

Manostar Electronic Micro Differential Pressure Measurement System

NEW

Manosys Digital Micro Differential Pressure Gage EMD8

DIN 48 × 24 Panel installation type

RoHS compliant



- UL standards and EU directive conformity
- It is easy to install equipment by RITS connector and snap-in to panel.
- High performance diaphragm and differential inductance method adopted as displacement sensor
- 10 variations of pressure range (including two ranges of zero point center range)
- Fine visibility of red LED of 12 mm in height
- Variety of function is loaded moving average filter, display of max., min. value memory and comparison output, and so on.
- The function of sign inverting is available measuring negative pressure. (It can be displayed minus quantity.)



EMD8

* The electric connector wiring side is not attachment for an instrument. When you need it, use the optional 5P RITS Connector. (refer to p.48)

<Example of main use field>

Manufacturing machine parts of semi-conductors
Measuring negative pressure in bag filter and differential pressure in air conditioners
Monitoring of pressure loss in filters
Production lines of precision machine
Air conditioning control system of factory
Medical equipments

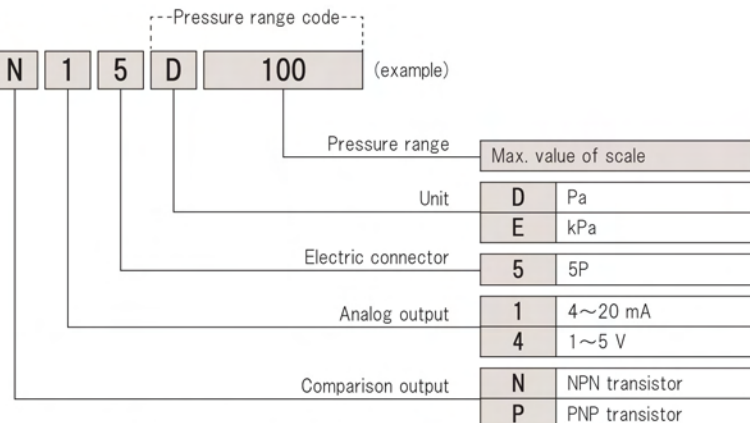
<Example of use>

Measuring inner pressure of indoor equipments
Detector of a pressure loss in an air filter
Detector of a pressure loss in a bag filter
Measuring of dynamic pressure in a ventilator and an exhauster
Measuring the inside pressure of clean rooms

*(refer to p.93)

Product code

E M D 8 N 1 5 D 100 (example)



◆If you order or ask, please specify the product code and the pressure range code.



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Specification

Types	EMD8			
Pressure Units	Pa, kPa	Power supply voltage	12 to 24 V DC $\pm 10\%$ (with a ripple 10 % or less)	
Pressure measuring method	Measuring differential pressure	Max. current consumption	1. EMD8N (Comparison output NPN transistor type) Total consumption : 100 mA (Only internal consumption) 2. EMD8P (Comparison output PNP transistor type) Internal consumption : 100 mA Total consumption : 300 mA (include comparison output load current 100 mA $\times$ 2)	
Gas to be measured	Air or non-corrosive gas (not liquid)	Insulation resistance	Between each terminal and case 10 M Ω or more (500 V DC megger)	
Pressure receiving element	Diaphragm (silicone rubber)	Withstand voltage	Between each terminal and case 500 V AC 50 / 60 Hz, for one minute	
Standard installation position	On vertical wall only	Installation category	Standard IEC60664 level II (However, it is necessary to connect this instrument with the secondary side of the safety insulation transformer such as DC switching power supplies.)	
Medium and ambient temperature	0 to + 60 °C (no freezing)	Ambient altitude	Altitude up to 2000 m	
Ambient humidity	35 to 85 % RH (no dewing)	Protection degree	Standard IEC60529 IP-code IP 40	
Withstanding pressure of instrument body	10 kPa (refer to p.104)	Pollution degree	Standard IEC60664 degree 2 (When you can not install in dry and well-kept clean locations, this equipment must be enclosed in box of min IP54.)	
Withstanding pressure of receiving element	10 kPa (refer to p.104)	Withstanding vibration	5 to 10 Hz Amplitude : 10 mm, 10 to 50 Hz Acceleration : 39 m/s ² (each two hours on triaxial directions)	
Material of the outer case	Polycarbonate	Withstanding impact	100 m/s ² (each six times on triaxial directions)	
Conversion method of electric signal	Variable inductance	Applicable piping	Vinyl, plastic or rubber tube (I.D. 4)	
Display	Display part Seven segments LED red 3.1 / 2 digits Accuracy $\pm 1.5\%$ FS ± 1 digit (at 20 °C) Temperature characteristics $\pm 0.15\%$ FS/°C (zero + span)	Tube tap polarity	Pressure side mark indicated on the polarity piping tube tap that high side is H and low side is L.	
Zero adjustment	Push type auto zero (Both display scale and analog output adjust zero point at the same time)	Electric connector	5P RITS Connector (Tyco) Use exclusive accessory on the connector wiring side. (refer to p.48)	
Comparison output	Setting method Push type of digital setting Output display Red LED $\times$ 2 Output type 1. EMD8N NPN transistor open collector Two channels Max. load current 100 mA or less (respectively) Max. applied voltage 30 V DC or less Output saturation voltage 1 V DC or less (at load current 100 mA) 2. EMD8P PNP transistor open collector Two channels Max. load current 100 mA or less (respectively) Max. applied voltage 30 V DC or less Output saturation voltage 2 V DC or less (at load current 100 mA)	Mass	Approximately 60 g	
Analog output	Accuracy $\pm 1.5\%$ FS (at 20°C) Temperature characteristic $\pm 0.15\%$ FS/°C (zero + span) Output type 1. EMD8 □ 1 4 to 20 mA (single pressure: 0 to FS pressure, $\pm$: - 50 to + 50 % FS pressure) Load resistance 0 to 250 Ω 2. EMD8 □ 4 1 to 5 V (single pressure: 0 to FS pressure, $\pm$: - 50 to + 50 % FS pressure) Load resistance 10 k Ω or more			
Pressure range codes	Rated pressure ranges	LED displays	Comparison output	Analog output
D 100	0 ~ 100 Pa	0.0 ~ 100.0	NPN transistor or PNP transistor	4 to 20 mA or 1 to 5 V
D 200	0 ~ 200 Pa	0 ~ 200		
D 300	0 ~ 300 Pa	0 ~ 300		
D 500	0 ~ 500 Pa	0 ~ 500		
D 1000	0 ~ 1000 Pa	0 ~ 1000		
E 2	0 ~ 2 kPa	0.00 ~ 2.00		
E 3	0 ~ 3 kPa	0.00 ~ 3.00		
E 5	0 ~ 5 kPa	0.00 ~ 5.00		
D + - 50	- 50 ~ + 50 Pa	-50.0 ~ 50.0		
D + - 100	- 100 ~ + 100 Pa	- 100 ~ 100		

