

ELECTRIC PRESSURE TRANSMITTER

OPERATION MANUAL

( Type SMP- 2LB )

MEIYO ELECTRIC CO., LTD.

### 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.

Especially, pay special attention to high-temperature systems, for example, those involving exhaust gas.

### 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 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

This equipment uses a Buldon tube for a primary detector which transforms the liquid pressure of the various measuring points to the displacement quantity, and uses a Linear transformer which transforms the above displacement to the electric signal by the electro-magnetic coupling without a mechanical contact. The above electric signal got from the Linear transformer is rectified, and through an amplifier, it is converted to D.C. current signal (4-20mA) which has hardly an influence against an inductive disturbance. Moreover, it is transmitted to such a load as an Analogue indicator, etc. Since SMP-2L type pressure transmitter is 2 wire system, if the pressure transmitter and the load are connected in series in D.C.24V sourceline, you can get D.C. current signal for pressure. The transmitter constructed as the above is small, convenient enough to deal with, high confidently and the best for the remote control and measurement.

## 2. CONSTRUCTION

This shell is made of the pressed steel and consisted of the three parts, that is, the cover supporting the internal construction, the outer pipe and the cover. By using the cover supporting the internal construction, the Buldon tube, the Linear transformer and the Printed circuit are put together into one unit and are supported. Moreover, they are cased in the outer trunk. So, in order to deal with this equipment, it is unnecessary for you to open the cover supporting of the internal construction. Open the cover, and you can find the

terminal board for the in-put and out-put, Zero adjuster and Span adjuster. The degree of protection is IP 44.

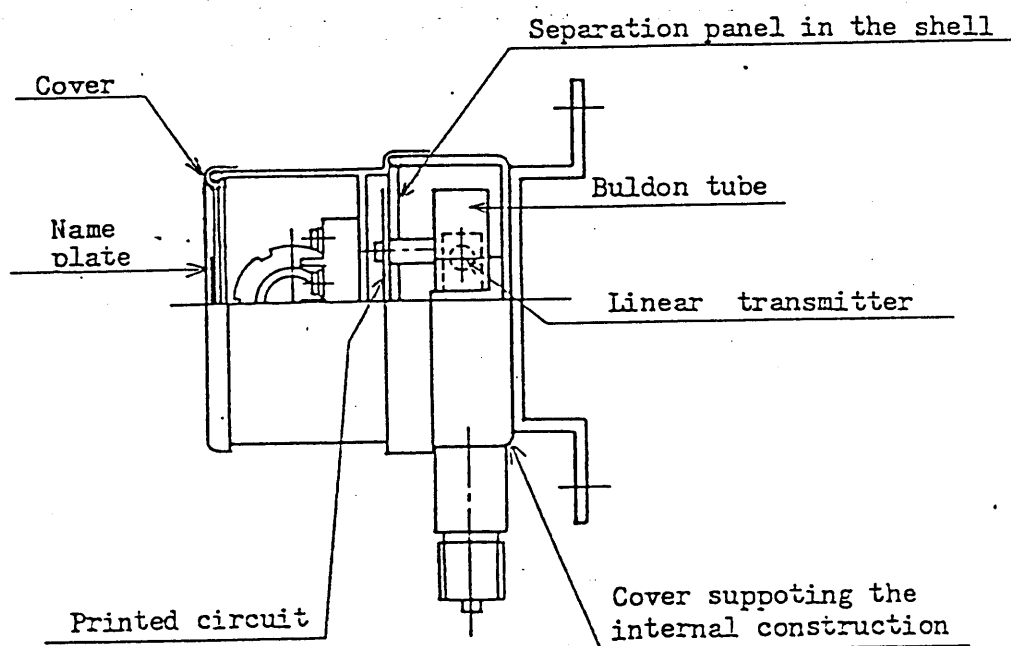
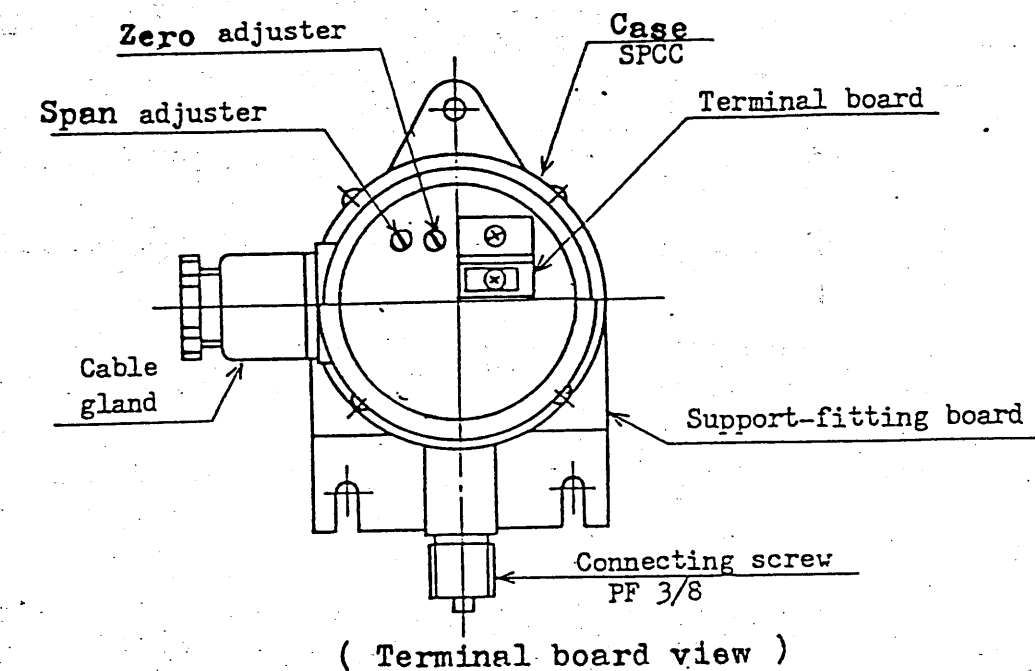


