



【 Operation Manual 】

Compact digital meter

MODEL : SP2441 Series

(Pulse input type)

Series name	Output	Input	Function
SP2441			Sensor power : DC12V 50mA MAX Power source : DC power supply(DC24V) Preset output : NPN open collector(×2) Input signal : NPN open collector(×1) Color : Black
	P1		Preset output one points (1c contact relay output)
		AI	Analog current output (DC4-20mA)
		AV3	Analog voltage output (DC1-5V)
		AV4	Analog voltage output (DC0-5V)
		AV5	Analog voltage output (DC0-10V)
			F Voltage pulse input
			F2 Current pulse input

⚠ Caution

For professional use only or designed for use by a licensed electrician only.

⚠ Caution

Check if the label (model name) of the unit and your desired product specification correspond before use.

【 The 6th edition 1 Apr. 2024 】
@SP2441CE(6)-E

Precautions

Please read this Operation Manual including the following precautions carefully to ensure safe use of your meter.

⚠ Warning: Contents that may cause death or serious injury.

1. Perform wiring with the power off. There is a risk of electric shock or fire.
2. Do not touch the terminals while power is being supplied. There is a risk of electric shock.
3. Do not disassemble or touch the inside of the product. There is a risk of electric shock or fire.
4. Do not use the product where there is flammable gas or ignited material.
5. In the event of a product failure or abnormality, build an emergency stop or fail-safe system to ensure safety.

⚠ Caution: Contents that may cause minor injury or property damage.

1. Use the power supply voltage and load within the specified range.
2. Do not use in the following environments.
 - A place exposed to metal powder, dust, water, chemicals, oil, etc.
 - A place with corrosive gas
 - Outdoor use and places exposed to direct sunlight
 - Locations where condensation occurs
 - Temperature and humidity outside the rated range
 - Locations subject to vibration or impact
3. Do not allow metal powder, dust, water, chemicals, oil, etc., to enter the product. There is a risk of failure or fire.
4. Check regularly for any malfunctions or abnormalities.
5. If the product is malfunctioning or has fire, smoke, overheating, abnormal noise, etc., immediately turn off the power and stop using it.
6. Install the switch or circuit breaker in a position where it can be operated immediately in an emergency.
Please indicate that it is a device shut-off device.
7. Keep the product and wiring away from noise sources.
8. If there is a possibility of invasion the lightning surges, install countermeasure parts such as a lightning arrestor in outside.
9. It can be used almost at the same time as the power is turned on, but it requires 30 minutes of power to satisfy all performance requirements.
10. When cleaning, wipe with a dry cloth, do not use organic solvents such as benzine, thinner or alcohol.
11. If the waterproof packing is used in a deteriorated state, the waterproof and dustproof function will be impaired. Inspect and trade it periodically.

Product Description

- With the panel mounted, the front has been protected by grade IP66. dust and water resistant products.

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1. About confirmation of an attachment and a guaranteed period

About confirmation of attachments.

When you received as a product, please confirm whether it includes the following.

- (1)SP2441 (The chosen specification) 1
- (2)Installation adapter(Attachment) 1
- (3)SP2441 Operation manual (Digest version) 1
- (4)Rubber packing : Color (Black) (Attachment) 1
- (5)Unit label(Attachment) 1

If there are the mistaking parts and the missing parts, please inform a dealer or us.(There is a case that you don't attach by convenience.)

About a guaranteed period and a guaranteed area.

1. Guaranteed period

The period a product guarantees is 4 years from a delivered day.

2. Guaranteed area

If we trouble by responsibility in whole guaranteed period, it's repaired without charge at our factory. But if a product conflicted in the following matter, it isn't a guarantee target. Please understand.

- (1) Case of outside of the product specifications.
- (2) Case of User-conducted alterations and modifications of the unit
- (3) Case of besides our responsibility.
- (4) Case of safekeeping and transportation beyond the product specification condition.
- (5) Case of an accident.

2. Specifications

【 Standard specifications 】

Items		Specifications
Measurement	Type	Ratemeter/Totalizer
	Method	Cycle calculation method
Display	Display	Red LED : 5 digits, Character height : 7mm(range : 0 - 99999)
	Display switching	Rate meter/Totalizer
Rate meter	Display accuracy	$\pm 0.05\% \text{rdg.} \pm 1 \text{digit}$ (at Sampling time for 0.5 second or more)
	Scaling	$1 \times 10^{-9} - 9999$ (per pulse)
	Indication area	0 - 99999
	Overflow indication	"99999" flashing, endless, or 10x shift.
	Time unit	$10^{-1}, 10^{-2}, 10^{-3}, 10^{-4}$, nothing
	Sampling time	Rate reading averaged by 0.1-100.0 sec.
	Moving average	Display moving average. Averaged by 2 to 19 indication values.
		Pulses moving average Averaged by 2 to 19 input pulses.
	Auto zero time	After an input signal is stopped, the reading turns to zero after time that can be set 0.1 - 99.9 sec.
Least significant digit	Real, fixed at 0, or 0/5	
Totalizer	Measurement accuracy	± 0 (Scaling is set to 1.)
	Scaling	$1 \times 10^{-9} - 9999$ (per pulse)
	Indication area	0 - 99999
	Decimal point	$10^{-1}, 10^{-2}, 10^{-3}, 10^{-4}$, nothing
	Overflow Indication	"99999" flashing, endless, or 10x shift.
	Offset	Value after a reset at the reach of 0 - 99999. (selectable)
Sensor input	Input signal	NPN open collector pulse input or No-voltage contact. *Sensor conditions: ON residual voltage 2.0V or less, OFF leakage current 1.5mA or less. Can open and close load current of 10.0mA.
	Input response frequency (at 50% duty)	LO : 0.01Hz - 50Hz HI : 0.01Hz - 10kHz
	Sensor power	DC 12V($\pm 10\%$) 50mA (max.)
EXT input	Input method	NPN open collector input or No-voltage contact. (X1) * It works by turning it ON for 50ms or more.
	Function selection	Reset / Hold / Inhibit / Indication change
Synchronize totalizer of pulse output	Output method	NPN open collector output. (X1) * It's impossible to use at the time of P1 option choice.
	Maximum rating	DC30V 50mA.(max)
	Output digits	1 - 4 digits.
	Output width	0.01 - 1.99 sec. * Maximum output frequency is 50Hz.

Preset output	Output method	NPN open collector output.(X 2)
	Maximum rating	DC30V 50mA(max.)
	Comparative method	The upper limit, lower (immediately) and lower (delay).
	Output mode	Compared with the indication value by preset value. Comparison, hold and 1 shot.
	Judgment prohibition time	The presetting output function is disabled for the specified time interval following power ON or reset. Up to 1 – 60 sec, 9 stages. 〔Does not work with lower(delay) mode.〕
Others	Error display function	When abnormality occurred to a sensor power supply, "Err01" and a measured value are indicated alternately.
	Data backup	Each mode set value and totalized value are saved on FRAM. (The memory writable number of times is within 100,000 times, retention about 10 years.)
	Mode protect	Prohibit mode setting change.
	Warm up time	After turning on the power, more than 30 minutes.
	Power supply	DC24V(±10%)
	Power consumption	3W max
	Temperature/humidity conditions	-10 - 50°C 30 - 80%RH (No-condensation)
	Dimensions and weight	W48×H24×D63mm (An installation adapter isn't included.) Approx 40g
	Color	Black
	Flame retardant grade	UL94 V-0
	Material of the case	Polycarbonate
	Safety class	IP66 (front)
	Isolation	Sensor input, external input, analog output, and power supply are not isolated. Preset output is isolated from others.
EMC	EN61326-1 EN55011 (Group1 ClassA), EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6	

【 Option specifications 】
 «Relay output : P1 option»

Preset output	Output method	Relay c contact output(x1)
	Maximum rating	AC220V 0.12A (Resistance load) DC 30V 1 A (Resistance load)

«Analog output : AI/ AV3 - 5 option»

Analog output	Output signal	[A] DC4 - 20mA Load impedance 500Ω or less. *Connect to the power supply-side and the floating input
		[AV3] DC1 - 5V Load impedance 2kΩ or more.
		[AV4] DC0 - 5V Load impedance 2kΩ or more.
		[AV5] DC0 - 10V Load impedance 2kΩ or more.
	Accuracy	Within ±0.3%F.S. for indicated value.(at 23°C)
	Temperature characteristic	±100ppm/°C : 0 - 50°C ±120ppm/°C : -10 - 0°C
Response time	Approx 20ms(that is the time an output change gets to 90%)	
Maximum resolution	13000	

«Sensor input : F option , F2 option»

Sensor input	Input signal	[F] Voltage pulse input LOW : 2.0 V or less, HI : 3.8 - 30.0 V
		[F2] Current modulation pulse input LOW : 8 mA or less, HI : 15 - 20 mA

3. Mounting meter

How to mount meter

1. Cut the panel to insert the meter from the front.
2. Slide installation adapter from the rear to fix the body.
At this time, if the body is not secured tightly, fasten screws a little more.

• Put the meter on a panel with a thickness of 1.0 – 4.0mm.

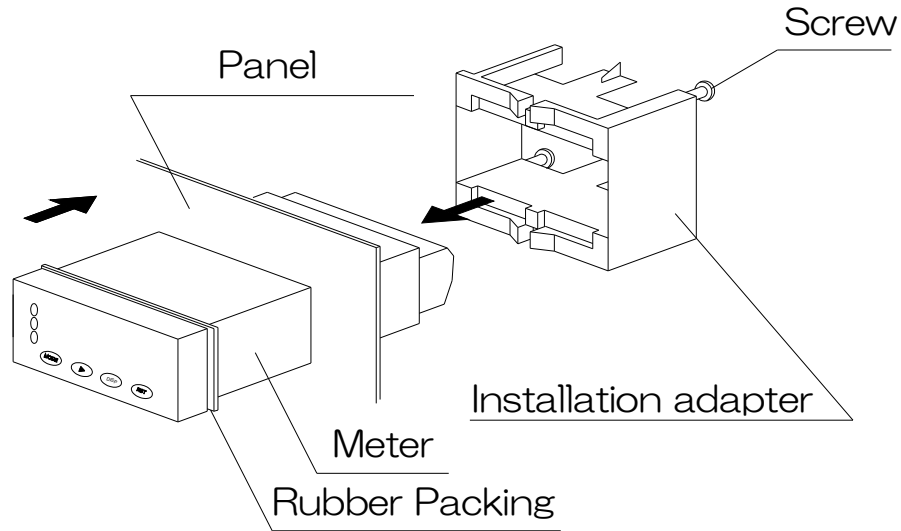


Fig.3-1

Panel cutout dimensions and pitch for mounting two or more meters.

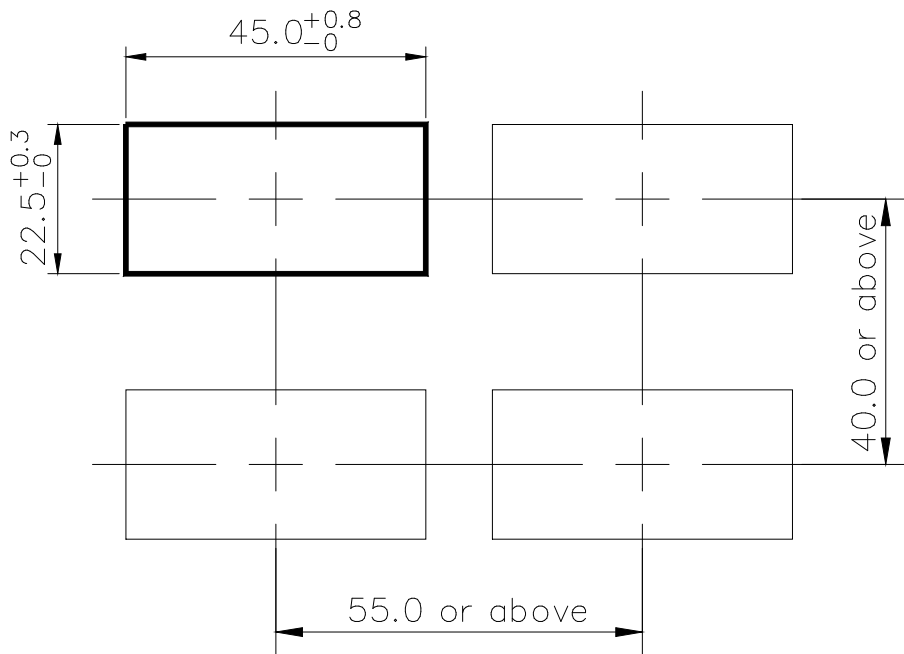


Fig.3-2

(Unit : mm)

* When using by protection against dust and waterproofing in forebody (IP66), please use rubber packing.

