Installation Operation and Maintenance Instructions

SERIES 500

VARIABLE RANGE PNEUMATIC DIFFERENTIAL PRESSURE TRANSMITTER

INDEX

In case of mounting or operation problems, please contact our Local Agent or Service Department

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1. INSTALLATION

The variable range differential pressure transmitter Series 500 is designed for horizontal, vertical or upside-down installation.

The transmitters series 550 H, 550 L e 550 HH (Fig.1.1) are supplied with a clamp for installation on a 2" pipe.

The transmitters series 550 FH e 550 FHH (Fig.1.2) are provided with a DN80 flange for direct mounting.

Note. When mounting the unit make sure to leave sufficient free space aside the transmitter for zero adjustment and cover removal.

Fig.1.1

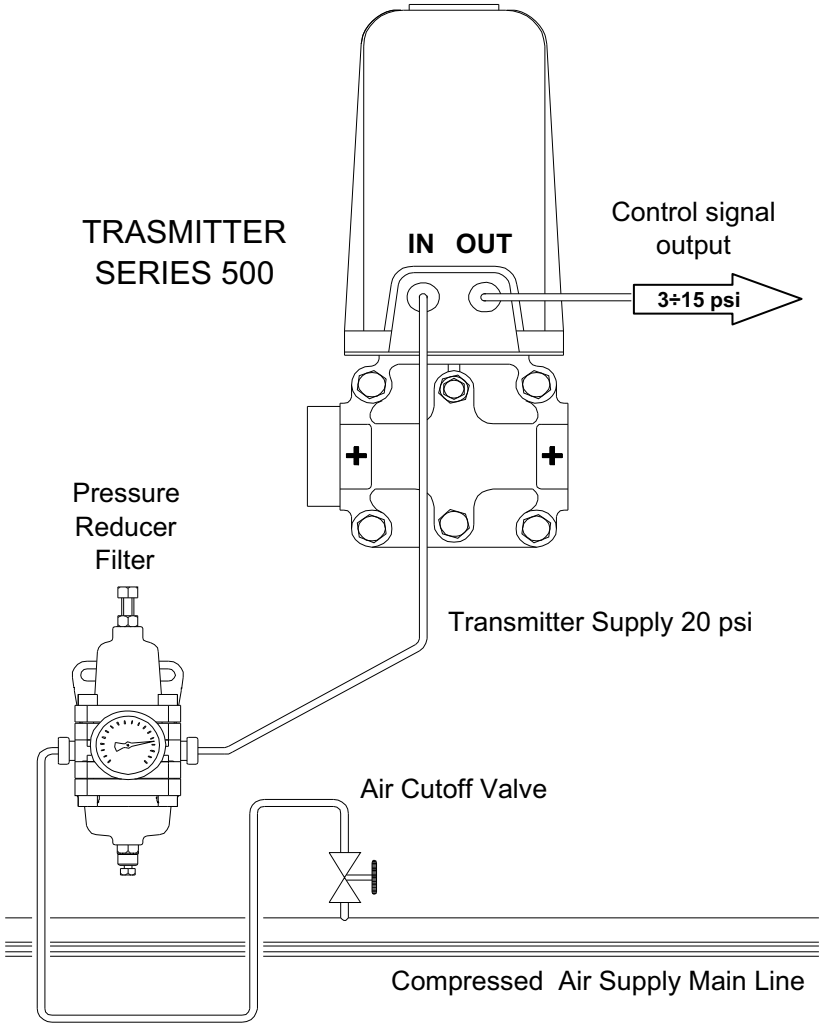

Fig.1.2

2. COMPRESSED AIR SUPPLY

(see Fig. 2.1)

The pneumatic connections (1/4"NPT) are identified by "IN" (air supply input 20 psi) and "OUT" (control signal output 3÷15 psi). The pneumatic instrumentation operation depends on the purity of the air supply. A filter, generally an integrated filter, must be installed in the air pressure relief system upstream to the transmitter. To prevent rusting, use only pneumatic connections in non-ferrous material (copper, nylon or polyethilene). The horizontal supply line should run towards the instrument with a minimal 2% slope. The connection of the supply line to the compressed air manifold must be made in the upper part of the tubing to keep condensate from entering the instrument. If necessary, a moisture trap can be installed upstream to the filter to remove any water or oil in the air supply. For a correct operation of the pressure reducer filter, the minimal air pressure must be set at min. 2.8 - 3 bar. We advise against the indiscriminate use of a single reducer supplying many instruments, since abrupt variations in air consumption, due to the simultaneous operation of several instruments, might adversely affect the operation of each transmitter.