Conformed standards

1. EU directive

This instrument conform EMC directive of EU.

The conformed basic request EMC directive standards No. EN61326-1

The instrument shall be used with the power adaptor HWS15-24/A (DENSEI-LAMBDA) to satisfy the EMC requirements.

Other adaptors may be used, but that such solutions is not guaranteed by the manufacture, since EMC properties are relying on the adaptor configuration.

2. UL standards

This instrument is authorized to apply the UL Re as the recognition part of UL standards. However, use this instrument following the condition of installation.

(1) The applicable request standards UL61010-1

(2) File No. E220685

(3) Condition of installation The instrument shall be powered by a NEC (National Electrical Code) class 2 or a Limited Power Source (LPS) power supply.



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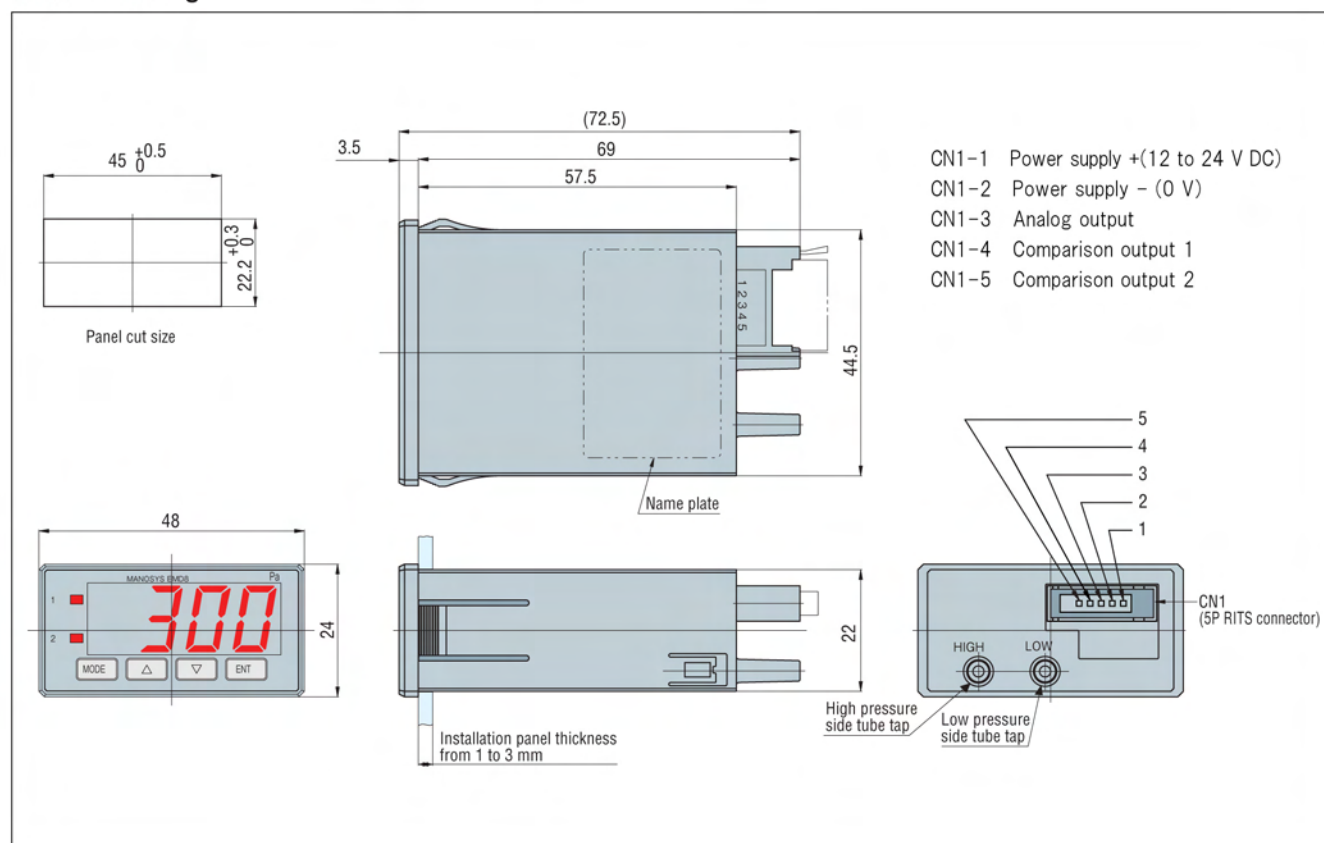
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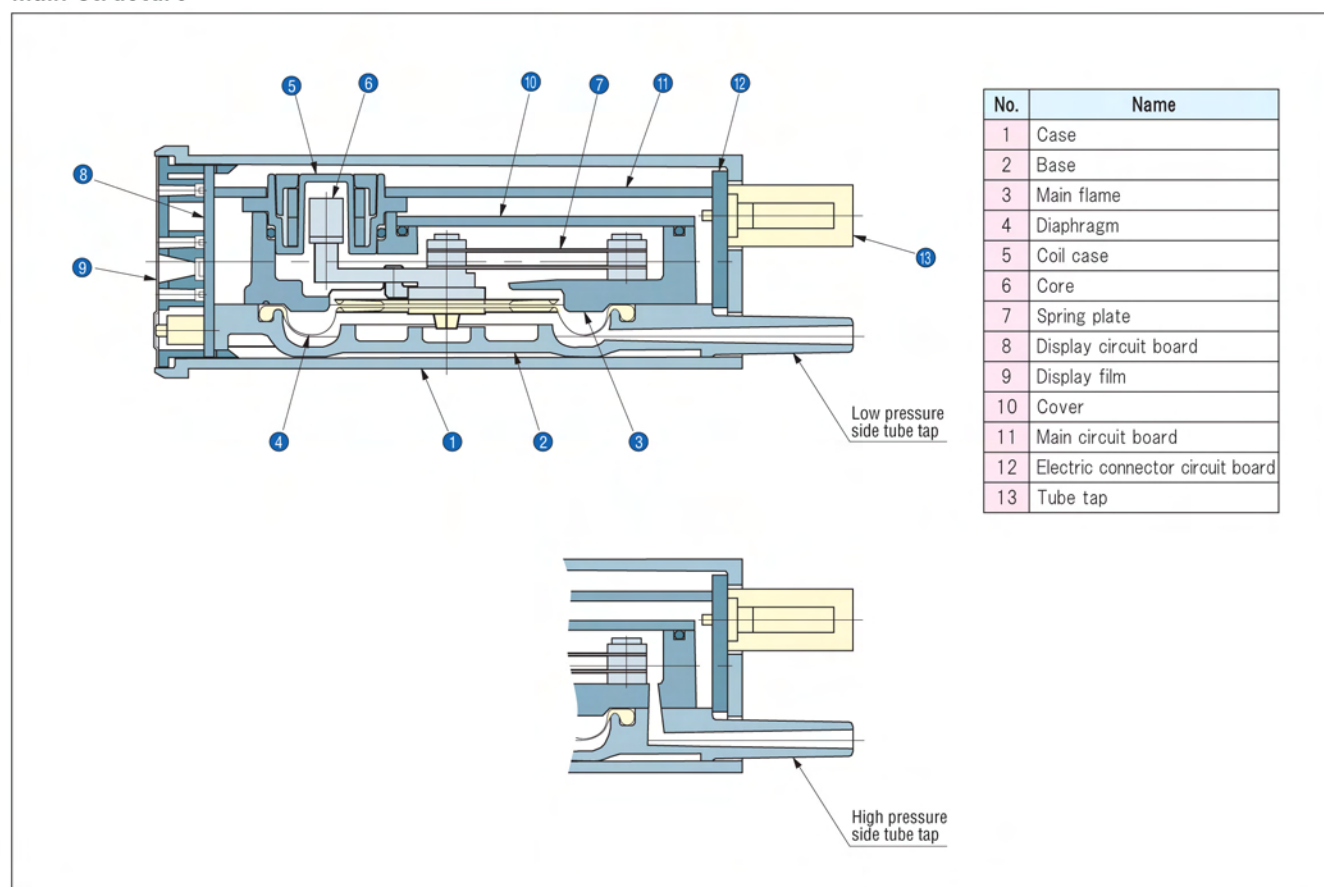
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Outline drawing

