【INSTRUCTION MANUAL】

Rate and Total digital indicator

MODEL : SP-564A Series

Series name	Output			Input signal	Communi-cation	Sensor power	Power supply	Body color	Function
SP-564A									Indicator 7-segment red LED
	GL								7-segment green LED
		P2							Two-row relay output
			AV3						Analog voltage output DC 1-5V
			AV4						Analog voltage output DC 0-5V
			AV5						Analog voltage output DC 0-10V
			AI						Analog current output DC4- 20mA
				No entry					NPN open collector pulse input
				F					Voltage pulse input(Low: less than 2V, Hi:3.8-30V)
				F2					Current pulse input(Low: less than 8mA,Hi:16-20mA)
		Note 1		V3					Taco-generator signal input AC 0.8V-80V(P-P)3KHz MAX
		Note 1		N					Sine wave signal input AC 0.05V-20V(P-P)
					No entry				Synchronous pulse output
					RS2				RS-232C communication
					RS4				RS-485 2-wire communication
					RS4W				RS-485 4-wire communication
					Note 2	No entry			Sensor power : DC12V 100mA max.
						S24			Sensor power : DC24V 50mA max.
							No entry		Power source : AC 85V to 264V
							DC		Power source : DC 12V to 24V
								No entry	Gray
								K	Black

Note 1: V3, N option can not be selected simultaneously with the S24 option.

Note 2: RS2,RS4 and RS4W Option is DC24V 60mA max

Thank you for purchasing this UINICS product.

Please read this Instruction Manual carefully in order to ensure that you use the meter safely and correctly.

UINICS CO.,LTD.

【 2nd edition : Apr 9, 2012 】

@SP-564AE(2)

■ Precautions

We thank you very much for buying our products. Please read the following matters that require attention and the contents of this booklet for safe use of the product.

⚠ Caution

- Use a power supply voltage within the working range.
- Avoid a load exceeding the rating.
- Avoid the direct rays of the sun.
- Avoid places where inflammable gas and combustibles are present.
- Avoid temperature and humidity exceeding the rating.
- Do not apply heavy shocks or vibration to the body.
- Avoid the penetration of metal powder, dust, water, and the like into the body.
- Pay attention to an electric shock in wiring the power supply.
- Do not touch a live terminal, which is likely to cause an electric shock.
- Do not disassemble the product nor touch its inside while it is activated.
- User-conducted alterations and modifications of the unit should not be performed as they may impair functioning or cause failure and accidents.

1. Accessories

Refer to the following items to check the accessories.

1. SP-564 (according to user's specifications)・・・1
2. Instruction manual for SP-564・・・1
3. Unit label・・・1
4. User-specified accessories.
   (In the case of the absence of such specifications, these accessories are not attached.)

If accessories are insufficient, please contact with an agency or UINICS.

2. Specifications

Item		Specifications
Operation system		Periodic sampling operation (CPU)
Display		7-segment red LED (14 mm character height) : 6 digits
GL-type		7-segment green LED (14 mm character height) : 6 digits
Rate mete	Measuring accuracy	±0.05% rdg. ± 1 digit (at Sampling time for 0.5 second or more)
	Scaling	9999 - 1×10^{-9} (selectable)
	Decimal digits	Displays 1-4 decimal digits (selectable) .
	Time unit	Selectable : per hour, per minute or per second
	Rate sampling time	Rate reading averaged by 0.1-100 sec. (selectable)
	Moving average	Averaged by 2 to 9 input pulses (selectable)
	Auto zero time	The time (0.1-99.9 sec. selectable) , following input stop, at which the reading returns to zero.
	Least significant digit	Selectable : real, fixed at 0, or 0/5
	Overflow indication	Indication overflow ,OV lamp ・999999 is blinking
Totalizer	Accuracy	±0 (Scaling is set to 1.)
	Scaling	9999 - 1×10^{-9} (selectable)
	Decimal digits	Display 1-4 decimal digits (selectable) . (Fixed decimal operation)
	Overflow indication	Indication overflow ,OV lamp is blinking
	Totalizer upper display	Upper digits 7-9 display by pressing Up key.
	Reset	Internal counter is reset using Reset key or input from terminal board (50 ms or more to activate) in rear. Input from terminal board : NPN open collector pulse input or ground contact
	Synchronization pulse output	Synchronization with total reading Synchronization output : 1-4 digits (selectable) Output width : 0.01-1.99 sec. (selectable) Signal level : NPN open collector output, rating DC30V 50mA (max.) ※At the time of communication option (RS2,RS4,RS4W) it does not operate.
Sensor input	Standard	NPN open collector pulse input (10 mA min.) or ground contact
	Option (F)	Voltage pulse input : 2.0 V or lower for LOW, 3.8-30 V for HI
	Option (F2)	Current pulse input : 8 mA or lower for LOW, 16-20 mA for HI
	Option input (V3)	Taco-generator signal input AC 0.8V~80V(P-P)3KHz MAX
	Option input (N)	Sine wave signal input AC 0.05V~20V(P-P) 3KHz MAX
	Input response frequency (at 50% duty)	LOW : 0.01Hz - 50Hz : It does not accept noise element of higher frequency. MID:0.01Hz - 1kHz HI : 0.01Hz - 10kHz : It responds to higher frequency.
	Sensor power	DC+12V (±10%)100mA max. output (stabilized)
	S24-type	DC+24V (±10%)100mA max. output (stabilized) ※RS2,RS4 and RS4W Option is 60mA max

EXT. input	Input	NPN open collector pulse input or ground contact
	Indicator change	When specified, input from the rear terminal board changes indicator (Rate meter or Totalizer)
	Sensor input deactivation	When specified, input from the rear terminal board deactivates sensor input.
	Reading hold input	When specified, input from the rear terminal board causes the current reading to go on “hold”.
Others	Power source	AC 85-264 V
	DC-type	DC 12-24 V(±10%)
	Power consumption	Approx. 19VA
	Temperature/ humidity conditions	0-50 ℃, 30-80 %RH (Non-condensing)
	Weight/dimensions	Approx. 350 g, W96×H48×D130 mm
	Body color	Gray
	K-type	Black
	Protection class	IP66

《 Alarm output : P2-type 》

Mechanism	Judged against upper and lower limits (Selectable) .
Alarm disable time interval	The alarm output function is disabled for the specified time interval following power ON or reset.
Output system	Two-row relay output Rating : DC 30 V 1 A, AC 125 V 0.3 A
Output indication	During alarm output, the OUT1 and OUT2 LEDs are activated.
Output reset	Alarm reset using Reset key or input from terminal board. 50 ms or more to activate.

《 Analog output : AV-type / AI-type 》

Voltage output (AV3)	DC 1-5 V Load resistance : 2kΩ or above
Voltage output (AV4)	DC 0-5 V Load resistance : 2kΩ or above
Voltage output (AV5)	DC 0-10 V Load resistance : 2kΩ or above
Current output (AI)	DC 4-20 mA Load resistance : 500Ω or under
Output accuracy	Within ±0.2 %F.S. for indicated value (23 ℃)
Variation due to temperature fluctuation	±100 ppm/℃
Output update	Less than about 20 ms
Output response	About 40 ms (Analog change time 0 %- 90 %)
Max Output resolution	12-bit D/A conversion operation AI DC4-20mA : 4000 resolution AV3 DC1-5V : 4000 resolution AV4 DC0-5V : 4000 resolution AV5 DC0-10V : 4000 resolution ※Maximum output area : It’s possible to output to 102.3% to the maximum of each output. ※An analog output is outputting calculation to the indication value shown to 7segment LED. Therefore the resolution sometimes falls from 4000 by setting of Mode No. ”C” and ”d”.

《 RS-232C communication : RS2-type 》

Signal standards	In accordance with EIA RS-232C standards (Serial signal)
Synchronous method	Asynchronous
Baud rate	1200bps / 2400bps / 4800bps / 9600bps (Selectable)
Start bit	1 bit
Stop bit	1 bit
Data bit	7 bits / 8 bits (Selectable)
Parity bit	Odd / Even / None (Selectable)
Unit (ID) number	00-99
Communication system	Communication is controlled by command.

《 RS-485 communication : RS4-type / RS4W-type 》

Signal standards	2-wire half duplex transmission (RS4-type) 4-wire half duplex transmission (RS4W-type)
Signal level	In accordance with IEE RS-485
Synchronous method	Asynchronous
Baud rate	1200bps / 2400bps / 4800bps / 9600bps (Selectable)
Start bit	1 bit
Stop bit	1 bit
Data bit	7 bits / 8 bits (Selectable)
Parity bit	Odd / Even / None (Selectable)
Unit (ID) number	00-99
Communication system	Communication is controlled by command.

3. Mounting meter

How to mount indicator (meter)

1. Cut the panel to insert the indicator (meter) from the front.

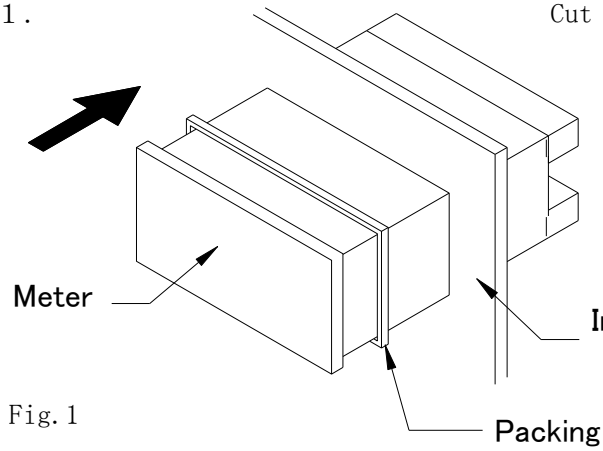
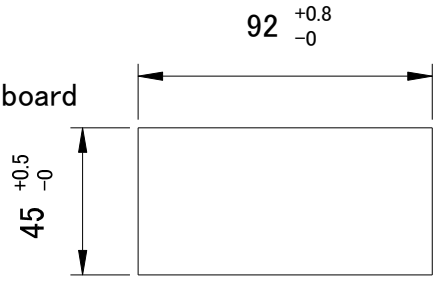


