Autonics

PULSE METER

MP5W SERIES

M A N U A L

Thank you very much for selecting Autonics products.
For your safety, please read the following before using.

▣ Caution for your safety

※Please keep these instructions and review them before using this unit.

※Please observe the cautions that follow;

⚠ Warning Serious injury may result if instructions are not followed.

⚠ Caution Product may be damaged, or injury may result if instructions are not followed.

※The following is an explanation of the symbols used in the operation manual.
⚠caution:Injury or danger may occur under special conditions.

⚠Warning

1. In case of using this unit with machinery(Ex: nuclear power control, medical equpment, ship, vehicle, train, airplane, combustion apparatus, safety device, crime/disaster prevention equipment, etc) which may cause damages to human life or property, it is required to install fail-safe device.
It may cause a fire, human injury or damage to property.

2. It must be mounted on panel.
It may give an electric shock.

3. Do not repair or check up when power on.
It may give an electric shock.

4. Do not disassemble and modify this unit, when it requires.
If needs, please contact us.
It may give an electric shock and cause a fire.

5. Please check the number of terminal when connect power line or measuring input.
It may cause a fire.

⚠Caution

1. This unit shall not be used outdoors.
It might shorten the life cycle of the product or give an electric shock.

2. When wire connection for power input and measuring input, the tightening strength for screw bolt on terminal block should be over than 0.74N.m~0.90N. m.
It may result in malfunction or fire due to contact failure.

3. Please observe specification rating.
It might shorten the life cycle of the product and cause a fire.

4. Do not use the load beyond rated switching capacity of Relay contact.
It may cause insulation failure, contact melt, contact failure, relay broken, fire etc.

5. In cleaning the unit, do not use water or an oil-based detergent.
It might cause an electric shock or fire that will result in damage to this product.

6. Do not use this unit at place where there are flammable or explosive gas, humidity, direct ray the sun, radiant heat, vibration, impact etc.
It may cause a fire or explosion.

7. Do not inflow dust or wire dregs into inside of this unit.
It may cause a fire or mechanical trouble.

8. Please connect properly after checking the polarity of measuring terminals.
It may cause a fire or explosion.

※The above specification are changeable without notice anytime.

▣ Ordering information

MP 5 W - 4 N

		Main output (Comparative value output)	Sub output (Display value output)
Output	N	Indicator	-
	A	Relay five-stage(HH, H, GO, L, LL)	-
	1	Relay three-stage(H, GO, L)	-
	2	NPN open collector quintuple output	BCD Dynamic
	3	PNP open collector quintuple output	BCD Dynamic
	4	NPN open collector quintuple output	PV transmission output (DC4-50mA)
	5	PNP open collector quintuple output	PV transmission output (DC4-50mA)
	6	NPN open collector quintuple output	Low speed serial output
	7	PNP open collector quintuple output	Low speed serial output
	8	NPN open collector quintuple output	RS485 communication
	9	PNP open collector quintuple output	RS485 communication
Power supply	2	24VDC	
	4	100~240VAC 50/60Hz	
Size	W	DIN W96 X H48mm	
Digit	5	99999(5 Digit)	
Item	MP	Pulse meter	

※PNP open collector output: Option

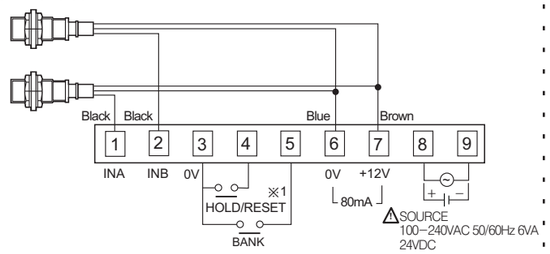
▣ Specifications

Series	MP5W-2□	MP5W-4□
Display method	7 Segment LED(Zero Blanking)	
Character size	W7 X H14mm	
Max. indication	5digit(-19999 to 99999)	
Power supply	24VDC	100-240VAC 50/60Hz
Allowable operation voltage	90 to 110% of rated voltage	
Power consumption	Max. 7W	Max. 6VA
Power for external sensor	12VDC ±10%, 80mA	
Input frequency	● Solid state input : Max. 50kHz(Pulse width:Min. 10μs) ● Contact input : Max. 45Hz(Pulse width:Min. 11ms)	
Input level	[Voltage input] High: 4.5-24VDC, Low: 0-1VDC, [No-voltage input] Residual voltage: Max. 1V	
Measuring range	● Mode F1, F2, F7, F8, F9, F10 : 0.0005Hz to 50kHz ● Mode F3: 0.02s to 3,200s ● Mode F4, F5, F6: 0.01s to 3,200s ● Mode F11, F12, F13: 0 to 4 X10^9 Count	
Measuring accuracy (23 ± 5℃)	● Mode F1, F2, F7, F8, F9, F10: F.S. ± 0.05% rdg ± 1Digit ● Mode F3, F4, F5, F6: F.S. ± 0.01% rdg ± 1Digit	
Display accuracy	0.05 / 0.5 / 1 / 2 / 4 / 8sec.(The same as update output cycle)	
Operation mode	Number of revolution/Speed/Frequency(F1), Passing speed(F2), Cycle(F3), Passing time(F4), Time width(F5), Time difference(F6), Absolute rate(F7), Error ratio(F8), Density(F9), Error(F10), Length measurement(F11), Interval(F12), Integration(F13)	
Prescale function	Direct input method(0.0001X10^{-9} to 9.9999X10^9)	
Hysteresis	0 to 9999※1	
Other functions	● Lock setting function ● Monitoring delay function ● Auto-Zero time setting function ● Time unit selection function ● Current output range selection(Current output type only) ● Comparative output function(HH, H, GO, L, LL) ● Deviation memory function(F output mode applied only) ● Peak value monitoring value ● Remote/Local switching function(Communication output type only) ● Data Bank switching function ● Memory protection function(Mode F13 applied only)	
Main output: Triple/Quintuple relay	250VAC 3A resistive load 3a	
Main output: NPN open collector quintuple output / PNP open collector quintuple output	12-24VDC 30mA Max.	
Sub output: BCD Dynamic	NPN open collector 12-24VDC 20mA Max.	
Sub output: Low speed serial output	NPN open collector 12-24VDC 20mA Max.	
Sub output: PV transmission	DC4-20mA Load 600Ω Max.(Response time: Max. 800ms)	
Sub output: RS485 com.	32 channels, Mutral direction communication function	
Memory	Non-volatile memory(Input times: 100,000 times)	
Insulation resistance	Min. 100MΩ (at 500VDC megger) between terminal and case	
Dielectric strength	2000VAC 60Hz 1minute(Between terminals of AC power and case, Between terminals of AC power and measuring terminals)	
Impulse noise strength	± 2000V the square wave noise(pulse width:1μs) by the noise simulator	
Vibration: Mechanical	0.75mm amplitude at frequency of 10 to 55Hz in each of X, Y, Z directions for 2 hour	
Vibration: Malfunction	0.5mm amplitude at frequency of 10 to 55Hz in each of X, Y, Z directions for 10 minutes	
Shock: Mechanical	300m/s² (Approx. 30G) 3 times at X, Y, Z direction	
Shock: Malfunction	100m/s² (Approx. 10G) 3 times at X, Y, Z direction	
Relay life cycle: Mechanical	Min. 10,000,000 operations	
Relay life cycle: Electrical	Min. 100,000 times at 250VAC 3A(resistive load)	
Environment: Ambient temperature	-10 to 50℃, Storage temperature: -20 to 60℃	
Environment: Ambient humidity	35 to 85%RH, Storage humidity: 35 to 85%RH	
Approval	CE c UL us	
Unit weight	Approx. 230g	

※Condition for use in environment is no freezing or condensation.
※1: The hysteresis setting range is changed by the setting position of decimal point.