Fig. 1.

### 3. OPERATION THEORY

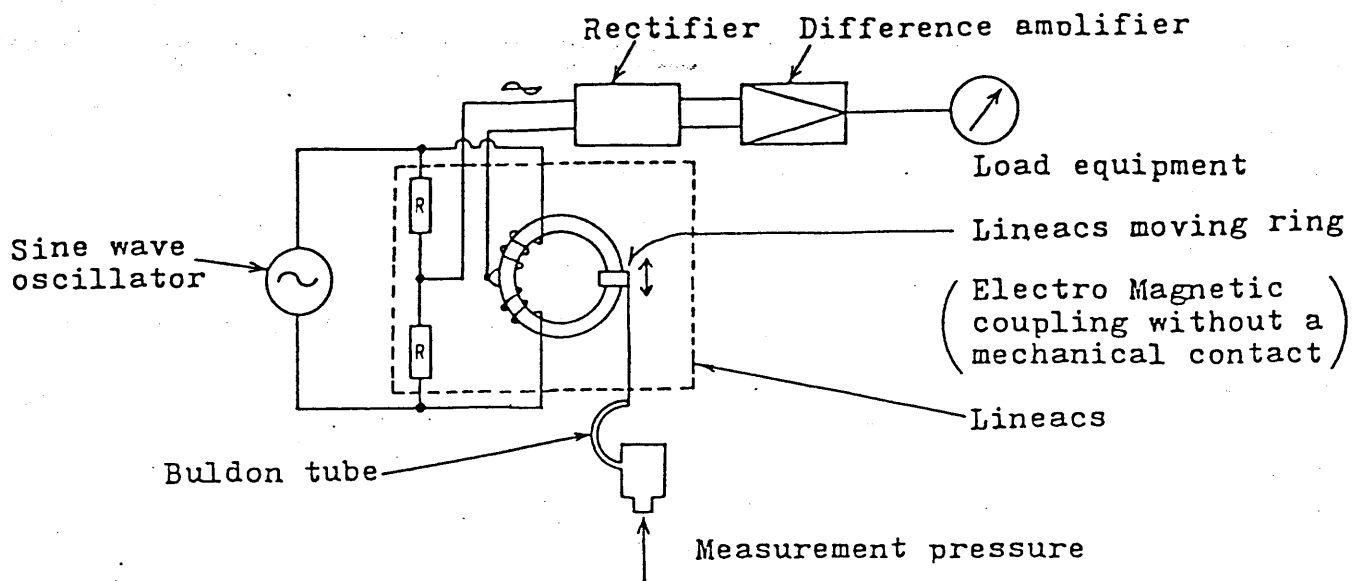


Fig 2. Operation Theory Diagram

### 4. INSTALLATION

- (1) Install the transmitter at the place where it is easy to do the maintenance and the examination.
- (2) Fit the receiving-pressure hole vertically to the strong panel or the installation base.
- (3) In case of the installation, be sure to tighten up with a wrench.
- (4) Avoid the place having an atmosphere of the erosive gas.
- (5) Avoid the place where the air temperature is over  $55^{\circ}\text{C}$  and where it is likely to change suddenly. Moreover, avoid the place where the water pressure has a possibility of decreasing under  $0^{\circ}\text{C}$ .
- (6) In case of the pressure-transmitter for the low pressure, the difference of the head-pressure has an influence on the

out-put. So, pay a good attention for the installation.

(Under  $6\text{kg/cm}^2$  rated range.)

- (7) In case of the installation at the place where the vibration is over  $100\text{Hz}$ , use the rubber to protect against the vibration.
