▣Features

- ●13 kinds of various operation modes
  : Revolution/Speed/Frequency, Absolute rate, Passing time, Error rate, Cycle, Density, Passing speed, Error ratio, Time width, Time interval, Interval, Integration, Length measurement(Except MP5M having 11 models)
- ●Various output function
  : Relay output, NPN/PNP open collector output, Low speed Serial output, BCD output, 4−20mA output, RS485 communication output
- ●Various functions
  : Prescale function, Data monitoring function, Hysteresis width setting function, Max./Min. value mornitoring function, Delay function, Auto zero time setting function, Lock setting function
- ●Max. display range : −19999 to 99999(MP5M:0.0001~99999)
- ●Various display units : rpm, rps, Hz, kHz, sec, min, m, mm, mm/s, m/s, m/min, m/h, ℓ/s, ℓ/min, ℓ/h, %, counts, etc.
- ●Selectable voltage input(PNP) or No voltage input(NPN)
- ●50kHz High speed response function

⚠ Please read "Caution for your safety" in operation manualbefore using.

CE

▣Ordering information

MP 5 S − 4 N

		Main output(Comparative value output)	Sub output(Display value output)
Output	S Type	N	Indication type	X
	Y Type	N	Indication type	X
		1	NPN open collector five−stage output	X
		2	PNP open collector five−stage output	X
		3	X	BCD Dynamic
		4	X	PV transmission(4−20mADC)
		5	X	RS485 communication output
	W Type	N	Indication type	X
		A	Relay five−stage(HH, H, GO, L, LL)	X
		1	Relay three−stage(H, GO, L)	X
		2	NPN open collector five−stage output	BCD Dynamic
		3	PNP open collector five−stage output	BCD Dynamic
		4	NPN open collector five−stage output	PV transmission(4−20mADC)
		5	PNP open collector five−stage output	PV transmission(4−20mADC)
		6	NPN open collector five−stage output	Low speed serial output
		7	PNP open collector five−stage output	Low speed serial output
		8	NPN open collector five−stage output	RS485 communication output
		9	PNP open collector five−stage output	RS485 communication output
	M Type	N	Indication type	X
		1	Relay single(High−limit)output + NPN open collector output	X
		2	Relay double(High/Low−limit) output + NPN open collector output	X
Power supply		4	100−240VAC 50/60Hz	
Size		S	DIN Size W48×H48mm	
		Y	DIN Size W72×H36mm	
		W	DIN Size W96×H48mm	
		M	DIN Size W72×H72mm	
Digit		5	5digit(99999)	
Series		MP	Pulse meter	

※PNP open collector output : Option

▣Specifications (MP5S/ MP5Y/ MP5W Series)

Series		MP5S	MP5Y	MP5W
Display method		7 Segment LED(Zero blanking)		
Character size		W4 × H8mm	W6.8 × H13.8mm	
Max. indication		5digits(−19999 ~ 99999)		
Power supply		100−240VAC 50/60Hz		
Allowable operation voltage		Allowable operation voltage: 90 ~ 110%		
Power consumption		Approx. Min. 7.5VA(240VAC)	Approx. Min. 3.5VA(240VAC)	Approx. Min. 6VA
Power for external sensor		12VDC ±10%, 80mA		
Input frequency		• Non−contact input : Max. 50kHz(Pulse width:Each over 10㎲) • Contact input : Max. 45Hz(Pulse width:Over 11ms)		
Input level		[Voltage input] High : 4.5−24VDC, Low : 0−1.0VDC, Input impedance : 4.5kΩ [No−voltage input] Impedance at short−circuit : Max. 200Ω, Residual voltage : Max. 1V Impedance at open−circuit : Min. 100kΩ		
Measuring range		• Mode F1, F4, F7, F8, F9, F10 : 0.0005Hz ~ 50kHz • Mode F3 : 0.02s ~ 3,200s • Mode F2, F5, F6 : 0.01s ~ 3,200s • Mode F11, F12, F13 : 0 to 4 ×10⁹ Count		
Measuring accuracy (23 ±5℃)		• Mode F1, F4, F7, F8, F9, F10 : F.S. ±0.05% rdg ±1Digit • Mode F2, F3, 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 time(F2), Cycle(F3), Passing speed(F4), Time width(F5), Time interval(F6), Absolute rate(F7), Error ratio(F8), Density(F9), Error rate(F10), Length measurement(F11), Interval(F12), Integration(F13) **※Please see the operating mode(F-18~21 page).**		
Prescale function		Direct input method(0.0001×10^{-9} to 9.9999×10^{9})		
Hysteresis		**(Note1)**	0 to 9999	
Other functions		• Lock setting function • Auto−Zero time setting function • Time unit selection function • Monitoring function : Memorize max. value • Memory retention function (Mode F13 applied only)	• Lock setting function • Monitoring delay function • Auto−Zero time setting function • Current output range selection(Current output type only) • Comparative output function(HH, H, GO, L, LL) • Time unit selection function • Deviation memory function(F output mode applied only) • Monitoring function : Memorize max. value or min. value • Remote/Local switching function(Communication output type only) • Data Bank switching function **(Note2)** • Memory retention function(Mode F13 applied only)	
Main output	Relay three−stage	———	———	250VAC 3A resistive load 3a
	Relay five−stage			250VAC 3A resistive load 5a
	NPN Open collector five−stage		12−24VDC 30mA Max.	12−24VDC 20mA Max.
	PNP Open collector five−stage			
Sub output	BCD Dynamic		NPN Open collector 12−24VDC 20mA Max.	NPN Open collector 12−24VDC 20mA Max.
	Low speed serial output		———	
	PV transmission		4−20mADC Load 600Ω Max.	4−20mADC Load 600Ω Max.
	RS485 communication		32 chennel, Mutual direction comunication function	
Memory		Non−volatile memory(Input times : Min. 100,000 times)		
Insulation resistance		Min. 100MΩ(at 500VDC) Between charge part and non−charge part		
Dielectric stength		2000VAC 60Hz 1minute (Between terminals of AC power and case, Between terminals of AC power and measuring terminals)		
Impulse noise stength		±2000VAC the square wave noise(pulse width:1㎲)by the noise simulator, Repeat frequency 60Hz		
Vibration	Mechanical	0.75mm amplitude at frequency of 10 ~55Hz in each of X, Y, Z directions for 2 hour		
	Malfunction	0.5mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 10 minutes		
Shock	Mechanical	300m/s² (30G) in X, Y, Z directions for 3 times		
	Malfunction	100m/s² (10G) in X, Y, Z directions for 3 times		
Relay life cycle	Malfunction	———	Min. 10,000,000 times	
	Mechanical	———	Min. 100,000 times(250VAC 3A Load current)	
Ambient temperature		−10 ~ +50℃(at non−freezing status)		
Storage temperature		−20 ~ +60℃(at non−freezing status)		
Ambient humidity		35 ~ 85%RH		
Weight		Approx. 130g	Approx. 135g	Approx. 230g

※**(Note1)** The hysteresis setting range is different by the place of decimal point set.
※**(Note2)** Data Bank switching function MP5W series only.

▣Specifications (MP5M Series)

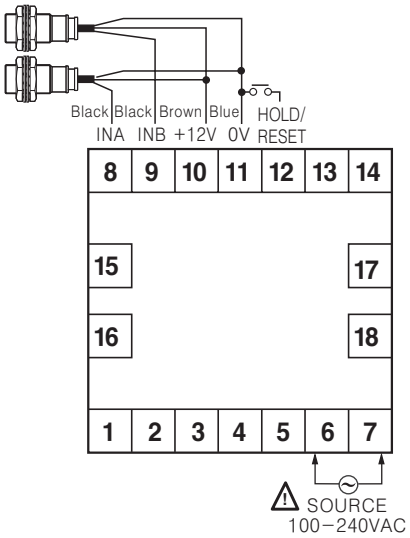
Model	MP5M	MP5M-41	MP5M-42
	Indication type	High-limit setting type	High/Low-limit setting type
Display method	7 Segment LED(Zero Blanking), Letter size : W4 X H8mm		
Max. indication	5digits(0.0001 ~ 99999)		
Power supply	100-240VAC 50/60Hz		
Allowable operation voltage	Allowable operation voltage: 90 ~ 110%		
Power consumption	Approx. 7.5VA(240VAC)	Approx. 8VA(240VAC)	
Power for external sensor	12VDC ±10%, 80mA		
Input frequency	• Non-contact input : Max. 50kHz(pulse width:over 10μs) • Contact input : Max. 45Hz(pulse width:over 11ms)		
Input level	[Voltage input] High : 4.5-24VDC, Low : 0-1.0VDC, Input impedance : 4.5kΩ [No-voltage input] Impedance at short-circuit : Max. 300Ω, Residual voltage : Max. 1V Impedance at open-circuit : Min. 100kΩ		
Measuring range	• Mode F1, F4, F7, F8 : 0.0005Hz ~ 50kHz • Mode F3 : 0.02s ~ 3,200s • Mode F2, F5, F6 : 0.01s ~ 3,200s • Mode F9, F10, F11 : 0 ~ 4 ×10⁹ Count		
Measuring accuracy (23 ±5℃)	• Mode F1, F4, F7, F8 : F.S. ±0.05% rdg ±1Digit • Mode F2, F3, 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 time(F2), Cycle(F3), Passing speed(F4), Time width(F5), Time interval(F6), Absolute rate(F7), Density(F8), Length measurement(F9), Interval(F10), Integration(F11) **※Please see the operating mode(F-18~21page).**		
Prescale function	Direct input method(0.0001×10^{-9} ~ 9.9999×10^{9})		
Hysterisis	———	**(Note1)** 0 ~ 9999	
Other function	• Lock setting function • Auto-Zero time setting function • Time unit selection function • Display value monitoring function • Memory retention function (Mode F11 applied only)	• Lock setting function • Monitoring delay function • Auto-Zero time setting function • Time unit selection function • Display value monitoring function • Memory retention function (Mode F11 applied only) • High-limit output function(H)	• Lock setting function • Monitoring delay function • Auto-Zero time setting function • Time unit selection function • Display value monitoring function • Memory retention function (Mode F11 applied only) • Comparative output function(H, L) • Output mode selection fuction (S, H, L, B, I, F) • Deviation memory function (F output mode applied only)
Main output: Relay output	———	250VAC 3A resistive load 1a 1b	250VAC 3A resistive load 1a×2
Main output: NPN Open Collector		30VDC 100mA Max.	30VDC 100mA Max. ×2
Memory retention	Non-volatile memory(Input times : Min. 100,000 times)		
Weight	Approx. 275g	Approx. 310g	Approx. 330g

※Function part is same as MP5S, MP5Y, MP5W series.
※**(Note1)** The hysteresis setting range is different by the place of decimal point set.(See F-24 Page, hysteresis function.)

