DIGITAL METER

INSTANTANEOUS FLOW INDICATOR

EM30DT Series

Operation Manual

<Complete edition>

Warning Before use, please read this Operation Manual with caution for your safety operation, since this Manual contains important instructions to be surely observed.

① Never use this product in such main loop control systems as medical equipment which has a direct effect on the human lives, space instrumentation, atomic power control machine, marine vessel and the chemical apparatus for the military purpose kept “Export Trade Control ordinance” under control.

② A great attention should be paid not to exceed the rated power supply(24VDC± 10%). The wiring service should be done, after turning off the power supply. Otherwise it may cause malfunction, damage to the devices or fire.

③ Avoid using the device in the following places, where it may cause fire, explosion, danger in life and damage to the device.

- In places, where the corrosive gases and flammable gases occur.
- In places, where water and oil splash and where there are much dust, metal powder and where is too saline.
- In places, where is exposed to the direct rays of the sun and where exceeds the ambient temperature ranging from 0℃ to 55℃.
- In places, where is damp and the condensation of humidity will occur due to the abrupt change of temperature.
- In a place, where vibrates and are given impact shock greatly.
- In places, where is near to such devices which produce a strong electromagnetic noises and high-frequency noises.

Precaution before use (Input/output signal lines)

① Do not connect any noise-generating unit to the sensor driver terminal at ＋12VDC.
② Avoid wiring together with such strong noise sources as power line, relay, electromagnetic valve and solenoid operated valve. Due to the triggers It may cause malfunction.

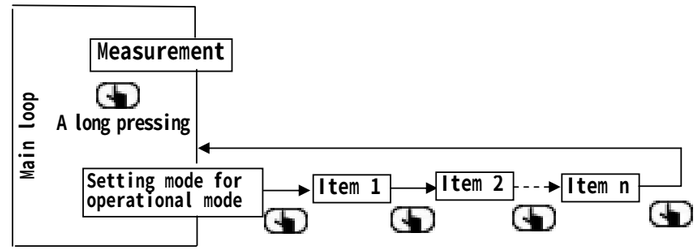
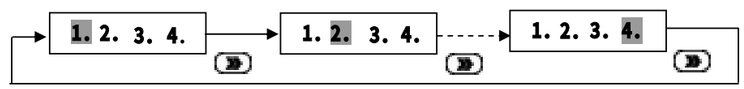
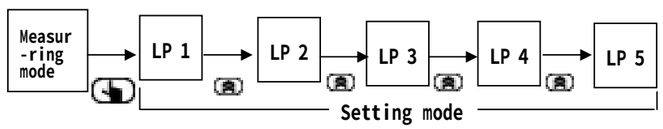
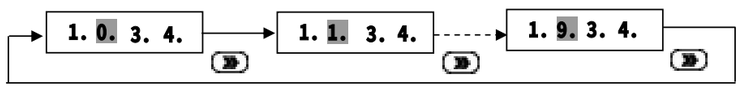
【Main features】

① Digital meter, EM30DT Series can be used for such sensor signal value indications as rotation, circumferential velocity, passing time, speedmeter and the like by means of pulse input.
② Taking advantage of the two staged comparative output functions, it can control the upper/lower limit, lower/lower limit and upper/upper limit controls.
③ It outputs the comparative output at NPN transistor.
④ Taking advantage of the linearizing functions, highly accurate measurement can be made to compensate the nonlinearity in the pulse input.
⑤ Conditional settings necessary for operation can all be made by the key switches on the front panel.
⑥ It is driven at 24VDC(D.C. voltage).
⑦ The driven power source is supplied at 5VDC and at 10mA to the sensor to be externally connected.
⑧ Outside dimensions are 30(H) x 30(W)x 26.2(D) mm, and compactly constructed.

Contents

Explanations for display unit and their operational keys

Names of functional keys	Functional contents
① Display unit of measured values	At the time of measuring: It displays measured values(Instantaneous flowrates), and also displays input signal values and comparative output setting values on a monitor by means of key operations. At the time of setting: It displays setting menus and setting parameters. Others: It displays erroneous messages on hard ware and defective setting.
②Indicator on CP1	At the time of measuring: The indicator lights up, when comparative output is turned on, and also if changed over the display to comparative output setting value monitor, the indicator blinks. At time of setting: Indicator blinks during setting the comparative values and comparative conditions.
③Indicator on CP2	At the time of measuring: The indicator lights up, when comparative output is turned on, and also if changed over the display to comparative output setting value monitor, the indicator blinks. At time of setting: Indicator blinks during setting the comparative values and comparative conditions.

Names of functional keys	Functional contents
④ Mode key	By pressing for a long time(more than 3 seconds) it is change over from the measuring mode to the setting mode, and it also change over the setting item within the setting mode. 
⑤ Shift key	It moves digit of numerical values to be set. After selecting setting contents by key, set it by key. 
⑥ Up key	It changes over the mode within setting mode.  It changes over setting contents and changes numerical values to be set. After selecting setting contents by key, set it by key. Digit to set blinks, when setting numerical values. By depressing key, numerical values which is blinking operates incremental operation. And also it is used for monitoring input signal values  And also it is used for monitoring the input signal values during flow measurement.

Explanation for each parameter

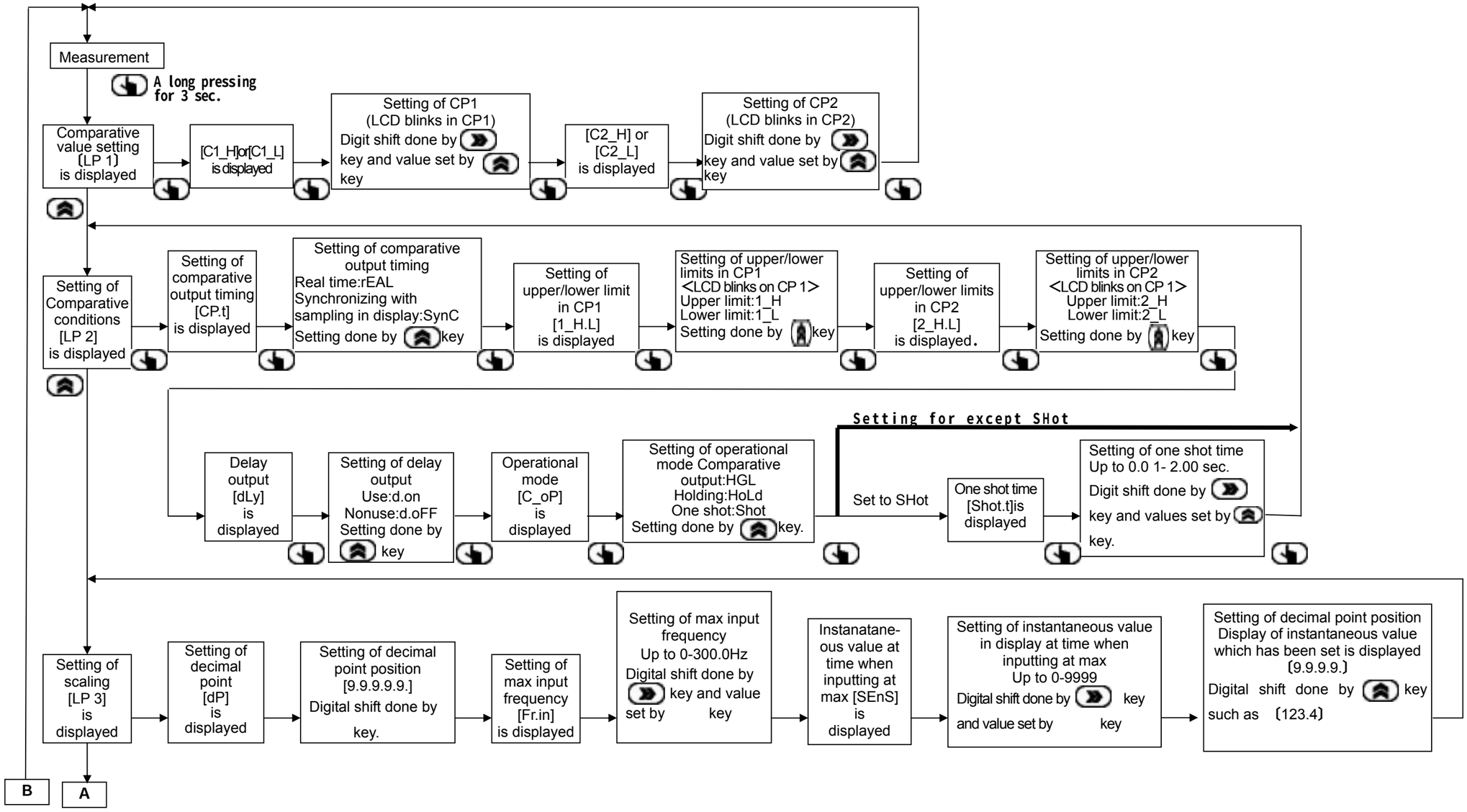
On-screen display	Items	Setting contents	Setting ranges	Initial values
LP 1	Setting of comparative values			
C1__H or L	Setting of comparative values on CP1	It sets values on CP1 in comparative output.	0 - 99999	0010.0
C2__H or L	Setting of comparative values on CP2	It sets values on CP2 in comparative output.	0 - 99999	0090.0
LP 2	Setting of comparative conditions			
CP.t	Setting of timing in comparative output	It selects operational timing in comparative output. r EAL: It outputs by internal measuring timing(0.1 sec.) S y n C: It outputs by synchronizing with display sampling time.	rEAL:Real time SynC:Synchronism	SynC
1__H.L	Setting of upper/lower limits on CP1	It selects operational conditions on CP1 in comparative output. H: Output is turned on, when setting input values ≧ comparative values. L: Output is turned on, when setting input values ≦ comparative values	1__H (Upper limit) 1__L (Lower limit)	1__H
2__H.L	Setting of upper/lower limits on CP2	It selects operational conditions on CP2 in comparative output. H: Output is turned on, when setting input values ≧ comparative values. L: Output is turned on, when setting input values ≦ comparative values	2__H (Upper limit) 2__L (Lower limit)	2__L
dLy	Setting of delay output	It selects use or nonuse of delay output functions. ※ At the time of turning on power, CP1 in comparative output is not outputted, until it has once been turned off, even if power supply has been turned on. Also it operates similarly to CP2 in comparative output.	d. on :Use d. oFF:Nonuse	d. oFF
C__oP	Setting of operational mode	It selects operational mode in comparative output. HGL :It outputs changes of input values to setting values at a real time. HoLd:It holds in a state of turning on the comparative output. SHot:It outputs one shot, when turning on the comparative output.	HGL :Comparative output HoLd:Holding Shot:One shot	HGL
Sht. t	Setting of one shot time	It sets up ON-time of one shot (Pulse signal), when setting Shot to the operational mode.	0.01 - 2.00 sec. (Settable at unit of 0.1 sec.)	0.20