Fig.1

Panel cutout dimensions



Unit : mm

2 Please push the Fitting for fixing the body.
Into a right and left both sides of the meter.

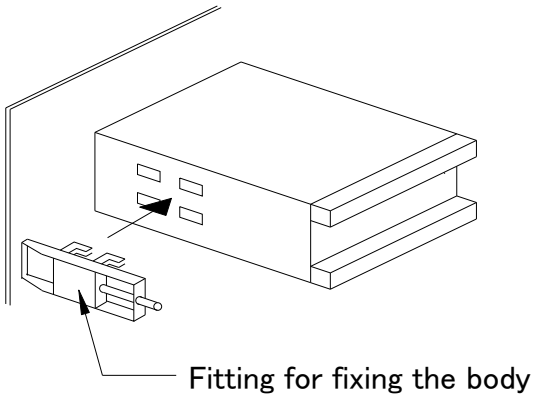


Fig.2

3. Slide in the rear side (terminal stand side)
as for the fitting for fixing the body.
It turns a screw by the driver.
The meter is fixed (right and left both sides)

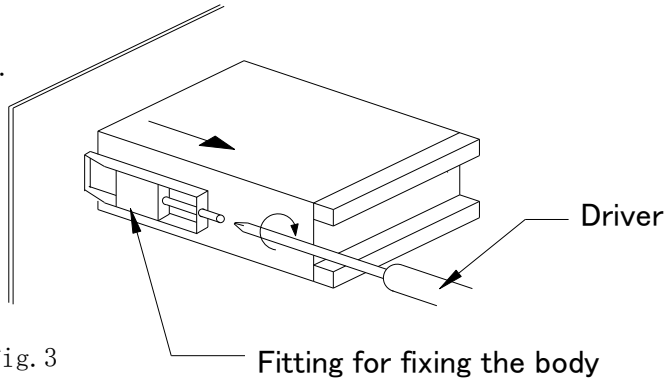
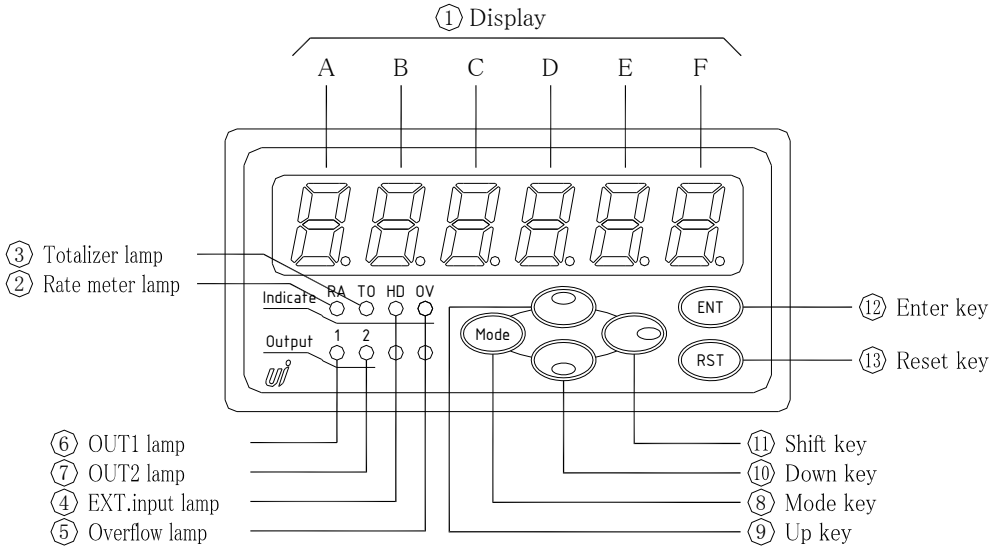


Fig.3

1. Please install it horizontally.
2. Fit the body on to a panel 1.0-4.0 mm in thickness.
3. Please do not tighten the screw of the mounting bracket too much.
   (The case might be damaged when tightening too much.)

4. Names and functions of components on front

Fig. 4



① Display

1) Display indicates the rate reading or the cumulative total reading.
2) The following displays appear in the setup mode.
   A, B・・・・・Mode No.
   C-F・・・・・Mode setting
3) Setting value is indicated while each setting up (preset value, offset value) .

② Rate meter lamp (RA)

The rate meter lamp is activated when rate reading is indicated.

③ Totalizer lamp (TO)

The totalizer lamp is activated when total reading is indicated.

④ EXT. input lamp (HD)

The EXT. input lamp is activated when terminal No.4 and No.6 is shorted.

⑤ Overflow lamp (OV)

The overflow lamp is blinking activated when the total exceeds.

⑥ Alarm output OUT1 lamp

The alarm output lamp is activated when the alarm is outputted.

⑦ Alarm output OUT2 lamp

The alarm output lamp is activated when the alarm is outputted.

⑧ Mode key (Mode)

The Mode key is used to call up or switch between various settings.

1) Mode + Activated for 2 sec. or more ・・・ calls up mode setting.
(Press MODE → Mode No. switchover)

2) Mode + Activated for 2 sec. or more ・・・ calls up offset value setting.

3) Mode Activated for 2 sec. or more ・・・ calls up alarm output preset value setting.
(Press MODE → OUT No. switchover)

⑨ Up key ( )

1) When the total exceeds 6 digits (999999) , the overflowed upper 3 digits are displayed while this key is pressed.
2) Changes the value of the blinking digit during setup procedures.
Each time the key is pressed, the number goes up by one.

⑩ Down key ( )

1) Activated for 2 sec or more ・・・
Mode protect ON “Ｌ－ＯＮ”
Mode protect OFF “Ｌ－ＯＦＦ”
2) Changes the value of the blinking digit during setup procedures.
Each time the key is pressed, the number goes down by one.

⑪ Shift key)

・Shifts the blinking indication to the digit to the right during setup procedures.

⑫ Enter key (ENT)

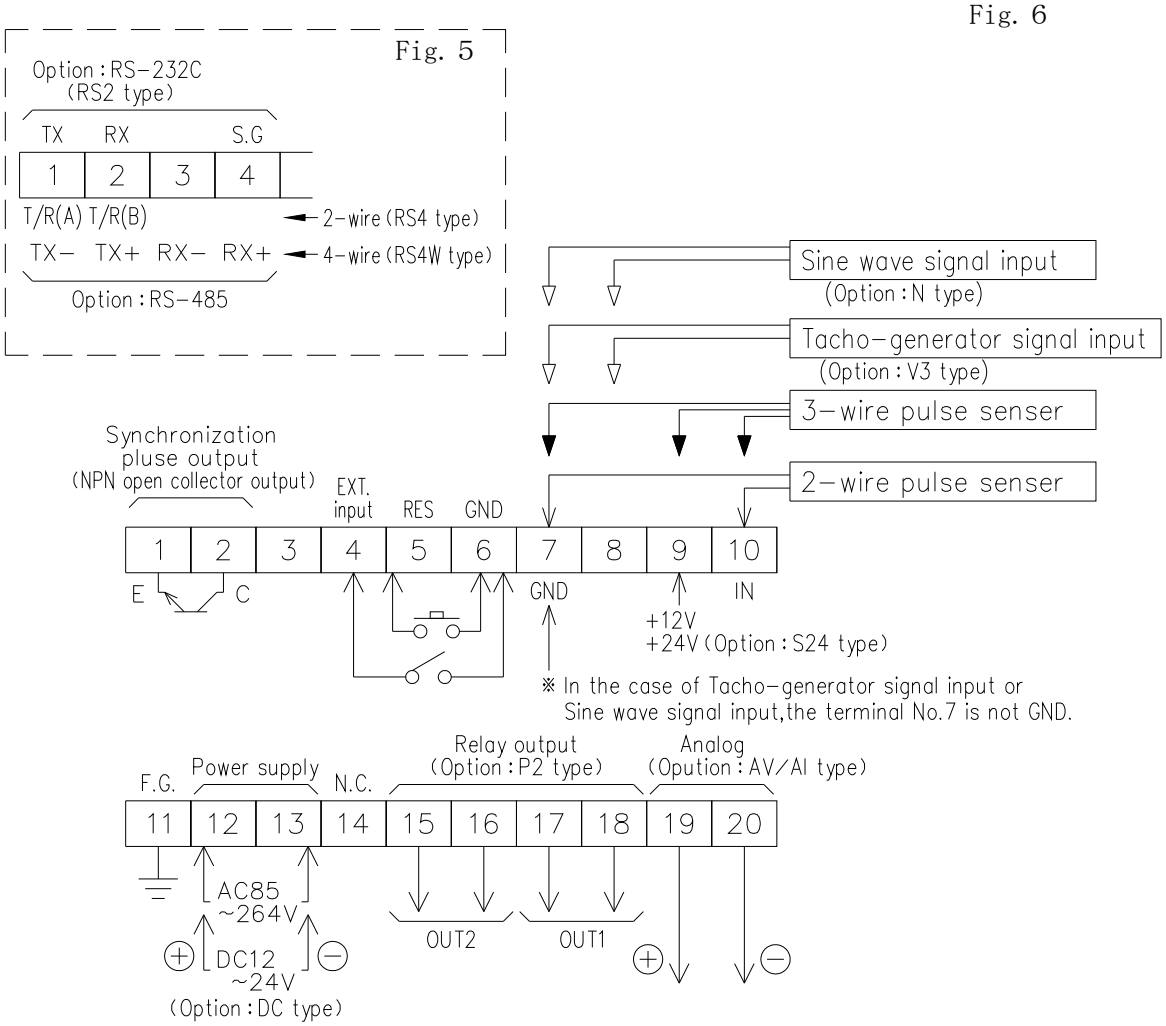
1) Indicator (Rate meter or totalizer) is switched. ※Refer to Mode 06.
2) During setup procedures, it is used to register the setting and to return the display to the readings.

⑬ Reset key (RST)

1) Resets the totalizer without interrupting or resetting the rate reading.
It also resets the alarms.
2) During setup procedures : The display returns to the readings, without registering.

5. Connecting terminal board

Fig. 6



※ RS-232C/RS-485/RS-485W communication type : Refer to fig. 5. (Terminal No. 1-4)

There is not the EXT. input the synchronization pulse output when select a communication type.

