

# **Type SMP-MC Pressure Transmitter**

## **Instruction Manual**

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### Safety Precautions

Be sure to follow the precautions given below before starting inspection or servicing.  
An accident may result due to electric shock or short circuit.

- (1) Be sure to turn off the power.
- (2) Using a tester, make sure no voltage is applied before starting the work.
- (3) Do not perform live-line work, except as required in emergency.

### General Information on Electric Shock

There are the following three cases where people suffer from electric shock:

- (1) Brought into contact with something electrically hot, his/her body makes a path of a ground-fault current.
- (2) Brought into contact with two lines under voltage, his/her body makes short circuit the lines.
- (3) Brought into a path of electricity, such as an electric wire and a switch, his/her body is inserted into the path of load current.

### Electric Shock Preventive Measures

- (1) Eliminate insufficient insulation in wiring and electrical machinery and apparatus.
- (2) Completely execute grounding work for electrical machinery and apparatus.
- (3) Provide electric leak preventive measures for cables to electrical machinery and apparatus operated in wet places.
- (4) Be sure to turn off the power before starting inspection or repair work.

## 1. Outline

The SMP-MC type pressure-transmitter has used the stainless steel diaphragm element in accordance with membrane strained gauge style. So, the above transmitter has a merit of being light weight, small sized, linear and finally having a high response efficiency.

Adding pressure, the element being strained and causes the voltage proportional to pressure. This pressure will be received by an amplifier, and after being amplified and changed to DC 4 ~ 20mA, it can be output as a 2 wire system signal. This output signal can be used in some instruments like indicator, data logger, recorder and warning instruments.

## 2. Cross section

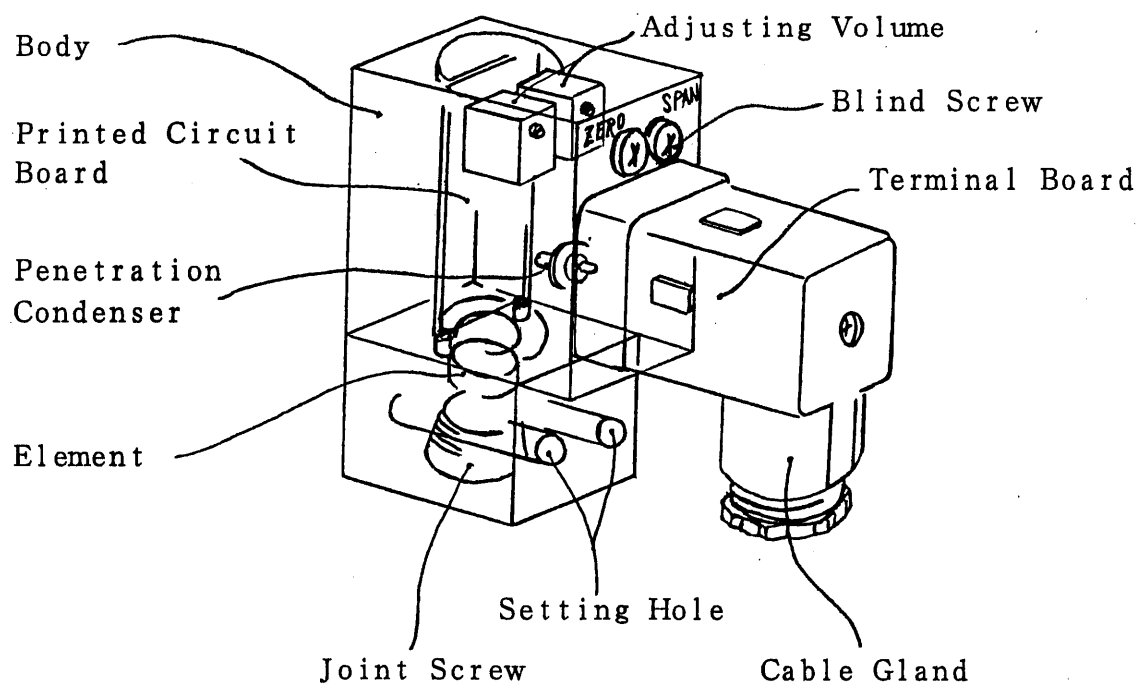


Fig 2.1

### 3. Operation theory

Adding pressure to the sensor element plate which forms bridge circuit consisting semiconductor strain gauge, the resistance of element will be changed and it causes a potential difference between the points of A and B as it shown in Fig 3.1.

Amplifying this potential difference, the output signal proportional to the pressure will be gained.

