

Type SMP-MD
Differential
Pressure Transmitter
Instruction Manual

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Safety Precautions

Be sure to follow the precautions given below before starting inspection or servicing. Otherwise 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-circuits 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-MD type differential pressure-transmitter has used the stainless steel diaphragm and etc. 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

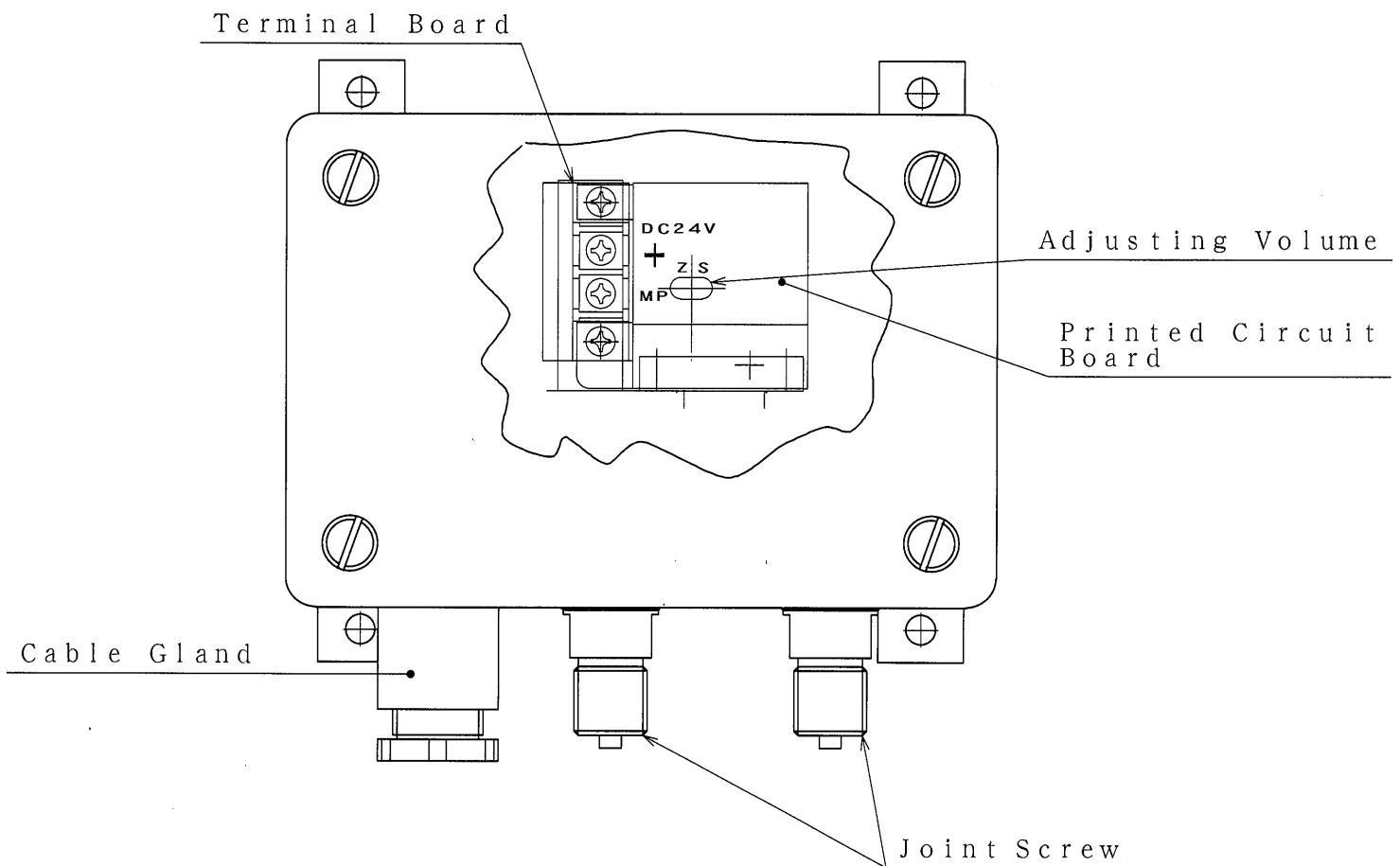


Fig 2.1

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.

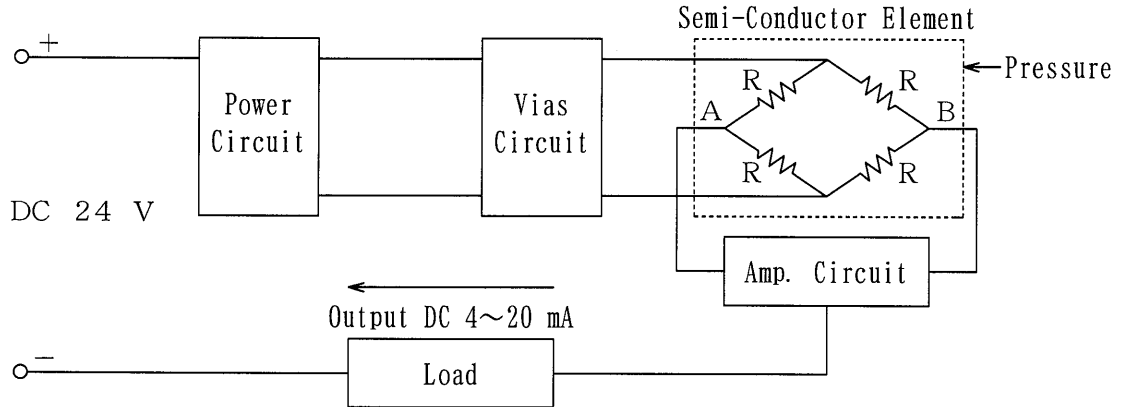


Fig 3.1

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 550Ω. 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 calculated 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.

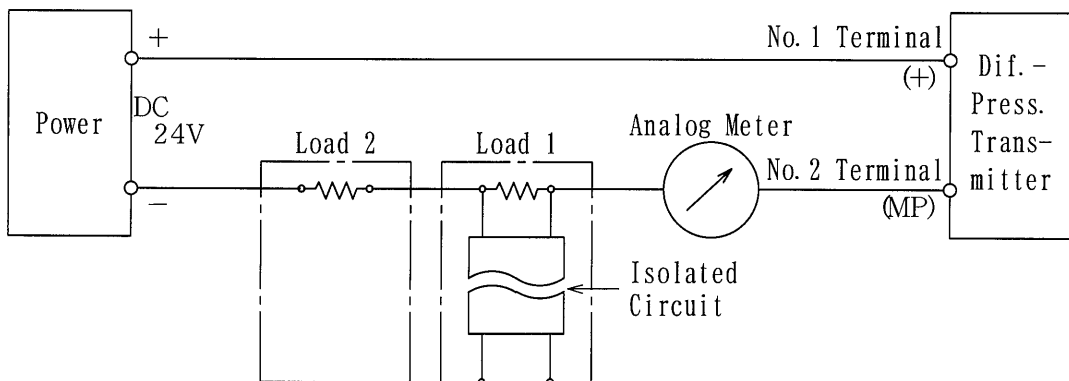


Fig 4.1

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 nearby.

6. Connections

Pass the wire through the cable gland and connect it to the block terminal board from the cover of transmitter after open.

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. 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.

8. 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.

8. 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 8. 1. and item 8. 2. repeatedly, adjusting would be carried out correctly.

9. Flow-chart for trouble treatment

