

Graphical Digital Panel Meter
WPMZ-6-□□□-□□-□□□
Quick instruction manual

Thank you for purchasing the WPMZ graphical digital panel meter. This manual is a quick instruction manual only for preparation, connection and basic condition settings of the WPMZ. For the all functions of the WPMZ, please refer to a detailed instruction manual which can be downloaded from our homepage.

For models with RS communication functions, please refer to "Modbus communication manual" or "RS-232C communication manual" which also can be downloaded from our homepage.

(<http://www.watanabe-electric.co.jp/en/>)

Checks before supplying power, preparations, wiring

1. CHECKING THE PRODUCT

1-1. MODEL CODES

Please check that the product has been delivered matches the model code ordered in reference to

"17. SPECIFICATIONS".

2. PRECAUTIONS FOR USE

2-1. ENVIRONMENTS AND CONDITIONS OF USE

Please do not use the product under the following circumstances. It might cause malfunctions and shortening the life of the product.

- 1) Ambient temperature of out of -5 to 50°C
- 2) Ambient humidity of out of 35 to 85%, or freezing condensing
- 3) Excessive dust or metal particles
(Storing in a dust-proof chassis and a countermeasure against heat dissipation are required.)
- 4) Environment of corrosive gas, salty air or oily smoke
- 5) Environment of much vibration or impact
- 6) Environment of rain or water drops (except the front panel)
- 7) Environment of strong electromagnetic field or much exogenous noises.

2-2. INSTALLATION AND CONNECTION

- 1) Please read this manual before the installation and the connection of wires. And they should be performed by a person having a specialized technique. In addition, the insulation class of the WPMZ is as shown by the figure below. Please confirm that the insulation class satisfies a use condition prior to the installation.

 Reinforced Insulation
 Basic Insulation
 Operational Insulation

AC power	Comparative outputs, External control inputs, Analog output, BCD output, RS-232C	RS-485 Modbus RTU
	Input Ach Totalizer-synchronized pulse	Input Bch Totalizer-synchronized pulse
DC power	Comparative outputs, External control inputs, Analog output, BCD output, RS-232C	RS-485 Modbus RTU
	Input Ach Totalizer-synchronized pulse	Input Bch Totalizer-synchronized pulse

- 2) Do not wire the power supply line, input signal lines and output signal lines near noise sources or relay drive lines.
- 3) Bundling or containing in a same duct with lines including noises might cause malfunctions.
- 4) The WPMZ becomes available functionally right after power activation, but requires 30 minutes' warming to satisfy all performance requirements.

Note: The inputs "A channel" and "B channel" may be abbreviated to "Ach" and "Bch" in this manual.

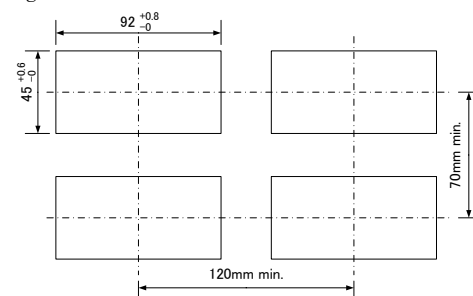
2-3. CHECKING BEFORE USE

Install the WPMZ under the environments and conditions of use which meet requirements.

If you find any damage to the product or any problem, please contact to your dealer or our company directly.

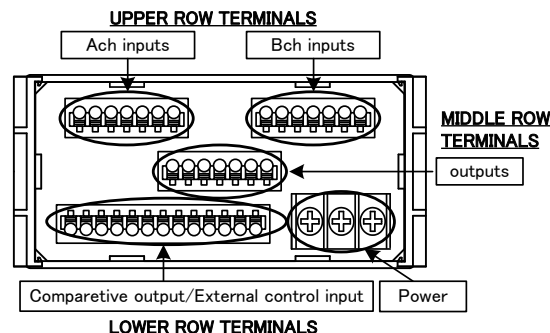
3. HOW TO INSTALL (PANEL CUT DIMENSIONS)

To install the WPMZ, panel cut dimensions are as shown by the figure below.

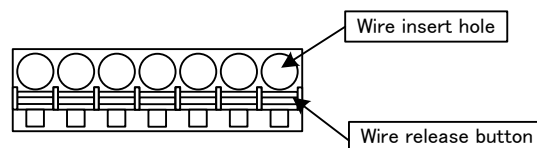


4. CONNECTING TERMINALS

4-1. BACK VIEW



4-2. WIRING TO SCREWLESS TERMINALS



Pushing the wire release button with a flat-blade screwdriver, insert the wire to the wire insert hole deeply and then release the button.

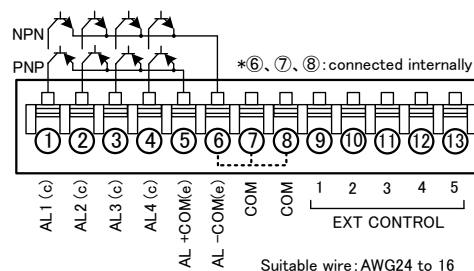
(Suitable tool for pushing buttons : flat-blade screwdriver blade width 2.5mm)

4-3. CONNECTOR FOR LOWER ROW TERMINALS (COMPARATIVE OUTPUT/EXTERNAL CONTROL INPUT, POWER)

4-3-1. Comparative Output / External Control Input

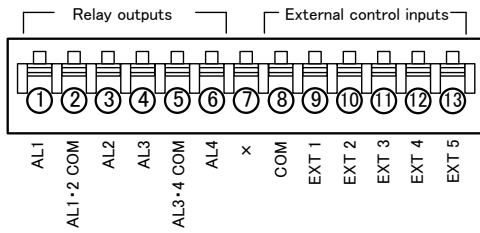
*Screwless connector

[Open-collector output products]



No.	Name	Description
1	AL1 c	AL1 open-collector output (collector)
2	AL2 c	AL2 open-collector output (collector)
3	AL3 c	AL3 open-collector output (collector)
4	AL4 c	AL4 open-collector output (collector)
5	AL+COM e	Common terminal for PNP output (emitter) (NPN output : no connection)
6	AL-COM e	Common terminal for NPN output (emitter) (PNP output : GND for PNP)
7,8	COM	Common terminal for external control inputs
9	1	External control input No.1
10	2	External control input No.2
11	3	External control input No.3
12	4	External control input No.4
13	5	External control input No.5

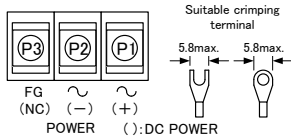
【Relay output products】



Suitable wire: AWG 24 to 16

No.	Name	Description
1	AL1	AL1 relay output
2	AL1.2 COM	Common terminal for relay outputs of AL1 and AL2
3	AL2	AL2 relay output
4	AL3	AL3 relay output
5	AL3.4 COM	Common terminal for relay outputs of AL3 and AL4
6	AL4	AL4 relay output
7	x	No connection
8	COM	Common terminal for external control inputs
9	EXT 1	External control input No.1
10	EXT 2	External control input No.2
11	EXT 3	External control input No.3
12	EXT 4	External control input No.4
13	EXT 5	External control input No.5

4-3-2. Supply Power

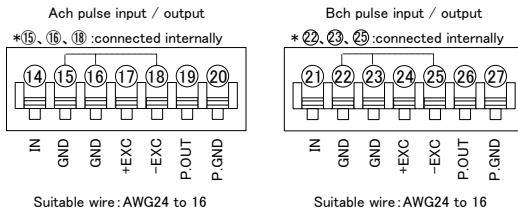


Terminal	Name	Description
P1	POWER (+)	Power source terminal (In case of DC power, +V)
P2	POWER (-)	Power source terminal (In case of DC Power, 0V)
P3	FG (NC)	FG terminal (DC power option: no connection (Non-usable for a relay terminal))

4-4. CONNECTION FOR UPPER ROW TERMINALS

4-4-1. Pulse Inputs / Output

*Screwless connector



Suitable wire: AWG24 to 16

Suitable wire: AWG24 to 16

●A channel. pulse input

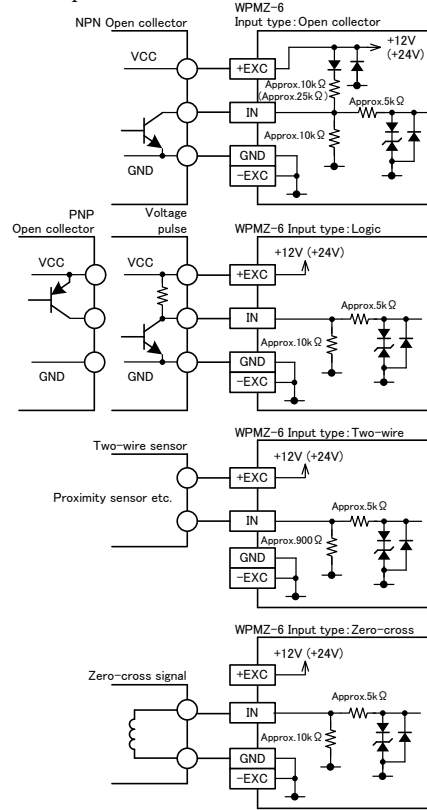
Terminal	Name	Description
14	IN	Ach pulse input terminal
15,16	GND	Ach input ground terminal
17	+EXC	Ach sensor power output terminal (+)
18	-EXC	Ach sensor power output terminal (-)
19	P.OUT	Ach totalizer-synchronous pulse output terminal (+)
20	P.GND	Ach totalizer-synchronous pulse output terminal (-)

●B channel. pulse input

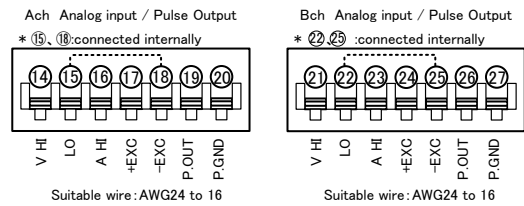
Terminal	Name	Description
21	IN	Bch pulse input terminal
22,23	GND	Bch input ground terminal
24	+EXC	Bch sensor power output terminal (+)
25	-EXC	Bch sensor power output terminal (-)
26	P.OUT	Bch totalizer-synchronous pulse output terminal (+)
27	P.GND	Bch totalizer-synchronous pulse output terminal (-)

*Using as a 2-phase pulse input, connect the GND of A channel to the GND of B channel.