▣ Connections

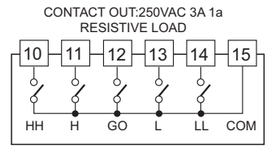
<Main terminal block>



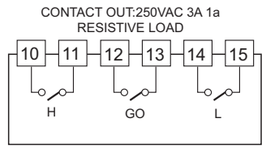
※1 is used RESET terminal only when it is operation mode(F13)
(See the "▣ Operation mode")

<Sub(Option) terminal block>

● **RELAY(Five-stage) output [MP5W-4A]**

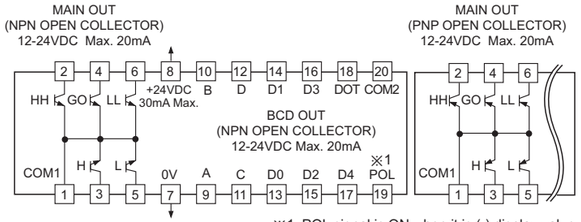


● **RELAY(Three-stage) output [MP5W-41]**



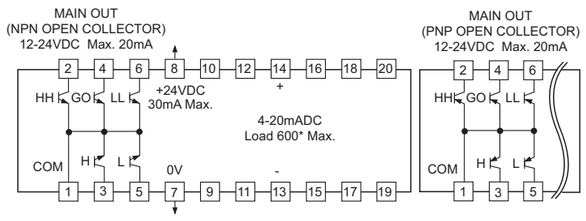
<Sub(Option) output connector>

● **NPN/PNP open collector output + BCD output [MP5W-42/MP5W-43]**



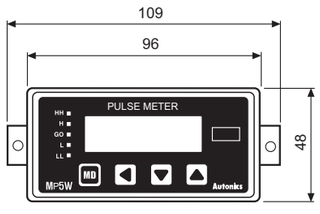
※1: POL signal is ON when it is (-) display value

● **NPN/PNP open collector output + PV transmission(4-20mADC) output[MP5W-44/MP5W-45]**

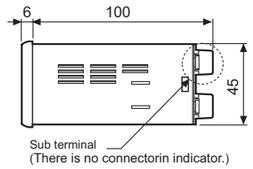


▣ Dimensions

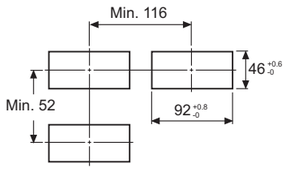
(Unit:mm)



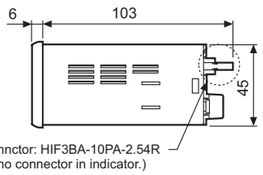
[Terminal type]



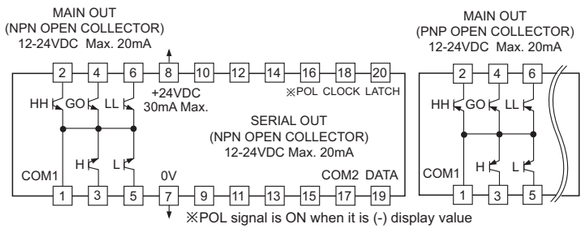
● Panel cut-out



[Connector type]

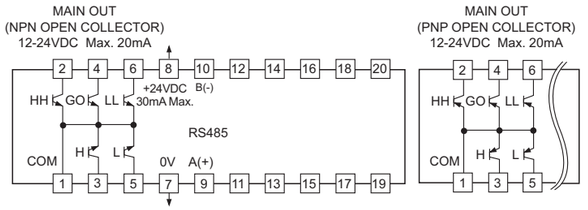


● **NPN/PNP open collector output + Low speed serial output[MP5W-46/MP5W-47]**



※POL signal is ON when it is (-) display value

● **NPN /PNP open collector output + RS485 communication output [MP5W-48/MP5W-49]**

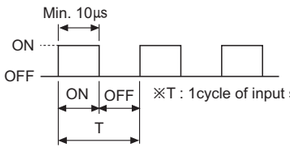


▣ Input/Output

● **Input specification**

1. Input signal

(1)Solid state input
①Input frequency: 50kHz(Max.)
But, standard duty rate of input signal is 1:1,
ON/OFF pulse width should be each over 10μs.
②Input voltage Level : ON voltage → 4.5-24V, OFF voltage → 0-1.0V

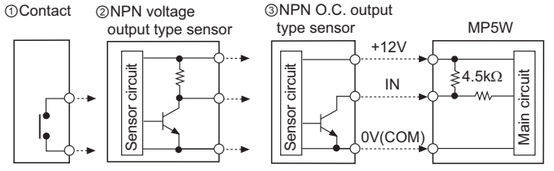


(2)Relay contact input
①Input frequency: 45Hz(Max.)
But, ON/OFF pulse width should be each over 11ms.
②Relay contact specification: Please use a contact that can switch reliably at 12VDC, 2mA min. of load current.

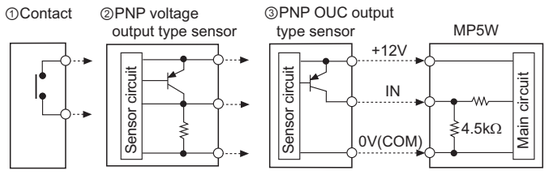
2. Input type

MP5W has NPN input and PNP input and it is able to select it in Parameter 1 group.

(1)NPN input type



(2)PNP input type



※O.C. is Open collector output

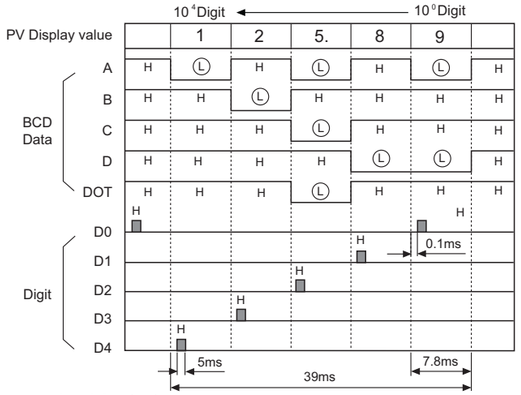
● **Output specification**

1. Relay output
①Output : Comparative or alarm output(See the "▣ Output mode")
②Output method : Relay
③Contact capacity : 250VAC 3A resistive load
④Life cycle : Mechanical-20million times(Switch times 180 times/min.)
Electrical-Min.100,000 times(3A 250VAC at resistive load)
(Switch times : 20 times/min.)