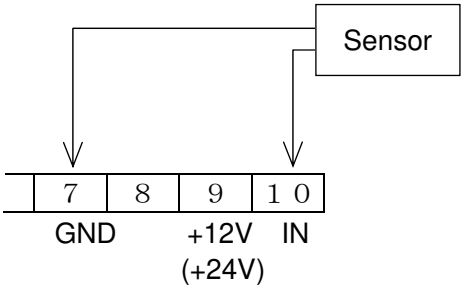
Wiring precautions

⚠ Caution

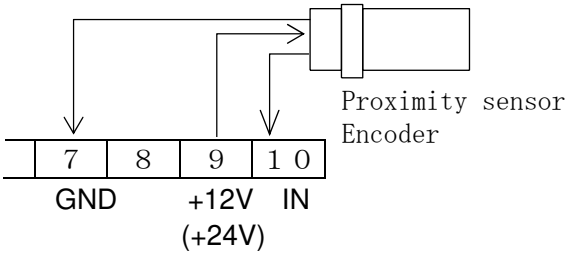
- Always turn the power off before commencing any wiring work.
- Please confirm the specification.
- Confirmation of power supply input
  Confirm the input voltage specification (AC or DC) once again. Pay much attention to this matter. If this is not right, a protective part and the like may be damaged.
- For DC power supply input
  If ⊕ and ⊖ are connected reversely, the internal protective circuit will function to stop the reverse current. In this case, disconnect the wires, and after about 30 seconds, connect the wires to ⊕ and ⊖ correctly. The system will work normally.
- Since the input and output wirings differ depending on the type of the sensor, make wiring work with the next-mentioned diagrams (Figs 7 to 9).
- Tighten the screw of the terminal boards securely.
- Use the terminal No. 7 - 10 as power supply for the sensor. Do not use these terminals for other things.

Sensor connection

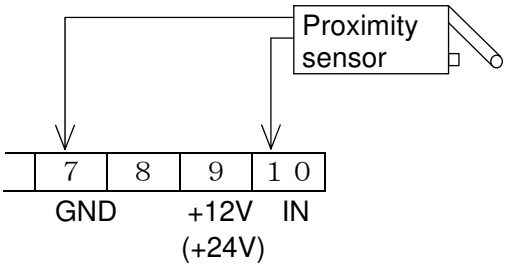
A) Pulse output 2-wire type sensor Fig. 7



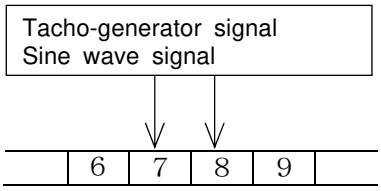
B) Pulse output 3-wire type sensor Fig. 8



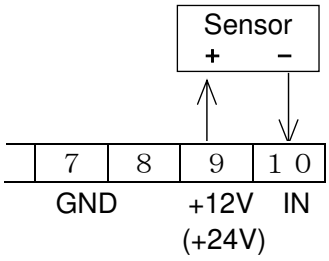
C) Ground contact output sensor Fig. 9



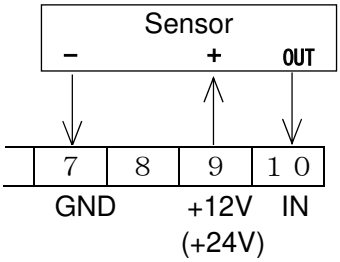
D) Tacho-generator signal/ Sine wave signal output sensor Fig.10



E) Current pulse input (2-wire pulse sensor) Fig.11



F) Current pulse input (3-wire pulse sensor) Fig.12

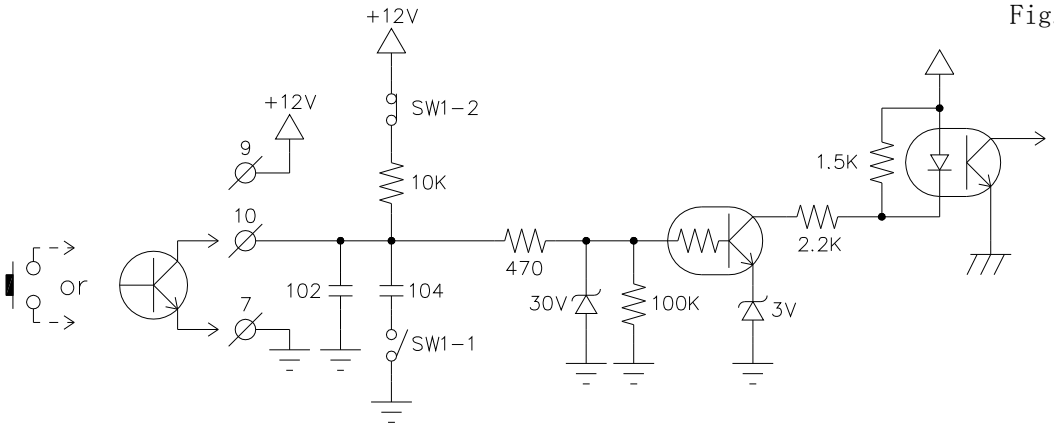


6. Construction of input circuit

[1] Pulse sensor input

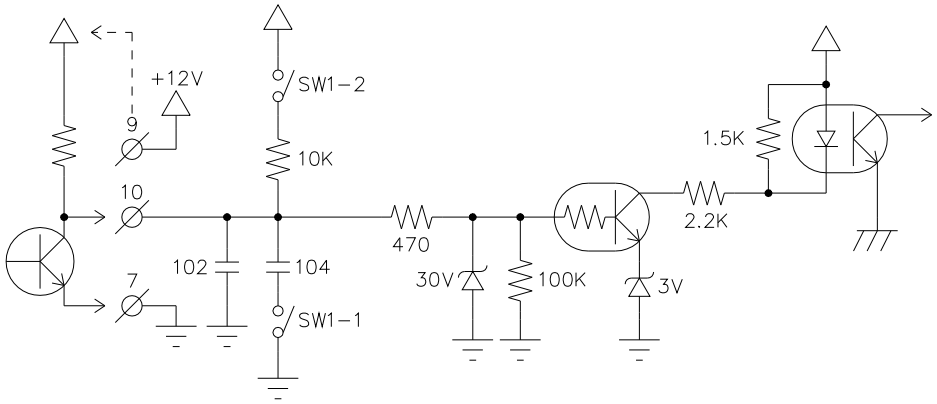
NPN open collector pulse input

Fig.13



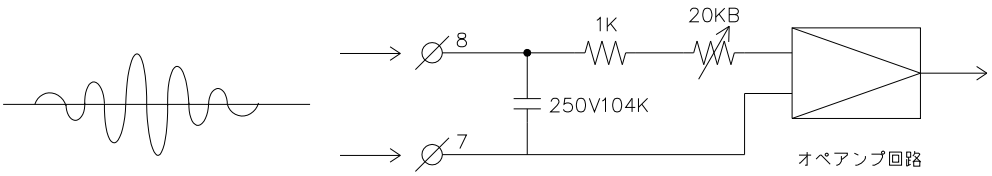
Voltage pulse input

Fig.14



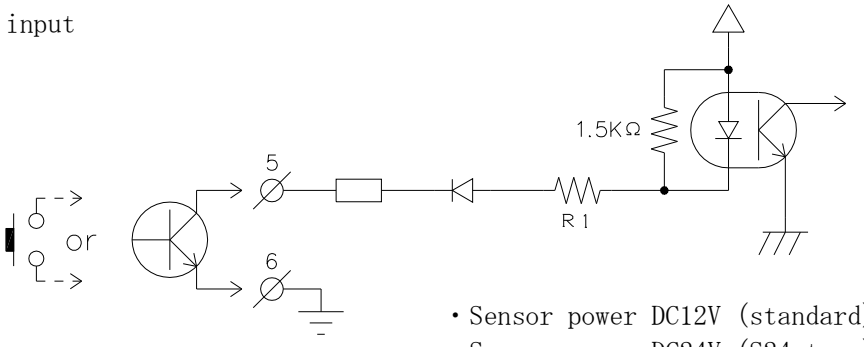
[2] Tacho-generator signal input/ Sine wave signal input

Fig.15



[3] Reset input

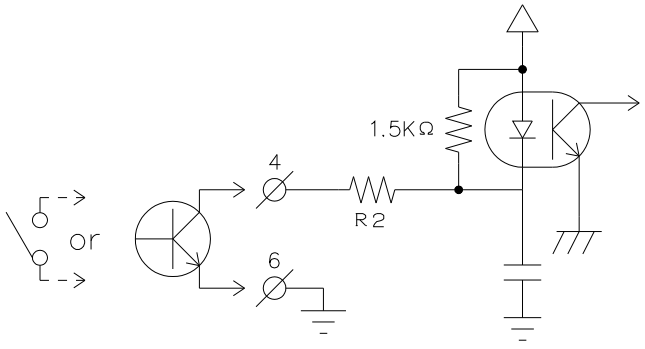
Fig.16



・Sensor power DC12V (standard) : R1 = 2.2kΩ
・Sensor power DC24V (S24 type) : R1 = 3.9kΩ

[4] EXT. input

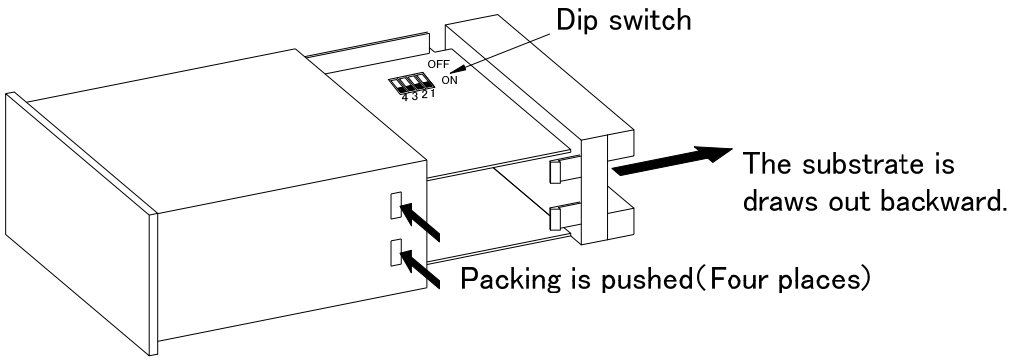
Fig.17



・Sensor power DC12V (standard) : R2 = 2.2kΩ
・Sensor power DC24V (S24 type) : R2 = 3.9kΩ

7. Setting the dip switch

Fig.18

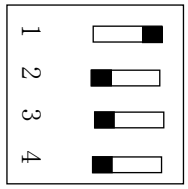


The input response frequency is selected by setting the dip switch.