Fig. 2.1 COMPRESSED AIR SUPLLY



3. FLOW MEASURE CONNECTIONS

In the transmitters series 550 H, 550 L and 550 HH the process connections are screwed 1/2"NPT and are identified by "+" and "-". For better maintenance operation integrated Manifolds must be installed (see Fig. 2.1).
Connect the pressure tap upstream to the measure flange to the transmitter input (+) and the pressure tap downstream to the measure flange to the transmitter input (-).
Accuracy in the flow measurement is obtained by connecting the transmitter as in fig. 2.3, 2.4 and 2.5 according to the working fluid (vapour, liquid, air/gas).
The diameter of the horizontal supply line should be min. 20 times the diameter upstream to the measure flange (d) and 10 times the diameter downstream to the measure flange (D). See Fig. 2.1

Fig. 2.1
TRANSMITTER
WITH MANIFOLD

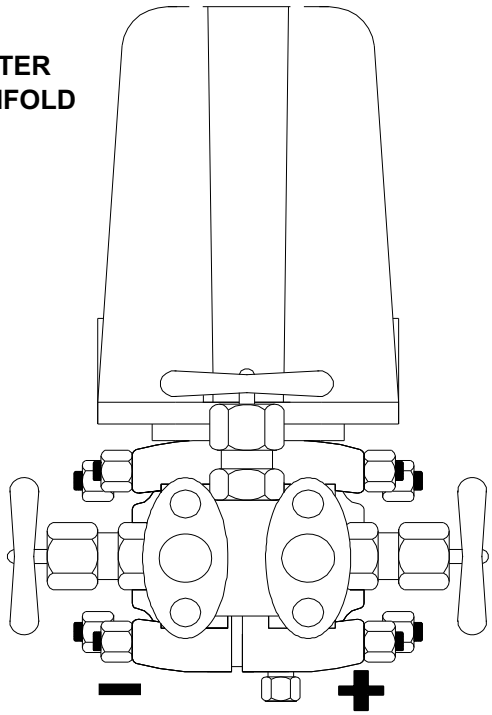


Fig. 2.2
MEASURE FLANGE