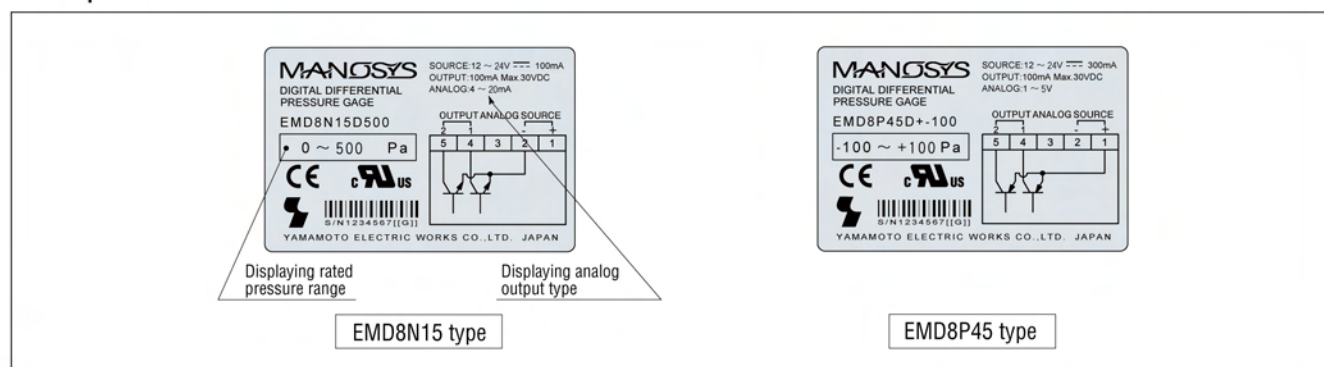


Main structure

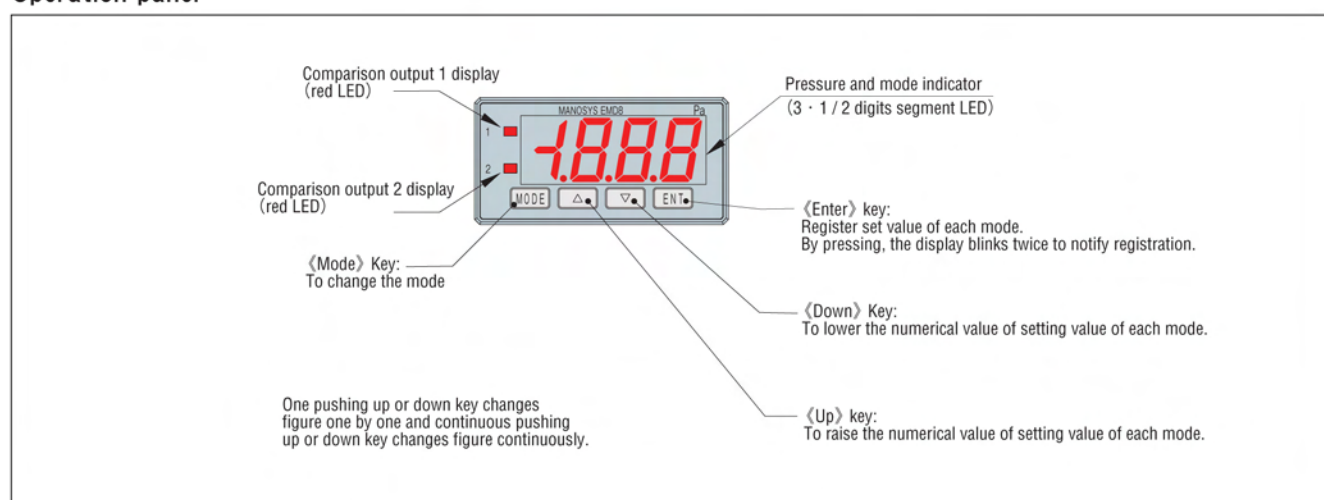


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Name plate



Operation panel



Function of EMD8▶▶▶

▶ Display

- Pressure display
Seven segment red LED of 12 mm in height is fine visibility
- Auto zero adjustment function of push type
Pressure display values and analog output are corrected zero point at the same time.
- Moving average filter (for display)
In case of large fluctuation of pressure, the fluctuation of display value can be reduced by delaying response time.
- Max. and Min. value memory function
Max. and Min. value of pressure can be kept in memory and displayed.