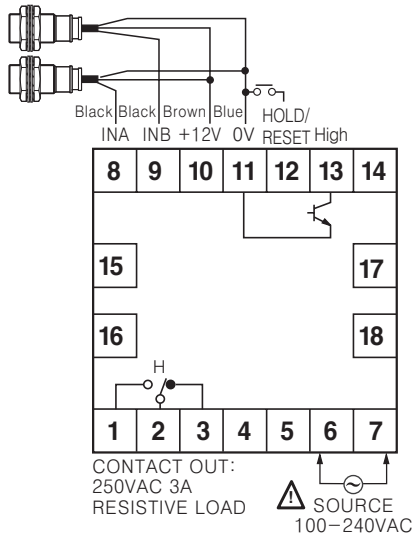
▣Connections

◎MP5M Series

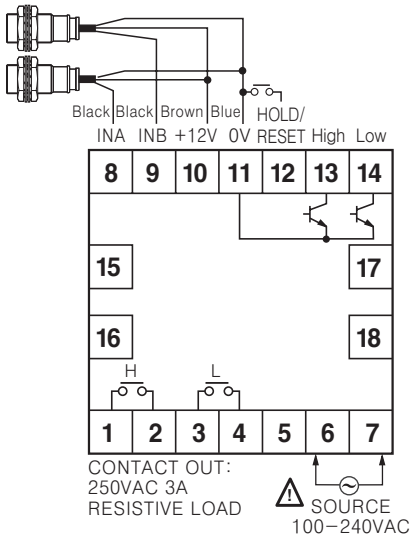
●MP5M-4N(Indication type)



●MP5M-41(High-limit setting type)



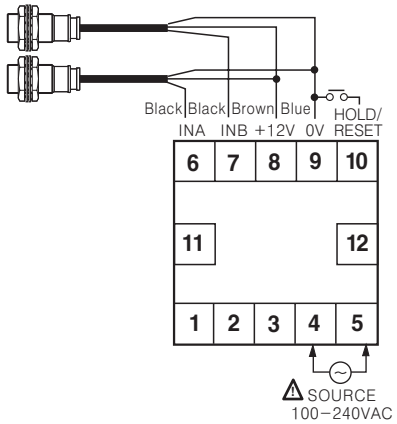
●MP5M-42(High/Low-limit setting type)



▣Connections

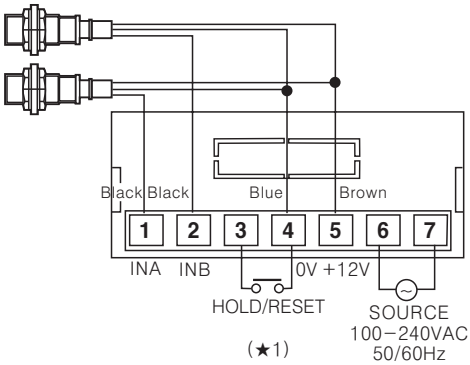
◎MP5S Series

●**MP5S-4N**(Indication type)

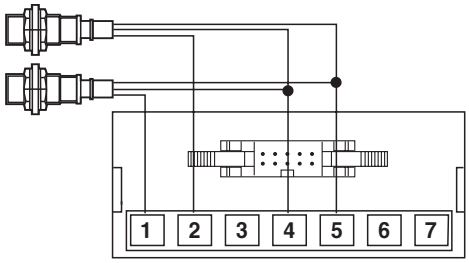


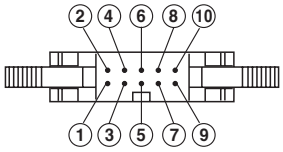
◎MP5Y Series

●**MP5Y-4N**(Indication type)



●**MAIN Output / SUB Output**





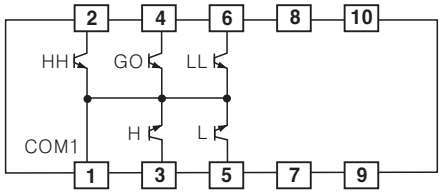
※Hirose Connector:
HIF3BD-10PA-2.54DS

※(★1)It is used for RESET terminal when an operation mode is F13.
(See the "Operating mode" F-21 page)

◈Main output(Connector)

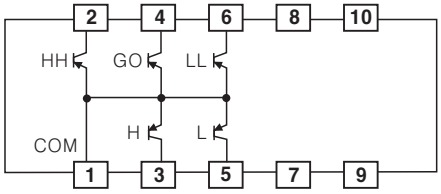
●**MP5Y-41**(NPN Open Collector output)

MAIN OUT
(NPN OPEN COLLECTOR)
12-24VDC Max. 30mA



●**MP5Y-42**(PNP Open Collector output)

MAIN OUT
(PNP OPEN COLLECTOR)
12-24VDC Max. 30mA

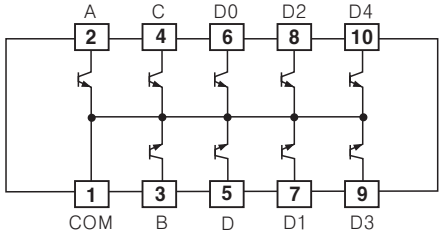


※Main output type & sub output type : option

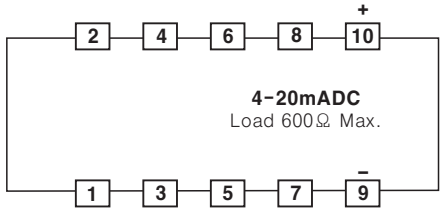
◈Sub output(Connector)

●**MP5Y-43**(BCD Dynamic output)

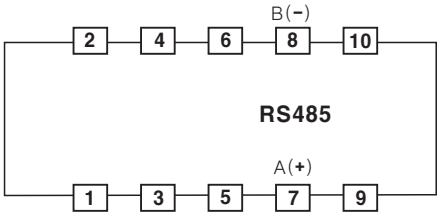
BCD OUT
(NPN OPEN COLLECTOR)
12-24VDC Max. 30mA



●**MP5Y-44**(PV transmission output)

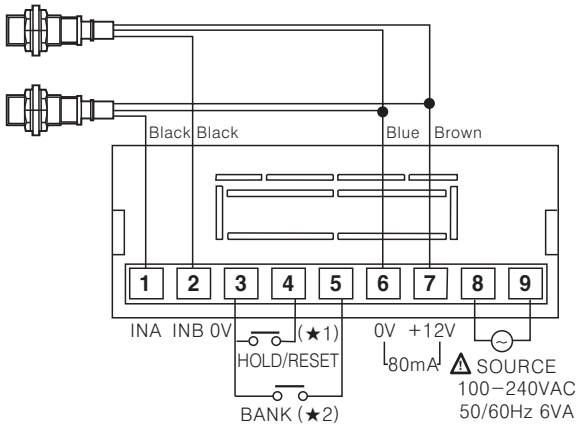


●**MP5Y-45**(RS485 communication output)

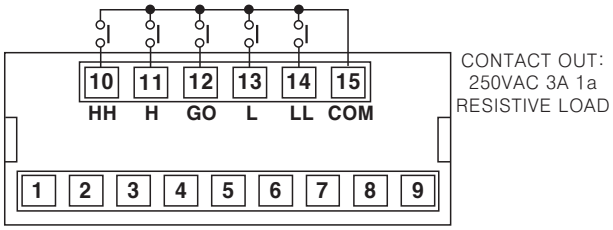


◎MP5W Series

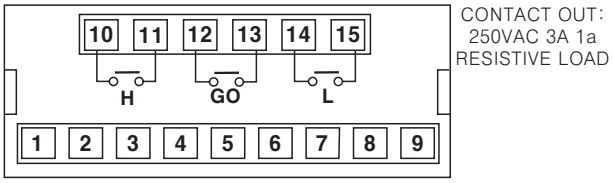
●**MP5W-4N**(Indication type)



●**MP5W-4A**(RELAY Five-stage output)

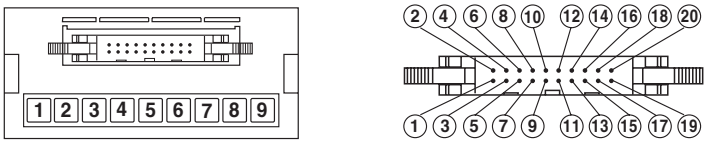


●**MP5W-41**(Three-stage output)



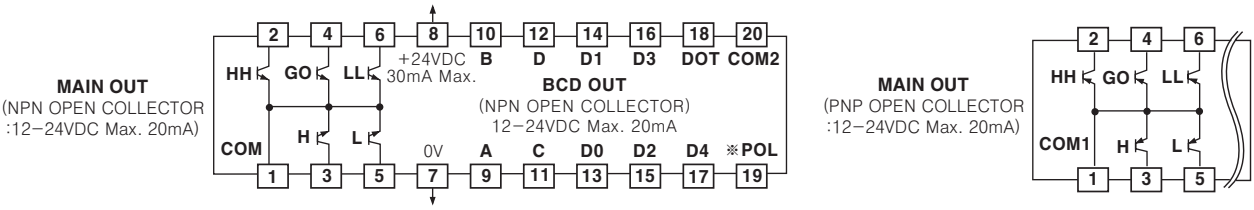
※(★1)It is used for RESET terminal when an operation mode is F13. (See the "Operating mode" F-21 page)
※(★2)Please see F-24 page for BANK function.
※Main output type & sub output type : option

◈Main output+Sub output(Connector)



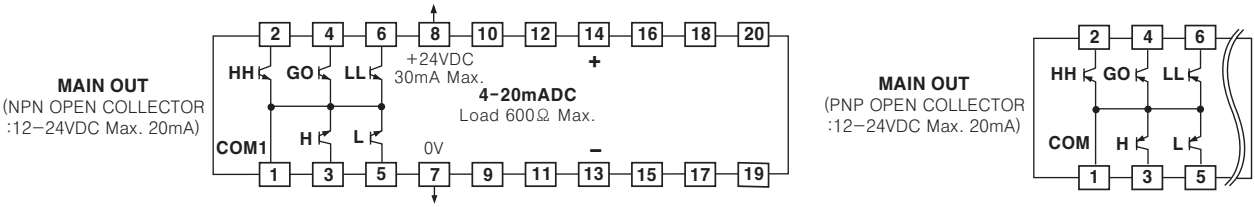
※Hirose Connetor:HIF3BA-20PA-2.54DS

●**MP5W-42/ MP5W-43**(NPN/PNP Open Collector output + BCD output)

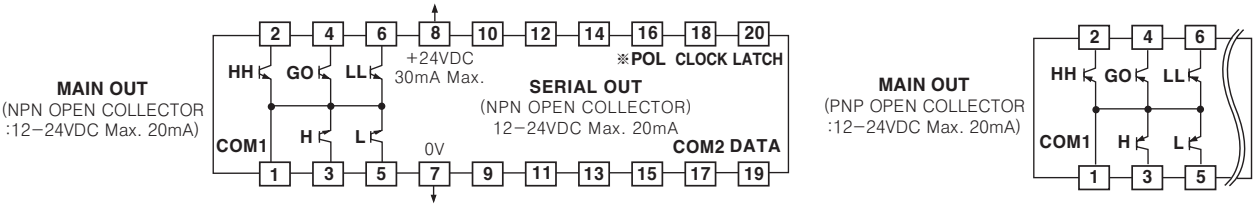


※POL signal is on when it is - display value

●**MP5W-44/ MP5W-45**(NPN/PNP Open Collector output + PV transmission output(4-20mADC) output)

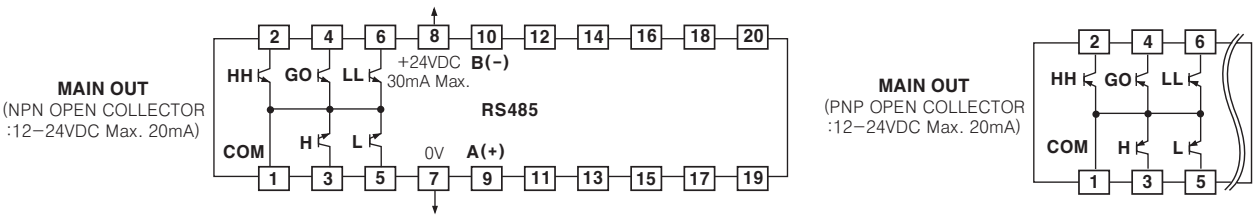


●**MP5W-46/ MP5W-47**(NPN/PNP Open Collector output + Low speed serial output)



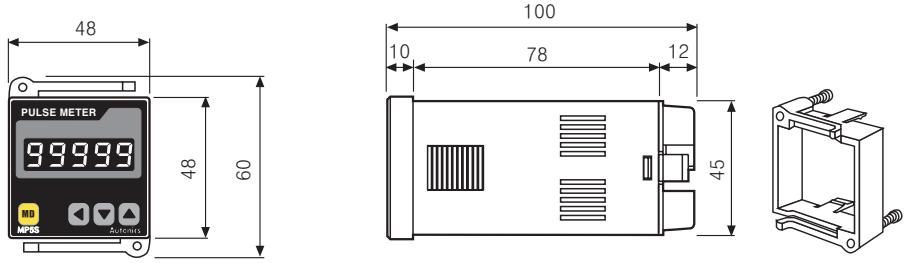
※POL signal is on when it is - display value

●**MP5W-48/ MP5W-49**(NPN/PNP Open Collector output + RS485 communication output)