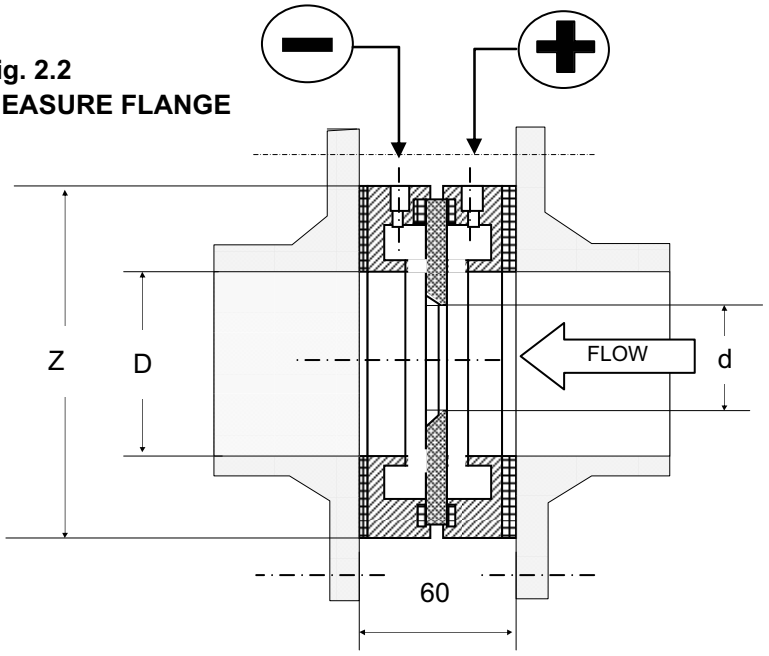


Fig. 2.3
VAPOUR
CONNECTIONS

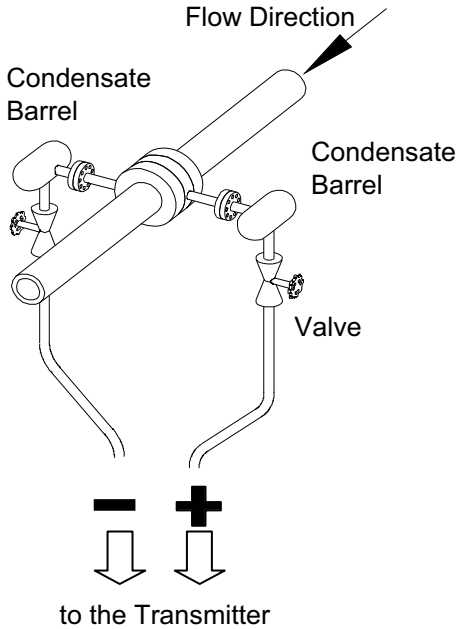


Fig. 2.4
LIQUID
CONNECTIONS

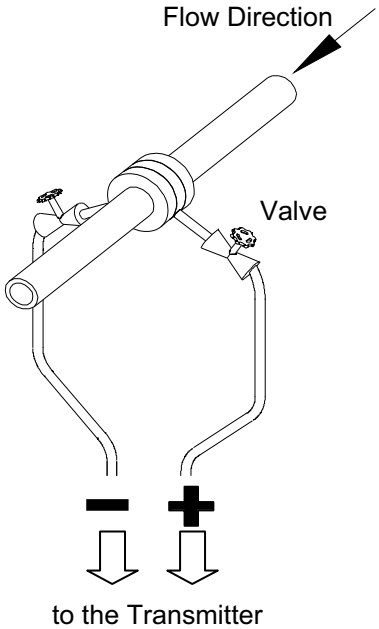
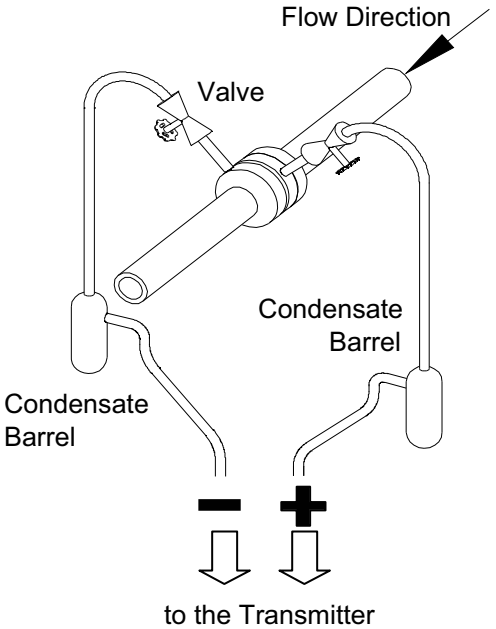


Fig. 2.5
AIR - GAS
CONNECTIONS



4. VESSELS LEVEL MEASURE CONNECTIONS

In the transmitters series 550 H, 550 L and 550 HH the process connections are screwed 1/2"NPT and are identified by "+" and "-".

In the transmitters 550 FH and 550 FHH one of the process connections is flanged DN80 (+) and the other is screwed 1/2"NPT (-). See Fig.4.

4.1 ATMOSPHERIC PRESSURE VESSELS CONNECTION

For atmospheric pressure vessel, connect the zero level tap of the vessel to the transmitter connection (+). Make sure that the connection (-) is free. See fig. 4. The transmitter pressure tap must be below the zero level of the vessel.

Note. If "Z" is minor than "Y" the transmitter must be provided with a depression device.