2. TR output
①Output : Comparative or alarm output(See the "▣ Output mode")
②Output method : NPN / PNP Open collector
③Rated load voltage : 12-24VDC
④Max. load current : 20mA

3. BCD Dynamic output

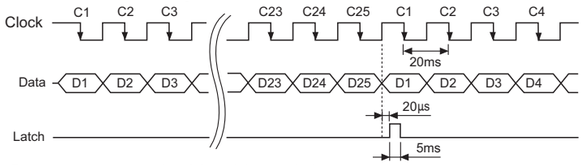
①Output: Display value
②Output signal: BCD Data(A, B, C, D, DOT) ← A: Lowest bit, Dot: Highest bit
Digit Data(D0, D1, D2, D3, D4) ← D0: Lowest digit, D4: Highest digit
③Output type: NPN Open Collector
④Rated load voltage: 12-24VDC
⑤Max. load current: 20mA
Ex) When display value is 125.89



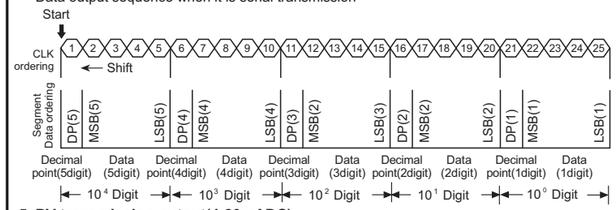
4. Low speed serial output

①Output: Display value
②Output signal: Clock, Data, Latch
③Clock cycle: 50Hz
④Output Clock bit: 25 bit
⑤Output Data bit: 25 bit
⑥Output form: NPN Open Collector
⑦Rated load voltage: 12-24VDC
⑧Max. load current: 20mA

● Serial transmission time diagram



● Data output sequence when it is serial transmission

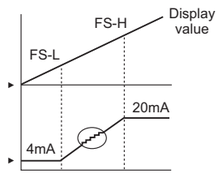


5. PV transmission output(4-20mADC)

①Application : To transmit the measured value
②Function :
This function is to transmit 4-20mADC converted from measured display value between High limit output(FS-H) and Low limit(FS-L).
③Range of High/Low limit output setting
-High limit setting range(FS-H):From min. to max within range of measurement
-Low limit setting range(FS-L):From min. to max within range of measurement
(FS-H should be over "1" bigger than FS-L)
④Resistive load : Max. 600Ω
⑤Resolution : 8000 division

If set FS-L and FS-H in certain section, the output will be 4-20mADC.

Revolution between FS-L and FS-H is 8000, therefore if display value is narrower than 8,000 the resolution will be low.



6. RS485 communication output

①Address: 0 ~ 99 address(32 channel)
②Transmission speed(Baud rate): 2400/4800/9600 bps
③Transmission code: ASCII
④Parity Bit: No
⑤Data Bit: 8 Bit
⑥Stop Bit: 1 Bit
⑦Communication items
-MP5W ← PC: Comparative value of each bank data, Prescale value and Peak value, RESET control
-MP5W → PC: Comparative value of each bank data, Prescale value and Peak value, Display value

■ Operation mode

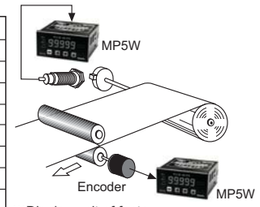
● Select operation mode from **mode**(mode) of Parameter 1 group.
● There are 13 kinds of operation mode in this unit.

◎ Mode F1(Frequency/Number of revolution/Speed)

This mode is to display calculated frequency or number of revolution, speed by measuring frequency of Input A,
1)Frequency(Hz) = f × α (α = 1[sec])
2)Number of revolution(rpm) = f × α (α = 60[sec])
3)Speed(m/min) = f × α (α = 60L[sec])
※L = The length of conveyor moved for 1 pulse cycle[m]

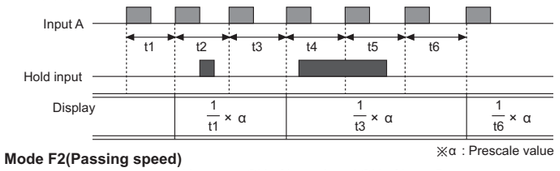
● Display value and display unit

Display value	Display unit	α (Prescale value)
Frequency	Hz	1
	kHz	0.001
Number of revolution	rps	1
	rpm	60
Speed	mm / sec	1,000L
	cm / sec	100L
	m / sec	L
	m / min	60L
	km / hour	3.6L



※Display unit of factory default : rpm

● Time chart



※α : Prescale value

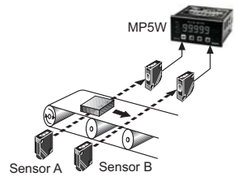
◎ Mode F2(Passing speed)

It displays the passing speed between ON of input A and ON of input B.
Passing speed(V) = f × α (α = L[m])
※f : This is reciprocal number of the time between ON of input A and ON of input B
L : The distance between input A and input B[m]

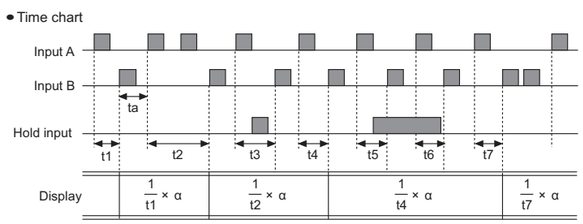
● Display value and display unit

Display value	Display unit	α (Prescale value)
Passing speed	mm / sec	1,000L
	cm / sec	100L
	m / sec	L
	m / min	60L
	km / hour	3.6L

※Display unit of factory default : m/sec



● Time chart



※α : Prescale value
ta : It needs min. 20ms for return time

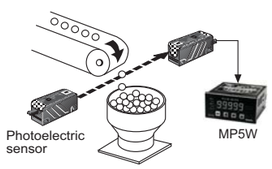
◎ Mode F3(Cycle)

It displays the time from when input A is ON to the next ON of input A.
Cycle(T) = t
※t: Measurement time[sec]

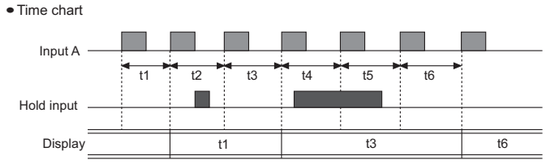
● Display value and display unit

Display value	Display unit	
	SEC	MIN
Cycle	999.99sec.	999.99min.
	9999.9sec.	9999.9min.
	99min. 59.9sec.	99hour 59.9min.
	9hour 59min. 59sec.	999hour 59min.
	99999sec.	99999min.

※Set the display unit at the **t.unt**(Time unit) of Parameter 2.
※Display unit of factory default : 999.99sec.



● Time chart



※t1, t2, t3, t4, t5, t6 should be over 20ms then able to measure

◎ Mode F4(Passing time)

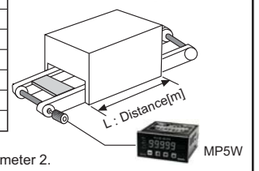
It displays the passing time of certain distance as measuring the time between ON and the next ON of Input A.

$$\text{Passing time[sec]} = t \times \alpha \quad (\alpha = \frac{\text{L[m]}}{\text{Moving distance within 1pulse cycle[m]}})$$

● Display value and display unit

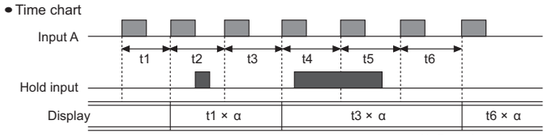
Display value	Display unit	
	SEC	MIN
Passing time	999.99sec.	999.99min.
	9999.9sec.	9999.9min.
	99hour 59.9sec.	99hour 59.9min.
	9hour 59min. 59sec.	999hour 59min.
	99999sec.	99999min.

※t: Measurement time[sec]
L: Certain distance[m]



※Display unit of factory default : 999.99sec.
※Set the display unit at the **t.unt**(Time unit) of Parameter 2.

● Time chart



**: Presale value

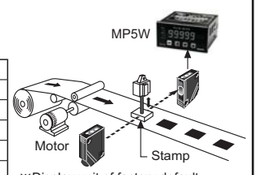
◎ Mode F5(Time width)

It displays the ON time of input A.
Time width[T] = t
※t : ON measurement time of input A[sec]

● Display value and display unit

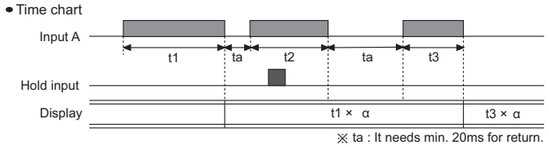
Display value	Display unit	
	SEC	MIN
Time width	999.99sec.	999.99min.
	9999.9sec.	9999.9min.
	99hour 59.9sec.	99hour 59.9min.
	9hour 59min. 59sec.	999hour 59min.
	99999sec.	99999min.

