

# Quick Manual

## Digital Panel Meter with Totalizer Function, Model 419B

I-01957

Thank you for purchasing our digital panel meter 419B series.

This meter indicates instantaneous and integrating flow rate by receiving the pulse signal from the flow meter.

Before use, read this manual carefully and thoroughly, and keep this manual available for routine reference.

### 1. Preface

#### 1.1 Inspection

- Remove the meter from box. Inspect the packaging and contents for damage. Report damages, if any, to the carrier. If any part is missing or the meter malfunctions, please contact your supplier or the factory for assistance with your information of model name and serial number.
- Please check contents of the package you received as outlined below.
  - (1) 419B itself
  - (2) This manual

#### 1.2 Keeping and maintenance

- Install the meter temperature in a cool and dry place, away from direct sunlight

<b>⚠ CAUTION</b>
<ul style="list-style-type: none"> <li>- Preserve the 419B in the range of -20 to +70 °C .</li> <li>- Wipe the front panel or the case by the soft cloth with a mild neutral cleanser if it is dirty. Do not use solvent such as thinner nor benzene to avoid deform nor discolor.</li> </ul>

#### 1.3 Precautions

<b>⚠ CAUTION</b>
<p>Preserve followings for your safety.</p> <ul style="list-style-type: none"> <li>- There is no power on-off switch on the model 419B. It immediately starts to operate after turning the power. The rated data is, however, defines with more than 15 minutes warming-up times.</li> <li>- When the product is installed in the cabinet, perform the appropriate heat radiation to keep less than 50°C in it.</li> <li>- Do not install under the following conditions.                     <ul style="list-style-type: none"> <li>- Where it is exposed to direct sunlight, dust, corrosive gases, rain, etc.</li> <li>- Where ambient temperature or humidity is high.</li> <li>- Where it is exposed to excessive noise or static electricity.</li> <li>- Where there is constant vibration or shock.</li> </ul> </li> </ul>

### 2. Model Numbering

419B	-		-		-		-	
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Input signal (sensor input)	Non-voltage output or open collector	Blank			
	Voltage pulse	RE			
	Tachogenerator	MG			
	Sine wave	SN			
Power supply	AC100 ~ 240V		A		
	DC12V		8		
	DC24V		9		
Power for sensor	N/A			Blank	
	12V±5%			3	
	24V±5%			5	
Data output	No output				Blank
	Analog	DC0 ~ 1V			03
		DC0 ~ 5V			04
		DC0 ~ 10V			05
		DC1 ~ 5V			09
		DC4 ~ 20mA			29
RS-485				E1	

### 3. Specifications

#### 3.1 Instantaneous value measurement

Rate of fluid flow is the volume of fluid which passes through a given surface per unit time, such as cubic meter per second, minute, hour, and so on.

The instantaneous display = Frequency × Instantaneous time unit (×1, ×60, ×3600) × Instantaneous pulse conversion value

Instantaneous value display:

- 0~9999 : Red LED, Character 8mm High, with zero-suppress function.
- Decimal point : Programmable form the front key
- Over-range indication : When exceeded 9999, blinking with 0000.
- Turned off : Changeover to be put on or off.

Note) Alarm, pause, and latch will be operated when the display is blank.

- Display cycle : Selectable from the front key. 100ms, 400ms, 1s, 2s, 5s.
- Moving averaging : Selectable from the front key. 1, 2, 3, 4, 8, 16-time.
- Pulse conversion value: Selectable from the front key, from  $1 \times 10^{-6}$  to 9999
- Time base : Selectable from the front key. Seconds, minutes, or hours
- Accuracy :  $\pm (0.05\% + 1\text{digit})$
- Auto-Zero display : It will automatically turn off when there is no water flowing. Setting range is from 0.1 to 99.9 seconds.
- Field adjustment : The function which is able to arbitrarily change the measuring value without laborious calibration.

Instantaneous average VS Moving average

Instantaneous display cycle	Numbers of Moving average	Setting
100ms	N/A	1/2/3/4/8/16-time
400ms	4-time per 100ms	Not available
1s	10-time per 100ms	
2s	20-time per 100ms	
5s	50 time per 100ms	

#### 3.2 Totalized value measurement

The meter displays calculation values which is multiplied numbers of input pulse by the K-factor. Any point can be assigned to initial of total value and be programmed anywhere in the range of the meter.

Totalized value display : 0~99999 : Green LED, Character 8mm High, with zero-suppress function.

- 5 or 10 significant digit: Programmable form the front key
- There is display switch of 5 high rank digits at 10-digit counter.

- Decimal point : Programmable form the front key
- Over-range indication : In case of 5-digit, count from 0 with blinking when exceeded 5-digit.  
In case of 10-digit, count from 0 with blinking when exceeded 10-digit.  
The presence selection function of blinking is provided.
- Turned off : Changeover to be put on or off.

Note) Alarm, reset, pause, and latch totalized P.O will be operated when the display is blank.

Totalizer pulse coefficient : Programmable pulse factor from the front panel. From  $1 \times 10^{-9}$  to 9999 pulses/unit.  
P.O output is synchronized to input pulse when exceeding 1.

Initial totalized value : from 0 to 99999, programmable from the front key.

Display cycle : approx. 0.1s.

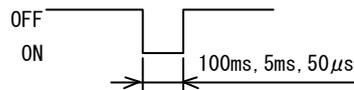
SIG display : Light-up when inputting the signal.

Totalization synchronizing pulse output(P.O.) :

- Output the pulse signal which is simulated with the totalized count.
- Output capacity: open collector output (NPN), DC30V 200mA
- Pulse factor: programmable from 1/1, 1/10, and 1/100 of integration by changing segmented frequency ratio.

Pulse width: Selectable in accordance with output frequency.

- 100ms: at 0 to 5Hz
- 5ms: at 0 to 100 Hz
- 50 $\mu$ s: at 0 to 10kHz



Reset : RESET switch inside the front panel or RESET terminals on the rear terminal blocks allow to reset the totalized count (to 0) or to the initial totalizing value. It also clears the incomplete batch of pulses of P.O. output.

Input to the terminal: non-voltage contact or open collector (NPN) DC5V 10mA

Active "L", "L"=0~1V, "H"=3.5~5V, 10ms min. Pulse width.

Keep pushing the reset key more than 1 sec to rest. Available the reset key to disable.

### 3.3 Common Specifications

Input signal :

code	Specifications	Input Frequency
Blank	Non-voltage output or open collector .....DC12V 10mA	0.01Hz ~ 10kHz
RE	Voltage pulse input .....“H”=4.5~30V, “L”=0~2.0V Input resistance approx. 5kΩ	
MG	Tachogenerator input .....AC0.8~80V p-p Up to 100Hz More than 0.8V p-p Up to 1kHz More than 6V p-p Up to 10kHz More than 24V~80V p-p	10Hz ~ 10kHz
SN	Sine wave input .....AC0.1~20V p-p Up to 100Hz More than 0.1V p-p Up to 1kHz More than 1.5V p-p Up to 10kHz More than 6V~20V p-p	

Input Frequency : HF range: 0.01Hz~10kHz / LF range: 0.01Hz~100Hz Programmable from the front key.