Fig.4

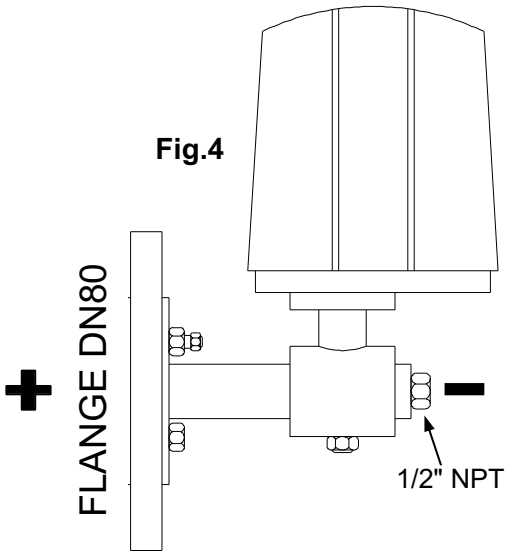
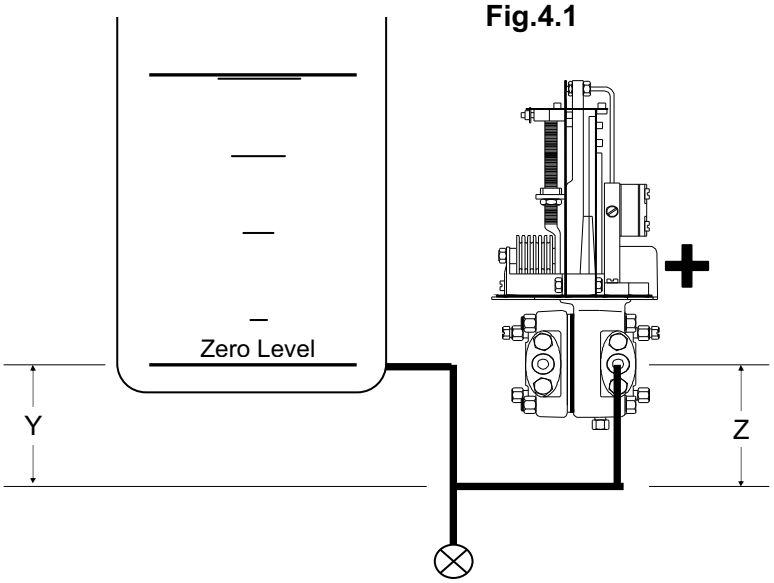


Fig.4.1



4.2 DEPRESSION DEVICE CALIBRATION

1) Set the vessel to zero level

3) Use the depression screw (Fig.4.2) to obtain a 3 psi transmitter output

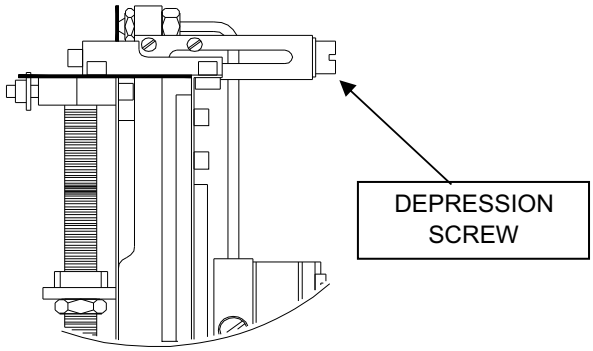


Fig.4.2 DEPRESSION DEVICE

4.3 PRESSURE VESSELS CONNECTION

For pressure vessels, connect the transmitter as in fig. 4.3. It must be provided with an elevation device (fig. 4.4) since the transmitter output signal would be different from 3 psi at zero level.