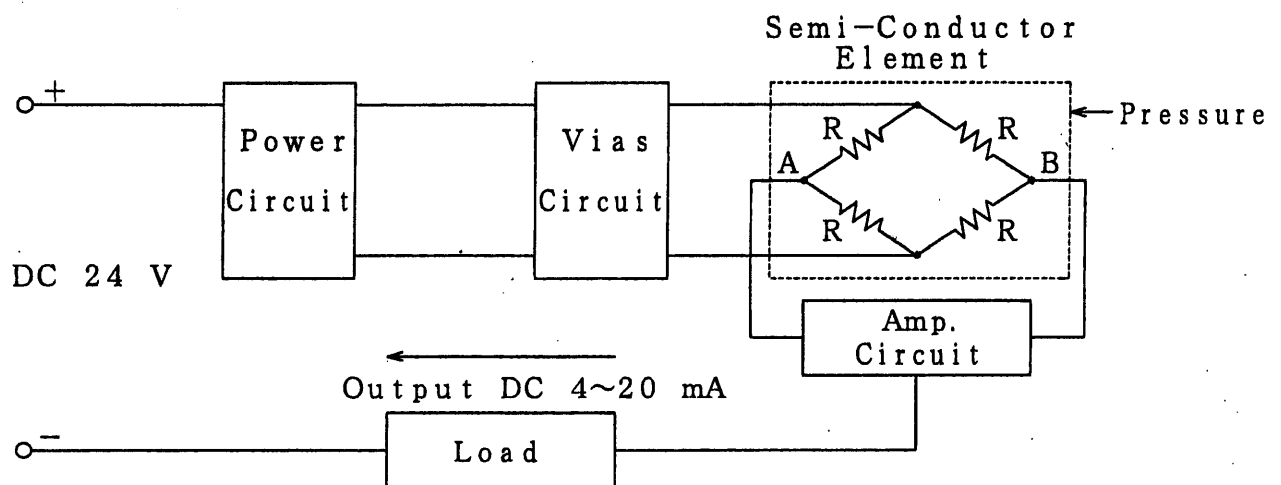


Fig 3.1

#### 4. The wiring

This type pressure-transmitter is 2 wire system, and its output signal is 4 ~ 20mA. In this system, the load should be connected in series between No.2 terminal of transmitter and 0V line of power supply as it shown in Fig 4.1.

In case of constant-voltage power supply, the connected maximum load could be up to 550  $\Omega$  . If not constant-voltage power supply, the maximum load should be calculated by the next formula.

$$R_L = \frac{\text{The lowest power supply voltage} - 13}{0.02} \quad (\Omega)$$

$R_L$  : Resistance of Load.

In case of connecting several receivers, the total resistance of load should be less than the maximum load resistance culculated above. And also; in case of connecting several receivers exception analog meter, those loads of them not connecting directly to the 0V line of power supply, should be isolated as it shown in Fig 4.1.

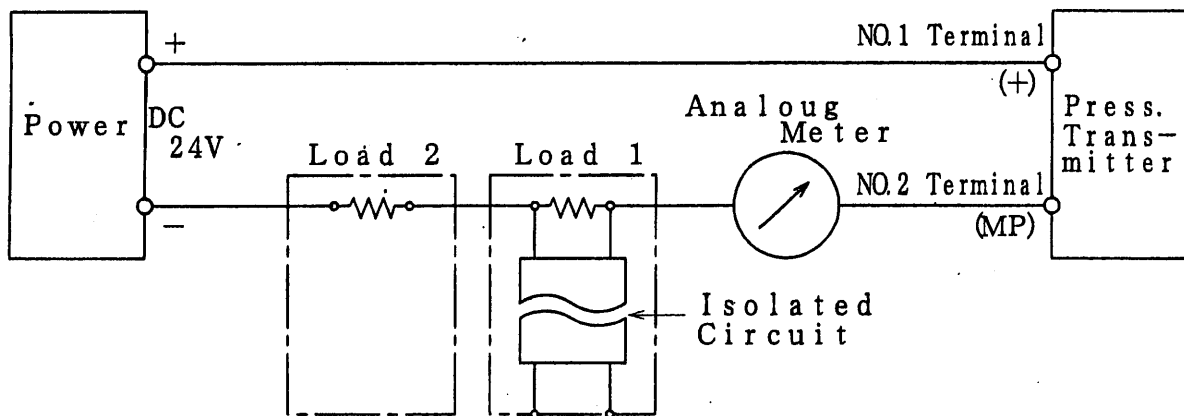


Fig 4.1

## 5. Installation

- (1) The transmitter should be installed at the place where it is easy to do maintenance and the expectation.
- (2) The receiving—pressure hole of the transmitter should be downward vertically.
- (3) The transmitter should not be installed in the corrosive gas area.
- (4) The transmitter should be avoided to install in the strong magnetic area or nearly.

