

Autonics PULSE METER MP5S/Y/W SERIES INSTRUCTION MANUAL



MP5S MP5Y MP5W
Thank you for choosing our Autonics product.
Please read the following safety considerations before use.

Safety Considerations

- ※Please observe all safety considerations for safe and proper product operation to avoid hazards.
- ※Safety considerations are categorized as follows.
- Warning** Failure to follow these instructions may result in serious injury or death.
- Caution** Failure to follow these instructions may result in personal injury or product damage.
- ※The symbols used on the product and instruction manual represent the following
- △ symbol represents caution due to special circumstances in which hazards may occur.

Warning

- Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss. (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.)
Failure to follow this instruction may result in personal injury, fire, or economic loss.
- The unit must be installed on a device panel before use.
Failure to follow this instruction may result in electric shock.
- Do not connect, repair, or inspect the unit while connected to a power source.
Failure to follow this instruction may result in electric shock.
- Do not disassemble or modify the unit. Please contact us if necessary.
Failure to follow this instruction may result in electric shock or fire.
- Check the terminal numbers before connecting the power source and measurement input.
Failure to follow this instruction may result in fire.

Caution

- Do not use the unit outdoors.
Failure to follow this instruction may result in electric shock or shortening the life cycle of the unit.
- When connecting the power input or measuring input, make sure to tighten the terminal screw bolt above 0.74N·m to 0.90N·m.
Contact failure may result in fire.
- Use the unit within the rated specifications.
Failure to follow this instruction may result in electric shock or shortening the life cycle of the unit.
- Do not use loads beyond the rated switching capacity of the relay contact.
Failure to follow this instruction may result in insulation failure, contact failure, contact bonding, relay damage, or fire.
- Do not use water or oil-based detergent when cleaning the unit. Use dry cloth to clean the unit.
Failure to follow these instructions may result in electric shock or fire.
- Do not use the unit where flammable or explosive gas, humidity, direct sunlight, radiant heat, vibration, and impact may be present.
Failure to follow this instruction may result in fire or explosion.
- Keep dust and wire residue from flowing into the unit.
Failure may result in fire or product malfunction.
- Check the polarity of the measurement input contact before wiring the unit.
Failure to follow this instruction may result in fire or explosion.

Ordering Information

MP	5	Y	-	4	N		
Output	Main output (Comparative value output) / Sub output (Display value output)						
S	N	Indicator					
Y	N	Indicator	—				
	1	NPN open collector quintuple output	—				
	2	PNP open collector quintuple output	—				
	3	Indicator	BCD dynamic output				
	4	Indicator	PV transmission output (current output)				
	5	Indicator	RS485 comm. output				
W	6	Relay triple output (H, GO, L)	—				
	N	Indicator	—				
	A	Relay quintuple output (HH, H, GO, L, LL)	—				
	1	Relay triple output (H, GO, L)	—				
	2	NPN open collector quintuple output	BCD dynamic output				
	4	NPN open collector quintuple output	PV transmission output (current output)				
Power supply	2	24VAC 50/60Hz, 24-48VDC					
	4	100-240VAC 50/60Hz					
	Size	S	DIN W48×H48mm				
Digits	Y	DIN W72×H36mm			W	DIN W96×H48mm	
	5	99999 (5-digit)					
	Item	MP	Pulse meter				

※The above specifications are subject to change and some models may be discontinued without notice.