Table 1

	SW1-1	SW1-2	SW1-3	SW1-4
open collector pulse	ON	—	—	—
Voltage pulse	OFF	—	—	—
Input frequency (Low)	—	—	OFF	ON
Input frequency (Mid)	—	—	ON	OFF
Input frequency (Hi)	—	—	OFF	OFF

OFF ⇔ ON

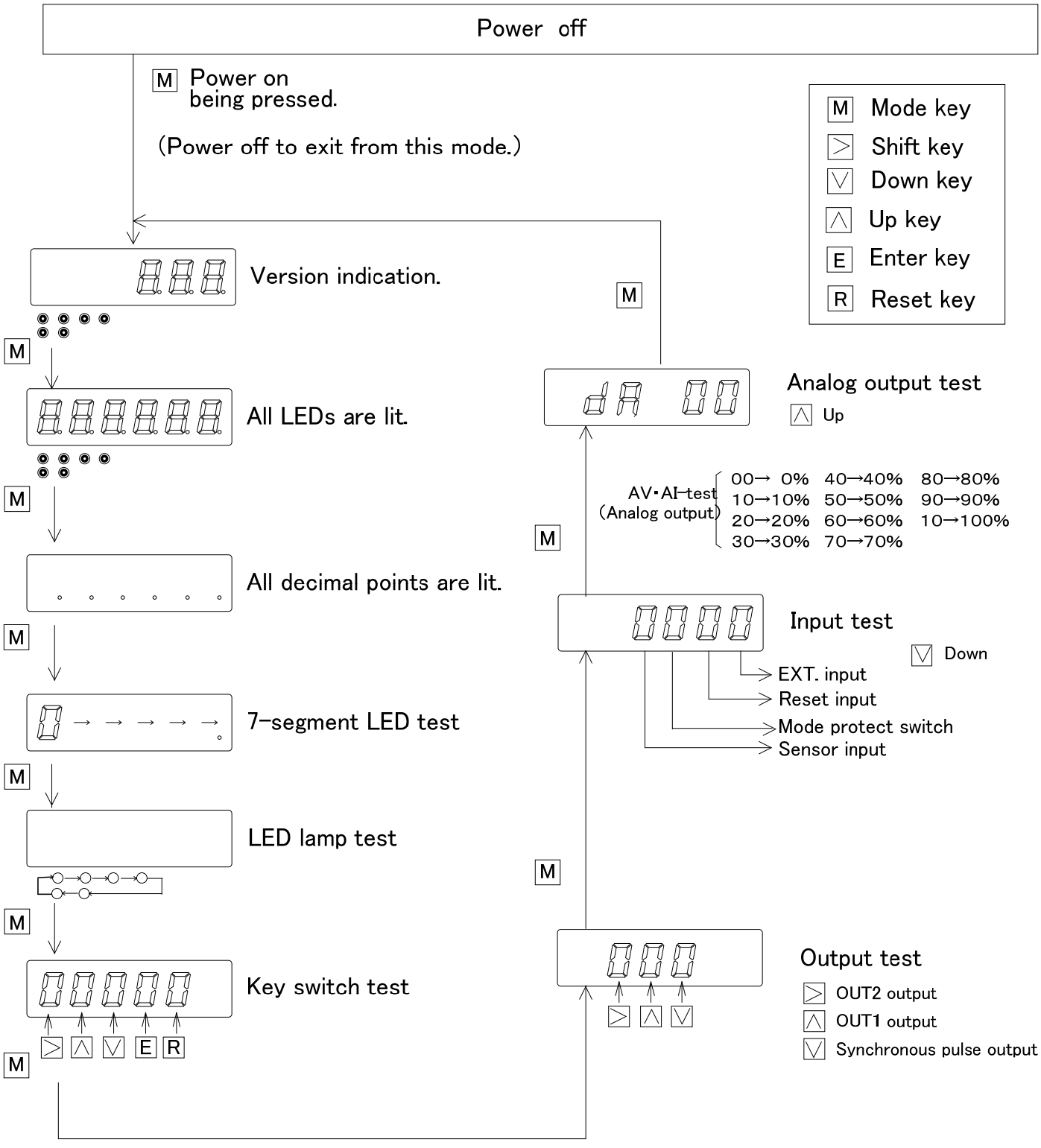


The black square indicates switch position.

LOW : 0.01Hz - 50Hz
MID : 0.01Hz - 1kHz
HI : 0.01Hz - 10kHz

The regular factory settings are shown in the diagram in the upper right.

8. Test mode


Power off
M Power on being pressed.
(Power off to exit from this mode.)
M Mode key
> Shift key
∨ Down key
∧ Up key
E Enter key
R Reset key
Version indication.
All LEDs are lit.
All decimal points are lit.
7-segment LED test
LED lamp test
Key switch test
Analog output test
∧ Up
AV・AI-test (Analog output)
00→ 0% 40→40% 80→80%
10→10% 50→50% 90→90%
20→20% 60→60% 10→100%
30→30% 70→70%
Input test
∨ Down
EXT. input
Reset input
Mode protect switch
Sensor input
Output test
> OUT2 output
∧ OUT1 output
∨ Synchronous pulse output

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.

1. Value setting of each Mode Table 1

Mode No.	Initial setting				Note			
AB	C	D	E	F	C	D	E	F
01.	1	0	0	0				
02.	3	0	1	1				
03.	−	0	2.	0	−			
04.	−	−	−	0	−	−	−	
05.	−	0	2.	0	−			
06.	−	−	0	0	−	−		
07.	1	0	0	0				
08.	3	0	0	0				
09.	−	0	−	0	−		−	
10.	1	0	0	0				
11.	0	0.	0	5				
12.	−	0	−	0	−		−	
13.	0	0	0	0				
14.	0	0	0	0				
15.	0	1	0	3				
16.	0	0	−	0			−	

2. Preset value setting of each alarm output Table 2

Alarm No.	Initial setting						Notes					
	A	B	C	D	E	F	A	B	C	D	E	F
OUT1	9	9	9	9	9	9						
OUT2	9	9	9	9	9	9						

3. Offset value setting (Totalizer) Table 3

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

Initialization : Power on Enter key being pressed to initialize the settings.
After the initialization, the set values will be as shown in Table 1-3.

Note : 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. Setting the mode

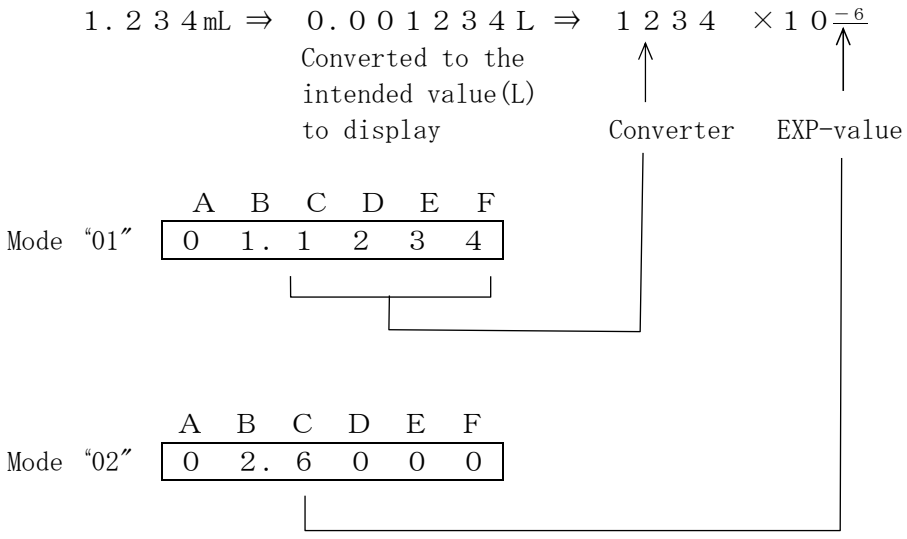
・Calling up and modifying the mode setting
When a mode is set, operate each key according to the following table.

Operating key	Display unit	Operation procedure
MODE + ＞	A B C D E F 0 1. 1 0 0 0 ↑ Mode No.	While holding down the MODE key, press the ＞ key for 2 seconds or more. “0 1” appears in displays A-B and the value setting for mode 0 1 is shown.
∧	A B C D E F 0 1. 1 0 0.0 ↑ 0 to 9	Change the blinking numeral value. Every press raises the value by ones. (0 → 1 → 2・・・9 → 0・・・)
∨	A B C D E F 0 1. 1 0 0.0 ↑ 0 to 9	Change the blinking numeral value. Every press reduce the value by ones. (0 → 9 → 8・・・1 → 0 →9・・・)
＞	A B C D E F 0 1. 1 0 0 .0 ↑→ → →	Change the blinking indication position (figure). Every press moves the position to the right by a figure.
MODE	A B C D E F 0 2. 3 0 1 1 ↑ 01 to 16	Change the mode number. Every press raises the number by one. There are 16 modes in total. When it reaches 16, it returns to 01. (01 → 02 → 03・・・16 → 01・・・)
ENT		After adjusting the setting, make registration with this key. It returns to the measuring mode after registration.
RES		Even by pressing this key during the time setting the mode, it returns to the measuring mode. Pay attention to the fact that the set data is not memorized.

Note : In case you change mode setting, turn OFF mode protect.
If it is turned ON, change of mode setting will be made impossible.
(Refer to 27 page.)

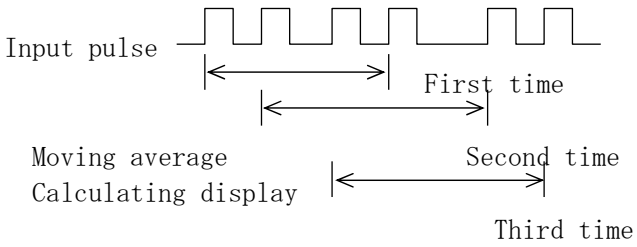
∨ Activated for 2 sec or more ・・・
Mode protect ON “L－ON”
Mode protect OFF “L－OFF”

Contents of modes and setting values

Mode No.	Setting of converting value (scaling)
0 1	A B C D E F 0 1. 1 0 0 0 → Converted value 0001～9999 (Do not set 0000)
	①This mode "01" acts as input converter. Mode "02"-C acts as magnification(EXP-value). ②With input of this converter and EXP-value, it is possible to set the magnification per 1 pulse. This EXP-value is set with Mode "02". ③For instance, with display of instant flow-rate by L/min in the use of flow sensor of 1.234mL per 1 pulse, the following is shown. 

Mode No.	EXP-value, and measurement time unit setting
0 2	A B C D E F 0 2. 3 0 1 1 Display decimal point setting 0··· 0 1··· 0.0 2··· 0.00 3··· 0.000 4··· 0.0000 measurement time unit 0 ··· per Hour 1 ··· per Minute 2 ··· per Second Display condition for last figures 0 ··· real display 1 ··· "0" fixed 2 ··· only "0" or "5" display EXP-value 0—9 This mode "02" -C is EXP-value input as explained in mode "01" .