Min. Pulse width : HF range: 0.05ms / LF range: 5ms.

Latch / Pause input : Latch : Hold of display and data output of instantaneous and totalized value. (except of totalization-synchronized pulse output(P.O.)). Count of totalizing is continued.

: Pause : Hold of display and data output of instantaneous and totalized value.  
Count of totalizing is temporarily stopped.

Non-voltage contact or open collector (NPN) DC5V 10mA

Active "L", "L"=0~1V, "H"=3.5~5V, 10ms min. Pulse width.

Option: hold both analog output and RS-485 output.

Power to the sensor :

code	voltage	output current	Ripple
Blank	-	-	-
3	12V±5%	60mA	5% or less
5	24V±5%	30mA	5% or less

Backup : An

accumulated total flow when the power is interrupted.

Keep 10 years.

Alarm output : Photo mos relay contact: AC/DC 150V 80mA

Power source line penetrating noise

: 1000V

Withstanding Voltage : Power supply terminals – Case

: AC1500V each for 1 min.

Input terminals – Case

: AC1500V each for 1 min.

Power supply terminals - Input and Output terminals : AC1500V each for 1min.

Input terminals – Analog output/RS-485 output terminals : AC500V each for 1 min.

Insulation Resistance : DC500V 100MΩ or more.

Power Supply : AC 100 to 240V (50/60HZ), DC12V±10%, DC24V±10%

Allowable power : AC 90 to 250V (50/60Hz), DC10.8 to 13.2V, DC21.6 to 26.4V

Power Consumption : Approx. 7.5VA at AC100V, 10VA at AC200V, 400mA at DC12V, 250mA at DC24V.

Operating Temperature : 0 to 50°C

Storage Temperature : -20 to 70°C

Weight : Approx. 160g

Mounting Method : Panel mount from the rear with the special bracket.

EEPROM retains the data of

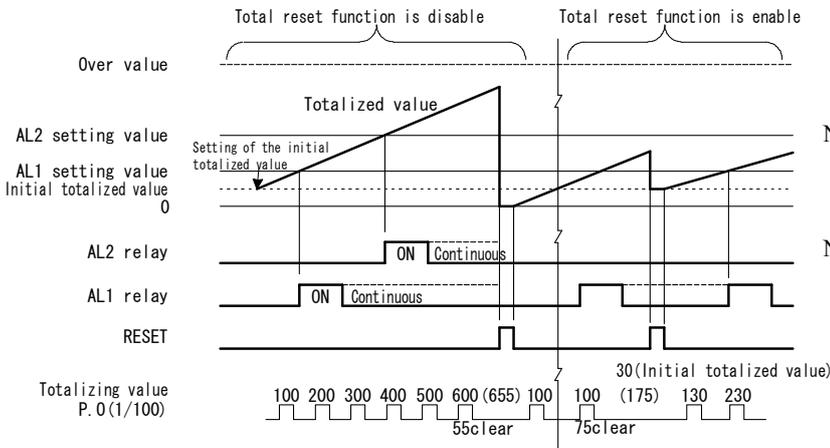
### 3.4 Total Reset function

#### 3.4.1 When outputting H and HH alarm

- In case of the total reset function is enable, resets the total to the initial integrated value.
- In case of the total reset function is disable, resets the total to zero.
- When the total exceeds the over flow value, total reset automatically either enable or disable, count from zero.

#### 3.4.2 When outputting batch output

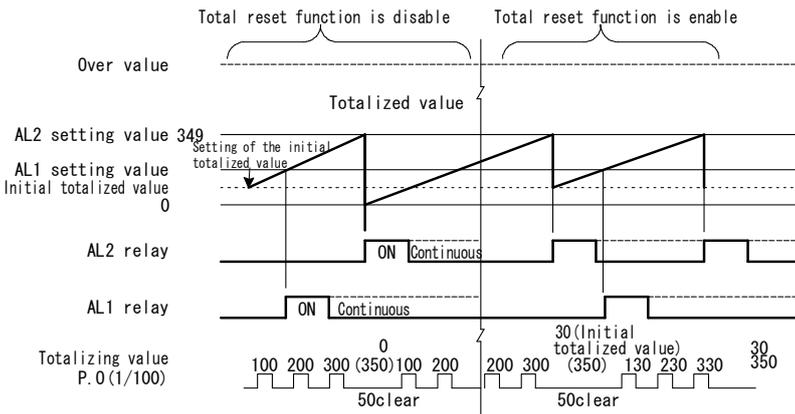
##### (a) In case of the automatic total reset is disable



NOTES 1: In case of the total reset function is disable, resets the total to zero and frequency dividing of P.O. output goes clear.

NOTES 2: In case of the total reset function is enable, resets the total to initial value and frequency dividing of P.O. output goes clear.

##### (b) In case of the automatic total reset is enable



NOTES 3: In case of the total reset function is disable, automatically resets the total to zero and frequency dividing of P.O. output goes clear.

NOTES 4: In case of the total reset function is enable, automatically resets the total to initial value and frequency dividing of P.O. output goes clear.

NOTES 5: Setting range of the AL2 setting value: initial value < AL2 (display Err2 if you set to the out of range)

### 3.5 Alarm output

Alarm will outputs by switching back and forth either instantaneous value alarm (AL1 lower, AL2 upper) or integrating value alarm (H and HH alarm or two-level batch) at AL1 and AL2.

#### 3.5.1 Instantaneous value alarm output

Outputs upper and lower alarm (on the front panel monitor).

Setting range is from 0 to 9999. Outputs to simulate the instantaneous display frequency.

##### ► Condition of comparison

Instantaneous value > Upper setting value, AL2OUT ON (lit up the AL2 on the front panel monitor)

Instantaneous value < Lower setting value, AL1OUT ON (lit up the AL1 on the front panel monitor)

Output	AL1 OUT-COM	AL2 OUT-COM
high alarm	OFF	ON
Low alarm	ON	OFF

NOTE: Reset is enable to the totalized value, Instantaneous value alarm does not return.

### 3.5.2 Totalized value alarm output

Totalized value alarm outputs by switching back and forth either H and HH alarm or two-level batch.

H and HH alarm will compare to the display, and batch output will compare to total value (NOTE 1).

Delay of the relay output: Max. 20ms to the display at HH alarm. Max. 120ms at batch output.

NOTE 1: Alarm may output due to display frequency delay against quicker totalized count which is faster than 0.1s.

#### (a) H and HH alarm output (on the front panel monitor).

Setting range is from 0 to 99999.