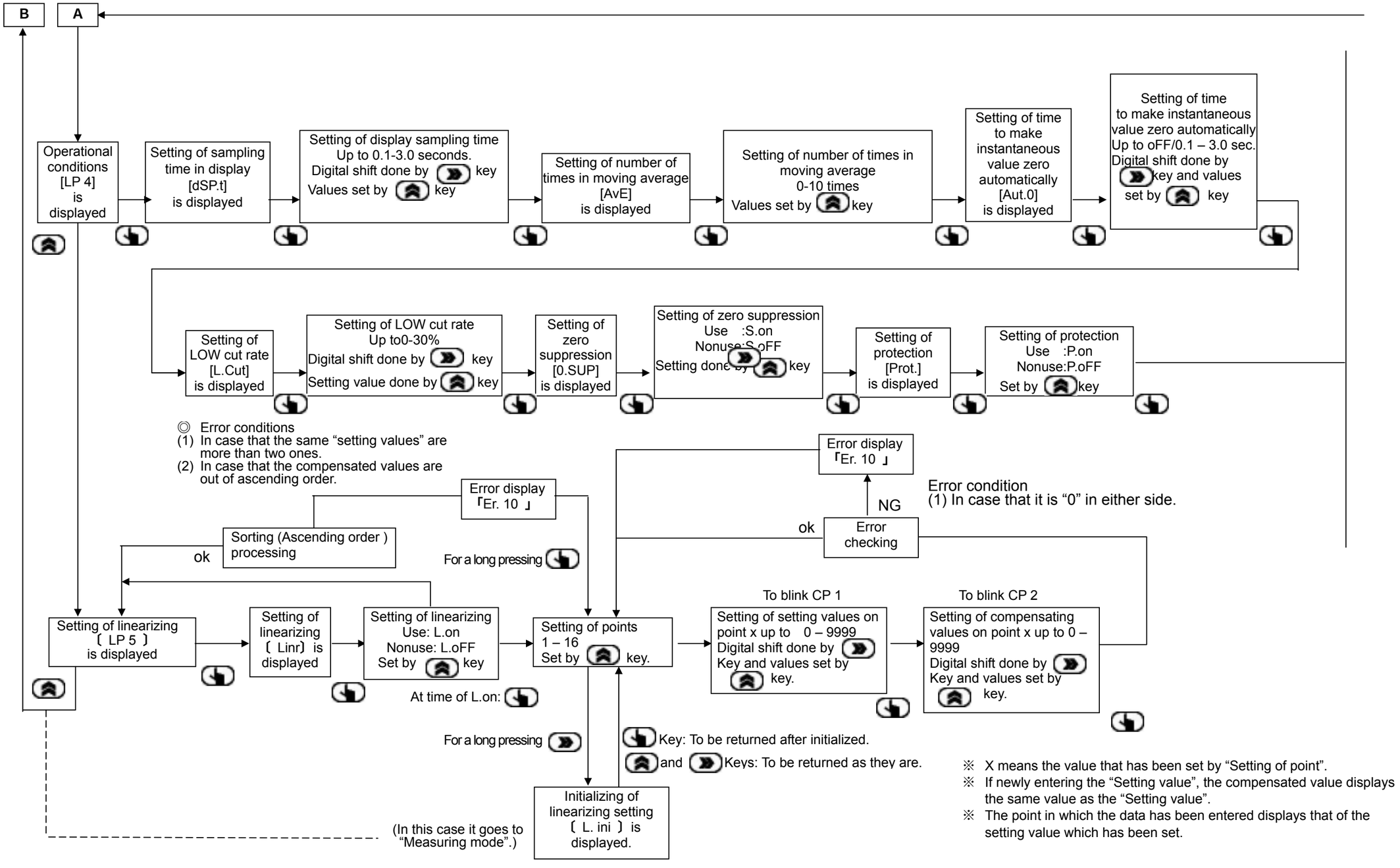
On-screen display	Items	Setting contents	Setting ranges	Initial values
LP 3	Setting of scaling			
dP	Setting of decimal position on display of instantaneous values	It sets decimal point position in display of instantaneous values.	∗.∗.∗.∗.∗.	∗∗∗∗.∗
Fr.in	Setting of max input frequency	It sets max values of pulse frequency to input.	0 - 200.00Hz	100.00
SEnS	Setting of instantaneous value display at the time of inputting at max.	It sets max values in display of instantaneous values. (It sets max instantaneous values to make it display at the time when input signal is at max)	0 - 99999	0100.0
	Setting of decimal position in "Instantaneous value display at the time of inputting at max".	It sets decimal point position in accordance with the rated value of sensor to be used.	∗.∗.∗.∗.∗.	∗∗∗∗.∗
LP 4	Setting of operational conditions			
dSP.t	Setting of display sampling time	It sets the time which updates display contents in instantaneous value display.	0.5 - 3.0sec. (Settable at a unit of 0.1 sec.)	2.0
AvE	Setting of number of times in moving average	It sets number of times of moving average in input signal. ※It functions to restrain from fluctuation of instantaneous value display caused by that of input signal in terms of taking the arithmetic average of past n times and measured values this time.	0 - 10 times (Settable at a unit of once)	10
Aut. 0	Setting of time to make it zero automatically	It sets the time compulsorily to make the instantaneous value display zero, if input signal is not inputted even one pulse within setting time. ※If setting is made oFF and pulse input has been gone out, instantaneous values are not updated and it remains to display a present value, until next pulse is inputted.	oFF／0.5 - 3.0 sec. (Settable at a unit of 0.1 sec.)	1.0
L. Cut	Setting of low cut rate	For "setting of max input frequency" it sets Low cut rate to make input signal less than 0-30% zero.	0 - 30% at F.S. (Settable at a unit of 1 %)	00
0. SUP	Setting of zero suppression	It selects use or nonuse of zero suppression function. The higher-order zero than decimal point in instantaneous value display is not made to display, if setting is made effective.	S.on ：Use S.oFF：Nonuse	S.on
Prot.	Setting of protection	It selects use or nonuse of protection function. If having setting effective, setting data can be confirmed, but not changed.	P.on ：Use P.oFF：Nonuse	P.oFF
LP 5	Setting of linearizing			
Linr	Setting of linearizing	It selects use or nonuse of linearizing function.	L. on : Use L. oFF : Nonuse	L. oFF
	Setting of point setting value	It sets each point of the setting value.	0 - 9999	000.0
	Setting of point compensating value	It sets each point of the compensating value.	0 - 9999	000.0

Setting loop of functions

Press key for three seconds, when moving from measuring mode to setting mode.
For moving of main loop, press the key of and press key to step to each item.

: **Mode key**
: **Shift key**
: **Up key**

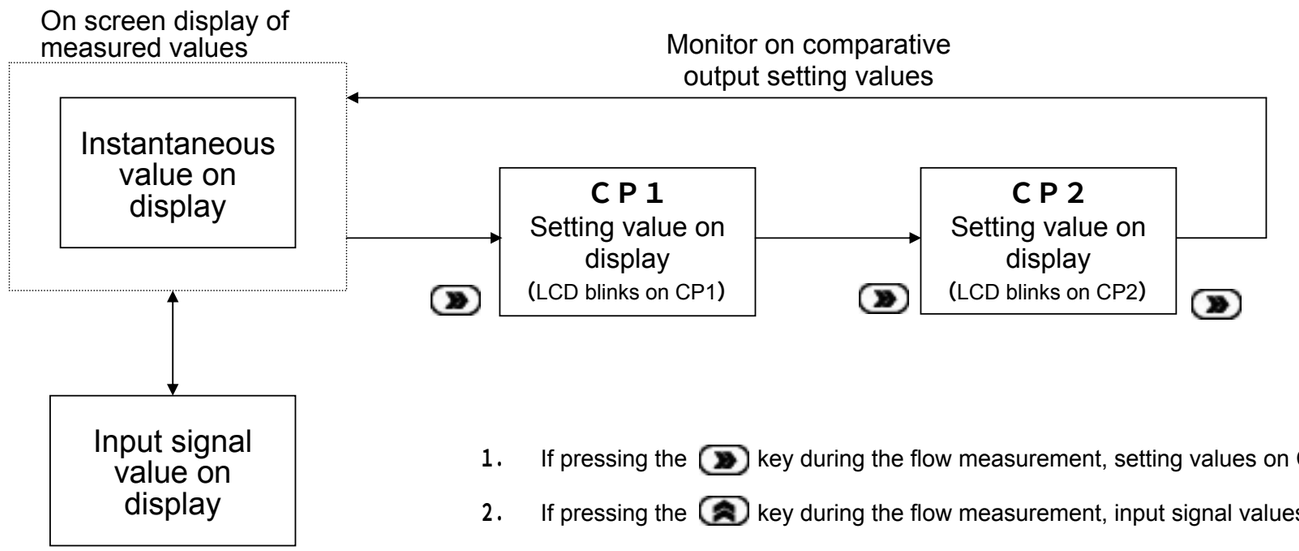




※ X means the value that has been set by “Setting of point”.
※ If newly entering the “Setting value”, the compensated value displays the same value as the “Setting value”.
※ The point in which the data has been entered displays that of the setting value which has been set.