Specifications

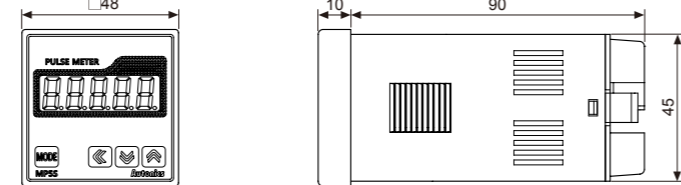
Series	MP5S	MP5Y	MP5W
Display method	7-segment LED (zero blanking method)		
Character size	W4×H8mm W7×H14mm		
Display range	-19999 to 99999		
Power supply	AC/DC voltage 24VAC~50/60Hz, 24-48VDC		
Power consumption	AC voltage Max. 7.5VA (100-240VAC~50/60Hz)	Max. 9VA (100-240VAC~50/60Hz)	Max. 15VA (100-240VAC~50/60Hz)
AC/DC voltage	Max. 6VA (24VAC~50/60Hz), Max. 4.5W (24-48VDC)	Max. 7VA (24VAC~50/60Hz), Max. 6.2W (24-48VDC)	Max. 11VA (24VAC~50/60Hz), Max. 7W (24-48VDC)
Permissible voltage range	90 to 110% of rated voltage		
External power supply	Max. 12VDC ±10% 80mA		
Sub power supply	— Max. 24VDC = 30mA		
Input frequency	Solid state input 1: Max. 50kHz (pulse width: min. 10μs) Solid state input 2: Max. 5kHz (pulse width: min. 100μs) ※For F7, F8, F9, F10 operation mode, max. 1kHz (pulse width: min. 500μs) Contact input: Max. 45Hz (pulse width: min. 11ms)		
Input method	[Voltage input] High: 4.5-24VDC, Low: 0-1VDC, Input impedance: 3.9kΩ [No-voltage input] Short-circuit impedance: Max. 80Ω, Residual voltage: Max. 1VDC, Open-circuit impedance: Min. 100kΩ		
Measurement range	Operation mode F1, F2, F7, F8, F9, F10 : 0.0005Hz to 50kHz Operation mode F3, F4, F5, F6 : 0.01 to max. of each time range Operation mode F11, F12, F13, F16 : 0 to 99999 Operation mode F14, F15 : -19999 to 99999		
Measurement accuracy (23°C±5°C)	Operation mode F1, F2, F7, F8, F9, F10 : F.S.±0.05%rdg±1-digit Operation mode F3, F4, F5, F6 : F.S.±0.01%rdg±1-digit		
Display cycle	OFF (for F2, F16 operation mode), 0.05, 0.5, 1, 2, 4, 8 sec (same as update output cycle)		
Operation mode	Frequency/Revolutions/Speed (F1), Passing speed (F2), Cycle (F3), Passing time (F4), Time interval (F5), Time differential (F6), Absolute ratio (F7), Error ratio (F8), Density (F9), Error (F10), Length measurement 1 (F11), Interval (F12), Accumulation (F13), Addition/Subtraction-individual input (F14), Addition/Subtraction-phase difference input (F15), Length measurement 2 (F16)		
Prescale function	Direct input method (0.0001×10 ⁹ to 9.9999×10 ⁹)		
Hysteresis	0 to 9999 ^{※1}		
Output	Main	Relay triple Relay quintuple NPN/PNP open collector quintuple BCD dynamic	250VAC~3A resistive load — 250VAC~3A resistive load Max. 30VDC = 30mA
	Sub	PV transmission Communication	Max. 30VDC = 30mA DC4-20mA/DC0-20mA max. load 500Ω RS485 communication output (Modbus RTU method)
Memory retention	Non-volatile memory (number of inputs: 100,000 operations)		
Insulation resistance	Over 100MΩ (at 500VDC megger)		
Dielectric strength	2,000VAC 60Hz for 1 min		
Noise immunity	±2kV the square wave noise (pulse width: 1μs) by the noise simulator		
Vibration	Mechanical	0.75mm amplitude at frequency of 10 to 55Hz in each X, Y, Z direction for 1 hour	
	Malfunction	0.5mm amplitude at frequency of 10 to 55Hz in each X, Y, Z direction for 10 min	
Shock	Mechanical	300m/s ² (approx. 30G) in each X, Y, Z direction for 3 times	
	Malfunction	100m/s ² (approx. 30G) in each X, Y, Z direction for 3 times	
Relay life cycle	Mechanical	— Min. 10,000,000 operations	
	Electrical	— Min. 100,000 operations (250VAC 3A resistive load)	
Environment	Ambient temp.	-10 to 50°C, storage: -20 to 60°C	
	Ambient humi.	35 to 85%RH, storage: 35 to 85%RH	
Approval	CE, UL, etc.		
Weight ^{※2}	Approx. 191g (approx. 132g)	Approx. 230g (approx. 140g)	Approx. 334g (approx. 210g)

※1: Setting range will vary depending on the decimal point.
※2: The weight includes packaging. The weight in parenthesis is for unit only.
※Environment resistance is rated at no freezing or condensation.

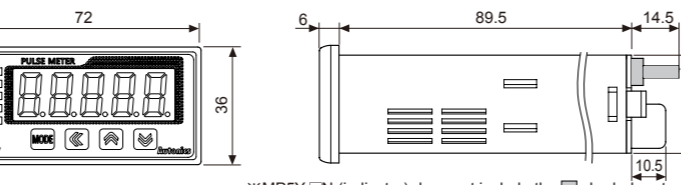
Dimensions

※Side dimensions of MP5Y/W differ by output type.