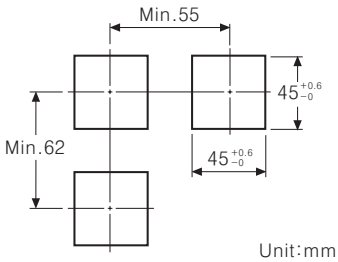


▣Dimensions

●MP5S Series

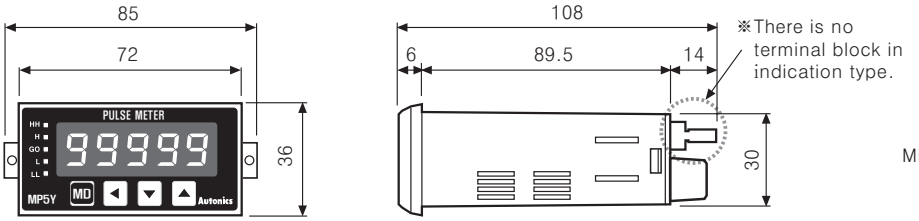


●Panel cut-out



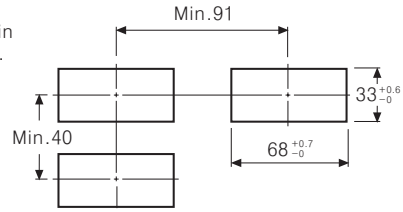
Unit:mm

●MP5Y Series



※Hirose Connetor :HIF3BD-10PA-2.54DS

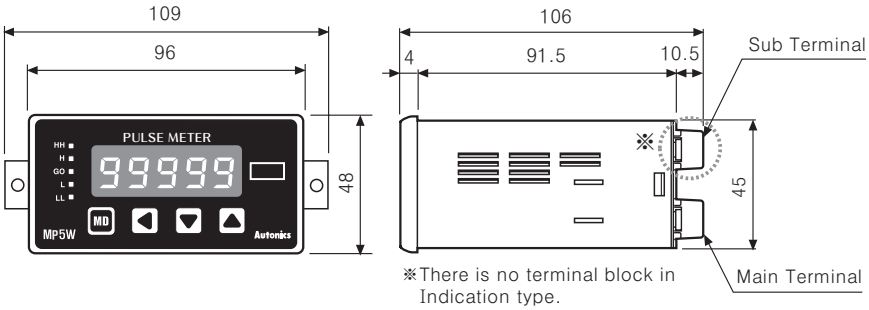
●Panel cut-out



Unit:mm

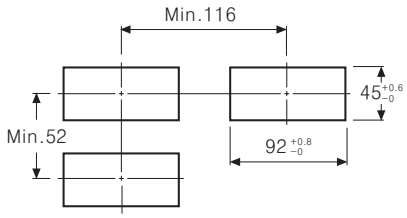
●MP5W Series

[Terminal type]



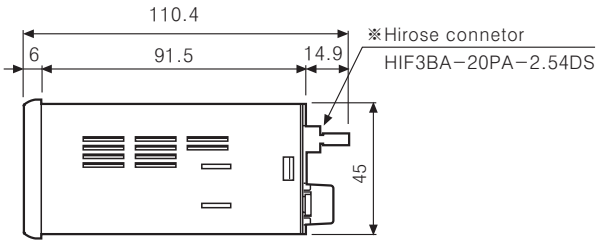
※There is no terminal block in Indication type.

●Panel cut-out

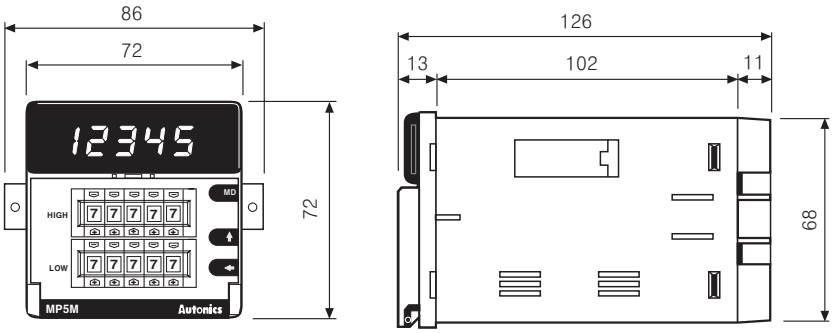


Unit:mm

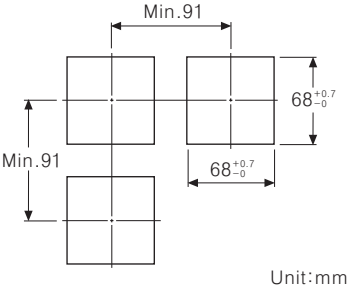
[Connector type]



●MP5M Series



●Panel cut-out



Unit:mm

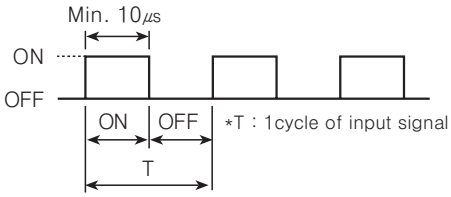
▣Input specifications

◎Input signal

●Non-contact input

• Input frequency: **50kHz Max.**
Standard duty rate of input signal is 1:1, ON/OFF pulse width should be over 10㎲.

• Input voltage Level : ON voltage → 4.5-24V, OFF voltage → 0-1.0V



●Relay contact input

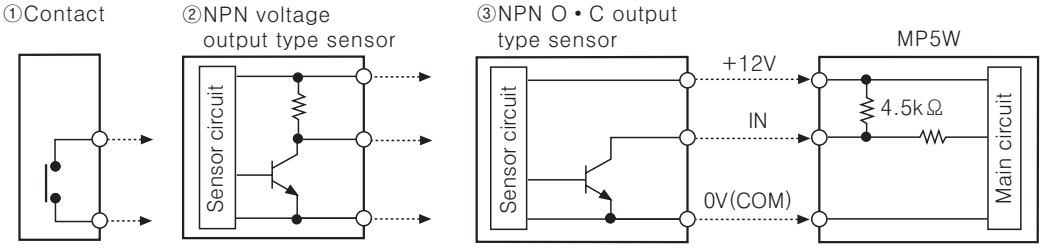
• Input frequency : **45Hz Max.**
ON/OFF pulse width should be over 11ms.

• Relay contact specification : Please use a relay contact that can carry the load current(min. 12VDC 2mA).

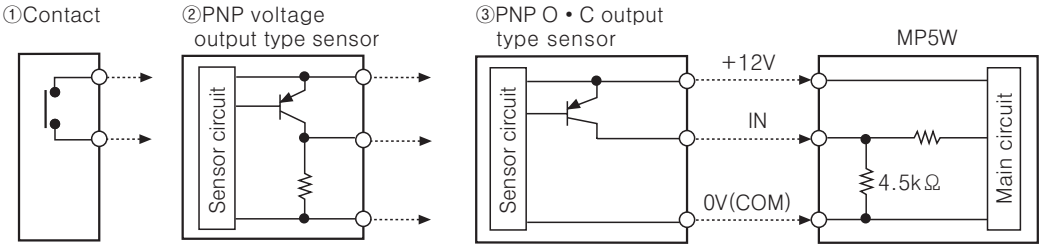
◎Input type

MP5W has NPN input and PNP input and you are able to select in Parameter 1 group.

1) When it is NPN input type



2) When it is PNP input type



※O • C is Open collector output.

▣Output specification(MP5Y/ MP5W Series)

◎BCD Dynamic output

●Output : Display value

●Output 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

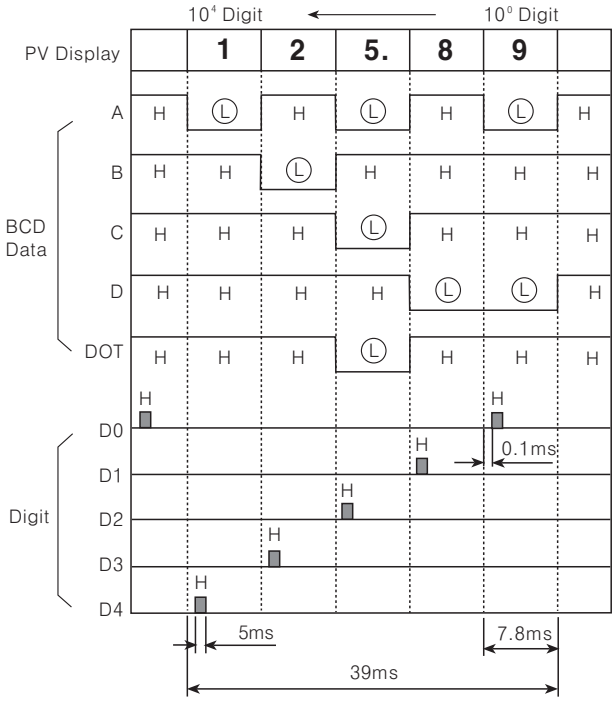
※There is no Dot data output in MP5Y-43, therefore decimal point should be mark in first display plate.

●Output type : NPN Open collector

●Rated load voltage : 12-24VDC

●Max. load current : 30mA(MP5Y)/20mA(MP5W)

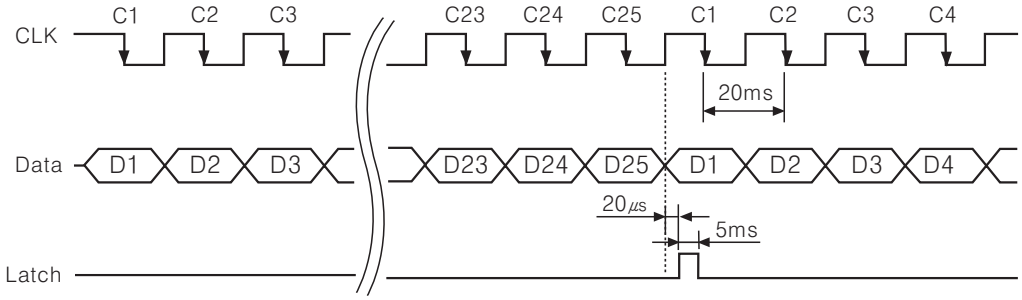
Ex) When BCD Dynamic output is 125.89



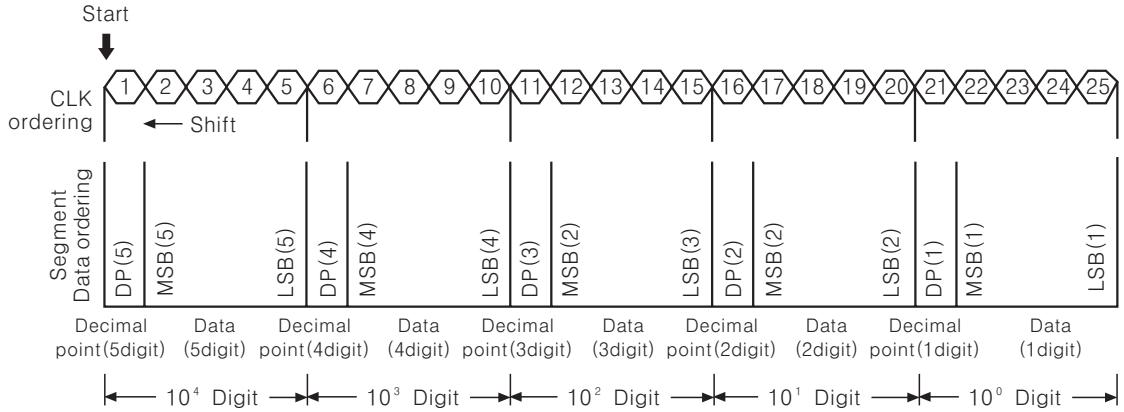
◎Low speed serial output

- ●Output : Display value
- ●Output signal : CLK, Data, Latch
- ●CLK cycle : 50Hz
- ●Output CLK bit : 25 bit
- ●Output Data bit : 25 bit
- ●Output form: NPN Open Collector
- ●Rated load voltag : 12-24VDC
- ●Max. load current : 30mA(MP5Y)/20mA(MP5W)

●Serial transmission time diagram

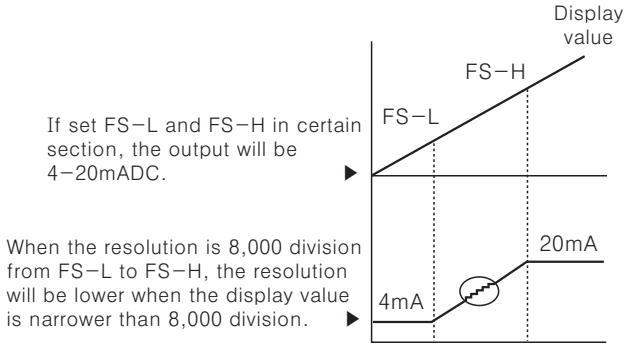


●Data output sequence when it is serial transmission



◎PV transmission output(4-20mADC)

- ●Application : Transmit the measured value
- ●Function : This function is to transmit 4-20mADC converted from measured display value between High limit output(FS-H) and Low limit(FS-L).
- ●Range of High/Low limit output setting
  - • High limit setting range(FS-H)
    : From min. to max within range of measurment
  - • Low limit setting range(FS-L)
    : From min. to max within range of measurment
- ●Resistive load : Max. 600Ω
- ●Resolution : 8000 division



◎RS485 communication output

- ●Address : 0 ~ 99 address(32 channels)
- ●Transmission speed(Baud rate) : 2400/4800/9600 bps
- ●Transmission code : ASCII
- ●Parity Bit : No
- ●Data Bit : 8 Bit
- ●Stop Bit : 1 Bit
- ●Communication 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

※See page F-25 for communication data.