##### ► Condition of comparison

Integrating value > H alarm setting value, AL1OUT ON (lit up the AL1 on the front panel monitor)

Integrating value > HH alarm setting value, AL2OUT ON (lit up the AL2 on the front panel monitor)

Judgment \ Output	AL1 OUT-COM	AL2 OUT-COM
high alarm	ON	OFF
HH alarm	OFF	ON

#### (b) Batch output (on the front panel monitor).

If the total value and the setting value become same at the two-level batch of AL1OUT and AL2OUT, the relay outputs ON pulse.

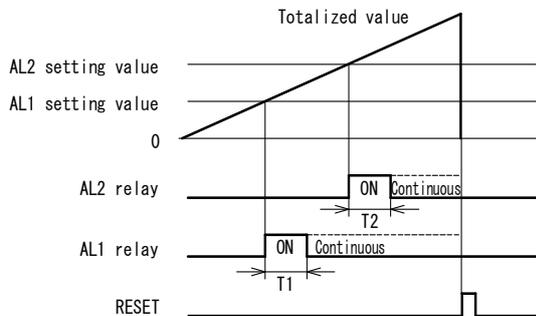
Pulse width is programmable from 100ms, 200ms, 500ms, 1s, and continuous, which is common to AL1 (T1) and AL2 (T2).

AL2OUT is an output with the automatic reset on-off function for the totalized value.

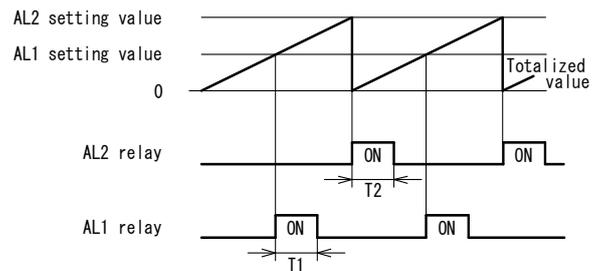
NOTE : Continuous output switches off by inputting the reset.

NOTE : Reset the meter if switch the H and HH alarm output to the batch output. If the total value is smaller than al1 or AL2, reset is not necessary.

【 In case of the automatic reset function is disable 】

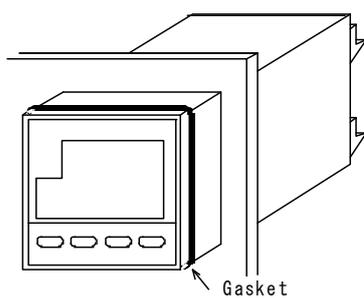


【 In case of the automatic reset function is enable 】



## 4. Mounting

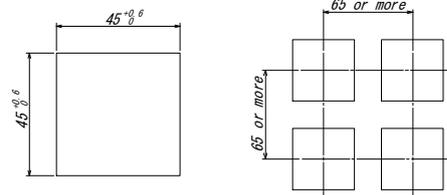
Detach the special bracket from the case, and insert the case from the panel front.



Panel thickness:

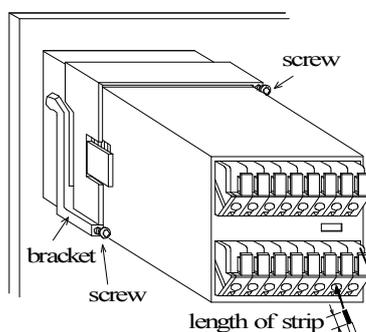
Recommended panel thickness is 0.6 to 5mm in case of the non-water-proof condition. For light panel, such as aluminum, should be 1.5mm or more to avoid deform.

Recommended panel thickness is 1.5 to 5mm in case of the gasket usage.



Panel cut dimension:  $45^{+0.6/0} \times 45^{+0.6/0}$  mm

Fix the case to the panel by using the mounting bracket.



Push this portion (lever) to insert the wire for connection. You can directly insert hard single-wire without pushing

Connecting wire:

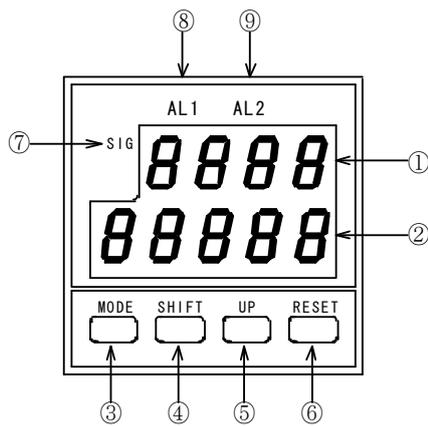
- solid wire: within 0.4 - 1.2mm<sup>2</sup> (AWG26 - 16)
- twisted wire: within 0.3 - 0.75mm<sup>2</sup> (AWG22 - 20)

Diameter of solid conductor is more than  $\phi 0.18$



## 5. Name of parts

### 5.1 Front panel



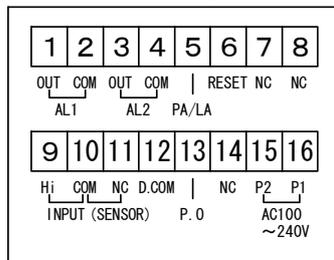
- ① Instantaneous display: <when measuring> Display instantaneous value.  
<when setting> Display item of each function.
- ② Totalizing display: <when measuring> Display totalized value.  
<when setting> Display setting value or function group.
- ③ **MODE** key: <when setting> Switch each item.
- ④ **SHIFT** key: <when setting> Move the digit
- ⑤ **UP** key: <when setting> Change or switch the setting value.  
<when measuring> In case of 10-digit integrating display, switch to upper 5-digit display by keep the **UP** key pushing.
- ⑥ **RESET** key: <when measuring> Reset totalized value by pushing more than 1 sec. Available to lock **RESET** key operation.
- ⑦ SIG display <when measuring> Light-up when inputting the signal
- ⑧ AL1: Alarm output display for AL1
- ⑨ AL2: Alarm output display for AL2

⚠ Push each key with the round-tipped object, such as the bottom of the ball point pen

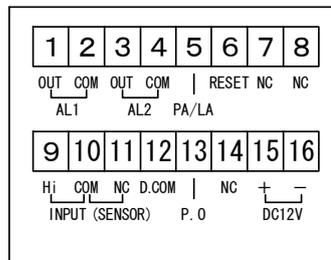
### 5.2 Rear panel

#### 5.2.1 Terminal layout

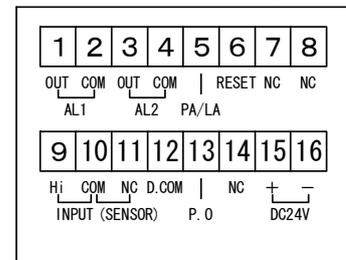
for AC power supply



for DC12V power supply



for DC24V power supply



#### ⚠ WARNING

- Do not miswiring to avoid the meter broken
- The power shall be turned off during wiring to avoid personal injury.
- Do not wire at the highly humid location. Do not wire with wet hands. Otherwise, you may get an electrical shock.
- Do not touch to the power terminals after turning on the power.
- Make sure the polarity of DC power supply to avoid the meter broken.