- For changing the setting data, they are updated by pressing key after changed the data on display.
- During the setting mode it stops measuring, but the comparison operation is held.
- As to the linearization
  - Set the “ Setting value” and “Compensated value” at each point.
    - ※ It displays “Er 10”, if it is “0” in either case.
  - In the item of “Setting of point” if pressing key for three seconds, the setting data are sorted in ascending order.
    - ※ If an error occurred at that time, it would display “Er 10”.
      - ◎ Error conditions
      - (1) In case that there has been the same setting value more than two of them.
      - (2) In case that the compensated values are not sorted in ascending order.
    - ※ When the setting values of the point are all “0”, they are returned to “Linearizing setting”.
  - Set more than at least two points, when setting the linearizing. (It displays “Er 10”, when the setting is less than one point.)
  - For the setting values and the compensated values at the last point, set the “Instantaneous value at the time when inputting at max.”.

Overview of screen display and how to change over



1. If pressing the key during the flow measurement, setting values on CP1 and CP2 in comparative output can be monitored.
2. If pressing the key during the flow measurement, input signal values (Pulse signal [Hz]) can be monitored.

※On-screen display returns to the screen of the instantaneous value display automatically, when key operations has been stopped for one minute while representing various kinds of monitor.
※Comparative output always operates, even if it is during the display of various kinds of monitor.

Initialization of the settings

It functions compulsorily to return all the setting contents to a state of initial setting.

1) Hold key and continue to press for more than five seconds in a state of displaying the setting modes such as “LP 1”, “LP 2” and “LP 3”, or “LP 4”.

2) It enters into the initial setting mode, displays “i n i t .” on screen and blinks.

3) If pressing key, all setting parameters return to the initial setting values as shown in a table of the initial setting values right.
If not initializing the settings, press any other key than key, and returns to the setting mode without being initialized.

※ The initial setting values of EM30DT purchased together with a set of our Flowmeter are not applicable to that of contents listed right. If trying to initialize the settings, be sure to make a copy of all parameters that have been set.
The setting values necessary for such scaling as “Setting of max input frequency ” and “Setting of Instantaneous value display at the time when it is at max.” vary with types.

Initial setting values

Setting items	Contents
Setting of comparative values on CP1	001.0
Setting of comparative values on CP2	009.0
Setting of comparative output timing	S y n C
Setting of upper/lower limits on CP1	H
Setting of upper/lower limits on CP2	L
Setting of delay output	o F F
Setting of operation mode	H G L
Setting of one shot time	0.20[second]
Setting of decimal position in instantaneous values display	＊＊＊.＊
Setting of max input frequency	100.0[Hz]
Setting of instantaneous value display at the time when inputting at max.	100.0 (100.0L/min)
Setting of decimal position in the “Setting of Instantaneous value display at the time when inputting at max.”	＊＊＊.＊
Setting of display sampling time	2.0[seconds]
Setting of number of times in moving average	10[times]
Setting of time automatically to zero	1.0 [second]
Setting of Low cut rate	00[%]
Setting of zero suppression	o n
Setting of protection	o F F
Setting of linearizing	o F F
Setting of point setting value (16 points)	000.0
Setting of point compensating value (16 points)	000.0

How to set scaling

Setting of instantaneous value display at the time of inputting at max. ： 10 is to be set when using a flowmeter whose max flowrate is 10 L/min.
Setting of max input frequency ： Pulse frequency obtained from a flowmeter whose max flowrate is 10 L/min is to be set.

To set the contents described above

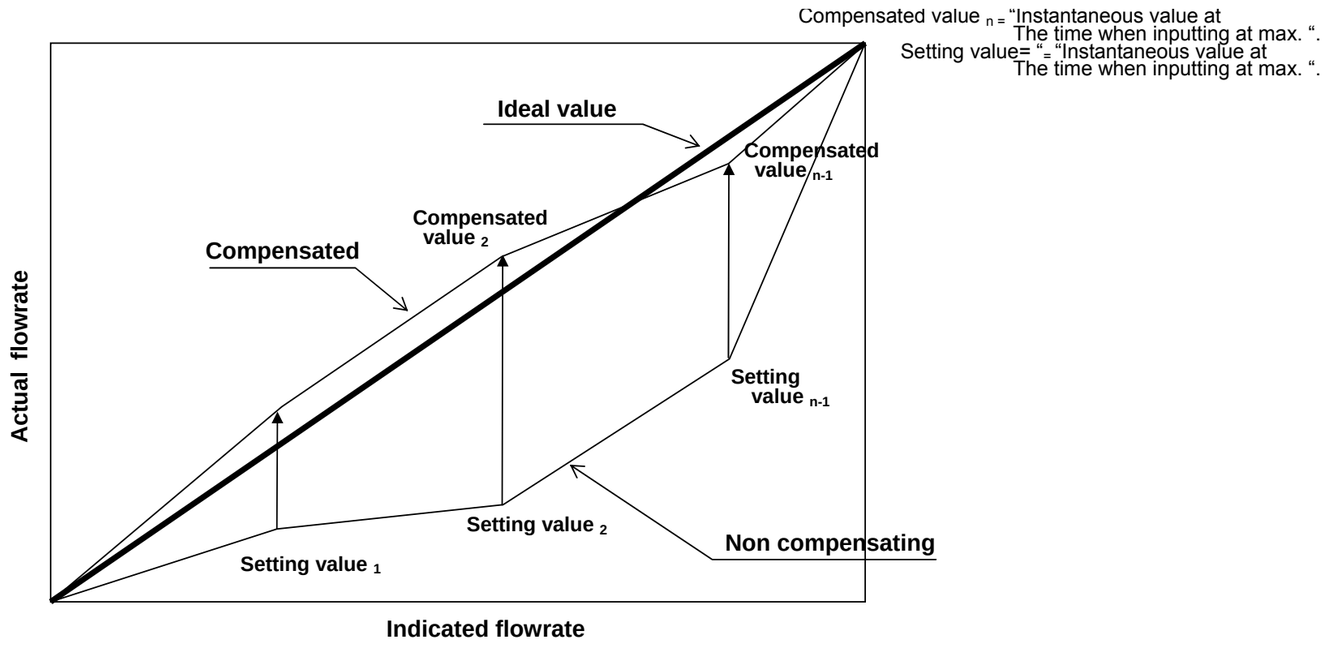
Scaling functions	Instantaneous values display are scaled at the setting values whose input signal has been set in the “Setting of instantaneous value display at time when inputting at max” Input corresponding to max ones is the value that has been set in the “Setting of max input frequency”. ● Values on display $\text{Values on display} = \frac{\text{Input signal frequency}}{\text{“Setting of max. input frequency”}} \times \text{“Setting of instantaneous value display at the time of inputting at max.”}$ Instantaneous value display is expressed in terms of L/min. When setting the scaling value in terms of “Setting of instantaneous value display at the time of inputting at max”, the decimal point position is also to be set in accordance with rating value of sensor to be used.
instantaneous value display functions	The instantaneous value display is the one that has been made a scaling by the scaling values (Values set by the “Setting of instantaneous value display at the time of inputting at max”) which have been set for the signal input whose measuring signal input pins are currently impressed ●Position of decimal point is displayed by the decimal place where has been set at “Setting of decimal point place in displayed value”. (It is settable independently of decimal point place set at “Setting of decimal point place in instantaneous value display at the time of inputting at max”) ● Display contents are updated by the time which have been set at “Setting of display sampling time”. ● “Zero” display higher than decimal point place is not displayed, when “Setting of zero suppression” is signified. ● The unit of instantaneous value display is expressed in terms of “L/min”. ● Instantaneous value display blinks, when input signal and digit of instantaneous value display have been overflowed.

On-screen display	Key operations	Explanatory comments
Measured value display		When screen of measuring value display appears, press key for more than three sec.
L P 1		Comparative value setting screen is appeared. Press key to go to next setting screen.
L P 2		Comparative conditions setting screen is appeared. Press key to go to next setting screen.
L P 3		Scaling setting screen appeared. Press key to go to the detailed setting screen for scaling.
d P		“Setting of decimal point position in instantaneous value display” is appeared. Press key to go to setting screen of decimal point position.
999.9		Decimal point position moves, every time key is pressed. Press key to update the settings and to go to next setting screen.
F r . i n		“Setting of max input frequency” is appeared. Press key to go to numerical value setting screen.
100.0		Blinking digit moves, every time key is pressed, and also numerical value of blinking digit runs incremental operation, every time key is pressed. Press key to update the settings and to go to next setting screen.
S E n S		“Setting of instantaneous value display at the time of inputting at max” is appeared. Press key to go to numerical value setting screen.
100.0		Blinking digit moves, every time key is pressed, and also numerical value of blinking digit runs incremental operation, every time key is pressed. Press key to update the settings and to go to next setting screen of decimal point position in “Setting of instantaneous value display at the time of inputting at max”.
100.0		Decimal point position moves, every time key is pressed. Press key to update and go to next setting screen.
L P 3		Scaling setting screen is appeared. Press key to go to next setting screen.

