【 Operation Manual 】

Batch counter

MODEL：CU－675 Series

Series name	Communication	Input Signal	Sensor Voltage	Function
CU-675				・NPN open collector Pulse／Voltage Pulse input ・AC85～264V free power ・DIN W72×H144×D122 mm
	RS2			RS-232C Communication
	RS4			RS-485 Communication (２-Wire)
	RS4W			RS-485 Communication (４-Wire)
		A2		Analog current input (DC4～20mA) For deviation detection
			Standard	Sensor Power DC12V 100mA Below
			S24	Sensor Power DC24V 60mA Below

【 4th edition 13th January 2016 】
@CU-675(4)-E

Precautions

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

⚠ <Caution> Do not use this product for applications outside of the product specifications.

⚠ <Caution> User-conducted alterations and modifications of the unit should not be performed as they may impair functioning or cause failure and accidents.

⚠ <Caution> Direct sunshine is avoided, and ratings are used in the place of each Onshime and the place where the be dewy occurs easily. Do not do.

⚠ <Caution> Do not use it in the place with the combustible gas and the ignition thing.

⚠ <Caution> Do not subject the unit to strong vibrations or shocks.

⚠ <Caution> Do not allow metallic debris, dust, or moisture to penetrate the unit.

⚠ <Caution> Always turn the power OFF before commencing any wiring work.

⚠ <Caution> After the power supply, it operates at once because there is no power on/off switch for the unit.

⚠ <Caution> Do not touch the terminal while operating. It gets an electric shock.

Contents

1. About confirmation of an attachment and a guaranteed period

About confirmation of an attachment.

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

（1）ＣＵ－６７５ (The chosen specification) ・・・・・・・・・・・・・・・・1

（2）ＣＵ－６７５ Operation manual (This book)・・・・・・・・・・・・・・・1

（3）Installation turniture ・・・・・・・・・・・・・・・・・・・・・・・・・4

（4）Drip-proof Packing ・・・・・・・・・・・・・・・・・・・・・・・・・・1

（5）Terminal block Cover For 13-pin ・・・・・・・・・・・・・・・・・・・2

（6）Unit label ・・・・・・・・・・・・・・・・・・・・・・・・・・・・・1

※ （3）、（5）were set in the body、 at the time of shipment。

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 due to natural disaster and accident.

2. Specifications

【 Standard specifications 】 Table. 1

	Item	Specifications	
Measurement	Mesurement accuracy (accumulate)	Scaling (Conversion instrument) ± 0 to the 1 (At the time of correction display current position and function stop)	
	Total display	Upper tier : 6 Digits red color LED character height10mm	
	PV display (Measured value)	Middle tier : 6 Digits red color LED character height10mm	
	SV display (Target value)	Lower tier : 6 Digits red color LED character height8mm	
	CH display	Lower tier : 6 Digits red color LED character height8mm	
	Analog input display	ＡＮＡ Lamp Lighting (orange 3φＬＥＤ)	
	Control signal display	ＲＵＮ Lamp Lighting (green 3φＬＥＤ)	
	Slow down signal display	ＳＬＷ Lamp Lighting (green 3φＬＥＤ)	
	End signal display	ＥＮＤ Lamp Lighting (green 3φＬＥＤ)	
	Normal stop display	ＳＴＰ Lamp Lighting (green 3φＬＥＤ)	
	Deviation error display	ＳＴＳ Lamp Lighting (red 3φＬＥＤ)	
	Measurement error display	ＡＬＭ Lamp Lighting (red 3φＬＥＤ)	
	Manual state display	ＭＡＮ Lamp Lighting (orange 3φＬＥＤ)	
	Measurement display Range	TOTAL	0～999999 more than 999999 was flashing display (Non-zero suppression)
		PV (Measured alue)	
	SV Setting of range	Target value	0～999999
	Scaling (Conversion value)	1×10^{-9} - 9999 (selectable)	
	Decimal point	Displays 1 - 3 decimal points. (selectable)	
	PV display reset	Use the start key or start signal for reset, start of surveying from 0.	
		Keep reset key is ON for more than two seconds Terminal block is ON for more than 100mS	
	Over run correction	Compensation beyond the value from SV value (Target value) (Arbitrarily set the be stopped value before In 00000～99999 of ＳＶ value.)	
	Sonsor input anomaly detection	If there is no input of set number of pulses in the set time、Outputs the abnormal signal measurement, Measurement abnormal display lights (ＡＬＭ) ,batch control stop.	
Sensor	Input signal	NPN Open Collector pulse, Or input voltage pulse. (Setting can be switched in DIP SW)	
	Input level	NPN Open Collector pulse : MIN 10mA or more (Sink current)	
		Voltage pulse : LOW Level 2.0V or lower HI Level 3.8～30V	
	Input response	LOW : 0.01Hz～50Hz HI : 0.01Hz～10kHz However, when duty 50%	
	Sensor power	Standard	DC＋12V (±10%) 100mA MAX (Stabilization)
		Option	DC＋24V (±10%) 60mA MAX
Signal	Reset signal	Terminal block input is ON for more than 100ms NPN Open Collector output,accept short output ＰＶdisplay reset and Release error Sink current : more than MIN 10mA	
	Start signal Stop signal Abnormality signal Ban signal	Terminal block input is ON for more than 100ms ＮＰＮ Open Collector output,accept short output Sink current : more than MIN 10mA	

SIGNAL output	Control signal	From the start signal output、to the PV display value (measured value) reaches the SV value(target value).In the output, control signal display (RUN), lamp lighting.	
		Output method	Relay 1c contact output AC250V (DC30V) 5A MAX (Resistance load)
	Deceleration signal	Two-stage opening and closing or Deceleration mode switching Two-stage opening and closing : From the Start time to the preset value that is to OFF, the output was stop before preset of the SV value(target value). Deceleration : The value output from the front set of SV, until it reaches the value of SV.	
		Output method	Relay 1c contact output AC250V (DC30V) 5A MAX (Resistance load)
	End signal	Output when the PVdisplay value (measured value) reaches the SV value(target value). Retention or One-shot output : Output width Can be set between 0.1 to 9.9 seconds. In the output,Termination signal-display (END) ,lamp lighting.	
		Output method	Relay 1a Contact output AC250V (DC30V) 3A MAX (Resistance load)
	Signal input anomaly detection	Abnormal measurement、Abnormal deviation、Output when the Abnormal signal. Abnormal measurement and When the Measurement signal for ON Measurement error display (ALM) Lamp lighting. When the Abnormal deviation was Deviation error display (STS) Lamp lighting.	
		Output method	Relay 1a Contact output AC250V (DC30V) 3A MAX (Resistance load)
	Synchronization pulse signal	Total output in synchronization with the display. Select a digit 1-6 digit synchronous output. Choose one of the seconds 10ms, 100ms, 1s output width.	
		Output method	NPN open collector output DC30V 50mA MAX
Other	Power failure compensation	FRAM Data Backup About 10 years	
	Power	AC85～264V 50／60Hz	
	Power consumption	About below 19VA	
	Humidity/Temperature	0～50℃ 30～85%RH (Without condensation)	
	Mass	About 850 g	
	Physical dimensions	W72×H144×D122mm (Dimensions include terminal cover)	
	Degree of protection	IP66	
	Case material	Body iron case Front part ABS	

（２）Analog input (options: Type A2)　　Table.2

Survey type	Measurement deviation detection
Input level	DC4 to 20mA
Display interval	Fixed 0.5 seconds
Display accuracy	±0.3%F.S.±1digit
A/D bit conversion	About 7000 Resolution
A/D measurement interval	About 20ms
Temperature characteristic	±50ppm
Input impedance	Input resistance 250Ω
Measurement display range	0 to 9999
Setting range deviation upper and lower limit	0 to 9999
Scaling (converter)	At analog MAX value, arbitrarily set in 0.001 to 9999

（３）Communication (Option：RS2、RS4、RS4W Type)　　Table.3

Signal level	RS2：EIA RS-232 standard RS4 (W)：EIA RS-485 standard
Communication method	Half-duplex Communication method
Communication speed	2400bps／4800bps／9600bps／19200bps
Start bit	Fixed to 1 bit
Stop bit	Fixed to 1 bit
Data bit	7,8-bit mode switching
Parity bit	Nothing／Odd／Even setting
Transmitted and received data	TOTAL display、ＰＶ display、ＳＶ Value setting Analog display, Deviation (Upper limit・Lower limit) Command method
Communication code	ASCII

3. Overview of Operation

① Control operation (Automatic operation)

1) When the start key or start signal was ON, SV value (Target value) is quoted and batch control is started.
   Note) Can not change the value SV during batch control. The setup can be performed when batch control has stopped.
2) Until the setting SV value (Target value) ,output the control signal.
3) When overrun correction value will be set to「SV value-overrun correction value」,output control signal.
   The deceleration signal uses the two-stage opening and closing or deceleration mode to output.
   ・Please refer to the deceleration figure 15 of P.20.
   ・Please refer to Two-stage switching operation figure 16 of P.21.
5) After the control signal has canceled, at the timing that has been set, end signal is output.
6) During control operation, if stop signal or stop key was ON, deceleration signal and control signal is immediate release, the termination signal is not output.
7) In the time of Measuring abnormal, abnormal signal, deviation abnormality, was immediately released the deceleration signal and control signal, the termination signal is not output.
   If the measurement abnormality and abnormal signal was ON, Measuring abnormal signal is output, the measurement abnormal display lamp (ALM) Lighting.
   If the deviation error, the measuring abnormal signal is output, the measurement abnormal display lamp (STS) Lighting.
8) After the control signal output by the end signal to complete the output, cannot be restarted.
9) When the stop signal or stop key is turned ON, stop signal, stop key is not accepted.

② Control action (Manual operation)

1) The start key, the start signal is turned ON, outputs the control signal.
   Please note that a deceleration signal is not output.
2) The start key, the start signal is turned OFF, releases the control signal.
   Please note that termination signal is not output.
3) Control signal in the output, when the measurement becomes abnormal, although the control signals are released, the abnormal signal is ON when the deviation abnormal, the behavior described above will continue to be.
4) The stop signal or stop key is turned ON, releases the control signal.

③ Abnormal action

・Measuring abnormal
  When the batch control use the mode06 (P.25) setting with the number of input pulses following conditions,immediately stop the operation of all controls,measurement abnormal signal and measurement abnormal display (ALM) lighting.
  Also use the normal start operation,If the current value is still greater than the start SV value, the measurement abnormal signal and the measurement abnormal display (ALM) lighting.
・Abnormal signal
  When it was be input, emergency stop all control operation、measurement abnormal signal output,measurement abnormal display(ALM) lighting. When the manual operating, measurement abnormal signal output, measurement abnormal display (ALM) lighting.
・Deviation Abnormal (option A2)
  For analog input, if below or above the set value(Or both),emergency stop all control operation,the measurement abnormal signal output,measuring abnormal display (ALM) and Deviation abnormal display (STS) lighting.
  When the manual operating, the measurement abnormal signal output, measuring abnormal display (ALM) and Deviation abnormal display (STS) only lighting.

④ Reset operation

・Front part reset key
  Push 2 seconds, PV display reset. Release the retention measurement abnormality signal.
・The rear terminal block reset signal.
  When they are input, release the retention measurement abnormality signal.

4. Mounting meter

How to mount meter

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

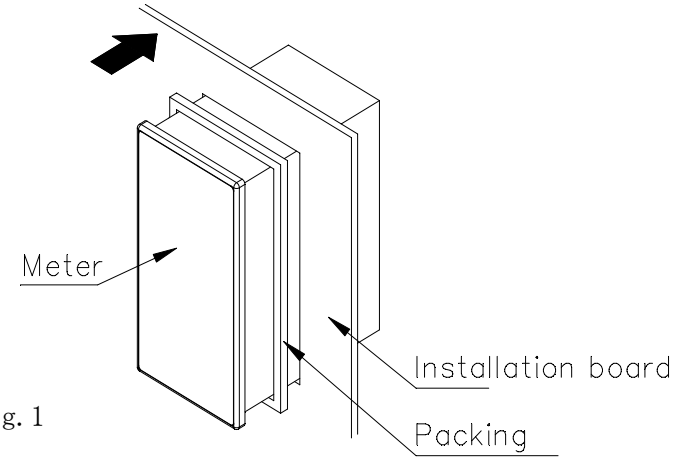
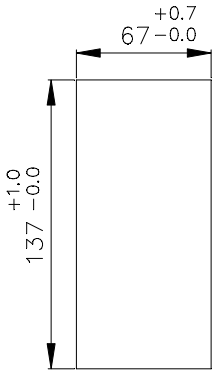


Fig. 1

Panel cut size.