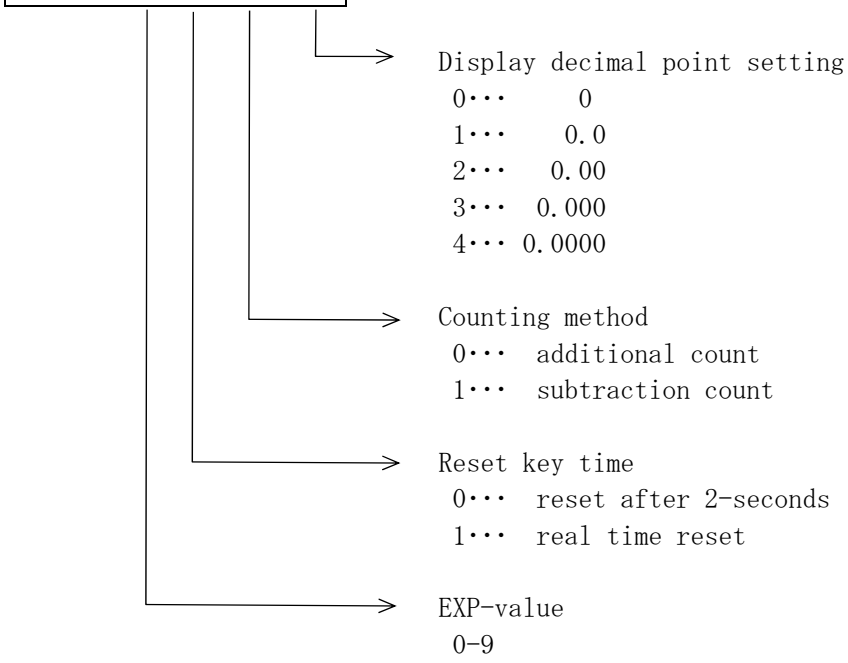
Mode No.	Display sampling time
0 3	A B C D E F 0 3. 0 2. 0 Sampling time 00.1～99.9 seconds (00.0 corresponds to 100 sec.) For display-sampling time, input signal is measured with its set time, and its mean value is calculated and display, then use it for preventing the flashing or for stabilizing the display. Accordingly, renewal shall be made by averaging the display for each set time.

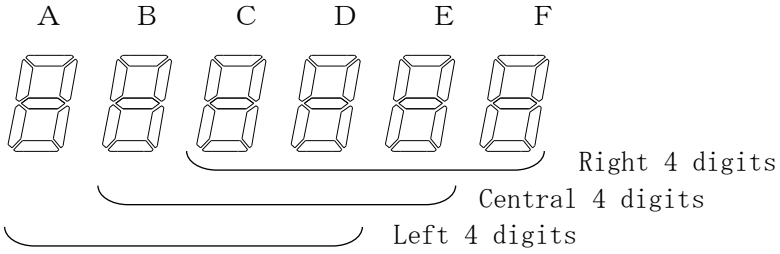
Mode No	Moving average setting
0 4	A B C D E F 0 4. 0 → Moving average 2～9 times (0,1 setting meaning no function)
	It inputs the number of times (0-9) of input pulse. For instance, upon setting "4" ,the average of 4 pulses can be calculated and displayed. Especially, it is effective when the flow value per 1 pulse of sensor is not correct.  Note)In relation to the calculation, use the input pulse in case of less than 20Hz. In case of higher frequency, try to stabilize the display by mode "03" display sampling.

Mode No.	Auto-zero time setting
0 5	A B C D E F 0 5. 0 2. 0 → Auto-zero time 00.0～99.9 seconds
	In case input signal without this time, returns the display to "0". Setting auto-zero time to 00.0, display last measuring data (present data) in case of input signal nothing.

Mode No.	Display selection, External input selection
0 6	A B C D E F 0 6. 0 0 Display selection 0 ··· Change over rate and total count 1 ··· Only rate display 2 ··· Only total count display External input selection 0 ··· Changeover the display 1 ··· Inhibit input 2 ··· Holding display
	EXT. input selection : Terminals no. 4 and 6 (※ RS/RS4/RS4W-type : The EXT. input terminals become the communication terminal) 0 : A change of the indicator is possible by the terminal input. 1 : Accepts no sensor inputs 2 : Holds the current indication while blinking. Internally, count calculations are continued.
	Indicator : 0 : A change of the indicator is possible by the front Enter key. 1 : The rate reading is indicated. It cannot switch to the total reading. 2 : The total reading is indicated. It cannot switch to the rate reading.

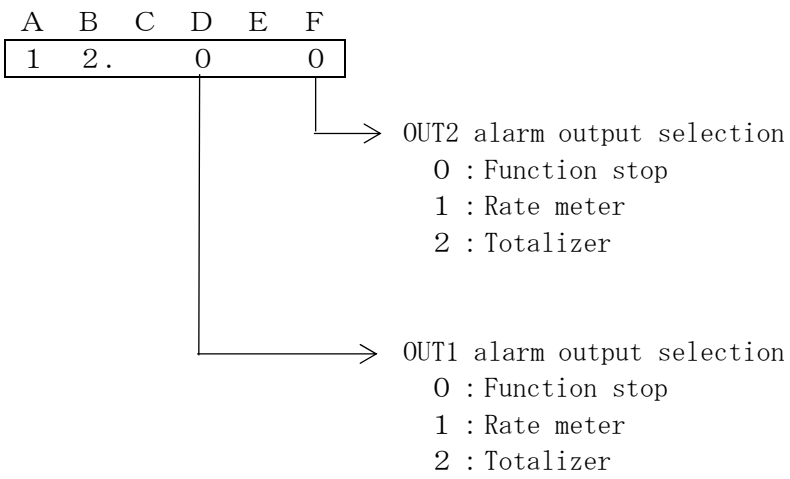
Mode No.	Totalizer : Setting the converted value
0 7	A B C D E F 0 7. 1 0 0 0 Converted value 0001-9999 (Do not set 0000) With input of this converter and EXP-value, it is possible to set the magnification per 1 pulse. This EXP-value is set with Mode "08" .

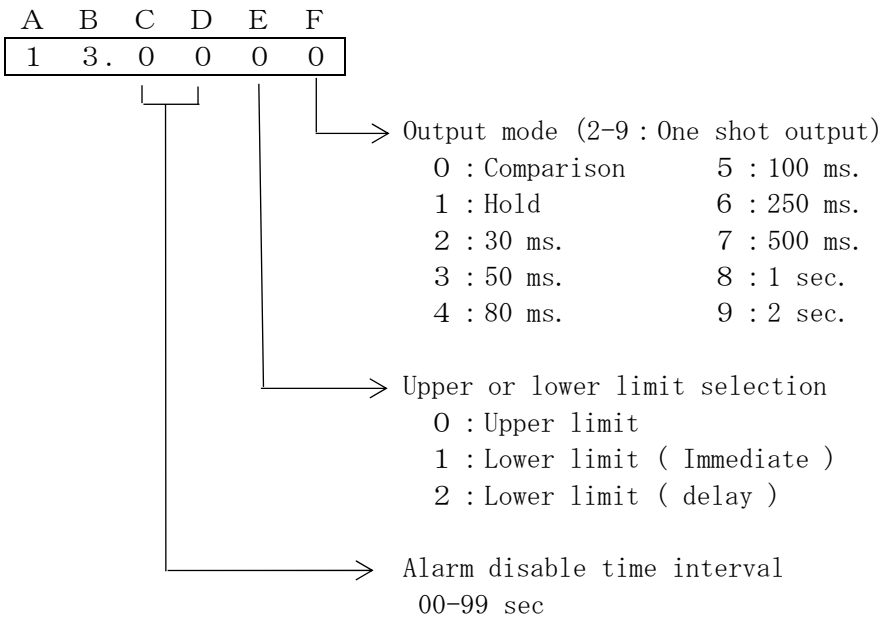
Mode No.	Totalizer : Decimal point, Counting method, Reset, Converter
0 8	A B C D E F 0 8. 3 0 0 0 
	Reset time : The setting for the front panel Reset key is specified. 0 : The Reset key is pressed for 2 seconds or longer for the count to be reset. 1 : The count is reset immediately when the Reset key is pressed. 1 : Reset input from the terminal board resets immediately, overriding this setting. 2 : The reset function resets the totalizer and the alarm output. 3 : The rate meter reading can not be reset.
	This mode "02" -C is EXP-value input as explained in mode "07".

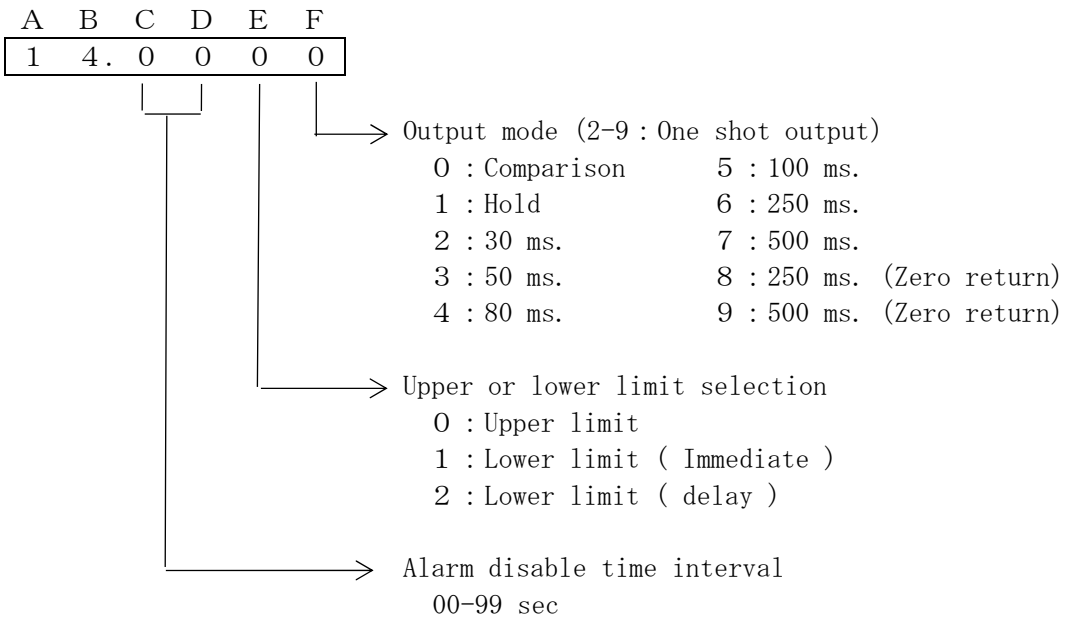
Mode No.	Analogue output
0 9	A B C D E F 0 9. 0 0 Analogue shift 0··· Comparative output with right 4digits 1··· Comparative output with central 4 digits 2··· Comparative output with left 4digits Output selection for rate or total count 0··· for rate (synchronized rate display) 1··· for rate (real time) 2··· for total count Selecting between rate/total : The value to be outputted is selected. 0 : It outputs synchronizing with the sampling time. 1 : Real time output of the rate reading. 2 : It outputs synchronizing with the renewal of the display of the totalizer.
	Digit selection : The four digits for comparison output are selected. 