Linearizing functions

Linearizing fuction is a function which compensates the nonlinearity.

- It sets the “setting value” and the “compensated value” for the “setting value”.
- The numbers of the point to be set are 16 points at max..
- It is settable to any point at random.(When setting, sorting is made in ascending order.)



L P 1		Comparative value setting screen is appeared. Press key to go to next setting screen.
L P 2		Comparative conditions setting screen is appeared. Press key to go to next setting screen.
L P 3		Scaling setting screen appeared. Press key to go to next setting screen.
L P 4		“Setting of operational condition setting screen is appeared. Press key to go to next setting screen.
L P 5		Linearizing setting screen is appeared. Press key to go to the detailed setting screen of linearizing.
L i n r		“Setting of linearizing” is appeared. Press key to go to ON/OFF setting screen.
L. o F F		ON/OFF switches over, every time key is pressed, and sets the display to “L. On”. Press key to update the settings and to go to next point setting screen.
1		Numerical values run incremental operation, every time key is pressed. Select No chosen for setting point. Press key to update the settings and to go to next point setting screen. Also here in this loop, if key is longly pressed (For more than three sec.), it moves to the linearizing setting screen (Display: LP5). **(※1)**
000.0		Blinking digit moves, every time key is pressed, and also numerical value of blinking digit runs incremental operation, every time key is pressed. Press key to update the settings and to go to next setting screen of “Point compensated value”.
000.0		Blinking digit moves, every time key is pressed, and also numerical value of blinking digit runs incremental operation, every time key is pressed. Press key to update the settings and to return to point setting screen. **(※2)**
L P 5		Linearizing setting screen is appeared. Press key to go to measured value display screen.

※ **1:** In this time it is necessary to sort the date on the “setting values” in ascending order, and in the following cases the error display “E r 10” is appeared, and goes to the point setting screen.

(1) In case that there has been the same setting value more than two pieces.

(2) In case that the compensated values are not in ascending order.

※ **2:** In this time if it is “0” either in the “setting value” or in the “compensated value”, error display “Er10” is appeared and both the numerical values are made to “0” and goes to the point setting screen.

How to awake HoLd(Holding) operation in comparative output

1） Hold key and continue to press for more than five seconds in a state of the measured values display screen (Instantaneous value display screen).
※ The setting of operation mode “C_oP” is effective for the time when it is “HoLd”.

2） It enters into the comparative output awaking mode, displays “CP. rE” on screen and blinks.
3） Press key to awake the holding (ON) status in the comparative output. If not awoken, press any other key than key to return to the measured value display screen (Instantaneous value display screen) without awaking the holding status.

Overflow display function

If the signal whose measuring signal input pin is impressed exceeded input ranges(Pulse input：300Hz), or if instantaneous value display exceeded a possible display digit, instantaneous value display which is currently displayed blinks and shows overflow, even if at the time when overflowing, however, the measured values are displayed within a possibly measurable ranges (Approx 10% of span area).

Error display function

When error occurred, error number is displayed and blinks on the measuring value display screen (Instantaneous value display screen).

Error No.	Contents	Countermeasures and their actions to take
Er01	Mask ROM memory error	MPU is out of order. It is necessary to repair hardware.
Er02	Backup memory error	Backup of EEPROM is out of order. It is necessary to repair hardware.
Er10	Setting error at set values	Erroneous setting values are inputted. Press key and retype parameters.

Setting of comparative output operation and characteristics of output patterns

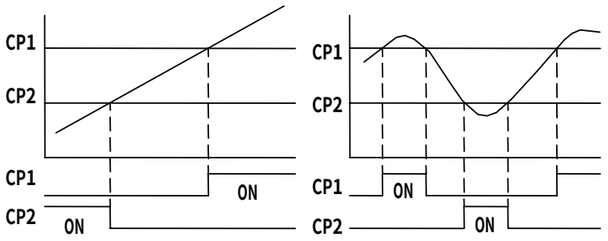
Setting of comparative conditions

A	Setting of comparative output timing	rEAL	Sync	
B	Setting of upper/lower limits on CP1	H	L	
C	Setting of upper/lower limits on CP2	H	L	
D	Setting of delay output	on	oFF	
E	Setting of operation mode	HGL <Comparative output>	HoLd <Holding>	SHot <One shot output>
F	Setting of one shot time	Up to 0.01-2.00 seconds		

Examples setting for comparative condition operations

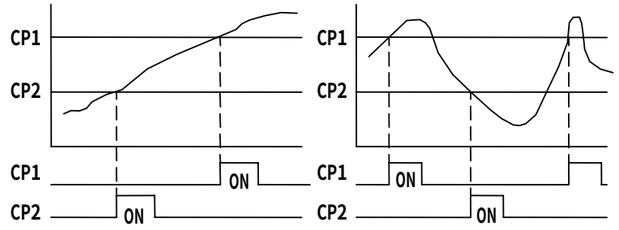
	Pattern 1	Pattern 2	Pattern 3	Pattern 4	Pattern 5	Pattern 6
Setting A	rEAL	rEAL	rEAL	rEAL	rEAL	rEAL
B	H	H	H	H	L	H
C	L	H	L	L	L	L
D	oFF	oFF	oFF	oN	oN	oFF
E	HGL	Shot	SHot	HGL	HGL	HoLd
F	—	0.2	0.2	—	—	—

Comparative output operation



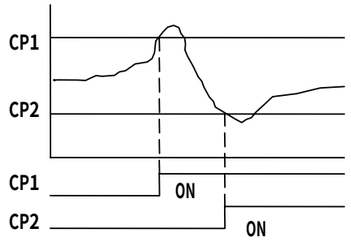
(Pattern 1)

One shot operation



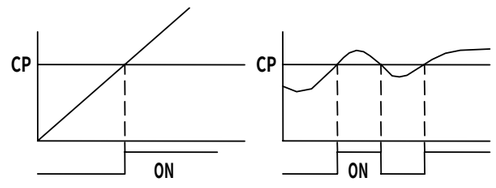
(Pattern 2) (Pattern 3)

Holding operation



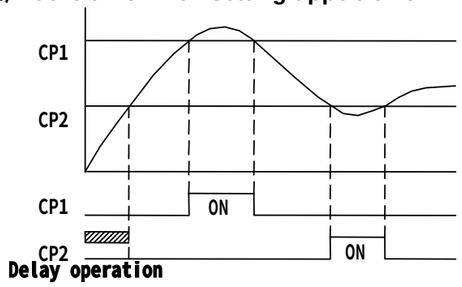
(Pattern 6)

1) At the time when setting upper limit



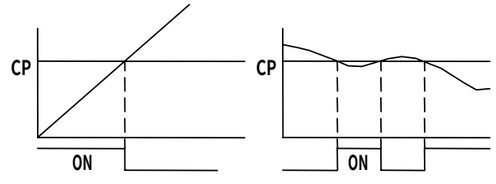
Delay operation

1) At the time when setting upper/lower limits

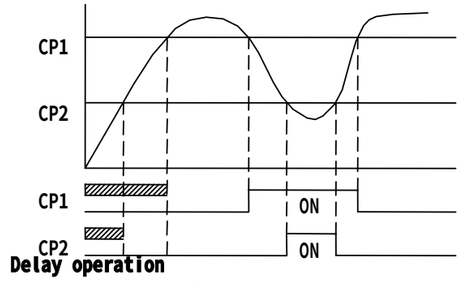


(Pattern 4)

2) At the time when setting lower limit

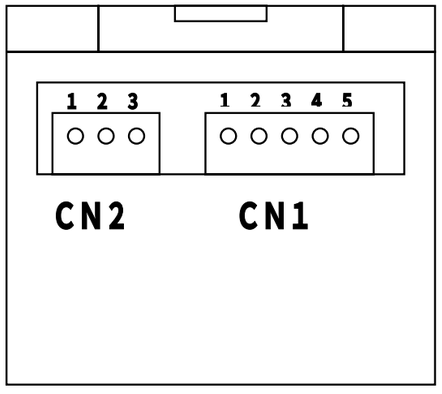


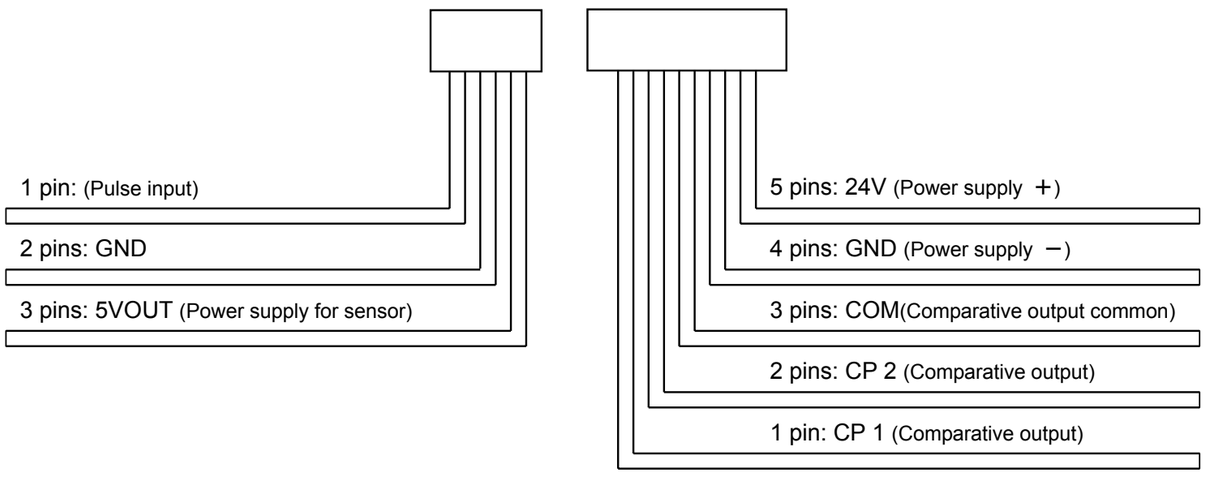
2) At the time when setting lower/lower limits



