MP Series

Digital multimeter

- Measure the RMS
- Multi input range
- Wide displayable range, 4 digits (-1999-9999)

Suffix code

Model	Code					Information
MP3-	□	□	□	□	□	Digital multi meter (Dimension : 96×48 ㎜)
Displaying digit	4					4 digits (9999)
Input type		AV				AC(a.c) voltmeter
		AA				AC(a.c) ammeter
		DV				DC(d.c) voltmeter
		DA				DC(d.c) ammeter
		AVR				AC voltmeter (RMS)
		AAR				AC ammeter (RMS)
Output (optional)			N			Only for displaying
			0			Relay (HI, GO, LO), measured Value output (4 - 20 ㎃ DC)
			1			Relay (HI, GO, LO)
			2			NPN Open collector (HI, GO, LO), BCD output (Dynamic)
			3			PNP Open collector (HI, GO, LO), BCD output (Dynamic)
			4			NPN Open collector (HI,GO,LO), measured Value output (4-20 ㎃)
			5			PNP Open collector (HI,GO,LO), measured Value output (4-20 ㎃)
			6			NPN Open collector (HI, GO, LO), serial output
			7			PNP Open collector (HI, GO, LO), serial output
			8			NPN Open collector (HI, GO, LO), communication (RS485)
			9			PNP Open collector (HI, GO, LO), communication (RS485)
			10			BCD output (static)
			11			Relay (HI, GO, LO), RS485 output
Front panel type				A		Front acrylic type
				B		Front plane type
Power supply voltage					·	None (100 - 240 V AC 50 - 60 Hz)
					C	24 V DC (front division B, only applied with the name plate attached type)

※ Please select the DC voltmeter because when measuring DC current above 5A, users need to use exclusive shunt.

Model	Code					Information
MP6-	□	□	□	□	□	Digital multi meter (dimension : 72×36 ㎜)
Displaying digit	4					4 digits (9999)
Input type		AV				AC(a.c) voltmeter
		AA				AC(a.c) ammeter
		DV				DC(d.c) voltmeter
		DA				DC(d.c) ammeter
		AVR				AC voltmeter(RMS)
		AAR				AC ammeter(RMS)
Output (optional)			N			Only for displaying
			0			Relay, present value output (4 – 20 ㎃ DC)
			1			Relay
			4			NPN Open collector, present value output (4 – 20 ㎃)
			5			PNP Open collector, present value output (4 – 20 ㎃)
Front panel type				A		Front acrylic type
				B		Front plane type (recommended)
Power supply voltage					·	No indication (100 – 240 V AC 50 – 60 ㎐)
					C	24 V DC (front division B, only applied with the name plate attached type)

Specification

Input

Input signal	AC (voltage, current), DC (voltage, current)
A/D conversion	Duplex integral type
Sampling period	DC type : 100 ㎳, AC type : 300 ㎳
Response time	Approx. 0.3 sec (max range)
Max displayable digit	4 digits (-1999~9999)
Indication unit	7 segments LED

Performance

Classification	Information
Accuracy	AC : less than ±5 Digit, DC : less than ±2 Digit
Insulation resistance	Min 100 MΩ(500 V DC)
Dielectric strength	1500 V AC for 1 min (power terminal-input terminal)

Function

Multi input range	Select the range that you want to measure. (Measured value and range)
Magnification	Multiply the set value of magnification to the measured value and display.
Input compensation	Compensates the measured value and displays it.
Renewal period	When variation of the process value is critical, it is hard to measure the accurate value. In this case, by changing the renewal period, it is possible to process by averaging the process value.
Running compensation time	Aim is to eliminate the value which falsely measured due to the initial over voltage or over current so it sets the delay time of measurement.
Scale function	Display the high and low process value in accordance with the input signal by changing to the certain value and display.
RMS measurement	Among the AC input types, RMS measurement specification (AVR, AAR) is one of the RMS counting measurement method regarding the distorted wave shape.
Position of a decimal point	Select the position of a decimal point.
Hold function	Memorize the max input value or min input value or become hold (stop) due to the external signal.
Lock function	Limits the set function of each parameter.
Address	Assign the address when using the communication function.
Communication speed	Set the communication speed (bps).
Max value indication	Display the max value of indicated value which being measured.
Min value indication	Display the min value of indicated value which being measured.
High setting	Set the high set value of high output.
Low setting	Set the low set value of low output.
Output operation (PSOT) selection	Among the output operations(OFF, HH, LH, HL, LL, IL), selecting "OFF" will not limit any functions to be operated but selecting various output types will allow only selected function to be operated.
Hysteresis setting	If the measured indication value starts to fluctuate minutely when it almost reaches the set value, it sets hysteresis in order to prevent the frequent operation of output.
Auto zero indication	In the measuring state(RUN), pressing the buttons ▽+◁ synchronously will begin the auto zero function. If "0" is not displayed due to the error occurrence between the input signal and instrument, running this function will set "0"