## 6. Connections

- (1) Remove the cable gland part from the body of transmitter after loosening the top screw of the cable gland.
- (2) Put out the terminal inside the cable gland with a small minus driver (lift arrow position).
- (3) Pass the wire through the cable gland hole and connect it to the terminal inside the cable gland.
- (4) Reform the terminal into the cable gland and push until it sounds. Be careful not to mistake the position of terminal.

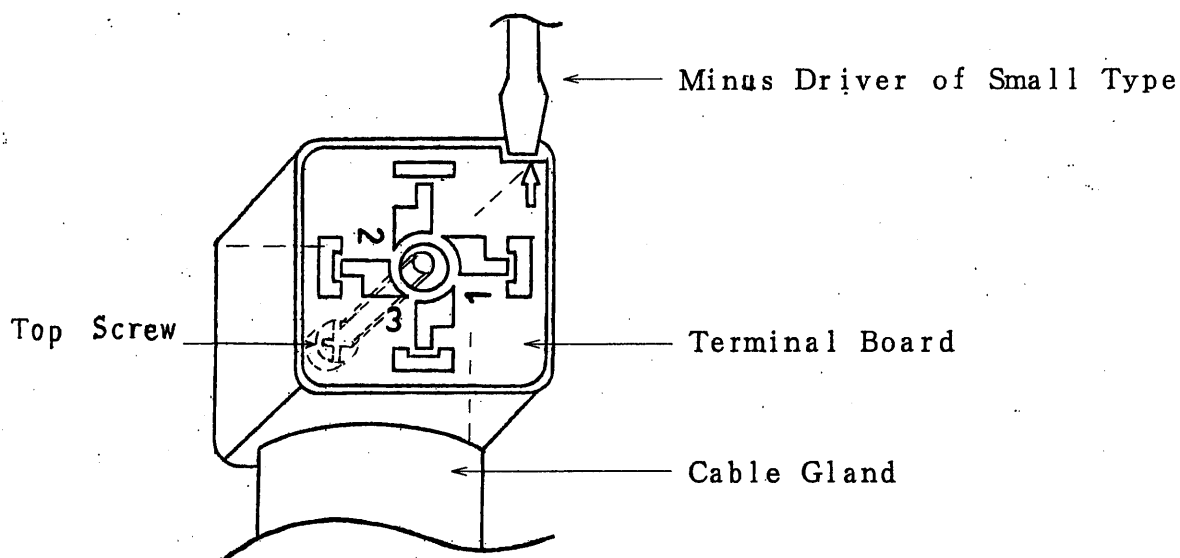


Fig 6.1

Attention: Since incorrect connection causes damage, the connecting or wiring should be done carefully. Also it should be surely tightened.

7. The things should be confirmed.

(1) Power supply

Check the wiring before power supplied and confirm that whether it is correctly supplied or not.