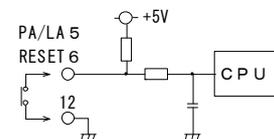
#### 5.2.2 Explanation of upper terminals

From terminal 1 to 4: Preset output (AL1OUT, AL2OUT, AL1COM, AL2COM)

Output relay capacity: AC/DC 150V 80mA, Normally Open. Resistance read (photo MOS relay).

Terminal 5: Pause / Latch input (PA / LA)

Pause or latch operation will start when short-circuiting this terminal to the D.COM terminal.



Terminal 6: RESET

Reset totalized value when short-circuiting this terminal to the D.COM terminal.

NOTE: Preset output does not return, but continuous integrated batch output return.

#### 5.2.3 Explanation of lower terminals

Terminal 9: Input (Hi)

Null: Non-voltage output or NPN open collector

RE: Voltage pulse

MG: Tachogenerator

SN: Sine wave

Use non-voltage output when using the LF range for frequency, and use open collector output when using the HF range.

Terminal 10: Common (Com)

Common terminal for the input and the sensor.

Terminal 11: SENSOR or NC

Make sure the polarity of DC power supply. Common terminal 0V shall connect to the terminal 10.

NOTE: This terminal may be not connected when the sensor power is not supplied. Do not use for junction

purpose.

Terminal 12: Data Common (D.COM)

Common terminal for P.O, RESET, and PA/LA.

Terminal 13: Pulse output (P.O)

Outputs the totalization-synchronized pulse in open collector (NPN).

Terminal 14: NC

This terminal may be not connected. Do not use for junction purpose.

Terminal 15 and 16: Power supply (P2, P1) at the AC power supply

Use for AC 90 to 250V.

Terminal 15 and 16: Power supply (+, -) at the DC power supply

Use for DC 12 or 24V power supply.

12V: Use for 10.8 to 13.2V DC.

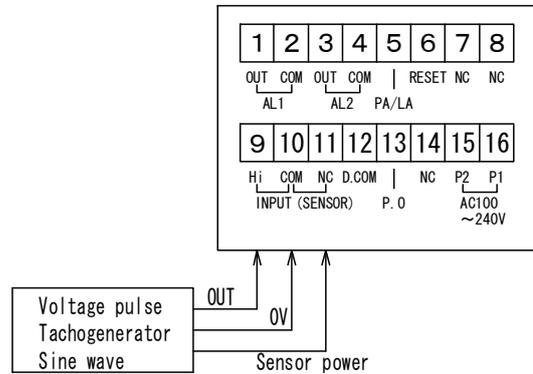
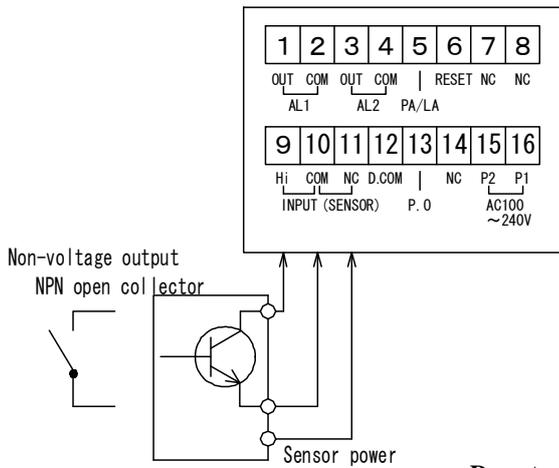
24V: Use for 21.6 to 26.4V DC.

+ and - should match to the marking on the terminals.

## 6. Wiring Example

(1) Example for Non-voltage output or NPN open collector.

(2) Example for Voltage pulse, Tachogenerator, or Sine wave.

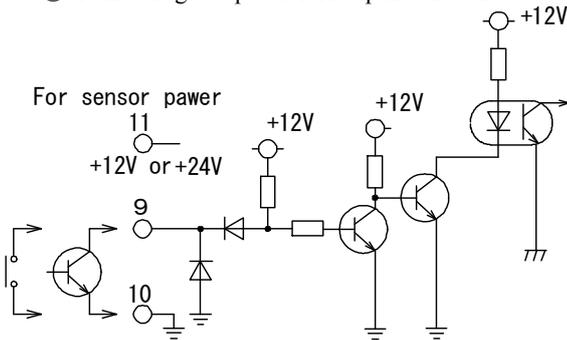


**Do not connect to the terminal 11 if your meter is not supplied the sensor power.**

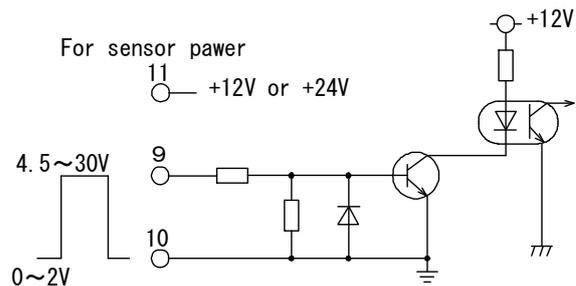
## 7. Input Circuit

(1) Pulse input

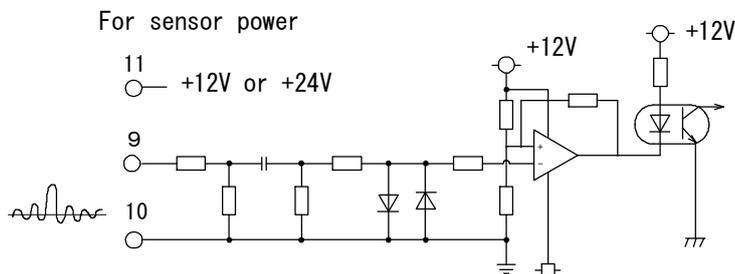
① Non-voltage output or NPN open collector



② Voltage pulse



(2) Tachogenerator or Sine wave



## 8. Programming Example

### 8.1 Example:

/display for total flow and /h for instantaneous flow rate

Condition: Output of the flow meter: 1pulse = 1 /, open collector

Max. rate display: 36000 /h = 36 m<sup>3</sup>/h

Min. display of the total flow: 1 / Unit of rate: /h Min. display of the integrating flow rate: 1 /

Setting Menu	Function	Setting value	
F 1- 1(000 10) *NOTE1	Totalizer pulse coefficient	1	magnification ratio per pulse
F 1- 2(00000)	Initial totalized value	0	
F 1- 3(000 10) *NOTE2	Rate Pulse conversion value	1	1pulse = 1litter
F 1- 4(0 0 1 0) *NOTE3	Time base	Hours	
F 2- 1(0.0000) *NOTE4	Rate display cycle	100ms	
F 2- 1(0.0000) *NOTE4	Total decimal point	None	No decimal point
F 2- 1(0.0000) *NOTE4	Instantaneous decimal point	None	No decimal point
F 2- 2( 99.9)	Auto-Zero display	99.9s	
F 2- 3(0.00P L) *NOTE4	Input frequency switching	LF	LF range is from 0.01 to 100Hz

NOTE1: Pulse conversion should be 1 thanks to 1pulse of the sensor output = 1litter.