Output

Communication output(RS485)	Able to set the address from 00~99 and able to select the baud rate of series transmission. (Transmission speed : 1200, 2400, 4800, 9600, 19200 bps)
Serial communication	Generate the sign(pot), decimal point(DOT), Clock, Data, Latch in order to make the current process value to the programmable controller and process.
Current output (transmission)	Yields the 4 – 20 ㎃ DC output corresponding to the current indication value. (Resolving power: 12000)
BCD output	Yields the output of current indication value as the BCD type (D0, D1, D2, D3, POL, DOT, A0, A1, A2, A3)
Transistor output	PNP/NPN open collector output (12 – 24 V DC 50 ㎃ max)
Relay output	1 c X 3 contact (HI, GO, LO), (220 V AC 5 A)

Standard specification

Model	MP3	MP6
Power supply voltage	100 – 240 V AC, 50 – 60 Hz (dual usage)	
Allowable voltage fluctuation range	85 – 264 V AC	
Power consumption	Approx. 5 VA	Approx. 5 VA
Weight(g)	350	250
Ambient temperature	0 ~ 50 ℃	
Ambient humidity	35 ~ 85 % RH	
Storage temperature	–10 ~ 70 ℃	
Vibration resistance	10 – 55 Hz peak amplitude to the each direction of X, Y, Z for 2 hour	
Shock resistance	300 m/s², to the 6 direction of X, Y, Z and each 3 times	

Measurement input and range

● DC Voltage

Input signal	Mode	Range	Input impedance
DC voltage	50 ㎷	0 – 50.00 ㎷	2 KΩ
	5 V	0 – 5.000 V	100 KΩ
	10 V	0 – 10.00 V	1 MΩ
	50 V	0 – 50.00 V	1 MΩ
	500 V	0 – 500.0 V	10 MΩ

※ Scale max displayable range : ±1.999, ±19.99, ±199.9, –1999 ~ 9999

● DC Current

Input signal	Mode	range	Input impedance
DC voltage	5 ㎃	0 – 5.000 ㎃	10 Ω
	20 ㎃	0 – 20.00 ㎃	1 Ω
	4 – 20 ㎃	4 – 20.00 ㎃	1 Ω
	50 ㎃	0 – 50.00 ㎃	1 Ω
	500 ㎃	0 – 500.0 ㎃	0.1 Ω
	5 A	0 – 5.000 A	0.01 Ω

● AC Voltage

Input signal	Mode	Range	Input impedance
AC voltage	5 V	0 – 5.000 V	100 KΩ
	50 V	0 – 50.00 V	1 MΩ
	500 V	0 – 500.0 V	10 MΩ

● AC Current

Input signal	Mode	Range	Input impedance
DC voltage	50 ㎃	0 – 50.00 ㎃	1 Ω
	500 ㎃	0 – 500.0 ㎃	0.1 Ω
	5 A	0 – 5.000 ㎃	0.01 Ω

Default setting

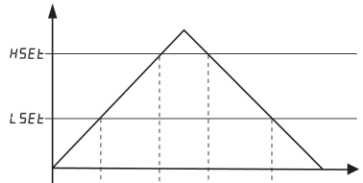
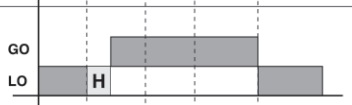
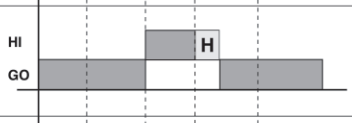
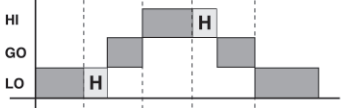
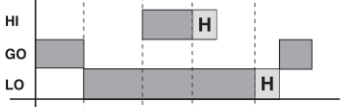
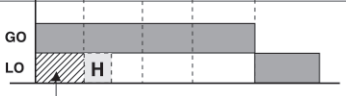
● Setting group 1