•Examples for Input connections



4-4-2. Analog Inputs / Pulse Output *Screwless connector



Suitable wire: AWG24 to 16

Suitable wire: AWG24 to 16

●A channel. analog input

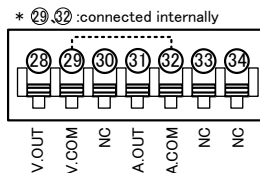
Terminal	Name	Description
14	V HI	Ach voltage range input terminal (+)
15	LO	Ach input common terminal (-)
16	A HI	Ach current range input terminal (+)
17	+EXC	Ach sensor power output terminal (+)
18	-EXC	Ach sensor power output terminal (-)
19	P.OUT	Ach totalizer-synchronous pulse output terminal (+)
20	P.GND	Ach totalizer-synchronous pulse output terminal (-)

●B channel. analog input

Terminal	Name	Description
21	V HI	Bch voltage range input terminal (+)
22	LO	Bch input common terminal (-)
23	A HI	Bch current range input terminal (+)
24	+EXC	Bch sensor power output terminal (+)
25	-EXC	Bch sensor power output terminal (-)
26	P.OUT	Bch totalizer-synchronous pulse output terminal (+)
27	P.GND	Bch totalizer-synchronous pulse output terminal (-)

4-5. CONNECTION FOR MIDDLE ROW TERMINALS

4-5-1. Analog Output *Screwless connector

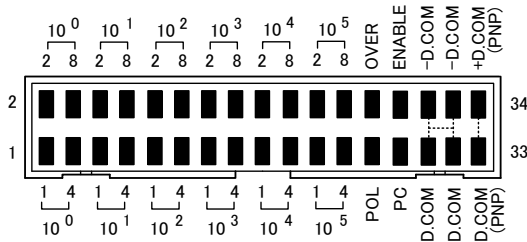


Suitable wire: AWG24 to 16

●WPMZ-6-□□□-1□-□□□

Terminal	Name	Description
28	V.OUT	Analog voltage output terminal (+)
29	V.COM	Analog voltage output terminal (-)
30	NC	No connection. (Non-usable for a relay terminal)
31	A.OUT	Analog current output terminal (+)
32	A.COM	Analog current output terminal (-)
33,34	NC	No connection. (Non-usable for a relay terminal)

4-5-2. BCD Output *MIL connector

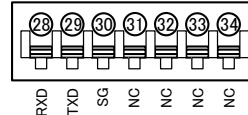


Suitable wire: AWG#28 flat cable(7/0.127mm)

●WPMZ-6-□□□-2or3□-□□□

Terminal	Name	Description
1 to 4	10 ⁰ 1-8	Bit 1-8 of BCD 10 ⁰ digit output terminals
5 to 8	10 ¹ 1-8	Bit 1-8 of BCD 10 ¹ digit output terminals
9 to 12	10 ² 1-8	Bit 1-8 of BCD 10 ² digit output terminals
13 to 16	10 ³ 1-8	Bit 1-8 of BCD 10 ³ digit output terminals
17 to 20	10 ⁴ 1-8	Bit 1-8 of BCD 10 ⁴ digit output terminals
21 to 24	10 ⁵ 1-8	Bit 1-8 of BCD 10 ⁵ digit output terminals
25	POL	BCD polarity output terminal
26	OVER	BCD over output terminal
27	PC	BCD synchronous signal output terminal
28	ENABLE	BCD enable terminal By bringing to same voltage level of -D.COM or connecting to -D.COM, transistors of BCD outputs become OFF.
29 to 32	-D.COM	Common terminal for BCD open collector NPN
33,34	+D.COM	External power terminal for BCD open collector PNP

4-5-3. RS-232C *Screwless connector



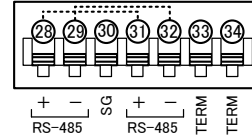
Suitable wire: AWG24 to 16

●WPMZ-6-□□□-4□-□□□

Terminal	Name	Description
28	RXD	receive data terminal
29	TXD	transmit data terminal
30	SG	common terminal for communication function
31 to 34	NC	no connection *Non-usable for a relay terminal

4-5-4. RS-485 Modbus RTU *Screwless connector

* 28, 29 & 30, 31: connected internally



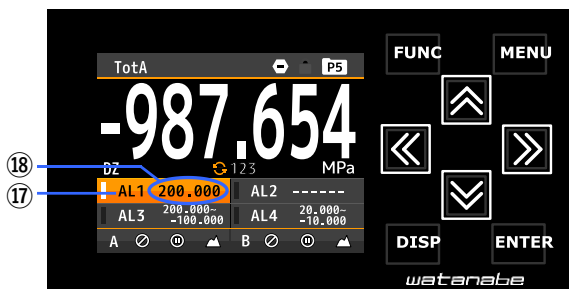
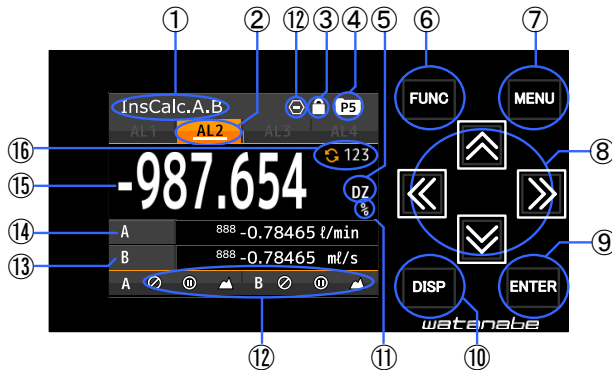
Suitable wire: AWG24 to 16

●WPMZ-6-□□□-5□-□□□

Terminal	Name	Description
28	+	Non-inverting signal
29	-	Inverting signal
30	SG	Signal ground
31	+	Non-inverting signal
32	-	Inverting signal
33,34	TERM	Terminal resistance (120Ω) terminals * Short 33 and 34 to be enable the resistance.

5. NAMES OF EACH PAR

5-1. NAMES OF EACH PART



8	Arrow keys	Used to move the cursor and to move to other displays while setting mode. *When the shortcut function is registered, the assigned function will be valid by holding down the key over 1 second.
9	ENTER key	Used to validate setting value.
10	DISP key	Used to switch measurement displays.
11	Display unit	Unit for 1st item display
12	External control	Lights when any of external control functions are valid
13	3rd item display	Displays measured value of 3rd item
14	2nd item display	Displays measured value of 2nd item
15	1st item display	Displays measured value of 1st item
16	Overflow counter	In case that 1st display item is totalized value, indicates overrun count. * If the setting for the overflow count is NONE, this item is not shown.
17	Comparison result	Lights when the result of comparative output is ON.
18	Judgement value	Shows value or area of comparison judgement

5-2. EXPLANATION OF ICONS

5-2-1. Display Icons on The Measurement Display

These icons are displayed on the top or the bottom of the measurement

No.	Name	Function
①	Display title	Indicates contents of display
②	Comparison result	Lights when the result of comparative output is ON.
③	Key lock	Lights when the key lock is effective.
④	Pattern	Indicates pattern No. in use.
⑤	DZ icon	Indicates the operation status of the "Digital zero" function
⑥	FUNC key	Used for registering external control shortcut function.
⑦	MENU key	Used for moving to setting display and returning to measurement display.

Icon	Meaning
P5	Indicates pattern No. in use.
🔒	Indicates key lock function is effective.
🔄	Indicates comparative output reset function(an external control function) is effective.
🚫	Indicates measurement inhibit function(an external control function) is effective.
⏸	Indicates display hold function(an external control function) is effective.
📈📉	Indicates maximum value or minimum value hold function (an external control function) is effective.

5-2-2. Key Operation Icons on The Setting Display

Key operation icons which are displayed on setting displays are shown below.

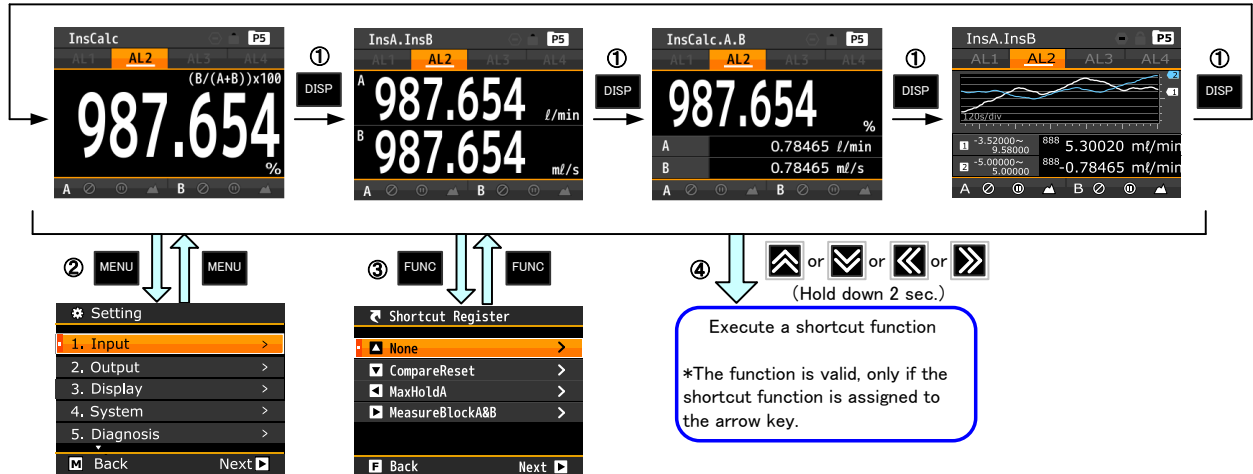
icon	Meaning	icon	meaning
	MENU key		ARROW key (LEFT)
	FUNC key		ARROW key (RIGHT)

	ENTER key		ARROW key (UP&DOWN)
	DISP key		ARROW key (LEFT&RIGHT)
	ARROW key (UP)		ARROW key (ALL)
	ARROW key (DOWN)		Pattern No. under setting

BASIC OPERATIONS, SETTINGS

6. BASIC OPERATIONS OF MEASUREMENT DISPLAY

During measurement mode, the following key operations can be done.



7. SETTING LAYER OVERVIEW

The setting menus of the WPMZ which are represented by key words and have layers, therefore desired setting menu can be selected accurately. The layers consist of 1st layer to 4th layer (Only custom unit setting has the 5th layer.)

Please refer to “8. BASIC OPERATION OF SETTING DISPLAY” about how to set up.