Display "0001.0" means  $1 \times 10^0 = 1$

Exponential expression of 0.1 is 1E-1. However, E minus sign could not display on the LED, this meter shows as below:

Example) 0.1 displays 0001.1 ( $=1 \times 10^{-1}$ ) or 0010.2 ( $=10 \times 10^{-2}$ ) or 0100.3 ( $=100 \times 10^{-3}$ )

1 displays 0010.1 ( $=10 \times 10^{-1}$ ) or 0100.2 ( $=100 \times 10^{-2}$ )

NOTE2: Totalizer pulse coefficient should be 1 as same as Pulse factor.

NOTE3: Rate display should be shown as below when 36000 litter/hour = 10 litter/second (10Hz)

36000 when you choose 2 (hour)

600 when you choose 1 (minute)

10 when you choose 0 (second)

NOTE4: Reverse character means corresponding digit in the setting menu.

## 9. Default setting

Function	Default setting	Setting menu	Display example
Totalizer pulse coefficient	1	F 1- 1	000 10
Initial totalizing value	0	F 1- 2	00000
Rate Pulse conversion value	1	F 1- 3	000 10
Time base	seconds	F 1- 4	0 0 1 0
Rate display frequency	100ms	F 2- 1	0.0000
Moving average	1-time		
Turned off	Display (total/inst.)		
DP(Total)	None		
DP(Inst)	None		
Auto-Zero display	99.9s	F 2- 2	___99.9
P.O (Pulse width)	100ms	F 2- 3	0.00LL
P.O (Divided frequency ratio)	1/1		
Reset key, Enable/Disable	Enable		
Switch of the Latch/Pause	Latch		
Input frequency switching (HF / LF)	LF		
Total Overflow	Blinking	F 2- 4	0.00__
Reset function	OFF		
Integrated 5-digit/ 10-digit	5-digit		
Alarm mode (none/inst./total/batch)	None	F 3- 1	A0.____
Decimal setting for 10-digit, Automatic reset	No display		
Alarm output pulse width	No display		
AL1	No display	F 3- 2	-----
AL2	No display	F 3- 3	-----
Analog output mode (total/inst.) *NOTE	Instantaneous	F 4- 1	___0.
RS-485, meter numbering *NOTE	0	F 4- 1	___00
Analog output constant *NOTE	200	F 4- 2	__0200

NOTE: Setting menu, F 4- 1 and F 4- 2, does not display at the standard (no output), but display at the optional.

## 10. Setup and Programming

<How to enter the Setup mode>



### Enter the Setup or the Calibration mode

- Press the **MODE** key for 2 sec or more. **Func.** and **CAL.** flashes and then lit up.

NOTE: If you will release the **MODE** key when flashing **Func.** and **CAL.**, return to the Measuring mode.



### Choose the Setup mode

- Each time you press the **SHIFT** key, **Func.** and **CAL.** alternately flashes. Choose the **Func.**



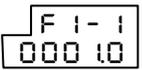
### Enter the setup mode

- Press the **UP** key to scroll through the menu from **Func. 1** to **Func. 3** (**Func. 4** if you use optional type). Example drawing shows **Func. 1**

- Refer to totalizer pulse coefficient for details.

### F1-1 Totalizer pulse coefficient

- Field programmable totalizer pulse coefficient converts input pulses to rate in 4-digit significant and 1-digit exponent part.
- This meter could not show minus sign of exponent part. May be programmed from  $1 \times 10^{-9}$  to 9999



↑  
significand

↑  
exponent part

### Enter the setup mode

- Choose the Setup mode as mentioned in the opening sentence of **How to enter the Setup mode**.

- Choose F1-1 by pressing the **MODE** key.

### Change totalizer pulse coefficient

- Press the **SHIFT** key to move to the right. The digit you choose will be blinking.

- Update the data by pressing the **UP** key.

### Move to the next menu

- The display moves to the next menu, F1-2, by pressing the **MODE** key.

### Return to the Measuring mode

- Press the **MODE** key to choose **Func. 1**.

- Press the **UP** key until the **Func. 3** or **Func. 4** (option) is displayed. Then, press the **UP** key once again to return the Measuring mode.

### F1-2 Initial totalized value

- Setting range is from 0 to 99999 (in case of 10-digit total, the range should be within the last 5-digit).



### Enter the setup mode

- Choose the Setup mode as mentioned in the opening sentence of **How to enter the Setup mode**.

- Choose F1-2 by pressing the **MODE** key.

### Change Initial totalized value

- Press the **SHIFT** key to move to the right. The digit you choose will be blinking.

- Update the data by pressing the **UP** key.

### Move to the next menu

- The display moves to the next menu, F1-3, by pressing the **MODE** key.

### Return to the Measuring mode

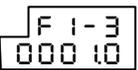
- Press the **MODE** key to choose **Func. 1**.

- Press the **UP** key until the **Func. 3** or **Func. 4** (option) is displayed. Then, press the **UP** key once again to return the Measuring mode.

### F1-3 Rate Pulse conversion value

- Rate of fluid flow is the volume of fluid which passes through a given surface per unit time, such as cubic meter per second, minute, hour, and so on.

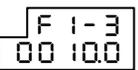
**The instantaneous display = Frequency × Instantaneous time unit × Instantaneous pulse conversion value**



### Enter the setup mode

- Choose the Setup mode as mentioned in the opening sentence of **How to enter the Setup mode**.

- Choose F1-3 by pressing the **MODE** key.



↑  
significand

↑  
exponent part

### Change rate Pulse conversion value

- Press the **SHIFT** key to move to the right. The digit you choose will be blinking.

- Update the data by pressing the **UP** key.

### Move to the next menu

- The display moves to the next menu, F1-4, by pressing the **MODE** key.

### Return to the Measuring mode

- Press the **MODE** key to choose **Func. 1**.

- Press the **UP** key until the **Func. 3** or **Func. 4** (option) is displayed. Then, press the **UP** key once again to return the Measuring mode.

### F1-4 Time base

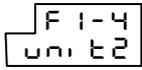
- Time base is unit of flow rate.
- Programmable from Seconds, minutes, or hours.

#### Enter the setup mode



- Choose the Setup mode as mentioned in the opening sentence of **How to enter the Setup mode**.
- Choose F1-4 by pressing the **MODE** key.