Mode	Mode name	MP□-DV	MP□-DA	MP□-AV(AVR)	MP□-AA(AAR)
1. IR5	Input range	500 V	5 A	500 V	5 A
2. HDP	Magnification	1.000	1.000	1.000	1.000
3. LDP	Input compensation	0	0	0	0
4. ADT	Renewal period	0.2	0.2	0.5	0.5
5. PDD	Running compensation time	0	0	0	0
6. SCH	High scale	0	0	0	0
7. SCL	Low scale	0	0	0	0
8. DPP	Position of a decimal point	000.0	0.000	000.0	0.000
9. PDH	Hold function	OFF	OFF	OFF	OFF
A. LOC	Lock function	OFF	OFF	OFF	OFF
B. ADR	Address	00	00	00	00
C. BPS	Communication speed	9.6 K	9.6 K	9.6 K	9.6 K

● Setting group 2

Mode	Mode name	MP□-DV	MP□-DA	MP□-AV(AVR)	MP□-AA(AAR)
HHPK	Max value indication	–	–	–	–
LLPK	Min value indication	–	–	–	–
HSET	Max setting value	5000	5000	5000	5000
LSET	Min setting value	2000	2000	2000	2000
PSOT	Output operation selection	OFF	OFF	OFF	OFF
HYST	Hysteresis	01	01	01	01

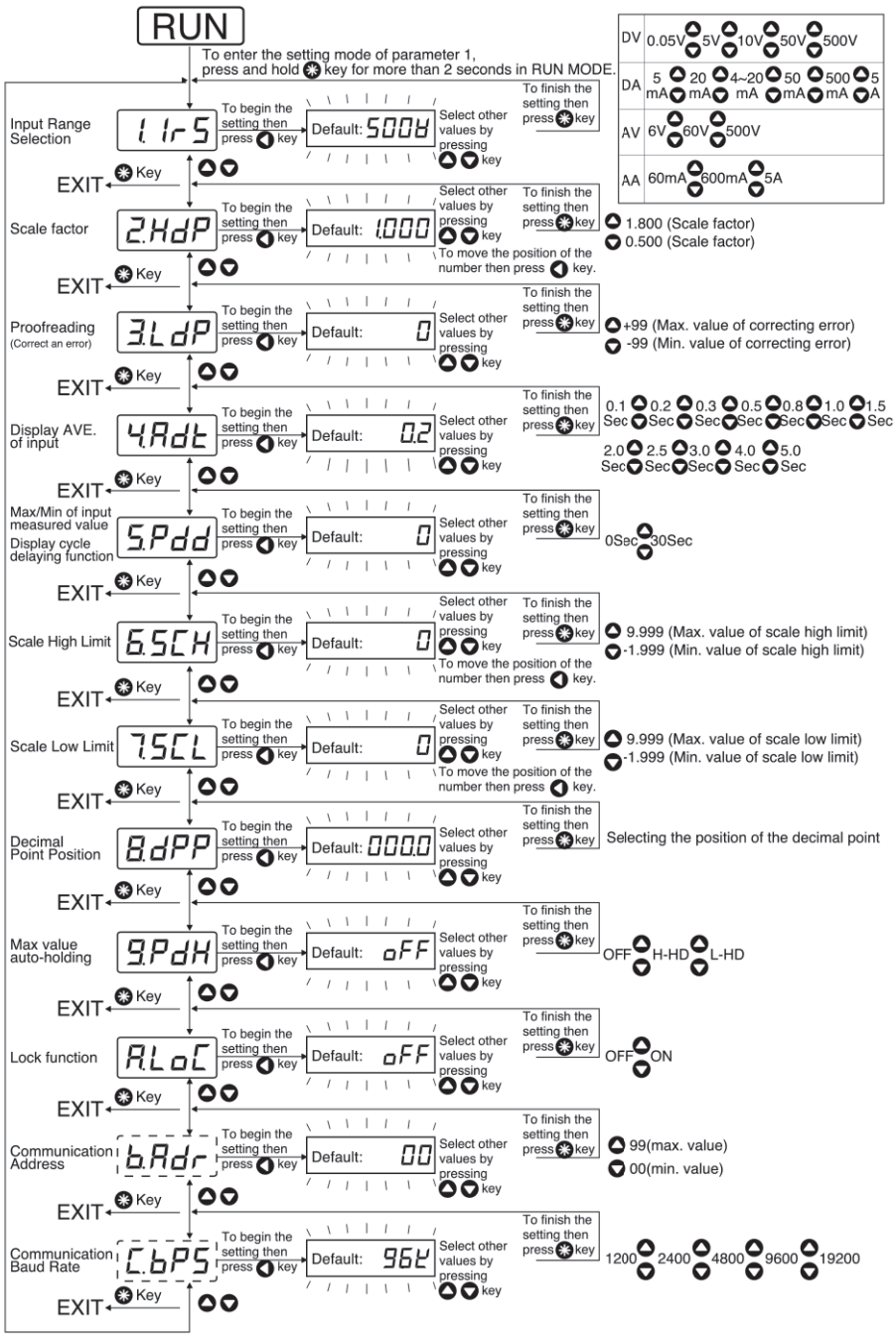
Comparative Output Mode (PSot)