(Pattern 5)

Explanation for external input/output pins





CN 1: Applicable connector
Made by J.S.T. Mfg. Co., Ltd.
Housing: PHR-5
Contact: SPH-002T-P0. 5S
Applicable wire: AWG30 – 24
Wire coating diameter: Φ0.9 – 1.5

CN 2: Applicable connector
Made by J.S.T. Mfg. Co., Ltd.
Housing: PHR-3
Contact: SPH-002T-P0. 5S
Applicable wire: AWG30 – 24
Wire coating diameter: Φ0.9 – 1.5

CN 1

Pin No.	Names of signals	Standard cable colors	Functional contents
1	CP 1	Yellow	It is a comparative output pin on CP 1. It will turned ON, when the conditions which have been set on CP 1 are satisfied.
2	CP 2	Green	It is a comparative output pin on CP 2. It will turned ON, when the conditions which have been set on CP 2 are satisfied.
3	COM	White	It is a common pin to CP 1 and CP 2.
4	GND	Black	It is a power supply pin. It supplies with power supply for driving from outside. Connection is made to “0V” of power source.
5	24V	Red	It is a power supply pin. It supplies with power supply for driving from outside. Connection is made to “＋24V” of power source.

CN 2

Pin No.	Names of signals	Functional contents
1	IN	It is a input pin for pulse signal.
2	GND	It is a common pin to pulse signal and power supply for sensor.
3	5VOUT	It is an output pin for sensor at ＋5V.

How to connect wires

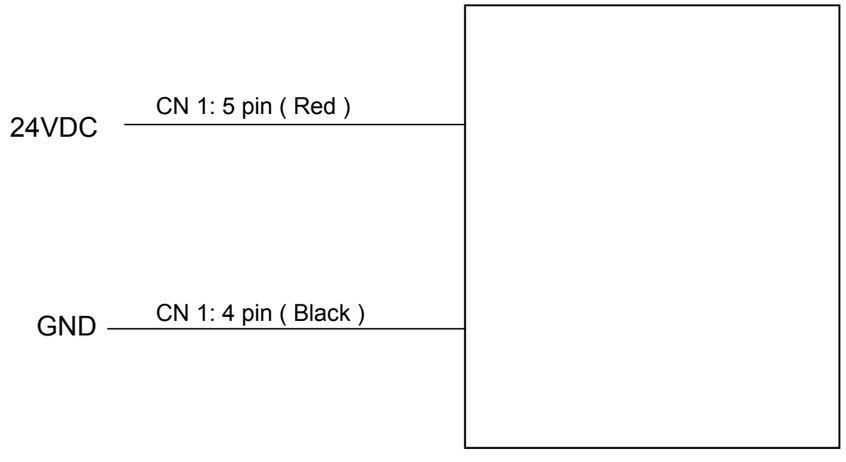
Caution

Wiring should be done under the condition that power source has been securely turned off. If not, it may cause damage to devices.

- Avoid wiring together with such power line and power supply line.
- The device is not constructed in water proofing. Avoid using in a place where splashes water.

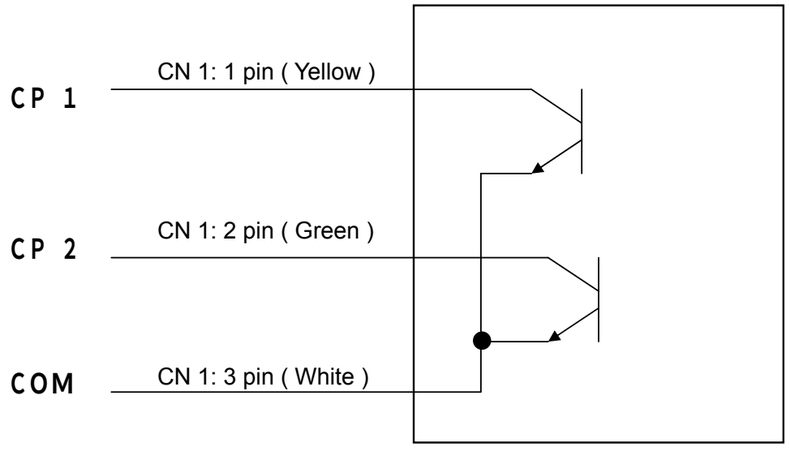
1. Power supply

No. 5 and No. 4 pins in CN 1 are to be connected to power supply.
Use it within 24VDC±10% of voltage and use the power supply which does not produce as few noises as possible.



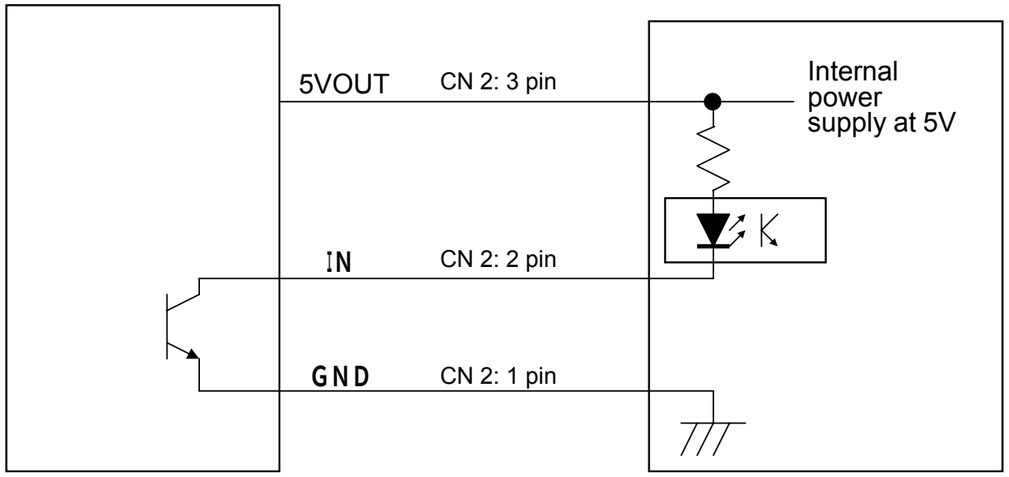
2. Comparative output

No.1 and No. 3 pins in CN 1 are to be connected to CP 1.
No. 2 and No. 3 pins in CN 1 are to be connected to CP 2.
Maximum voltage is 35V which can be impressed to comparative output, and in no event should current be used in the range that does not exceed 100mA. (Vol 2.0V)



3. Connecting sensor

No. 3 and No. 1 pins in CN 2 are to be connected to power supply for sensor.
Voltage is 5V±10% and current capacity is 10mA at maximum, and do not connect any load exceeding 10mA.



Specifications

1. Measuring input

Items	Conditions	Specifications
Input form	—	Single end input (Isolated from power supply)
Pulse input	—	Driven by open collector output devices Input response frequency 0 - 300Hz(duty50%)
Allowable excessive input	—	DC35V
Pulse measuring form	—	Periodic measuring form
Periodic measuring sampling	—	0.1 sec. (Sampling time is put off in lower frequency due to input frequency)
Scaling form	—	Digital scaling form In terms of “Setting of max input frequency” and “Setting of instantaneous value display at the time of inputting at max”.
Max input frequency	—	Setting ranges：0-300Hz
Number of times in moving average	—	Setting ranges：0 – 10 times
Instantaneous value Measurement	Ta＝+23℃±5℃ 35-85%RH,Setting of scaling for one year (9999)	±0.05% of F.S.+1digit
Instantaneous value temperature drift	Ta＝0 - +50℃	±100ppm of F.S./℃

2. Display

Items	Conditions	Specifications
Instantaneous flowrate display	—	Four digits are displayed Character height:8 ㎜ by red LCD display
Comparative output display	Two staged display	LCD displays when turning on comparative output. Character in CP 1 and CP 2 displays
Display sampling time	—	Setting ranges：0.1 - 3.0 sec.
Decimal position in Instantaneous value display	—	Setting position：*.*.*.*.*.
Overflow display	—	LCD blinks in instantaneous value display
_Zero suppression	—	Zero suppression is made in higher digit than that of decimal point.

3. Comparison

Items	Conditions	Specifications
Comparative operation	—	(Upper/upper limit, upper/lower limits and lower/lower limits)
Setting of comparative value	Two staged setting	Setting ranges：0 – 9999
Comparative output	—	Transistor NPN open collector output Output impressed voltage：Below 35VDC Sink current：Below 100mA(Vol=2.0V)

4. Functions

Items	Conditions	Specifications
Guarantee against power failure	EEPROM	Backup of each setting data Writable number of times：Approx one million times Storage life：Approx 10 years
LOW cut rate	—	Setting ranges：0-30% at F.S.
Input signal monitoring function	—	Displayed at raw value of signal input
Comparative output monitoring function	—	Selecting display from setting values in CP1 and CP2 in comparative output
Protective function	—	Selectable setting from protection of setting values.
Linearizing function	—	Input in terms of the setting value and the compensated value Number of inputs: 16 points at max.