- (8) In case that there is any pulsation or the water-hammer in the measured pressure, put the damper. (When the pulsation is more than 2% of the rated pressure of the transmitter, when the cycle time is over  $20\text{msec}$ , and when the water-hammer is over 150%.)
- (9) In case that the measured liquid is under the high temperature such as the heated-steam, install a pipe-syphon (with water) in front of the connection hole of the pressure-transmitter.
- (10) In case that it is necessary to exchange the measured liquid at about  $100^\circ\text{C}$  or so, install the tank-syphon.

## 5. WIRE CONNECTION

Since SMP-2LB type pressure-transmitter is 2 wire system, it is possible to connect a lot of load equipments in series as shown in Fig.3, if the internal resistance of the load equipments is within the allowance of the load resistance of the pressure-transmitter.

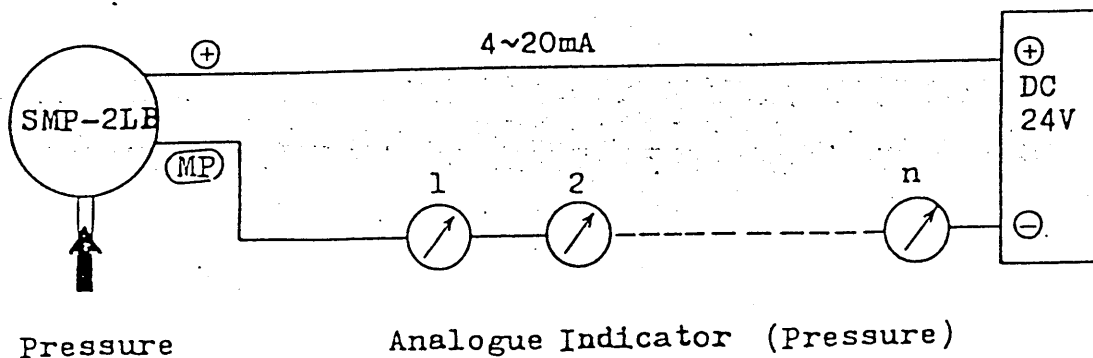
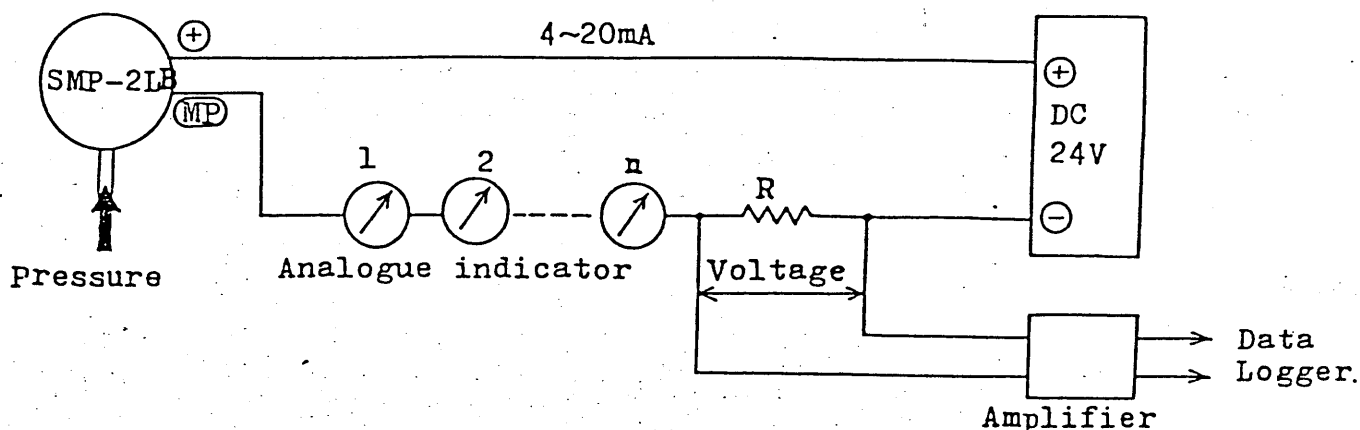