▶ Comparison output function (NPN or PNP transistor output)

- There are two systems that have same function and that operate independently.
(Each system has one transistor power output and one red LED for output monitor)
- It is possible to be used in various use by setting of following parameters.
 1. Comparison mode (hysteresis mode or window mode)
 2. Comparison pressure setting point
 3. Output mode (OFF, N.O., N.C.)
 4. Output-on delay time
 5. Output-off delay time
 6. Power supply-on delay time

▶ Analog output

- Analog output (4 to 20 mA or 1 to 5 V)
The digitalized pressure values are converted the analog output values after zero adjusting and moving average filtering.
- Moving average filter (for output)
In case of large fluctuation of pressure, the fluctuation of output value can be reduced by delaying response time.

▶ Other functions

- Test mode
This function can check operation and setting value without pressurization.
- Display low cut
When the pressure value to be measured is about zero, the display is indicated as zero by force.
- Sign reversal of display mesured
Display-code of pressure display mode and max., min. display mode is turned the other way.
- Analog output reversal
Analog output value is decreased in increasing measuring pressure.
- Low power consumption
The electric power consumption is reduced by lowering the display luminance of LED.
- Setting value protecting
It prevents a setting value to mistake by incorrect operation.
- Setting value clearing
All setting value is returned factory-setting.

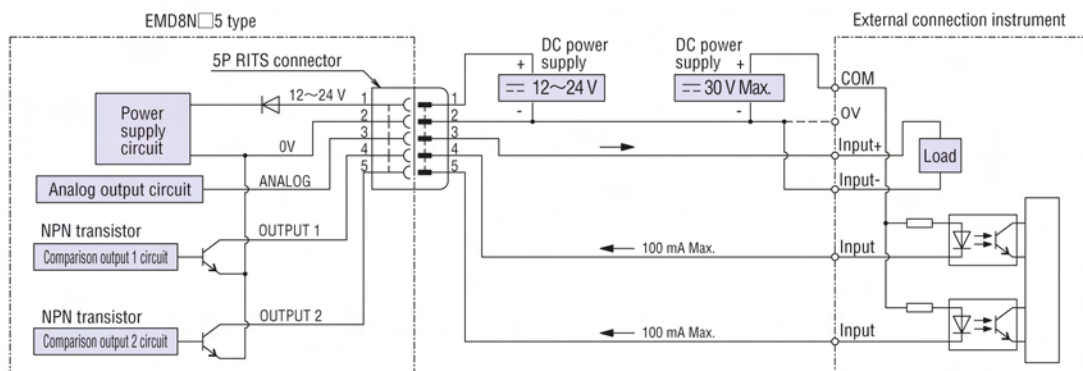


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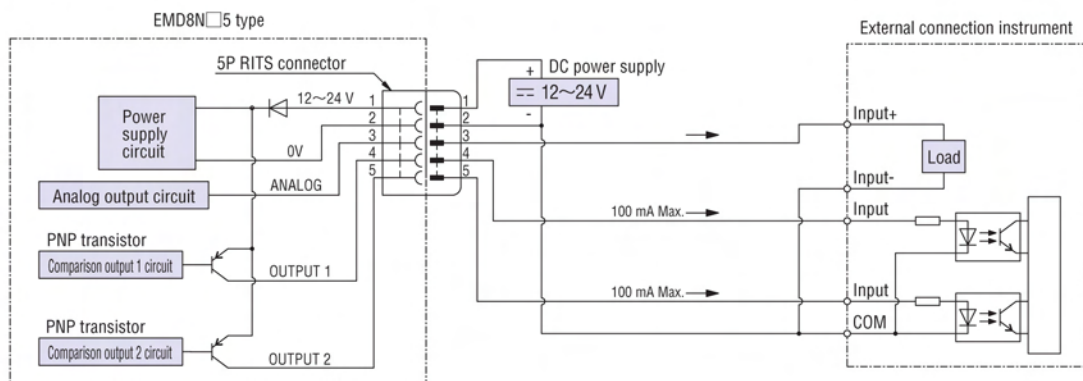
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Wiring