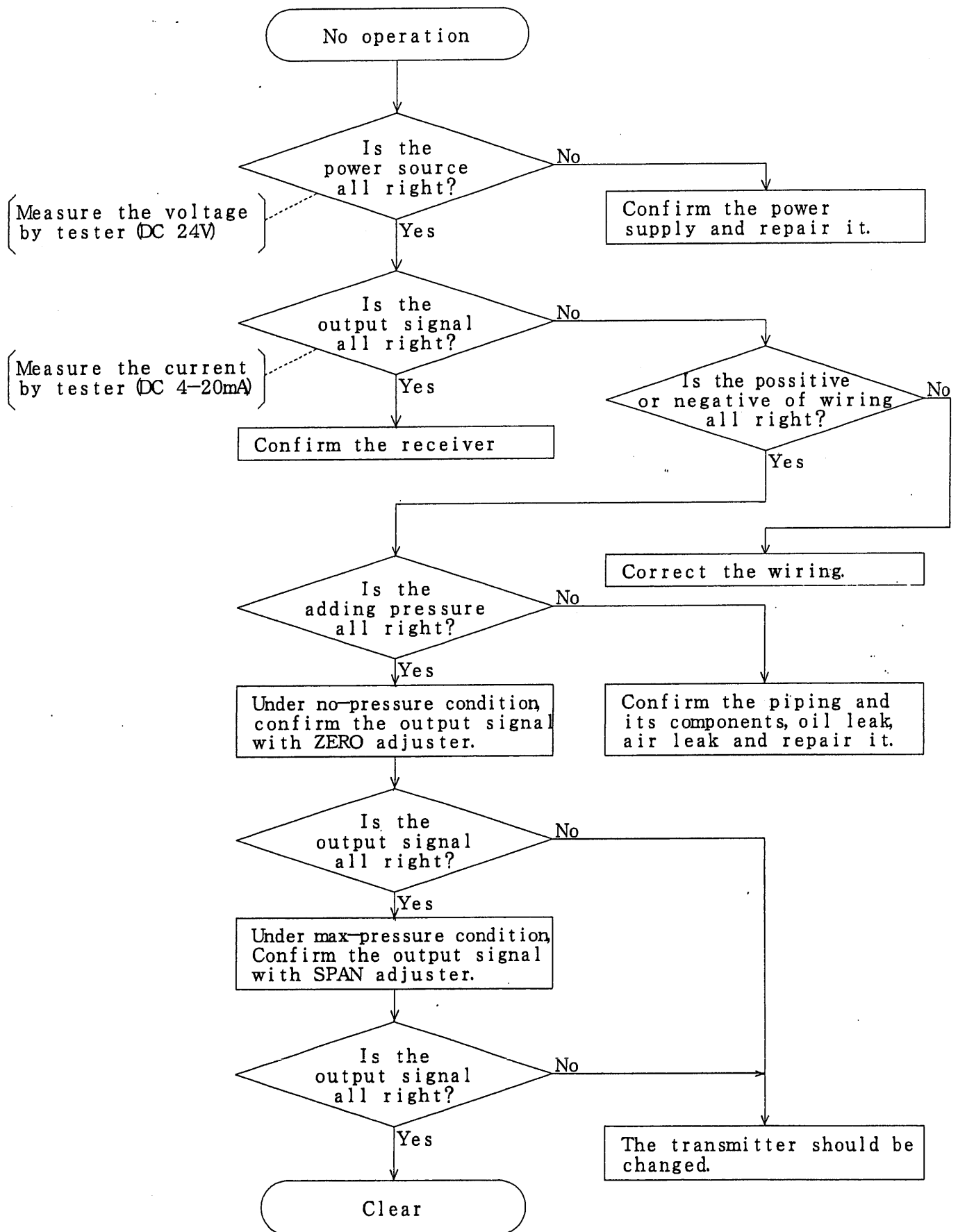
(2) Pressure and leakage

Confirm that whether the pressure is normally added to the transmitter or not.  
Also, confirm that whether there is any leakage in connection part of pipe or not.

(3) Output signal

Confirm the output signal with an ampere meter whether it is normal or not.

# 8. Flow-chart for trouble treatment





## 9. Adjustment

It is not necessary to adjust the transmitter, exception for head difference that means the difference of height between the transmitter and the pressure source supplied. The above head difference adjustment should be carried out according to the followings.

### 9.1 ZERO adjustment

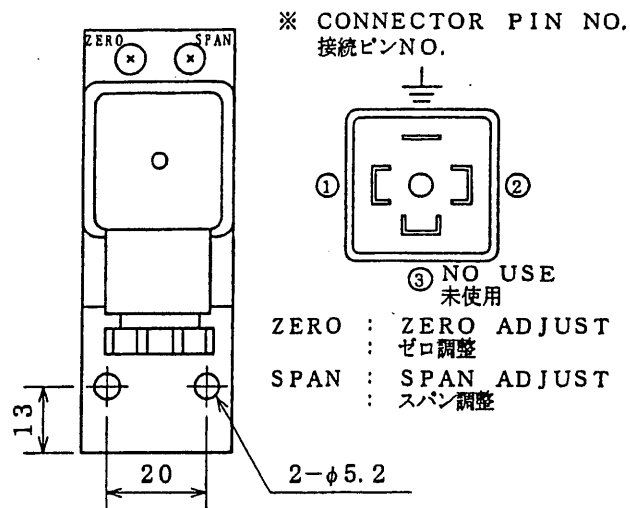
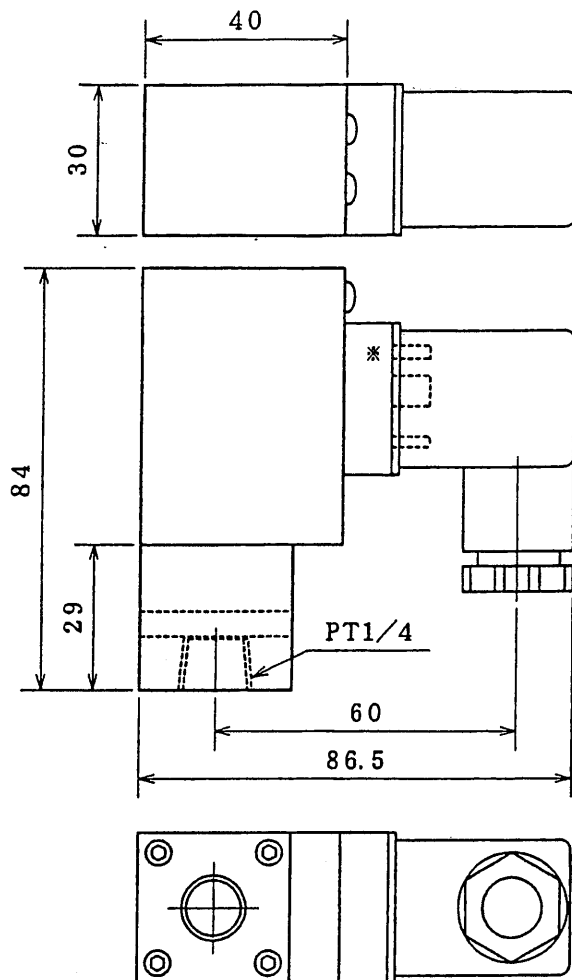
This adjustment should be done after 20 minutes power source supplied.