5. Power supply for sensor

Items	Conditions	Specifications
Output voltage	Ta=+23℃±5℃	5VDC±10%
Output current	—	10mA max

6. Service power supply

Items	Conditions	Specifications
Voltage	—	24VDC±10%
Current	—	Approx. 90mA at max. (Inrush current: Less than 180mA)

(Power supply line is not isolated.)

7. Environment

Items	Conditions	Specifications
Operating temperature	—	0 - +55℃
Operating relative humidity	—	35 - 85%RH (Non condensing)
Storage temperature	—	-20 - +70℃

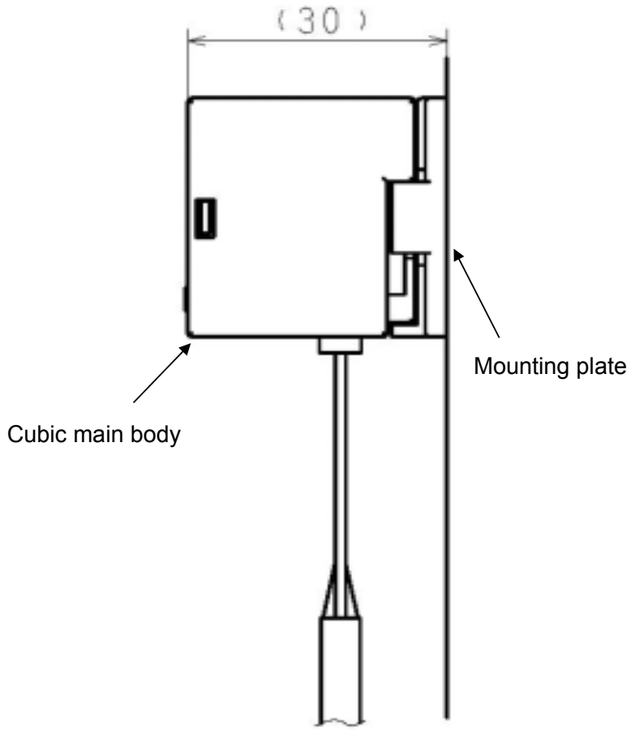
8. Miscellaneous

Items	Conditions	Specifications
Noise resistance (Impulse)	24VDC VS 0V Power supply VS Panel Panel VS SCOM	Power supply line：800V (Power supply noise in normal mode) Common mode：600V (Power supply noise in common mode) Common mode：600V(Common mode noise)
Withstand voltage	Power supply VS Alarm output Live part on block VS Case	500VAC ・ for one minute
Insulating resistance	Power supply VS Alarm output Live part on block VS Case	Measured at 500VDC megger. 20MΩ and more
Withstand vibration	—	Number of vibrations：10～55Hz、Double amplitude：1.5mm X,Y,Z each direction for 2 hours、Sweep time： For one minute (In terms of JIS-C0911-1984)
Withstand shock	—	Strength of shock：294m/s^2(Approx 30G) Duration of shock pulse：11ms X,Y,Z six directions for 3 times (JIS-C0912-1984)
Outside dimensions	—	30H×30W×approx 26.2D(mm)
Weight	—	Approx 20g
Case	—	Made of plastic molding

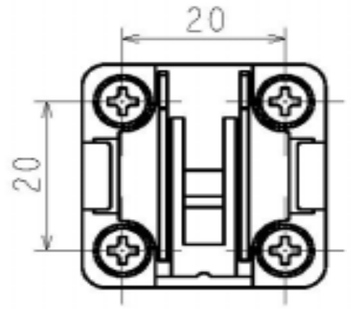
Explanation for mounting plate

1. To begin with

● Assembling drawing

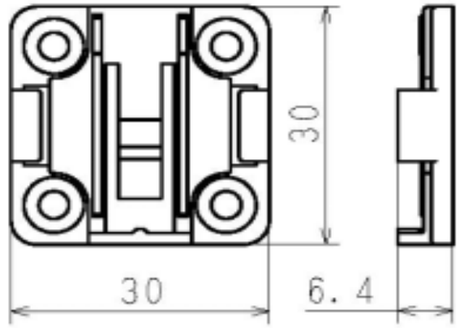


● **Mounting screw thread pitch**

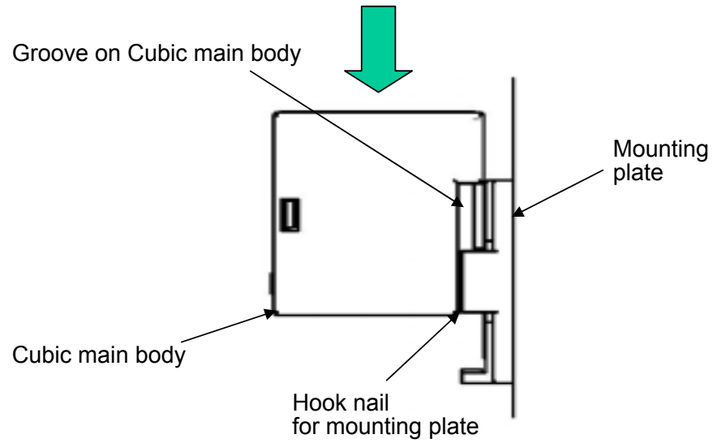


Recommended screw: Countersink tapping screw
(M3 class 2nd with groove)

● **Mounting plate**



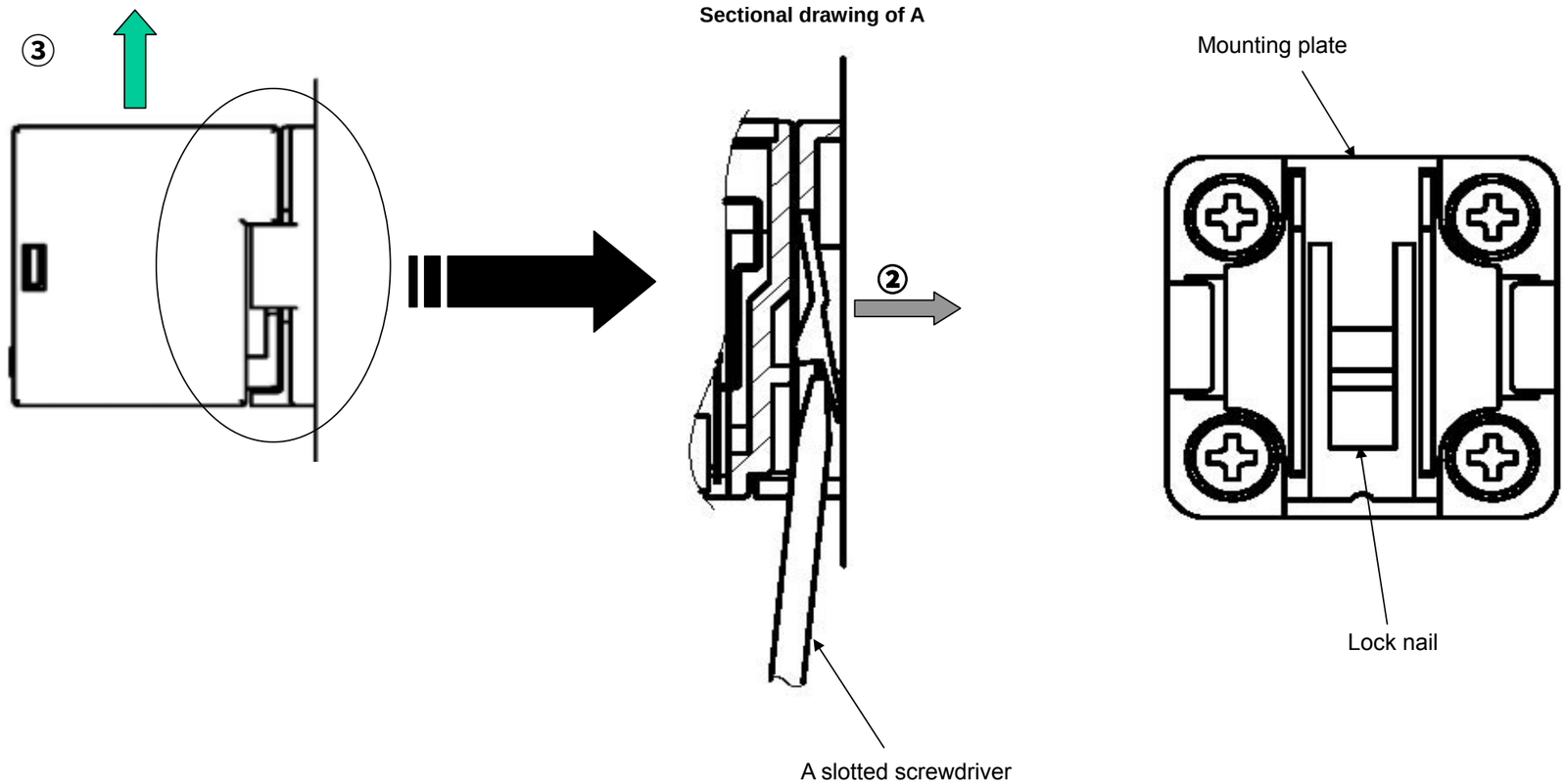
2. How to mount



① Secure the mounting plate with screws.
② Fit the mounting plate so as to enter the hook nail into the groove at the back of the Cubic main body.
③ Push the Cubic main body into the place until it clicks and stops.
④ Connect the connector and cable, etc..