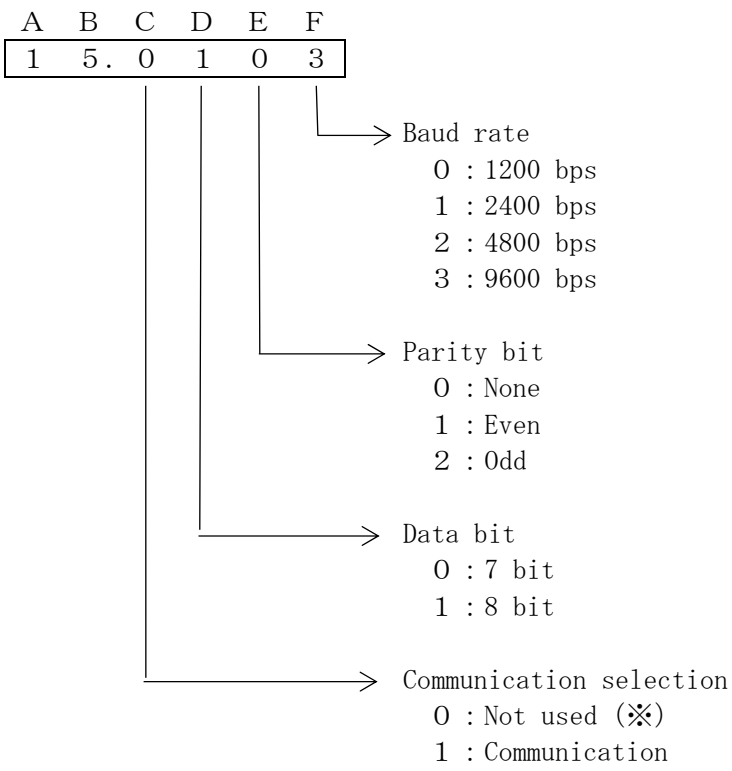
Mode No.	Display value at output time of analogue max.
1 0	A B C D E F 1 0. 1 0 0 0 setting maximum display value at maximum analogue output Input 0001 - 9999 (Do not set 0000)
	Set an indication value of the time when the analog output is maximum.
	Set a value in four digits, neglecting the decimal point. For example, both 500.0 and 50.00 are all right. 〔Ex.〕 The settings in a case where the analog output is 0-5 V DC, synchronized with the totalizer, with a maximum output (5V) when the reading is 500.0, would be as follows. A B C D E F Mode 09 0 9. 2 0 D : 2 (Output synchronized with totalizer) F : 0 (Right 4 digits) A B C D E F Mode 10 1 0. 5 0 0 0 C-F (Maximum output indication is 5000.)

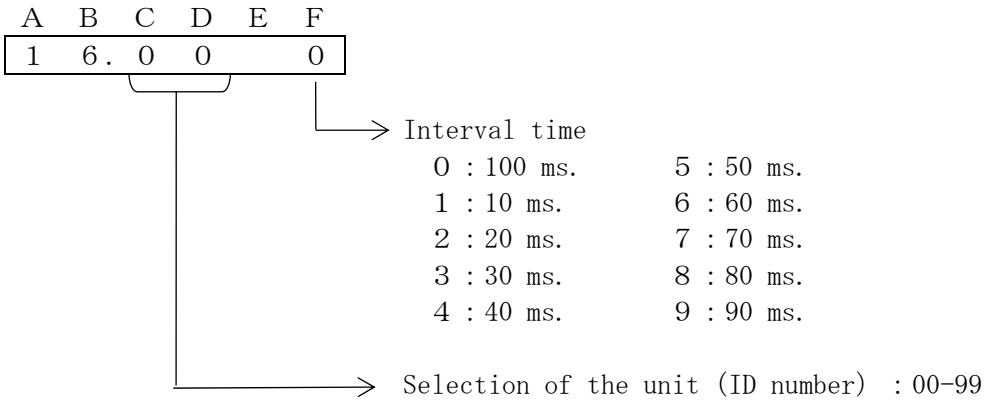
Mode No.	Output digit and output width for synchronized pulse
1 1	A B C D E F 1 1. 0 0 0 5 Set up output width (0.01 - 1.99sec) 0.00 is meaning no function Output digit 0··· 1 digit 1··· 2 digit 2··· 3 digit 3··· 4 digit
	Output digit selection : The digit whose change is to trigger the pulse output is specified.
	Pulse output width : Set the output width of totalizer synchronization pulse.
	※ 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.

Mode No.	Alarm output selection
12	
	OUT1 alarm output selection Function stop･･･OUT1 alarm output function stop Rate meter･････Compare rate meter indication value to Preset value. Totalizer･･････Compare totalizer indication value to Preset value. ※ OUT1 Alarm output, adapt itself to Mode No. 13, and please set it.
	OUT2 alarm output selection Function stop･･･OUT2 alarm output function stop Rate meter･････Compare rate meter indication value to Preset value. Totalizer･･････Compare totalizer indication value to Preset value. ※ OUT2 Alarm output, adapt itself to Mode No. 14, and please set it.

Mode No.	OUT1 : Setting the alarm output	P2-type
1 3		
	Alarm disable time interval : The time in second following power startup or reset at which the alarm function is activated is specified. ※Setting the upper or lower limit selection is “2 : Lower limit (delay)” Alarm disable time interval. Startup by setting 00.	
	Upper and lower limits selection : Select that this is output when the upper limit is exceeded or when the lower limit is exceeded.	
	Output mode : The length of the alarm output is specified. Comparison : Alarm is outputted when the indication value exceeds the upper/lower limit (preset values) . When the input returns to normal, the output is turned off. Hold : Alarm is outputted when the indication value exceeds the upper/lower limit (preset values). The alarm output, once activated, is sustained until reset. One shot : A pulse of pre-specified width is outputted once when the indication value exceeds the upper/lower limit (preset values) .	

Mode No.	OUT2 : Setting the alarm output	P2-type
1 4		
	Each setting is the same as that of the Mode 13 (Alarm output OUT1) .	
	Output mode 8 and 9 : Zero return When an indication value exceeds the specified value (preset value) , this outputs one pulse of the set width one time, and return the indicator to the offset value. ※1 : Condition of setting the preset value Upper : Preset value > Offset value Lower : Preset value < Offset value ※2 : Always reset starting the count. ※3 : In the rate meter one-shot output is available.	

Mode No.	Setting the communication	RS2-type / RS4-type / RS4W-type
15		
	Communication selection : Set the zero in the case of unit except communication option.	

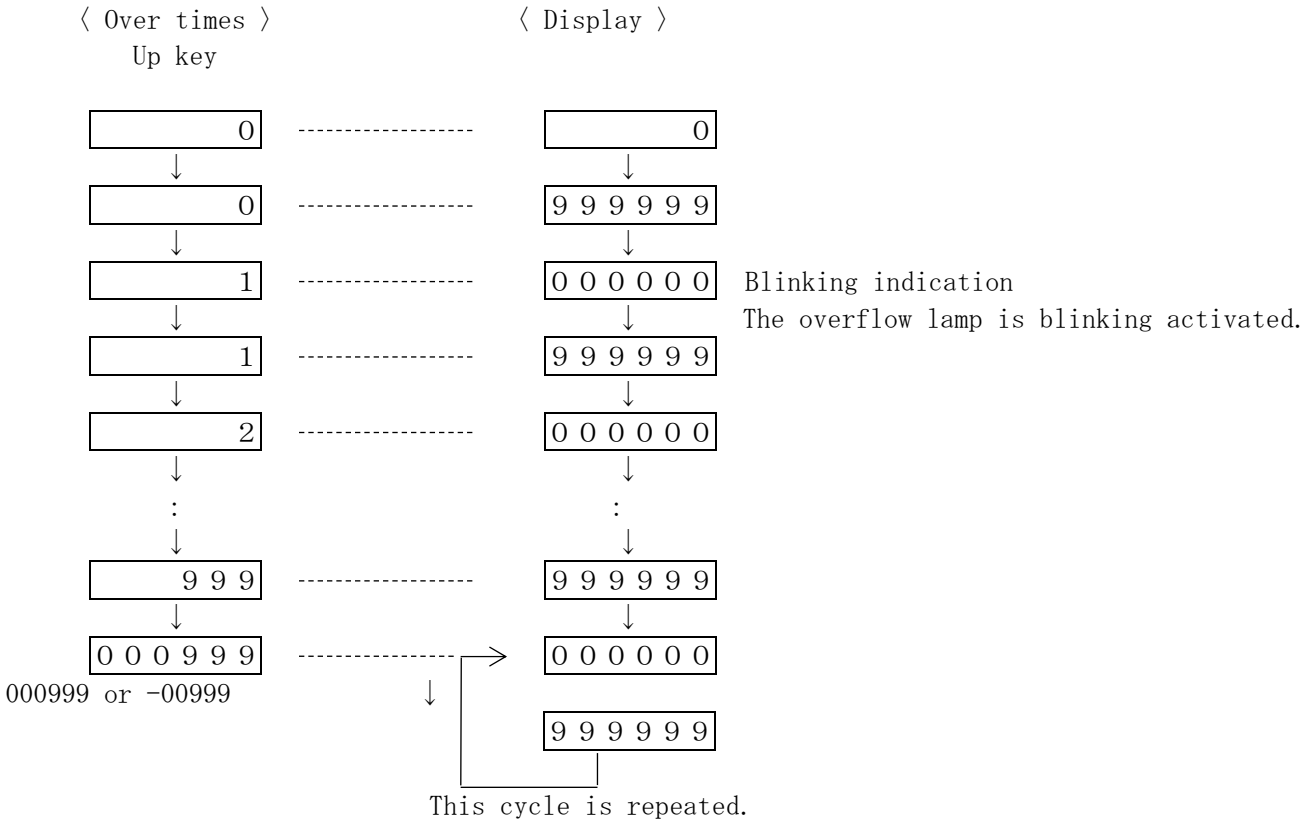
Mode No.	Setting the communication	RS2-type / RS4-type / RS4W-type
16		
	Interval time : Wait time when switching to receive signal from send signal, or to send signal from receive signal.	