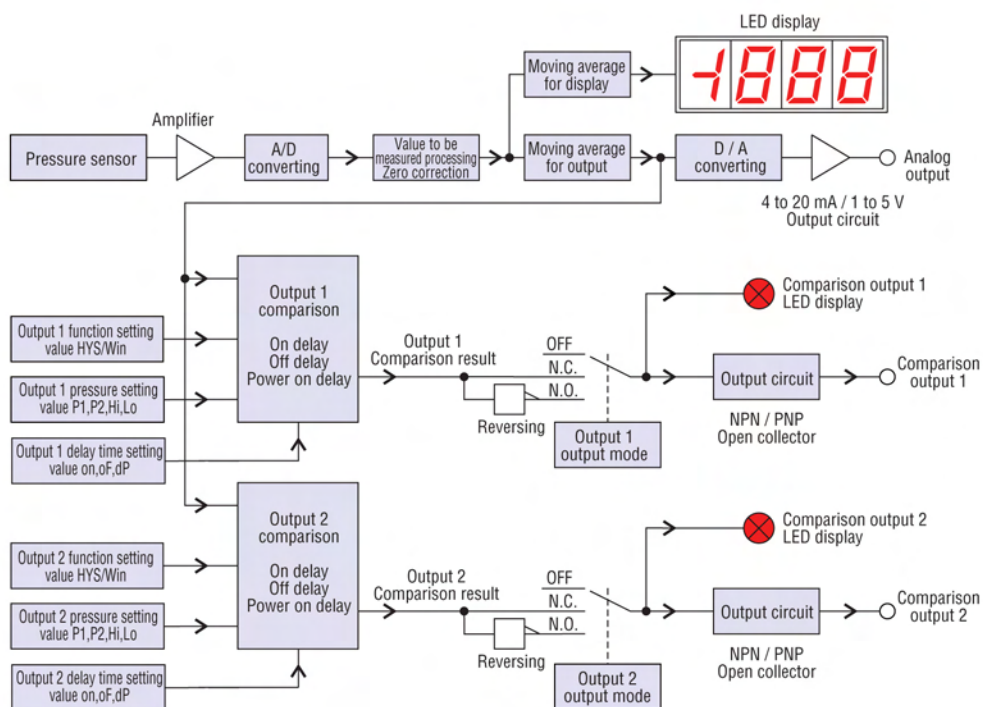
Comparison output NPN transistor type



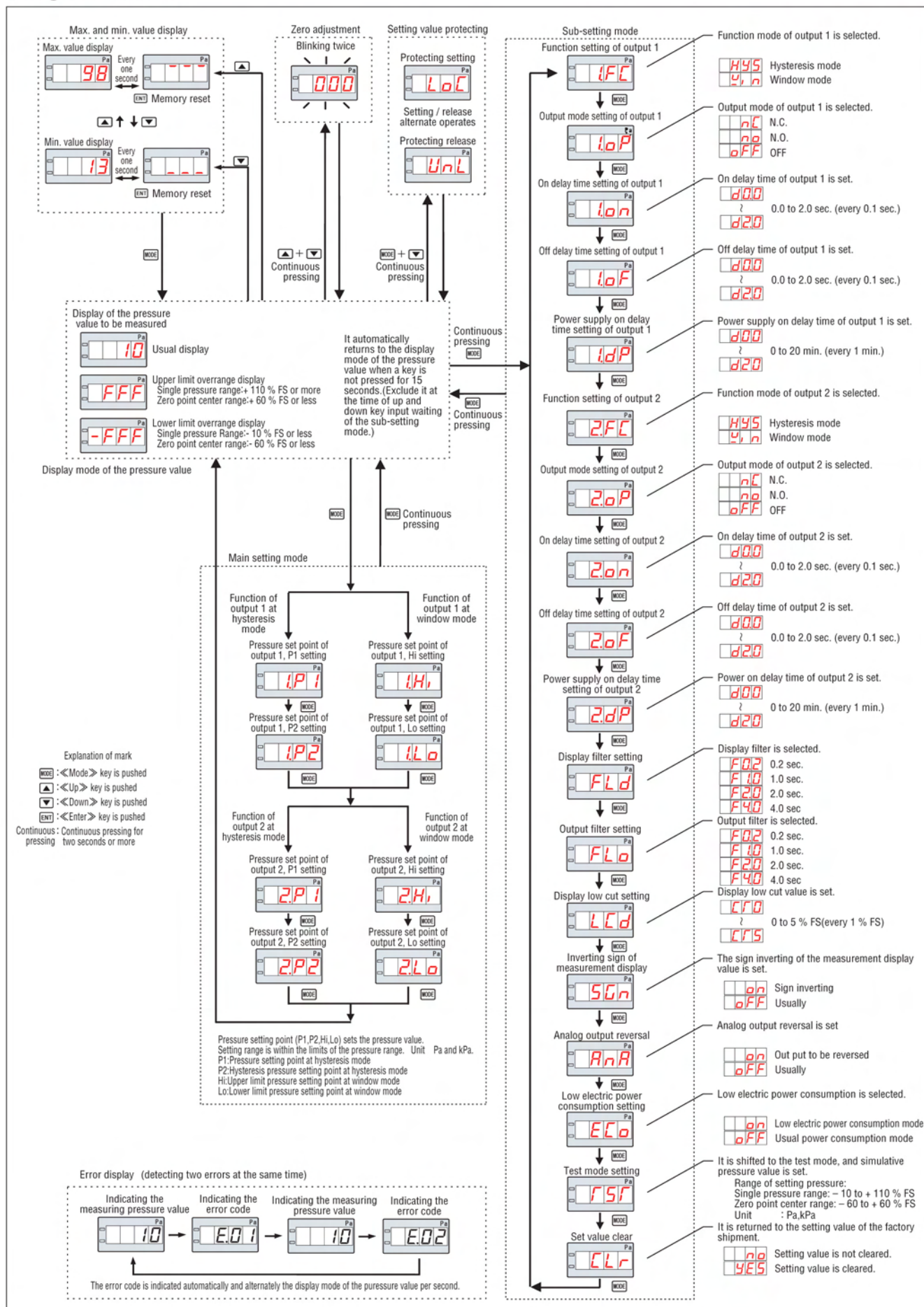
Comparison output PNP transistor type



Function block diagram



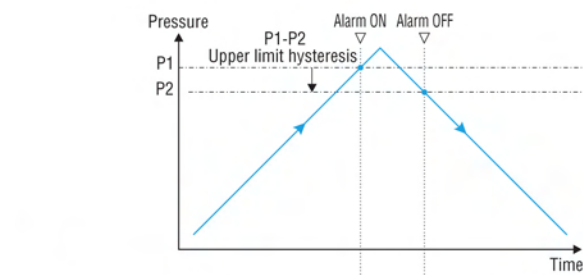
Changeover of mode



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Working drawing of function compared

Comparable function Hysteresis mode : Upper limit setting ($P1 > P2$)



Pressure state	Normal	Abnormal	Normal
Comparison output state			
Output mode	OFF	Open (OFF) always	
	N.C.	Close (ON)	Open (OFF)
	N.O.	Open (OFF)	Close (ON)

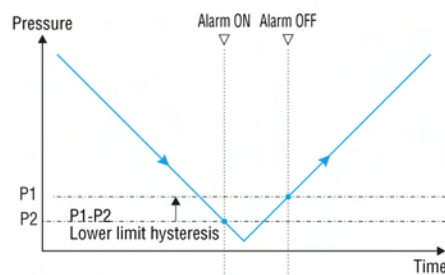
Explanation of operation

On detecting the abnormal pressure rise, the comparison output is operated. In the state to setting output mode to 'N.C.', when pressure exceeds the setting value P1, output becomes Open (OFF). When it falls below P2, output becomes Close (ON).

Power supply on delay timer

Comparison output compulsorily becomes Open (OFF) while the timer is working.

Comparable function Hysteresis mode : Lower limit setting ($P1 < P2$)



Pressure state	Normal	Abnormal	Normal