#### Change Time base



- Press the **SHIFT** key to move to the right.
- Update the data by pressing the **UP** key.
  - 00:00: Seconds
  - 00:01: Minutes
  - 00:02: Hours

#### Move to the next menu

- Choose **Func. 1** by pressing the **MODE** key.
- Choose **Func. 2** by pressing the **UP** key.
- Press the **MODE** key to enter the F2-1 menu.

#### Return to the Measuring mode

- Press the **MODE** key to choose **Func. 1**
- Press the **UP** key until the **Func. 3** or **Func. 4** (option) is displayed. Then, press the **UP** key once again to return the Measuring mode.

### F2-1 Instantaneous display frequency, Moving average, Turned off, Decimal Point

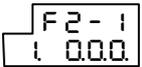
- o The meter can be set to display with 100ms, 400ms, 1s, 2s, or 5s interval.
- o Moving average should be set to 1-, 2-, 3-, 4-, 8-, or 16-time when you choose 100ms.
- o Any combination of light-up and light-off is selectable from the table below.
- o Decimal point of total and inst may be set with up to three decimal places or with no decimal point at all.

#### Enter the setup mode



- Choose the Setup mode as mentioned in the opening sentence of **How to enter the Setup mode**.
- Choose **Func. 2** by pressing the **UP** key.

#### Change Instantaneous display cycle, Moving average, Turned off, Decimal Point



- Choose F2-1 by pressing the **MODE** key.
- Press the **SHIFT** key to move to the right. The digit you choose will blinking.
- Update the data by pressing the **UP** key.

	0	1	2	3	4	
Instantaneous display frequency	0	-	-	-	-	100ms
	1	-	-	-	-	400ms
	2	-	-	-	-	1s
	3	-	-	-	-	2s
	4	-	-	-	-	5s
Moving average	0	-	-	-	-	1-time
	1	-	-	-	-	2-time
	2	-	-	-	-	3-time
	3	-	-	-	-	4-time
	4	-	-	-	-	8-time
	5	-	-	-	-	16-time
Turned off (total / inst.)	0	-	-	-	-	Total: lit-up / Rate: lit-up
	1	-	-	-	-	Total: lit-up / Rate: turned off
	2	-	-	-	-	Total: turned off / Rate: lit-up
	3	-	-	-	-	Total: turned off / Rate: turned off
Decimal Point (total)	0	-	-	-	-	0
	1	-	-	-	-	0.0
	2	-	-	-	-	0.00
	3	-	-	-	-	0.000
	4	-	-	-	-	0.0000
Decimal Point (Instantaneous)	0	-	-	-	-	0
	1	-	-	-	-	0.0
	2	-	-	-	-	0.00
	3	-	-	-	-	0.000

**SHIFT** : Choose the right digit  
**UP** : Update the setting value

Digit of moving average is dead, and the setting of moving average is impossible.

It is enable to change at the 100ms frequency only.

In case of 10-digit totalized, the range should be within the last 5-digit. Refer to the menu F2-4.

It is enable to change moving average at the 100ms frequency only.

#### Move to the next menu

- The display moves to the next menu, F2-2, by pressing the **MODE** key.

#### Return to the Measuring mode

- Press the **MODE** key to choose **Func. 2**
- Press the **UP** key until the **Func. 3** or **Func. 4** (option) is displayed. Then, press the **UP** key once again to return the Measuring mode.

## F2-2 Auto-Zero display

- It will automatically turn off when there is no water flowing.

- Example:

Input: Less than 1HZ pulse, Auto-Zero display: 1.0 seconds

Any low-flow input below the Auto-Zero value will result in a display of zero. But, the totalizer counts every incoming pulse regardless of the rate display.

Setting range is from 0.1 to 99.9 seconds.

Func.2

### Enter the setup mode

- Choose the Setup mode as mentioned in the opening sentence of **How to enter the Setup mode**.

- Choose **Func.2** by pressing the **UP** key.

- Choose F2-2 by pressing the **MODE** key.

F2-2  
00.1

### Change Auto-Zero display

- Press the **SHIFT** key to move to the right. The digit you choose will be blinking.

- Update the data by pressing the **UP** key.

F2-2  
05.0

### Move to the next menu

- The display moves to the next menu, F2-3, by pressing the **MODE** key.

### Return to the Measuring mode

- Press the **MODE** key to choose **Func.2**

- Press the **UP** key until the **Func.3** or **Func.4** (option) is displayed. Then, press the **UP** key once again to return the Measuring mode.

## F2-3 P.O (Pulse width), P.O (Divided frequency ratio), Reset key, Enable/Disable, Switch of the Latch/Pause, Input Frequency

o Set P.O (Pulse width), P.O (Divided frequency ratio), Reset key, Enable/Disable, Switch of the Latch/Pause, Input Frequency.

Func.2

### Enter the setup mode

- Choose the Setup mode as mentioned in the opening sentence of **How to enter the Setup mode**.

- Choose **Func.2** by pressing the **UP** key.

- Choose F2-3 by pressing the **MODE** key.

Change P.O (Pulse width), P.O (Divided frequency ratio), Reset key, Enable/Disable, Switch of the Latch/Pause, Input Frequency.

- Press the **SHIFT** key to move to the right. The digit you choose will be blinking.

- Update the data by pressing the **UP** key.

F2-3  
00.0L.L.

F2-3  
0.1 UPL.

F2-3  
00.0L.L.

**SHIFT** : Choose the right digit

**UP** : Update the setting value

P.O  
(Pulse width)  
NOTE

P.O (Divided  
frequency ratio)

Reset key

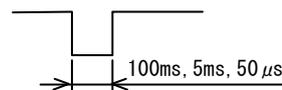
Latch/Pause

Input Frequency

0	-	-	-	-	100ms
1	-	-	-	-	5ms
2	-	-	-	-	50 $\mu$ s
0	-	-	-	-	1/1
1	-	-	-	-	1/10
2	-	-	-	-	1/100
0	-	-	-	-	Reset by pressing the key for 1 sec.
1	-	-	-	-	Disable
	L	-	-	-	Latch
	P	-	-	-	Pause
	L	LF	0.01Hz~100Hz		
	H	HF	0.01Hz~10kHz		

**NOTE:** Please select the output pulse width so as not to broaden more than the output cycle (1/output frequency).

If PO is wider than output frequency, output signal will be continuous, not to be pulse.



### Move to the next menu

- The display moves to the next menu, F2-4, by pressing the **MODE** key.

### Return to the Measuring mode

- Press the **MODE** key to choose **Func.2**

- Press the **UP** key until the **Func.3** or **Func.4** (option) is displayed. Then, press the **UP** key once again to return the Measuring mode.

### F2-4 Total Overflow, Reset function, Totalized 5-digit/10-digit

- Totalized display may blinking lit up when overflowing.
- Set to disable or enable of the reset function
- Set number of the totalized digit to 5 or 10.