▣Operation mode by each Parameter group chart

- ●Parameter display are different according to each operation mode, see "▣**Parameter**" site.
- ●"◐" : When select the operation mode, the parameter will be displayed.
  "X" : When select the operation mode, the parameter will not be displayed.
- ●"◎" : It is only able to set nPn.h.F or PnP.h.F for In-b sensor made in F11, F12, F13 of operation mode.

Parameter display		F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13
Parameter 0 group	PSt.hh	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
	PSt. h	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
	PSt. L	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
	PSt.LL	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
	h.PEY	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	X
	L.PEY	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	X
Parameter 1 group	nodE	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
	In-A	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
	In-b	X	◐	X	X	X	◐	◐	◐	◐	◐	◎	◎	◎
	out-t	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	X
	hYS	◐	X	X	X	X	X	◐	◐	◐	◐	X	X	X
	GuAr.d ←→ F.dEFY	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	X
	GuAr.d ←→ StAr.t	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	X
	Auto.A	◐	X	X	◐	X	X	◐	◐	◐	◐	X	X	X
	Auto.b	X	X	X	X	X	X	◐	◐	◐	◐	X	X	X
	nEno	X	X	X	X	X	X	X	X	X	X	X	X	◐
Parameter 2 group	P.bAnY	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
	dot	◐	◐	X	X	X	X	◐	◐	◐	◐	◐	◐	◐
	t.unt	X	X	◐	◐	◐	◐	X	X	X	X	X	X	X
	PSt.hh	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
	PSt. h	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
	PSt. L	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
	PSt.LL	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
	PSC.A.H	◐	◐	X	◐	X	X	◐	◐	◐	◐	◐	◐	◐
	PSC.A.Y	◐	◐	X	◐	X	X	◐	◐	◐	◐	◐	◐	◐
	PSC.b.H	X	X	X	X	X	X	◐	◐	◐	◐	X	X	X
	PSC.b.Y	X	X	X	X	X	X	◐	◐	◐	◐	X	X	X
	dISP.t	◐	X	X	X	X	X	◐	◐	◐	◐	X	X	X
Parameter 3 group	FS-h	When it is PV retransmission output, it operates in all mode.												
	FS-L													
	Addr	When it is RS485 communication output, it operates in all modes.												
	bPS													
	rEnot													
	LoC	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐

▣ Operation mode by each Series

Operation mode / Series name	Number of revolution/ Speed/ Frequency	Passing speed	Cycle	Passing time	Time width	Time interval	Absolute rate	Error ratio	Density	Error	Length measurement	Interval	Integration
MP5S/MP5Y/MP5W	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13
MP5M	F1	F2	F3	F4	F5	F6	F7	X	F8	X	F9	F10	F11

▣Model by each Parameter group chart

- ●The parameter has different modes according to each model, therefore see parameter group chart and operation chart for each mode.
- ●◐ : When select the operation mode, the parameter will be displayed.
  X : When select the operation mode, the parameter will not be displayed.

	Parameter \ Model name	MP5S-4N MP5Y-4N MP5W-4N MP5M-4N	MP5Y-41 MP5Y-42	MP5Y-43	MP5Y-44	MP5Y-45	MP5W-41	MP5W-4A MP5W-42 MP5W-43	MP5W-44 MP5W-45	MP5W-46 MP5W-47	MP5W-48 MP5W-49	MP5M-41	MP5M-42
Parameter 0 group	PSt.hh	X	◐	X	X	X	X	◐	◐	◐	◐	X	X
	PSt. h	X	◐	X	X	X	◐	◐	◐	◐	◐	X	X
	PSt. L	X	◐	X	X	X	◐	◐	◐	◐	◐	X	X
	PSt.LL	X	◐	X	X	X	X	◐	◐	◐	◐	X	X
	h.PEY	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
	L.PEY	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
Parameter 1 group	ñodE	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
	In-A	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
	In-b	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
	out-t	X	◐	X	X	X	◐	◐	◐	◐	◐	X	◐
	hYS	X	◐	X	X	X	◐	◐	◐	◐	◐	◐	◐
	GuAr.d ↔ F.dEFY	X	◐	X	X	X	◐	◐	◐	◐	◐	X	◐
	GuAr.d ↔ StAr.t	X	◐	X	X	X	◐	◐	◐	◐	◐	X	◐
	Auto.A	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
	Auto.b	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
	ñEño	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
Parameter 2 group	P.bAnY	◐	X	X	X	X	◐	◐	◐	◐	◐	X	X
	dot	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
	t.unt	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
	PSt.hh	X	◐	X	X	X	X	◐	◐	◐	◐	X	X
	PSt. h	X	◐	X	X	X	◐	◐	◐	◐	◐	X	X
	PSt. L	X	◐	X	X	X	◐	◐	◐	◐	◐	X	X
	PSt.LL	X	◐	X	X	X	X	◐	◐	◐	◐	X	X
	PSC.A.H	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
	PSC.A.Y	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
	PSC.b.H	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
	PSC.b.Y	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
	diSP.t	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
Parameter 3 group	FS-h	X	X	X	◐	X	X	X	◐	X	X	X	X
	FS-L	X	X	X	◐	X	X	X	◐	X	X	X	X
	Addr	X	X	X	X	◐	X	X	X	X	◐	X	X
	bPS	X	X	X	X	◐	X	X	X	X	◐	X	X
	rEñot	X	X	X	X	◐	X	X	X	X	◐	X	X
	LoC	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐

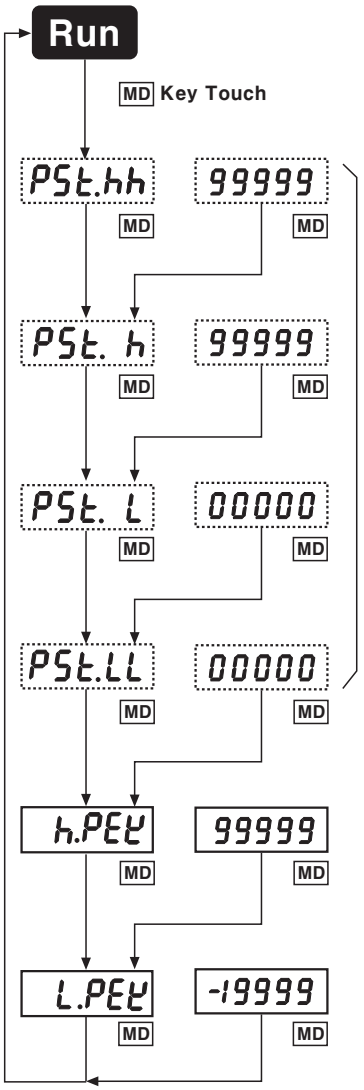
※ : Data bank(P.bAnY)setting is available in only MP5W-4N.

▣Monitoring delay operation function 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



If prssing MD key in **RUN** mode, it will enter into Parameter into Parameter 0 group.

Set HH comparativevalue.
See the "setting range of comparative value by operating mode" for a setting range.
(◀ : Move the setting digit ▼, ▲ : Change the setting value)

Set H comparativevalue.
(◀ : Move the setting digit
▼, ▲ : Change the setting value)

(★1)

Set L comparativevalue.
(◀ : Move the setting digit
▼, ▲ : Change the setting value)

Set LL comparativevalue.
(◀ : Move the setting digit
▼, ▲ : Change the setting value)

Display High Peak value among measuring values.
If press ◀ Key for 2 sec, The Peak value will be reset and
it displays a current measuring value

Display Low Peak value among measuring values.
If press ◀ Key for 2 sec, The Peak value will be reset and
it displays a current measuring value

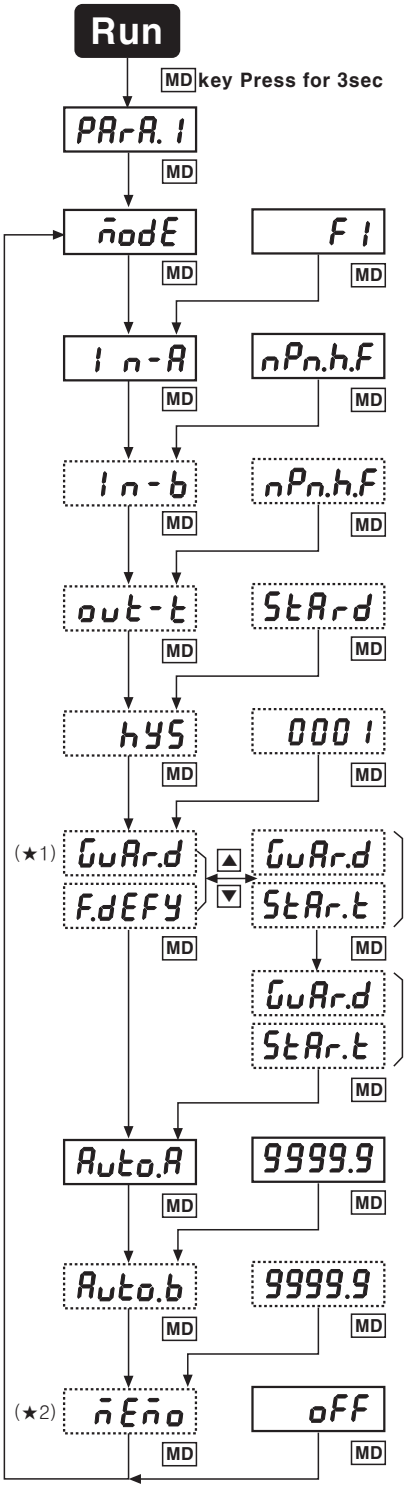
●Setting range of comparative value by operating mode

Operating mode	Setting range
F1, F2, F7, F9, F11, F12, F13	0 ~ 99999
F3, F4, F5, F6	0 ~ Setting time range
F8, F10	−19999 ~ 99999

※The setting range differs by setting position of decimal point.

※If pressing MD key in **RUN** mode, it will enter into Parameter 0 group.
※When entering into Parameter 0 group, parameter and set dara value flash as 1 sec. cycle.
※(★1) • The parameter shown in dotted line is displayed only for comparative value setting type.
• If selecting F mode among output modes, it is to set H and L deviation only, therefore [PSt.hh] and [PSt.LL] parameter will not appear.
※After changing set data value in each parameter, data will be saved by pessing MD key for 2sec and return to **RUN** mode, but if you do not touch any key for 60sec while change data, if will return to **RUN** mode whit previous set value.
If no comparing value setting function type, [h.PEU] Parameter will appear when entering parameter 0 group.

●Parameter 1 group



This is parameter 1 group.
Display **PArA. 1** for 2 sec and move to **nodE**.

Select operation mode.
→F 1 →F2 →F3 ~ F 13
(▼, ▲: Change the operation mode)

Set the sensor type of input A.
→ nPn.h.F →nPn.L.F → PnP.h.F → PnP.L.F
(▼, ▲: Change the)

Set the sensor type of input B.
→ nPn.h.F →nPn.L.F → PnP.h.F → PnP.L.F
(▼, ▲: Change the sensor type)

●Input sensor

NPN input type
• Transistor input : nPn.h.F • Contact input : nPn.L.F
PNP input type
• Transistor input : PnP.h.F • Contact input : PnP.L.F

Select the output mode.
→StArd →out-h →out-L →out-b →out-1 →out-F
(▼, ▲: Change the output mode)

Set the hysteresis for the output .
Setting range : 0 ~ 9999 (The hysteresis range differs by the setting position of desimal point. See F−24 page)
(▼, ▲: Change the setting value)

Select starting time correction function (StAr.t) or comparative output (L,LL) limit function(F.dEFY)
→F.dEFY → StAr.t
(▼, ▲: Change the setting value)

The retention time is set at the thetimer furction of starting operation(StAr.t)
setting range : 0.0 ~ 99.9 sec
(◀: Move the digit ▼, ▲ : Change the setting value)