※Set the display unit at the **t.unt**(Time unit) of parameter 2.
※Display unit of factory default : 999.99sec.



※Display unit of factory default : 999.99sec.

● Time chart



※ ta : It needs min. 20ms for return.

◎ Mode F6(Time interval)

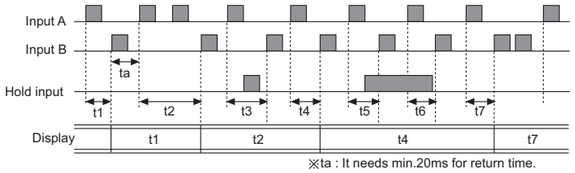
It displays the time from input A is ON to input B is ON.
Time difference(T) = t(ta to tb)
※t(ta to tb):The measurement time from input A is ON to input B is ON[sec]

● Display value and display unit

Display value	Display unit	
	SEC	MIN
Time interval	999.99sec.	999.99min.
	9999.9sec.	9999.9min.
	99hour 59.9sec.	99hour 59.9min.
	9hour 59min. 59sec.	999hour 59min.
	99999sec.	99999min.

※Display unit of factory default : 999.99sec.
※Display unit can be set at **t.unt**(Time unit) of Parameter 2.

● Time chart



※ta : It needs min.20ms for return time.

◎ Mode F7(Absolute rate)

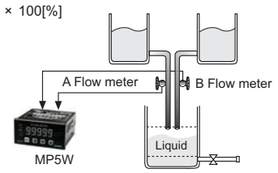
It displays how many percentage(%) faster or late, speed, volume etc. of Input B against input A)
Absolute rate = (Input B / Input A) × 100%

$$\text{Absolute rate} = \frac{\text{Frequency of input B[Hz]} \times B\alpha}{\text{Frequency of input A[Hz]} \times A\alpha} \times 100[\%]$$

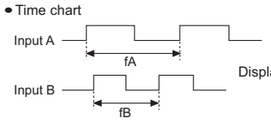
● Display value and display unit

Display value	Display unit
Absolute rate	%

※Aα : Prescale value of input A
Bα : Prescale value of input B



● Time chart



$$\text{Display} = \frac{\text{Frequency of input B[Hz]} \times B\alpha}{\text{Frequency of input A[Hz]} \times A\alpha} \times 100[\%]$$

※Hold : Hold signal is ON, the display value will be held until hold signal is OFF.

◎ Mode F8(Error ratio)

It displays how many percentage(%) faster or late of Input B against Input A.

$$\text{Absolute rate} = \frac{\text{Input B-Input A}}{\text{Input A}} \times 100[\%]$$

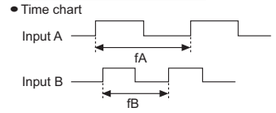
$$\text{Error rate} = \frac{(\text{Frequency of input B[Hz]} \times B\alpha) - (\text{Frequency of input A[Hz]} \times A\alpha)}{\text{Frequency of input A[Hz]} \times A\alpha} \times 100[\%]$$

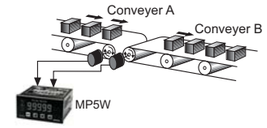
● Display value and display unit

Display value	Display unit
Error rate	%

※Aα : Prescale value of input A
Bα : Prescale value of input B

● Time chart





$$\text{Display} = \frac{(\text{Frequency of input B[Hz]} \times B\alpha) - (\text{Frequency of input A[Hz]} \times A\alpha)}{\text{Frequency of input A[Hz]} \times A\alpha} \times 100[\%]$$

※Hold : Hold signal is ON, the display value will be held until hold signal is OFF.

◎ Mode F9(Density)

It displays the density rate of input B against total sum of input A and input B.

$$\text{Density} = \frac{\text{Input B}}{\text{Input A + Input B}} \times 100[\%]$$

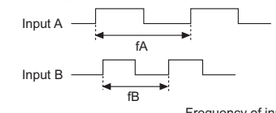
$$\text{Density} = \frac{\text{Frequency of input B[Hz]} \times B\alpha}{(\text{Frequency of input A[Hz]} \times A\alpha) + (\text{Frequency of input B[Hz]} \times B\alpha)} \times 100[\%]$$

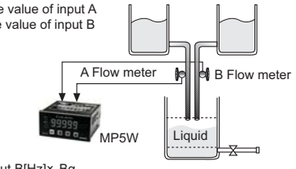
● Display value and display unit

Display value	Display unit
Density	%

※Aα : Prescale value of input A
Bα : Prescale value of input B

● Time chart





$$\text{Display} = \frac{\text{Frequency of input B[Hz]} \times B\alpha}{(\text{Frequency of input A[Hz]} \times A\alpha) + (\text{Frequency of input B[Hz]} \times B\alpha)} \times 100[\%]$$

※Hold : Hold signal is ON, the display value will be held until hold signal is OFF.

◎ Mode F10(Error)

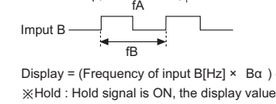
It displays the error between standard Input A and comparing Input B.
Error = Input B - Input A
Error = (Frequency of input B[Hz] × Bα) - (Frequency of input A[Hz] × Aα)

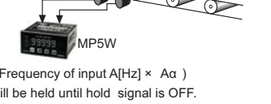
● Display value and display unit

Display value	Display unit
Error	END User setting unit

※Aα : Prescale of input A
Bα : Prescale of input B

● Time chart





Display = (Frequency of input B[Hz] × Bα) - (Frequency of input A[Hz] × Aα)

※Hold : Hold signal is ON, the display value will be held until hold signal is OFF.

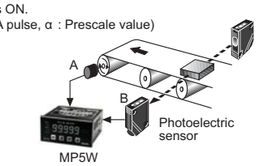
◎ Mode F11(Length measurment)

It displays the number of Input A pulse while Input B is ON.
Length measurment = P × α (※P : Number of input A pulse, α : Prescale value)

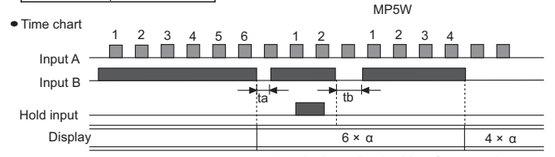
● Display value and display unit

Display value	Display unit
Length measurment	Quantity[EA]
	mm
	cm
	m

※Factory default(Unit) : Quantity[EA]



● Time chart



※ta, tb : It needs min. 20ms for return time

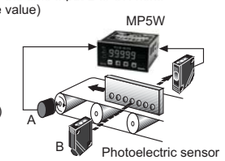
◎ Mode F12(Interval)

It displays the number of Input A pulse from Input B is ON to the time Input B is ON next.
Interval = P × α (※P: Number of input A pulse, α : Prescale value)

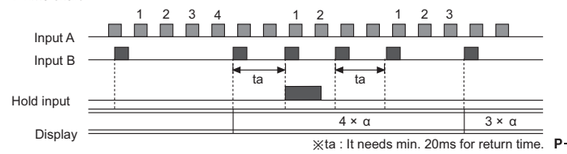
● Display value and display unit

Display value	Display unit
Interval	Quantity[EA]
	mm
	cm
	m

※Factory default(Unit) : Quantity[EA]



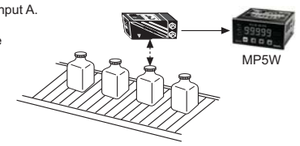
● Time chart



※ta : It needs min. 20ms for return time.