1st Layer Large Categories	2nd Layer Small Categories	3rd Layer (Setting Variables)		4th Layer (Setting Values)		Remarks
		Names of Variables	Character Strings On Display (Abbreviated Form)	Initial Values	Settable Values	
1.Input	Pulse input A Pulse input B	Pattern select	PatternSelect	Pattern1(or pattern No. in use)	Pattern1/ Pattern 2/ Pattern 3/ Pattern 4/ Pattern 5/ Pattern 6/ Pattern 7/ Pattern 8	Select pattern No. to set.
		Input type	InputType	OpenCollector	OpenCollector/Logic/ZeroCross/2Wire/ 2PhaseOpenCol/2PhaseLogic/2Phase2wire	Select input signal type
		Input filter	InputFilter	None	None/30Hz/1.5kHz/15kHz	Select analog input filters
		Sensor power	SensorPower	12V	12V/24V	Switch Sensor power voltage
		Instantaneous value display coefficient	InsDispCoef	1.00000×10 ⁰	0.00000 to 9.99999×10 ⁻⁹	For scaling setting of instantaneous value display, multiply frequency by instantaneous coefficient and unit time.
		Instantaneous Unit Time	InsUnitTime	Sec	Sec/Min/Hour	
		Instantaneous value decimal point position	InsDecPoint	##### (No decimal point)	#####/#####/#####/#####/#####	Set number of digits after decimal point
		Instantaneous value display unit	InsDispUnit	None	None/select from 62 units (See 6-2)/custom unit	Refer to detailed instruction manual about custom unit
		Instantaneous value auto zero	InsAutoZero	0.00	0.00 to 99.99sec	Displays 0 if no pulse input over more than setting time
		Instantaneous value moving average	InsMoveAve	None	None/2times/3times /4times /5times /6times /7times /8times / 9times	Set number of moving average.
		Instantaneous value simple average	InsSimpleAve	None	None/2 times /4 times /8 times /16 times /32 times /64 times /128 times /256 times	Set number of simple average for internal sampling (10ms)
		Instantaneous value display step	InsDispStep	None	None/5steps/10steps	Setting of steps of display (If set to 5steps, displayed only 0 or 5 on LSB)
		Totalized value display coefficient	TotDispCoef	1.00000×10 ⁰	0.00000 to 9.99999×10 ⁻⁹	Scaling setting for totalized value display.
		Totalized value default value	TotDefaults	0.00000×10 ⁰	± 9.99999×10 ⁻⁹	Setting of Initial value of totalized value
		Total calculation direction	TotDirection	AddToDefault	AddToDefault/SubFromDefault	Set addition or subtraction for totalized value
		Totalized value decimal point position	TotDecPoint	##### (No decimal point)	#####/#####/#####/#####/#####	Set number of digits after decimal point
		Totalized value display unit	TotDispUnit	None	None/select from 62 units (See 6-2)/custom unit	Refer to detailed instruction manual about custom unit
		Totalized value overrun count	TotOverCount	None	None/999times/Endless	Setting for overrun count
	Analog Input A Analog Input B	Pattern select	PatternSelect	Pattern1(or pattern No. in use)	Pattern1/ Pattern 2/ Pattern 3/ Pattern 4/ Pattern 5/ Pattern 6/ Pattern 7/ Pattern 8	Select pattern No. to set.
		Input Type	InputRange	4 to 20mA	0 to 5V/1 to 5V/0 to 10V/4 to 20mA/0 to 20mA	Select input signal type
		Sensor Power	SensorPower	12V	12V/24V	Select sensor power voltage
		Shut Down	InputLowCut	00.500	0.00 to 100.00%	Cutting off low level input signal
		Linearize Function	InputCorrect	Disable	Disable/Enable	Switch ON/OFF of linearize function.
		Linearize Point	Linearize Point	0.00 to 100.0 0.00 to 100.0	Input value (1st to 21st point) : 0.00 to 100.00% Output value (1st to 21st point) : 0.00 to 100.00%	On after 2nd point, if both of input value and output value are 0.00, the following points become invalid.
		Instantaneous value display Coefficient	InsDispCoef	1.00000×10 ⁴	0.00000 to 9.99999×10 ⁻⁵	Scaling setting of instantaneous value display.

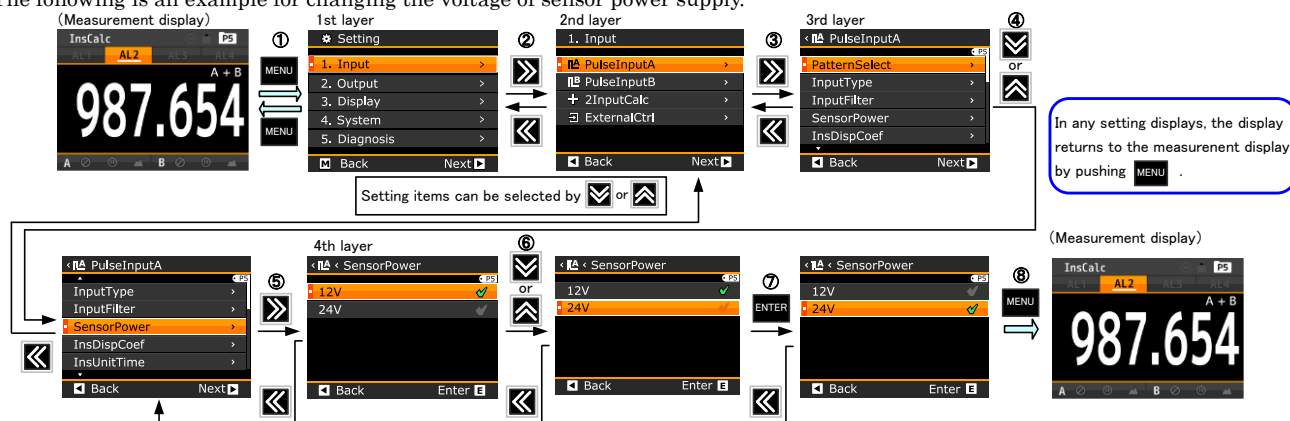
1st LayerLarge Categories	2nd LayerSmall Categories	3rd Layer (Setting Variables)		4th Layer (Setting Values)		Remarks
		Names of Variables	Character Strings On Display (Abbreviated Form)	Initial Values	Settable Values	
1.Input	Analog Input A	Instantaneous value decimal point position	InsDecPoint	##### (No decimal point)	#####/####. #####. #####. #####	Set number of digits after decimal point
		Instantaneous value display unit	InsDispUnit	None	None/select from 62 units (See 6-2)/custom unit	Refer to detailed instruction manual about custom unit
		Instantaneous value moving average	MoveAve	None	None/2times/3times /4times /5times /6times /7times /8times /9times	Set number of moving average for analog inputs
		Instantaneous value simple average	SimpleAve	None	None/2 times /4 times /8 times /16 times /32 times /64 times /128 times /256 times	Set number of simple average
		Instantaneous value display step	InsDispStep	None	None/5steps/10steps	Setting of steps of display (If set to 5steps, displayed only 0 or 5 on LSB)
		Totalized unit time	TotUnitTime	Hour	Sec/Min/Hour	Set unit time
		Totalized value display Coefficient	TotDispCoef	1.00000×10 ⁵	0.00000 to 9.99999×10 ⁻⁹	Scaling setting for totalized value display.
		Totalized value default value	TotDefaults	0.00000×10 ⁰	± 9.99999×10 ⁻⁹	Setting of Initial value of totalized value
		Total calculation direction	TotDirection	AddToDefault	AddToDefault/SubFromDefault	Set addition or subtraction for totalized value
		Totalized value decimal point position	TotDecPoint	##### (No decimal point)	#####/####. #####. #####. #####	Set number of digits after decimal point.
	Analog Input B	Totalized value display unit	TotDispUnit	None	None/select from 62 units (See 6-2)/custom unit	Refer to detailed instruction manual about custom unit
		Totalized value overrun count	TotOverCount	None	None/999times/Endless	Setting for overrun count
	2 input calculation	Pattern select	PatternSelect	Pattern1(or pattern No. in use)	Pattern1/ Pattern 2/ Pattern 3/ Pattern 4/ Pattern 5/ Pattern 6/ Pattern 7/ Pattern 8	Select pattern No. to set.
		Expression for instantaneous value	InsExpression	None	None/ (B/A)*100 / (B/A-1)*100 /B-A / (B(A+B))*100 / A+B	Select expression for calculation of instantaneous value.
		Instantaneous value decimal point position	InsDecPoint	##### (No decimal point)	#####/####. #####. #####. #####	Set number of digits after decimal point
		Instantaneous value display unit	InsDispUnit	None	None/select from 62 units (See 6-2)/custom unit	Refer to detailed instruction manual about custom unit
		Instantaneous value display step	InsDispStep	None	None/5steps/10steps	Setting of steps of display (If set to 5steps, displayed only 0 or 5 on LSB)
		Expression for totalized value	TotExpression	None	None/A+B / B-A	Select expression for calculation of totalized value.
		Totalized value decimal point position	TotDecPoint	##### (No decimal point)	#####/####. #####. #####. #####	Set number of digits after decimal point.
		Totalized value display unit	TotDispUnit	None	None/select from 62 units (See 6-2)/custom unit	Refer to detailed instruction manual about custom unit
		Totalized value overrun count	TotOverCount	None	None/999times/Endless	Setting for overrun count
	External Control	Function of external control terminal 1 to 5	ExtCtrl1Func ExtCtrl2Func ExtCtrl3Func ExtCtrl4Func ExtCtrl5unc	None	None/ CompareReset/ TotalResetA/ TotalResetB/ TotalResetA&B/ MeasureBlockA/ MeasureBlockB/ MeasureBlockA&B/ DispHoldA/ DispHoldB/ DispHoldA&B/ MaxHoldA/ MaxHoldB/ MaxHoldA&B/ MinHoldA/ MinHoldB/ MinHoldA&B/DigitalZeroA/DigitalZeroB/ DigitalZeroA&B/PatternChange1/ PatternChange2/ PatternChange3/ MonitorChange/ TrendHold	Select functions assigned to external control terminals.
2.Output	Comparative Output AL1	Pattern select	PatternSelect	Pattern1(or pattern No. in use)	Pattern1/ Pattern 2/ Pattern 3/ Pattern 4/ Pattern 5/ Pattern 6/ Pattern 7/ Pattern 8	Select pattern No. to set.
		Source output display value	OutputDispValue	None	None/InsA/InsB/InsCalc/TotA/TotB/TotCalc	Select source output display value to compare.
		Compare mode	CompareMode	LevelJudge	LevelJudge/ ZoneJudge	Select compare mode
		Condition of ON	OnConditions	Excess	Excess/LessThan	In level judge mode
				InTheZone	InTheZone/OutsideTheZone	In Zone judge mode
	Comparative Output AL2			10000 0	Threshold :±999999 Hysteresis:0 to 999999	In level judge mode
		Comparison judgement value	Threshold	0 10000 0	Zone lower limit :±999999 Zone upper limit :±999999 Hysteresis:0 to 999999	In Zone judge mode
	Comparative Output AL3	Comparison ON delay	OnDelay	None	None/20ms/50ms/100ms/200ms/500ms	Comparative output turns ON, if ON condition continues over set delay time.
	Comparative Output AL4	Comparison OFF delay	OffDelay	None	1s/5s/10s/20s	Comparative output turns OFF, if OFF condition continues over set delay time.
	Pulse Output A Pulse Output B	Output mode	OutputMode	Normal	Normal/Latch/OneShot5ms/ OneShot 10ms/ OneShot 20ms/ OneShot 50ms/ OneShot 0.1s/ OneShot 0.2s/ OneShot 0.5s/ OneShot 1s/ OneShot 2s	Select output mode of comparison
		Output logic	OutputLogic	Negative(NO)	Positive(NC)/Negative(NO)	NC/NO are for relay output product.
		Background Color at ON	OnBgColors	Black	Black/Red/Yellow/Green	Background color priority AL1>AL2>AL3>AL4
	Analog Output	Pattern select	PatternSelect	Pattern1(or pattern No. in use)	Pattern1/ Pattern 2/ Pattern 3/ Pattern 4/ Pattern 5/ Pattern 6/ Pattern 7/ Pattern 8	Select pattern No. to set.
		Source output display value	OutputDispValue	None	None/TotA/TotB/TotCalc	Select source output display value to output as totalizer-synchronous pulse
		Output synchronous digit	OutputSyneDigit	1stDigit	1stDigit/2ndDigit/3rdDigit/4thDigit/5thDigit /6thDigit	Select display digit with which totalizer-synchronous pulse synchronized.
		Output pulse width	OutputPulseWidth	5ms	5ms/10ms/20ms/50ms/100ms/500ms/1s/2s	Select width of totalizer-synchronous pulse.
	BCD Output	Output logic	OutputLogic	Negative	Positive/Negative	Select logic of totalizer-synchronous pulse.
		Pattern select	PatternSelect	Pattern1(or pattern No. in use)	Pattern1/ Pattern 2/ Pattern 3/ Pattern 4/ Pattern 5/ Pattern 6/ Pattern 7/ Pattern 8	Select pattern No. to set.
		Output range	OutputRange	0-10V	0-10V/±10V/1-5V/0-20mA/4-20mA	Select output range (type).
		Source output display value	OutputDispValue	None	None/InsA/InsB/InsCalc/TotA/TotB/TotCalc	Select a displayable item for analog output
	RS-485 Modbus communication	Output scale	OutputScale	0 10000	0% display value :±999999(±99999) 100% display value :±999999(±99999)	Set scaling for analog output. Set expected display values at 0% and 100% output.
		Pattern select	PatternSelect	Pattern1(or pattern No. in use)	Pattern1/ Pattern 2/ Pattern 3/ Pattern 4/ Pattern 5/ Pattern 6/ Pattern 7/ Pattern 8	Select pattern No. to set.
		Source output display value	OutputDispValue	None	None/InsA/InsB/InsCalc/TotA/TotB/TotCalc	Select a displayable item for BCD output
		Data signal logic	DataSignalLogic	Negative	Positive /Negative	Select logic of data signal output.
	RS-232C communication	Synchronous signal logic	SyncSignalLogic	Negative	Positive /Negative	Select logic of synchronous signal (PC) output.
		Slave Address	SlaveAddress	1	1/2/3/4/ /30/31	Set ID number.
		Baud rate	Baudrate	19200bps	9600bps/19200bps/38400bps	Set baud rate.
		Parity	Parity	Even	None/Even/Odd	Set parity bit.
	Display Select	Protocol	Protocol	Modbus-RTU	Modbus-RTU/OriginalCommand/OriginalOutput	Set protocol
		Baud rate	Baudrate	19200bps	9600bps/19200bps/38400bps	Set baud rate.
		Data length	DataLength	8bit	7bit/8bit	Set data character length
		Parity	Parity	None	None/Even/Odd	Set parity bit.
		Stop bit	Stopbit	1bit	1bit/2bit	Set stop bit length.
		Delimiter	Delimiter	CR	CR/CR LF	Set delimiter type.
3.Display	Display Select	Measure select	MeasureSelect	1input: InsA+ TotA 2inputs: InsA+ TotA / InsB+ TotB	InsA/InsB/InsCalc/ InsA+InsB / InsCalc+A+B/ TotA/TotB/TotCalc / TotA+TotB/TotCalc+A+B/ InsA+ TotA / InsB+ TotB/ InsCalc+ TotCalc/ InsA+Comp/InsB+Comp/InsCalc+Comp/ TotA+Comp/TotB+Comp/ TotCalc+Comp	Select displayable items can be switched by DISP key or external control (multiple selects are available)
		Level select	LevelSelect		InsA/InsB/InsCalc/ InsA+InsB / TotA/TotB/TotCalc / TotA+TotB / InsB+ TotB/ InsCalc+ TotCalc	Select an item displayed on level display
		Trend select	TrendSelect			Select an item displayed on trend display.