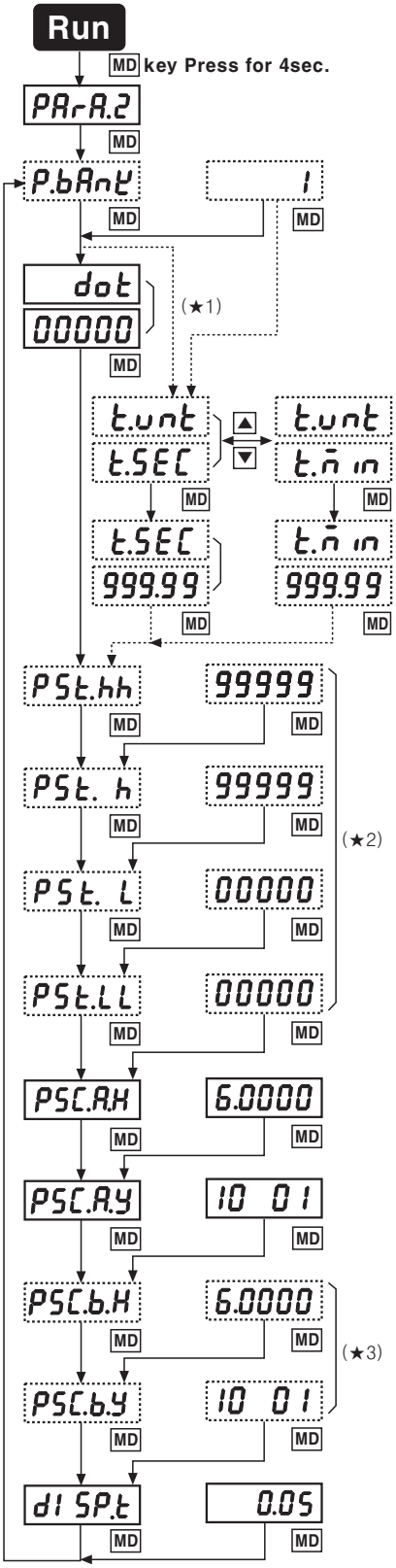
Set the Auto−Zero time of INA input.
Setting range : 0.1 ~ 9999.9 sec
(◀: Move the digit ▼, ▲ : Change the setting value)

Set the Auto−Zero time of INB input.
Setting range : 0.1 ~ 9999.9 sec
(◀: Move the digit ▼, ▲ : Change the setting value)

It sets the memory retention.
→oFF → on (oFF : Memory retention, on : No memory retention)
(▼, ▲: Change the setting value)

※If pressing MD key for 3 sec. in **RUN** mode, it will enter into Parameter 1 group.
※When entering into Parameter 1 group, parameter and set data value flash as 1 sec. cycle.
※The parameter shown in dotted line is not displayed by operating mode.
(See F−15page, "**Setting range of comparative value by operating mode**".)
※(★1) The parameter is displayed in case of comparative value setting type only.
(But, only MP5M−42 is available among MP5M Series.)
※(★2) The Selecting function of memory retention is displayed when the mode is F13(Integration mode).
(But, F11 mode for MP5M−42)
※After changing set data value in each Parameter, data will be saved by MD pressing key for 2sec and return to **RUN** mode, but if you do not touch any key for 60sec while changing data, it return to **RUN** mode with previous set value.

●Parameter 2 group



Display **PArA.2** for 2 sec. and move to [**dot**] parameter automatically.
This is Parameter 2 group.

Select Data Bank.
1 → 2 (▼ , ▲ : Change the setting value)
Only MP5W type has the Data bank parameter.

Set the decimal point position of display value.
00000 → 0000.0 → 000.00 → 00.000 → 0.0000

It will be displayed in F3, F4, F5, F6 operation mode and set the **time unit**.
t.SEC → t.Min (▼ , ▲ : Change the setting value)

It will be displayed in F3, F4, F5, F6 operation mode and set the time range.
999.99 → 9999.9 → 99.59.9 → 9.59.59(sec.) → 99999 ← 999.59(min.) (▼ , ▲ :Change the setting value)

●Time range by time unit

SEC	MIN
999.99sec.	999.99min.
9999.9 sec.	9999.9min.
99min59.9sec.	99hour59.9min.
9hour59min59sec.	999hour59min.
99999sec.	99999min.

Set the comparative value HH.
See "Setting range of comparative value by operating mode" for setting range
(◀ :Move the setting digit ▼, ▲ :Change the setting value)

Set the comparative value H.
See "Setting range of comparative value by operating mode" for setting range
(◀ :Move the setting digit ▼, ▲ :Change the setting value)

Set the comparative value L.
See "Setting range of comparative value by operating mode" for setting range
(◀ :Move the setting digit ▼, ▲ :Change the setting value)

Set the comparative value LL.
See "setting range of comparative value by operating mode" for setting range
(◀ :Move the setting digit ▼, ▲ :Change the setting value)

●Setting range of comparative value by operation mode

Operating mode	Setting range
F1, F2, F7, F9, F11, F12, F13	0 ~ 99999
F3, F4, F5, F6	0 ~ Setting time range
F8, F10	−19999 ~ 99999

※The setting range differs by setting position of decimal point.

Set the prescale value of input A mantissa(X).
Setting range : 0.0001 ~ 9.9999
(◀ :Move the setting digit ▼, ▲ :Change the setting value)

Set the prescalevalue of input A an exponent(y).
Setting range : 10 -9 ~ 10 09 (10^{-9} ~ 10^{9})
(◀ :Move the setting digit ▼, ▲ :Change the setting value)

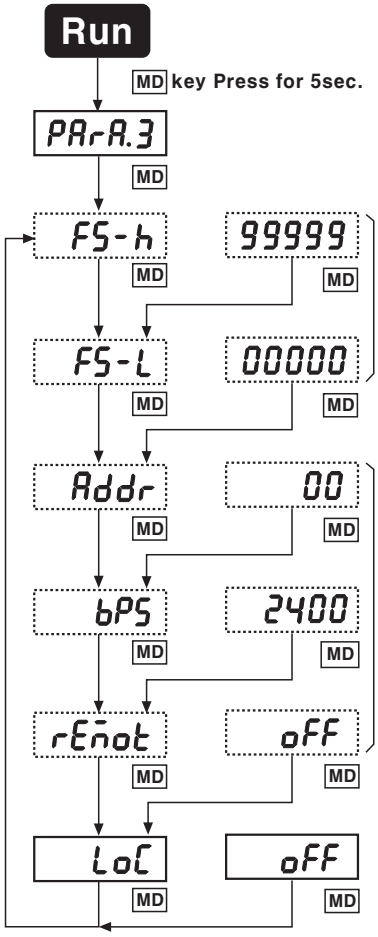
Set the prescale value of input B mantissa(X).
Setting range : 0.0001 ~ 9.9999
(◀ :Change the digit ▼, ▲ :Change the setting value)

Set the prescalevalue of input A an exponent(y).
Setting range : 10 -9 ~ 10 09(10^{-9} ~ 10^{9})
(◀ :Change the digit ▼, ▲ :Change the setting value)

Select the display cycle.
0.05 → 0.5 → 1 → 2 → 4 → 8 (Unit:sec)
(▼, ▲ :Change the setting value)

※If pressing MD key for 4sec.in **RUN** mode, [PArA.1] will be displayed after [PArA.2]. If releasing MD key, it is entering into Parameter 2 group.
※When entering into Parameter 2 group, parameter and set data value flash by 1sec cycle.
※(★1) It will be displayed only in F3, F4, F5, F6 modes.
※(★2) If selecting F mode among output modes, it is set H and L deviation only, therefore [PSt.hh] and [PSt.LL] parameter will not appear.
※(★3) It will be displayed only in F7, F8, F9, F10 modes. But in case of MP5M typw, it is displayed only in F7, F8 modes.
※After changing the setting value in each Parameters, if pressing MD key for 2sec., data will be saved then return to **RUN**.
If no keys are touched for 60sec.,previous data will be saved and return to **RUN**.

●Parameter 3 group



This is Parameter 3 group.
Display **PArA.3** for 2 sec. and move to [**FS-h**] parameter automatically.

Set the High-limit value of PV retransmission output.
See "setting range of comparative value by operating mode" for setting range
(◀:Move the setting digit ▼, ▲:Change the setting value)

Set the Low-limit value of PV retransmission output.
(◀:Move the setting digit ▼, ▲:Change the setting value)

Set the communication Address.
setting range : **00** ~ **99** (32channel)
(◀:Move the setting digit
▼, ▲:Change the setting value)

Set the communication Speed.
→ 2400 → 4800 → 9600 →
(◀:Move the setting digit
▼, ▲:Change the setting value)

Select the Remote and the Local.
→ oFF → on → (**oFF** : using, **on** : non-using)
(◀:Move the setting digit ▼, ▲:Change the setting value)

Enable to lock the key for each parameter group
→ oFF → LoC.0 → LoC.1 → LoC.2 → LoC.3 →
(◀:Move the setting digit
▼, ▲:Change the setting value)

- oFF : Lock cancel
- LoC.0 : P0 ~ 3 Lock
- LoC.1 : P1 ~ 3 Lock
- LoC.2 : P2 ~ 3 Lock
- LoC.3 : P3 Lock only

●Setting range of comparative value by operation mode

Operating mode	Setting range
F1, F2, F7, F9, F11, F12, F13	0 ~ 99999
F3, F4, F5, F6	0 ~ Setting time range
F8, F10	−19999 ~ 99999

※The setting range differs by setting position of decimal point.

※If pressing MD key for 5sec. in RUN mode, [**PArA.1**] and [**PArA.2**]will be displayed after [**PArA.3**].
If releasing MD key, it is entering into Parameter 3 group.
※When entering into Parameter 3 group, parameter and data value flash as 1sec. cycle.
※(★1)The parameter is displayed in case of PV transmission output type only.
※(★2)The parameter is displayed in case of RS485 transmission output type only. When selecting Remote[**rEnot**], you cannot operate front keys.
※After changing set data value in each parameters, data will be saved by pressing MD key for 2sec and return to **RUN** mode, but if you do not touch any key for 60sec while changing data, it will return to **RUN** move with previous set value.

▣Factory defalts

●Parameter 1 group

Mode	Setting range
nodE	F1
In-A	nPnhF
out-t	StArd
hYS	0001
GuArd	F.dEFY
AutoA	9999.9
nEno	oFF

●Parameter 2 group

Mode	Setting range
P.bAnd	1
dot	00000
PSthh	99999
PSt. h	99999
PSt. L	00000
PStLL	00000
PSCAH	6.000
PSCAY	10 01
dI SP.t	005

●Parameter 3 group

Mode	Setting range
FS-h	99999
FS-L	00000
Addr	00
bPS	2400
rEnot	oFF
LoC	oFF

※Setting specification may not be displayed because of operation mode or output specification.

▣Operation mode

- ●Select operation mode from mode (mode) of Parameter 1 group.
- ●There are 13 kinds of operation mode in this unit.
  There are 11 kinds of operation mode in MP5M series.

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

: This mode is to display calculated frequency or number of revolutions or 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)]

Several targets $\alpha = 60 \times \frac{1}{N}$

3)Speed(m/min) = f × α [α = 60 × L(m)]

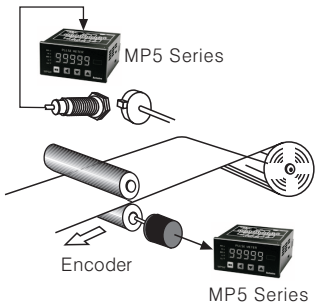
Several targets $\alpha = 60 \times \frac{\pi D}{1000N}$

※L = The length of conveyor moved for 1 pulse cycle[m]
N : Detection target per 1 revolution
α : Prescale value

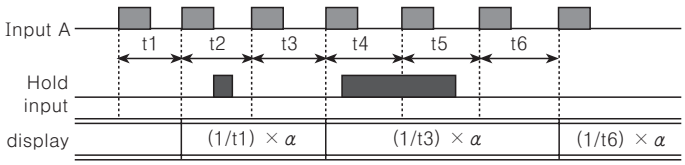
●Display value and display unit

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 default:rpm



●Time chart



※α : Prescale value

●Mode F2 (Passing speed)

: Display the passing speed between ON of input A and ON of input B.

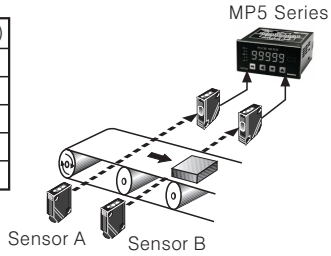
Passing speed(V) = f × α [α = L(m)]

※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]
※α : Prescale value

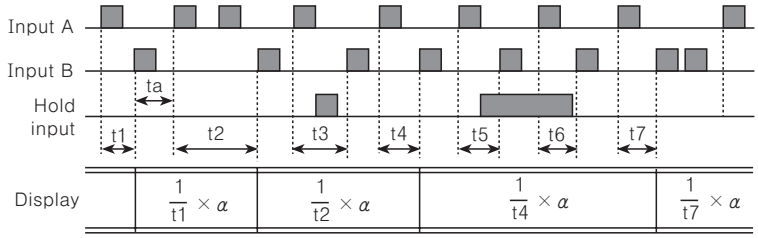
●Display value and display unit

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



ta : It requires min. 20ms for return time

●Mode F3 (Cycle)

Display the time from when input A is ON to the next ON.