2.

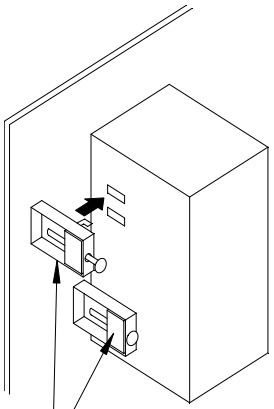


Fig. 2

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

3.

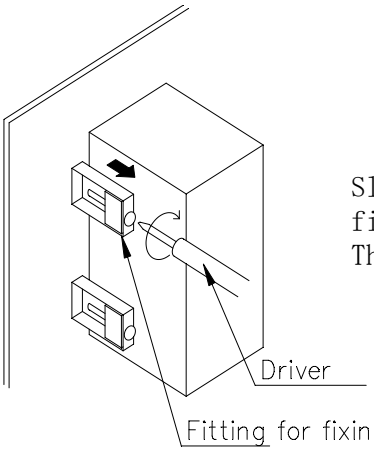


Fig. 3

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)

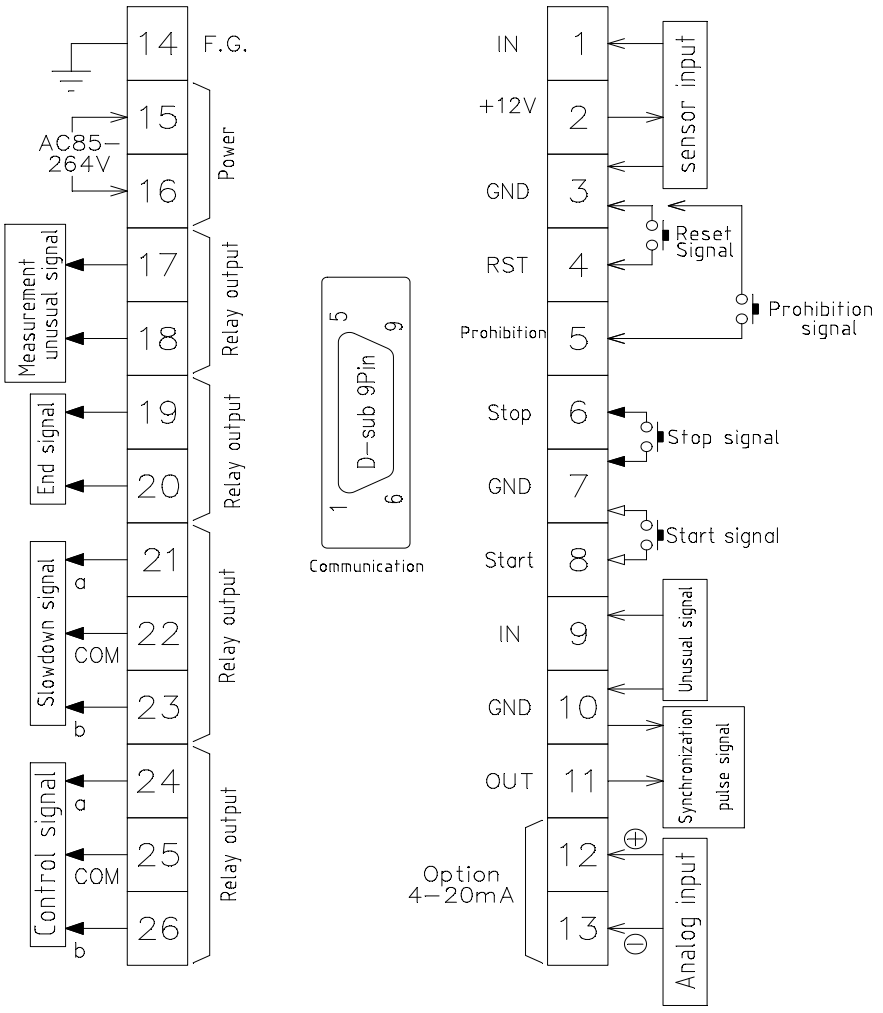
When installing the meter

1. Please horizontally install.
2. Please install into the panel of Sheet thickness 1.0mm～4.0mm.
3. Please be careful not to overtighten the screws of the fixture.(There is a possibility that the case will be damaged if overtighten.)

5. Connecting terminal boards

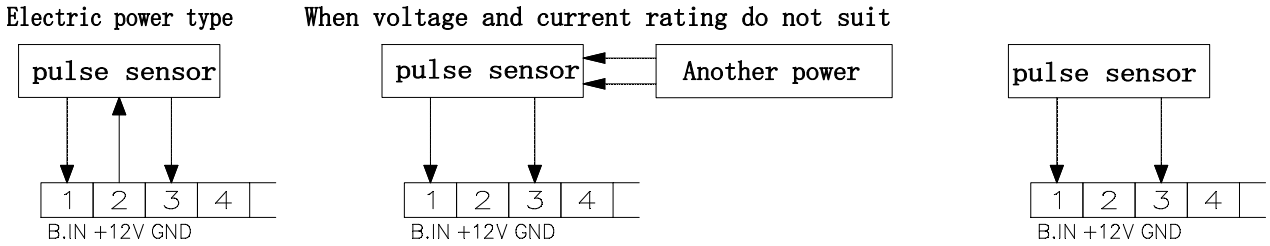
≪ Terminal block connection diagram ≫

Fig.4



A. 3-wire type pulse sensor

Fig.5 B. 2-wire type pulse sensor Fig.6



① Sensor input
Please connect to the terminal block 1, 2, 3.

② Reset signal
When the reset signal was ON、the PV measurement value return to”0”.
Also、abnormal output release too. (It is the same as the reset key on the front panel.)
Please connect to the terminal block 3, 4.

Note： Reset in the batch control, will can not be a successful batch control.

③ Stop signal
When the stop signal was ON in the batch control, stop the batch control.
Release the control, deceleration signal.End signal is not output.

During the stop, it will remove the measurement abnormal signal. (It is the same behavior as the stop key on the front panel)
Please connect to the terminal block 6, 7.

④ Start signal
Input signal in during the stop,start the batch control,output a control signal at the same time.
When the abnormal signal measurement be output, start the batch control after release of abnormal signal measurement.
(It is the same behavior as the start key on the front panel)
Please Connect to the terminal block 7, 8.

⑤ Abnormal signal
When the abnormal signal is ON in the batch control, the batch control stop. Release the control, deceleration signal.At the same time、the display of the measuring abnormal (ALM) is lighting.
The termination signal is not output.
Please connect to the terminal block 9, 10.

⑥ Prohibition signal
When the prohibition signal was ON during, do not count the pulse input.
Please connect to the terminal block 3, 5.

⑦ F.G.
Please connect the earth (Ground) to 14th of the terminal block.

⑧ Power
AC power AC85 to 264V power input.
Please connect to the terminal block 15, 16.

⑨ Abnormal signal measurement
Output in the following cases. Please connect to the terminal block 17, 18.

・Measuring abnormal
Since the start of the batch control measuring abnormal signal is output in the following conditions, stop the batch control.

1) Within the set time when the set number of pulses has not been entered
2) When the display value at the start of batch control is greater than the SV value (Target value).

・Abnormal signal
When the abnormal signal was input, measurement abnormal signal is output, the measurement abnormal display (ALM) is lights, the batch control stop.

・Deviation Abnormal (Option A2)
When the analog input of display value is greater than the set value,output the measurement abnormal signal,the deviation abnormal display (STS) is lights, the batch control stop.

⑩ End signal
When the PV value (Measured value) has reached to SV value (Target value) ,the end signal will output.
Output Timing andOutput width can be set. Please connect to the terminal block 19, 20.

⑪ Deceleration signal
When the control action was decelerationing, the deceleration signal will output. Please connect to the terminal block 21, 22, 23.

⑫ Control signal
Output the control signal when the start signal was ON. Until the control signal measurement value reaches to the SV value (Target value) ,continues to output.
Please connect to the terminal block 24, 25, 26.

⑬ Sync pulse output
Follow the setting of Mode 08, output the sync pulse signal.
(The NPN open collector output emitter is connection to the GND)
Please Connect to the Terminal block 10, 11.

⑭ Communication Connector (Communication option)
D-Sub 9pin (Male) connector

⑮ Analog input (Option A2)
Input the analog signal of measurement for deviation detection.
When it exceeds the set value, the batch control will stop,output the abnormal signal of measurement, deviation error display is Lighting.
Release the contro, the deceleration signal.
Please connect to the terminal block number 12 and 13.

⚠ Caution

• Power supply confirmation

1) Always turn the power off before commencing wiring work. There is fear of the electric shock.

2) Checking the power input
Please check once again the input voltage.

3) Wire correctly after often confirming the terminal stand label.

4) The wiring technique is different depending on the kind of the sensor、Please refer P.7 Fig.4 to Fig.6.
Because the sensor power supply is DC12V 100mA MAX (Option : DC24V 60mA)、Please do not overload. The sensor and the meter might break down when connecting it by mistake.

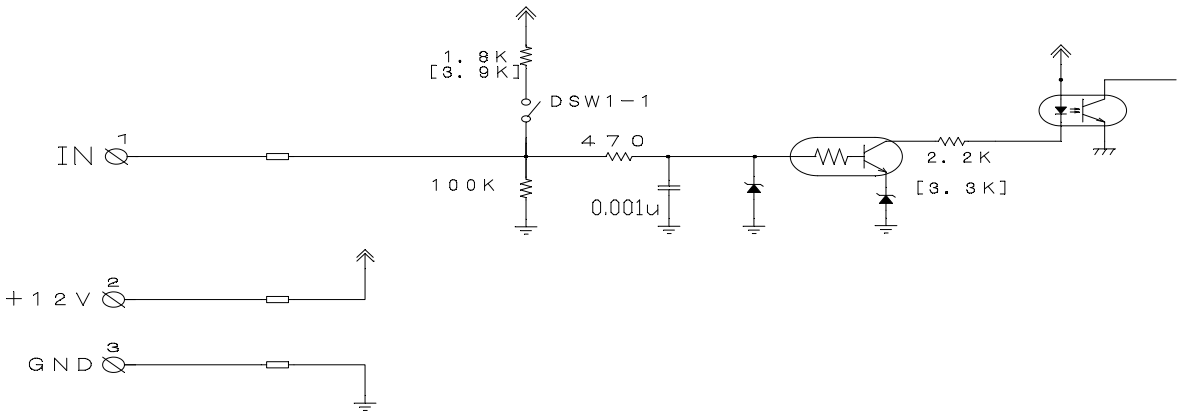
5) Do not use the sensor power supply for the usages other than the sensor.

6) Tighten the screw of the terminal stand surely.