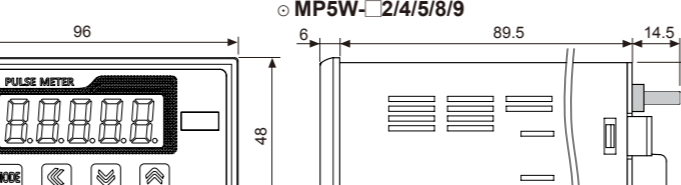
MP5S



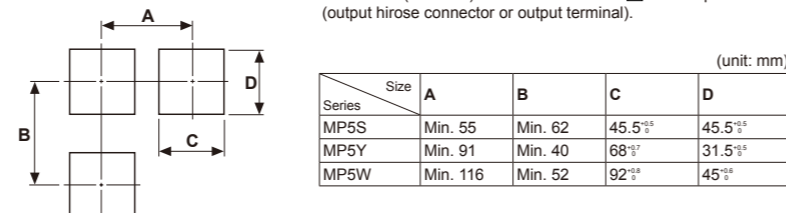
MP5Y



MP5W



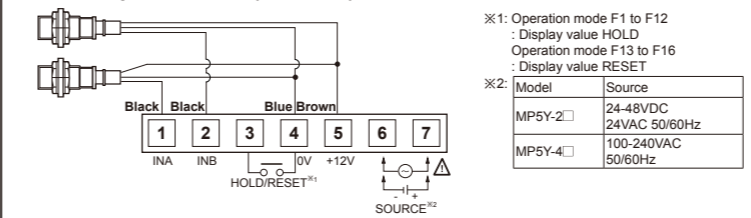
Panel Cut-out Dimensions



Connections

MP5Y Series

• Power/Input Terminal (common) ※MP5Y-□N (indicator) only has 'Power/Input terminals'

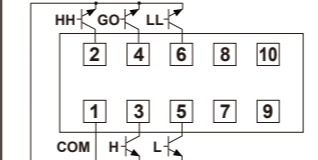


Output Connector (MP5Y-□1 to 5)

※Hirose connector: HIF3BA-10PA-2.54DS
※Hirose connector socket: HIF3BA-10D-2.54R (sold separately)

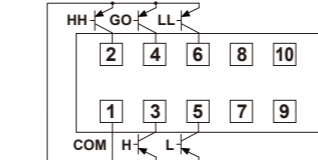
MP5Y-□1 (NPN open collector output)

MAIN OUT (NPN OPEN COLLECTOR)
30VDC 30mA



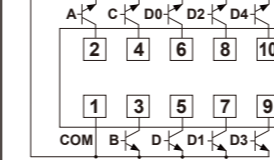
MP5Y-□2 (PNP open collector output)

MAIN OUT (PNP OPEN COLLECTOR)
30VDC 30mA



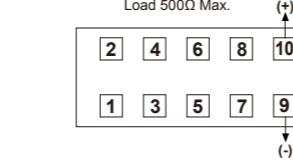
MP5Y-□3 (BCD dynamic output)

BCD OUT (NPN OPEN COLLECTOR)
30VDC 30mA



MP5Y-□4 (PV transmission output)

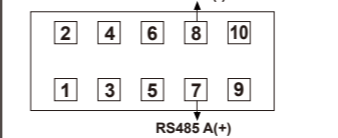
DC4-20mA/DC0-20mA
Load 500Ω Max.



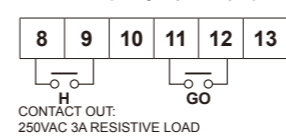
※Autonics display unit (DS/DA Series) is recommended for stable minus (-) sign display.

Output Terminal (MP5Y-□6)

MP5Y-□5 (RS485 communication output)



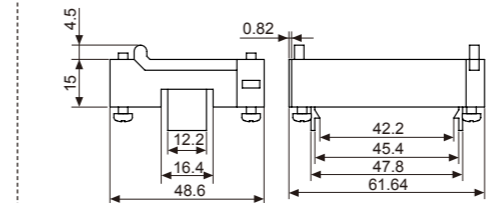
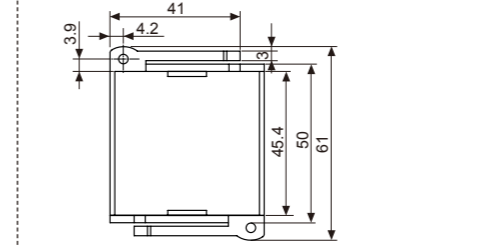
MP5Y-□6 (Relay triple output)



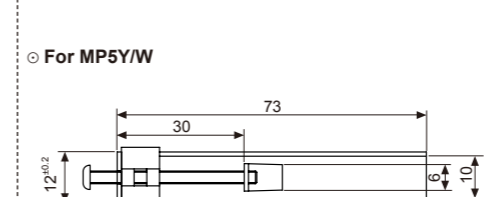
(unit: mm)