Comparison output state			
Output mode	OFF	Open (OFF) always	
	N.C.	Close (ON)	Open (OFF)
	N.O.	Open (OFF)	Close (ON)

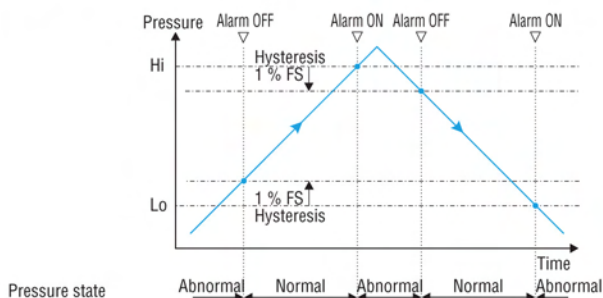
Operation explanation

On detecting the abnormal pressure fall, the comparison output is operated. In the state to set output mode to 'N.C.', when pressure falls below the setting value P1, output becomes Open (OFF). When it exceeds P2, output becomes Close (ON).

Power supply on delay timer

Comparison output compulsorily becomes Open (OFF) while the timer is working.

Comparable function Window mode : Inside area ($Hi > Lo$)



Pressure state	Abnormal	Normal	Abnormal	Normal	Abnormal
Comparison output state					
Output mode	OFF	Open (OFF) always			
	N.C.	Open (OFF)	Close (ON)	Open (OFF)	Close (ON)
	N.O.	Close (ON)	Open (OFF)	Close (ON)	Open (OFF)

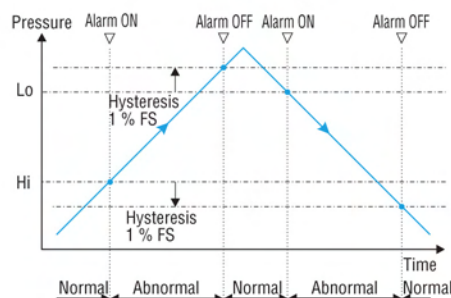
Explanation of operation

It compares the setting areas from Lo to Hi (window). In the state to setting output mode to 'N.C.', when pressure enters while it is an area (window), the output becomes Close(ON). When it comes off from the area, output becomes Open (OFF).