11. Operation explanation for totalizer

1) Totalizer starts measurement from zero or offset value. (addition or subtraction)

2) Display range : -99999 to 999999
   The Overflow (OV) lamp is blinking activated when the total exceeds 999999 (or -99999).
   While blinking indication, it continues measurement from 000000 or -00000.
3) The over times (the overflowed upper 3 digits) are displayed while Up key is pressed.

Fig.19



12. Mode protect function

If this function is turned ON, change of mode setting will be made impossible.
(The Up key and Down key is canceled.)
The mode protect at the time of the shipment becomes OFF.

Operation of the mode protect

1. If setting it, finish setting.
2. [∨] Activated for 2 sec or more.
3. Current mode protect state is displayed when it passes for 2 sec.

Mode protect ON

A	B	C	D	E	F
	L	−	O	N	

Mode protect OFF

A	B	C	D	E	F
	L	−	O	F	F

4. Keeps pushing [∨] key for 8 sec as it is continuously, the state of mode protect is changed.
5. It usually returns when [∨] key is stopped being pushed.

13. Setting the offset value

The preset total reading value to be displayed directly following a reset is specified.
For example, if the offset value is set at “001000”, 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 “000000”. The procedure for setting the offset value is described below.
The setting range is -99999-999999.
This is a function only applicable to the totalizer.

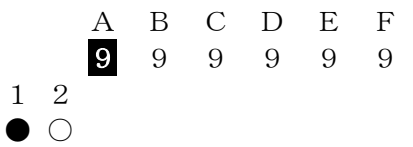
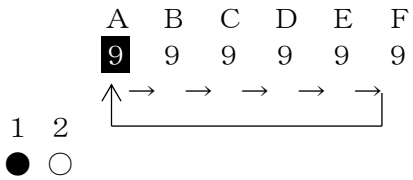
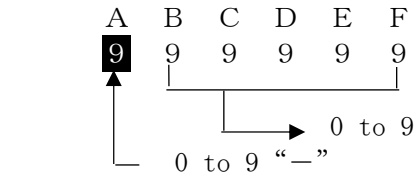
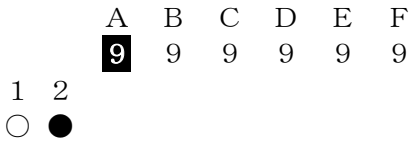
Operating key	Display unit	Operation procedure
MODE + ∧	A B C D E F 0 0 0 0 0 0	While holding down the MODE key, press the ∧ key for 2 seconds or more. The present setting value is shown in displays.
>	A B C D E F 0 **0** 0 0 0 0 ∧ → → → → →	Change the blinking indication position (figure). Every press moves the position to the right by a figure.
∧ ∨	A B C D E F **9** 9 9 9 9 9 0 to 9 0 to 9 “−”	Change the blinking numeral value. A number goes up and down one by one once. Set value of hope together with Shift key. Display A Setting “−”
ENT		After adjusting the setting, make registration with this key. It returns to the measuring mode after registration. (The offset value is not displayed.)
RES		Even by pressing this key during the time setting the offset value, it returns to the measuring mode. Pay attention to the fact that the set data is not memorized.

RES	A B C D E F 1 0 0 0 0	The registered offset value can be displayed by pressing this key. The totalizer count is resumed from this value (setting).

Note : The decimal place of the reading is interlocked with Mode 08

14. Setting the alarm preset value

Set the preset values on the upper and lower limits in alarm output.
The setting range is -99999-999999.

Operating key	Display unit	Operation procedure
MODE		Press the key for 2 seconds or more. The OUT1 lamp lights up and the preset value setting for OUT1 is shown.
＞		Change the blinking indication position (figure). Every press moves the position to the right by a figure.
∧ ∨		Change the blinking numeral value. A number goes up and down one by one once. Set value of hope together with Shift key. Display A Setting “－”
MODE		The OUT2 lamp lights up and the preset value setting for OUT2 is shown. Each time the key is pressed, OUT1 and OUT2 switch. (OUT1 → OUT2 → OUT1 → ・・・)
ENT		After adjusting the setting, make registration with this key. It returns to the measuring mode after registration.
RES		Even by pressing this key during the time setting the preset value, it returns to the measuring mode. Pay attention to the fact that the set data is not memorized.

Note 1 : Which of the totalizer or rate meter is this alarm output used by must be selected according to the Modes 12 (P.22)

Note 2 : The decimal place of the reading is interlocked with Mode 02 (P.16) for rate meter or Mode 08 (P.19) for totalizer.

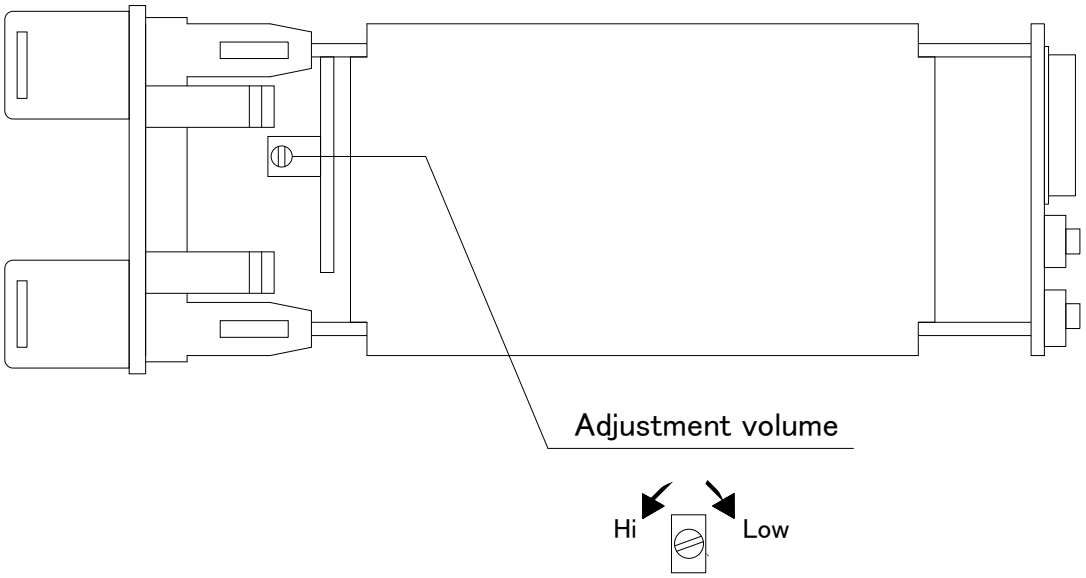
15. Adjusting the tacho-generator signal, sine wave signal input

The input (V3, N) range is adjusted correctly at the factory.
Please do not touch except necessity/

V3-type : Taco-generator signal input AC 0.8V-80V(P-P)
N-type : Sine wave signal input AC 0.05-20V(P-P)

While looking at display , adjust an adjustment volume.
The adjustment volume is located as shown in fig20

(Fig. 20)



16. Adjusting the analog output

The analog output (AV3 - 5,AI) range is adjusted correctly at a factory.
Please do not touch except necessity.

・Tune in exactly

1. Power on Mode key being pressed to put the instrument into the test mode.
2. Press the Mode key until the analog output test “dA” appears. (Refer to page 12.)
3. It adjusts so that it may become the output value corresponding to indication value as follows. Be sure to start the adjustment from the zero volume.

For the voltage output (AV3) type unit

Indication	Output voltage	
0	1 V	Turn the zero volume to adjust
10	5 V	Turn the span volume to adjust

(※ Repeat the procedure several times for fine adjustment.)

For the voltage output (AV4) type unit

Indication	Output voltage	
0	0 V	Turn the zero volume to adjust
10	5 V	Turn the span volume to adjust

(※ Repeat the procedure several times for fine adjustment.)

For the voltage output (AV5) type unit

Indication	Output voltage	
0	0 V	Turn the zero volume to adjust
10	10 V	Turn the span volume to adjust

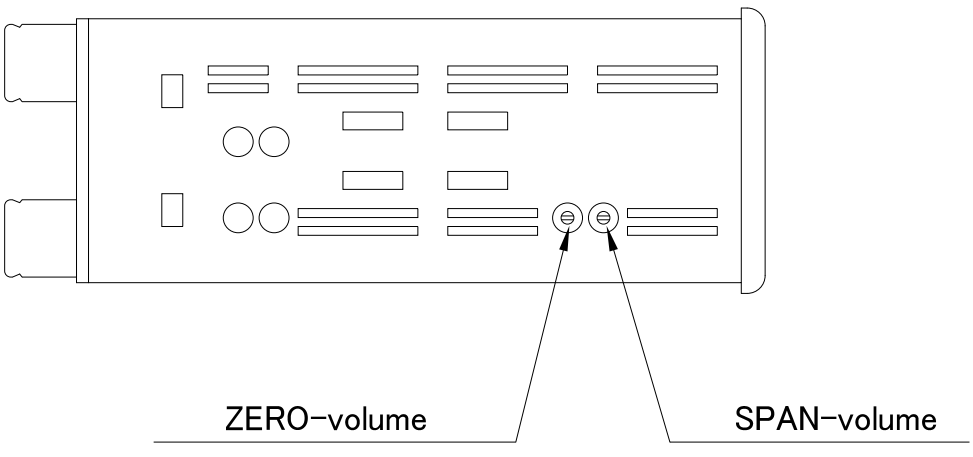
(※ Repeat the procedure several times for fine adjustment.)

For the current output (AI) type unit

Indication	Output current	
0	4 mA	Turn the zero volume to adjust
10	20 mA	Turn the span volume to adjust

(※ Repeat the procedure several times for fine adjustment.)