6. Construction of input circuit,output circuit

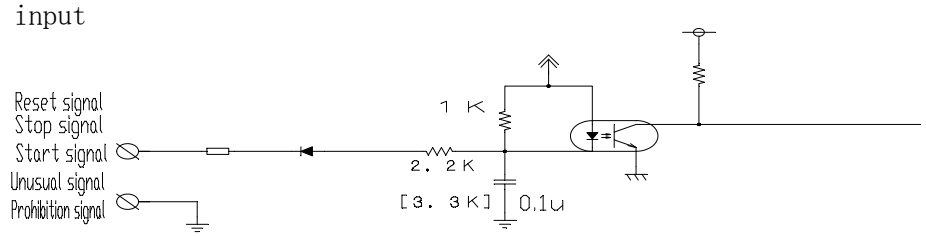
Sensor input

Fig.7



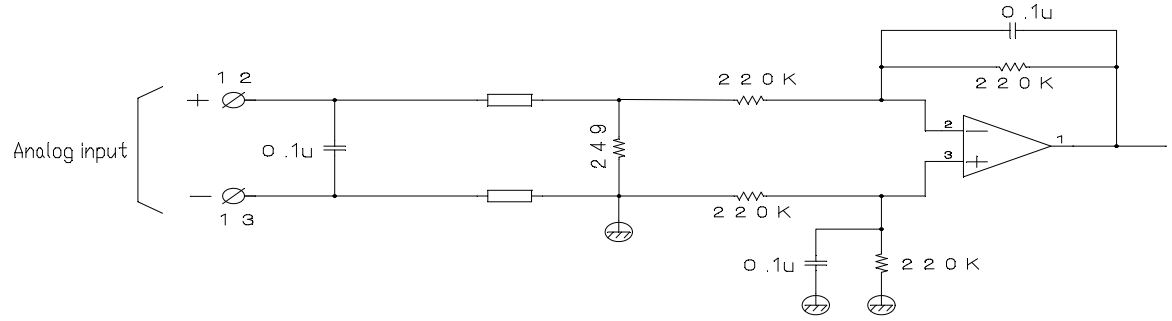
Signal input

Fig.8



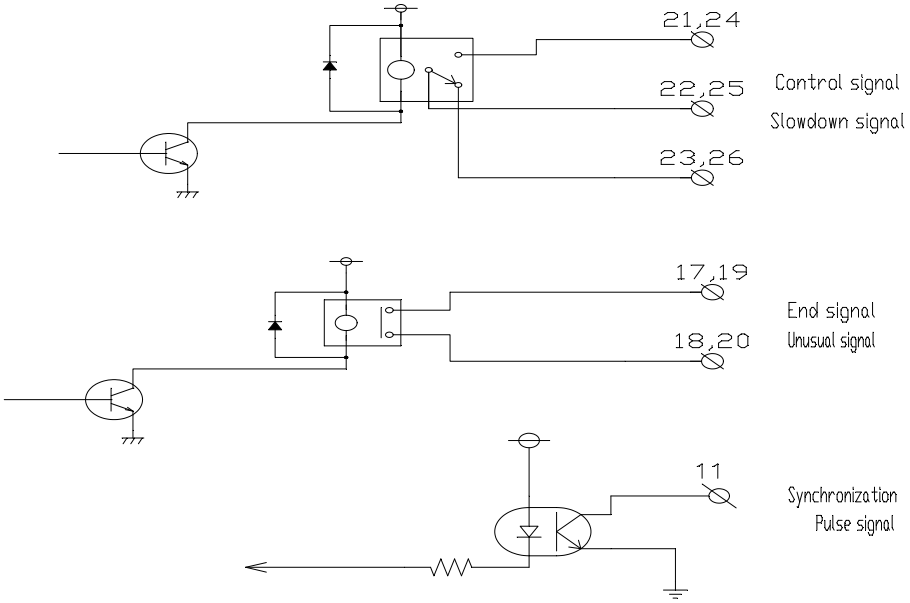
Analog input

Fig.9



Signal output

Fig.10

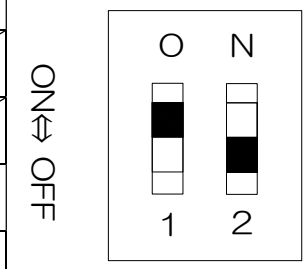


7. Setting the dip switches

Sensor input response, sensor input (NPN open collector or Voltage pulse) can be selected by changing the switch.

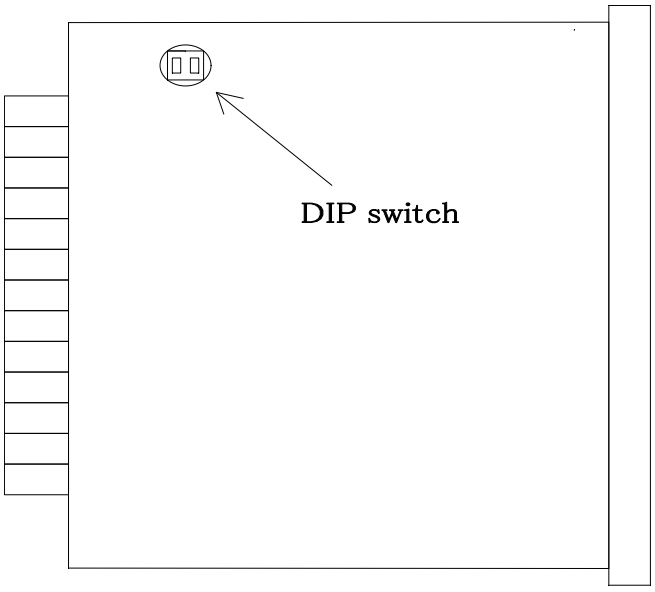
Table.4

SW set		1	2
	NPN open collector input	ON	
	Voltage pulse Input	OFF	
	Input frequency less than 50Hz(LO)		ON
	Input frequency less than 10kHz(HI)		OFF



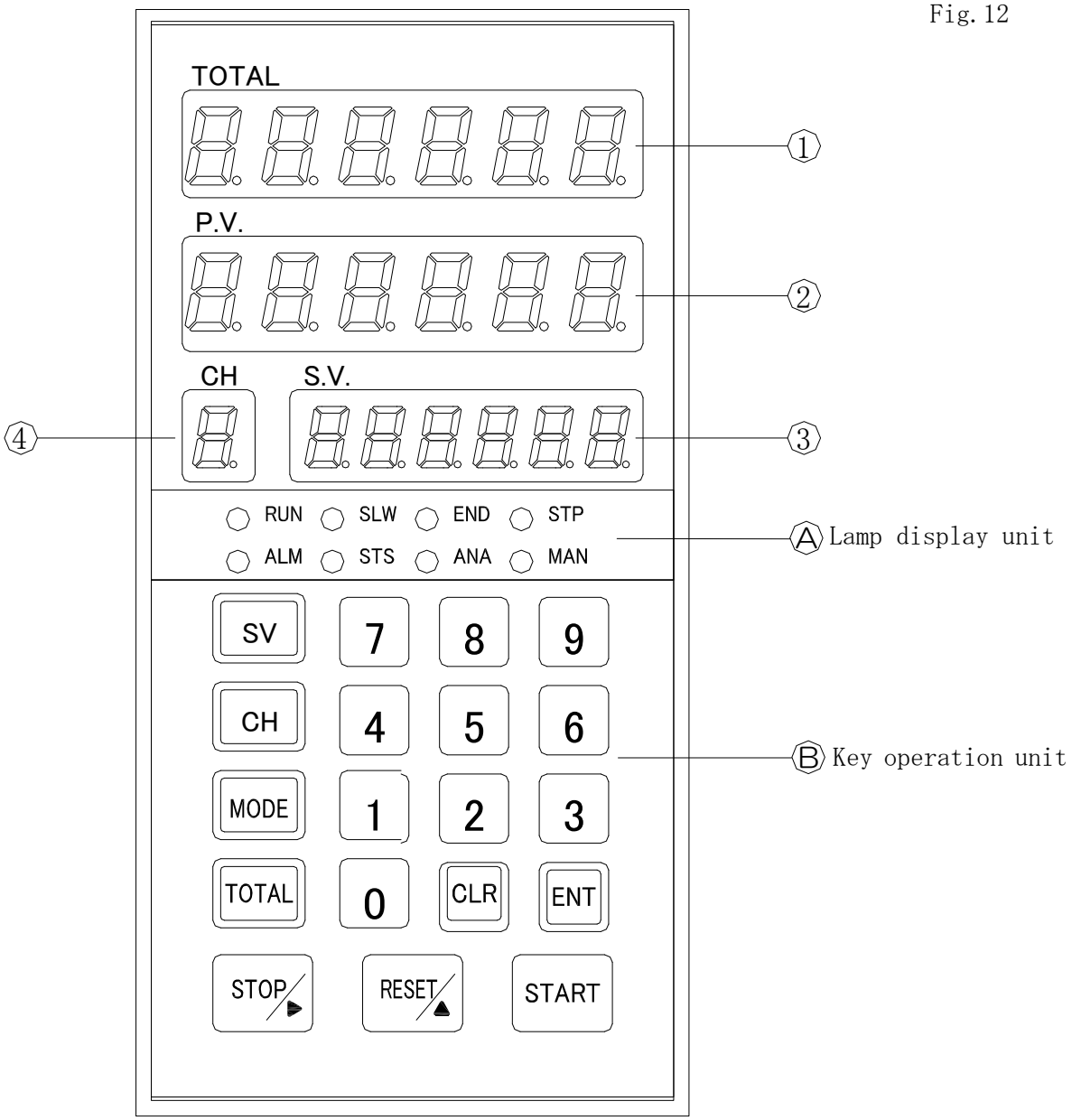
Set the DIP switch with hole in the side of the case.
Unless otherwise specified、at the factory the standard specification was NPN open collector pulse input、the Input frequency was less than 10kHz(HI).

Fig.11



8. Names and functions of components on front

Fig.12



① TOTAL display
Display measurement : Display the TOTAL value (Total) .
Mode setting : Display mode No.

② PV display
Display measurement : display the PV value (Measured value) .
Mode setting : Disuplay the date value according to the mode.

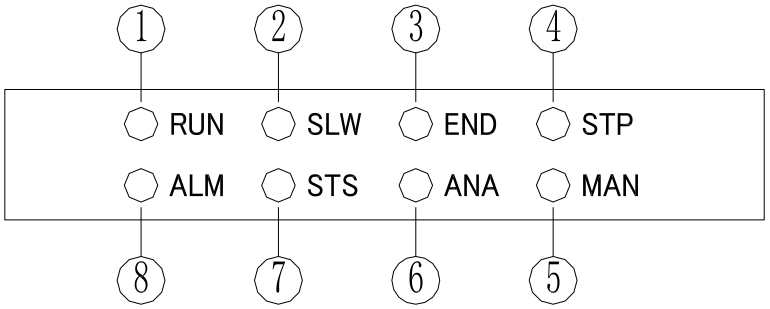
③ SV diaplay
Display measurement : Display the Target value (SV value) .

④ CH display
Display measurement : CH setting : Display the CHNo.
Operating in Communication (RS-232,RS-485) ,display the「t」

Ⓐ Lamp display unit

The lamp of the control status was display.

Fig. 13



	Function	Signage	Color	Function description.
①	Control signal display	ＲＵＮ	Green	When the control signal is output、lights.
②	Slowdown signal display	ＳＬＷ	Green	When the slowdown signal is output, lights.
③	End signal display	ＥＮＤ	Green	When the end signal output, lights.
④	Normal stop display	ＳＴＰ	Green	Stop in a normal state, lights.
⑤	Manual display	ＭＡＮ	Orange	When the manual state, lights.
⑥	Analog input display	ＡＮＡ	Orange	Display analog input, lights.
⑦	Deviation error display	ＳＴＳ	Red	When the deviation error, keep lights.
⑧	Measurement error display	ＡＬＭ	Red	When the measuring abnormal, when abnormal signal is ON, keep lit.