Bracket

For MP5S

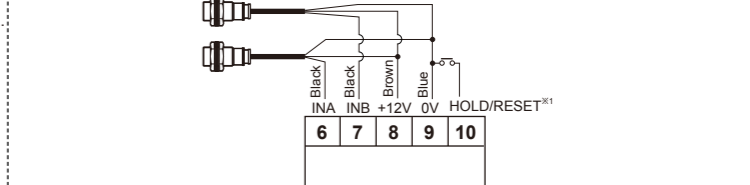


For MP5Y/W



(unit: mm)

MP5S Series



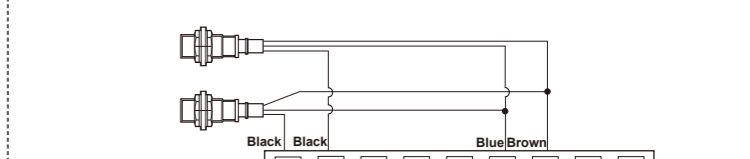
※1: Operation mode F1 to F12 : Display value HOLD
Operation mode F13 to F16 : Display value RESET

Model	Source
MP5S-2N	24-48VDC 24VAC 50/60Hz
MP5S-4N	100-240VAC 50/60Hz

MP5W Series

Power/Input Terminal (Common)

※MP5W-□N (indicator) only has 'Power/Input terminals'



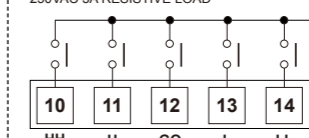
※1: Operation mode F1 to F12 : Display value HOLD
Operation mode F13 to F16 : Display value RESET

Model	Source
MP5W-2	24-48VDC 24VAC 50/60Hz
MP5W-4	100-240VAC 50/60Hz

Output Terminal (MP5W-□A/1)

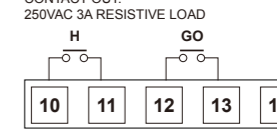
MP5W-□A (Relay quintuple output)

CONTACT OUT:
250VAC 3A RESISTIVE LOAD



MP5W-□1 (Relay triple output)

CONTACT OUT:
250VAC 3A RESISTIVE LOAD



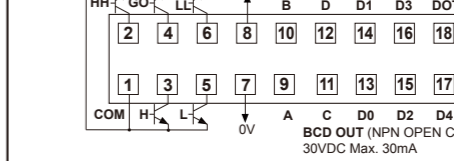
Output Connector (MP5W-□2/4/5/8/9)

※Hirose connector: HIF3BA-20PA-2.54DS
※Hirose connector socket: HIF3BA-20D-2.54R (sold separately)

※1: Sub power supply
※2: POL signal turns ON when the display value is a minus (-) value.

MP5W-□2 (NPN open collector + BCD dynamic output)

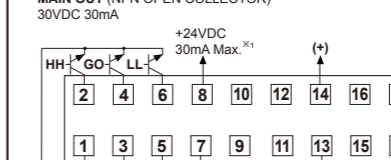
MAIN OUT (NPN OPEN COLLECTOR)
30VDC 30mA



※Autonics display unit (DS/DA Series) is recommended for stable minus (-) sign display.

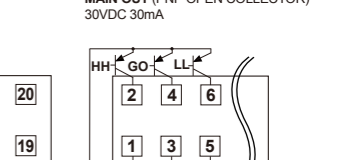
MP5W-□4 (NPN open collector + PV transmission output)

MAIN OUT (NPN OPEN COLLECTOR)
30VDC 30mA



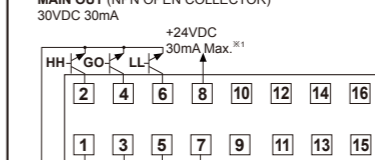
MP5W-□5 (PNP open collector + PV transmission output)

MAIN OUT (PNP OPEN COLLECTOR)
30VDC 30mA



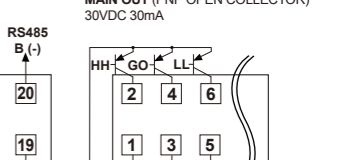
MP5W-□8 (NPN open collector + RS485 comm. output)

MAIN OUT (NPN OPEN COLLECTOR)
30VDC 30mA



MP5W-□9 (PNP open collector + RS485 comm. output)