1st Layer Large Categories	2nd Layer Small Categories	3rd Layer (Setting Items)		3rd Layer (Setting Items)		Remarks
		Name Of Item	Character Strings On Display (Abbreviated Form)	Initial Values	Settable Variables	
3.Display	Level Display	Pattern select	PatternSelect	Pattern1(or pattern No. in use)	Pattern1/ Pattern 2/ Pattern 3/ Pattern 4/ Pattern 5/ Pattern 6/ Pattern 7/ Pattern 8	Select pattern No. to set.
		Instantaneous value A scale	InsA Scale	0 10000	Lower limit :±999999 Upper limit :±999999	Set display scale of level display. Left edge of display is lower limit and right edge of display is higher limit
		Instantaneous value B scale	InsB Scale			
		Instantaneous calculation scale	InsCalcScale			
		Totalized value A Scale	TotA Scale			
		Totalized value B Scale	TotB Scale			
		Totalized calculation scale	TotCalcScale			
	Trend Display	Pattern select	PatternSelect	Pattern1(or pattern No. in use)	Pattern1/ Pattern 2/ Pattern 3/ Pattern 4/ Pattern 5/ Pattern 6/ Pattern 7/ Pattern 8	Select pattern No. to set.
		Instantaneous value A scale	InsA Scale	0 10000	Lower limit :±999999(±99999) Upper limit :±999999(±99999)	Set display scale of trend display. Bottom edge of display is lower limit and top edge of display is higher limit.
		Instantaneous value B scale	InsB Scale			
		Instantaneous calculation scale	InsCalcScale			
		Totalized value A scale	TotA Scale	0 10000	Lower limit :±999999(±99999) Upper limit :±999999(±99999)	Set display scale of trend display. Bottom edge of display is lower limit and top edge of display is higher limit.
		Totalized value B scale	TotB Scale			
		Totalized calculation scale	TotCalcScale			
4.System	General	Time axis	TimeAxis	1s/div	1s/div,2s/div,5s/div,10s/div,30s/div,60s/div 120s/div	Select time for 1 division of time axis.
		Brightness	Brightness	5 Bright	5 Bright/4/3/2/1 Dark/0 Off	Select brightness of display **0 Off** is set, whole display is black out
		Power on delay	PowerOnDelay	None	None/2Sec/5Sec/10Sec/20Sec/30Sec/60Sec	Select time from power on to starting measurement
		Power saving time	PowerSavingTime	None	None/1min/2 min/5 min/10 min/30 min/60 min	In power saving state, brightness becomes "1 Dark" level.
		Totalized value Memory	TotMemory	Enable	Enable/Disable	Select saving totalized value or not.
		Digital zero retention	D-ZeroRetention	Disable	Enable/Disable	Select retent digital zero execution state and value or not.
		Language	Language	日本語	日本語 /English	Select language
		Direction of display	DisplayDirection	Horizontal	Horizontal/Vertical	Select direction of display
		Setting protect	SettingProtect	Disable	Disable/Enable	If Enable, changing settings are disabled.
	Initialize	Pattern Copy	PatternCopy	Pattern5(source) PatternAll(destination) Excuse	Pattern 1/2/3/4/5/6/7/8 Pattern 1/2/3/4/5/6/7/8/PatternAll Operationselect Excuse	Function of copying settings for each pattern.
		Save user defaults	UserDefaultSave	Message "Save current settings as user initial values?"		
		Initialize to user defaults	UserDefaultLoad	Message "Initialize setting values to user initial values?"		
		Initialize to factory default	FactoryDefaultLoad	Message "Initialize setting values to factory default?"		
5.Diagnosis	Input Diagnosis	Pulse input A Pulse input B	PulseInputA PulseInputB	—	—	Check for input signal existence. (Displays pulse counts)
		Analog input A Analog input B	AnalogInputA AnalogInputB	—	—	Check for input signal existence. (Displays level in percentage of rating.)
		External control inputs	ExternalCtrl	—	—	Check for ON/OFF state of terminals
	Output Test	Comparative output AL1 to AL4	CompareAL1 CompareAL2 CompareAL3 CompareAL4	—	—	Outputs ON level or OFF level
		Pulse output A Pulse output B	PulseOutputA PulseOutputB	—	—	Outputs ON level or OFF level
		Analog output	AnalogOutput	—	—	Outputs level of 10% steps of rating.
		BCD Output(Data) BCD Output(PC)	BCD Output(Data) BCD Output(PC)	—	—	Outputs ON level or OFF level for each bit
		Modbus Communication	ModbusCom	—	—	Displays receive data and transmit data
		RS-485 RS-232C	RS-232C Com	—	—	Displays receive data and transmit data

8. BASIC OPERATIONS FOR SETTING DISPLAYS

Basic operations for setting displays are shown as below.

The following is an example for changing the voltage of sensor power supply.