Operation mode	Output Operation	Explanation
		 H : Hysteresis
oFF		No output operation
LLot		If PDV ≦ LSEt than Low Output ON. If PDV > LSEt than Go Output ON.
HHot		If PDV ≧ HSEt than High Output ON. If PDV < HSEt than Go Output ON.
LHot		If PDV ≦ LSEt than LOW Output ON. If PDV ≧ HSEt than High Output ON. If PDV > LSEt or If PDV< HSEt Than Go Output ON.
HLot		If PDV ≧ LSEt than LOW Output ON. If PDV ≧ HSEt than High Output ON. If PDV ≦ LSEt or If PDV< HSEt Than Go Output ON.
iLot		It's the same as LLot Function. But low output will not operate under the initial setup value of LSEt. From the next value under LSEt low output will operate.

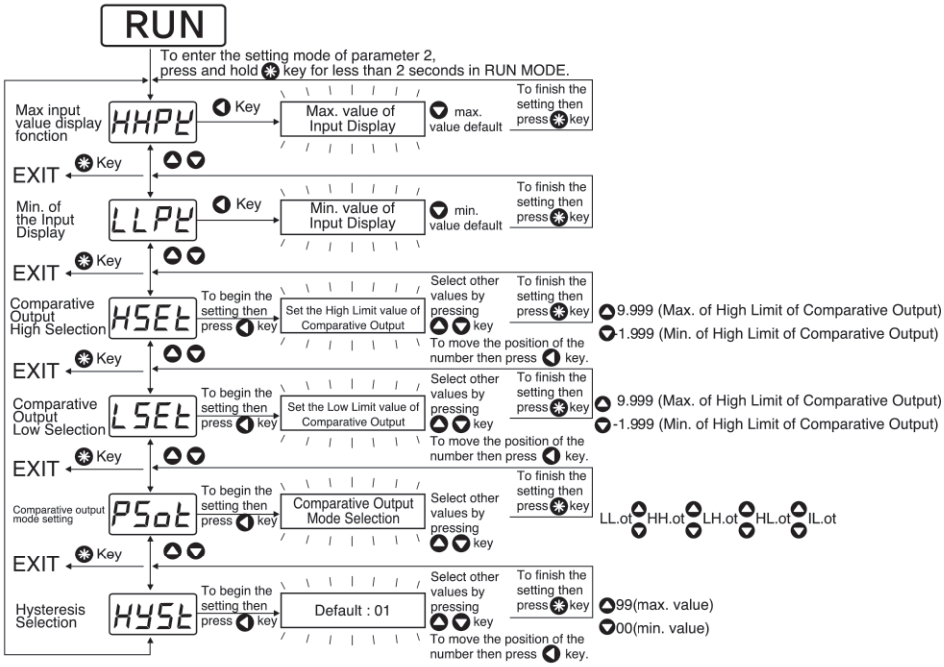
▶ It does not operate under the initial LSEt

Parameter composition and setting method

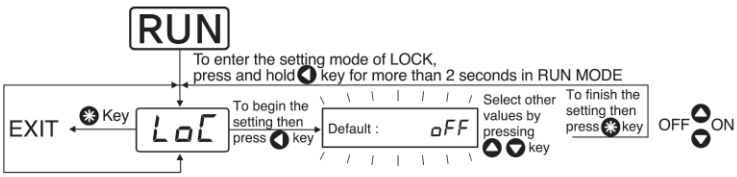
● Parameter 1 (✱ key - more than 2 seconds)



● Parameter 2 (✱ key – less than 2 seconds)



● Lock Key (◀ Key – for more than 2 seconds)

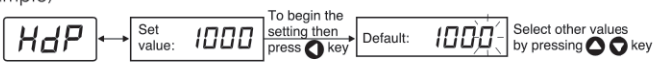


※ When LoCY function is ON, it is impossible to set any of parameters.

How to change the setting value of parameter

1. Pressing ❋ key more than 2 sec within the RUN MODE will enter into the Parameter 1 and pressing ❋ key less than 2 sec will enter into the parameter 2.
2. Able to select the parameter by pressing ▲, ▼ key and within the selected parameter, parameter and set value repeatedly flickers in the display unit.
3. Able to change the set value by pressing the ◀ key and at this moment, set value flickers in the display unit(when set value is 0, only the 0th digit of constant value flickers and displayed)

When changing the setting of constant value, able to perform the position shifting by using ◀ key.
Example)



When set value is constant, only 0th digit of the constant value will flicker in the display unit.
In order to change the value on 100th digit, press the ◀ key 3 times. Each time when users press the ◀ key, position of the digit will shirt to the left and selected digit will flicker in the display unit.
When setting is completed, return to the parameter mode by pressing the ❋ key. At this moment, flickers the parameter and set value repeatedly. Able to return to the RUN mode by pressing the ❋ key again.