2. How to dismount

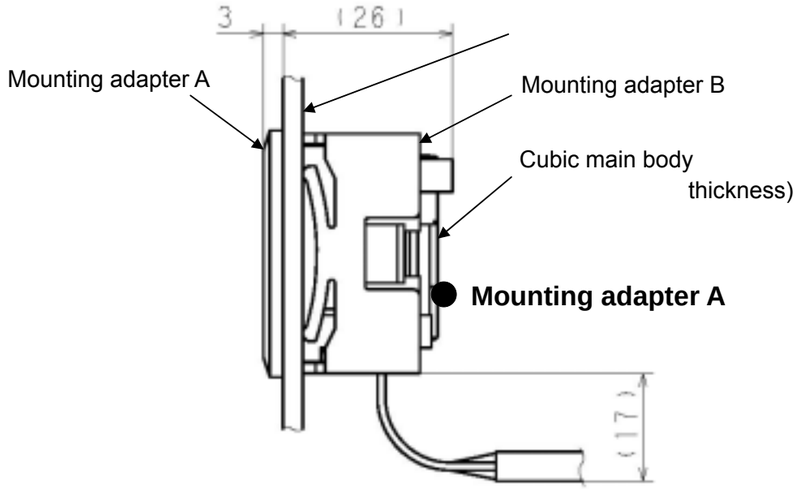
① Remove connector cable, etc..
② Push lock nail of the mounting plate into the arrowhead direction illustrated in ② below by using a slotted screwdriver, etc.. from the bottom of the mounting plate.
③ As leaving the lock nail in a state of ②, remove the Cubic main body to the arrowhead direction ③.



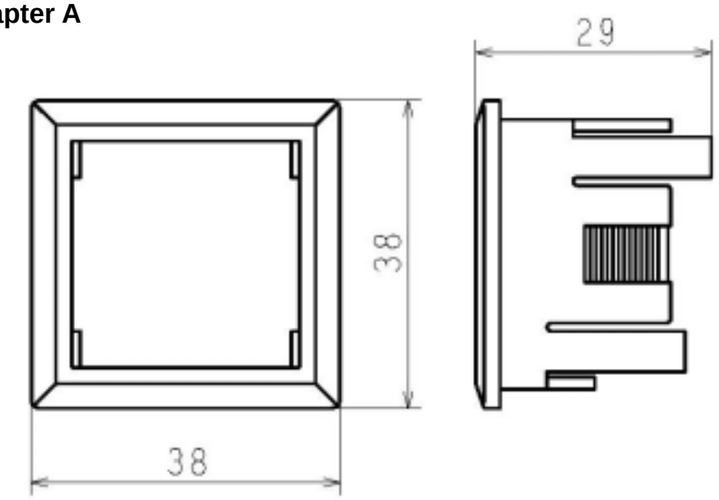
Explanation for mounting adapter (Optional item)