- By pushing the "MENU" key in the measurement mode, the display moves to the setting display and displays the **1st layer (major categories)**.
By moving the cursor with "arrow key (UP/DOWN)", the selection of major categories to set can be changed.
* On the 1st layer, by pushing the "MENU" key, the display returns to the measurement display.
- Pointing the cursor to a major category to set and pushing "arrow key (RIGHT)", the display moves to the **2nd layer (small categories)**.
By moving the cursor with "arrow key (UP/DOWN)", the selection of small categories of the setting can be changed.
If the "arrow key (LEFT)" is pushed, the display returns to the 1st layer.
* On the 2nd layer, by pushing the "MENU" key, the display returns to the measurement display.
- Pointing the cursor to a small category to set and pushing "arrow key (RIGHT)", the display moves to the **3rd layer (setting items)**.
If the "arrow key (LEFT)" is pushed, the display returns to the 2nd layer.
* On the 3rd layer, by pushing the "MENU" key, the display returns to the measurement display.
- By moving the cursor with "arrow key (UP/DOWN)", select a setting item.
If the "arrow key (LEFT)" is pushed, the display returns to the 2nd layer.
- At the selected setting item, by pushing "arrow key (RIGHT)", the display moves to the 4th layer (setting contents) and a current

selected content has a check mark. If the “arrow key (LEFT)” is pushed, the display returns to the 3rd layer.

- ⑥ By moving the cursor with “arrow key (UP/DOWN)”, select a content.
If the “arrow key (LEFT)” is pushed, the display returns to the 3rd layer.
- ⑦ By pushing the “ENTER” key, the selected content is confirmed and a check mark accompanies.
If the “arrow key (LEFT)” is pushed, the display returns to the 3rd layer.
- ⑧ By pushing the “MENU” key, the selected content is stored and returns the measurement display.
* If the power is shut down before being pushed the “MENU” key, the selected content is not stored.

9. SETTING EXAMPLES

The followings are some examples for some necessary setting point and operation methods to perform flow measurements.

9-1. EXSAMPLES FOR PULSE INPUTS

9-1-1. Setting Example 1

When maximum flow rate is approx. 40[l/min], using a sensor of rating 7.5[mℓ/Pulse] (open collector type), instantaneous flow rate will be displayed in [l/min] and total flow volume will be displayed in [kℓ].

- ① Input type setting
The sensor is an open collector output type, therefore select “opencollector” as input type.
- ② Setting for instantaneous flow rate display
Set flowrate per 1 pulse as instantaneous display coefficient
Although instantaneous flow rate will be displayed in [l/min], the rating of the sensor is 7.5[mℓ/Pulse], it should be converted to 7.5×10^{-3} [l/Pulse].
•Set the “Instantaneous display factor” as “ 7.50000×10^{-3} ”
•Displayed unit is [l/min], therefore select “minute” as the instantaneous unit time.
By “instantaneous decimal point position”, set the number of digits after the decimal point
- ③ Setting for totalize flow rate display
Set flowrate per 1 pulse as totalize display coefficient
•Although totalize flow rate will be displayed in [kℓ], the rating of the sensor is 7.5[mℓ/Pulse], it should be converted to 7.5×10^{-6} [kℓ/Pulse].
•Set the “Totalize display factor” as “ 7.50000×10^{-6} ”
•By “totalize decimal point position”, set the number of digits after the decimal point
- ④ Setup steps
Although setup steps are basically same as “8.BASIC OPERATION OF SETTING DISPLAY”, setting of instantaneous display factor is needed, an example is shown below.

9-1-2. Setting Example 2

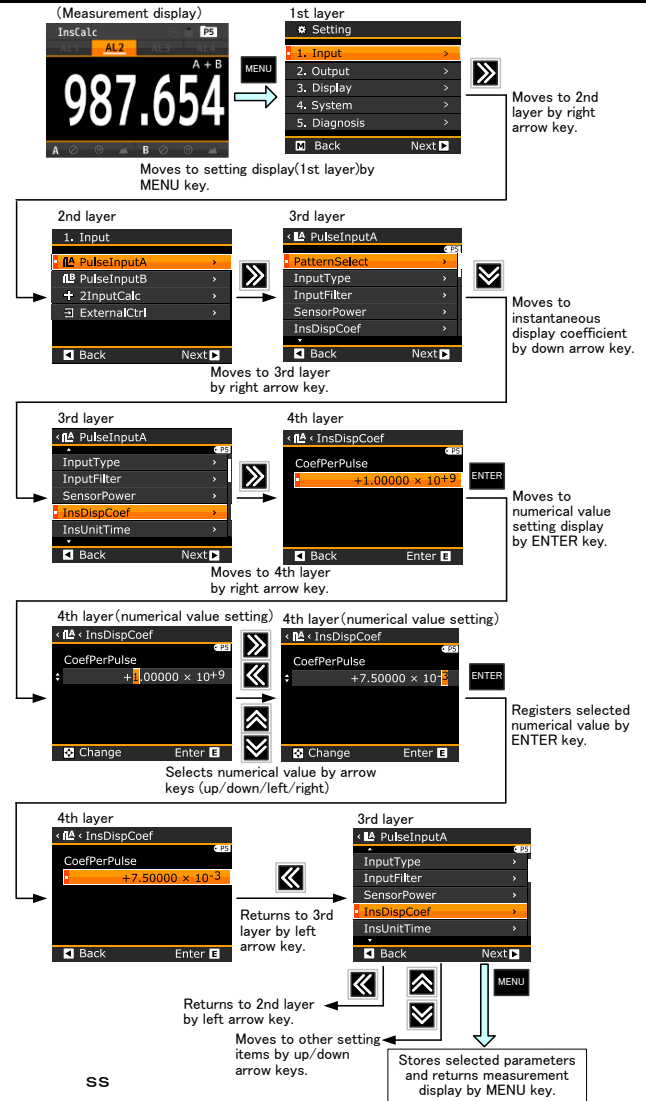
Using a sensor (Voltage output type) which outputs 15 [Hz] for 90[l/min], instantaneous flow rate will be displayed in [l/sec] and total flow volume will be displayed in [kℓ].

- ① Input type setting
The sensor is Voltage output type, therefore select “LOGIC” for “input type”.
- ② Setting for instantaneous flow rate display
Set flowrate per 1 pulse as “instantaneous display coefficient”.
•Calculate number of pulses per 1 [ℓ].
The sensor outputs pulses of 15[Hz] at 90[l/min], therefore, $(15 \times 60) / 90 = 10$ [Pulse/ℓ].
•Calculate flowrate per 1 pulse.
Number of pulses per 1 liter is 10[Pulse/ℓ], therefore, $1/10 = 1 \times 10^{-1}$ [ℓ/Pulse].
•Set “ 1.00000×10^{-1} ” for the “instantaneous value display coefficient”.
* Any settings of “ 1.00000×10^{-1} ”, “ 0.10000×10^0 ” and “ 0.01000×10^1 ” for the “instantaneous value display coefficient” bring same results.
•Unit to display is [l/sec], therefore, select “Sec” for the “instantaneous unit time”.
•By “instantaneous decimal point position”, set the number of digits after the decimal point.
- ③ Setting for the totalized value display
As setting of the totalized value display coefficient, set flow volume per 1 pulse.
•The totalized value is displayed in [kℓ], therefore convert 1×10^{-1} [ℓ/Pulse] to 1×10^{-4} [kℓ/Pulse].
•Set “ 1.00000×10^{-4} ” for the totalized value display coefficient
•By “totalize decimal point position”, set the number of digits after the decimal point

9-1-3. Setting Example 3

Detecting pulses from a gear wheel which generates 5 pulses per 1 round by proximity switch (open collector output) and displays the revolving speed in [rpm].

- ① Input type setting
The sensor is an open collector type, therefore “open collector” should be selected as the input type.



- ② Setting for Instantaneous flow rate display
For setting of Instantaneous display coefficient, Number of rotation per 1 pulse is needed.
•Calculate the number of rotation per 1 pulse.
Because of 5 [Pulse] per 1 round, therefore, $1/5 = 2 \times 10^{-1}$ [round]
•Set “ 2.00000×10^{-1} ” as the Instantaneous display coefficient
•Unit to display is [rpm], therefore, select “Min” for the instantaneous unit time.
•By “instantaneous decimal point position”, set the number of digits after the decimal point.
- ③ Setting for totalized flow rate display
The totalize function is not used, therefore, the setting is not needed.

9-1-4. Setting Example 4

Using a gearbox of 805[rpm] with an open collector output, displaying the circumferential speed of the roll diameter 350[mm] in [m/min] (conditions)
•rotation speed 805[rpm] (output pulse 60[P/R] built-in)
•reduction ratio 1/90
•roll diameter 350[mm]

- ① Input type setting
The sensor is an open selector type, therefore “open collector” should be selected as the input type.
- ② Setting for instantaneous flow rate display
For setting of Instantaneous display coefficient, travel distance of rotation per 1 pulse is needed.
•calculation of circumferential speed
 $805[\text{rpm}] \times 1/90 \times (0.35[\text{m}] \times 3.14) = 9.82994[\text{m/min}]$
•Cumulate travel distance per 1 pulse
 $1/60[\text{P/R}] \times 1/90 \times (0.35[\text{m}] \times 3.14) = 2.03518 \times 10^{-4}[\text{m/Pulse}]$
•Set “ 2.03518×10^{-4} ” as the Instantaneous display

coefficient

- Display is in [min], therefore, “Min” is selected for the instantaneous unit time.
- By “instantaneous decimal point position”, set the number of digits after the decimal point.

- ③ Setting for totalized flow rate display
The totalize function is not used, therefore, the setting is not needed.

9—2. EXAMPLES FOR ANALOG INPUT SETTING

9—2—1. Setting Example 1

For flowrate of 0-90[l/min], using a sensor outputs 4-20 [mA], display instantaneous flow rate in [l/min] and totalized value in [kl].

- ① Input type setting
The sensor outputs 4 to 20 [mA], therefore select “4 to 20mA” for input type.
- ② Setting for instantaneous flow rate display
As setting of instantaneous display coefficient, set flow rate at 20 [mA] output.
• The sensor outputs 20 [mA] at 90 [l/min], therefore set 9.00000×10^1 as instantaneous display coefficient.
• By “instantaneous decimal point position”, set the number of digits after the decimal point.
- ③ Setting for totalized value display
As setting of totalized value display coefficient, set flow volume for 1 hour of 20 [mA] input.
• The sensor outputs 20 [mA] at 90 [l/min], therefore the flow volume after 1 hour work is $90 \times 60 = 5400$ [l].
The unit to display is [kl], therefore the setting value is $5.4 [kl]$.
• Set “ 5.40000×10^0 ” for the totalized value display coefficient.
• By “totalize decimal point position”, set the number of digits after the decimal point.