MAIN OUT (PNP OPEN COLLECTOR)
30VDC 30mA



Input/Output Specifications

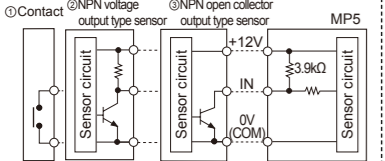
1. Input signal

- Standard duty ratio of input signal is 1:1.
- (1) Solid state input 1
Input frequency: Max. 50kHz (ON/OFF pulse width: min. 10μs of each)
※T: single cycle of input signal
- (2) Solid state input 2
Input frequency: Max. 5kHz (ON/OFF pulse width: min. 100μs of each)
※For F7, F8, F9, F10 operation mode, max. 1kHz (ON/OFF pulse width: min. 500μs of each)
- (3) Contact input
① Input frequency: Max. 45Hz (when each ON/OFF pulse width is over 11ms)
② Contact specifications: 12VDC, stable switching of load current as small as 5mA

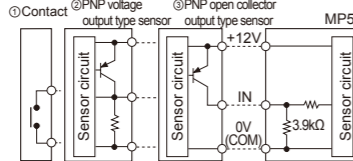
2. Input type

MP5 allows selection between NPN input (solid state/contact) or PNP input (solid state/contact).

(1) NPN input type



(2) PNP input type



3. Output Specifications

1. Relay output

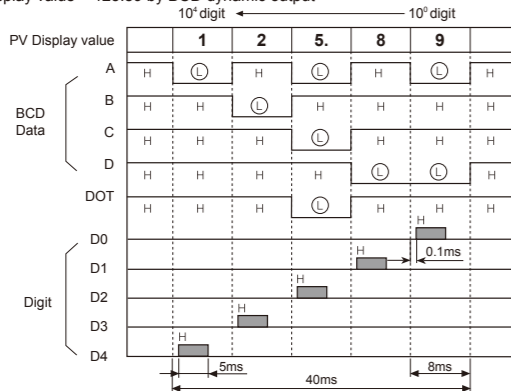
- ① Output: Comparative or alarm output (refer to "Output mode")
- ② Output type: Relay
- ③ Contact capacity: 250VAC 3A resistive load
- ④ Life cycle: [Mechanical] min. 10,000,000 operations (switching frequency 180 operations/min)
[Electrical] min. 100,000 operations (3A 250VAC, 30VDC resistive load) (switching frequency 20 operations/min)

2. Transistor output

- ① Output: Comparative output or alarm output (refer to "Output mode")
- ② Output type: NPN/PNP open collector
- ③ Rated load voltage: 30VDC
- ④ Max. load current: 30mA

3. BCD dynamic output(negative logic)

- ① Output: present value
- ② 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
- ③ Output type: NPN open collector
- ④ Rated load voltage: 30VDC
- ⑤ Max. load current: 30mA
- ⑥ Dynamic COM cycle (T) = 40ms
- E.g.) To display value = 125.89 by BCD dynamic output

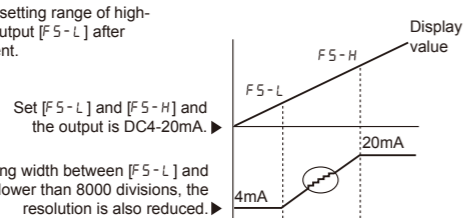


4. PV transmission output

- ① Application: transmit measured value
- ② Function: transmit measured value within setting range of high-limit output [F5-H] to low-limit output [F5-L] after conversion into DC4-20mA or DC0-20mA current.
- ③ Output range of high/low-limit
-High-limit [F5-H] range: From min. value to max. value within measurement range
-Low-limit [F5-L] range: From min. value to max. value within measurement range ($[F5-H] \geq [F5-L] + 1$)

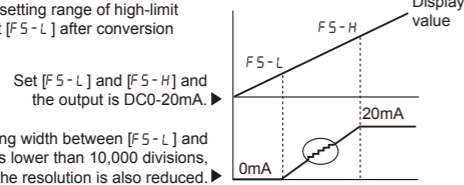
(1) DC4-20mA transmission output

- ① Transmit measured value within setting range of high-limit output [F5-H] to low-limit output [F5-L] after conversion into DC4-20mA current.
- ② Resistive load: Max. 500Ω
- ③ Resolution: 8000 divisions



(2) DC0-20mA transmission output

- ① Transmit measured value within setting range of high-limit output [F5-H] to low-limit output [F5-L] after conversion into DC0-20mA current.
- ② Resistive load: Max. 500Ω
- ③ Resolution: 10,000 divisions