Ⓑ Key operation unit

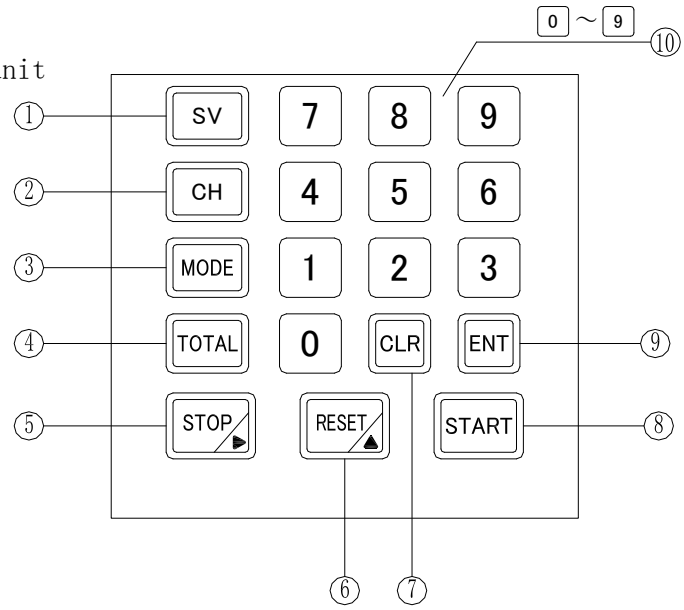
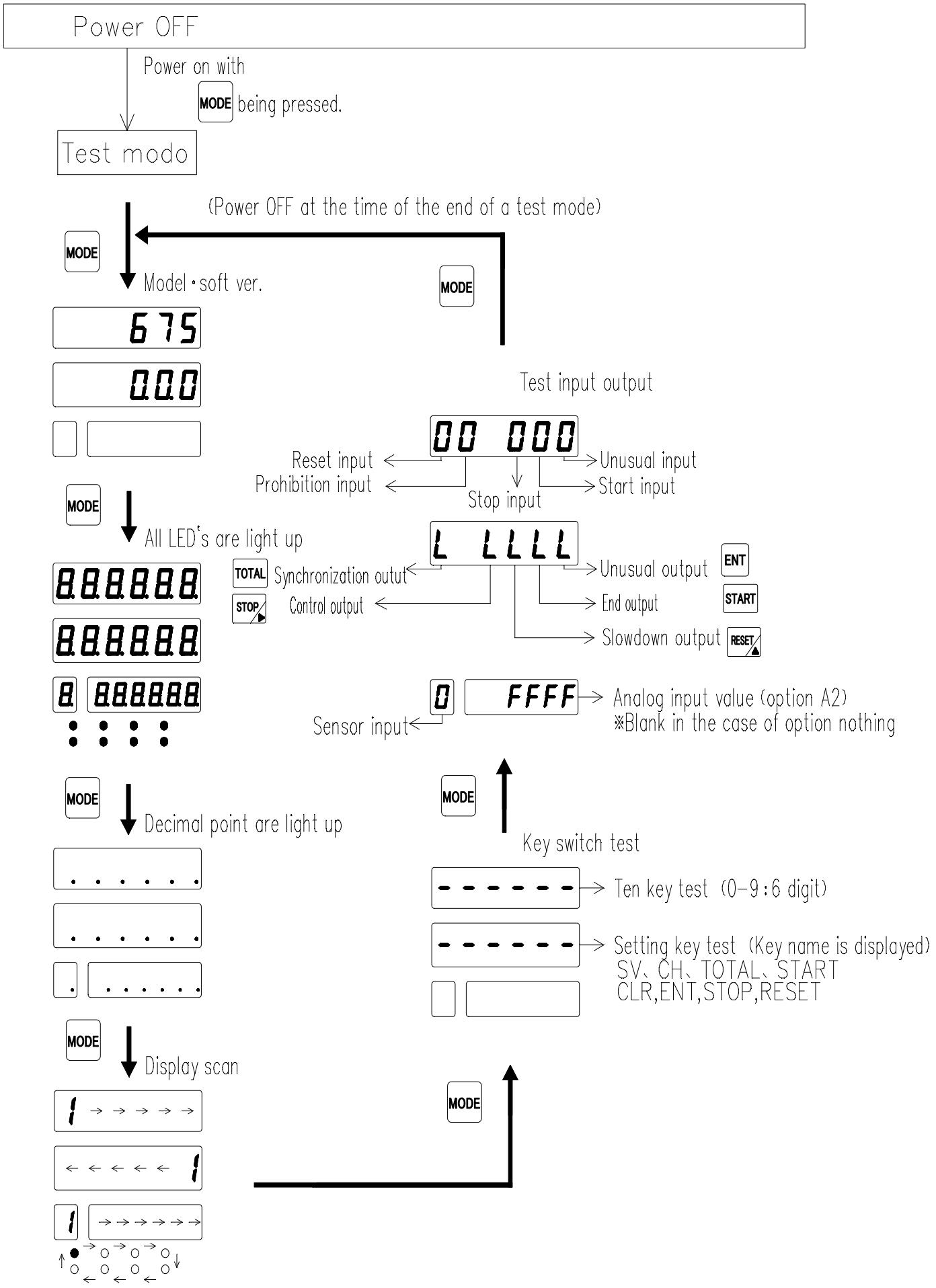


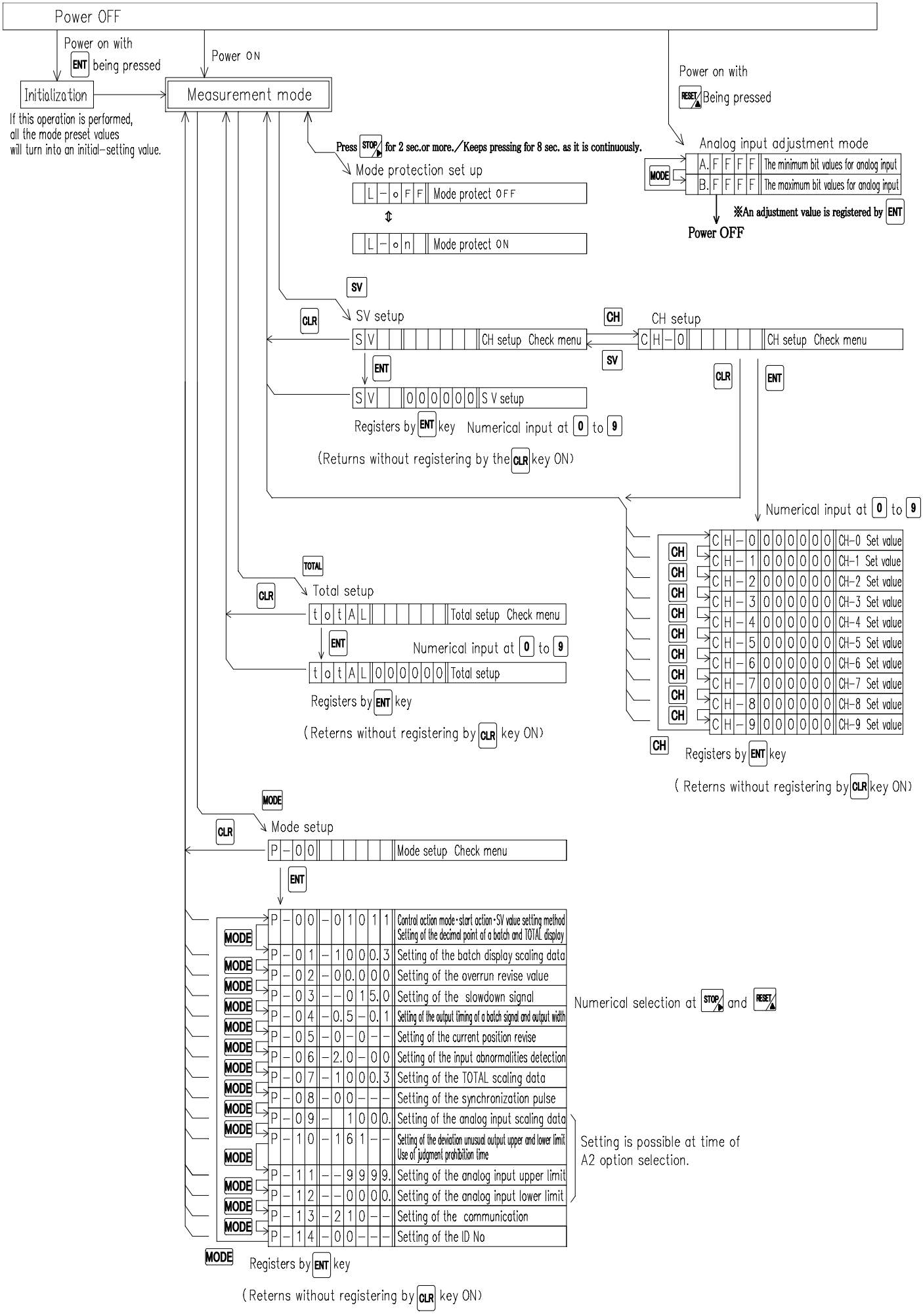
Fig. 14

	Mark key	Name	Display name	Function description
①	SV	SV key	Measure display	Setting SV value.
			Each setting	Not use.
②	CH	CH key	Measure display	CH mode、switch the CH No.
			CH set	Switch the SV setting value and CH setting. In the CH setting, change to CH No.
③	MODE	Mode key	Measure display	Mode setting.
			Mode set	Change the mode No.
④	TOTAL	Total key	Measure display	Total value setting.
			Each setting	Not use.
⑤	STOP	Stop key Shift key	Measure display	The control operation during the control operation is stopped.
			Mode set	Function as shift key. Move the setting digit to right digit.
⑥	RESET	Reset key Up key	Measure display	Clear the error output. Pressed for more than 2 seconds, PV display is reset, PV display value will be to 0.
			Mode set	Function as up key. Set value up by 1.
⑦	CLR	Clear key	Automatic mode	Pressed for more than 2seconds, switched to manual mode.
			Manual	Pressed for more than 2seconds, switched to automatic mode.
			Mode set	Don`t sign up the set value, return to the measurement display.
			SV value setting	SV value setting : clear the setting value.
			Channel setting	Channel Settings : clear the setting value.
			Total set	Total set : clear the setting value.
⑧	START	Start key	Automatic mode	Start the control operation.
			Manual	While the Manual is ON, output the control signal.
			Each setting	Not use.
⑨	ENT	Ent key	Measure display	SV switch the display of the deviation. (When selecting the A2 options)
			Each setting	Register the set value, return to the measurement display.
⑩	0 ~ 9	Ten key	Measure display	Not use.
			Each setting	SV value, Channel, Total setting, Enter the number

<<Test mode>>


Power OFF
Power on with
MODE being pressed.
Test modo
(Power OFF at the time of the end of a test mode)
MODE
Model・soft ver.
675
0.0.0
Test input output
00 000
Reset input
Prohibition input
Stop input
Unusual input
Start input
All LED's are light up
L LLLL
TOTAL
Synchronization outut
STOP
Control output
Unusual output
End output
Slowdown output
ENT
START
RESET
0
FFFF
Analog input value (option A2)
※Blank in the case of option nothing
Sensor input
Decimal point are light up
Key switch test
Ten key test (0-9:6 digit)
Setting key test (Key name is displayed)
SV、CH、TOTAL、START
CLR,ENT,STOP,RESET
Display scan

<<Various setting operations>>



10. Initial setting values and initialization

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

Value setting of each mode Table.5

Mode No.	Initial setting						Note					
A～D	G	H	I	J	K	L	G	H	I	J	K	L
P－00	－	0	1	0	1	1	－					
P－01	－	1	0	0	0	3	－					
P－02	－	0	0.	0	0	0	－		.			
P－03	－	－	0	1	5.	0	－	－				
P－04	－	0.	5	－	0.	1	－			－		
P－05	－	0	－	0	－	－	－		－		－	－
P－06	－	0	2.	0	0	0	－					
P－07	－	1	0	0	0	3	－					
P－08	－	－	0	－	0	－	－		－		－	－
P－09	－	－	1	0	0	0.	－	－				
P－10	－	1	6	0	－	－	－				－	－
P－11	－	－	9	9	9	9	－	－				
P－12	－	－	0	0	0	0	－	－				
P－13	－	2	1	0	－	－	－				－	－
P－14	－	0	0	－	－	－	－			－	－	－

CH set value Table.6

CH No.	Initial setting						Note					
A～D	G	H	I	J	K	L	G	H	I	J	K	L
CH－0	0	0	0	0	0.	0						
CH－1	0	0	0	0	0.	0						
CH－2	0	0	0	0	0.	0						
CH－3	0	0	0	0	0.	0						
CH－4	0	0	0	0	0.	0						
CH－5	0	0	0	0	0.	0						
CH－6	0	0	0	0	0.	0						
CH－7	0	0	0	0	0.	0						
CH－8	0	0	0	0	0.	0						
CH－9	0	0	0	0	0.	0						

〔 Initialization 〕

Throw power supply in with ENT pressed to initialize the settings.