10. SETTING OF UNITS

Units are selectable and can be displayed optionally.

If units should be used is not available, custom units up to 6 characters are can be made.

*For custom units, please refer to the detailed manual which can be downloaded from our home page.

10—1. LOCATIONS OF PARAMETERS FOR UNIT SETTING

1st Layer	2nd Layer	3rd Layer
1. Input setting	pulse input A (pulse input B)	Instantaneous display unit
	analog input A (analog input B)	Instantaneous display unit
	2 input calculation	Instantaneous display unit
		Totalized display unit

10—2. AVAILABLE UNITS

The WPMZ has selectable 62 units.

Units
μA, mA, A, kA, μV, mV, V, kV, VA, W, kW, MW, μm, mm, cm, m, Ω, kΩ, MΩ, g, kg, N, kN, MN, Pa, kPa, MPa, hPa, J, kJ, MJ, Hz, kHz, MHz, m³, mm/s, mm/min, cm/min, m/s, m/min, m/h, m/s², m³/s, m³/min, m³/h, kg/h, kg/m², kg/m³, N/m², ℓ, ℓ/s, ℓ/min, ℓ/h, %, ‰, %RH, °C, pH, ppm, rpm, t, inch

10—3. SETTING OPERATION

Setting procedure is same as “8. BASIC OPERATIONS FOR SETTING DISPLAYS”. Operate in the track of SETTING DISPLAYS.

11. COMPARATIVE OUTPUT FUNCTION

Settings of comparative output functions needs 10 parameters to set for each output.

The following describe only main setting parameters and refer to detailed manual which can be downloaded from our homepage for other parameters.

11—1. LOCATIONS OF PARAMETERS FOR COMPARATIVE OUTPUT FUNCTION SETTING

1st Layer	2nd Layer	3rd Layer
4. Output settings	Comparative output AL1 (Comparative output AL2) (Comparative output AL3) (Comparative output AL4)	pattern select
		output source display value
		comparison mode
		compare ON condition
		compare judgement value
		compare ON delay
		compare OFF delay
		output mode
		output logic
		compare ON background color

*Refer to “7. SETTING LAYER OVERVIEW”

11—2. SETTING OF OUTPUT SOURCE DISPLAY VALUE

Comparative outputs AL1-AL4 are settable independently and they have no magnitude relationship.

For example, instantaneous measured value of Ach is assigned to AL1, instantaneous measured value of Bch is assigned to AL2 and instantaneous calilurate value is assigned to AL3, AL4 and so on. Every display item can be freely assigned to comparative outputs.

Setting procedure is same as “8. BASIC OPERATIONS FOR SETTING DISPLAYS”. Operate in the track of the procedure of SETTING DISPLAYS.

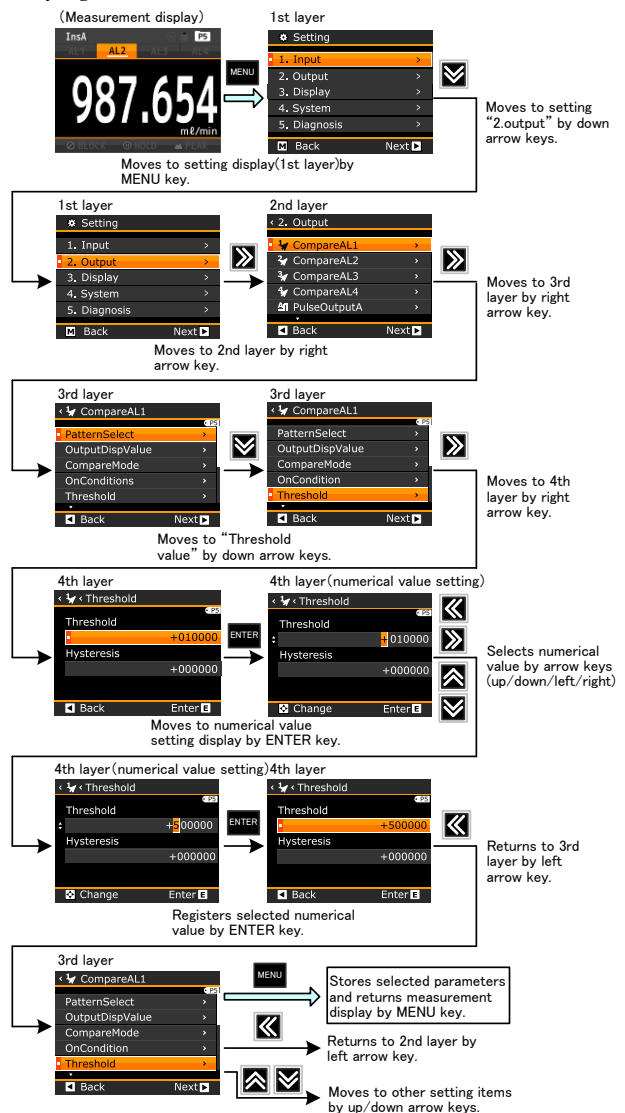
Caution: COM (emitter) terminal is common for AL1-AL4 in open-collector output products. Each AL1&2, AL3&4 have common terminal in relay output products.

11—3. COMPARISON JUDGEMENT VALUE

The comparison judgement value is a threshold value to judge.

Although, the setting procedure is same as “8. BASIC OPERATIONS FOR SETTING DISPLAYS”, comparison judgement values need the setting of numerical value. Therefore, its procedure is shown below.

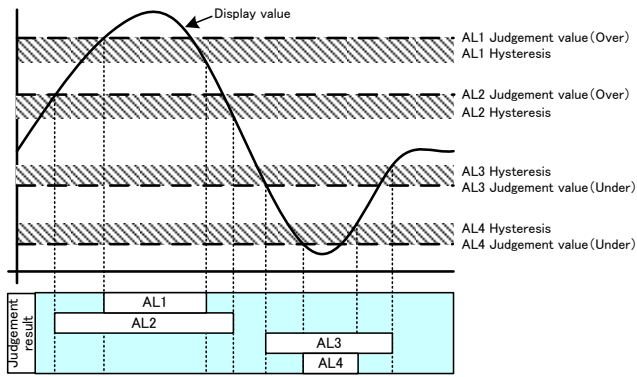
*The following is an explanation for the compare mode of “Level judgement”.



● Level judgement action

Comparative Output	Comparison type	Comparison formula	judgement result
AL1	alarm when over	display value > AL1 judgement value	AL1 ON
AL2	alarm when over	display value > AL2 judgement value	AL2 ON
AL3	alarm when under	display value < AL3 judgement value	AL3 ON
AL4	alarm when under	display value < AL4 judgement value	AL4 ON

*Refer to “16. SPECIFICATIONS –output specifications [comparative output]”



12. EXTERNAL CONTROL FUNCTION

As external control functions, the WPMZ has comparative output reset function, total reset function, measurement inhibit function, display hold function, maximum value hold function, minimum value hold function, digital zero function and pattern select function, each function can be executed by assigning to external control terminal 1 to 5.

*External control functions are also assigned (entered) to 4 arrow keys as shortcut functions.

12-1. TERMINAL CONTROL

The control of assigned functions is performed by shorting each terminal to the com terminal or bringing to the "0" level

"0" level: 0 to 1.5V, "1" level: 3.5 to 5V, Input current: -1.2mA

* The control terminals 1 to 5 are isolated from Power and input as DC signals.

12-2. COMPARATIVE OUTPUT RESET FUNCTION

Comparative output reset function makes all of comparative judgement results and their outputs OFF.

12-3. TOTAL RESET FUNCTION

The total reset function makes the totalized value clear and reset to the initial totalized value.

Total reset A: resets totalized value of Ach

Total reset B: resets totalized value of Bch

Total reset A&B: resets totalized values of both of Ach and Bch

12-4. MEASUREMENT INHIBIT FUNCTION

The measurement inhibit function ignores the input and the display value accompanies this.

Measurement inhibit A: inhibits the input of Ach

Measurement inhibit B: inhibits the input of Bch

Measurement inhibit A&B: inhibits the both inputs channel

12-5. DISPLAY HOLD FUNCTION

Display hold function holds display value. While this function is valid, measurement action is performed internally and the latest measurement value is displayed when the function become invalid.

Display hold A: holds the display of Ach

Display hold B: holds the display of Bch

Display hold A&B: holds the display of Ach and Bch

12-6. MAXIMUM VALUE HOLD FUNCTION

Maximum value hold function is the function which holds the maximum display value.

Maximum hold A: holds the maximum display value of Ach

Maximum hold B: holds the maximum display value of Bch

Maximum hold A&B: holds the maximum display value of Ach and Bch

Note: This function is valid for the instantaneous value only and invalid for the totalized value.

12-7. MINIMUM VALUE HOLD FUNCTION

Minimum value hold function is the function which holds the minimum display value.

*When both of the maximum value hold and the minimum value hold are ON simultaneously, only the maximum value hold becomes valid.

Minimum hold A: holds the minimum display value of Ach

Minimum hold B: holds the minimum display value of Bch

Minimum hold A&B: holds the minimum display value of Ach and Bch

Note: This function is valid for the instantaneous value only and invalid for the totalized value.

12-8. DIGITAL ZERO FUNCTION

The digital zero function is a function to set the input value at the start of instruction to zero. During instruction, the range of fluctuation from the start of instruction is treated as input value.

Digital zero A: Excute digital zero for Ach input

Digital zero B: Excute digital zero for Bch input

Digital zero A&B: Excute digital zero for both input channel
Note: This function is installed only for analog input products.

12-9. PATTERN SELECT FUNCTION

The pattern select function is the function which switches the pattern number to use for measurement. By using pattern select 1-3, Up to 8 patterns can be switched.

Function Name	Selected pattern No. (pattern No. in use)							
Pattern select1	1	2	3	4	5	6	7	8
Pattern select1	Open	Short	Open	Short	Open	Short	Open	Short
Pattern select2	Open	Open	Short	Short	Open	Open	Short	Short
Pattern select3	Open	Open	Open	Open	Short	Short	Short	Short

Open: pattern select terminal is open or connected to "1" level.