4. Connecting terminal boards

Terminal boards
 【 Standard type 】

Fig.4-1

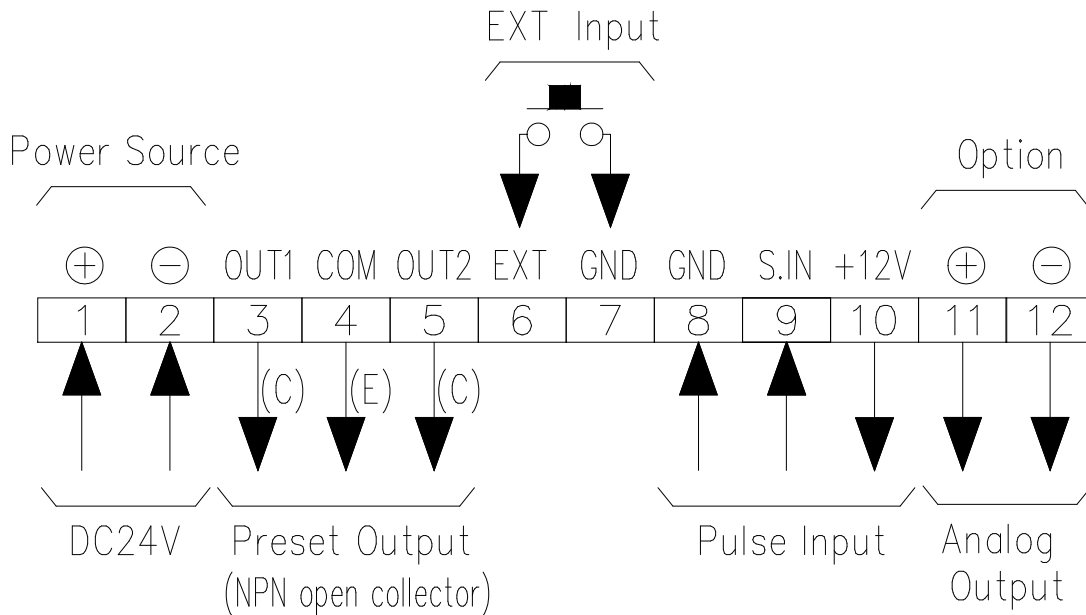
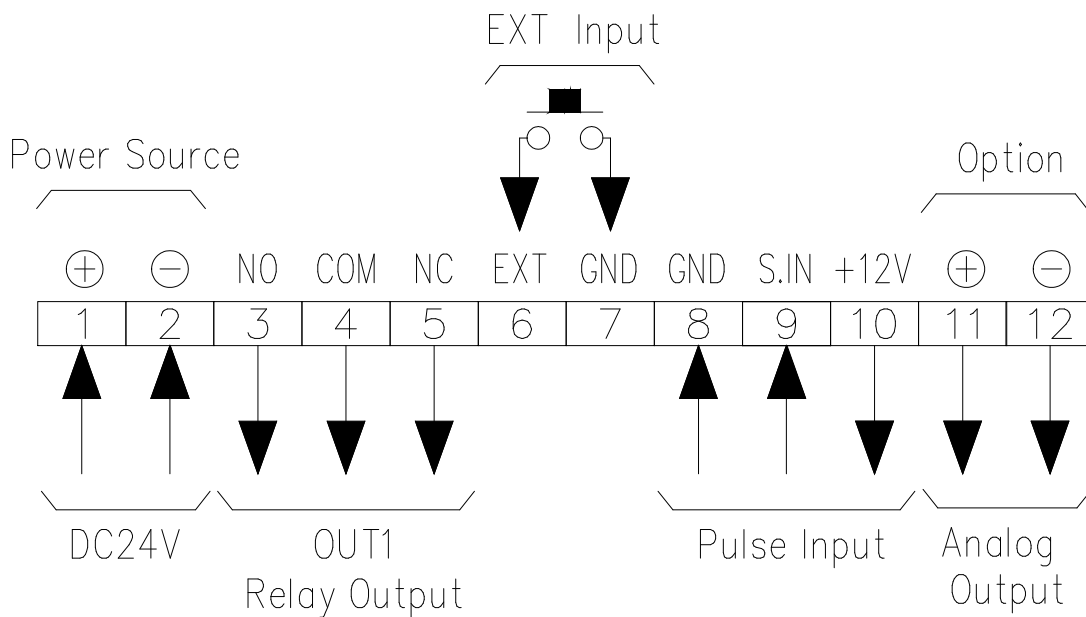


Fig.4-2

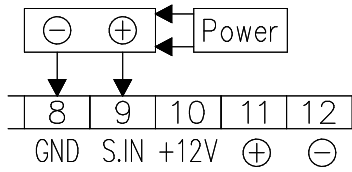
【 P1 option type 】



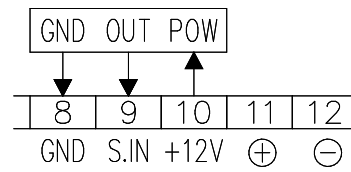
Terminal pitch : 3.5mm (Phoenix : SMKDS1/12-3.5)
 Wire : AWG30 - 16 (SQ Conversion : 0.05 - 1.3mm²)
 Length of stripped wire : 5.0mm

< Connection diagrams >

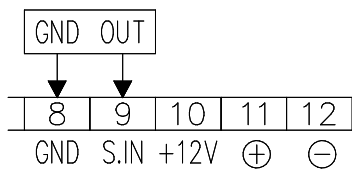
Sensor another power supply use. Fig.4-3



Sensor power supply use. Fig.4-4



DC two-line pulse output sensor Fig.4-5

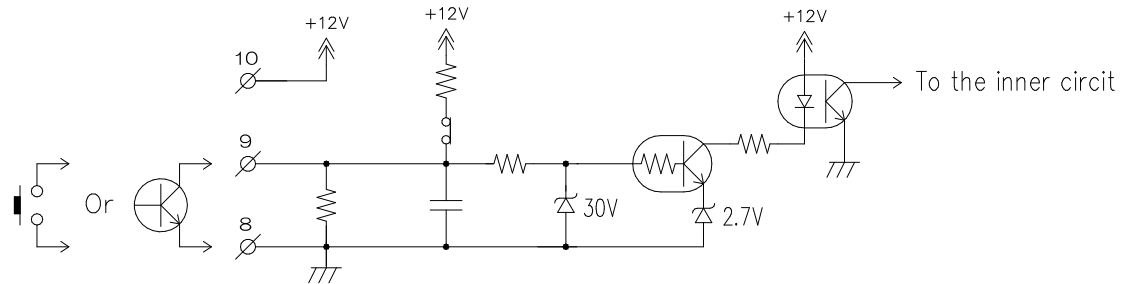


- ⚠ < Caution > Always turn the power OFF before commencing any wiring work.
- ⚠ < Caution > Please confirm the specification.
- ⚠ < Caution > DC power supply connections
If the + and - are connected in reverse by mistake, the internal protective circuit is activated to stop the reverse current flow. In this case, disconnect, then reconnect correctly normal operation.
- ⚠ < Caution > The input/output wiring scheme varies with sensor type. Please refer to the connection diagrams (Fig. 4-3, 4-4, 4-5) above for wiring details, to avoid damage to the sensor or input/output circuits.
- ⚠ < Caution > When making a connection to the terminal board, make sure the lead wire is fully and firmly inserted.
- ⚠ < Caution > Please tighten a screw of the terminal stand surely.
- ⚠ < Caution > Please don't use a sensor power supply for the use of anything but a sensor.

5. Construction of input/output circuit

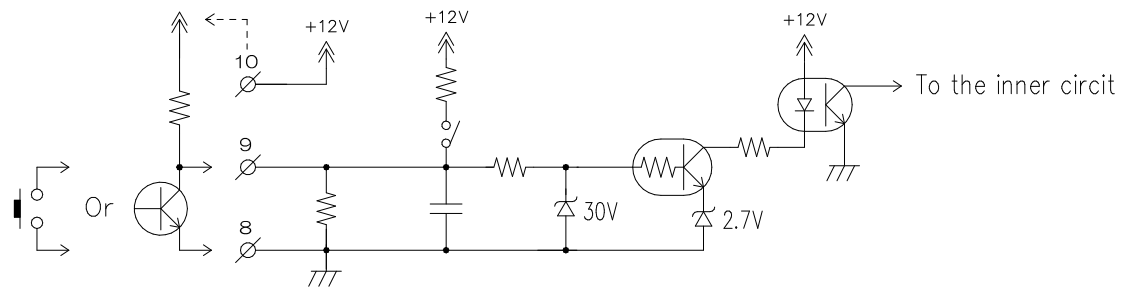
1. Senser input : NPN open collector pulse input

Fig.5-1



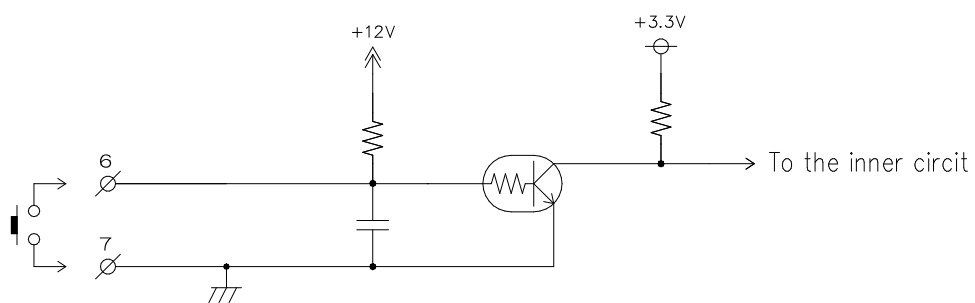
2. Senser input : Voltage pulse input

Fig.5-2



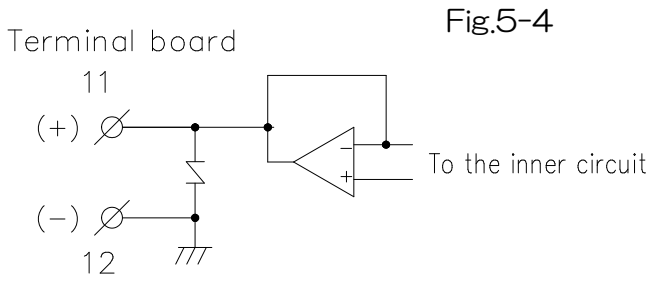
3. EXT input : NPN open collector input

Fig.5-3

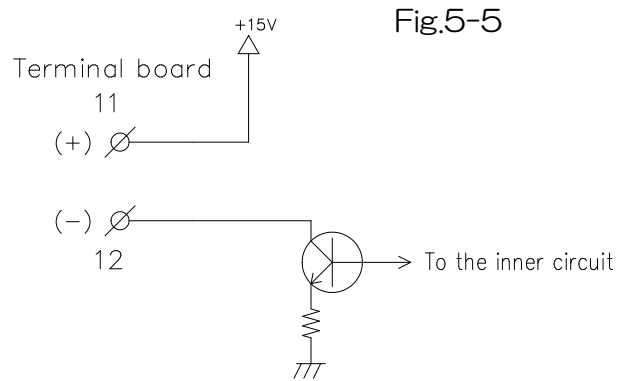


4. Analog output :

Voltage output (AV3 - 5)