Power supply on delay timer

Comparison output compulsorily becomes Open (OFF) while the timer is working.

Comparable function Window mode : Outside area ($Hi < Lo$)



Pressure state	Normal	Abnormal	Normal	Abnormal	Normal
Comparison output state					
Output mode	OFF	Open (OFF) always			
	N.C.	Close (ON)	Open (OFF)	Close (ON)	Open (OFF)
	N.O.	Open (OFF)	Close (ON)	Open (OFF)	Close (ON)

Operation explanation

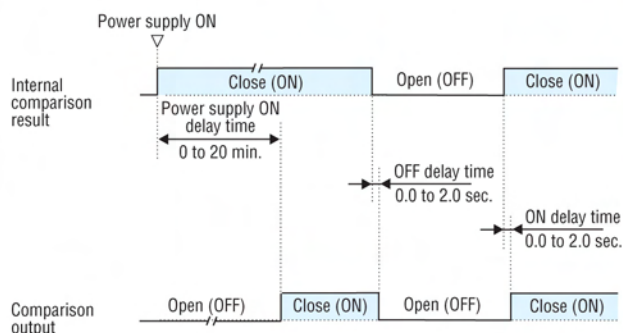
It compares the outside out of pressure area from Hi to Lo (window). In the state to setting output mode to 'N.C.', when pressure comes off from the area (window), output becomes Close(ON).

When it enters within the area, output becomes Open (OFF).

Power supply on delay timer

Comparison output compulsorily becomes Open (OFF) while the timer is working.

Comparable output delay (ON · OFF , Power supply on)



Operation explanation

The CLOSE / OPEN (ON / OFF) timing of the output transistor is delayed the delay-setting time regardless of the setting of output mode (N.C, N.O).

Power supply on delay timer

Comparison output compulsorily becomes Open (OFF) while the timer is working.



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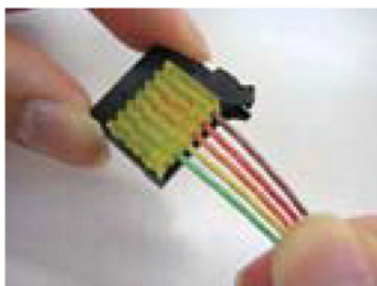
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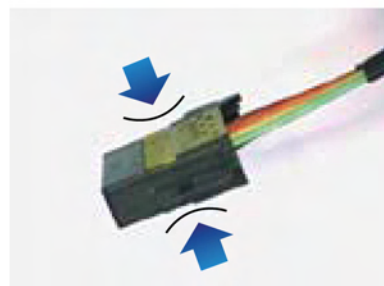
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About EMD8 type RITS connector ▶▶▶

RITS connector type contributes to reduction of the total setup time and cost in comparison with screw terminal block type.



Inset the wire to be connected



Press the connector with the plier

Comparison of operation

<Wiring process>

○Terminal block type
(usual model)

- Process**
- Removing terminal cover
 - Wire-cover stripping
 - Wire insertion to crimp terminal
 - Crimping
 - Loosing terminal screw of the instrument body
 - Crimping screws of the instrument body
 - Check

Number of operation

- 1 time
- 5 times
- 5 times
- 5 times
- 5 times
- 5 times
- 1 time

Total 27 operations

○RITS connector type
(EMD8 type)

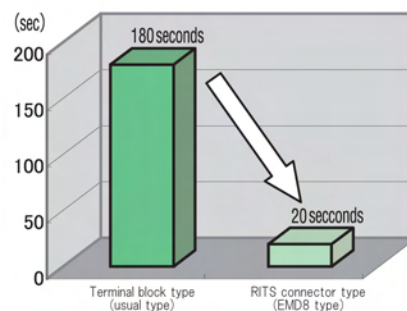
- Process**
- Wire insertion to the connector
 - Crimping
 - Connecting with EMD8 body
 - Check

Number of operation

- 5 times
- 1 time
- 1 time
- 1 time

Total 8 operations

<Wiring time>



* Wiring time is measured by Yamamoto Electric Works

Accessory for EMD8 RoHS compliant

5P RITS Plug connector

It is the wiring side connector to use RMD8 type for 5P RITS Connector.



RITS connector is not based on e-con with EMD8 type.
Caution Use 5P RITS Plug Connector produced by TYCO Electronics Co., Ltd. as follows.



Product code 1473562-5

Product code	Color of cover	Applicable cable	
		Nominal cross-sectional area	O.D. of the wire cover
1473562-5	Yellow	0.1 to 0.5 mm ²	1.0 to 1.15 mm



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