Short: pattern select terminal is shorted to COM terminal or connected to "0" level.

12-10. MONITOR CHANGE FUNCTION

The monitor change function is the function which switches display and performs same action of DISP key.

12-11. TREND HOLD FUNCTION

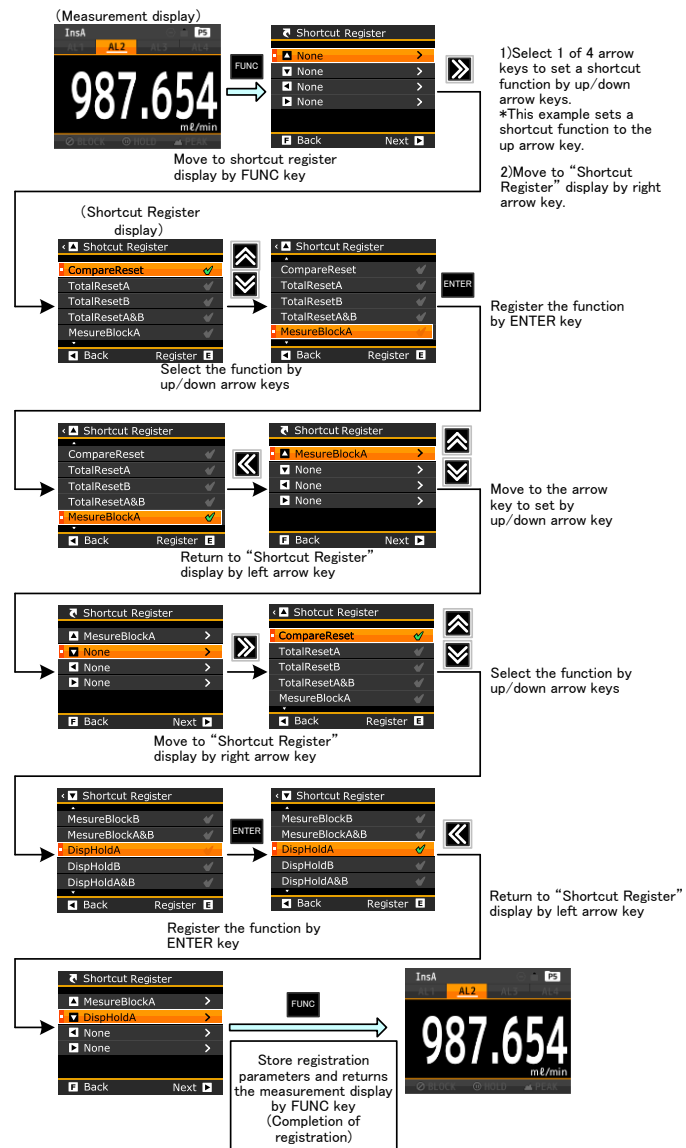
The trend hold function is a function which holds the trend display.

13. SHORTCUT FUNCTION

External control functions are registered to arrow keys and are performed not by the terminal control but by the operation of the keys

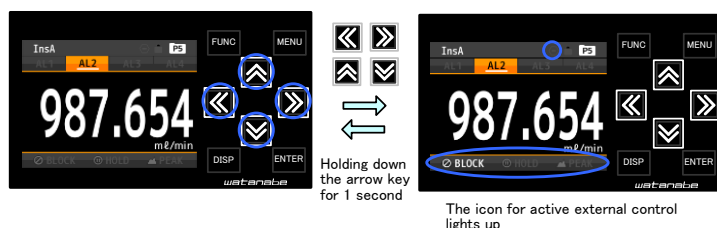
13-1. REGISTERING SHORTCUTS

External control functions which would be performed by shortcuts are assigned to arrow keys by the following steps.



13-2. PERFORMING SHORTCUTS

A shortcut function is performed by holding down the arrow key which an external control function is registered for 1 second. An active function becomes inactive by holding down the arrow key which the function is registered for 1 second.



*If an external control function assigned to a key is valid by the terminal control, the short cut function is not acceptable.

14. INITIALIZE

Setting values can be initialized to factory default settings or user saved settings.

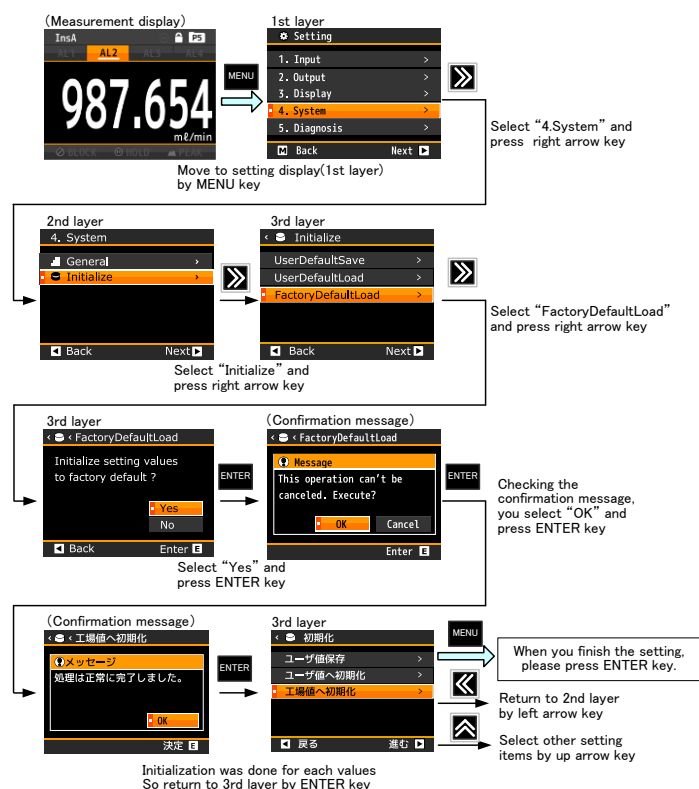
14-1. LOCATIONS OF PARAMETERS FOR INITIALIZE

1st Layer	2nd Layer	3rd Layer
4.System	Initialize	UserDefaultSave
		UserDefaultLoad
		FactoryDefaultLoad

*Refer to “7. SETTING LAYER OVERVIEW”.

14-2. INITIALIZE TO THE FACTORY DEFAULTS

By performing the following steps, setting values can be initialized to the factory defaults.



14-3. INITIALIZE TO USER DEFAULTS

Beside of initializing to factory defaults, current setting values can be saved as user default data and setting values will be initialized to the data.

14-3-1. Saving User Defaults

For initializing to user default values, entering setting values used as default values are required.

- ① Setting each values
Set all setting values which are needed as user default values.
- ② Saving user initial values
By executing to save user default values, current setting

values are saved as user default values.

Steps for the save operation are same as “14-2. **Initializing to the factory defaults**”. Operate the WPMZ according to the setting displays.

*Please refer to “14-1. Locations of parameters for initialize”.

14-3-2. Initializing To User Defaults

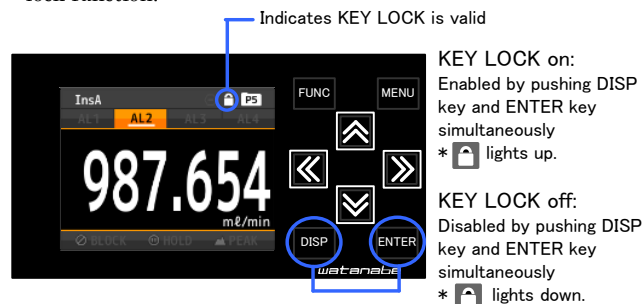
By executing to initialize to user defaults, current setting values are replaced by user defaults.

Steps for the initialize operation are same as **“14-2. Initializing to the factory defaults”**. Operate the WPMZ according to the setting displays.

*Please refer to “14-1. Locations of parameters for initialize”.

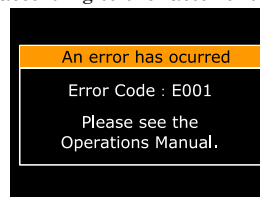
15. KEY LOCK FUNCTION

To prevent unconsidered key operations, the WPMZ has the key lock function.



16. ERROR CODES

When some malfunctions occur, error codes are displayed according to the factor of the error.



ERROR CODE	ERROR MESSAGE	RECOVERY PROCEDURE
E000	Program sum error	During the error mode, hold down the ENTER key for 1 seconds (long-press) to reset or power down and on. *If the WPMZ does not recover by this procedure, please contact your dealer or our company.
E006	RAM error	
E100 to 102	Errors associated with serial flash memory	
E103 to 105 E210 to 211	Errors associated with FRAM	
E202 to 203	Errors associated with calibration values	
E110 to 111	Error associated with sensor power short	
E204 to 205	Errors associated with setting values	
E206 to 209	Errors associated with initial values	
Other than above codes	Other errors	

- If start-up delay is enabled, the WPMZ displays “-----” according to the delay time.
- If display value becomes out of displayable range, “OVER” is displayed in the display.

17. SPECIFICATION

MODEL CODES

WPMZ-6-□□□-□□-□□□									
Series name	Power	Input Ach	Input Bch	Output	Comparative output	Test report	Additional code	Description	
WPMZ-6								Flow rate meter/Flow totalizer	
	1							Voltage power : AC100 to 240V	
	3							Voltage power : DC12V	
	4							Voltage power : DC24 to 48V	
	P							Pulse input (*1)	
	A							Analog input	
		X						No Bch input	
		P						Pulse input (*1)	
		A						Analog input	
			X					Display only (No output)	
			1					Analog output	
			2					BCD output (Open collector NPN)	
			3					BCD output (Open collector PNP)	
			4					RS-232C	
			5					RS-485 (Modbus RTU)	
				E				Open collector output (NPN)	
				F				Open collector output (PNP)	
				R				Relay output (Normally open)	
					X			Test report: No test report	
					T			Test report: With test report	
					00			Standard (Initial language: Japanese)	
					E0			Initial language setting : English	

(*1) Combination of 2 pulse inputs

The combination of 2 pulse inputs (the A channel single phase input and the B channel single phase input) can be used for a 2-phase (90° phase) pulse input.