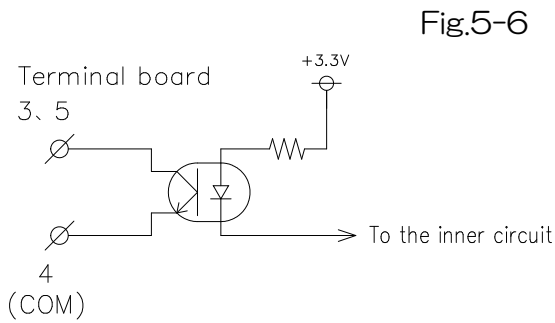


Current output (AI)

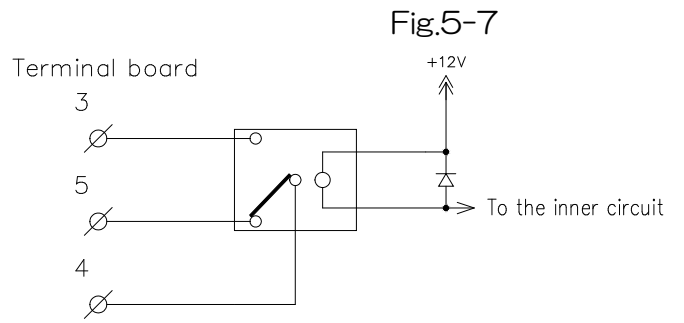


5. Preset output :

Synchronization pulse output
(NPN open collector output)



6. P1 Option relay output

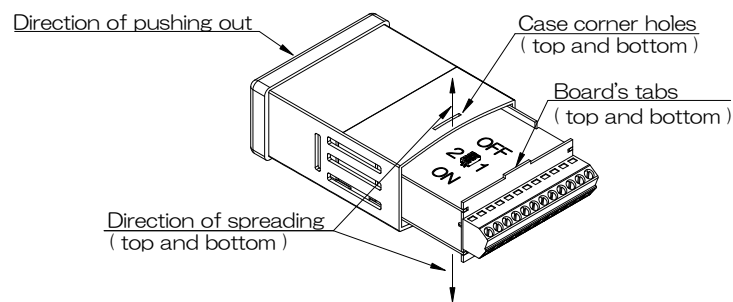


6. Setting the dip switch

To set the DIP switch, disassembly is required, but forcing it apart may lead to damage. For safety, disconnect the wiring from the terminal block and remove it from the panel before following the steps below.

1. With the rear part of the case spread up and down, gently push the front part to the rear side.
 ※Top of case square holes may be hidden by a label, but there is no need to peel it off.
2. Since the board's tabs come off from the case square holes, please grab the terminal block in that state and pull it out.

Fig.6-1



3. Since the DIP switch is visible, please configure the pulse input and input response frequency settings according to Table.6-1.

Table.6-1

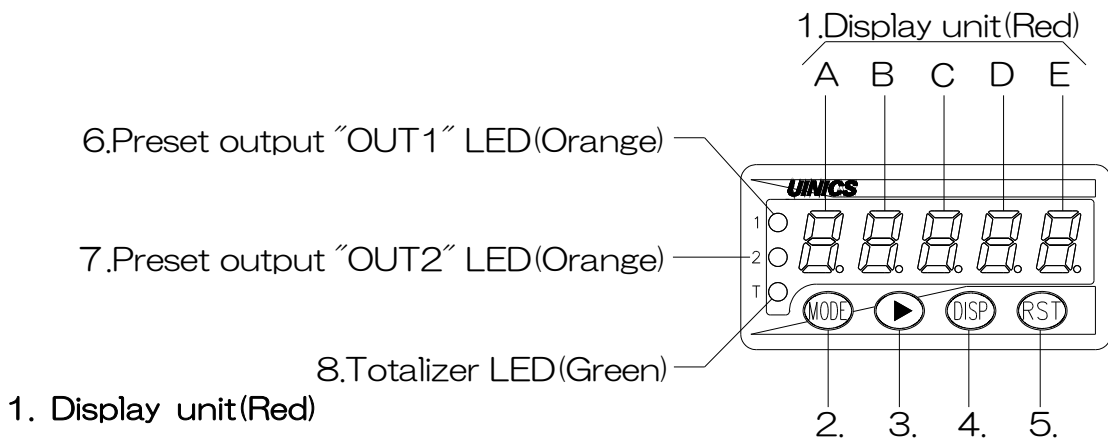
	DSW1-1	DSW1-2	
NPN open collector pulse input	ON	-	OFF⇔ON
Voltage pulse input	OFF	-	
Input response frequency 0.01Hz - 50Hz (LOW)	-	ON	
Input response frequency 0.01Hz~10kHz (HI)	-	OFF	

※As default setting, NPN open collector pulse input and Input response frequency is HI (0.01Hz - 10kHz).

4. When you have finished the configuration, please insert the board into the case while paying attention to the top and bottom orientation.
 ※The direction where the case label and the board's DIP switch are visible.
5. Extend the rear part of the case and push the board forward toward the front, ensuring that the board's tabs are securely inserted into the square holes of the case. If the tabs are not inserted, the power will turn on, but you won't be able to operate the keys on the front part.

7. Names and functions of components on front

Fig.7-1



1. Display unit(Red)

Measurement state : A measured value is indicated.

Setting state :

A Mode No. is indicated.

B to E The present set value is indicated.

: When preset value setting indicates the preset value.

: When offset value setting indicates the offset value.

: It indicates “L-oFF” and “L-on” at the time of mode protect function setting.

: AnA, An-1-2 and the present bit value are indicated at the time of analog output adjustment mode setting.

2. Mode Key

Turning on : When a power supply is supplied while is pushing down Mode Key, a test mode functions is called.

(A stop of the test mode function is power supply off.)

Measurement state : When Shift Key is pressing for 2 sec. or more, while is pushing down Mode Key, mode setting is called.

: When Mode Key is pressing for 2 sec. or more, preset value is called.

: When Display Key is pressing for 2 sec. or more, while is pushing down Mode Key, offset value setting is called.

Setting state : Switch mode No. (1→2→3……9→A→b→C→d→1)

: OUT1,2 is switched at the time of preset value setting.

: An-1-2 is switched at the time of analog output adjustment mode setting.

3. Shift Key

Measurement state : Shift Key is used to call the mode setting.
(It's on for more than 2 sec with Mode Key.)

: Shift Key is used to call the mode protect function,
or used to change it.
(It's on for more than 2 sec. → The current mode protect function
state is indicated. → It's on for more than 8 sec just as it is.
→ Change. «L-oFF ⇔ L-on»)

Setting state : Shift Key moves the flash figure when each setting, to the right.

: The output bit values decreases at the time of analog output
adjustment mode setting.

4. Display Key

Turning on : When a power supply is supplied keeping pushing
an analog output adjustment mode setting.

(A stop of the analog output adjustment mode setting is power supply off.)

Measurement state : Display Key is used to call the offset value setting.
(It's on for more than 2 sec with Mode Key.)

: Display Key is used to switch the ratemeter/totalizer.
(Need to set "Mode No.6".)

Setting state : Display Key changes the flash figure when each setting.

: The output bit values increases at the time of analog
output adjustment mode setting.

5. Reset Key

Turning on : Throw power supply while Reset Key pressed to call
initialization setting.

Measurement state : Resets the totalizer if offset value is set, change the
reading to an offset value.

It also resets the presetting output.
(When using EXT input (terminals No.6 - 7), need to set "Mode No.6".)

Setting state : Reset Key is used to register and make it measurement status.

: The bit value of "An-1 and 2" is registered at the time of
analog output adjustment mode setting.

6,7. Preset output LED (Orange)

Measurement state : "OUT1,2" turns on during generating preset output.
: "OUT1" LED turns on during generating a
synchronization pulse.

Setting state : The presetting output LED lights up at the time of the
preset output value setting.

8. Totalizer LED (or "x10 LED") (Green)

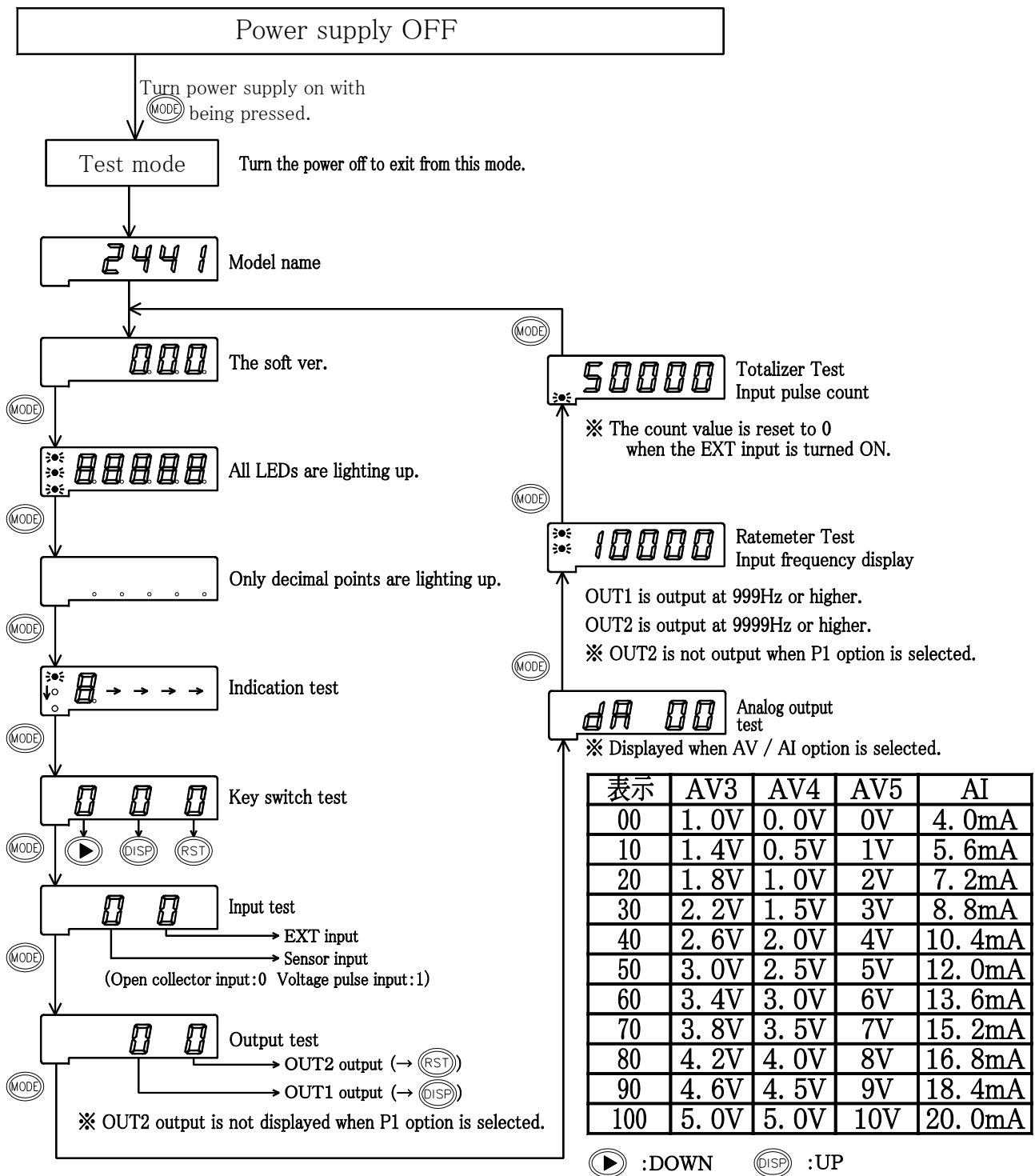
Measurement state : It lights up at totalizer.
: When totalizer is being "x 10", it'll change to a flash.
(Need to set "Mode No.8".)