After the initialization, the set values will be as shown in Table 5～Table 6. Mode protect function are also cleared.

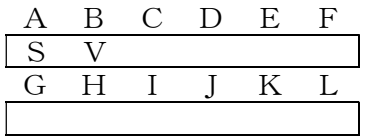
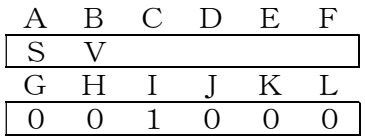
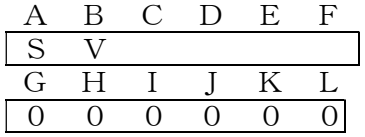
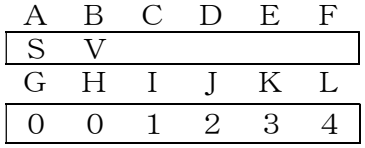
〔 Caution 〕

※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.

11. SV value (target value) of call and change settings

When set up the SV value of deta,Please perform the operation of each key as shown in the following figure.

Operation key	Display	Operating procedure
SV		Press SV Display 「SV」 in A to B Display C to L is Blank, SV settings confirmation menu. Press CLR, return to the search screen.
ENT		Press ENT Display SV value in the display G to L.
CLR		Press CLR Clear the Setting value to zero.
0 ∫ 9		Please enter the set value (0-9).
ENT		Press ENT the SV setting value will be register、and return to the measurement display.
CLR		Press CLR for more than 2 seconds, setting value will be not registered、return to the measurement display.

12. Content and setting the each mode

≪ 1. Operating method the mode setting ≫

When set up the mode, Please perform the operation of each key as shown in the following figure.

Operation key	Display	Operating procedure
MODE	A B C D E F P − 0 0 G H I J K L (blank)	Press MODE Display 「P-00」 in A to D Display E to L is Blank, mode settings confirmation menu. Press CLR, return to the search screen.
ENT	A B C D E F P − 0 0 G H I J K L 0 1 0 1 1	Press ENT Display the contents of mode in the display G to L. It becomes a mode setup.
MODE	A B C D E F P − 0 1 ↑ ↑ ００～１４	Whenever it pushes once, the mode No goes up. ００→０１→・・→１４→００→
STOP	A B C D E F P − 0 1 G H I J K L 1 0 0 0. 3 → → → →	Change the blinkig numeral value. Whenever it pushes once, it moves to the right. This key becomes invalid during mode protection. Display blink is carried out.
RESET	A B C D E F P − 0 1 G H I J K L 1 1 0 0. 3 ↑ ０～９	Change the blinkig numeral value. Every press raises the value by ones. →０→１→２→…→８→９→ Numerical change is different for every setting item. It may not go up to 9. This key becomes invalid during mode protection. Display blink is carried out.
ENT		Press ENT the setting value will be register、and return to the measurement display.
CLR		Press CLR for more than 2 seconds, setting value will be not registered、return to the measurement display.

≪2. Content of the each mode and set value≫

Mode No.	Mode control operation・Start operation・set SV value・Display decimal point

P－００

A	B	C	D	E	F
P	－	0	0		
G	H	I	J	K	L
	0	1	0	1	1

→ TOTAL display decimal point
０：　　０
１：　０．０（Single below decimal point）
２：　０．００（Double below decimal point）
３：０．０００（Triple below decimal point）

→ ＰＶ display decimal point
０：　　０
１：　０．０（Single below decimal point）
２：　０．００（Double below decimal point）
３：０．０００（Triple below decimal point）

→ Set ＳＶ value
０：Numerical setup (Keystroke)
１：ＣＨ setup
２：ＲＳ－２３２
３：ＲＳ－４８５

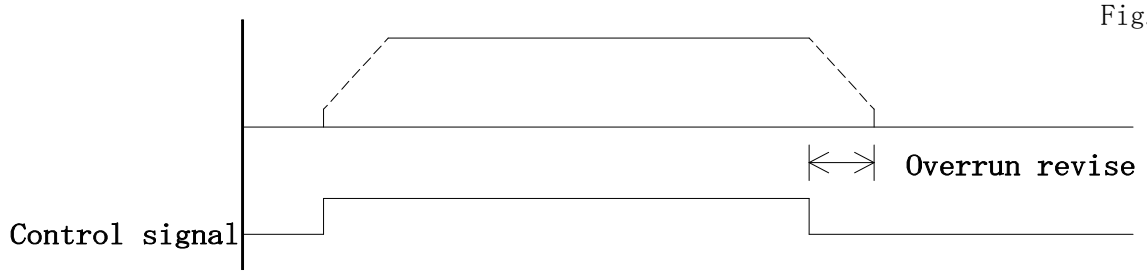
→ Start operation
０：Resetstart (measurement start from "0.")
１:Normalstart(measurement start from the current price.)

→ Control operatin
０：Standard operation
１：Deceleration operation (Low-speed stop)
２：Two-step switching action

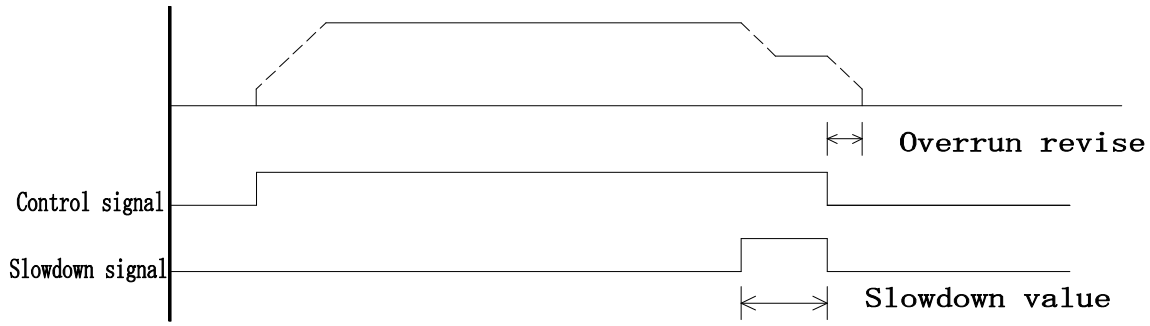
〔Control operatin mode〕 It sets up what kind of motion control is carried out.

０：Standard operation

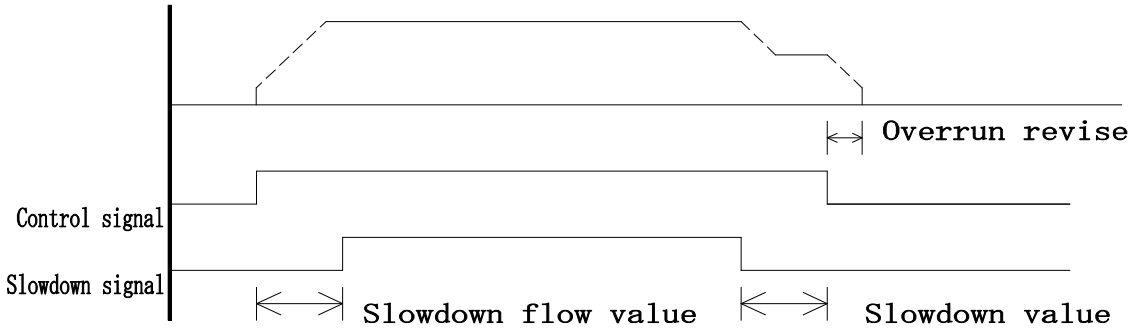
Fig.15



1 : Slowdown operation (Low-speed stop) Fig.16



2 : Two-step opening-and-closing operation. Fig.17



〔Start operation〕

0 : Resetstart
PV value displayed by start signal ON now is reset, and measurement is started from "0."

1 : Normalstart
It continues from PV value displayed by start signal ON now, and starts measurement (which is not reset).
A display is cleared by "0" by pressing the reset key 2 seconds or more before a start key, or turning on a terminal box reset signal.

〔Set S V value〕

0 : Numerical setup
It is made to operate by a numerical value is put into SV value.

1 : CH setup
From CH data which has registered SV value, a preset value is chosen and is operated.

2 : RS232
It is made to operate by RS232 communication or a numerical value is put into SV value.

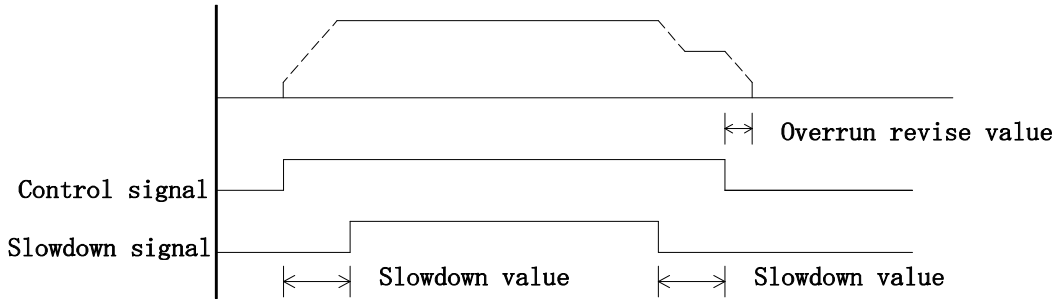
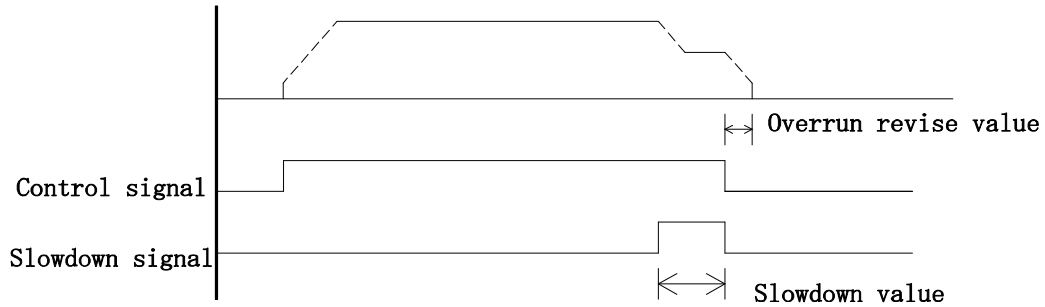
3 : RS485
It is made to operate by RS485 communication or a numerical value is put into SV value.

〔Display decimal point〕

It is set up what figure below a decimal point displays.
The measurement indicated value and the desired value indicated value are interlocking.

Mode No.	Setting of (unit conversion) PV display data scaling
P－０１	A B C D E F P － 0 1 G H I J K L 1 0 0 0 3 → EXP-value 10^{-n} n＝0～9 → 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.
	＜For example＞ Display of addition flow by L/min in the use of flow sensor of 1.234mL per 1 pulse. １．２３４ｍＬ ⇒ ０．００１２３４Ｌ ⇒ １２３４ × １０$^{-6}$ Converted to theintended value(L) to display ↑ Converter ↑ EXP-value A B C D E F P － 0 1 G H I J K L 1 2 3 4 6 H～K：１２３４ (Converter) L ：６ (EXP-value)

Mode No.	Setting of overrun correction value
P－０２	A B C D E F P － 0 2 G H I J K L 0 0.0 0 0 ※A decimal point can be set up to the 3rd place. It sets to a decimal point by a Shift key, and moves a decimal point by a rise key. → overrun correction value 00.000～99999.
	〔overrun correction value〕 When a measurement value reaches a desired value and stops operation, a desired value may be exceeded from habit. The value exceeded in order to lose the excess is set up as correction value.From next measurement, operation is stopped in the set-up correction value part this side,and a measurement value is kept from exceeding a desired value. ＜caution＞ A setup inputs the actual flow value of overrun. For example, supposing it applies the correction value of 0.5L, it will set to 00.500.