Func.2

F2-4  
000.LL

F24-  
0.11

#### Enter the setup mode

- Choose the Setup mode as mentioned in the opening sentence of **How to enter the Setup mode**.
- Choose **Func.2** by pressing the **UP** key.
- Choose **F2-4** by pressing the **MODE** key.
- Press the **SHIFT** key to move to the right. The digit you choose will blinking.
- Update the data by pressing the **UP** key.

F2-4  
000

**SHIFT** : Choose the right digit

**UP** : Update the setting value

Total Overflow

Reset function

Number of Integrated digit

0	-	-	Blinking
1	-	-	Lit up
0	-	-	OFF
1	-	-	ON
0	-	-	5-digit
1	-	-	10-digit

#### Move to the next menu

- Choose **Func.2** by pressing the **MODE** key.
- Choose **Func.3** by pressing the **UP** key.
- Press the **MODE** key to enter the F3-1 menu.

#### Return to the Measuring mode

- Press the **MODE** key to choose **Func.2**
- Press the **UP** key until the **Func.3** or **Func.4** (option) is displayed. Then, press the UP key once again to return the Measuring mode.

### F3-1 Alarm mode (none/inst./total/batch), Decimal setting for 10-digit, Automatic reset, Alarm output pulse width

- AL1OUT and AL2OUT are set to compare with total or instantaneous.
- Set to digit for 10-digit total integrating.
- Choose ON or OFF for automatic reset.
- Set the width of alarm output pulse.

Func.3

F3-1  
A0

F3-1  
A3.0.10

#### Enter the setup mode

- Choose the Setup mode as mentioned in the opening sentence of **How to enter the Setup mode**.
- Choose **Func.3** by pressing the **UP** key.
- Choose **F3-1** by pressing the **MODE** key.

#### Change Alarm mode, Decimal setting for 10-digit, Automatic reset, Alarm output pulse width

- Press the **SHIFT** key to move to the right. The digit you choose will blinking.
- Update the data by pressing the **UP** key.

F3-1  
A0 \*1 \*2 \*3

**SHIFT** : Choose the right digit

**UP** : Update the setting value

Alarm mode

Decimal setting for 10-digit

Automatic reset

Alarm output pulse width

A0	-	-	-	none	*1, *2 and *3 are turned off, and the settings are impossible.
A1	-	-	-	inst.	
A2	-	-	-	total	
A3	-	-	-	batch	*2 and *3 are turned off, and the settings are impossible.
0	-	-	-	Compare with from 1- to 10-digit	In case of 5-digit totalized, *1 is turned off, and the setting is impossible. Refer to the menu F2-4.
1	-	-	-	Compare with from 1- to 5-digit	
2	-	-	-	Compare with from 6- to 10-digit	
0	-	-	-	OFF	It is disable to set at the A0, A1, and A2 alarm mode.
1	-	-	-	ON	
0	-	-	-	Continues	
1	-	-	-	0.1s	
2	-	-	-	0.2s	
3	-	-	-	0.5s	
4	-	-	-	1s	

It is enable to change at the batch output of alarm mode.  
It is enable to change at the total of alarm mode.

**Move to the next menu**

- The display moves to the next menu, F3-2, by pressing the **MODE** key.

**Return to the Measuring mode**

- Press the **MODE** key to choose **Func.3** or **Func.4** (option)  
 - Press the **UP** key to return the Measuring mode.

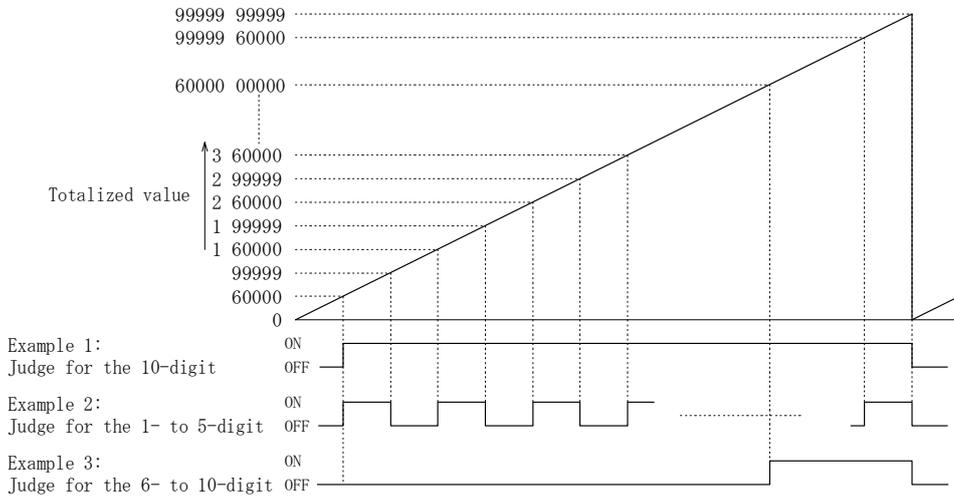
**F3-2 AL1**

- Set the output value of AL1.  
 - Setting range is in accordance with the setting of F3-1.

Setting of F3-1	Comparison method	Setting Range	Compared digit
A0: None alarm	—	—	—
A1: Instantaneous alarm	L	0000 to 9999	Compare with display value of inst
5-digit (inst.)	H	00000 to 99999	Compare with 5-digit
0: 1- to 10-digit (Totalized 10-digits)	H	00000 to 99999	Compare with *****00000 to *****99999 Example 1
1: 1- to 5-digit (Totalized 10-digits)	H	00000 to 99999	Compare with 00000 to 99999 Example 2
2: 6- to 10-digit (Totalized 10-digits)	H	00000 to 99999	Compare with 00000***** to 99999***** Example 3

\* means the numerical value from 0 to 9

Examples at 60000 setting value



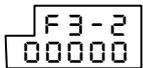
**Enter the setup mode**

- Choose the Setup mode as mentioned in the opening sentence of **How to enter the Setup mode** .  
 - Choose **Func.3** by pressing the **UP** key.  
 - Choose F3-2 by pressing the **MODE** key.



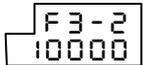
**Change AL1**

- Press the **SHIFT** key to move to the right. The digit you choose will be blinking.  
 - Update the data by pressing the **UP** key.



**Move to the next menu**

- The display moves to the next menu, F3-3, by pressing the **MODE** key.



**Return to the Measuring mode**

- Press the **MODE** key to choose **Func.3** or **Func.4** (option)  
 - Press the **UP** key to return the Measuring mode.

### F3-3 AL2

- Set the output value of AL2.
- Setting range is in accordance with the setting of F3-1.