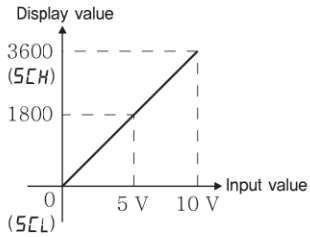
Scale setting method

When the model is MP3-4-DV-X and when users want to display 3600 (minimum -1999~9999) within the 10V input, parameter setting is as follows.

1. Enter into parameter 1 mode by pressing the ❋ key for more than 2 sec
2. Set `IrS` (Input range) parameter as the `10V` range mode.
3. Set `3600` in the `SCH` (High slope value) parameter by using the shift, up and down key.
4. Set `0` in the `SCL` (Low slope value) parameter by using the shift, up and down key.

Set just like above setting and return to the RUN mode by pressing the menu key.

Parameter 1			
Parameter	IrS	SCH	SCL
Set value	10V	3600	0



Initializing the set value

While pressing the ▲, pressing ❋ → ◀ → ▼ will display the `tESt`. At this moment, releasing the ▲ and pressing it ▲ away will initialize all of the setting values. (*Initializing the set value is impossible in the `LoCK` mode)

Error display mode

`-HH-` : Displayed when exceeding the max displayable range 9999 (4 digits) or indicating the negative number in the normal mode. Normal mode: SCH 0 or SCL 0

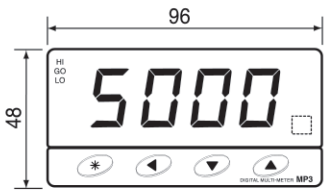
`OVEr` : Displayed when measured input value exceeded the max input range.

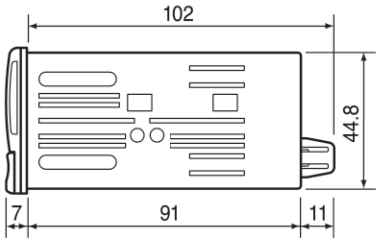
`HLEr` : When High comparative output setting value is smaller than the Low comparative output setting value, setting Error is displayed.

Dimension and panel cutout (unit : ㎜)