Mode F13(Integration)

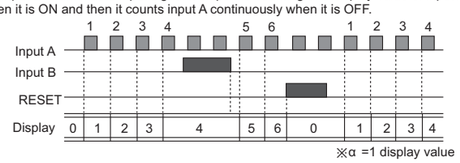
It displays the counting value against pulses of Input A.
Integration = P × α
※P: Pulse number of input A, α : Prescale value



- Display value and display unit

Display value	Display unit
Integration	Quantity[EA]

- Operation and Time chart
  ①It counts the number of input A pulse.
  ②As input B is an enable input signal it stops the counting and display value of input A when it is ON and then it counts input A continuously when it is OFF.

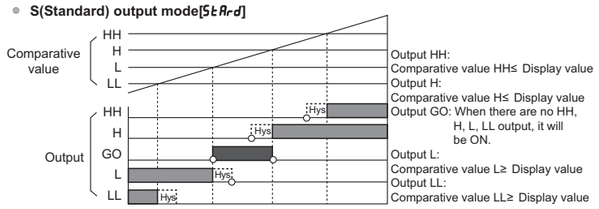


※α =1 display value

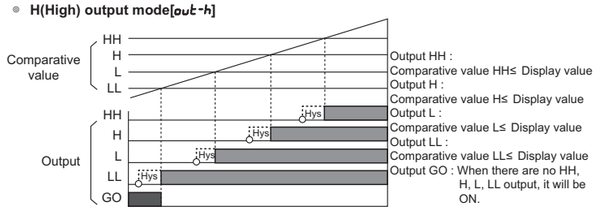
Output mode

- Select output mode in **out-t**(output type) of Parameter1 group.
- There are 5 stages output(HH, H, GO, L, LL) and 3 stage output(H, GO, L).
- There are 6 kinds of output mode such as S(Standard) output mode, H(High) output mode, L(Low) output mode, B(Block) output mode, I(One shot)output mode, F(Deviation) output mode.
- Comparative value(HH, H, L, LL) can be set as LL<L<H<HH in B output mode and the other outputs can be operated separately in output(S,H, L, I) mode regardless of comparative(HH, H, L, LL) set value.

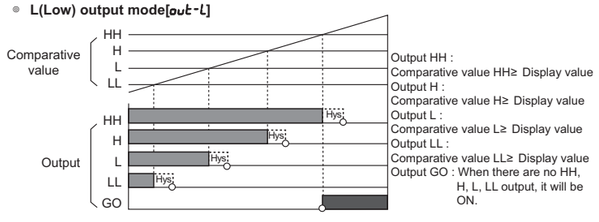
S(Standard) output mode[StAnd]



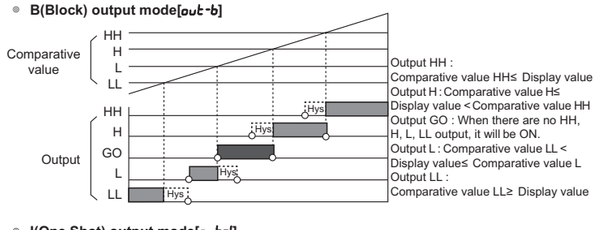
H(High) output mode[out-h]



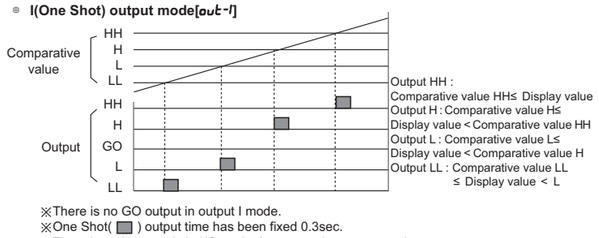
L(Low) output mode[out-L]



B(Block) output mode[out-b]



I(One Shot) output mode[out-I]

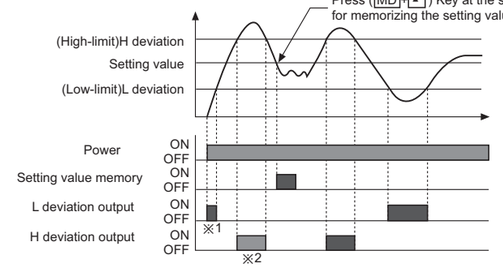


※There is no GO output in output I mode.
※One Shot(▭) output time has been fixed 0.3sec.
※There is no Hysteresis in I(One shot) comparative output mode.

F(Deflection) output mode[out-F]

This function is to memorize the setting value and provide outputs when it exceeds the deviation of H, L.

- The setting value memory: Memorize the current display value as the setting value by pressing(MD +▲) key in front.
- Display the setting value: Check the memorized the setting value by (▲) key. (Display the memorized setting value for pressing ▲ key continuously.)
- Deviation setting : Set H, L deviation by setting value. (The set deviation will be memorized until set the next deviation again when power off.)
- Deviation setting range : 0.0001 to 99999(The setting range will be changed by decimal point setting parameter. If set decimal point as 0000.0, the setting range will be 0.1 to 9999.9.)
- Operation



※1: When select the comparative output limit function, output will not be come.
※2: Output position may different from above graph as output coming under assuming the setting value memory is before the setting value memory point on above graph.
※There are no HH, GO, LL outputs in F output mode.
※Even thought you set the deviation as "0(Zero)", it will actually work as setting "1".

Operation chart by each Parameter group

- The display parameter are different by each operation mode, please see "■ Parameter".
- ◐ : When select the operation mode, the parameter will be displayed.
  X : When select the operation mode, the parameter will not be displayed.
- Parameter 0 group

Parameter 0	Sub mode	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13
PSt.hh		◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
PSt. h		◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
PSt. L		◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
PStLL		◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
h.PEU		◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	X
L.PEU		◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	X

- Parameter 1 group

Parameter 1	Sub mode	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13
nodE		◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
In-A		◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
In-b		X	◐	X	X	X	◐	◐	◐	◐	◐	*	*	*
out-t		◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	X
hYS		◐	X	X	X	X	X	◐	◐	◐	◐	X	X	X
GuArd	F.dEFY	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	X
	StArt	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	X
AutoA		◐	X	X	◐	X	X	◐	◐	◐	◐	X	X	X
Autob		X	X	X	X	X	X	◐	◐	◐	◐	X	X	X
nEno		X	X	X	X	X	X	X	X	X	X	X	X	◐

※"* : In-b sensor will be set as nPnh.F or PnPh.F in mode F11, F12, F13.

- Parameter 2 group

Parameter 2	Sub mode	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13
PbAnt		◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
dot		◐	◐	X	X	X	X	◐	◐	◐	◐	◐	◐	◐
tunt		X	X	◐	◐	◐	◐	X	X	X	X	X	X	X
PSthh		◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
PSt. h		◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
PSt. L		◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
PStLL		◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
PSCAH		◐	◐	X	◐	X	X	◐	◐	◐	◐	◐	◐	◐
PSCAY		◐	◐	X	◐	X	X	◐	◐	◐	◐	◐	◐	◐
PSCbH		X	X	X	X	X	X	◐	◐	◐	◐	X	X	X
PSCbY		X	X	X	X	X	X	◐	◐	◐	◐	X	X	X
di SPt		◐	X	X	X	X	X	◐	◐	◐	◐	X	X	X

※1: PSC.H, PSC.Y are displayed in mode F1, F2, F4, F11, F12, F13.