BASIC SPECIFICATIONS

Number of measurement channel	:	1 or 2 (according to model codes)
Display	:	2.4 inch TFT liquid crystal display Used in 1ch input : Ach measurement result Used in 2ch inputs : Ach measurement result, Bch measurement result, calculation result, Ach and Bch measurement results, Ach or Bch measurement result and calculation result
Over warning	:	By exceeding the range of display, displays OVER or -OVER
External controls	:	5 functions of the followings can be assigned to control terminals (user-configurable). ① Comparative output reset function ② Measurement inhibit function : Measurement inhibit A/B/A&B ③ Current value hold function: Current value hold A/B/A&B ④ Maximum value hold function: Maximum value hold A/B/A&B ⑤ Minimum value hold function: Minimum value hold A/B/A&B ⑥ Totalized value reset function : Totalized value reset A/B/A&B ⑦ Digital zero function: Digital zero A/B/A&B ⑧ Display select function ⑨ Pattern select function: Pattern select 1/2/3 ⑩ Trend Hold function
Ambient temperature range	:	-5 to 50°C 35 to 85%RH (Non condensing)
Storage temperature range	:	-10 to 70°C up to 60%RH
Supply power	:	AC power (WPMZ-6-1□□-□□-□□□) AC100 to 240V±10% 50/60Hz DC power (WPMZ-6-3□□-□□-□□□) DC12V±10% DC power (WPMZ-6-4□□-□□-□□□) DC24 to 48V±10%
Power consumption	:	AC power (WPMZ-6-1□□-□□-□□□) At AC100V: 10VA max At AC240V: 14VA max DC power (WPMZ-6-3□□-□□-□□□) At DC12V: 6W max, DC power (WPMZ-6-4□□-□□-□□□) At DC24V: 6W max, At DC48V: 6.5W max
Sensor power	:	DC12V±10% 100mA max. DC24V±10% 50mA max. *For 2ch inputs, allowable current of both Ach and Bch is same as above. *Combine at DC12V, 24V: 1.2W max.
External dimensions	:	96mm (W)×52mm (H)×145mm (D)
Weight	:	Approx. 350g
Withstand voltage	:	AC power (WPMZ-6-1□□-□□-□□□) Between Power terminals and inputs/external controls/comparative outputs/other outputs AC3000V for 1 minute DC power (WPMZ-6-3or4□□-□□-□□□)

Insulation resistance	:	Between terminals mentioned above, at DC500V 100MΩ or higher
Vibration tolerance	:	10 to 55Hz half amplitude 0.15mm in X,Y,Z directions for 30 minutes
Protective structure	:	IP66 (front)
Installation environment	:	indoor use
Rated altitude	:	up to 2000m
Transient overvoltage	:	II
Measurement category	:	II
Pollution degree	:	2
Conformed EN standard	:	EN61326-1 (EMS : industrial electromagnetic environment/EMI: Class A) (Applicable to line length only under 30m) EN61010-1 EN50581
Material of enclosure	:	polycarbonate (PC) black UL94V-0

INPUT SPECIFICATIONS

【Pulse input instantaneous and totalized measurement】

● Input specifications (common to Ach, Bch)

Frequency range	:	0.01Hz to 500kHz (*2ch input: 250kHz)
Input signal	:	Single ended Open collector (NPN/PNP type), Voltage pulse, Totem pole, AC pulse, Proximity sensor
Input method	:	Single phase pulse *In the 2ch input option, 2 phase pulse (90° phase) can be accept.
Input level	:	Open collector Pullup to 12V or 24V Logic L level: ≤1.0V H level: 3.9 to 30V (max. allowable voltage ±50V) Zero Cross AC60mV to 40V (max. allowable voltage 70V) *AC signal which gets across 0V.
Input resistance	:	Open collector Pulled up to 12 V through approx. 10kΩ (in the case of sensor power 12V) Pulled up to 24 V through approx. 25kΩ (in the case of sensor power 24V) Pulled down to GND through approx. 10kΩ. Logic/Zero Cross Pulled down to GND through approx. 10kΩ 2 wire Pulled down to GND through approx. 900Ω ≥ 0.9μs (both of L level and H level) (2 channel inputs: ≥ 1.8 μs)
Input pulse width	:	≥ 0.9μs (both of L level and H level) (2 channel inputs: ≥ 1.8 μs)
Measurement method	:	Cyclic calculation method
Sampling rate	:	10ms (calculation period)
Display updating period	:	100ms
(Instantaneous display)	:	Display range : 0 to 999999 Zero display : Reading zero suppress Decimal point : Settable freely Display unit : Can be selected one of second, minute, hour time
Accuracy	:	±(20ppm rdg +1digit) @23±5°C
(Totalized display)	:	Display range : -999999 to 999999 Zero display : Reading zero suppress Decimal point : Settable freely Totalized value : Totalized value can be reset to total initial value by reset Totalizer-synchronous pulse : NPN open collector pulse output DC30V 20mA max. Accuracy : ±0 (at scaling "1")

【Analog input instantaneous and totalized measurement】

● Input specifications (Common to Ach and Bch)

Measurement range	Input resistance	Maximum allowable input	Accuracy	
0 to 5V	Approx. 1MΩ	±100V	±(0.05% of FS +1 digit)	
1 to 5V				
0 to 10V				
4 to 20mA	Approx. 10Ω	±50mA		
0 to 20mA				

*Accuracy is applicable at 23±5°C 35 to 85%RH.

Conversion method	: $\Delta\Sigma$ conversion method
Input signal	: Single ended
Sampling rate	: Max. 100times/sec.
Display updating period	: 100ms
Zero display	: Reading zero suppress
Decimal point	: Settable freely
(Instantaneous display)	
Display range	: 0 to 99999
(Totalized display)	
Display range	: -999999 to 999999
Totalized value	: Totalized value can be reset to total initial value by reset
Totalizer-synchronous pulse	: NPN open collector pulse output DC30V 20mA max. (Max. 100Hz)

OUTPUT SPECIFICATIONS**【Comparative outputs】**

Open collector output	: Output rating NPN : sink current 50mA MAX. PNP : source current 50mA MAX. Applied voltage 30V MAX. Output saturation voltage $\leq 1.2V$ at 50mA Number of outputs 4 transistor outputs Contact rating : AC250V 2A, DC30V 2A Mechanical life : 20 million times Electrical life : 100 thousand times or more 4 A contacts, AL1 and AL2, AL3 and AL4 share common
Relay output	: Microcomputer calculating method
Control method	: Pulse input : -999999 to 999999 Analog input : Instantaneous measurement -99999 to 99999 Totalized measurement -999999 to 999999
Judgement value settable range	: Settable within the range of 1-999999 digits for each judgement value independently.
Hysteresis	: According to sampling rate (calculate period).
Comparison action	: Condition of comparison can be set to AL1 to AL4 independently.
Setting condition	: •Level judgement mode The alarm is ON when display value exceeds judgement value (over alarm) The alarm is ON when display value underruns judgement value (under alarm) Over alarm (upper limit judgement)

Condition of comparison	Judgement result
display value > AL1 judgement value	AL1
display value > AL2 judgement value	AL2
display value > AL3 judgement value	AL3
display value > AL4 judgement value	AL4

Under alarm (Under limit judgement)

Condition of comparison	Judgement result
AL1 judgement value > display value	AL1
AL2 judgement value > display value	AL2
AL3 judgement value > display value	AL3
AL4 judgement value > display value	AL4

•Zone judgement mode

The alarm is ON when display value between upper and lower judgement values (inside of zone alarm)
The alarm is ON when display value out of upper and lower judgement values (outside of zone alarm)

Inside of zone alarm

Condition of comparison	Judgement result
AL1 zone upper limit $\geq$ display value $\geq$ AL1 zone lower limit	AL1
AL2 zone upper limit $\geq$ display value $\geq$ AL2 zone lower limit	AL2
AL3 zone upper limit $\geq$ display value $\geq$ AL3 zone lower limit	AL3
AL4 zone upper limit $\geq$ display value $\geq$ AL4 zone lower limit	AL4

Outside of zone alarm

Condition of comparison	Judgement result
display value > AL1 zone upper limit or AL1 zone lower limit > display value	AL1
display value > AL2 zone upper limit or AL2 zone lower limit > display value	AL2
display value > AL3 zone upper limit or AL3 zone lower limit > display value	AL3
display value > AL4 zone upper limit or AL4 zone lower limit > display value	AL4

【Analog output】

Conversion method	: D/A conversion method
Resolution capability	: Equivalent of 13bit
Scaling	: Digital scaling
Output objective	: An item can be selected from source displayable values
Response speed	: Up to 25ms (0→90% response)
Specifications for each output	: Refer to the following chart.

Output type	Load resistance	Accuracy	Ripple
0 to 10V	$\geq 2k\Omega$	$\pm(0.1\% \text{ of FS})$	$\pm 50mVp-p$
$\pm 10V$			
1 to 5V			
0 to 20mA	$\leq 550\Omega$		$\pm 25mVp-p$
4 to 20mA			

*Ripple for 4 to 20mA is at load resistance 250 Ω , 20mA output.

【BCD output】

Output type	: Open collector output NPN/PNP type
Measurement data	: Negative logic transistor is ON at logical "1"
Polarity signal	: Negative logic transistor is ON at minus display
Over signal	: Negative logic transistor is ON at over display
Synchronized signal (PC)	: Transistor is ON for a fixed period every time data becomes valid.
Transistor output capability	: Voltage 30V max. Current 10mA max. Output saturation voltage up to 1.2V at 10mA
Enable	: By shorting the enable terminal to -D.COM or bringing to same voltage level, the BCD output transistors become OFF.

【RS-232C】

Communication protocol	: Modbus-RTU/OriginalCommand/OriginalOutput
Synchronization method	: Asynchronous
Communication method	: Full duplex
Baud rate	: 9600bps, 19200bps, 38400bps
Data length	: 7bit, 8bit
Start bit	: 1bit
Parity bit	: None, Odd, Even
Stop bit	: 1bit, 2bit
Delimiter	: CR LF, CR
Character code	: ASCII
Transmission control procedure	: No control sequence
Used signal names	: TXD, RXD, SG
Number of connectable units	: 1
Cable length	: Max. 15m

【RS-485】

Communication protocol	: Modbus RTU
Synchronization method	: Asynchronous
Communication method	: 2-wire half-duplex
Baud rate	: 9600bps, 19200bps, 38400bps
Data length	: 8bit
Start bit	: 1bit
Parity bit	: None, Odd, Even
Stop bit	: 1bit
Used signal names	: Non-inverting (+), Inverting (-)
Number of connectable units	: 31
Cable length	: Max. 1.2km (total) ※Conforming CE mark, less than 30m

The contents of this instruction manual are subject to change without prior notice.

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