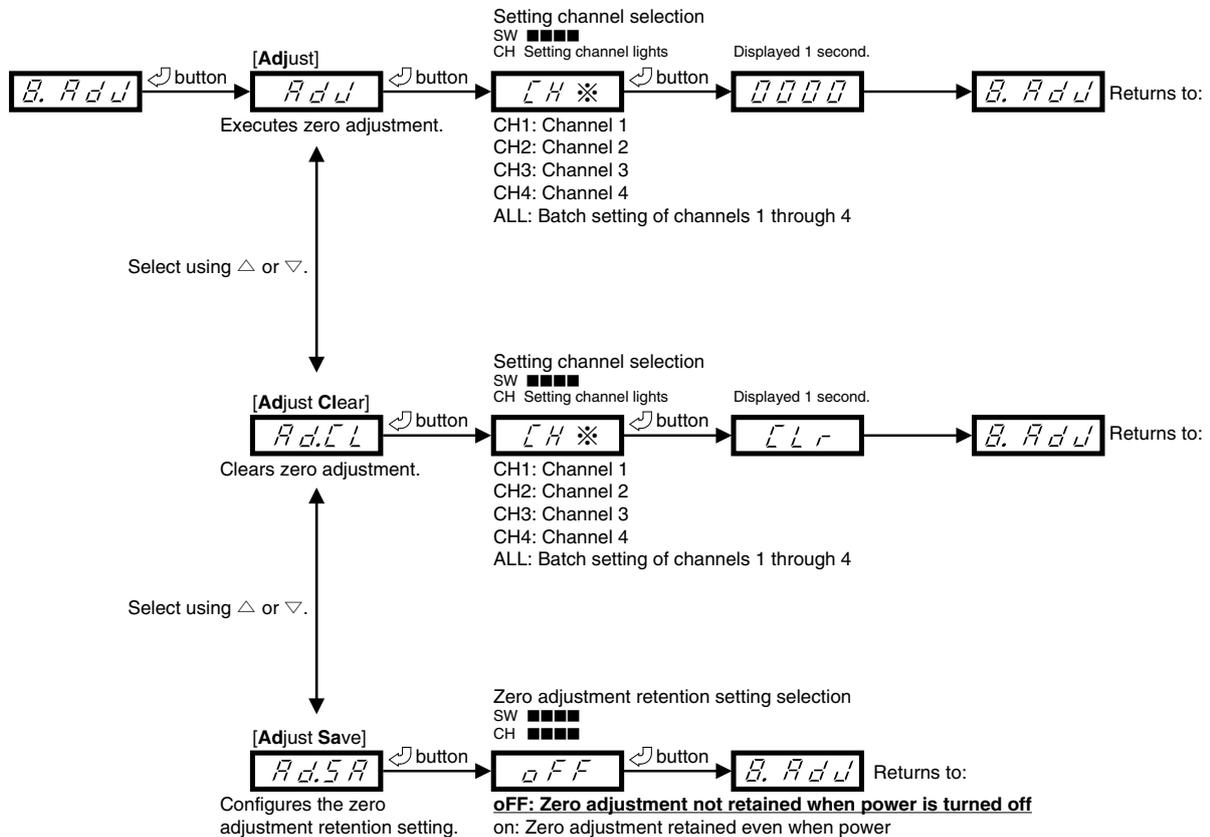
7. Hold

Hold input function assignment



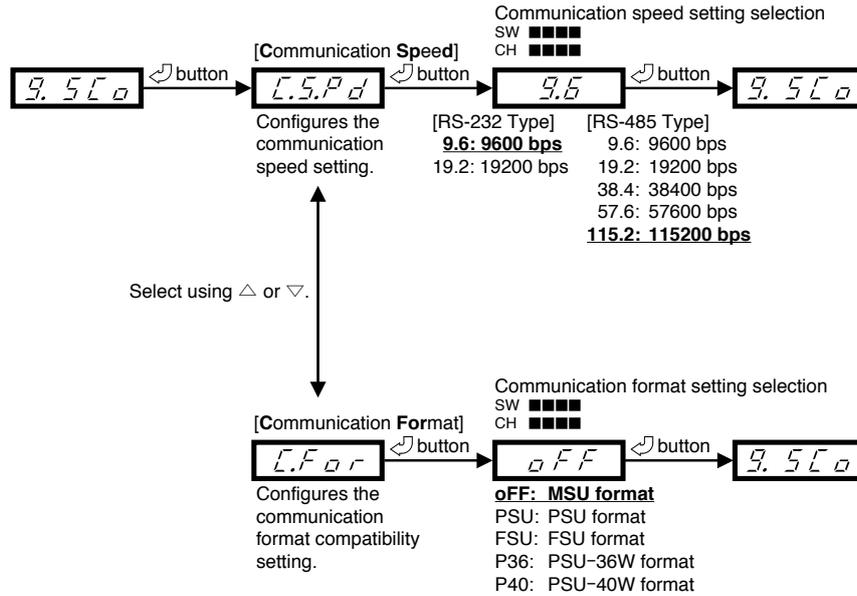
8. Adjust

Zero adjustment execution, zero adjustment clear, zero adjustment retention setting