- Parameter 3 group

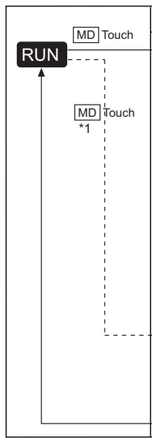
Parameter 3	Sub mode	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13
FS-h		※When it is PV transmission output, it operates in all mode.												
FS-L														
Addr		※When it is RS485 communication output, it operates in all modes.												
bPS														
rEnot														
LoC		◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐

- Monitoring delay function operation chart by each output mode

out-t	StArd	out-h	out-L	out-b	out-I	out-F
Comparative output adjustment function.	◐	X	X	◐	X	◐
Starting correction timer function	◐	◐	◐	◐	◐	◐

■ Parameter

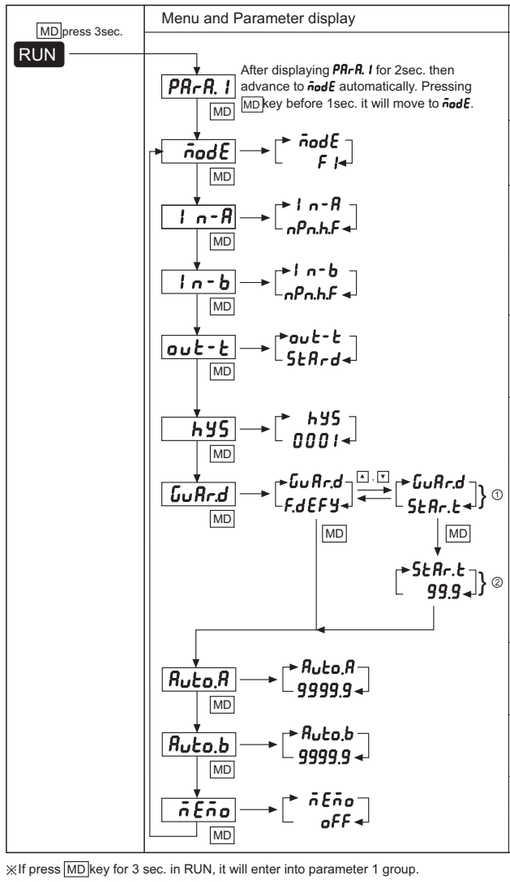
• Parameter 0 group



Menu and Parameter display	Parameter	Setting range	Setting key
PSt.hh → PSt.hh 99999	Set HH comparative value	● F1, F2, F7, F9, F11, F12, F13 : 0 to 99999 ● F3 to F6 : 0 to Setting time range ● F8, F10 : -19999 to 99999	◂ : Move the setting digit ▼, ▲ : Change the setting value MD : Fix and move to the next parameter
PSt. h → PSt. h 99999	Set H comparative value		
PSt. L → PSt. L 00000	Set L comparative value		
PSt.LL → PSt.LL 00000	Set LL comparative value		
h.PEU → h.PEU 99999	Display high peak value among measuring values		● Reset If you press ◂ key for 2sec. while h.PEU or L.PEU is flickering, the Peak value display will be reset to the current measuring value and it will keep flickering. MD If you touch once again, it will return to L.PEU or RUN.
L.PEU → L.PEU -19999	Display low peak value among measuring values		

※1: If you press MD key in RUN mode, it will enter into PSt.hh(F output mode:PSt. h) at comparative output mode and h.PEU at indication type.
※When entering into parameter 0, the parameter and data will be flickering by 1 sec. then moving the setting digit and changing the setting value are available.
※It will show the set data to flicker by 1sec., then move to next Parameter with touching MD key once.

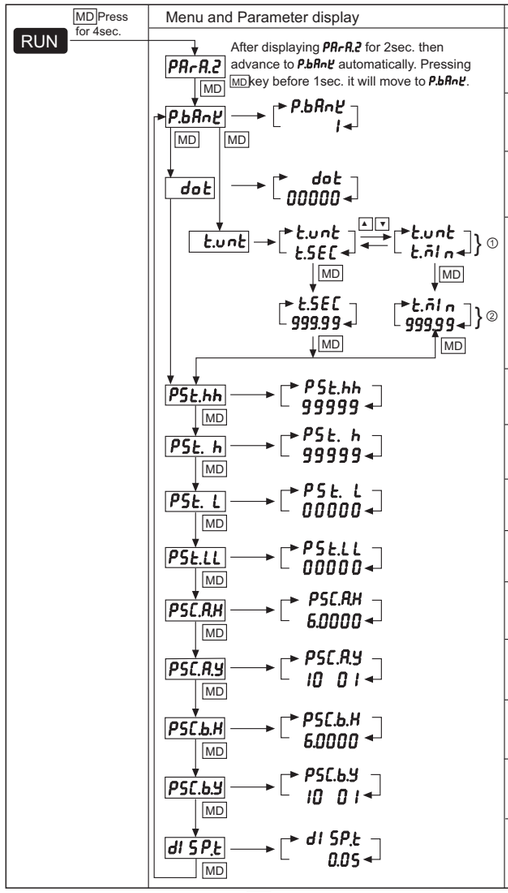
• Parameter 1 group



Menu and Parameter display	Parameter	Setting range	Setting key
PArA. 1 → nodE F 1	This is parameter 1 group.		
nodE	Select operation mode.	F 1 to F 13	▼, ▲ : Change the setting mode → F1→F2 to F13 MD : Fix and move to the next parameter
In-A → In-A nPn.hF	Set the sensor type of input A.	● PNP transistor output type : PnP.hF ● Contact output type(L output) : PnP.LF ● NPN transistor output type : nPn.hF ● Contact output type(H output) : nPn.LF	▼, ▲ : Change the sensor type →nPn.hF→nPn.LF→PnP.hF→PnP.LF MD : Fix and move to the next parameter
In-b → In-b nPn.hF	Set the sensor type of input B.		
out-t → out-t StArd	Select the output mode. ※1	StArd / out-h / out-L out-b / out-I / out-F	▼, ▲ : Change the setting mode →StArd→out-h→out-L→out-F→out-I→out-b→ MD : Fix and move to the next parameter
hYS → hYS 0001	Set the hysteresis for the output. ※2	0 to 9999 (If decimal point is set in 0000.0, the range will be 0 to 999.9.	◂ : Move the setting digit ▼, ▲ : Change the setting value MD : Fix and move to the next parameter
GuArd → F.dEFY / StAr.t	Select the start compensating timer function or comparative output(L, LL) limit function. ※3	①F.dEFY / StAr.t ②When select StAr.t When StAr.t 99.9 is flickering by 1sec. cycle, set the starting correction time 0.0 to 99.9	① ▼, ▲ : Change the setting mode →F.dEFY→StAr.t MD : Fix and move to the next parameter ② ◂ : Move the setting digit ▼, ▲ : Change the setting value MD : Fix and move to the next parameter
AutoA → AutoA 9999.9	Set the Auto-zero time of INA input.	0.1 to 9999.9	◂ : Move the setting digit ▼, ▲ : Change the setting value MD : Fix and move to the next parameter
Autob → Autob 9999.9	Set the Auto-zero of INB input.	0.1 to 9999.9	◂ : Move the setting digit ▼, ▲ : Change the setting value MD : Fix and move to the next parameter
nEno → nEno oFF	It sets the memory retention. The measuring value will be memorized when the power off. (Mode F13 only)	on : Memory retention oFF : No memory retention	▼, ▲ : Change the setting mode → on → oFF MD : Fix and move to the next parameter nodE.

※If press MD key for 3 sec. in RUN, it will enter into parameter 1 group.
※1: It will not be displayed in indication type.
The output mode is fixed as out-h type in F13 operation mode.
※2: Hysteresis operation mode is able to be set in F1, F7 to F10 operation mode.
※3: You are able to select the comparative output[F.dEFY] limit function or starting correction[StAr.t] timer in monitoring delay function mode.
When selecting the comparative output limit[F.dEFY] function, it will move to the next parameter[AutoA] and when selecting the starting correction timer[StAr.t] you need to be set the starting correction time[0.0 ~ 99.9] so that it moves to the next parameter[AutoA].
※If press MD key for over 2 sec. in every setting mode, data will be set and return to RUN.
※When entering into parameter 1 group, the parameter name and data will be flickering by 1 sec. then move setting digit by ◂ key or change the setting value by ▼ ▲ key.
※All data set by users will be shown[displayed] to 1sec. cycle then move to the next parameter by pressing MD key.