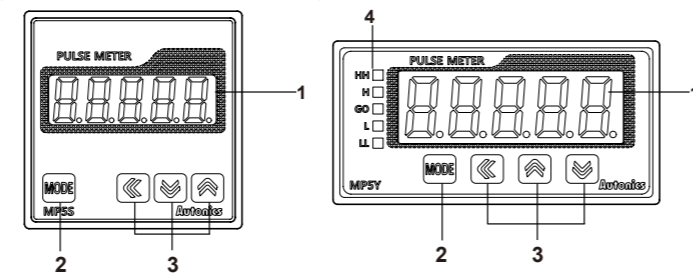
5. RS485 communication output

Comm. protocol	Modbus RTU	Comm. speed	2400, 4800, 9600 (default), 19200, 38400 bps
Connection method	RS485	Comm. response time	5 to 99ms (default: 20ms)
Application standard	Compliance with EIA RS485	Start bit	1-bit (fixed)
Max. connections	31 units (address: 1 to 99)	Data bit	8-bit (fixed)
Synchronization method	Asynchronous	Parity bit	None (default), Even, Odd
Comm. method	Two-wire half duplex	Stop bit	1-bit, 2-bit (default)
Comm. distance	Max. 800m		

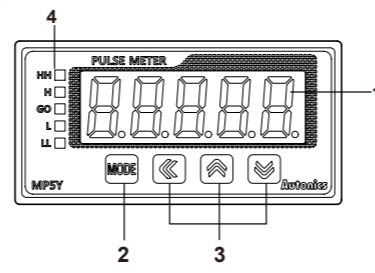
※For more information about RS485 communication output specifications, refer to "RS485 communication output".

Unit Description

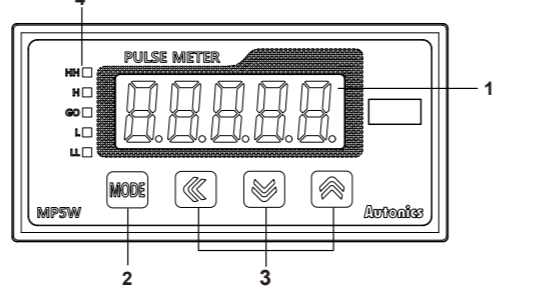
MP5S



MP5Y



MP5W



1: Display component

Displays current value in RUN mode. Alternately displays setting parameters and corresponding value in SETTING mode.

2: MODE key

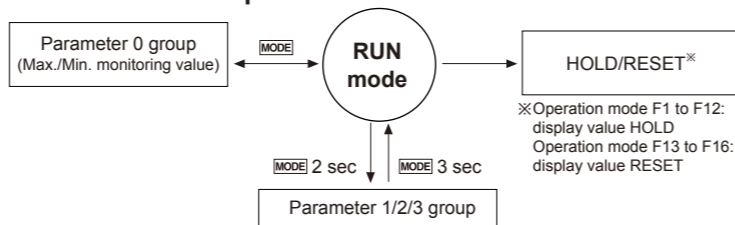
In RUN mode, press the key once to check max./min. value.
In RUN mode, hold the key for over 2 sec to enter parameter groups.

3: ←, →, ↵ key

Select parameter groups, and select or setting values in the corresponding parameters.