Setting of F3-1	Comparison method	Setting Range	Compared digit
A0: None alarm	—	—	—
A1: Instantaneous alarm	H	0000 to 9999	Compare with display value of rate
5-digit (inst.)	HH	00000 to 99999	Compare with 5-digit
0: 1- to 10-digit (Totalized 10-digits)	HH	00000 to 99999	Compare with *****00000 to *****99999 Refer to Example 1 at F3-2.
1: 1- to 5-digit (Totalized 10-digits)	HH	00000 to 99999	Compare with 00000 to 99999 Refer to Example 2 at F3-2.
2: 6- to 10-digit (Totalized 10-digits)	HH	00000 to 99999	Compare with 00000***** to 99999***** Refer to Example 3 at F3-2.

\* means the numerical value from 0 to 9

Func.3

#### Enter the setup mode

- Choose the Setup mode as mentioned in the opening sentence of **How to enter the Setup mode**.
- Choose **F<sub>unc.3</sub>** by pressing the **[UP]** key.
- Choose F3-3 by pressing the **[MODE]** key.

F3-3  
00000

#### Change AL2

- Press the **[SHIFT]** key to move to the right. The digit you choose will be blinking.
- Update the data by pressing the **[UP]** key.

F3-3  
99999

#### Move to the next menu

- Choose **F<sub>unc.3</sub>** by pressing the **[MODE]** key.
- Choose **F<sub>unc.4</sub>** by pressing the **[UP]** key.
- Press the **[MODE]** key to enter the F4-1 menu or RS-485 output as optional specifications. See Analog & RS-485 output manual.

#### Return to the Measuring mode

- Press the **[MODE]** key to choose **F<sub>unc.3</sub>** or **F<sub>unc.4</sub>** (option)
- Press the **[UP]** key once again to return the Measuring mode.

## 11. Registration function

- This function provides an easy way to view and write down the flow rate settings without troublesome k-factor calculation. This function is also ideal for error correction by the key operation.
- For example, if the display shows 55L/min but the actual measured rate is 50 L/min, enter 50 to correct.
- Range of Registration function is from 1 to 9999.

#### NOTE:

$P$  of the following formula must be < 9999. Otherwise, display can not program.

$$Q = fUP$$

where  $Q$  is display of the flow rate

$f$  is a frequency

$U$  is the user-readable unit of flow (x 1 for seconds, x 60 for minutes, x 3600 for hours)

$P$  is the pulse conversion value

Example:

If you want to correct the display of flow rate ( $= Q$ ) to 2000, and  $f$  is 0.1HZ, and  $U$  is seconds ( $= x 1$ ),

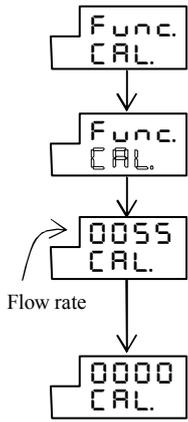
$$2000 = 0.1 \times 1 \times P$$

$$P = 20000$$

In this case, 20000 is bigger than 9999. Thus, this correction is impossible.

We recommend changing the value of  $f$  as the following table to minimize the error.

Unit of $U$	Recommended value of $f$
Seconds	10 kHz Max.
Minutes	1 kHz Max.
Hours	500 Hz Max.



**Enter the Calibration mode**

- Press the **MODE** key for 2 sec or more. **Func.** and **CAL.** blinking and then lit up.

**NOTE:** If you will release the **MODE** key when flashing **Func.** and **CAL.**, return to the Measuring mode.

**Choose the Registration mode**

- Each time you press the **SHIFT** key, **Func.** and **CAL.** alternately flashes. Choose the **CAL.**

**Enter registration mode.**

- Press the **UP** key to enter registration mode.

**Flow rate Correction**

- Input the actual measured rate. Display is not correct yet. See **NOTE1**

- Press the **SHIFT** key to select the desired digit location. See **NOTE 2** and **NOTE3**

- Press the **UP** key to select the desired figure.

Example shows that the value is correct 55 to 50. See **NOTE 4.**

**NOTE:** Unit of flow, such as Seconds, Minutes, and Hours, shall be changed by the parameter of F1-4.

**Return to the Measuring mode**

- Press the **MODE** key for 3 sec or more to success the calibration.

- Then, return the Measuring mode automatically.

**NOTE1:** Even though you choose to turn-off the flow rate display, the display would light up during correction.

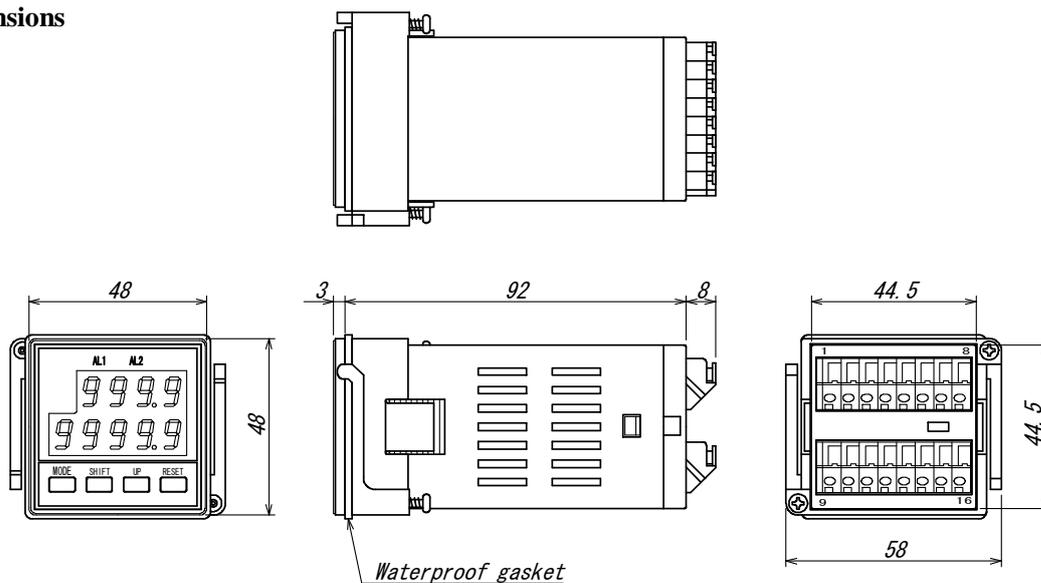
**NOTE2:** The meter is programmed to fix the display corresponding to the input signal. If you want to change the input signal level or value, start again from scratch.

**NOTE3:** A meter display of Error during calibration indicates that the calibration process was not successful. The meter should be recalibrated. The Error message will appear if Auto-Zero display time is shorter than the input signal pulse width. Change the Auto-Zero display time to be long or adjust the input signal.

**NOTE4:** The Error message will appear if you select the value to 0 when pushing the **MODE** key to return the measuring mode. Change the value within the range of 1 to 9999.

Auto-Zero display time > Input signal pulse width	Successful
Auto-Zero display time ≤ Input signal pulse width	Error

**12. Dimensions**



Panel cut dimension: 45<sup>+0.6/0</sup> x 45<sup>+0.6/0</sup> mm

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