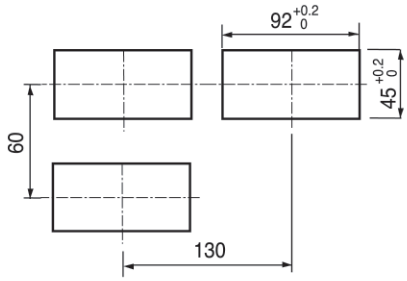
MP3-□□□A

● Dimension



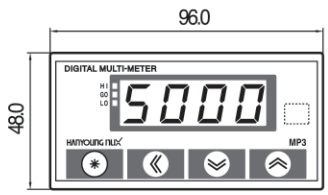


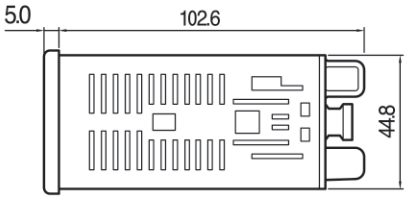
● Panel cutout



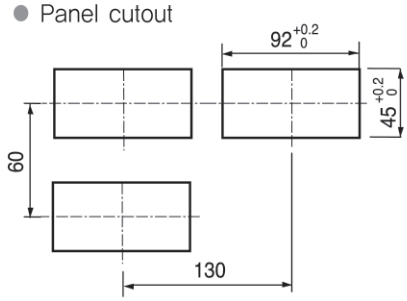
MP3-□□□B

● Dimension



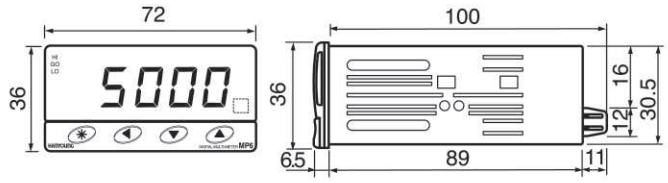


● Panel cutout

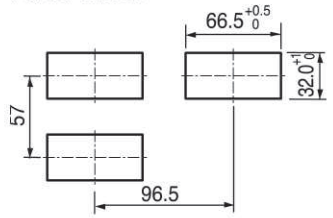


MP6-□□□A

● Dimension

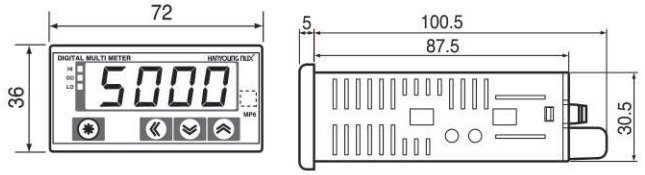


● Panel cutout

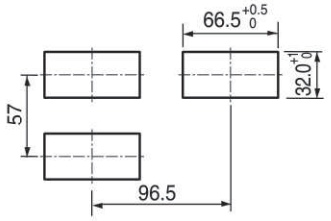


MP6-□□□B

● Dimension



● Panel cutout



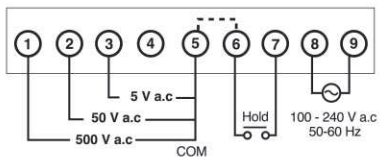
Connection diagram

MP3 terminal structure

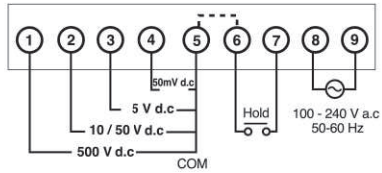
• MP3-4□NA (front acryl structure)

AC type	DC type
■ MP3-4AVNA (Voltmeter)	■ MP3-4DVNA (Voltmeter)
■ MP3-4AANA (Current meter)	■ MP3-4DANA (Current meter)

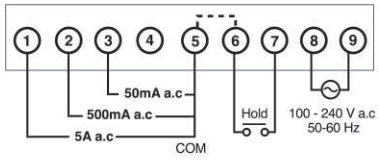
■ MP3-4AVNA (Voltmeter)



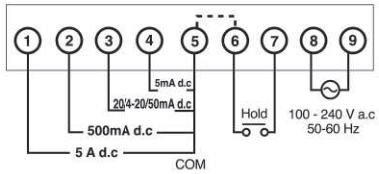
■ MP3-4DVNA (Voltmeter)



■ MP3-4AANA (Current meter)

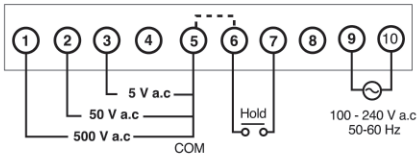


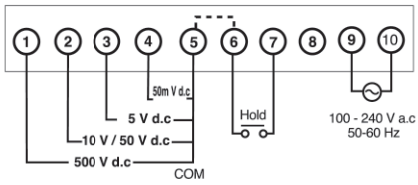
■ MP3-4DANA (Current meter)

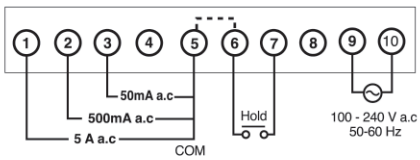


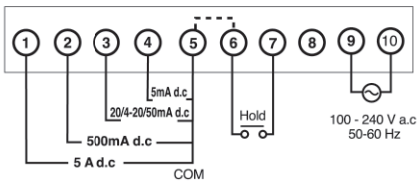
• MP3-4□NB (front name plate attachment type)

AC type	DC type
■ MP3-4AVNB (Voltmeter)	■ MP3-4DVNB (Voltmeter)
■ MP3-4AANB (ammeter)	■ MP3-4DANB (ammeter)

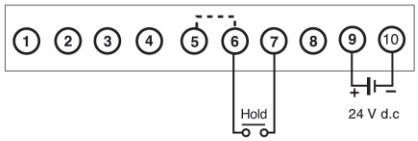








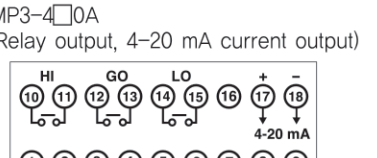
■ MP3-4□□□C

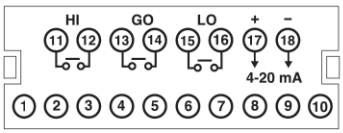


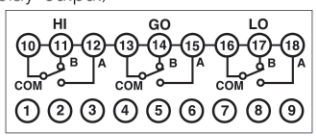
※ This is the connection diagram when power supply voltage is 24 V DC. Input type and output selection are same as the product with power supply voltage is 100 – 240 V AC.