Setting state : It lights up at totalizer.

8. The setting menu

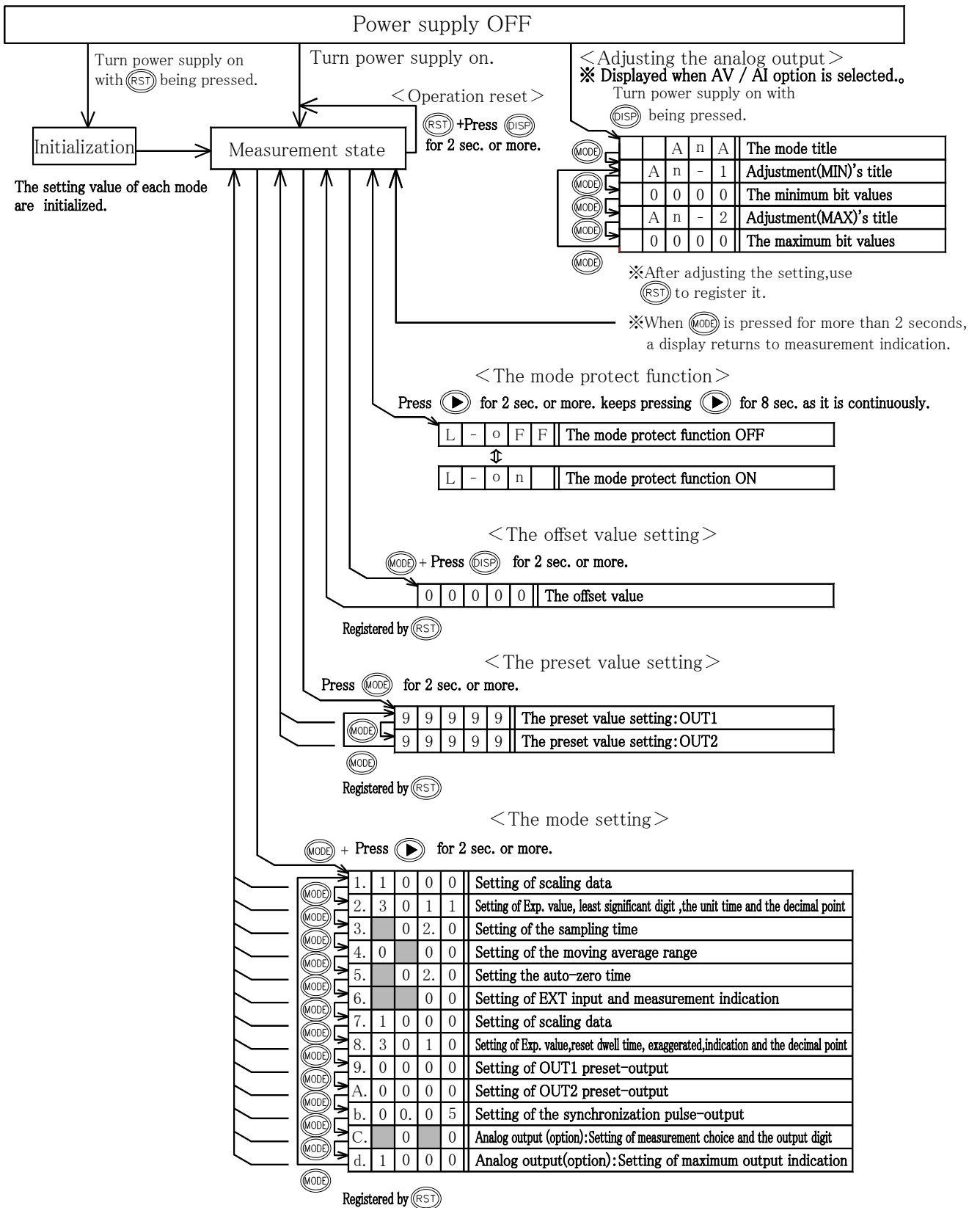
«The test mode function»

Fig.8-1



«The setting menu»

Fig.8-2



9. Initial setting values and initialization

If the specifications desired by the user are requested prior to shipment, the meter will be set these settings. Otherwise, the regular factory settings are shown below.

Value setting of each mode

Table.9-1

Mode No.	Initial setting				Notes				Mode contents
	A	B	C	D	E	B	C	D	
1.	1	0	0	0					Setting of scaling data
2.	3	0	1	1					Setting of Exp. value, least significant digit, the unit time and the decimal point
3.		0	2.	0					Setting of the sampling time
4.	0		0	0					Setting of the moving average range
5.		0	2.	0					Setting the auto-zero time
6.			0	0					Setting of EXT input and measurement indication
7.	1	0	0	0					Setting of scaling data
8.	3	0	1	0					Setting of Exp. value, reset time, overflow indication and the decimal point
9.	0	0	0	0					Setting of OUT1 preset output
A.	0	0	0	0					Setting of OUT2 preset output
b.	0	0.	0	5					Setting of the synchronization pulse-output
C.		0		0					Analog output : Setting of measurement choice (option) and the output digit
d.	1	0	0	0					Analog output : Setting of maximum output (option) indication

Presetting output set value

Table.9-2

Preset value	Initial setting					Notes				
	A	B	C	D	E	A	B	C	D	E
OUT1	9	9	9	9	9					
OUT2	9	9	9	9	9					

* With the P1 option, there is no OUT2 preset value setting.

Offset value

Table.9-3

Offset	Initial setting					Notes				
	A	B	C	D	E	A	B	C	D	E
Indication	0	0	0	0	0					

[Initialization]

Throw power supply in with Reset Key pressed to initialize the settings.

After the initialization, the set values will be as shown in "Table.9-1", "Table.9-2" and "Table.9-3".

Counter data and the mode protect function are also cleared.

⚠ < Caution >







* Since an initialization changes all existing setting values to the initial setting values, be sure to record all the setting values before an initialization.

* In case the computer froze when unusual functioning occurred with the normal operation, initialize according to the above procedure and set the desired value again.

10. Mode setting

« 1. Operating method (the mode setting) »

When doing mode setting, please operate as follows.


Operation key	Indication	Procedure										
 + 	<table border="1"> <tr><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td></tr> <tr><td>1.</td><td>1</td><td>0</td><td>0</td><td>0</td></tr> </table>	A	B	C	D	E	1.	1	0	0	0	While pushing down Mode Key, press Shift Key for 2 sec, or more. "1" appears in display A, the value setting for mode No.1 is shown.
A	B	C	D	E								
1.	1	0	0	0								
	<table border="1"> <tr><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td></tr> <tr><td>1.</td><td>1</td><td>0</td><td>0</td><td>0</td></tr> </table>	A	B	C	D	E	1.	1	0	0	0	A figure of flash indication is shifted. Each time the key is pressed, a flash figure is shifted to the right.
A	B	C	D	E								
1.	1	0	0	0								
	<table border="1"> <tr><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td></tr> <tr><td>1.</td><td>1</td><td>1</td><td>0</td><td>0</td></tr> </table> <p style="text-align: center;">0 → 9</p>	A	B	C	D	E	1.	1	1	0	0	Changes the value of the flashing digit. Each time Display Key is pressed, the number goes up by one. (0→1→……→9→0→……) * In situation, doesn't indicate by a setting figure, up to nine.
A	B	C	D	E								
1.	1	1	0	0								
	<table border="1"> <tr><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td></tr> <tr><td>2.</td><td>3</td><td>0</td><td>1</td><td>1</td></tr> </table> <p style="text-align: center;">1 - d</p>	A	B	C	D	E	2.	3	0	1	1	Changes the value of the mode No. Each time Mode Key is pressed, the number goes up by one. (1→2→……→d→1→2……) Set the desired value with the Shift Key and Display Key.
A	B	C	D	E								
2.	3	0	1	1								
	<table border="1"> <tr><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td></tr> <tr><td colspan="5">measured value</td></tr> </table>	A	B	C	D	E	measured value					After adjusting the setting, use Reset Key to register it. The display returns to the readings following registration.
A	B	C	D	E								
measured value												

⚠ < Caution >

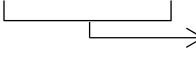
* Please make the mode protect function "L-off" at the mode setting. If it's a condition of "L-on", it can't be changed.

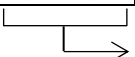
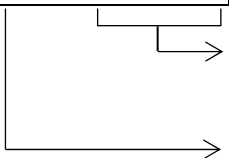
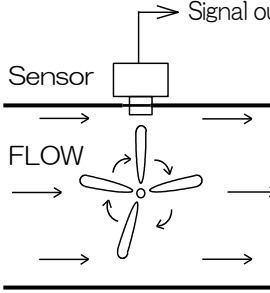



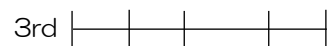
About the contents of the mode protect function, please refer to, "11. The mode protect function".

«2. Contents of the each mode and set value»

Mode No.	Ratemeter : Setting of scaling data																																												
1	<div style="text-align: center;"> <table border="1" style="margin: auto;"> <tr> <td style="padding: 2px;">A</td> <td style="padding: 2px;">B</td> <td style="padding: 2px;">C</td> <td style="padding: 2px;">D</td> <td style="padding: 2px;">E</td> </tr> <tr> <td style="padding: 2px;">1.</td> <td style="padding: 2px;">1</td> <td style="padding: 2px;">0</td> <td style="padding: 2px;">0</td> <td style="padding: 2px;">0</td> </tr> </table>  <p style="margin-left: 100px;"> Scaling data 0001-9999 (Do not specify 0000.) </p> <hr style="border-top: 1px dashed black;"/> <p>Input scaling is performed for the rate meter reading. By specifying the scaling data and the exponential value (a minus power of 10), the scaling ratio per pulse can be set. The exponential value (a minus power of 10) is set in mode No.2.</p> <hr style="border-top: 1px dashed black;"/> <p>[Ex.] Using a flow meter which emits 1 pulse per 1.234mL, the cumulative total flow in liters can be expressed using the following conversion.</p> <p style="margin-left: 40px;"> $1.234\text{mL} \longrightarrow 0.001234\text{L} \longrightarrow \frac{1234}{10^6} \times 10^{-6}$ Scaled to the desired unit (L) </p> <div style="margin-left: 100px;"> <table style="border-collapse: collapse;"> <tr> <td style="padding-right: 10px;"></td> <td style="padding-right: 10px;">↑</td> <td style="padding-right: 10px;">↑</td> </tr> <tr> <td style="padding-right: 10px;"></td> <td style="padding-right: 10px;">4 digits</td> <td style="padding-right: 10px;">Exp. value</td> </tr> </table> </div> <div style="margin-left: 40px; margin-top: 10px;"> <table style="border-collapse: collapse;"> <tr> <td style="padding-right: 10px;"></td> <td style="padding-right: 10px;">A</td> <td style="padding-right: 10px;">B</td> <td style="padding-right: 10px;">C</td> <td style="padding-right: 10px;">D</td> <td style="padding-right: 10px;">E</td> <td style="padding-left: 10px;">↑</td> </tr> <tr> <td style="padding-right: 10px;">Mode No.1</td> <td style="border: 1px solid black; padding: 2px;">1.</td> <td style="border: 1px solid black; padding: 2px;">1</td> <td style="border: 1px solid black; padding: 2px;">2</td> <td style="border: 1px solid black; padding: 2px;">3</td> <td style="border: 1px solid black; padding: 2px;">4</td> <td style="padding-left: 10px;">↑</td> </tr> </table> <table style="border-collapse: collapse;"> <tr> <td style="padding-right: 10px;"></td> <td style="padding-right: 10px;">A</td> <td style="padding-right: 10px;">B</td> <td style="padding-right: 10px;">C</td> <td style="padding-right: 10px;">D</td> <td style="padding-right: 10px;">E</td> <td style="padding-left: 10px;">↑</td> </tr> <tr> <td style="padding-right: 10px;">Mode No.2</td> <td style="border: 1px solid black; padding: 2px;">2.</td> <td style="border: 1px solid black; padding: 2px;">6</td> <td style="border: 1px solid black; padding: 2px;">*</td> <td style="border: 1px solid black; padding: 2px;">*</td> <td style="border: 1px solid black; padding: 2px;">*</td> <td style="padding-left: 10px;">↑</td> </tr> </table> </div> <hr style="border-top: 1px dashed black;"/> <p>Please refer to the next page for other property examples.</p> </div>	A	B	C	D	E	1.	1	0	0	0		↑	↑		4 digits	Exp. value		A	B	C	D	E	↑	Mode No.1	1.	1	2	3	4	↑		A	B	C	D	E	↑	Mode No.2	2.	6	*	*	*	↑
A	B	C	D	E																																									
1.	1	0	0	0																																									
	↑	↑																																											
	4 digits	Exp. value																																											
	A	B	C	D	E	↑																																							
Mode No.1	1.	1	2	3	4	↑																																							
	A	B	C	D	E	↑																																							
Mode No.2	2.	6	*	*	*	↑																																							