(Fig 21)



17. Communication format (RS2-type / RS4-type / RS4W-type)

・Communication command

	Command (Host)	↔	Response (Indicator)
1.	Rate meter data read		
	@□□RDT△△$^{C}_{R}$	→	
		←	@□□◇◇±0 1 2 3 4 5△△$^{C}_{R}$
2.	Totalizer data read		fixed
	@□□RCT△△$^{C}_{R}$	→	
		←	@□□◇◇±0 1 2 3 4 5△△$^{C}_{R}$
3.	Preset value OUT1 read		fixed
	@□□RP1△△$^{C}_{R}$	→	
		←	@□□◇◇±0 1 2 3 4 5△△$^{C}_{R}$
4.	Preset value OUT2 read		fixed
	@□□RP2△△$^{C}_{R}$	→	
		←	@□□◇◇±0 1 2 3 4 5△△$^{C}_{R}$
5.	Preset value OUT1 write		fixed
	@□□WP1±0 1 2 3 4 5△△$^{C}_{R}$	→	
	fixed	←	@□□◇◇△△$^{C}_{R}$
6.	Preset value OUT2 write		
	@□□WP2±0 1 2 3 4 5△△$^{C}_{R}$	→	
	fixed	←	@□□◇◇△△$^{C}_{R}$
7.	Reset		
	@□□RST△△$^{C}_{R}$	→	
		←	@□□◇◇△△$^{C}_{R}$
8.	Indication is switched to rate meter		
	@□□DSD△△$^{C}_{R}$	→	
		←	@□□◇◇△△$^{C}_{R}$
9.	Indication is switched to totalizer		
	@□□DSC△△$^{C}_{R}$	→	
		←	@□□◇◇△△$^{C}_{R}$
10.	Status clear		
	@□□RER△△$^{C}_{R}$	→	
		←	@□□◇◇△△$^{C}_{R}$

・□□ : ID number (00-99)
・△△ : Checksum (MOD)
・◇◇ : Status

≪ ID ≫

The ID number (00-99) of the unit of the place of the communication is specified.

≪ Checksum processing method ≫

Transmission command data become the next.
ID number : 00, In the case of "Reset"

"@００RST△△$^{C}_{R}$"
↑
This is subjected to a checksum.

"@" + "0" + "0" + "R" + "S" + "T"
(40H) (30H) (30H) (52H) (53H) (54H) ← Character strings (HEX value)

= (１９９H) ← This lower two digits, "99" is used for the checksum.

Accordingly, the transmission command is "@００RST９９$^{C}_{R}$"

≪ Status ≫

The condition of the unit and a communication error are shown.
Status is shown in expressing HEX value in 2 byte character strings.

bit 7 : OUT1 output condition (1 : output)
bit 6 : OUT2 output condition (1 : output)
bit 5 :
bit 4 :
bit 3 : Transmission error
bit 2 : Over run error
bit 1 : Parity error
bit 0 : Command injustice・Checksum error

bit 0-3 : These error, once activated, is sustained until status clear (RER) .

・Example of status
Status : 81

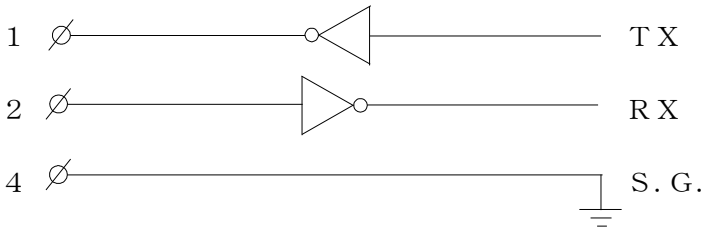
Hexadecimal number (81) is converted to binary.

bit 7	bit 6	bit 5	bit 4	bit 3	bit2	bit 1	bit 0
1	0	0	0	0	0	0	1

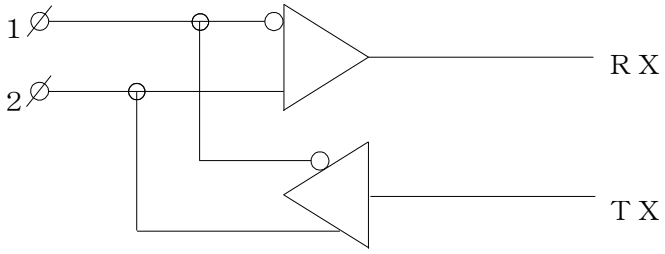
Accordingly, bit 7 : OUT1 is outputting.
bit 0 : Command injustice・Checksum error

■ Internal circuit

1. RS-232C (RS2-type) Fig.22

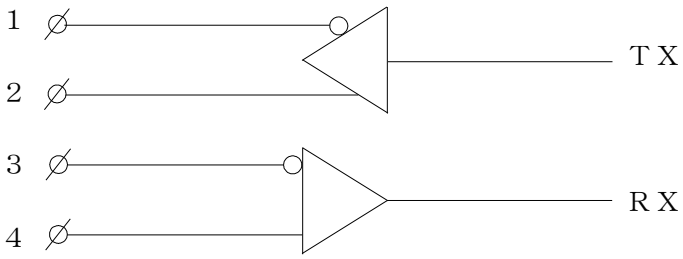


2. RS-485 2-wire (RS4-type) Fig.23



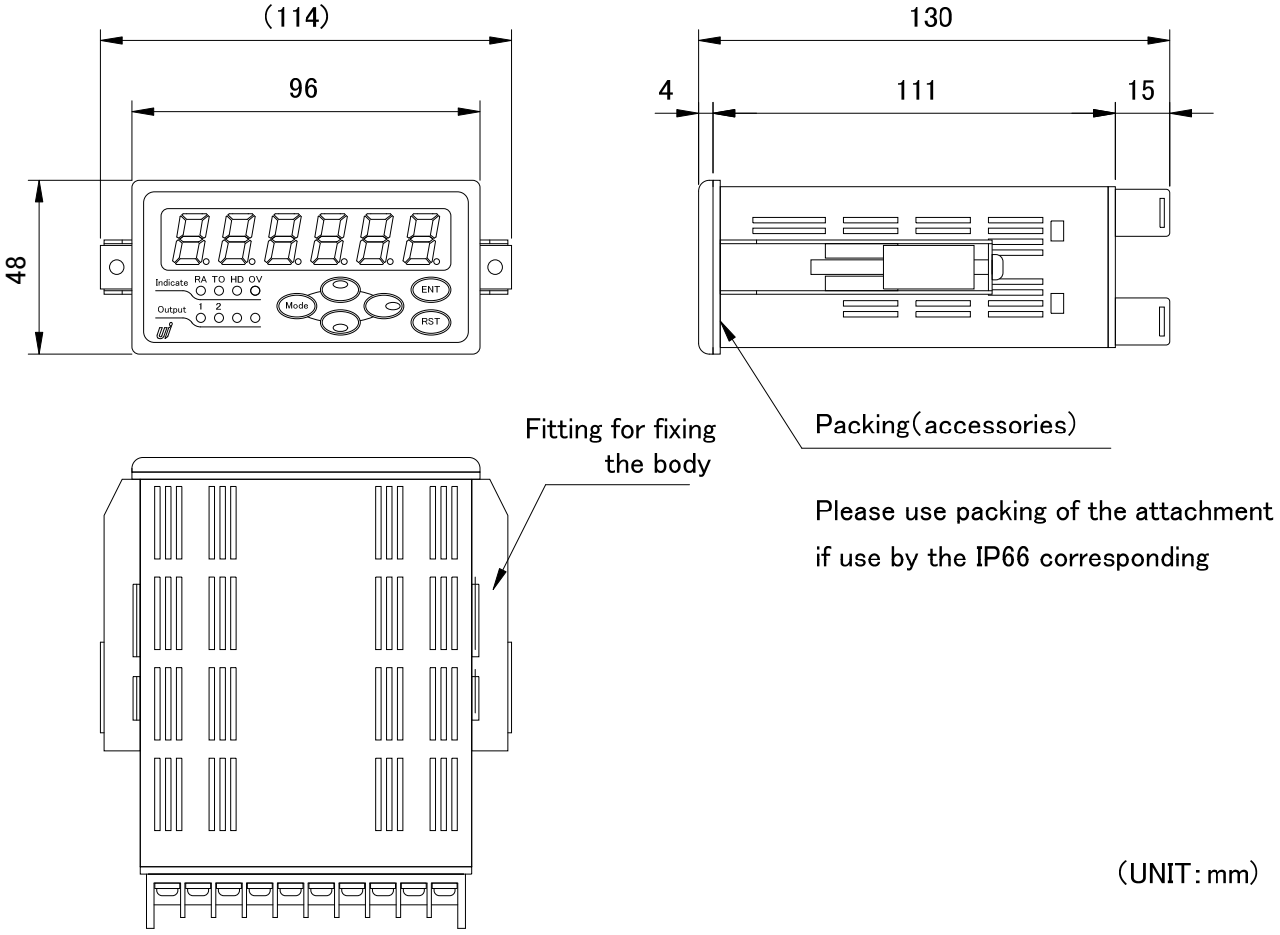
3 (N.C.)

3. RS-485 4-wire (RS4W-type) Fig.24



18. External dimensions

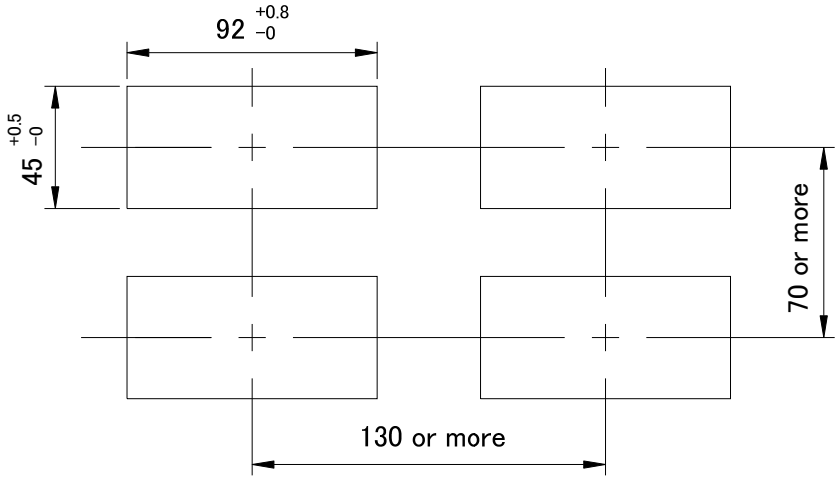
Fig.25



(UNIT:mm)

※The terminal board cover with an option separately(SH-920)

Fig.26



(UNIT:mm)

These specifications and the like may be revised for improvement without prior notice, which please understand and accept.

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