Mode No.	Setting of deceleration signal (deceleration flow value)
P－０３	A B C D E F P － ０ ３ G H I J K L ０ １ ５．０ ※A decimal point can be set up to the 3rd place. It sets to a decimal point by a Shift key, and moves a decimal point by a rise key. deceleration flow value 0.000～9999. .
	〔deceleration flow value〕 A deceleration signal is outputted from a No. 21～23 terminal. Two-step switching action： It is operation in case the flow velocity is controlled by two-step opening and closing by a valve etc. It outputs to a part for the value set up from the start time, and outputs to the value part this side that the desired value was set up from there. (※) Please choose a two-step switching action by Mode 00. 
	Deceleration operation： When you would like to slow down a flow from the middle, It sets up which is slowed down from a front flow value from a desired value. (※) Please choose a deceleration operation by Mode 00. 

Mode No.	Setting of termination signal of output timing and output width

P－０４

A	B	C	D	E	F
P	－	0	4		
G	H	I	J	K	L
	0．5			0．1	

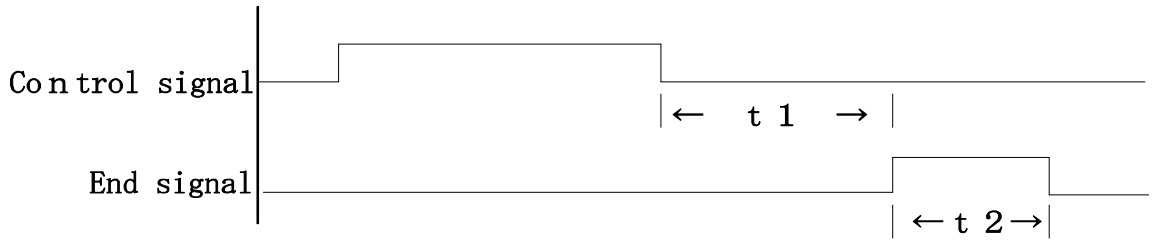
→ Output width
0.1～9.9 sec (0.0 holds an output.)

→ Output timing
0.0～9.9 sec

〔Output timing〕
It is set up in how many seconds an end signal is outputted, after a measurement value reaches a desired value (after a control signal is canceled) . (t 1)

〔Output width〕
The output width time (t2) of an end signal is set up.
When output maintenance (0.0) is set up, it cancels by start signal (or switch) ON.

t 1 ＝Output timing ／ t 2 ＝Output width

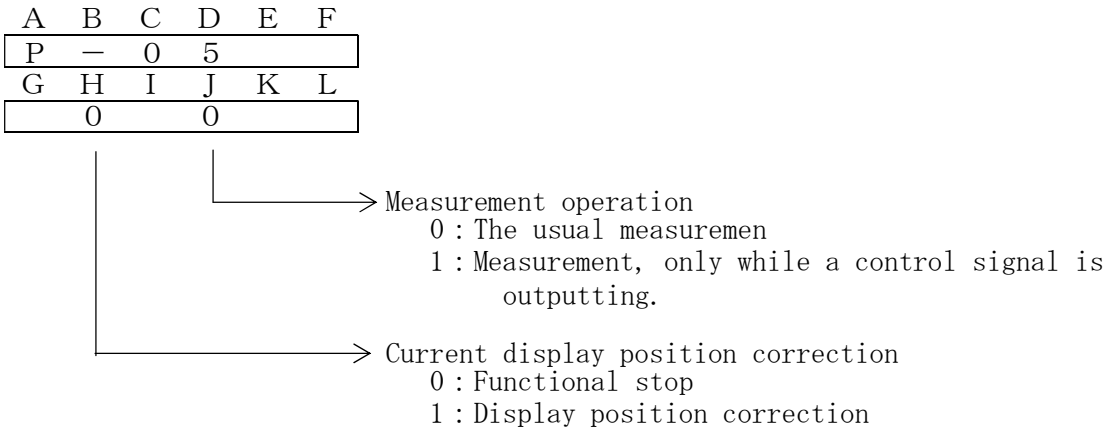


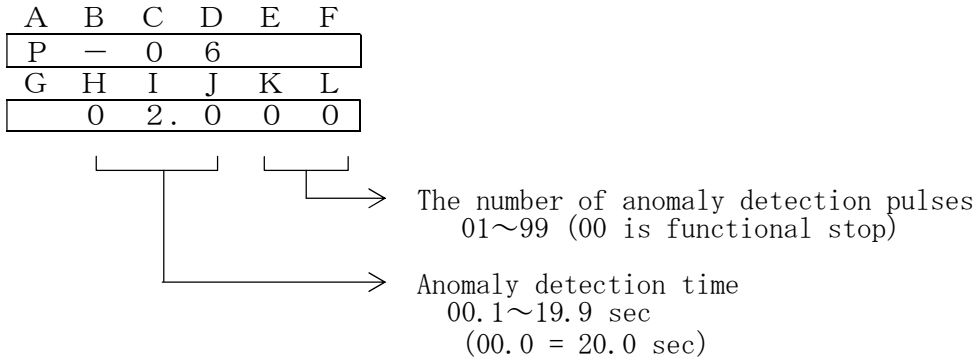
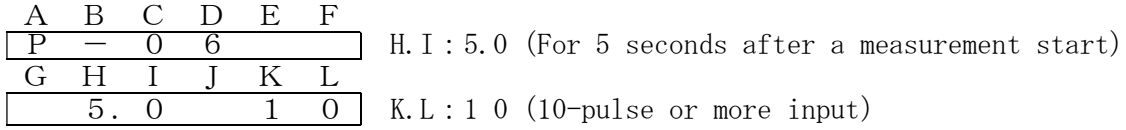
＜The example of a setting＞
For 1 second wants to output an end signal., after 2 seconds of since a measurement value reaches a desired value.

A	B	C	D	E	F
P	－	0	4		
G	H	I	J	K	L
	2．0			1．0	

H. I : 2. 0 (After 2 seconds)
K. L : 1. 0 (The output during 1 second)

＜Caution＞
The end of measurement operation serves as a time of the output of an end signal finishing.

Mode No.	Current display position correction・setting of the measurement operation
P－05	
	〔Current display position correction〕 A current position is rectified to a target position after the end of batch control. ＜Caution＞ TOTAL indicated value is not rectified.
	〔setting of the measurement operation〕 You want to measure a flow only while the control signal is outputting, please set up "Measurement, only while a control signal is outputting." ("1") Only while a control signal is outputting, TOTAL display and PV display also measures a flow.

Mode No.	Setting of input anomaly detection
P－06	 ・Release of a measurement abnomal signal is reset and a stop (a key and a terminal box) are turned on.
	〔input Anomaly detection〕 If there is no input of a number of pulses (the number of anomaly detection pulses) set up within the set-up time (anomaly detection time), a measurement unusual signal will be outputted, batch control is suspended, and a measurement abnormality display (ALM) lights up.
	＜The example of a setting＞ If there is no input for 10 pulses for 5 seconds after starting measurement, it will suppose that an input is unusual and will output a measurement unusual signal. 

Mode No.	Setting of total display scaling data
P－07	A B C D E F P － 0 7 G H I J K L 1 0 0 0 3 → EXP-value 10^{-n} n＝0～9 → 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.
	＜For example＞ Display of addition flow by L/min in the use of flow sensor of 1.234mL per 1 pulse. 1．234mL ⇒ 0．001234L ⇒ 1234 × 10^{-6} Converted to theintended value(L) todisplay ↑ Converter EXP-value ↑ A B C D E F P － 0 7 G H I J K L 1 2 3 4 6 H～K：1234 (Converter) L ：6 (EXP-value)

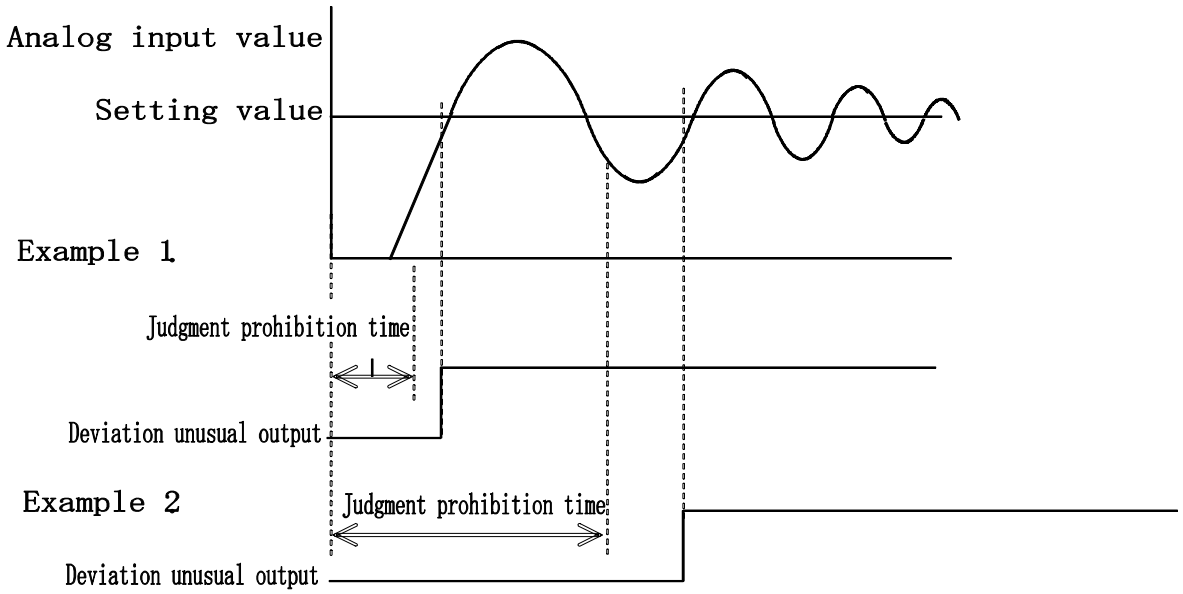
Mode No.	Setting of synchronization pulse signal
P－08	A B C D E F P － 0 8 G H I J K L 0 0 Caution：It outputs to a total counter. → Set up output width 0‥‥10mS 1‥‥100mS 2‥‥1S → Output digit 0‥‥1digit 1‥‥2digit 2‥‥3digit 3‥‥4digit 4‥‥5digit 5‥‥6digit

Mode No.	Setting of analog input scaling data (A2-type)
P－０９	A B C D E F P － ０ ９ G H I J K L １ ０ ０ ０. ※A decimal point can be set up to the 3rd place. It sets to a decimal point by a Shift key, and moves a decimal point by a rise key. → deceleration flow value 0. 000～9999. 1. The indicated value in the analog MAX 0.001～9999 (Do not set 0000)
	Setting the indicated value in the analog MAX. Please set up for a 4-figure numerical value. It can set up to "0.001～9999" by moving a decimal point. ＜Caution＞ The indicated value in the analog input MIN is being fixed to "0."

Mode No.	Setting of deviation error (analog input : setting of output of upper and lower limit・decision prohibit time・use of decision prohibit time) (A2-type)
P－１０	A B C D E F P － １ ０ G H I J K L １ ６ ０ → Use of decision Prohibit time 0····It is not used. 1····It is used. → Decision prohibit time 0····100 sec　5····50 sec 1····10 sec　6····60 sec 2····20 sec　7····70 sec 3····30 sec　8····80 sec 4····40 sec　9····90 sec → Setting of output of Upper and lower limit 0····output of Upper and lower limit 1····output of Upper limit 2····output of Lower limit ＜Caution＞about a decision prohibit time After power activation or after reset ON/OFF、It is not outputted within decision prohibition time.

〔setting of output of Upper and lower limit〕
Please set up whether it outputs with an upper and lower limit value, it outputs by upper limit, or it outputs by a lower limit.