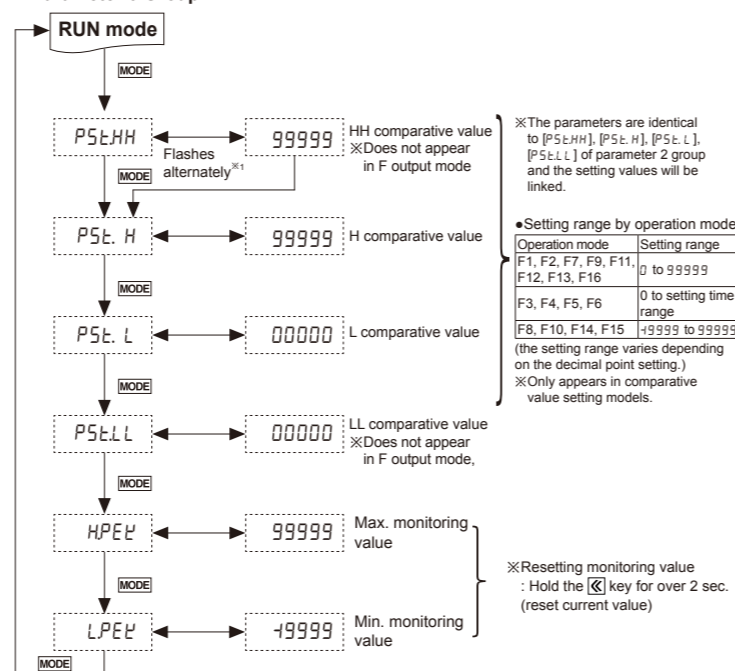
4: Output status indicator

Parameter Groups

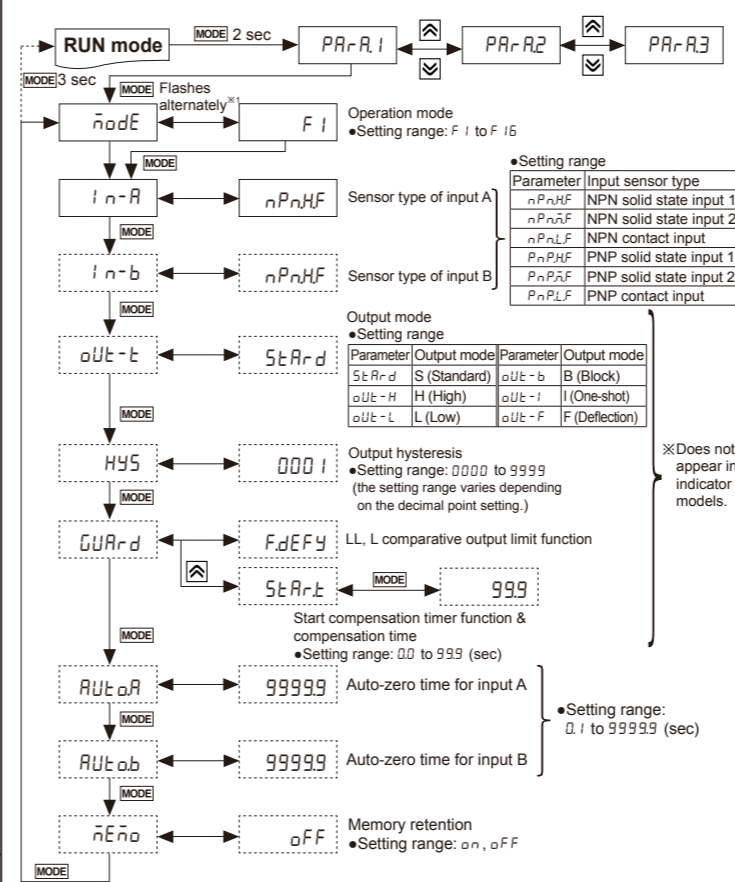


- ※Press the ←, →, ↵ keys to select or set the desired value.
※Press the MODE key once after changing the setting value, to save the setting value and move to the next parameter.
※Hold the MODE key for 1.5 sec at any parameters to return to the select parameter group mode.
※Hold the MODE key for 3 sec to save the setting value and return to RUN mode after changing the setting value.
※If there is no key input for 60 sec while setting the parameters, the new settings are ignored, and the unit will return to RUN mode with previous settings.
※The dotted line parameters may not appear depending on output specifications or other parameter settings. Please refer to "Operation mode by parameter group".
※1: Each parameter and corresponding setting value will flash alternately every 0.5 sec.