Mode No.	Rate meter : Setting of Exp. value, least significant digit , the unit time and the decimal point										
2	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding: 2px;">A</td> <td style="padding: 2px;">B</td> <td style="padding: 2px;">C</td> <td style="padding: 2px;">D</td> <td style="padding: 2px;">E</td> </tr> <tr> <td style="padding: 2px;">2.</td> <td style="padding: 2px;">3</td> <td style="padding: 2px;">0</td> <td style="padding: 2px;">1</td> <td style="padding: 2px;">1</td> </tr> </table> <div style="margin-left: 100px;"> <p>→ Decimal point 0 : 0 1 : 0.0 2 : 0.00 3 : 0.000 4 : 0.0000</p> <p>→ Unit time 0 : Per hour 1 : Per minute 2 : Per second</p> <p>→ Least significant digit 0 : Real 1 : Fixed at 0 2 : 0 or 5</p> <p>→ Exp. value (exponent 10⁻ⁿ) n = 0 - 9</p> </div>	A	B	C	D	E	2.	3	0	1	1
A	B	C	D	E							
2.	3	0	1	1							
<p>【 Exp. value 】 The magnification per 1 pulse is decided at registered property of "Mode No.1" and "Exp. value".</p>											
<p>【 Least significant digit 】 The form of indication for the least significant digit (digit on the right end) is selected.</p> <p>0 : Real Synchronized at the sampling time. 1 : Fixed at 0 Always, "0". 2 : 0 or 5 0 - 4 are expressed as 0, and 5-9 as 5.</p> <p>⚠ < Caution > * This setting is effective in avoiding flickering of least significant least significant digit.</p>											
<p>【 Unit time 】 The unit time for ratemeter is specified.</p> <p>0 : Per hour . . . The input is shown converted to a rate per hour value. 1 : Per minute . . The input is shown converted to a rate per minute value. 2 : Per second . . The input is shown converted to a rate per second value.</p>											
<p>【 Decimal point 】 The location of the decimal point setting. (Ratemeter)</p>											

Mode No.	Ratemeter : Setting of the sampling time										
3	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">B</td> <td style="text-align: center;">C</td> <td style="text-align: center;">D</td> <td style="text-align: center;">E</td> </tr> <tr> <td style="text-align: center;">3.</td> <td style="text-align: center;">0</td> <td style="text-align: center;">2.</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> </tr> </table> <p style="margin-left: 150px;">  Sampling time 00.1-99.9 seconds ("00.0" is "100 sec"). </p> <hr style="border-top: 1px dashed black;"/> <p>【 Sampling time 】 Input signals are read by this time, and its average value is calculated and indicated. Therefore, input signals are averaged and renewed by the set time. Use this setting for preventing flickering and for stabilizing indications. When 0.00 sec. is set, it is 100 seconds.</p>	A	B	C	D	E	3.	0	2.	0	0
A	B	C	D	E							
3.	0	2.	0	0							

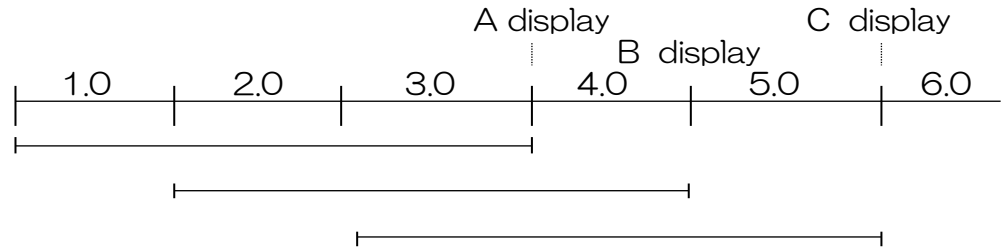
Mode No.	Ratemeter : Setting of the moving average range										
4	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">B</td> <td style="text-align: center;">C</td> <td style="text-align: center;">D</td> <td style="text-align: center;">E</td> </tr> <tr> <td style="text-align: center;">4.</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> </tr> </table> <p style="margin-left: 150px;">  Moving average count 00-19(00 and 01 are equivalent in effect.) </p> <p style="margin-left: 150px;">  Moving average method 0 : Pulses moving average 1 : Display moving average </p> <hr style="border-top: 1px dashed black;"/> <p>【 Pulses moving average 】 If the moving average count is set to 4 at "mode No.4", four pulses intervals are averaged and measured. When a new next pulse comes in, the measurement is repeated to discharge the oldest pulse interval, take in the new pulse interval, and average the four pulses intervals.</p> <p>Pulses moving average is especially effective when the flow rate per pulse of the sensor is not accurate.</p> <p>< Caution > This function should be applied only at 20 Hz or less.</p> <p>■ Example (Moving average count : 4)</p> <div style="display: flex; align-items: center;"> <div style="flex: 1;">  </div> <div style="flex: 2;"> <p>Signal input </p> <p>1st </p> <p>Pulses moving average 2nd </p> <p>3rd </p> </div> </div> <p>< Caution > This function should be applied only at 20 Hz or less.</p> <p>《Relationship between the moving average range and sampling time》 The newest data, obtained from the moving average performed at the preset sampling interval, is indicated in the reading if sampling is specified.</p>	A	B	C	D	E	4.	0	0	0	0
A	B	C	D	E							
4.	0	0	0	0							

【 Display moving average 】

If the moving average count is set to 3 at "Mode No.4", captures 3 times of instantaneous measurement data capture Calculates, captures the next instantaneous measurement data, discharges the oldest instantaneous measurement data, and displays the calculation.

■ Example (Moving average count : 3)

Rate meter



A display $2.0 = (1.0+2.0+3.0) \div 3$
 B display $3.0 = (2.0+3.0+4.0) \div 3$
 C display $4.0 = (3.0+4.0+5.0) \div 3$

< Caution >

- * Please note that the display response is delayed until it stabilizes because the display sampling time is taken in the set number of times.
- * If the data is less than the moving average count, the average value of the currently held data is displayed.

Mode No.	Rate meter : Setting the auto-zero time										
5	<table style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr> <td style="padding: 0 5px;">A</td> <td style="padding: 0 5px;">B</td> <td style="padding: 0 5px;">C</td> <td style="padding: 0 5px;">D</td> <td style="padding: 0 5px;">E</td> </tr> <tr> <td style="border: 1px solid black; text-align: center;">5.</td> <td style="border: 1px solid black; text-align: center;">0</td> <td style="border: 1px solid black; text-align: center;">2.</td> <td style="border: 1px solid black; text-align: center;">0</td> <td style="border: 1px solid black; text-align: center;">0</td> </tr> </table> <p style="margin-left: 100px;"> </p> <p style="margin-left: 100px;"> Auto-zero time 00.1-99.9 seconds (Fixed decimal place) [00.0 disables the function.] </p>	A	B	C	D	E	5.	0	2.	0	0
A	B	C	D	E							
5.	0	2.	0	0							
<p>【 Auto-zero time 】 If no input signal comes in within the set time, this function returns the reading indication value to "0".</p> <p>⚠ < Caution > * Please note that when "00.0" is specified, this function is disabled, and the reading remains still even after the input is shut off.</p>											

Mode No.	Setting of EXT input and measurement indication										
6	<div style="text-align: center; margin-bottom: 10px;"> <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px 10px;">A</td> <td style="padding: 2px 10px;">B</td> <td style="padding: 2px 10px;">C</td> <td style="padding: 2px 10px;">D</td> <td style="padding: 2px 10px;">E</td> </tr> <tr> <td style="padding: 2px 10px;">6.</td> <td style="padding: 2px 10px;"></td> <td style="padding: 2px 10px;"></td> <td style="padding: 2px 10px;">0</td> <td style="padding: 2px 10px;">0</td> </tr> </table> </div> <div style="margin-left: 100px;"> <p>Indicator 0 : Rate meter/totalizer is switched. 1 : Rate meter is fixed. 2 : Totalizer is fixed.</p> <p>EXT input 0 : Reset 1 : Hold 2 : Inhibit 3 : Indication change</p> </div> <hr style="border-top: 1px dashed black; margin: 10px 0;"/> <p>【 Indicator 】 0 : Rate meter/totalizer is switched. Rate meter/totalizer is switched with Display Key.</p> <p>1 : Rate meter is fixed. Rate meter is fixed and indicated.</p> <p>2 : Totalizer is fixed. Totalizer is fixed and indicated.</p> <hr style="border-top: 1px dashed black; margin: 10px 0;"/> <p>【 EXT input 】 The function of "terminals No. 6-7" can be registered. (selectable)</p> <p>0 : Reset Totalizer is made offset value. When the presetting output (OUT1,2) is output, it is released.</p> <p>1 : Hold During input on, "Hold" is indicated the present value. [Operating state : flash] * Even the state of a hold is calculated by a computer, and the presetting output is output by calculation.</p> <p>2 : Inhibit During input on, "Inhibit" restrains sensor input. [Operating state : non flash]</p> <p>3 : Indication change During input on, rate meter/totalizer is switched.</p> <p>⚠ < Caution > * When choosing 1 or 2 by an indicator, an indication change doesn't function.</p>	A	B	C	D	E	6.			0	0
A	B	C	D	E							
6.			0	0							

Mode No.	Totalizer : Setting of scaling data										
7	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">B</td> <td style="text-align: center;">C</td> <td style="text-align: center;">D</td> <td style="text-align: center;">E</td> </tr> <tr> <td style="text-align: center;">7.</td> <td style="text-align: center;">1</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> </tr> </table> <p style="margin-left: 150px;"> </p> <p style="margin-left: 150px;"> Scaling data 0001-9999 (Do not specify 0000.) </p> <hr style="border-top: 1px dashed black;"/> <p>Input scaling is performed for the totalizer reading. By specifying the scaling data and the exponential value (a minus power of 10), the scaling ratio per pulse can be set.</p> <p>The exponential value (a minus power of 10) is set in mode No.8. The setting is the same as that of the mode No.1.</p>	A	B	C	D	E	7.	1	0	0	0
A	B	C	D	E							
7.	1	0	0	0							

Mode No.	Totalizer : Setting of Exp. value, reset dwell time, overflow indication and the decimal point										
8	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">B</td> <td style="text-align: center;">C</td> <td style="text-align: center;">D</td> <td style="text-align: center;">E</td> </tr> <tr> <td style="text-align: center;">8.</td> <td style="text-align: center;">3</td> <td style="text-align: center;">0</td> <td style="text-align: center;">1</td> <td style="text-align: center;">0</td> </tr> </table> <p style="margin-left: 150px;"> </p> <p style="margin-left: 150px;"> Decimal point 0 : 0 1 : 0.0 2 : 0.00 3 : 0.000 4 : 0.0000 </p> <p style="margin-left: 150px;"> Overflow indication 0 : 99999 flashing 1 : 5 digits endless 2 : A place shift is carried out in the 1st excess. [" T " LED flashes on and off.] Furthermore, when exceeded : 99999 flashing. </p> <p style="margin-left: 150px;"> Reset time 0 : 2 sec. 1 : Immediate at (ON edge) </p> <p style="margin-left: 150px;"> Exp. value (exponent 10⁻ⁿ) n=0-9 </p> <hr style="border-top: 1px dashed black;"/> <p>【 Exp. value 】 The magnification per 1 pulse is decided at registered property of "Mode No.7" and "Exp. value".</p>	A	B	C	D	E	8.	3	0	1	0
A	B	C	D	E							
8.	3	0	1	0							

【 Reset time 】

Reset time for the front Reset Key is specified.