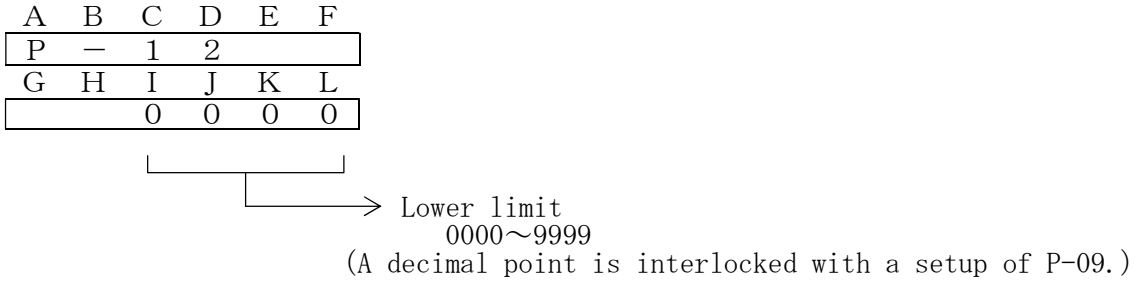
The relation between judgment prohibition time and a deviation unusual output becomes as it is shown in the following figures.
(When it is used by setup of upper limit) Fig.18

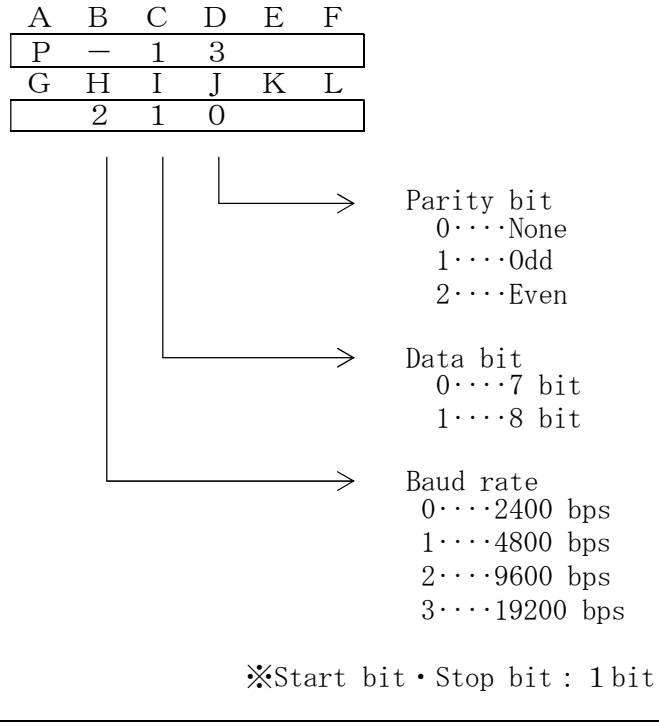


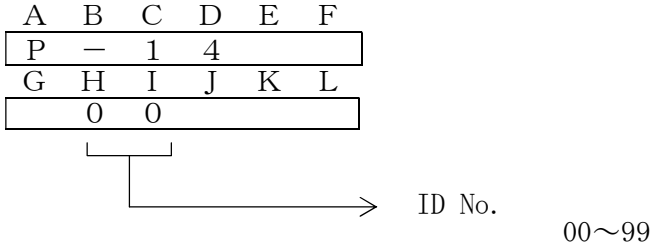
・Release of an abnomal output
If reset is turned on, a measurement abnomal signal will be canceled.

〔decision prohibit time〕
After power activation or after reset ON/OFF、It is not outputted within decision prohibition time.

Mode No.	Setting of deviation error (analog input) upper limit value (A2-type)
P－１１	A B C D E F P － 1 1 G H I J K L 9 9 9 9 → Upper limit 0000～9999 (A decimal point is interlocked with a setup of P-09.)
	〔Setting of upper limit value〕 The upper limit of the abnormalities in a deviation of an analog input is set up.

Mode No.	Setting of deviation error (analog input) lower limit value (A2-type)
P－１２	
	〔Setting of upper limit value〕 The lower limit of the abnormalities in a deviation of an analog input is set up.

Mode No.	Setting of communication (RS2-type / RS4-type / RS4W-type)
P－１３	 ※Start bit・Stop bit : 1 bit

Mode No.	Setting of communication ID No. (RS2-type / RS4-type / RS4W-type)
P－１４	
	Please refer to ″3. communication format″(P. 38) of ″17 communication ″about ID No.

13. Mode protect function

If this function is turned on, change of mode setting will be made impossible.
(The up key is canceled.)

The mode protect at the time of the shipment becomes OFF.

Please perform the call of mode protection and the setting method by the following key operation at the time of measurement.

≪Oparation of the mode≫

Operation key	Display	The contents of operation
	A B C D E F L − o F F (Mode protect state:Present)	It pushes 2 seconds or more in the state of a measurement display. Current mode protect state is displayed. 〔It is “OFF” at the time of shipment.〕
	A B C D E F L − o n (Mode protect state : Change)	Keeps pushing the key for 8 sec as it is continuously, the state of mode protect is changed. ※It changes into ON at the time of OFF, and changes into OFF at the time of ON.
		It usually returns when the key is stopped being pushed.

⚠<Caution>

※With regards to a mode protect function,the following setup can change a preset value.

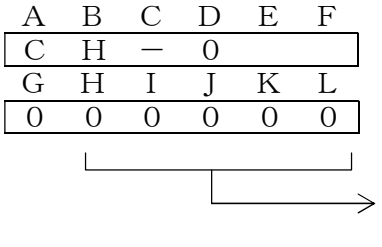
- ＳＶ VALUE
- ＣＨ preset value
- ＴＯＴＡＬ VALUE

※If it initializes, a mode protect function will serve as "OFF."

14. Setting of channel value and change

When you set up channel data, please operate each key as follows.

Operation key	Display	The contents of operation
SV	A B C D E F S V G H I J K L	SV is pushed. "SV" is displayed on A～B, and C～L becomes blank and becomes a SV setting check menu. If the CLR is pushed, it will return to a measurement screen.
CH	A B C D E F C H G H I J K L	CH is pushed. "CH" is displayed on A～B, and C～L becomes blank and becomes a CH setting check menu. If the CLR is pushed, it will return to a measurement screen.
ENT	A B C D E F C H － 0 G H I J K L 0 0 1 0 0 0	ENT is pushed. "CH-0" is displayed on A～D, and Channel preset value is displayed on G～L.
CH	A B C D E F C H － 0 ↑ 0～9	Whenever it pushes once, a numerical value goes up every [1]. Please set a CH No. 0→1→・・→9→0→
CLR	A B C D E F C H － 0 G H I J K L 0 0 0 0 0 0	CLR is pushed. A preset value is cleared.
0 ～ 9	A B C D E F C H － 0 G H I J K L 0 0 0 0 0 0	A preset value is inputted with a ten key (0～9).
ENT		ENT is pushed, and a total value will be changed and it will return to a measurement display.
CLR		CLR is pushed 2 seconds or more, and a preset value will not be changed but it will return to a measurement display.

	A setup of each channel data
CH 0～9	 A decimal point is interlocked with the decimal point of a measurement value. Preset value (Target value) 0～999999
	The value set up here is used as a desired value by channel operational mode. A total of ten channels can be set up.

15. Setting of total value and change

When you set up total data, please operate each key as follows.

Key	Display	The contents of operation
TOTAL	A B C D E F t o t A L G H I J K L	TOTAL Is pushed. "total" is displayed on A～E, and F～L becomes blank and becomes a total setting check menu. If the CLR is pushed, it will return to a measurement screen.
ENT	A B C D E F t o t A L G H I J K L 0 1 0 0 0 0	ENT Is pushed. The present total value is displayed on G～L.
CLR	A B C D E F t o t A L G H I J K L 0 0 0 0 0 0	CLR Is pushed. A preset value is cleared.
0 ～ 9	A B C D E F t o t A L G H I J K L 0 0 1 2 3 4	A preset value is inputted with a ten key (0～9).
ENT		ENT is pushed, and a total value will be changed and it will return to a measurement display.
CLR		CLR is pushed 2 seconds or more, and a total value will not be changed but it will return to a measurement display.

⚠ <Caution>

※When the display of analog input voltage is adjusted, please change according to the following procedure.

RESET If a power supply is switched on pushing, it will become analog input adjustment mode.

Key	Display	The contents of operation
RESET	A B C D E F A. X X X X (X is a hexadecimal number of 0～F.)	If power activation is carried out pushing this key, it will become the analog input minimum setup and "A. XXXX" will be displayed.
RESET	「A. ～b. community」 A B C D E F A. X X X X It is decimal point lighting of F at the time of a display of a registration bit value.	While pressing this key, the registered bit value can be checked. ※While displaying the bit value registered, the decimal point of a least significant digit lights up.
RESET	A B C D E F A. X X X X (Expression bit value)	A push on this key will display the analog input minimum set value (bit value) registered now.
ENT		**If this key is pressed inputting the analog minimum input, the input value (bit value) in that time will be registered as the analog input minimum.**
MODE	A B C D E F b. X X X X	This key is pressed, it will become the analog input maximum setup and "b. XXXX" will be displayed.
RESET	A B C D E F b. X X X X (Expression bit value)	A push on this key will display the analog input maximum set value (bit value) registered now.
ENT		**If this key is pressed inputting the analog maximum input, the input value (bit value) in that time will be registered as the analog input maximum.**
MODE	A B C D E F A. X X X X	MODE is pressed, it will return to the analog input minimum setup.
Power OFF		Please use the power supply OFF after the end of registration.
Power ON	A B C D E F Measurement display	If power supply ON is carried out again, it will return to a measurement display.

※Please adjust by 4 mA of the minimum analog inputs, and 20 mA of the maximum analog inputs.

When RS-232C and RS-485 communication is used, please set up a baud rate, a bit, parity, ID, etc. in the modes 13 and 14.
When writing in a preset value using communication, it is the setting method of SV value in the mode 00 (P. 20), Please set it as RS-232C and RS-485.

1. ＲＳ２: ・・・・・Signal level RS-232C conformity
   ＲＳ４ (W)・・・Signal level RS-485 conformity

2. Correspondence procedure・・・Half-duplex communication method

3. baud rate・・・(It is a mode setup Reference″ mode 13″)
   ２４００ bps
   ４８００ bps
   ９６００ bps
   １９２００ bps

4. Start bit
   1-bit fixation

5. Stop bit
   1-bit fixation

6. Data bit (It is a mode setup Reference″ mode 13″)
   7-bit・８-bit

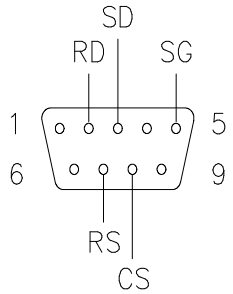
7. Parity bit (It is a mode setup Reference″ mode 13″)
   Nothing, odd number, and even number

8. Communication code
   ASCII CODE

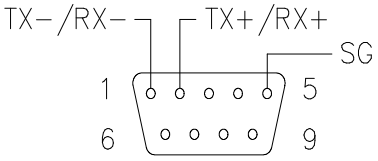
9. Communication connector pin configuration (Meter side : Ｄ－sub９pin male)

Fig. １９

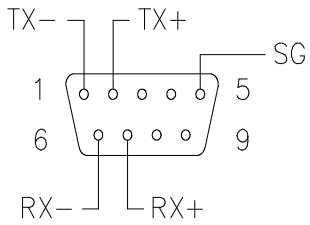
ＲＳ２ Connector



ＲＳ４ Connector



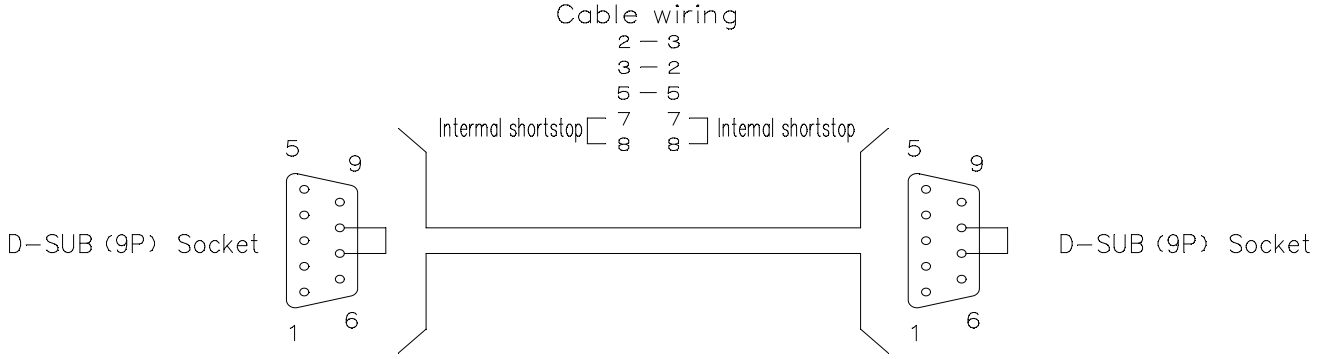
ＲＳ４W Connector



Meter side connector : OMRON ＸＭ２Ａ－０９０１

１０. ＲＳ－２３２Ｃ Connection diagram

＜Cabling diagram＞ Fig１９a



Meter		PC
Pin NO.	Name	Name
2	ＲＤ	ＳＤ （ＴｘＤ）
3	ＳＤ	ＲＤ （ＲｘＤ）
5	ＳＧ	ＳＧ
7	ＲＳ	ＣＳ （ＣＴＳ）
8	ＣＳ	ＲＳ （ＲＴＳ）

Communication operation

1. Checksum

①Checksum computing range

(Command 1)

@ × × R D 1 △ △ CR

This range is object of a checksum.