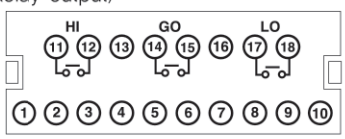
• Output (optional) connection diagram

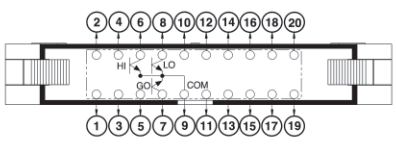
Output code	Output connection diagram	
0	● MP3-4□0A (Relay output, 4–20 mA current output)	● MP3-4□0B (Relay output, 4–20 mA current output)
1	● MP3-4□1A (Relay output)	● MP3-4□1B (Relay output)
2	● TR [NPN] output Hirose 20P Flot	● BCD dynamic output Hirose 20P Flot connector NPN open collector 12–24V DC max 50mA

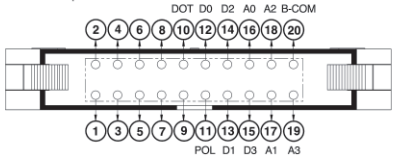


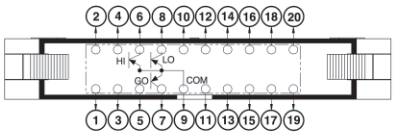
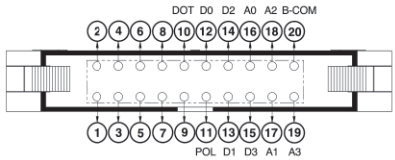
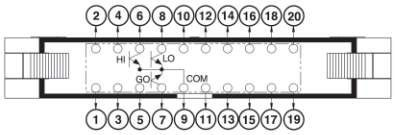
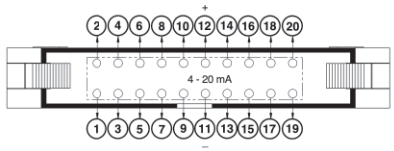
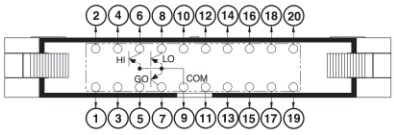
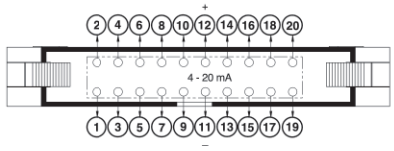
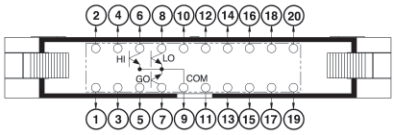
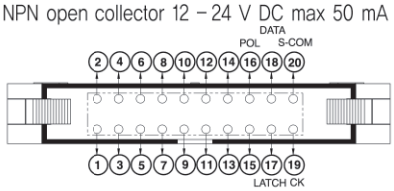
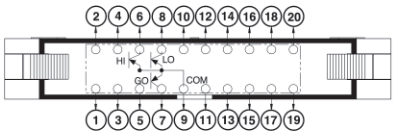
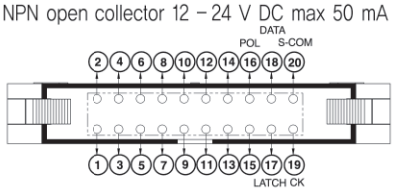
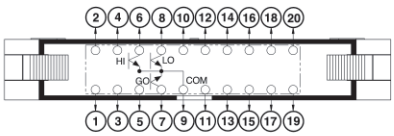
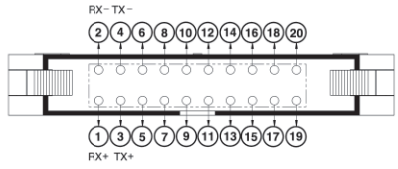


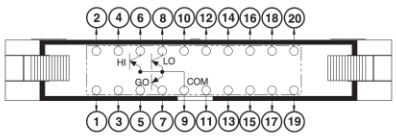
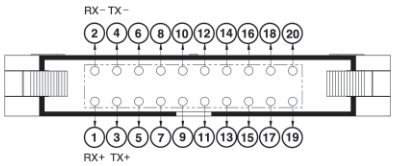
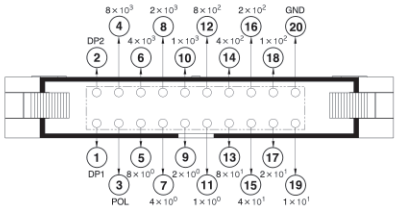
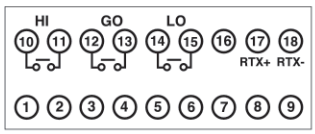
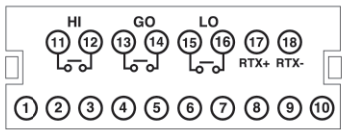