0 : 2 sec.

After the Reset Key is pressed for 2 seconds or longer, the reading is reset.

1 : Immediate

The reading is reset immediately when the Reset Key is pressed.

⚠ <Caution>

- * While Reset Key and "Reset" of the EXT input are in, the presetting output is suspended.
- * "Reset" of the EXT input is always immediately.
- * Reset Key and "Reset" of the EXT input is made offset value.
- * Rate meter isn't reset.

【 Overflow indication 】

The function of "overflow indication" can be registered.(selectable)

0 : 99999 flashing

Counting from 0, when the total exceeds 99999, the indication flashes.

(* Internal totaling is continued. To resume totaling from 0, reset.)

1 : 5 digits endless

Display is continued endlessly. When the total exceeds 99999, the totaling is resumed from 00000.

2 : Display shift to the digit to the left when the total exceeds 99999 to the 1st time. ("T"LED flashes on and off.)

Once again when the total exceeds 99999, the indication flashes.
(Indication shifts to the left.)

(* Internal totaling is continued. To resume totaling from 0, reset.)

⚠ < Caution >

- ※The analog output setting is registered by "totalizer", and if the total exceeds 99999, the analog output value is shifted in the state biggest (102.4%).

【 Decimal point 】

The location of the decimal point setting. (Totalizer)

Mode No.	Setting of OUT1 preset output										
9	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> </tr> </thead> <tbody> <tr> <td>9.</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> </tbody> </table> <p style="margin-left: 40px;"> → Output mode(2 - 9 : One shot output) 0 : Comparison 5 : 100ms 1 : Hold 6 : 250ms 2 : 30ms 7 : 500ms 3 : 50ms 8 : 1sec. 4 : 80ms 9 : 2sec. </p> <p style="margin-left: 40px;"> → Upper or lower limit selection 0 : Upper limit 1 : Lower limit (Immediate) 2 : Lower limit (Delay) ⚠ < Caution > ↑ * It's the same from which is chosen "1", when "1" is chosen by "output selection". </p> <p style="margin-left: 40px;"> → Output selection 0 : Rate meter 1 : Totalizer 2 : Synchronization pulse output </p> <p style="margin-left: 40px;"> → Disabled time interval 0 : 0sec. 5 : 8sec. 1 : 1 sec. 6 : 10sec. 2 : 2sec. 7 : 20sec. 3 : 3sec. 8 : 30sec. 4 : 6sec. 9 : 60sec. </p>	A	B	C	D	E	9.	0	0	0	0
A	B	C	D	E							
9.	0	0	0	0							
<p>The presetting output compares display value with the preset value, and outputs it by the result. Refer to "13. Calling up and modifying the preset value setting" for setting the preset values.</p>											
<p>【 Disabled time interval 】 The time in seconds following power startup or reset at which the presetting output function is activated is specified.</p> <p>⚠ < Caution > * It also functions,during each setting. Attention please. * It's the same from which is chosen "0", when "2" is chosen by " upper or lower limit selection".</p>											

【 Output selection 】

A display to compare with a preset value is chosen.

0 : Rate meter

Rate meter is compared with a preset value.

1 : Totalizer

Totalizer is compared with a preset value.

2 : Synchronization pulse output

It outputs synchronizing with totalizer. Refer to page 29.
In this case, a preset value is unrelated.

【 Upper and lower limits selection 】

Output condition is specified.

0 : Upper limit

It outputs, "Indication value \geq Preset value"

1 : Lower limit (Immediate)

It outputs, "Indication value \leq Preset value"

2 : Lower limit (Delay) * **Only when display is Rate meter, it functions.**

It outputs,

"Indication value $>$ Preset value \rightarrow Indication value \leq Preset value"

【 Output mode 】

The length of a presetting output is specified.

0 : Comparison

This is output when the indication value exceeds the upper/lower limit setting value (preset value). When the indication value returns to within the set range, the output is turned off.

1 : Hold

This is output when the indication value exceeds the upper/lower limit setting value (preset value). The presetting output, once activated, is sustained until reset.

2 - 9 : One shot output

A pulse of pre-specified width is output once when the indication value exceeds the upper/lower limit setting value (preset value).

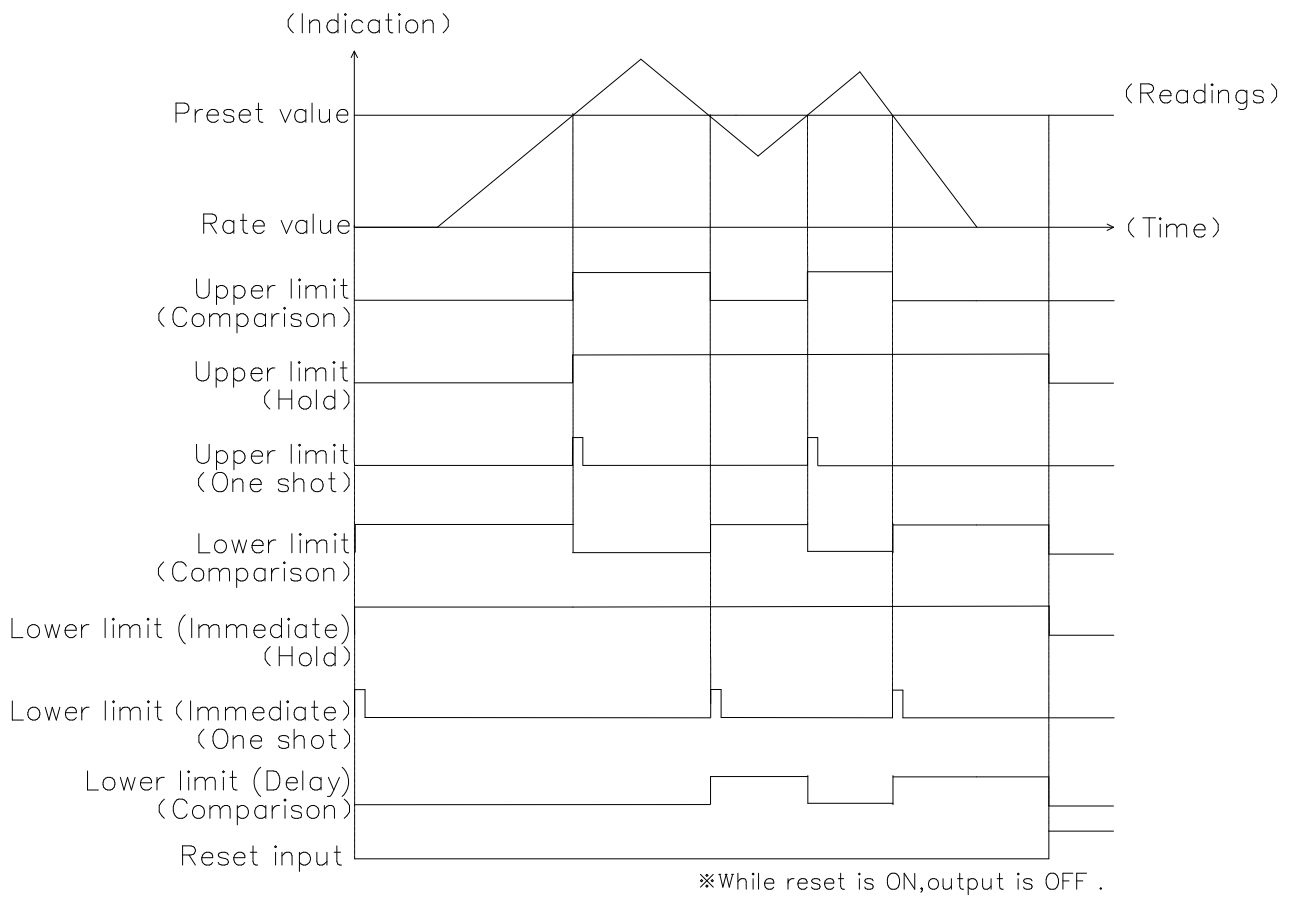
"Output error : ± 2 ms"

[Ex.] The following settings are required in a case where the presetting function is to be activated 6 sec following startup, and the presetting output is to be outputted and sustained when the reading exceeds the rate meter upper limit.

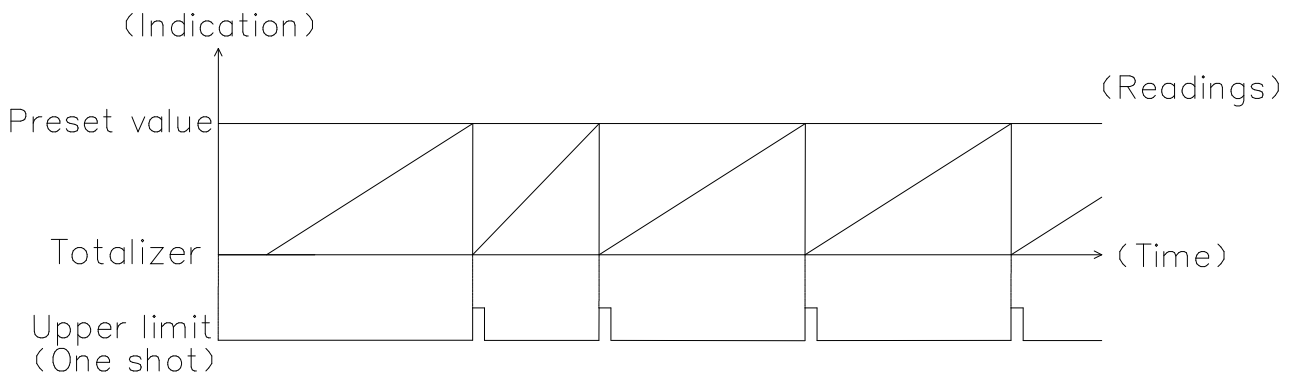
"Output selection : Rate meter"