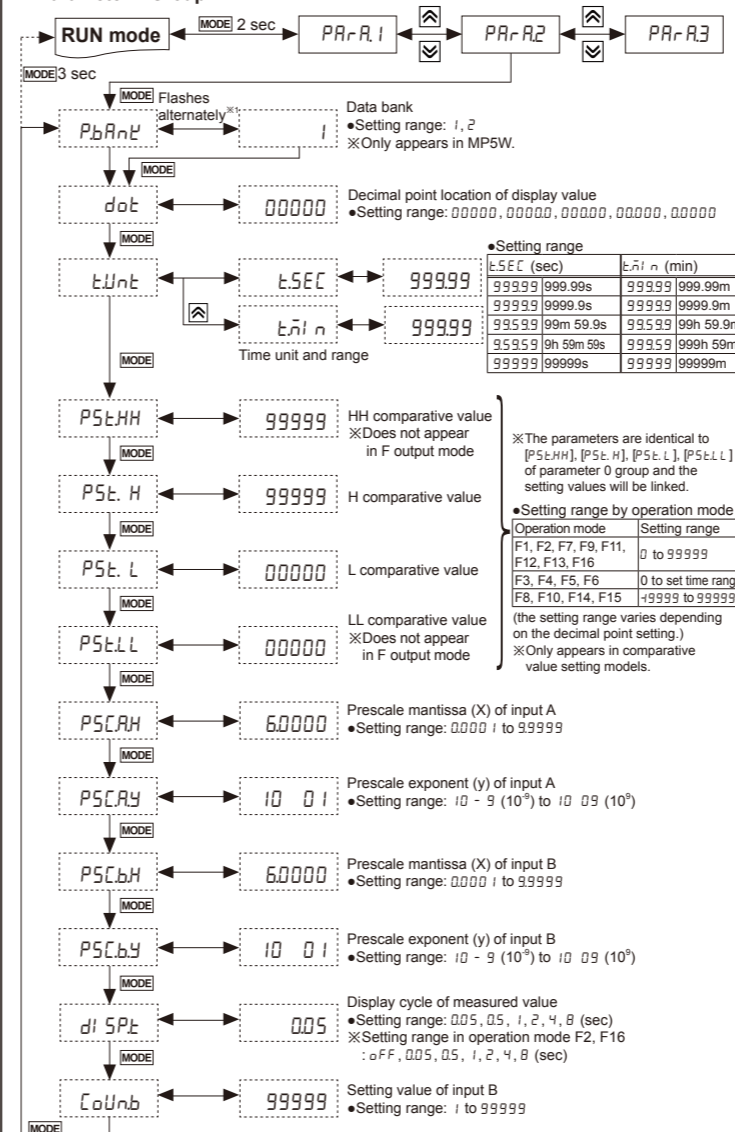
Parameter 0 Group



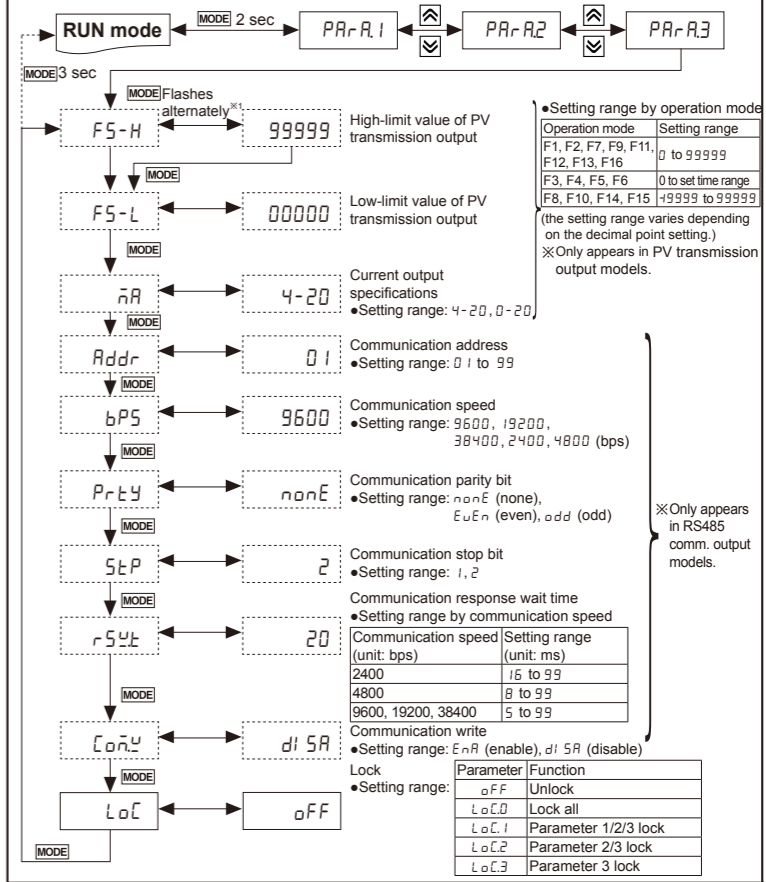
Parameter 1 Group



Parameter 2 Group



Parameter 3 Group



Operation Mode By Parameter Groups

Parameter	Operation mode	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14	F15	F16
0 group	PSt.HH ^{X1}																
	PSt.H ^{X2}																
	PSt.L ^{X2}																
	PSt.LL ^{X1}																
	HPEL																
1 group	In-A																
	In-B	X		X	X	X											X ^{X3}
	oUt-t ^{X2}																X ^{X4}
	HYS ^{X2}		X	X	X	X	X										X
	GUAR-d ^{X2}															X	X
2 group	AUtoA	X	X	X	X	X	X										X
	AUtoB	X	X	X	X	X	X										X
	nEn	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	PbaRnE																
	dot		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3 group	PSt.HH ^{X1}																
	PSt.H ^{X2}																
	PSt.LL ^{X2}																
	PSt.L ^{X1}																
	PSt.AH																

- ※1: Only appears in only for quintuple output models.
 ※2: Only appears in triple, quintuple output models.
 ※3: The settings for In-B and In-A are applied.
 ※4: (●) F output mode[oUt-t-F] cannot be set.
 ※5: (■) setting range: oFF, 0.05, 0.5, 1, 2, 4, 8
- Monitoring delay function by output mode
- | Output mode | S mode | H mode | L mode | B mode | I mode | F mode |
|--------------------------|--------|--------|--------|--------|--------|--------|
| Parameter | StAr-d | oUt-H | oUt-L | oUt-b | oUt-I | oUt-F |
| Comparative output limit | | X | X | | X | |
| Start compensation timer | | | | | | |