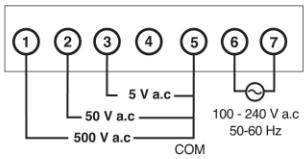
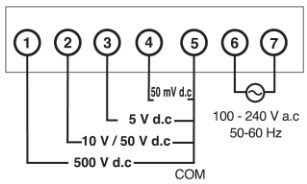
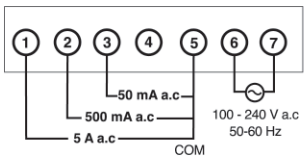
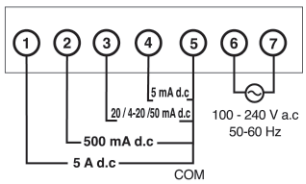
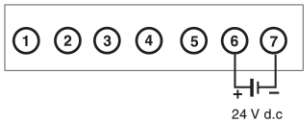


Output code	Output connection diagram	
3	● TR [PNP] output Hirose 20P Flot connector 	● BCD dynamic output Hirose 20P Flot connector 
4	● TR [NPN] output Hirose 20P Flot connector 	● Current output Hirose 20P Flot connector max resistive load 600 Ω 
5	● TR [PNP] output Hirose 20P Flot connector 	● Current output Hirose20P Flot connector max resistive load 600 Ω 
6	● TR [NPN] output Hirose 20P Flot connector 	● low speed serial output Hirose 20P Flot connector NPN open collector 12 – 24 V DC max 50 mA 
7	● TR [PNP] output Hirose 20P Flot connector 	● low speed serial output Hirose 20P Flot connector NPN open collector 12 – 24 V DC max 50 mA 
8	● TR [NPN] output Hirose 20P Flot connector 	● RS-485 output hirose 20P Flot connector 

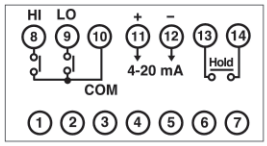
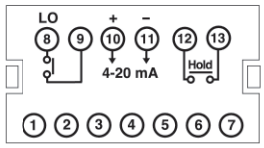
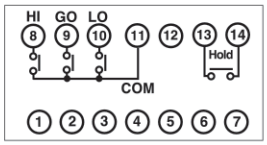
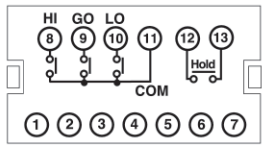
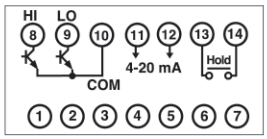
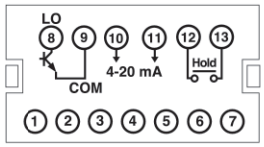
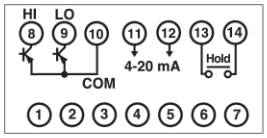
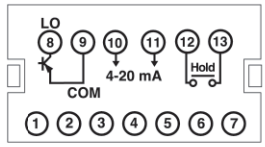
Output code	Output connection diagram	
9	● TR [PNP] output Hirose 20P Flot connector 	● RS-485 output hirose 20P Flot connector 
10	● BCD static output hirose 20P Flot connector NPN open collector 12 – 24 V DC max 50 mA 	blank
11	● MP3-4□□11A (Relay output, RS-485 output) 	● MP3-4□□11B (Relay output, RS-485 output) 

MP6 terminal structure

• MP6-4□NA / MP6-4□NB Dual usage

AC type	DC type
■ MP6-4AV□□ 	■ MP6-4-DV□□ 
■ MP6-4AA□□ 	■ MP6-4DA□□ 
■ MP6-4□□□C 	※ This is the connection diagram when power supply voltage is 24 V DC Specification of input type and output selection are same as the product with power supply voltage is 100 – 240 V AC

• Output (optional) connection diagram

Output code	Output connection diagram	
	MP6-4□0A (Front acryl)	MP6-4□□B (Front name plate)
0	● MP6-4□0A (Relay output, 4-20 mA current output) 	● MP6-4-□0B (Relay output, 4-20 mA current output) 
1	● MP6-4□1A (Relay output) 	● MP6-4□1B (Relay output) 
4	● MP6-4-□4A (NPN TR output, 4-20 mA current output) 	● MP6-4□4B (NPN TR output, 4-20 mA current output) 
5	● MP6-4-□5A (PNP TR output, 4-20 mA current output) 	● MP6-4□5B (PNP TR output, 4-20 mA current output)