A	B	C	D	E
9.	4	0	0	1

【 Chart at the timing of the preset output 】



【 Chart at the timing of the offset return output 】



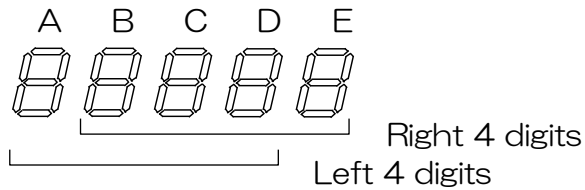
Mode No.	Setting of OUT2 preset output										
A	<p>※ Not displayed when P1 option is selected</p> <table border="1" style="margin-left: 20px;"> <tr> <td style="padding: 2px;">A</td> <td style="padding: 2px;">B</td> <td style="padding: 2px;">C</td> <td style="padding: 2px;">D</td> <td style="padding: 2px;">E</td> </tr> <tr> <td style="padding: 2px;">A.</td> <td style="padding: 2px;">0</td> <td style="padding: 2px;">0</td> <td style="padding: 2px;">0</td> <td style="padding: 2px;">0</td> </tr> </table> <p>→ Output mode (2-9 : One shot output) 0 : Comparison 5 : 100ms 1 : Hold 6 : 250ms ◆ 2 : 30ms 7 : 500ms ◆ 3 : 50ms 8 : 1sec. 4 : 80ms 9 : 2sec.</p> <p>◆ It outputs as "one shot output" at rate meter. It outputs as "offset return" at totalizer.</p> <p>→ Upper or lower limit selection 0 : Upper limit 1 : Lower limit (Immediate) 2 : Lower limit (Delay) ⚠ <Caution></p> <p>→ Output selection 0 : Rate meter 1 : Totalizer</p> <p>→ Disabled time interval 0 : 0sec. 5 : 8sec. 1 : 1sec. 6 : 10sec. 2 : 2sec. 7 : 20sec. 3 : 3sec. 8 : 30sec. 4 : 6sec. 9 : 60sec.</p> <hr style="border-top: 1px dashed black;"/> <p>Each setting is the same as that of the mode No. 9 "Setting of OUT1 preset output".</p> <hr style="border-top: 1px dashed black;"/> <p>【 Offset return 】 When the indication value exceeds the upper limit (preset value), this outputs one pulse of the set width one time, and the indication is returned to the offset value and totaling is resumed. "Output error : ±2ms"</p> <p>In case of "the upper limit" does function, but in case of "the lower limit" doesn't function.</p> <p>⚠ < Caution > * The following settings are required . "Preset value > Offset value"</p> <p>Always reset before starting count.</p>	A	B	C	D	E	A.	0	0	0	0
A	B	C	D	E							
A.	0	0	0	0							

Mode No.	Totalizer : Setting of the synchronization pulse output										
b	<p>※ Not displayed when P1 option is selected</p> <p>⚠ < Caution > * It will function, if the totalizer synchronous pulse output is set up by output selection of the mode No.9. The synchronization pulse is outputted from OUT1 (terminals no. 3-4).</p> <table border="1" data-bbox="351 492 702 571"> <tr> <td>A</td> <td>B</td> <td>C</td> <td>D</td> <td>E</td> </tr> <tr> <td>b.</td> <td>0</td> <td>0.</td> <td>0</td> <td>5</td> </tr> </table> <p>→ Synchronization pulse output width setting 0.01-1.99 sec. ("00.0" is "0.01 sec".)</p> <p>→ Output digit selection 0 : 1st digit (E) 1 : 2nd digit (D) 2 : 3rd digit (C) 3 : 4th digit (B)</p> <hr/> <p>【 Output digit 】 The digit whose change is to trigger the pulse output is specified.</p> <hr/> <p>【 Pulse output width 】 The output width of synchronization pulse is specified.</p> <p>⚠ < Caution > * Caution is required as the synchronization output pulse is renewed each time the output digit value changes : if the pulse width is set longer than the time interval of the output digit change, the pulse output becomes continuous.</p> <p>⚠ < Caution > * When 0.01 sec. were set by a synchronization pulse output, an output response is faster than indication scan, so "OUT1 LED" sometimes doesn't light up. It's outputting.</p>	A	B	C	D	E	b.	0	0.	0	5
A	B	C	D	E							
b.	0	0.	0	5							

Mode No.	Analog output(option) : Setting of measurement choice and the output digit										
C	<p data-bbox="391 208 1380 241">* Displayed when analog output option is selected (AI/AV3-5 type).</p> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <table border="1" style="border-collapse: collapse; text-align: center; margin-right: 20px;"> <tr> <td style="padding: 2px 10px;">A</td> <td style="padding: 2px 10px;">B</td> <td style="padding: 2px 10px;">C</td> <td style="padding: 2px 10px;">D</td> <td style="padding: 2px 10px;">E</td> </tr> <tr> <td style="padding: 2px 10px;">C.</td> <td style="padding: 2px 10px;"></td> <td style="padding: 2px 10px;">0</td> <td style="padding: 2px 10px;"></td> <td style="padding: 2px 10px;">0</td> </tr> </table> <div> <p data-bbox="762 376 973 409">→ Digit selection</p> <p data-bbox="778 416 1220 483">0 : Right 4 digits : comparison (Display unit B,C,D,E)</p> <p data-bbox="778 490 1209 557">1 : Left 4 digits : comparison (Display unit A,B,C,D)</p> </div> </div> <div style="margin-left: 150px; margin-top: 10px;"> <p data-bbox="762 602 1193 636">→ Selecting between rate/total</p> <p data-bbox="778 642 1433 676">0 : Rate meter (Synchronized with the indication value) ◆</p> <p data-bbox="778 683 1433 716">1 : Rate meter (Synchronized with the calculation value) ◆</p> <p data-bbox="778 723 1385 757">2 : Totalizer (Synchronized with the indication value)</p> <p data-bbox="778 763 1385 797">3 : Totalizer (Synchronized with the calculation value)</p> <p data-bbox="826 804 1433 837">◆Synchronized with the sampling time.</p> </div> <hr style="border-top: 1px dashed black; margin: 20px 0;"/> <p data-bbox="391 860 861 893">【 Selecting between rate/total 】</p> <p data-bbox="406 900 1433 967">The value to be outputted is selected. And the indication value or the calculation value is selected too.</p> <p data-bbox="438 1012 1252 1135">0 : Rate meter(Synchronized with the indication value.) It outputs to the indication value. It outputs to the holding value,when "1" is chosen by"Mode No.6 - Hold".</p> <p data-bbox="438 1180 1284 1247">1 : Rate meter (Synchronized with the calculation value.) It outputs to the calculation value.</p> <p data-bbox="438 1292 1252 1438">2 : Totalizer (Synchronized with the indication value.) It outputs to the indication value. It outputs to the holding value,when "1" is chosen by"Mode No.6 - Hold".</p> <p data-bbox="438 1482 1268 1550">3 : Totalizer (Synchronized with the calculation value.) It outputs to the calculation value.</p>	A	B	C	D	E	C.		0		0
A	B	C	D	E							
C.		0		0							

【 Digit selection 】

It chooses "the right 4 digits" or "the left 4 digits", and setting.



⚠ < Caution >

※An analog output is outputting calculation to the indication value shown to 7 segment LED. Therefore the resolution sometimes falls from 13000 by setting of mode No.C,d. When the analog output maximum output indication value set "more than 1300" and "the left 4 digits", it will be 13000 resolutions, basically.

< Addition about the analog output resolution >

The setting of analog output sets each 4 digits of left and right. But that's compared by at most 5 digits (left 4digits) by calculation. The analog output is outputting to the indication value into which the reach from a least significant digit to the highest rank figure was divided by 13000 resolutions in relation to mode d. (the indication value to the 1bit)

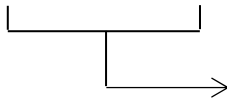
(Ex.) The settings in a case where the analog output is synchronized with the rate reading, with a maximum output when the reading is 10, would be as follows.

< Condition >

Mode No.C : Digit selection → Left 4 digits
Mode No.d : Setting of maximum output indication → 0001

(Result)

Digital/analog converter is 0-13000 bits to indication value 0-10. Therefore analog is output every 1300 bits to a change in the indication value "1". Therefore the resolution is 10 resolutions.

Mode No.	Analog output(option) : Setting of maximum output indication																			
d	<p>※ Displayed when analog output option is selected (AI/AV3-5 type).</p> <table border="1" data-bbox="443 271 748 342"> <tr> <td>A</td> <td>B</td> <td>C</td> <td>D</td> <td>E</td> </tr> <tr> <td>d.</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> </tr> </table>  <p>Indication value 0001-9999 (Do not specify 0000.)</p>	A	B	C	D	E	d.	1	0	0	0									
	A	B	C	D	E															
	d.	1	0	0	0															
	<p>Set an indication value of the time when the analog output is maximum.</p>																			
<p>Set a value in four digits, neglecting the decimal point. For example, both 500.0 and 50.00 are all right. (It sets as "5000" in this case.)</p> <p>[Ex.] The settings in a case where the analog output is synchronized with the rate reading, with a maximum output when the reading is 5000, would be as follows.</p> <table border="1" data-bbox="371 853 684 920"> <tr> <td>A</td> <td>B</td> <td>C</td> <td>D</td> <td>E</td> </tr> <tr> <td>C.</td> <td></td> <td>0</td> <td></td> <td>0</td> </tr> </table> <p>C : 0 [Rate meter (Synchronized with the indication value.)] E : 0 [Digit selection (Right 4 digits)]</p> <table border="1" data-bbox="371 987 684 1055"> <tr> <td>A</td> <td>B</td> <td>C</td> <td>D</td> <td>E</td> </tr> <tr> <td>d.</td> <td>5</td> <td>0</td> <td>0</td> <td>0</td> </tr> </table> <p>B-E [Setting of maximum output indication : 5000]</p>	A	B	C	D	E	C.		0		0	A	B	C	D	E	d.	5	0	0	0
A	B	C	D	E																
C.		0		0																
A	B	C	D	E																
d.	5	0	0	0																
<p>⚠ < Caution ></p> <ul style="list-style-type: none"> * Even if the indication value goes over the indication value setting of analog maximum output, it outputs the setting of analog maximum output indication value. The limited on 102.4%. * When setting mode No. d as (0000), an analog output is always 102.4%. * If the indication value goes over the indication value setting of analog maximum output, the limit reaches to 102.4%. After that, it outputs by the limited value (102.4%). * If it's always overflow indication in spite of rate meter and totalizer, it always outputs by the limited value (102.4%). <p>[Ex.] When it will be making the overflow indication by setting of the biggest indication and the left 4 digits at "Mode No.C, d", it'll be 102.4% immediately.</p>																				




11. The mode protect function

When the mode protect function is made effective, Display Key operation is invalid by mode setting.
Therefore the set value can't be changed.

In an early stage, the mode protect function is invalid.

When doing the mode protect function setting, please operate as follows.

«Operation of the mode protect»

Operation key	Indication	Procedure
	<pre> 1O A B C D E 2O [L - o F F] TO (The mode protect : present) </pre>	Press the key for 2 sec. or more. The present mode protect state is displayed. [The regular factory setting is "L-oFF" .]
	<pre> 1O A B C D E 2O [L - o n] TO (The mode protect : change) </pre>	Keep pressing Shift Key for 8 sec as it's continuously, the state of mode protect is changed. * "OFF → ON" or "ON → OFF"
	<pre> 1O A B C D E 2O [Measured value] TO </pre>	It usually returns when Shift Key is stopped being pressed.

⚠ < Caution >

- * The preset value setting and the offset value setting always can be changed.
- * At the mode protect state, other indication goes off.
- * The mode protection function becomes "OFF", when it's initialized.

12. Calling up and modifying the offset value setting

The preset totalizer reading value to be displayed directly following a reset is specified.

For example, if the offset value is set at "01000", the reading becomes "1000" when reset, and the count resumes from "1000".

In order to start the count from "0", the offset value should be set as "00000".

The possible range for offset is 0-99999.

The procedure for setting the offset value is described below.

«Operation of the offset value setting»

* When there are no customer requests, the initial value setting is "00000".

Operation key	Indication	Procedure
	A B C D E 1 O 2 O 0 0 0 0 0 T ●	While pushing down Mode Key, press Display Key for 2 sec. or more. "T" LED lights up and the present offset value is displayed.
	A B C D E 1 O 2 O 0 → 0 → 0 → 0 → 0 T ●	Shifts the flashing indication to the digit to the right. Each time Shift Key is pressed, shifts the indication to one right.
	A B C D E 1 O 2 O 0 1 0 0 0 T ●	Changes the value of the flashing digit. Each time Display Key is pressed, the number goes up by one. (0→1→……→9→0→……)
	A B C D E 1 O 2 O Measured value T ●	After adjusting the setting, use Reset Key to register it . The display returns to the readings following registration .

«After registration»

	A B C D E 1 O 2 O 1 0 0 0 T ●	The registered offset value can be displayed by pressing Reset Key. The totalizer count is resumed from this value.
--	--	---

⚠ < Caution >

※The mode protection function is invalid.

(Please refer to "11. The mode protect function".)