1. In the beginning

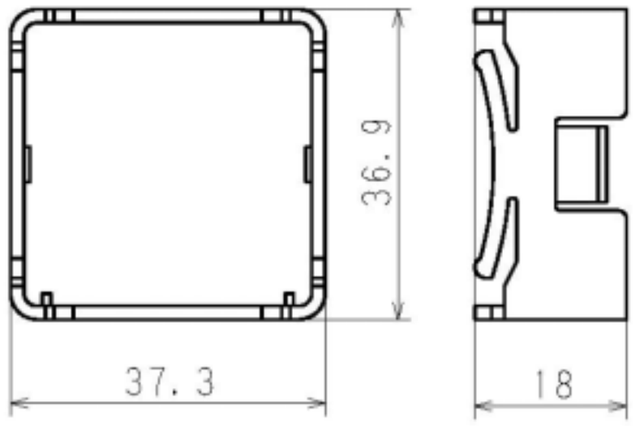
● **Assembling drawing**



● **Mounting adapter A**

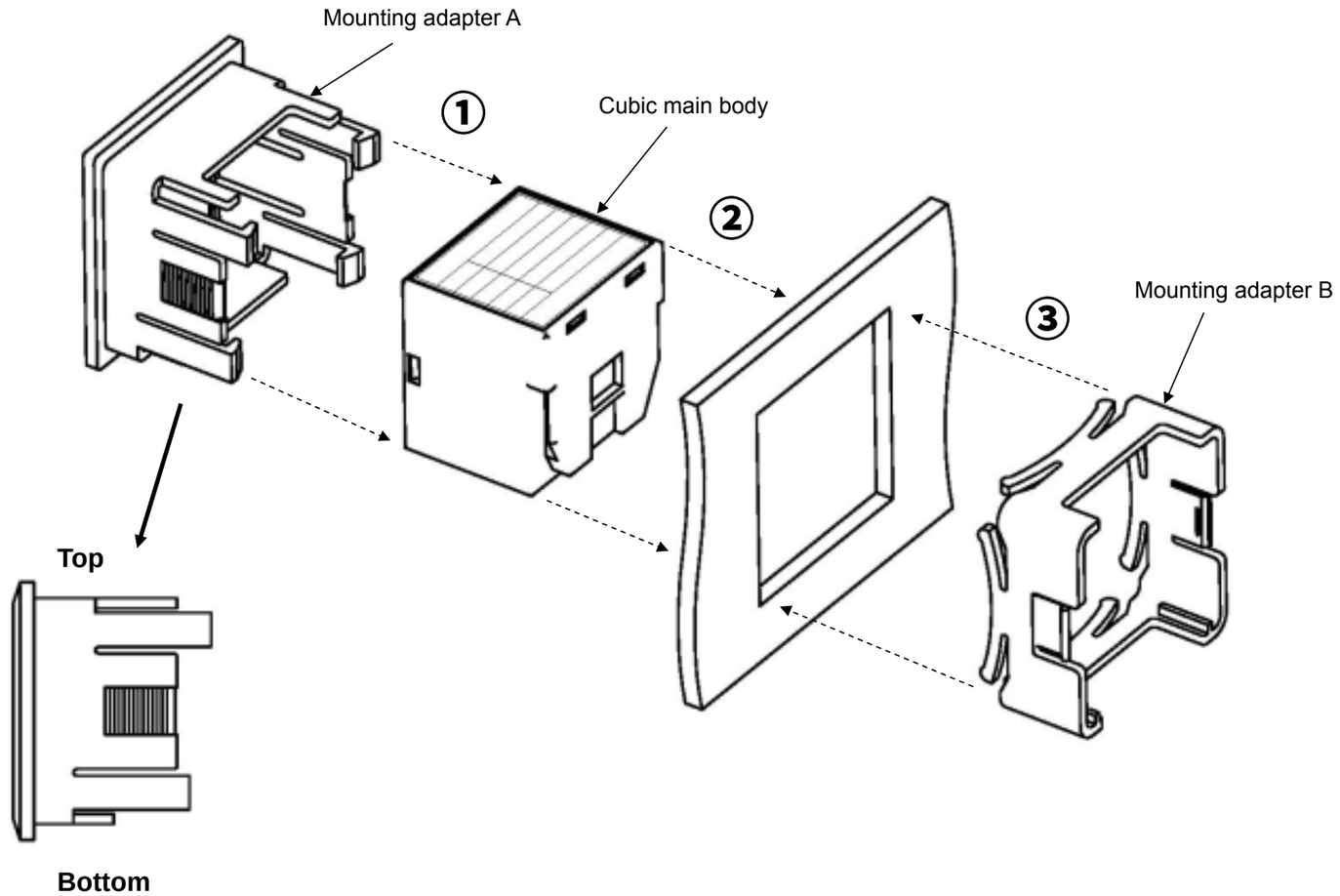


● **Mounting adapter B**



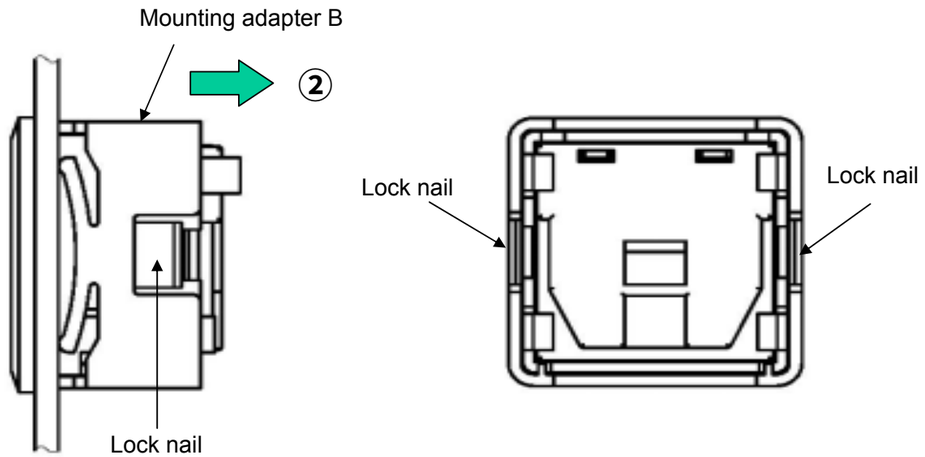
2. How to mount

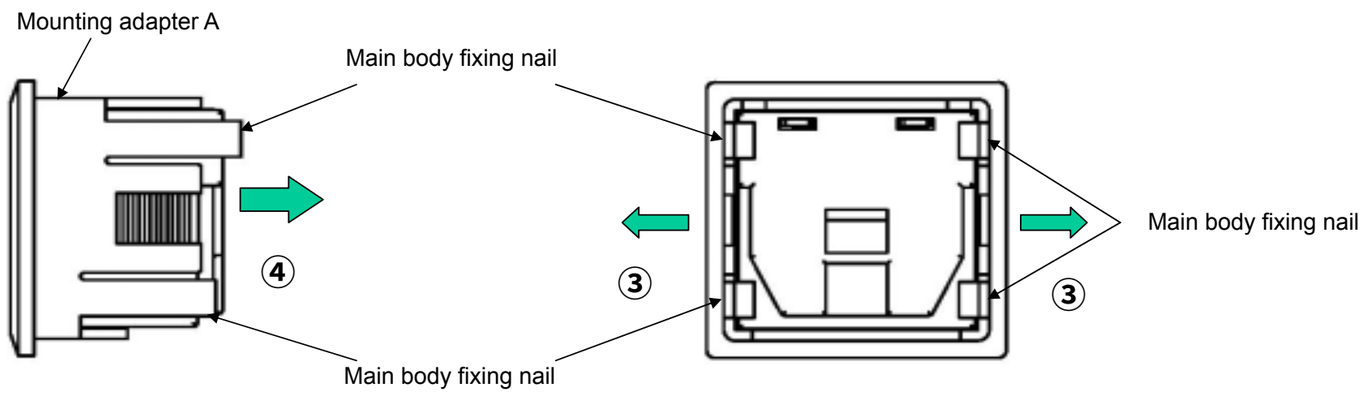
① Insert the Cubic main body to make it to direct the mounting adapter downward as shown below.
② Insert it to the panel cut-out section.
③ Push the mounting adapter B into the place until it clicks and stops.
④ Connect the connector cable, etc..



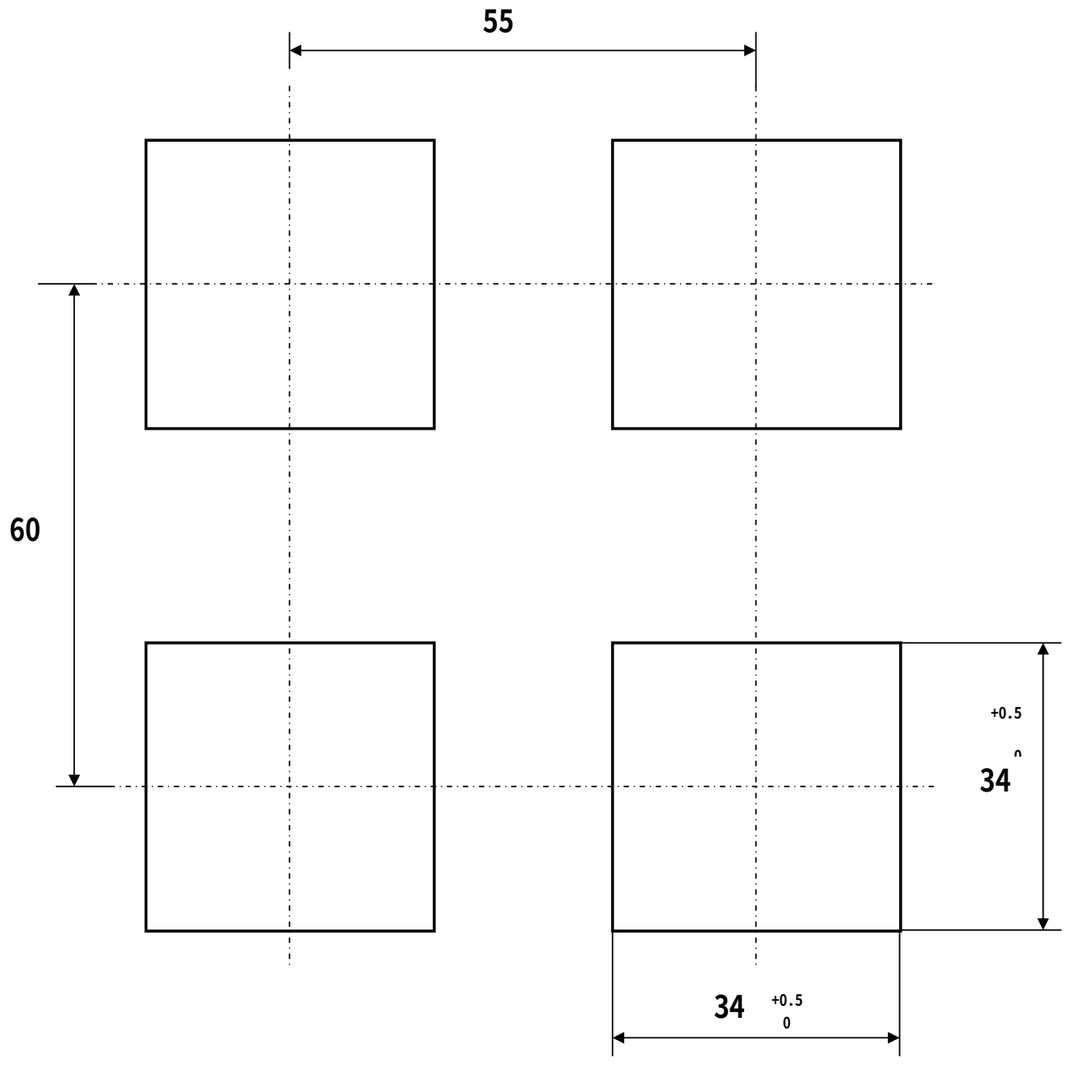
2. How to dismount

① Remove the connector cable, etc..
② Widen the Lock nail of mounting adapter B to make it to draw out the mounting adapter B to the arrowhead direction ②.
③ Widen the nail for securing the main body of the mounting adapter A to the arrowhead direction ③.
④ As leaving the mounting adapter A in a state of ③, draw out the Cubic body to the arrowhead direction ④.

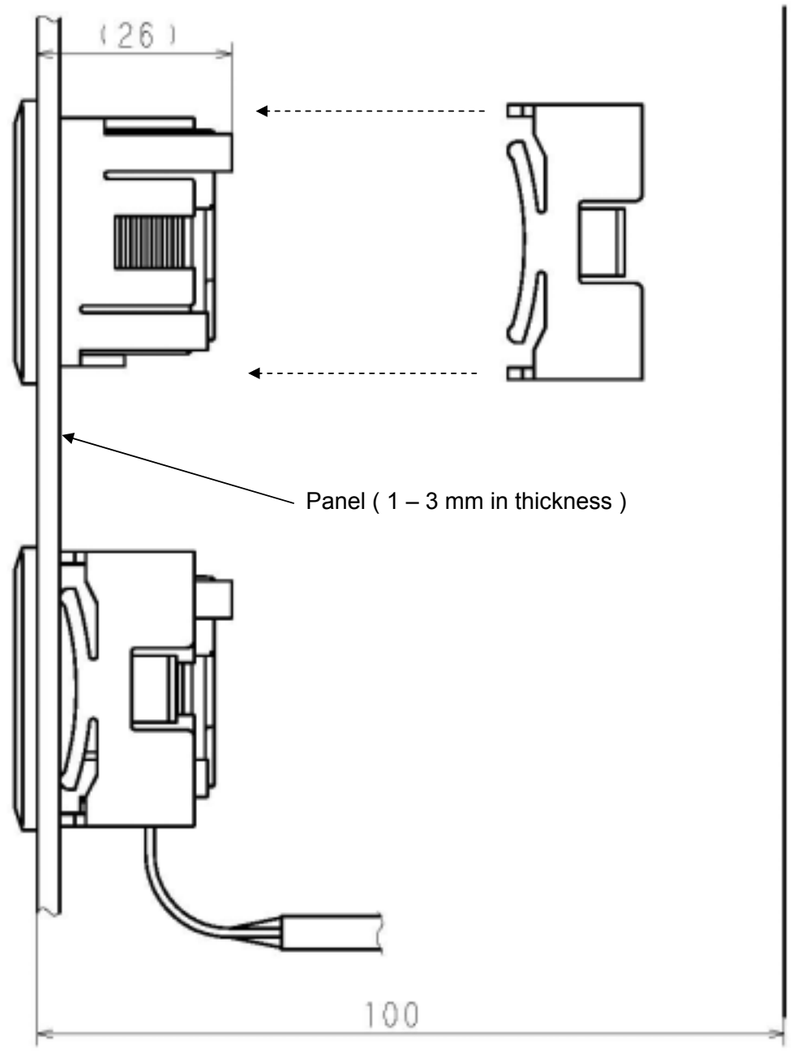




Dimensions for panel cut-out



● **Panel depth**



Warranty

- The warranty period of the product shall be one year commencing on the date of delivery.
  We will repair or replace any faults occurred during this period which is obviously liable for us at a cost of no charge.
- As to how to repair, you are kindly requested to send back the faulty product to our company and to let us do the take-back repair.
- In case of the following items it shall not be covered by warranty.
  ① The secondary loss arising from the failure of this product (such as damage to equipment, passive damages and so forth) and any other damages shall not be covered by warranty.
  ② Any failure caused by abuse or improperly handling by user side.
  ③ Any failure caused by other reasons except for the liability for which we are liable.
  ④ Any failure caused by remodeling or repairing except done by our company.
  ⑤ Any failure caused by such disasters as fire, earthquake or damage by wind and flood
  ⑥ .Any failure due to unpredictable reasons considering from the level of technology at the time when shipping the product.

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