Cycle(T) = t

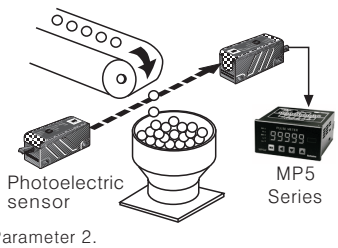
※t : Measurement time [sec]

※ [ ] is not displayed in MP5M-4N, MP5M-41, MP5M-42.

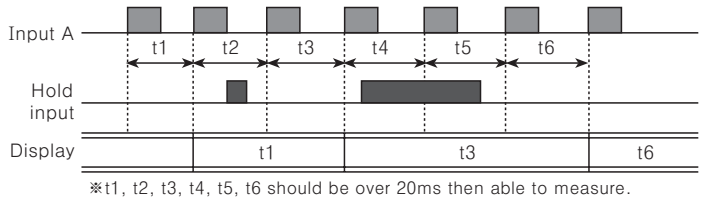
●Display value and display unit

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.unit (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 pass time of certain distance to measure the time between ON and the next ON of Input A.

Passing time(sec) = t × α

$$\left[\alpha = \frac{L(m)}{\text{Moving distance within 1pulse cycle}[m]}\right]$$

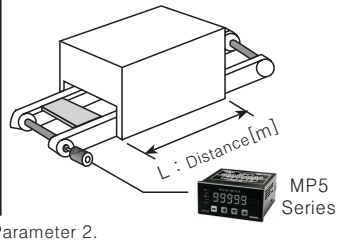
※t : Measurement time[sec]
L : Certain distance[m]
※α : Presale value

※ [ ] is not displayed in MP5M-4N, MP5M-41, MP5M-42.

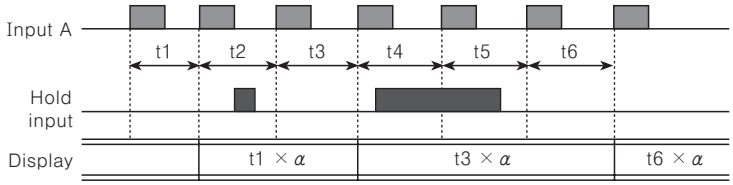
●Display value and display unit

Display value	Display unit	
	SEC	MIN
Passing time	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



●Mode F5(Time width)

It displays the ON time of input A.

Time width(T) = t

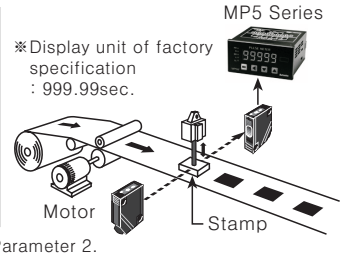
※t : ON measurement time of input A[sec]

※ [ ] is not displayed in MP5M-4N, MP5M-41, MP5M-42.

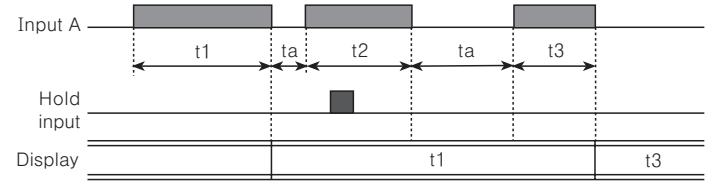
●Display value and display unit

Display value	Display unit	
	SEC	MIN
Time width	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



ta : It requires min. 20ms for return time

●Mode F6(Time interval)

It displays the time from input A is ON to input B is ON.

Time difference(T) = t(Ta~Tb)

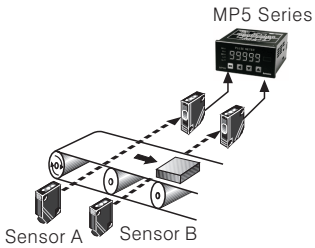
※t(Ta ~ Tb) : The measured time from input A is ON to input B is ON[sec]

※ [ ] is not displayed in MP5M-4N, MP5M-41, MP5M-42.

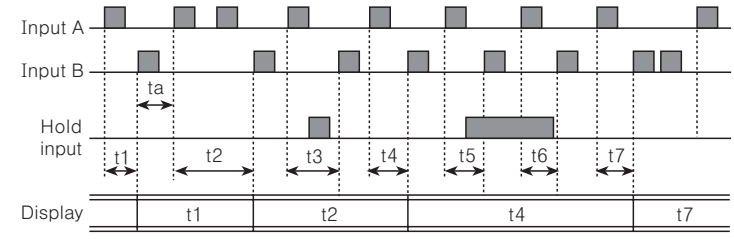
●Display value and display unit

Display value	Display unit	
	SEC	MIN
Time interval	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



ta : It requires min. 20ms for return time

●Mode F7(Absolute rate)

It displays how many percentage fast or late, speed, value etc. of input B against input A

Absolute rate = (Input B / Input A) × 100%

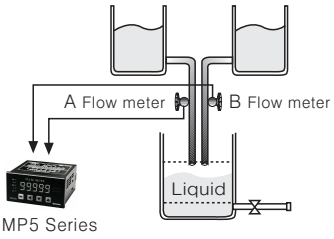
$$\text{Absolute rate} = \frac{\text{Frequency of input B[Hz]} \times B\alpha}{\text{Frequency of input A[Hz]} \times A\alpha} \times 100[\%]$$

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

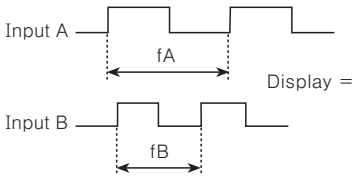
※There is no error mode in MP5M-4N, MP5M-41, MP5M-42 models.

●Display value and display unit

Display value	Display unit
Absolute rate	%



●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(%) fast or late of input B against input A.

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

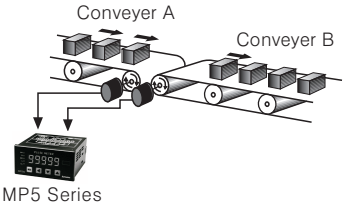
$$\text{Error ratio} = \frac{(\text{Frequency of input B[Hz]} \times B\alpha) - (\text{Frequency of input A[Hz]} \times A\alpha)}{\text{Frequency of input A[Hz]} \times A\alpha} \times 100[\%]$$

※There is no error ratio mode in MP5M-4N, MP5M-41, MP5M-42 models.

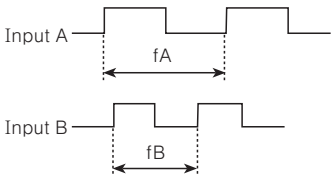
●Display value and display unit

Display value	Display unit
Error ratio	%

※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.

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

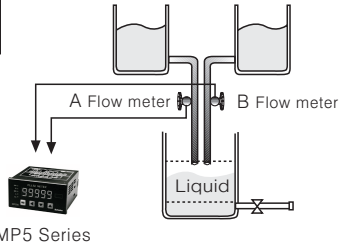
$$\text{Density} = \frac{\text{Frequency of input B[Hz]} \times B\alpha}{(\text{Frequency of input A[Hz]} \times A\alpha) + (\text{Frequency of input B[Hz]} \times B\alpha)} \times 100[\%]$$

※F8 mode is applied to MP5M-4N, MP5M-41, MP5M-42 models.

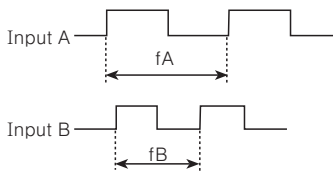
●Display value and display unit

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 rate)

It displays the error between standard input A and comparing input B.

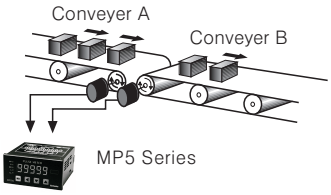
Error = Input B - Input A
Error = (Frequency of input B[Hz] × Bα)
- (Frequency of input A[Hz] × Aα)

※There is no error mode in MP5M-4N, MP5M-41, MP5M-42 models.

●Display value and display unit

Display value	Display unit
Error	END User setting unit

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



●Time chart

※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 pulses while input B is ON.

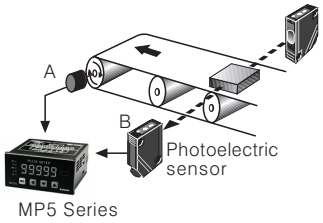
Length measurment = P × α
※P : Number of input A pulse,
α : Prescale value

※F9 mode is applied to MP5M-4N, MP5M-41, MP5M-42 models.

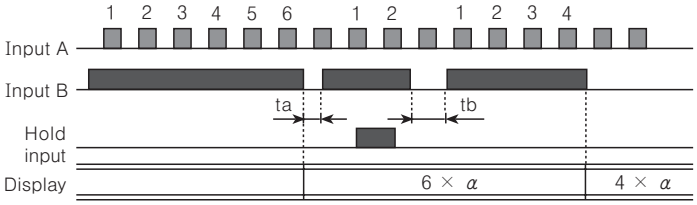
●Display value and display unit

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

※Factory default(Unit) : Quantity[EA]



●Time chart



※ta, tb : It requires 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

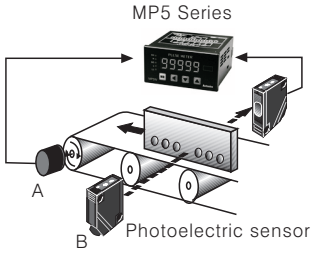
※P : Number of input A pulse,
α : Prescale value

※F10 mode is applied to MP5M-4N, MP5M-41, MP5M-42 models.

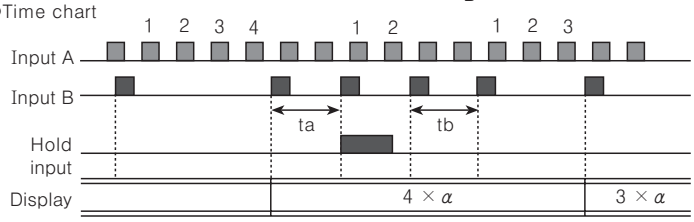
●Display value and display unit

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

※Factory default(Unit) : Quantity[EA]



●Time chart



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

●Mode F13(Integration)

It displays the counting value against pulses of input A.

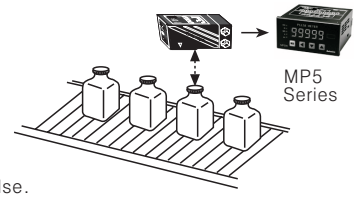
Integration = P × α

※P : Pulse number of input A,
α : Prescale value

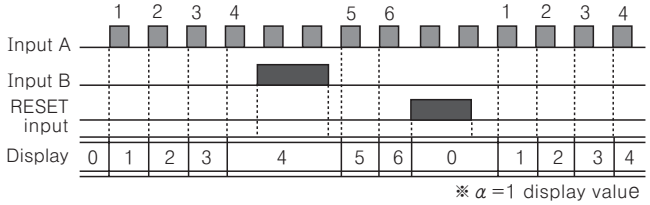
※F11 mode is applied to MP5M-4N, MP5M-41, MP5M-42 models.

●Display value and display unit

Display value	Display unit
Integration	Quantity[EA]



●Operation and Time chart
①It is counting the number of Input pulse.
②Input B is an Enable input signal, when this is ON, it stops the display value and counting Input A. When it is OFF, input A is counting again.