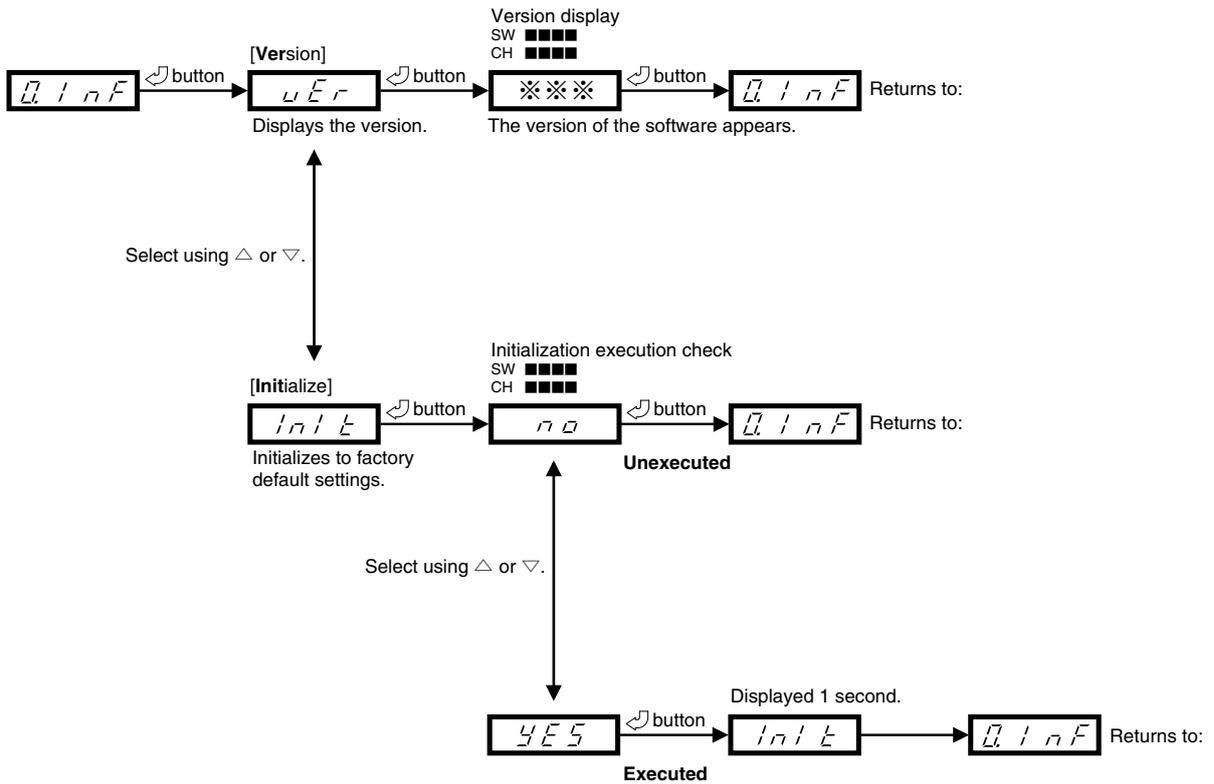
9. Serial Communication - **Serial communication settings can be configured only for a type that has a communication function.**

Communication speed setting, communication compatibility settings (RS-232 Type only)



0. Information

Version check, setting initialization



9. Communications

<Communication specifications>

Product Model Number	MSU-232	MSU-485
Communications standard	RS232C	RS485
Maximum number of connections	1	16
Communication speed <small>*Underlined settings are the factory default</small>	<u>9600</u> , 19200 bps	9600, 19200, 38400, 57600, <u>115200</u> bps
Stop bit	1	
Parity	Odd	
Data bit	8	
Communication data	ASCII	

<Communications format>

Delimiters: , [0x2c]

Newline code: CR [0x0D]

■ RS232 type (MSU-232)

Transmits: @[command], [argument1], [argument2]...[CR]

Receives: [result], [return1], [return2]...[CR]

■ RS485 type (MSU-485)

Transmits: @[address], [command], [argument1], [argument2]...[CR]

Receives: [result], [return1], [return2]...[CR]

address: command destination address when using the RS485 type

command: a signal to do a basic function

argument*: parameter (omitted when no command)

result: outcome (answered as OK: normal or ER: error)

return*: returned values (omitted when there are none)

The English letters for transmission data are case insensitive.

When sending commands in succession, send the next command after receiving a response from the command you sent.

For information on communications settings for PLC, computers, etc., refer to the user's manual for the device or software you are using.

Each setting of a type that has a communication function can also be done with support software. Please download the support software from our website.

10. Troubleshooting

If product operation appears to be abnormal, immediately shut off the power to the main unit, disconnect the connection cable from the main unit's power connection terminal, and check the items in this section. If the abnormal situation continues, it may mean that a breakdown has occurred. Contact the outlet (the agency) at which you purchased the product, or the nearest Koganei service station.



KOGANEI CORPORATION

JUST CONSULT US:

KOGANEI CORPORATION OVERSEAS DEPARTMENT

3-11-28, Midoricho, Koganei-shi, Tokyo, 184-8533, Japan

TEL:+81- 042-383-7271 FAX:+81- 042-383-7276

Website: <http://www.koganei.co.jp>

The specifications or the appearance of this product are subject to change any time without prior notice.