※The decimal point is interlocked with the mode No.8.

※When using "offset return" by mode No.A, please be sure to set the preset value by the following condition.

Always reset before starting count.

"Preset value > Offset value"






13. Calling up and modifying the preset value setting

Set the preset values. "OUT1, OUT2".

The setting ranges are 0-99999.

The procedure for setting the preset value is described below.

«Operation of the preset value setting»

Operation key	Indication	Procedure
	A B C D E 1 ● 2 O 9 9 9 9 9 T O	Press Mode Key for 2 sec. or more. "OUT1" LED lights up and the present preset value is displayed.
	A B C D E 1 ● 2 O 9 → 9 → 9 → 9 → 9 T O └-----┘	Shifts the flashing indication to the digit to the right. Each time the key is pressed, shifts the indication to one right..
	A B C D E 1 ● 2 O 9 0 9 9 9 T O	Changes the value of the flashing digit. Each time Display Key is pressed, the number goes up by one. (0→1→.....→9→0→.....)
	A B C D E 1 O 2 ● 9 9 9 9 9 T O	The OUT2 led lights up and the preset value setting for OUT2 is shown. Press Shift Key and Display Key to set the desired setting value.
	A B C D E 1 O 2 O Measured value T O	After adjusting the setting, use Reset Key to register it . The display returns to the readings following registration.

⚠ < Caution >

- * Which of the rate meter or totalizer is the preset values used by must be selected according to the mode No.9 and the mode No.A.
- * The decimal point is interlocked with the mode No.2 for rate meter and the mode No.8 for totalizer.
- * The mode protection function is invalid.
(Please refer to "11. The mode protect function".)









14. Adjusting the analog output (option)

⚠ < Caution >

※It's being adjusted according to the analog output option, but when being adjusted by yourself, please setting it with the following procedure.

When a power supply is supplied while is pressing Display Key, an analog output adjustment mode setting.

* Displayed when analog output option is selected (AI/AV3-5 type).

Operation key	Indication	Procedure
	A B C D E 1O 2O A n A TO	When a power supply is supplied while is pressing Display Key, "AnA" is displayed.
	A B C D E 1O 2O A n - 1 TO	When Mode Key is pressed, "An-1" is displayed. An analog output adjustment (minimum) is performed.
	A B C D E 1O 2O 0 4 A 8 TO (The bit values)	Please adjust the bit value to the output minimum value of "AI,AV3-5". When Display Key is pressed, the bit values increases. When Shift Key is pressed, the bit values decreases. [The variable range is 0000-3FFF.]
	A B C D E Measured value	After adjusting the setting, use Reset Key to register the lower bit values .
	A B C D E 1O 2O A n - 2 TO	When Mode Key is pressed, "An-2" is displayed. An analog output adjustment (maximum) is performed.
	A B C D E 1O 2O 3 b 5 8 TO (The bit values)	Please adjust the bit value to the output maximum value of "AI,AV3-5". When Display Key is pressed, the bit values increases. When Shift Key is pressed, the bit values decreases. [The variable range is 0000-3FFF.]
	A B C D E Measured value	After adjusting the setting, use Reset Key to register the upper bit values .
	A B C D E 1O 2O Measured value TO	When Mode Key is pressed for more than 2 seconds, a display returns to measurement indication.

In case of "AV3(1-5V)"

Items	Voltage
Adjustment (MIN)	1.000V
Adjustment (MAX)	5.000V

In case of "AV4(0-5V)"

Items	Voltage
Adjustment (MIN)	0.000V
Adjustment (MAX)	5.000V

In case of "AV5(0-10V)"

Items	Voltage
Adjustment (MIN)	0.000V
Adjustment (MAX)	10.000V

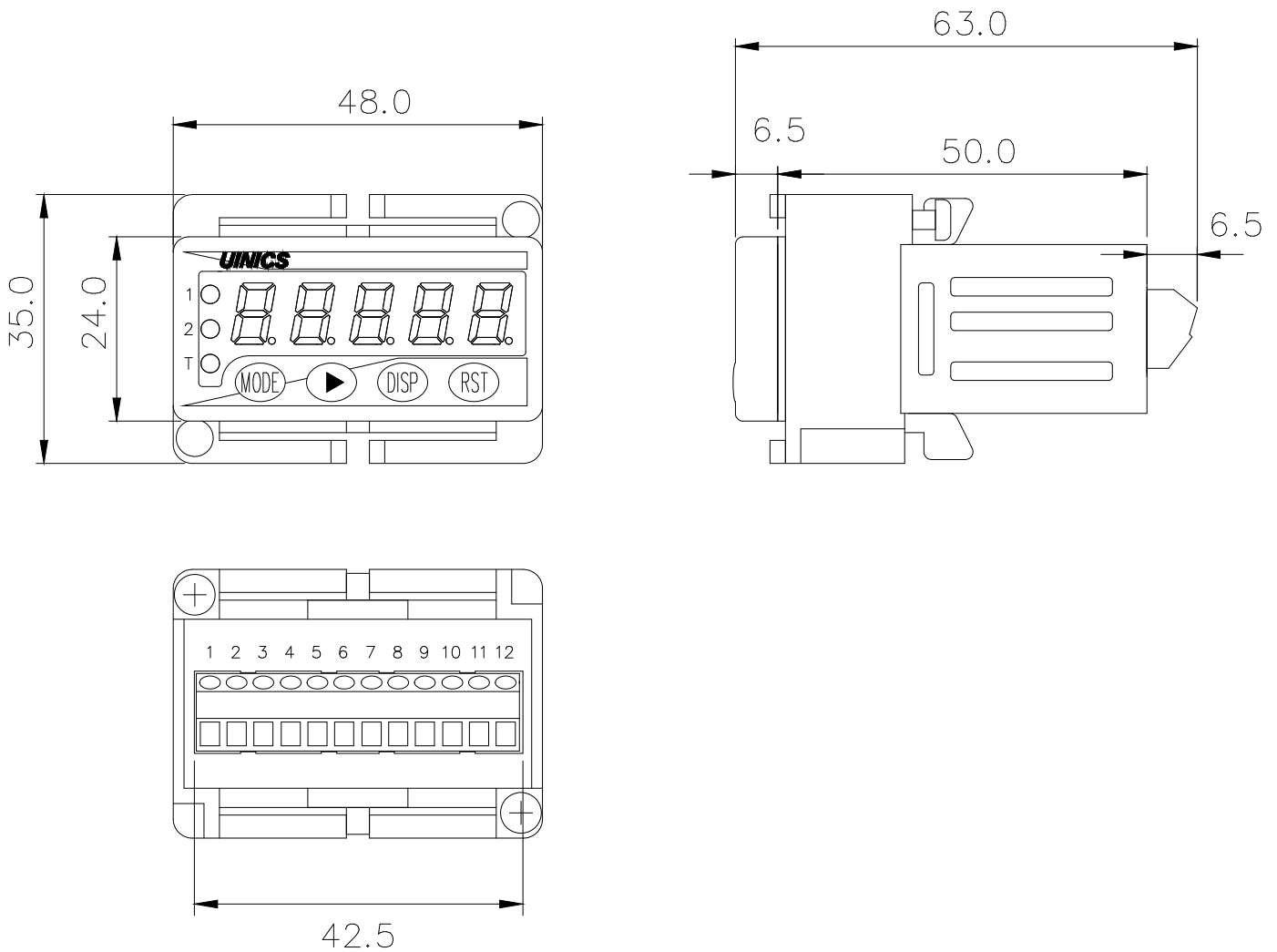
In case of "AI(4-20mA)"

Items	Current
Adjustment (MIN)	4.000mA
Adjustment (MAX)	20.000mA

15. External dimensions

External dimensions

Fig.15-1



(Unit : mm)

16. About a noise countermeasure

When influence of noise occurred, please be careful about the following.

When doing a blackout and a malfunction by influence of noise, please be initialized. (Refer to page 15)

Please take notes of the value setting of each modes.

If it becomes normal, please take the following measure.

And please setting it once again.

- (1) Please use 3 cores of shielding wire for a sensor, separate as much as possible from a source of noise.
- (2) Please avoid a source of noise (power supply line and inverter), make it as short as possible. After that, please install a sensor code.
- (3) Please separate from a power supply line, in a case affected by noise. And please install a EMI filter.
- (4) The manner of the sensor cord installation.
When there is a power supply line near the sensor cord, a surge and noise are influenced.
Therefore, install a sensor cord independently or for 50 cm or more.

Fig.16-1

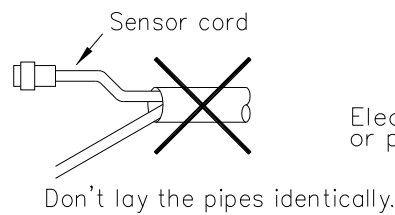
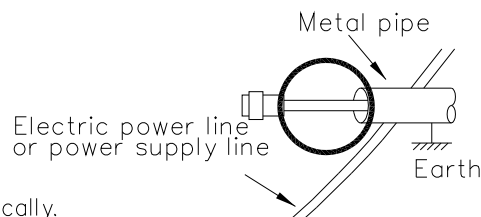
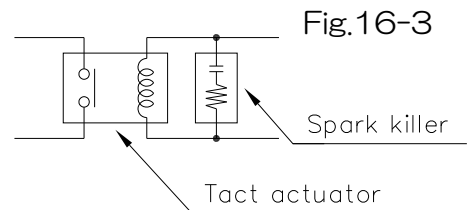


Fig.16-2



- (5) When being affected than other equipment, please use a spark killer like Fig.16-3 and take a measure.



- (6) If there is an unclear point, please even consult with use about a dealer or us.

17. Troubleshooting

When abnormality occurred, please check it as follows.

No.	Problem	Checking point	Solution
1	Display does not appear at all.	→Has it connected with the rear terminal correctly? Is the screw tightened certainly? Is the polarity of the 24V DC line correct?	→Connect correctly according to "Connecting terminal boards" (Refer to page 6). ↓ When display still does not appear, have it serviced.
2	Unusual LED lighting, key switch operation, preset - output, synchronization pulse, analog output	→Check with the test mode (Refer to page 13).	→Initialize(Refer to page 15). ↓ When it still does not resume normal status, have it serviced.
3	Rate meter remains at "0" and does not count.	→Is the setting for each mode correct? ↓ →Is the sensor input normal? ↓ →Is the distance of the sensor normal? ↓ →Is the input system of this meter suitable for the output signal of the sensor?	→Check the setting again (Refer to page 17-32). →Check the connection of the sensor(Refer to page 6). Check with the test mode (Refer to page 15). →The sensor lamp flash is confirmed. A sensor is tested. "ON/OFF" →Operation manual check. ↓ When it still does not resume normal status, have it serviced.
4	Indicator is flashing "99999".	→Check whether the scaling is not too large. (Rate meter) ↓ →Overflow indication. (Totalizer) ↓ →Influence of noise.	→Change the scaling data. (Refer to page 17 for mode No.1, page 23 for mode No.7 and page 23-24 for mode No.8.) About a noise countermeasure →Refer to page 38 for "About a noise countermeasure". ↓ When it still does not resume normal status, make a contact to a dealer or us.
	The measurement display alternates with "Err01"	→Is the polarity of the 24V DC line correct? →Sensor failure	→Connect correctly according to "Connecting terminal boards" (Refer to page 6). →Replace sensor. ↓ When display still does not appear, have it serviced.

■EMC standard (EN61326-1:2021)

Emission

EN55011 Group 1 Class A

This product complies with EMC standards for industrial environments.

When used in a residential or light industrial environment, it may cause electromagnetic interference to other equipment.

Immunity

EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6

*Analog output is allowed up to ± 1 mA for 4-20mA during testing.

This product complies with EMC standards for industrial environments.

Users should pay particular attention to the electromagnetic immunity listed below.

- Electrostatic discharge
- Radiated noise
- Conducted noise
- Magnetic field noise
- Surge noise

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