Note. Y= (Z multiplied by the specific weight of the measure liquid) divided by (the specific weight of the compensation liquid)

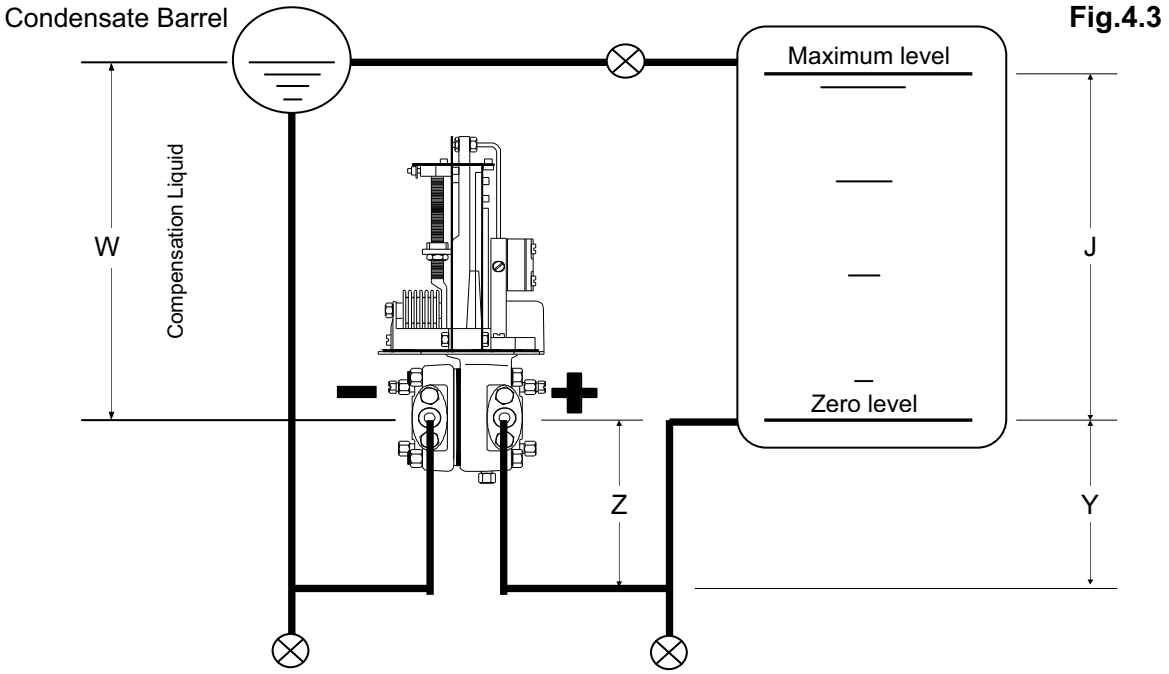


Fig.4.3

4.4 ELEVATOR CALIBRATION

1) Set the vessel to zero level
2) Fill it with liquid (W)
3) Use the elevation screw (Fig.4.4) to obtain a 3 psi transmitter output

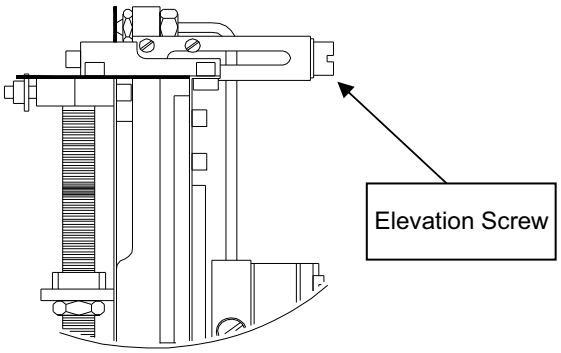


Fig.4.4 ELEVATION DEVICE

5. CALIBRATION (Fig.5)

Calibration of the transmitter is necessary in case a change of range is required, or if the unit has been removed for cleaning or part replacement.

THE FOLLOWING CALIBRATION PROCEDURE IS TO BE PERFORMED BY AUTHORIZED PERSONNEL ONLY.

For accurate calibration proceed as follows:

1) Apply a 20 psi air supply.

2) Connect the transmitter output to a manometer with scale amplitude sufficient for calibration to be carried out

3) Connect the transmitter pressure tap (+) to a manual pressure regulator controlled by a manometer with scale amplitude sufficient for calibration to be carried out.

4) Keep the pressure tap (-) free to atmospheric pressure

5) Loosen the nut (36), place the range setting ring (19) as indicated by the scale alongside the range rod and tighten nut (36).

6) With instrument at zero differential pressure, adjust screw (23) until the output reads 3 psi.