Fig. 3.

(Remarks)

In case that a pressure-indicator, a continuous watch unit, a Data-logger, etc., is connected in series as the load equipments, convert from current to voltage and do the level shift properly, so as to fit the voltage of the transmitter to the voltage level of the in-put circuit of the load equipments.



## 6. ADJUSTMENT

It is unnecessary to adjust on the spot. It is, however, necessary to readjust after the installation on the spot as it happens that there is some difference between this transmitter and the direct indicator in the engine room due to the difference of the head-pressure.

The above adjustment should be carried out according to the following.

### 6.1. Initial adjustment

This should be done in more than 20 minutes after the electric source is supplied.

- (1) Keep spart the connection hole of the transmitter from the sack type nut, and keep the transmitter under the no-pressure condition.

- (2) Confirm the out-put amperage. The proper amperage of the no-pressure condition in this case is 4mA. When this out-put amperage is within the range from D.C. 3,84 mA to D.C. 4,16 mA ( $\pm 1.0\%$  F.S.), the adjustment is carried out according to the item 6.2. on the adjustment in using.
- (3) In case that the amperage of the no-pressure condition is beyond the range of the above allowance ( $\pm 1.0\%$  F.S.), take off the cover and adjust with the ZERO adjuster and the span adjuster.

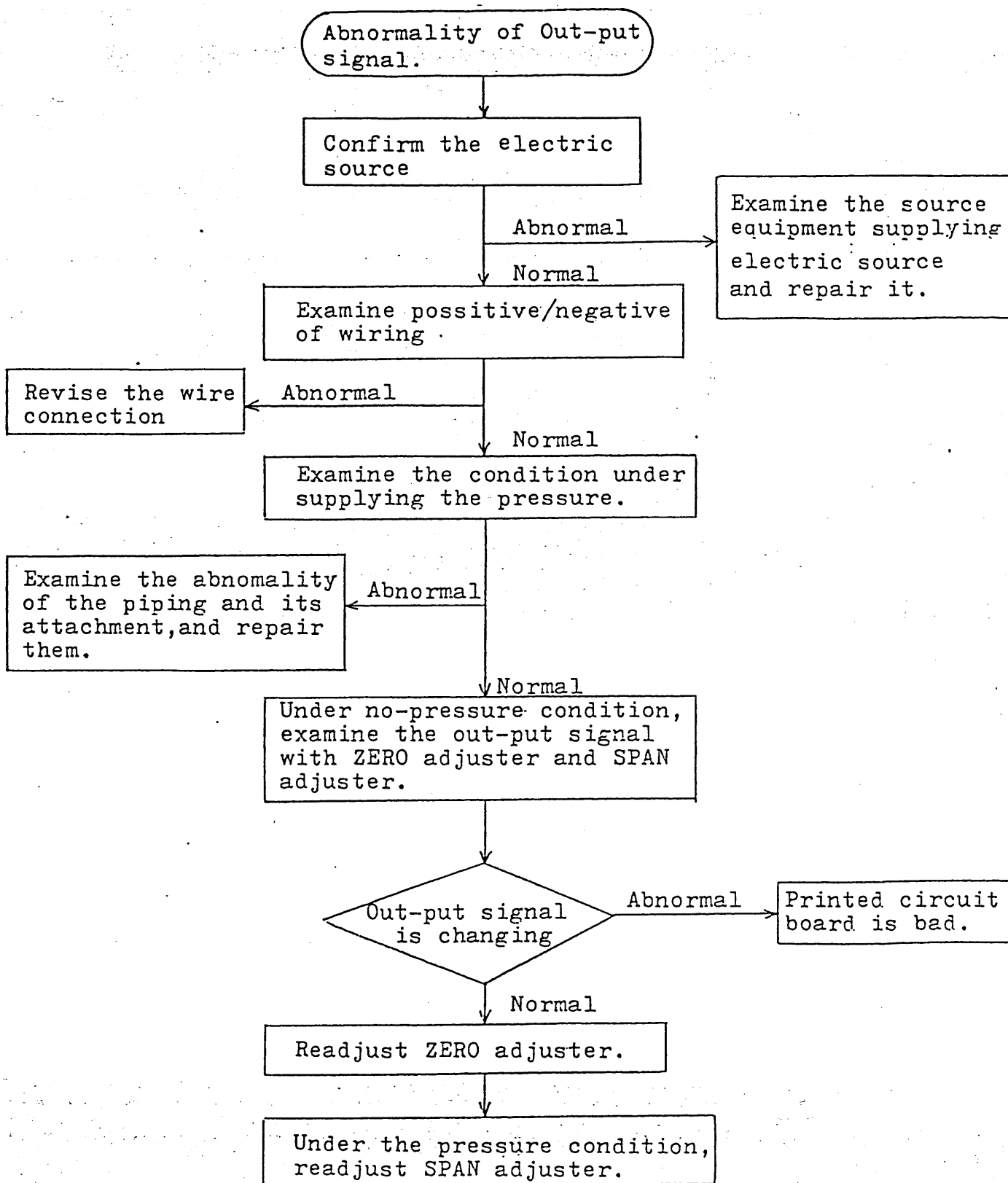
#### 6.2. Adjustment at use

Adjust under the no-pressure condition after the confirmation of the rated out-put amperage.