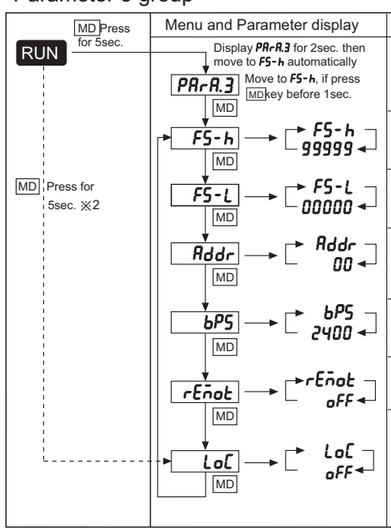
• Parameter 2 group



Parameter	Setting range	Setting key
This is parameter 2 group.		
Select Data bank.	1 : Data bank 1 2 : Data bank 2	▼, ▲ : Change the setting value ↦1↦2 MD : Fix and move to the next parameter
Set decimal point position of display value	00000 00.000 0000.0 0.0000 000.00	◄ : Move the decimal point MD : Fix and move to the next parameter
It will be displayed in F3, F4, F5, F6 operation mode and set the time unit. (★1) ①Select the time unit ②Select the time range	SEC / MIN 999.99sec. / 999.99min. 9999.9sec. / 9999.9min. 99min.59.9sec. / 99hour59.9min. 9hour 59min.59sec. / 999hour59min. 99999sec. / 99999min.	①▼, ▲ : Change the setting mode MD : Save ↦t.SEC→t.Min ②▼, ▲ : Change the setting value ↦999.99→9999.9→99.59.9 99999 ← 9.59.59 (sec.) / 999.59 (min.) MD : Fix and move to the next parameter
Set the comparative value HH. Set the comparative value H. Set the comparative value L. Set the comparative value LL.	● F1, F2, F7, F9, F11, F12, F13 : 0 to 99999 ● F3 to F6 : 0 to Setting time range ● F8, F10 : -19999 to 99999	◄ : Move the setting digit ▼, ▲ : Change the setting value MD : Fix and move to the next parameter
Set the prescale value of input A mantissa(X).	0.0000 to 9.9999	◄ : Move the setting digit ▼, ▲ : Change the setting value MD : Fix and move to the next parameter
Set the prescale value of input A an exponent(y).	-9 to 9 (10^{-9} to 10^{9})	◄ : Move the setting digit ▼, ▲ : Change the setting value MD : Fix and move to the next parameter
Set the prescale value of input B mantissa(X).	0.0000 to 9.9999	◄ : Move the setting digit ▼, ▲ : Change the setting value MD : Fix and move to the next parameter
Set the prescale value of input B an exponent(y).	-9 to 9 (10^{-9} to 10^{9})	◄ : Move the setting digit ▼, ▲ : Change the setting value MD : Fix and move to the next parameter
Select the display cycle.	0.05, 0.5, 1, 2, 4, 8	▼, ▲ : Change setting value ↦0.05→0.5→1→2→4→8← MD : Fix and move to the P.bAnK

※It will enter into parameter 2 if pressing MD key for 4sec in RUN mode
*(★1)It will be displayed in F3, F4, F5, F6 operation mode only and enable to select the time until as sec.[t.SEC] or min.[t.Min] in t.unt parameter.
Select the time range after selecting the time unit as sec.[t.SEC] or min. [t.Min].
※If press MD key for over 2 sec. in every setting mode, data will be set and return to RUN.
※When enter into the parameter 2 group, the parameter name and data value will flicker by cycle(1sec.). Then to move the setting digit by ◄ key and change the setting value by ▼ ▲ key.
※The fixed data value set by user in each parameter will flicker by cycle(1sec.) and move to the next parameter by pressing MD key.

• Parameter 3 group



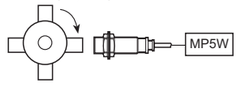
Parameter	Setting range	Setting key
This is parameter 3 group.		
Set the High-limit value of PV transmission output.	● F1, F2, F7, F9, F11, F12, F13 : 0 to 99999 ● F3~F6 : 0 to Setting time range ● F8, F10 : -19999 to 99999	◄ : Move the setting digit ▼, ▲ : Change the setting value MD : Fix and move to the next parameter
Set the Low-limit value of PV transmission output.		
Set the communication Address.	00 to 99 (32 channel)	◄ : Move the setting digit ▼, ▲ : Change the setting value MD : Fix and move to the next parameter
Select the communication speed.	2400 / 4800 / 9600	▼, ▲ : Change the setting mode ↦2400→4800→9600← MD : Fix and move to the next parameter
Select the Remote and the Local. ※1	on : Use oFF : Not use	▼, ▲ : Change the setting mode ↦oFF → on← MD : Fix and move to the next parameter
Enable to lock the key for each parameter group	oFF : There is no key lock in all mode LoC.0 : Parameter0 ~ 3 Lock LoC.1 : Parameter1 ~ 3 Lock LoC.2 : Parameter2 ~ 3 Lock LoC.3 : Parameter3 Lock only	▼, ▲ : Change the setting mode ↦oFF → LoC.0 → LoC.1 → LoC.2 → LoC.3← MD : Fix and move to the next FS-h.

※It will enter into parameter 3 if pressing MD key for 5sec. in RUN mode.
※1: It is enable to set the remote or local function in communication output type. When select the remote[rEnot] function, the front keys are disabled.
※2: Pressing MD key at parameter 3, it will enter into FS-h or Addr(option function), LoC(Indication type only).
※If press MD key for over 2 sec. in every setting mode, data will be set and return to RUN.
※When entering into the parameter 3 group, the parameter name and data value will flicker by cycle(1sec.). Then move the setting digit by ◄ key and change the setting value by ▼ ▲ key.
※The fixed data value by user in each parameter will flicker by cycle(1sec.) and move to the next parameter by pressing MD key.

■ Function

◎ Prescale function

This prescale function allows you to multiply the number of pulse or pulse length by a variable ($X \times 10^{Y}$) then display a specific unit or a certain double number.
It will display frequency or RPM from prescale value(α) by measuring the input A frequency.
For example, the prescale value when need to display the RPM as below.



RPM = f × α
= f × 60 × 1/N
= f × 60 × 1/4
= f × 60 × 0.25
= f × 15 (α =15)

※f:Input pulse (Frequency) per sec.
※α :Prescale value
※N:Pulse number per 1 revolution

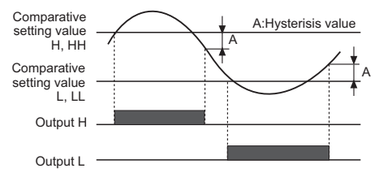
● How to set prescale value(α =15)
Set prescale value separating as a mantissa(X) and an exponent(Y) at SC.AH, SC.AY (or SC.bH, SC.bY). For example, prescale value(*)=15, a mantissa(X):1.5000, an exponent(Y): 01. Or if set α value as SC.AH=0.1500, SC.AY=02 then also get the same display value.

◎ Monitoring function

This function is to save High Peak value(H.PEt) or Low Peak value(L.PEt) against display value.
● User can check saved value in Parameter 0 group. And High Peak value(H.PEt) or Low Peak value(L.PEt) will be continuously saved during checking.
● See Parameter 0 for Reset.