Note. In case the diaphragm has been removed, proceed as follows: remove bottom plug (34), insert into the opening a 1/4" Allen wrench and loosen locknut. Adjust zero screw and tighten nut. Pay attention not to move the force bar from its normal position. In case of output pressure change, loosen again locknut, retighten and mount the plug (1). If output pressure still differs more than 0.4 psi, it indicates that diaphragm is not perfectly aligned with the body. Provide therefore for alignment.

7) Apply to pressure tap (+) a pressure equal to required range. If output value is less than 15 psi, move ring (19) upwards, or vice versa.

8) Repeat steps 6 and 7 until desired accuracy is obtained.

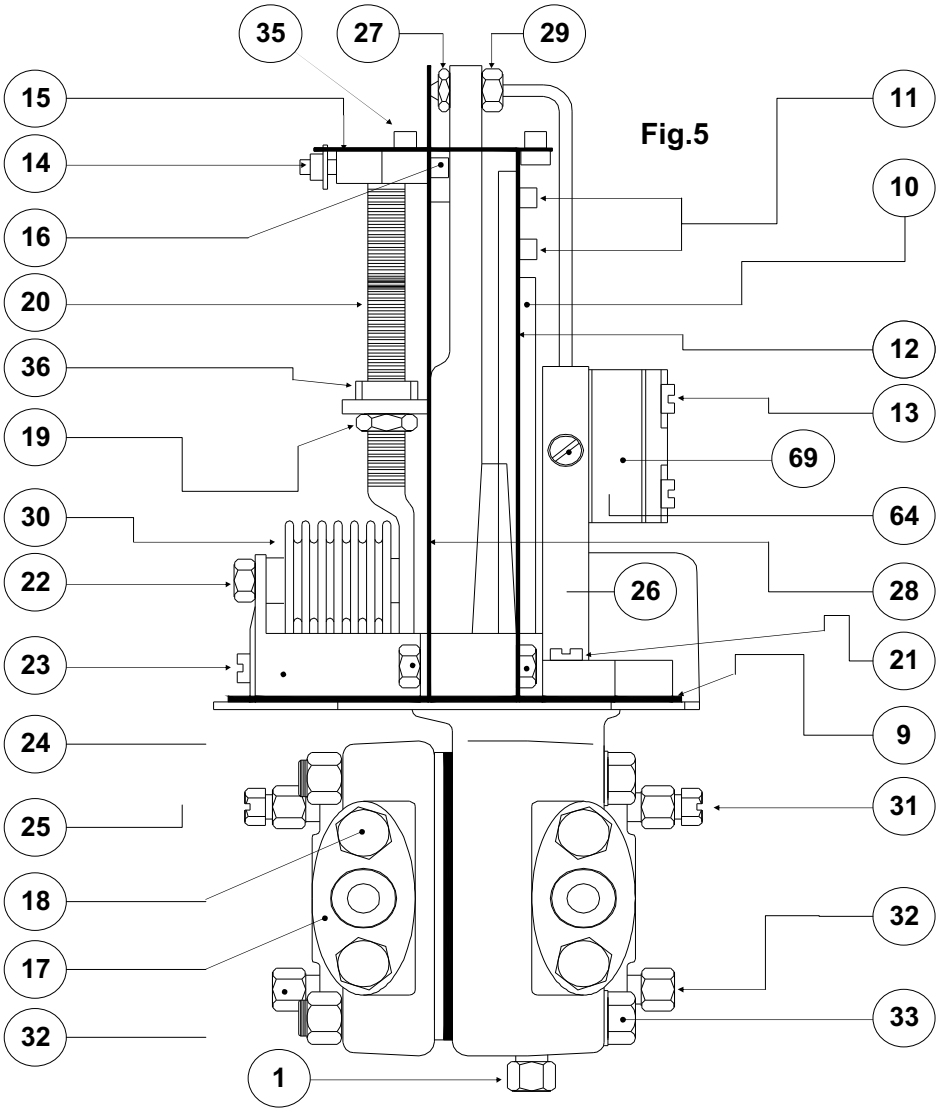


Fig.5

6. MAINTENANCE

In normal operating conditions the transmitter Series 500 does not require specific maintenance. The pneumatic instrumentation operation depends on the purity of the air supplied. Daily bleed the filter in the air supply line until any water, air or other impurities are completely expelled.