- (1) Connect the connection hole with the sack type nut.
- (2) Supply the transmitter with the maximum measuring pressure and compare the supplied pressure value with the indicating out-put amperage. (20mA)
- (3) In case that the out-put amperage has some allowance in comparison with the rated value (20mA), adjust the span with the SPAN adjuster and set the amperage at 20mA.
- (4) If you repeat to do item 6.1. (Initial adjustment) and item 6.2. (Adjustment at use) several times, the adjustment can be carried out correctly.



## 7. FLOWCHART FOR TREATMENT OF TROUBLE



# Type SMP- 2LB Pressure Transmitter Specification

- ( 1) Source voltage : DC 24V ( -25 ~ +30 % ) =Vs
- ( 2) Source ripple : Within 500 mV P- P
- ( 3) Out-put signal : DC 4 - 20 mA
- ( 4) Power consumption : 1 VA
- ( 5) Load impedance : 500  $\Omega$  Max at 24V (  $\frac{Vs - 13.5}{0.02}$   $\Omega$  Max )
- ( 6) Accuracy :  $\pm 1.0$  % F.S
- ( 7) Reappearance :  $\pm 0.3$  % F.S
- ( 8) Sensitivity : 0.03 % F.S
- ( 9) Ambient temperature : 0 ~ 55  $^{\circ}$ C
- (10) Temperature drift :  $\pm 0.05$  % F.S /  $^{\circ}$ C
- (11) Humidity : Less than 95 % RH
- (12) Insulation resistance: 10M $\Omega$  at DC 500V
- (13) High voltage : AC 500V 1 minute
- (14) Inclination : 22.5 $^{\circ}$  at the direction of front/rear  
and right/left against the vertical axis.
- (15) Vibration : 5~ 25 Hz 3.2mm P- P  
25~100 Hz 4G
- (16) Shock : Less than 15 G
- (17) Case : SPCC
- (18) Insulation : Wall mounting type
- (19) Protection : IP 44
- (20) Color : Metallic silver
- (21) Weight : 1.0 kg