- (1) Remove the connection port of the transmitter from pipe joint, and keep the transmitter under the no-pressure condition.
- (2) Confirm the output amperage. The proper amperage of no-pressure condition should be 4mA. ( $\pm 1.0\%$  at F.S.)
- (3) If the amperage of no-pressure condition being greater than the above allowance, remove the blind screw and adjust with the ZERO adjuster.

### 9.2 SPAN adjustment

- (1) Connect the connection port to the pipe joint.
- (2) Supply the transmitter with the maximum measuring pressure and compare the supplied pressure value with the indicating output amperage. (20mA)
- (3) The output amperage having some allowance in comparison with the rated value 20mA ( $\pm 1.0\%$  at F.S.), adjust the span with the SPAN adjuster and set the amperage at 20mA.

Doing item 9.1 and item 9.2 repeatedly, adjusting would be carried out correctly.



# SPECIFICATIONS 仕様

SOURCE : DC24V (+30% ~ -25%)  
 電源  
 SOURCE RIPPLE : 500mV p-p less (以下)  
 電源リップル  
 OUTPUT SIGNAL : DC4~20mA  
 出力信号  
 LOAD IMPEDANCE : 550Ω at DC24V  
 負荷抵抗  

$$\left( \frac{\text{SOURCE (電源)} - 13 \text{ (V)}}{0.02 \text{ (A)}} \right)$$

ACCURACY : ±1.0% F.S.  
 精度  
 (at AMBIENT TEMP. 23±2°C & SOURCE DC24V±10%)  
 (周囲温度 23±2°C, 電源電圧 DC24V±10%において)

TEMP. DRIFT : ±0.03% F.S./°C  
 温度ドリフト

OVER LOAD : 1.5 Times of max press. range  
 耐圧力  
 計測最大値の1.5倍

WATER RESISTANCE : IP54  
 外被形式

CABLE GLAND : JIS F8801 10a or 15c  
 ケーブルグランド

COLOR : SILVER  
 塗装色  
 シルバー

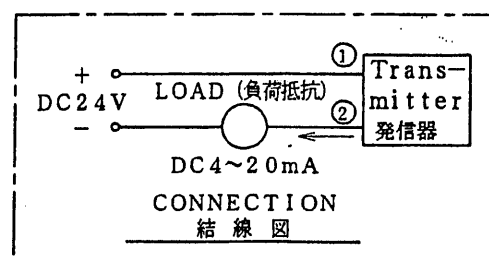
MATERIAL : CONNECT PORT (受圧部) BS  
 材質 : CASE (ケース) ADC

WEIGHT : 0.33kg  
 質量

PERFORMANCE TEMP. : -20~70°C  
 動作温度

ACCURACY GURANTEE TEMP. : 0~55°C  
 精度保証温度

Etc. : EMI RESISTANCE  
 その他 : EMI 対策品



第3角法  
3RD ANG  
PROJECT

縮尺  
SCALE

単位  
UNIT  
mm

明陽電機株式会社  
MEIYO ELECTRIC CO., LTD.

TYPE SMP-MC 名称 TITLE  
PRESSURE TRANSMITTER  
圧力発信器