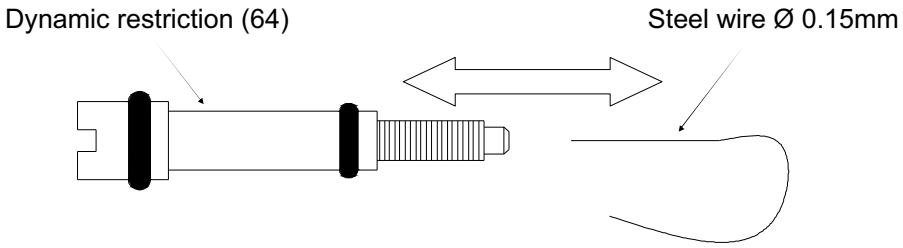
6.1 DYNAMIC RESTRICTION CLEANING (Fig.5)

Dust and dirt in the air supply might adversely affect the correct operation of the transmitter. For cleaning, proceed as follows:

1) Eliminate supply to transmitter.
2) Remove screw (64) and clean by means of a Ø 0.15 mm steel wire, as shown in Fig. 6.1.
3) If the capillary orifice is obstructed, clean it with a bath in trichloroethylene and a blow of compressed air.

Before fastening screw (64), we recommend lubricating O-Rings by applying a coat of silicone lubricant.

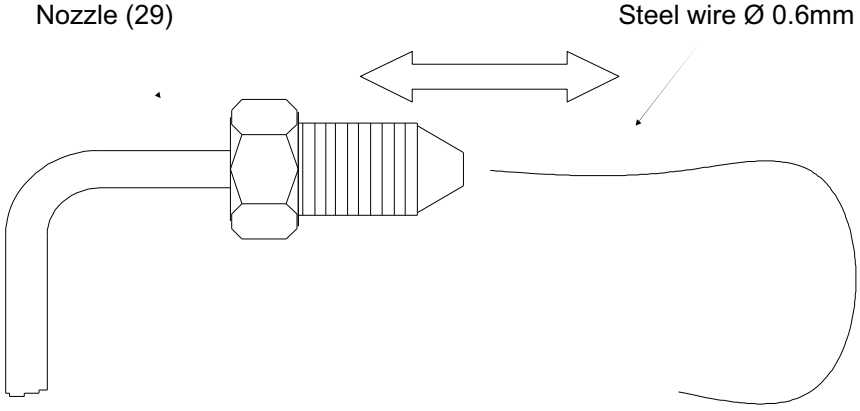
Fig.6.1 Dynamic Restriction Cleaning



6.2 NOZZLE CLEANING (Fig.5)

1) Eliminate supply to transmitter
2) Engage nut (29) and remove nut (26).
3) Remove the pipe connected to relay (69).
4) Clean the nozzle by means of a Ø 0.6 mm steel wire, as shown in Fig.6.2.
5) If the nozzle is obstructed, clean it with a bath in trichloroethylene and a blow of compressed air.

Fig.6.2 Nozzle cleaning



7. DISASSEMBLING

Normal transmitter operation does not require removal of parts other than those described in the previous paragraph.

NOTE. THE FOLLOWING DIAPHRAGM REPLACEMENT PROCEDURE IS FOR EMERGENCY ONLY AND IS TO BE PERFORMED BY AUTHORIZED PERSONNEL ONLY.

7.1 DIAPHRAGM REPLACEMENT (Fig. 7.1)

1) Cut off transmitter from process.
2) Open vent screw (31) and drain nut (32) on both sides.
3) Remove the 4 nuts (2). Do not pull bolts (33) out of the body.
4) Remove the bottom plug (1). Insert a 1/4" Allen wrench into the opening and loosen the locking nut without completely uncrewing it.
5) Remove the diaphragm (6) and the Teflon rings (5).
6) Replace diaphragm and perform the calibration procedure indicated in paragraph 5.

Fig.7.1 Diaphragm Replacement