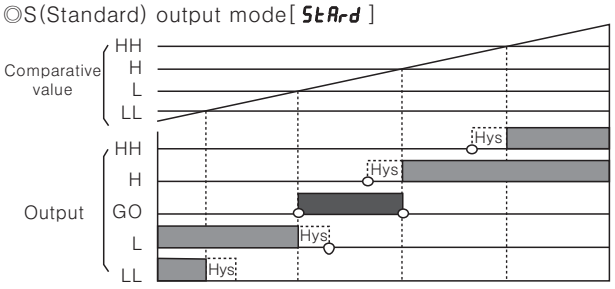


※α=1 display value

▣Output mode

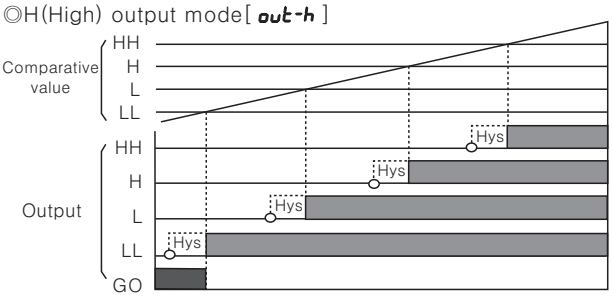
- ●Select output mode in **out-t**(output type) of Parameter1 group.
- ●MP5 series are 6 kinds of output mode. There is no output mode in indicator type, MP5Y-43/44/45, MP5M-41 models.
  - ☞ S(Standard) output mode, H(High) output mode, L(Low) output mode, B(Block) output mode, I(One shot)output mode, F(Deviation)output mode.
- ●B output mode : Comparative setting value condotion is that B output mode should be LL<L<H<HH, F output mode should be L<H, other S, H, L, I output modes operate individually regardless to value size of comparative setting value. (There is no GO, HH, LL, OUTPUT in MP5M-42)

◎S(Standard) output mode[**StAnd**]



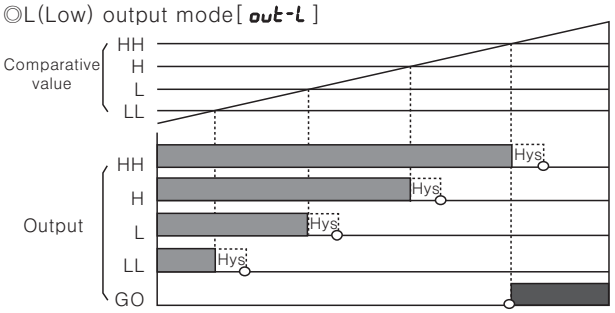
Display value ≥ Comparative value HH ☞ HH output ON
Display value ≥ Comparative value H ☞ H output ON
Display value ≤ Comparative value L ☞ L output ON
Display value ≤ Comparative value LL ☞ LL output ON
GO output : When there are no HH, H, L, LL output, it will be ON.

◎H(High) output mode[**out-h**]



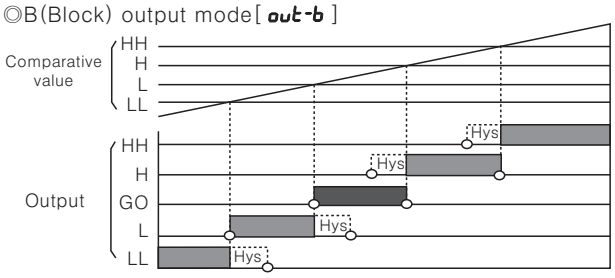
Display value ≥ Comparative value HH ☞ HH output ON
Display value ≥ Comparative value H ☞ H output ON
Display value ≥ Comparative value L ☞ L output ON
Display value ≥ Comparative value LL ☞ LL output ON
GO output : When there are no HH, H, L, LL output, it will be ON.

◎L(Low) output mode[**out-L**]



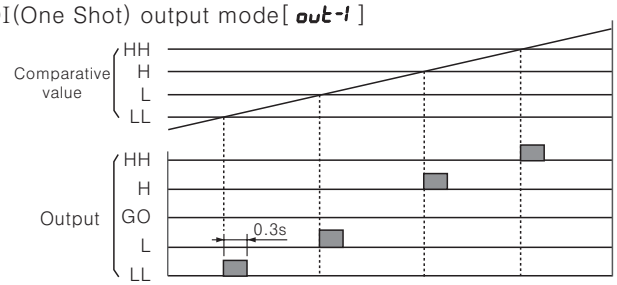
Display value ≤ Comparative value HH ☞ HH output ON
Display value ≤ Comparative value H ☞ H output ON
Display value ≤ Comparative value L ☞ L output ON
Display value ≤ Comparative value LL ☞ LL output ON
GO output : When there are no HH, H, L, LL output, it will be ON.

◎B(Block) output mode[**out-b**]



Display value ≥Comparative value HH ☞ HH output ON
Comparative value HH >Display value ≥Comparative value H ☞ H output ON
Comparative value LL >Display value ≥Comparative value L ☞ L output ON
Display value ≤ Comparative value LL ☞ LL output ON
GO output : When there are no HH, H, L, LL output, it will be ON.

◎I(One Shot) output mode[**out-I**]



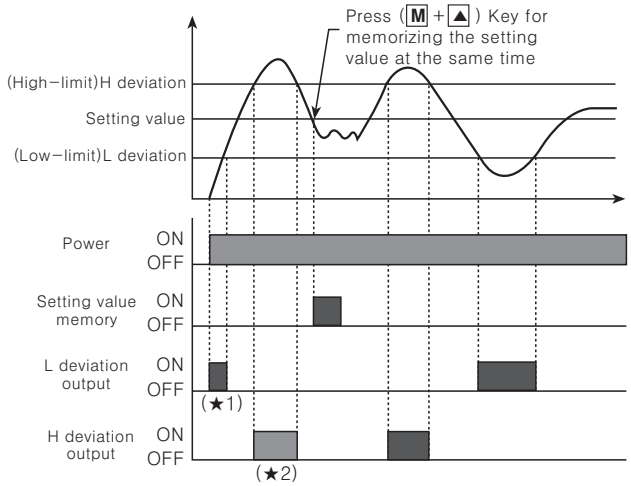
Display value ≥Comparative value HH ☞ HH output ON
Comparative value HH >Display value ≥Comparative value H ☞ H output ON
Comparative value H >Display value ≥Comparative value L ☞ L output ON
Comparative value L >Display value ≥Comparative value LL ☞ LL output ON

※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 it outputs when exceed the deviation of H, L.

- ●The setting value memory : Memorize the current display value as the setting value with pressing(M + ▲) 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[**PSt. h**], L[**PSt. 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 : Display value ≤ L Comparative value ☞ L Comparative output ON, Display value ≥ H Comparative value ☞ H Comparative output ON

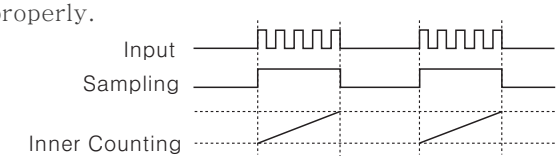


※(★1)When select the comparative output adjustment function, output will not be come.
※(★2)Output position may be different from above graph.
※There are no HH, GO, LL outputs in F output mode.
※Even thought set the deviation as "0(Zero)", it will work as setting "1".

▣Function

◎Display sampling time

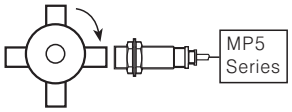
This model is cycle measurement calculation type. It displays reciprocal number of measuring time that detecting time of target. Measuring accuracy may be dropped by short of cycle measuring time if the target is revolving with high speed.
This function is to change the display cycle in range of (0.05/0.5/1/2/4/8sec.) and displays the average value of measuring value then able to prevent measuring accuracy drop when revolving with high speed. When the measuring time is iong, the response of preset output type is delayed.
Therefore, please adjust the measuring time properly.



※Select display sampling time in parameter 2.

◎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 specification of measurement.
It will display frequency or RPM from prescale value by measuring the input A frequency, For example, the prescale value when need to display the RPM as below.
For example, when need to display rpm, what is α value of prescale ?



$$RPM = f \times \alpha$$
$$= f \times 60 \times (1/N)$$
$$= f \times 60 \times (1/4)$$
$$= f \times 60 \times 0.25$$
$$= f \times 15$$

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

●Prescale value(α =15) setting
Set Prescale value(α) as (X and y) separately in PSC.A.H, PSC.A.y(PSC.b.H, PSC.b.y) of Parameter 2group.
Set Prescale(α =15) as (X):1,5000, y:10^{1}
Also you are able to get the same display value even though set as X=0.1500, y=10^{2}
X setting range : 0.0001~9.9999
Y setting range : 10^{-9} ~10^{9}

◎Display peak value monitoring function

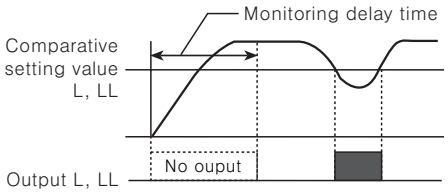
This function is to save High Peak value h.PEY or Low Peak value L.PEY against display value.
●This function is to save the High Peak(h.PEY) value or Low Peak(L.PEY)value against the display value.
●See Parameter 0 for Reset.

◎Monitoring delay time function

This function is for the stable control to limit L, LL output until certain output is come or to limit all output during the equipment will reach to be stable status against various change of input such as the staring current when the motor is running after power on.

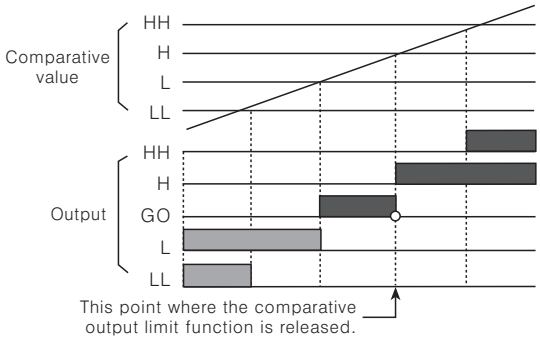
There are the starting correction timer function and comparative output limit function in the monitoring delay function.
(Select it in GuAr.d mode of Parameter 1)

①The starting correction timer function(StAr.t mode of Parameter 1 group). This function is to make the output not come for the setting time.
(Time setting range 0.0 to 99.9sec.)
Applicable output mode : S, H, L, B, I, F mode



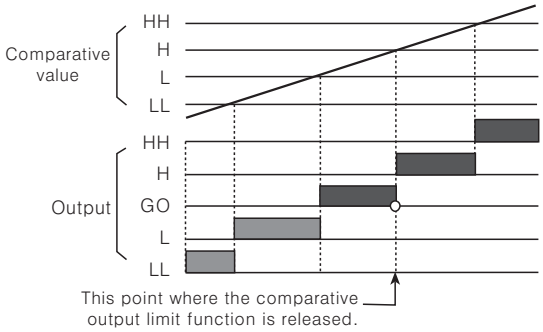
②Comparative output limit function(F.dEFY mode of Parameter1 group)This function is to limit the LL, L output before H or HH output.
Applicable output mode : S, B, F mode

●The output mode is S output mode



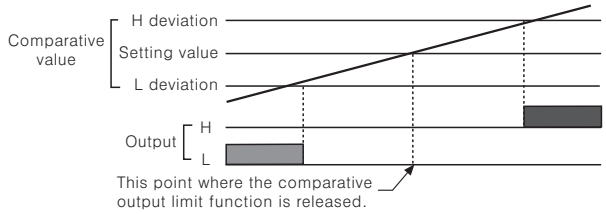
※L, LL comparative output(■) does not come on after supplying power.
※When the output mode is S output mode, the setting value of HH, H, L, LL are not effected by each other. Therefore HH value may be equal or lower than LL value.

●The output mode is B output mode



※L, LL comparative output(■) does not come on after supplying power.
※Each setting value of HH, H, LL, L does not effect on each other. Therefore HH value may be equal or smaller than LL value.
Setting value should be LL<L<H<HH in sequence.

●The output mode is F output mode



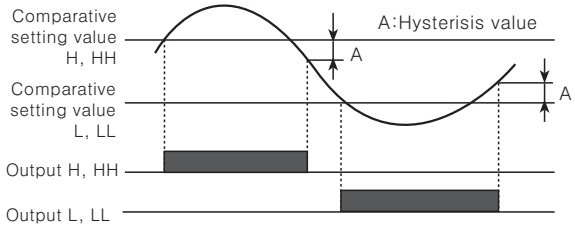
※Initial L comparative output( ) does not come on after supplying power.

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

※H and L deviation does not effect on each other. Therefore, H deviation setting value may be equal or smaller than L deviation setting value.

◎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 ~ 9999
0000.0	000.0 ~ 999.9
000.00	00.00 ~ 99.99
00.000	0.000 ~ 9.999
0.0000	0.000 ~ 0.999

※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 "**hYS**" mode of Parameter 1 group.

◎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".

●Set the time in "**AUto.A**" mode of parameter1 group.

◎Lock setting function

This function is to set the enable or disable of each Parameter.

●Off : No lock function

●LoC 0 : P0 ~ P3 Lock(Lock Parameter 0 ~ 3)

●LoC 1 : P1 ~ P3 Lock(Lock Parameter 1 ~ 3)

●LoC 2 : P2 ~ P3 Lock(Lock Parameter 2 ~ 3)

●LoC 3 : P3 Lock(Lock Parameter 3 only)

※Set lock function in paramert 3 group.

◎Inner hardware Lock setting function

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

●h0(Hardware Lock0)
It is able to check and change **LoC** mode in Parameter 3 group.

●h1(Hardware Lock1)
It is able to check and change **LoC** mode in Parameter 3 group but, unable to change.