◎ Hysteresis function

Set the Hysteresis value(A) for comparative setting value in order to prevent unstable operation due to output going ON/OFF frequently.

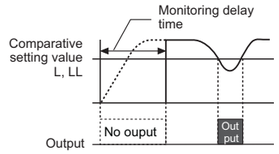


DOT position	Setting range
00000	0000 to 9999
0000.0	000.0 to 999.9
000.00	00.00 to 99.99
00.000	0.000 to 9.999
0.0000	0.000 to 0.9999

※You are able to set "0", but when set "0", the actual operation will be as "1".
※The initial setting value is 0001.
※You are able to set in the Parameter 1 group.

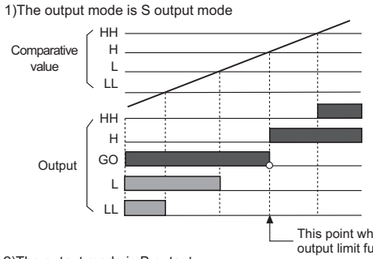
◎ Monitoring delay times function

This function is for the stable control to limit L, LL outputs until certain output is come or to limit all outputs while the equipment is reaching a stable status against various change of input such as the staring current when the motor is running after power on. There are the starting correction timer function and comparative output limit function in the monitoring delay function.



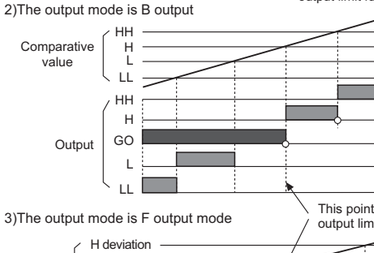
● The starting correction timer function
This function is to make the output not come out during the setting time. (Time setting range 0.0 to 99.9sec.)
● Comparative output limit function(LL, L output limit function)
Applicable output mode: S,B,F mode(See "* Output mode")
This function is to limit the LL, L output before H or HH output.

1)The output mode is S output mode



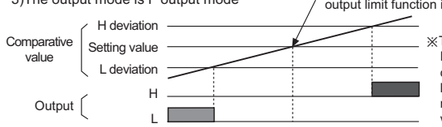
※The comparative output will not come out when it is operating ( ) after supplying power.
※When the output mode is S output mode, the setting value of HH, H, L, LL are not effected by each other. Therefore HH value may be equal or lower than LL value.

2)The output mode is B output



※When output mode is B output mode, the setting value should be LL < L, H < HH in sequence
※The comparative output will not come out when it is operating( ) after supplying power.

3)The output mode is F output mode



※The output mode is F output mode, the comparative output limit function will be released at the setting value(Standard setting).

◎ Auto-Zero time setting function

When you know the interval of input signal, Auto-zero time should be set as a little bit longer than that interval of input signal. If there is no pulse input within setting time(Auto-zero time), it regards as the input signal is cut off then make the value as "00000" forcibly. Note that the Auto-zero time setting should be longer than the narrowest interval of input pulse. Otherwise it may be difficult to make the display value as "00000".
● Auto-zero time setting range(0.1 to 9999.9sec)
● When the display value is "00000", each output will respond to how it was programmed for "0".

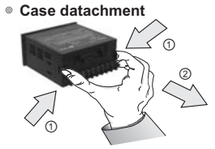
◎ Lock setting function

This function is to set the enable or disable of each Parameter and mode changes in MP5W.

Parameter	Parameter 0 group	Parameter 1 group	Parameter 2 group	Parameter 3 group
oFF	-	-	-	-
LoC 0	●	●	●	●
LoC 1	-	●	●	●
LoC 2	-	-	●	●
LoC 3	-	-	-	●

※ -: Unlock, ● : Lock
※Lock setting is available in Parameter 3 group.

◎ Case datachment



Please turn off the power before detaching the case.
※Push the side locks to direction ① and then pull out to direction ②.

◎ Inner hardware Lock setting function

This function is to lock LoC in Parameter 3 group by Inner hardware Lock mode in order to prevent wrong setting.

	Pin	LoC Mode	Remark
h0 (Hardware Lock0)		Check: ○ , Change: ○	Factory default
h1 (Hardware Lock1)		Check: ○ , Change: ×	
h2 (Hardware Lock2)		Check: × , Change: ×	

※Setting pin for Lock setting is located on internal PCB.

◎ Display cycle selection function

This function is to change the display cycle in range of 0.05/0.5/1/2/4/8 sec., and displays the average value of measuring value for the setting cycle.

◎ Time unit selection function

Enable to display PV value with firmed time unit in range of various time.
● Time unit selection function can be set in parameter 2 group.
● Applicable mode : Mode 3 to 6
※There is no DOT setting mode when set the time unit display function.

SEC	MIN
999.99sec.	999.99min.
9999.9sec.	9999.9min.
99min.59.9sec.	99hour59.9min.
9hour59min.59sec.	999hour59min.
99999sec.	99999min.

◎ Data Bank switching function

This function is to use the values by switching Data Bank 1, 2 after registering comparative setting value and prescale value into Data Bank1 and Data Bank2.
● When the 3 and 5 terminals are open circuited, the comparative value and prescale of Data Bank 1 will be used.
● When the 3 and 5 terminals are short-circuited, the comparative value and prescale of Data Bank 2 will be used.
● After selecting the Data Bank for saving the comparative setting value and prescale value, set the comparative setting value and prescale value then it will be saved at Data Bank.

◎ Factory default

● Parameter 1 group

Mode	Setting value	Mode	Setting value
nodE	F1	HYS	0001
In-A	nPnP	GuArd	FdEFY
out-t	StArd	AutoA	9999.9

● Parameter 2 group

Mode	Setting value	Mode	Setting value
PbAnK	1	PSLLL	00000
dot	00000	PSC. H	6.000
PStHH	99999	PSC. Y	01 01
PSt. H	99999	diSPt	0.05
PSt. L	00000		

● Parameter 3 group

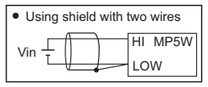
Mode	Setting value
FS-h	99999
FS-L	00000
Addr	01
bPS	9600
rEnot	oFF
LoC	oFF

※The specification may not be displayed due to the operation mode and output specification.

■ Caution for using

1. Installation environment
①It shall be used indoor ③Pollution Degree 2
②Altitude Max. 2000m ④Installation Category II .
2. Please use separated line from high voltage line or power line in order to avoid inductive noise.
3. Please install power switch or circuit breaker in order to cut the power supply.
4. The switch or circuit breaker should be installed near by users for safety.
5. Do not use this unit at below places.
①Place where there are severe vibration or impact.
②Place where there are direct ray of the sun.
③Place where strong magnetic field or electric noise are generated.
6. Storage method
When storing this unit for a long time, please avoid the direct ray of the sun and keep this unit under circumstances as -20 to 60℃, 35 to 85RH.
7. Input line
Shield wire must be used when the measuring input line is getting longer or there are lots of noises.
8. Please put enough space between power line and terminal of measuring input.

● Using shield with two wires



※It may cause malfunction if above instructions are not followed.

■ Main products

- Proximity sensors
- Area sensors
- Door/Door side sensors
- Counters
- Rotary encoders
- Power controllers
- Panel meters
- Graphic/Logic panels
- Temperature controllers
- Tachometer/Pulse(Rate) meters
- Temperature/Humidity transducers
- Stepping motors/drivers/motion controllers
- Laser marking system(CO_2, Nd:YAG)
- Laser welding/soldering system
- Photoelectric sensors
- Fiber optic sensors
- Pressure sensors
- Timers
- Display units
- Sensor controllers

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