(Command 2)

@ × × W P 1 ± 0 1 2 3 4 5 △ △ CR

This range is object of a checksum.

※The object of a checksum is a range from header character "@" to before a checksum.

②Checksum computing type

A checksum computing type is 2 bytes of character string notation of the HEX value by MOD.

〔Example〕 In the case of @ 0 1 R D 1 △ △ CR

(The indicated value demand of the ID number 01)

A commsnd is transposed to an ASCII code (hexadecimal number), and is added.

@	0	1	R	D	1
↓	↓	↓	↓	↓	↓
40H	30H	31H	52H	44H	31H

40H ＋ 30H ＋ 31H ＋ 52H ＋ 44H ＋ 31H ＝ 168H

A value is transposed to a checksum.

168H is 168(hexadecimal number) Lower 2 figure 68 becomes a checksum.

If 68 is considered to be a character in order to consider it as 2 bytes of ASCII notation,

6	8
↓	↓
36H	38H

A transmitting command becomes "@ 0 1 R D 1 6 8 CR"

If the above is denoted by an ASCII code (hexadecimal code),

@	0	1	R	D	1	6	8	CR
↓	↓	↓	↓	↓	↓	↓	↓	↓
40H	30H	31H	52H	44H	31H	36H	38H	0DH

2. Status

① The view of status
Status has written the hexadecimal number by 2 bytes of character string.

② Status allotment
0 0 Normal communication.
0 1 Communication fault.

3. Communication format Table. 7

Measurement data lead (TOTAL)	Command format	@××RD1△△CR
	Response format	@××◇◇±□□□□□□△△CR
Measurement data lead (PV)	Command format	@××RD2△△CR
	Response format	@××◇◇±□□□□□□△△CR
Measurement data lead (Analog input)	Command format	@××RD3△△CR
	Response format	@××◇◇±00□□□□△△CR
SV value lead	Command format	@××RP1△△CR
	Response format	@××◇◇±□□□□□□△△CR
Deviation error (analog input) upper limit value lead	Command format	@××RP2△△CR
	Response format	@××◇◇±00□□□□△△CR
Deviation error (analog input) lower limit value lead	Command format	@××RP3△△CR
	Response format	@××◇◇±00□□□□△CR
SV value write(*1)	Command format	@××WP1±□□□□□□△△CR
	Response format	@××◇◇△△CR
Deviation error (analog input) upper limit value write (*1)	Command format	@××WP2±00□□□□△△CR
	Response format	@××◇◇△△CR
Deviation error (analog input) lower limit value write (*1)	Command format	@××WP3±00□□□□△△CR
	Response format	@××◇◇△△CR

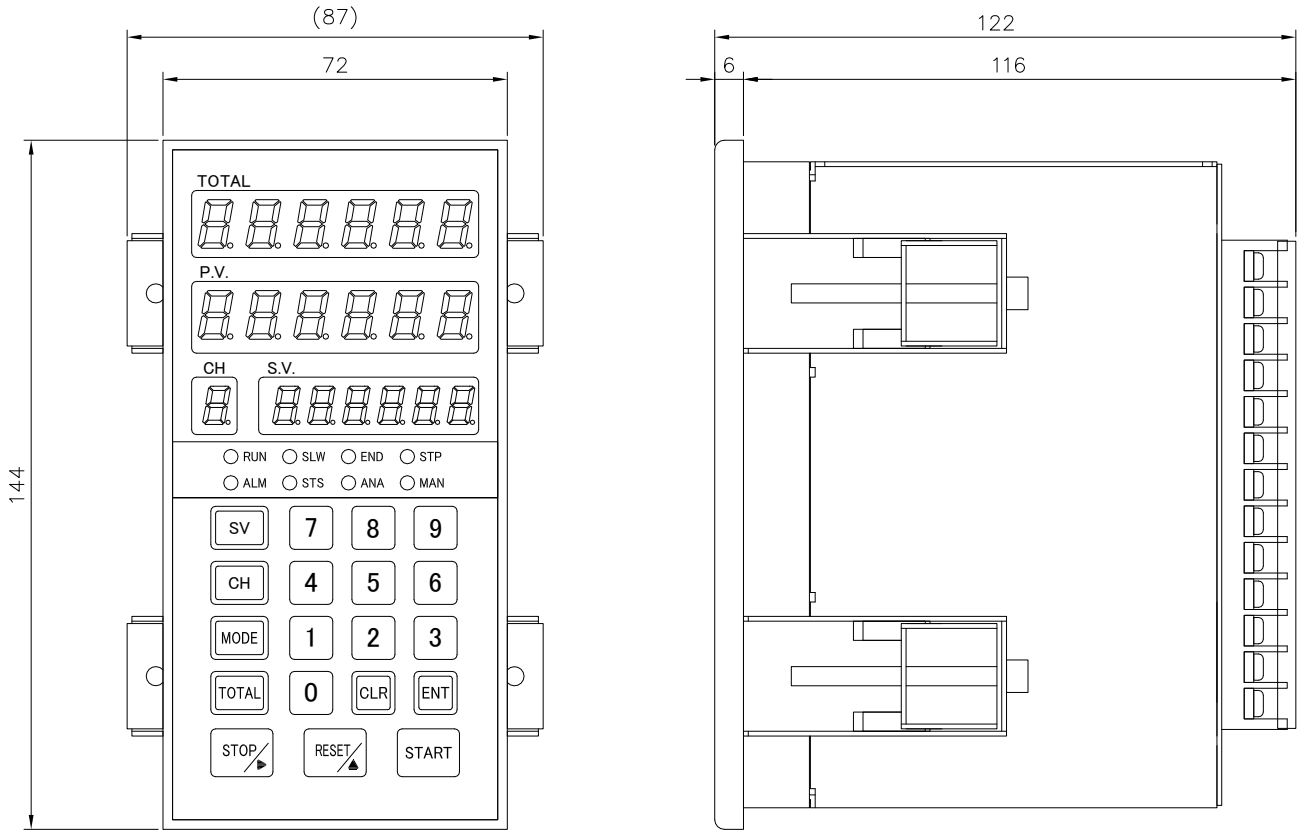
(*1) This data light command can be used when 2 or 3 (RS-232, RS-485) setup of J in the mode P-00 is set up.

××・・・・・ID No.
△△・・・・・Checksum
◇◇・・・・・Status
□□□□・・・Indicated value data

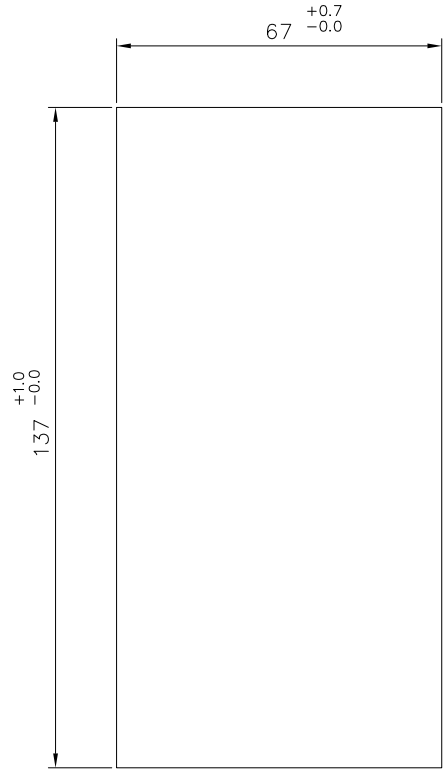
Please keep in mind that a decimal point does not go into transmission and received data.
A decimal point position turns into a position according to each display.

18. External dimensions

External dimensions Fig. 20



Panel cut dimensions



(Unit : mm)

19. About a noise coutermeasure

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 17)
Please take notes of the value setting of each mode. If it becomes normal, please take the following measure.
And please setting it once again.

(1) Please use cores of shielding wire for a sensor, separate as much as possible from a source of noise.

(2) Please shorten the sensor code as much as possible.
Please avoid sources of noises such as the power lines and inverters, select the route that doesn't pick up the noise as much as possible, and wire.

(3) When you receive the influence of the noise from the power line
Please separate from the noise source, shorten wiring as much as possible, and give the treatment such as EMI filters.

(4) Wiring technique of sensor code
Around the sensor code, there are an electric power line and a power line.
When the influence of the noise such as serge is received, let's use piping.
Or, please separate by 50 centimeters or more.

Fig. 21

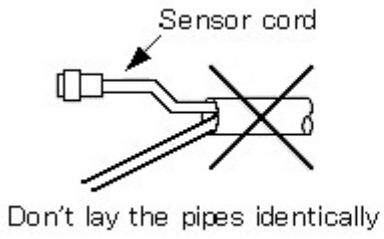
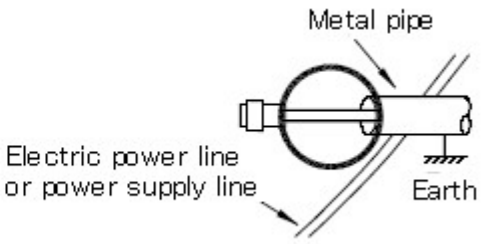
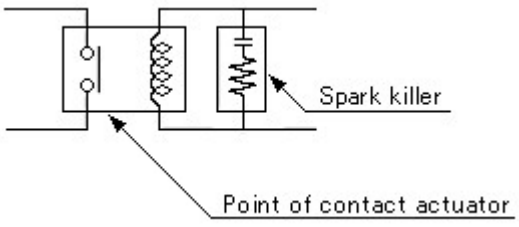


Fig. 22



(5) Stop the noise generation caused by an external factor.
Please put and plan the spark killer as shown in Fig. 23 when the serge noise by the opening and shutting of the having points of contact of the electromagnetic switch, the thermo regulator, the solenoid-controlled valve, and the relay, etc. from which a strong noise seems to be generated in the control board in which the meter is installed and the circumference influences.

Fig. 23



(6) Especially, please consult the handling shop or our company when there are use in a big noise area and a point of uncertainty.

20. 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 power connection correct?	→Connect correctly according to "Connecting terminal boards" (Refer to page 7) ↓ When display still does not appear, have it serviced.
2	Unusual LED lighting, key switch operation, preset-output.	→Check with the test mode (Refer to page 15).	→Initialize (Refer to page 17) ↓ 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 input system of this meter suitable for the output signal of the sensor?	→Check the setting again. →Check the connection of the sensor (Refer to page 7). Check with the test mode (Refer to page 15) →Operation manual check. ↓ When it still does not resume normal status, have it serviced.
4	Indication value is too large.	→Influence of noise.	→About a noise countermeasure. (Refer to page 40 for "About a noise countermeasure".)
5	Other ploblem		→Have it serviced

Head Office　: 123-1, Kami, Nishi-ku, Sakai-city, Osaka, Japan.
TEL.81-72-274-6001　FAX.81-72-274-6005

Tokyo Branch　: TEL.81-3-5256-8311　FAX.81-3-5256-8312