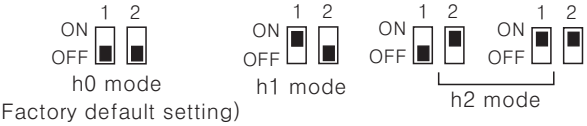
●h2(Hardware Lock2)
It is unable to check and change **LoC** mode in Para-meter 3 group

●It is possible to lock or unlock after supplied power in inner hardware Lock setting.

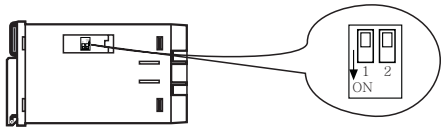
●MP5S, MP5Y, MP5W Series

※Inner hardware lock setting pin is on inner PCB.

●MP5M Series



※The position of inner hardware lock setting switch.



◎Data bank switching function

This function is to program 2 sets of comparative setting value and 2 kinds of prescale value(Data bank 1, Data bank 2) then able to select.

●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.

●To save comparing value and prescale value at each data bank, select data bank to be saved at **P.bAnK** mode of parameter2, then when setting comparing value and prescale value, it will save in related data bank.

※This function is only for MP5W series.

◎Time unit selection function

Enable to display PV value in various time ranges.

- Time unit selection functioncan be set in parameter 2 group.
- Applicable mode : Mode F3 to F6

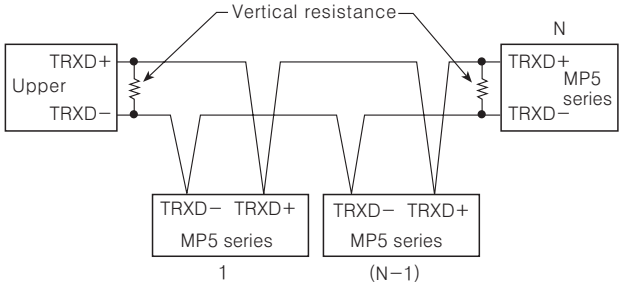
SEC	MIN
999.99sec.	999.99min.
9999.9sec.	9999.9min.
99min59.9sec.	99hour59.9min.
9hour59min59sec.	999hour59min.
99999sec.	99999min.

※There is no "dot" setting mode when set the time unit display function.

※Time range of( ) part is not displayed in MP5M series.

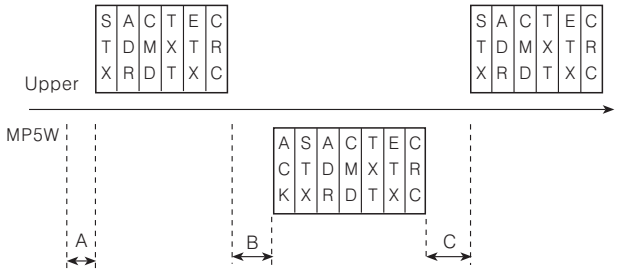
▣Communication output

◎System ordering



◎Communication control ordering

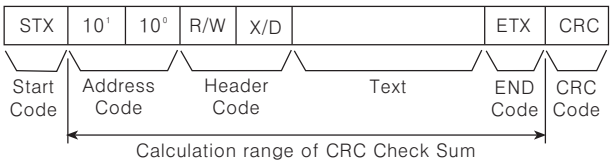
1. The communication control ordering of MP5 series is protocol(Not compatible with other system).
2. After 4sec. being supplied the power in to upper system, then able to start communicating.
3. Initial communication will be started by upper system. When Command signal come out from upper system then MP5 series will response.
   If there is no response after 3times of the command signal from upper system, error will be occurred.



※A → Min. 4sec, B → Max. 300msec,
C → Min. 20msec

◎Communication Command and Block

Format of Command and Response



①Start Code

It shows the first of BLOCK

STX → [02H], in case of Response, ACK/NAK will be added.

②Address Code

This code is upper system can discern MP5 series and able to set within range of 00 to 99. (BCD ASCII)

③Header Code

It shows Command as 2 alphabets as below.

RX(Read request) → R[52H], X[58H]

RD(Read response) → R[52H], D[44H]

WX(Write request) → W[57H], X[58H]

WD(Write response) → W[57H], D[44H]

④Text

It indicates the detail contents of Command /Response.(See Command)

⑤END Code

It indicates the end of BLOCK. ETX → [03H]

⑥CRC

CRC is Cyclic Redundancy Check and called polynominal code. CRC is for more reliable transmit/receive to check the error between transmitter and reciever.

There are CRC−8, CRC−16 and CRC−32, CRC−8 has been adopted in MP5 series according to CCITT−8 Polynomial regulation. (See CRC table)

Result value is HEX 1 Byte.

<CRC Table >

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0x00	0x5E	0xBC	0xE2	0x61	0x3F	0xDD	0x83	0xC2	0x9C	0x7E	0x20	0xA3	0xFD	0x1F	0x41
1	0x9D	0xC3	0x21	0x7F	0xFC	0xA2	0x40	0x1E	0x5F	0x01	0xE3	0xBD	0x3E	0x60	0x82	0xDC
2	0x23	0x7D	0x9F	0xC1	0x42	0x1C	0xFE	0xA0	0xE1	0xBF	0x5D	0x03	0x80	0xDE	0x3C	0x62
3	0xBE	0xE0	0x02	0x5C	0xDF	0x81	0x63	0x3D	0x7C	0x22	0xC0	0x9E	0x1D	0x44	0xA1	0xFF
4	0x46	0x18	0xFA	0xA4	0x27	0x79	0x9B	0xC5	0x84	0xDA	0x38	0x66	0xE5	0xBB	0x59	0x07
5	0xDB	0x85	0x67	0x39	0xBA	0xE4	0x06	0x58	0x19	0x47	0xA5	0xFB	0x78	0x26	0xC4	0x9A
6	0x65	0x3B	0xD9	0x87	0x04	0x5A	0xB8	0xE6	0xA7	0xF9	0x1B	0x45	0xC6	0x98	0x7A	0x24
7	0xF8	0xA6	0x44	0x1A	0x99	0xC7	0x25	0x7B	0x3A	0x64	0x86	0xD8	0x5B	0x05	0xE7	0xB9
8	0x8C	0xD2	0x30	0x6E	0xED	0xB3	0x51	0x0F	0x4E	0x10	0xF2	0xAC	0x2F	0x71	0x93	0xCD
9	0x11	0x4F	0xAD	0xF3	0x70	0x2E	0xCC	0x92	0xD3	0xBD	0x6F	0x31	0xB2	0xEC	0x0E	0x50
A	0xAF	0xF1	0x13	0x4D	0xCE	0x90	0x72	0x2C	0x6D	0x33	0xD1	0xBF	0x0C	0x52	0xB0	0xEE
B	0x32	0x6C	0x8E	0xD0	0x53	0x0D	0xEF	0xB1	0xF0	0xAE	0x4C	0x12	0x91	0xCF	0x2D	0x73
C	0xCA	0x94	0x76	0x28	0xAB	0xF5	0x17	0x49	0x08	0x56	0xB4	0xEA	0x69	0x37	0xD5	0x8B
D	0x57	0x09	0xEB	0xB5	0x36	0x68	0x8A	0xD4	0x95	0xCB	0x29	0x77	0xF4	0xAA	0x48	0x16
E	0xE9	0xB7	0x55	0x0B	0x88	0xDB	0x34	0x6A	0x2B	0x75	0x97	0xC9	0x4A	0x14	0xF6	0xA8
F	0x74	0x2A	0xC8	0x96	0x15	0x4B	0xA9	0xF7	0xB6	0xE8	0x0A	0x54	0xD7	0x89	0x6B	0x35

◎Communication Command

●The Charictaristic(Number) at " " is ASCII.

Sort	ACK	STX	Addr		Command		Bank	Code		+/−	10^5	10^4	10^3	10^2	10^1	10^0	DP	ETX	CRC
Read request		02H			"R"	"X"					"0"	"0"	"0"	"0"	"0"	"0"	"0"	03H	CRC
Read response	06H	02H			"R"	"D"												03H	CRC
Write request		02H			"W"	"X"												03H	CRC
Write response	06H	02H			"W"	"D"												03H	CRC

P	0	Process Value
C	0	Comparative Value HH
C	1	Comparative Value H
C	2	Comparative Value L
C	3	Comparative Value LL
K	0	Peak Value Max.
K	1	Peak Value Min.
X	0	Prescaling Value X.Ain
X	1	Prescaling Value X.Bin
Y	0	Prescaling Value Y.Ain
Y	1	Prescaling Value Y.Bin
R	0	Reset control of maximum/minimum values

●Read[RX] of measurement/setting value :
Address 01, Command RX

1. Command(Upper)
   ①Command
   ②Application : Address(01), Header code(RX), Current value(P0) of Bank(0), CRC Check sum(B5H)

STX	0	1	R	X	0	P	0	+	0	0	0	0	0	0	0	ETX	CRC
Start	Address		Command		Bank	Command		Symbol	10^5	10^4	10^3	10^2	10^1	10^0	Decimal point	END	Check sum
02H	30H	31H	52H	58H	30H	50H	30H	2BH	30H	30H	30H	30H	30H	30H	30H	03H	B5H

2. Response
   ①Normal receive : Adding ACK[06H] to current value of Data transmission Bank(0) is +1.234.

ACK	STX	0	1	R	D	0	P	0	+	0	0	1	2	3	4	3	ETX	CRC
ACK	Start	Address		Command		Bank	Command		Symbol	10^5	10^4	10^3	10^2	10^1	10^0	Dec−imal point	End	Check sum
06H	02H	30H	31H	52H	44H	30H	50H	30H	2BH	30H	30H	31H	32H	33H	34H	33H	03H	23H

   ②Normal : Adding ACK[06H] to current value of Data transmission Bank(0)is −56.7.

ACK	STX	0	1	R	D	0	P	0	−	0	0	1	5	6	7	1	ETX	CRC
ACK	Start	Address		Command		Bank	Command		Symbol	10^5	10^4	10^3	10^2	10^1	10^0	Dec−imal point	End	Check sum
06H	02H	30H	31H	52H	44H	30H	50H	30H	2DH	30H	30H	31H	35H	36H	37H	31H	03H	42H

●Write[WX] of measurement / Setting value :
Address 01, Command WX

1. COMMAND(Upper)
   ①Command
   ②Application : Address(01), Head Code(WX), The setting value into SV−HH(C0) of BANK(0) is +1.234.

STX	0	1	W	X	0	C	0	+	0	0	1	2	3	4	5	ETX	CRC
Start	Address		Command		Bank	Command		Symbol	10^5	10^4	10^3	10^2	10^1	10^0	Dec−imal point	End	Check sum
02H	30H	31H	57H	58H	30H	43H	30H	2BH	30H	30H	31H	32H	33H	34H	33H	03H	5DH

2. Response(MP5 series)
   When complete the operation after normal receive.

ACK	STX	0	1	W	D	0	C	0	+	0	0	1	2	3	4	3	ETX	CRC
ACK	Start	Address		Command		Bank	Command		Symbol	10^5	10^4	10^3	10^2	10^1	10^0	Dec−imal point	End	Check sum
06H	02H	30H	31H	57H	44H	30H	43H	30H	2BH	30H	30H	31H	32H	33H	34H	35H	03H	3CH

3. CRC error : Transmit NAK[15H] only.
   (Need to transmit again)
4. Other : No response of ACK/NAK
   ①After receiving STX, the address are not the same
   ②When receive buffer overflow is occurred.
   ③When the baud rate or other communication setting value are not the same.
5. When there are no ACK/NAK response
   ①Check the status of lines
   ②Check the communication condition (Setting value)
   ③When assume the problem is due to noise, try to operate communi−cation 3 times more until recovery
   ④When occurred communication failure frequently, please adjust the communicating speed.

▣Precaution for communicating with MP5 series

1. It is not possible to modify Parameter(Baud rate, Address etc)related to communication of MP5 series on line with upper systems such as PC, PLC etc. (Error will be occurred)
2. Firstly make communication Parameter of MP5 series and upper system at one.
3. It is not allow to set overlapping communication number at the same communication line. (Error will be occurred)
4. Please use Twist pair wire for RS485 commu−nication.
5. The total length of communication is 800m and over 32 equipment can be connected.
6. When connect communication cable between MP5 series and upper systems, the vertical resistance(100 ~ 200Ω) must be installed at between both communication lines.
7. Please check Parameter related to communi−cation
   ①Start bit : 1(Fix)
   ②Stop bit : 1(Fix)
   ③Parity bit : Non(Fix)
   ④Data bit : 8(Fix)
   ⑤Baud rate : 2400, 4800, 9600(Setable)
   ⑥Address : 00 ~ 99(Setable)