User's Manual

# Y/13A, Y/13HA and Y/15A Pneumatic Differential Pressure Transmitters

IM 02C01C02-01EN

YOKOGAWA
Yokogawa Electric Corporation

IM 02C01C02-01EN
9th Edition

# Y/13A, Y/13HA and Y/15A
# Pneumatic Differential Pressure Transmitters

IM 02C01C02-01EN 9th Edition

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Model Y/13A PNEUMATIC DIFFERENTIAL PRESSURE TRANSMITTER (Style C) ..... CMPL 02C01C02-01EN

Model Y/15A PNEUMATIC DIFFERENTIAL PRESSURE TRANSMITTER (Style C) ..... CMPL 02C01C01-01EN

Model Y/13HA PNEUMATIC DIFFERENTIAL PRESSURE TRANSMITTER (Style C) ..... CMPL 02C01C03-01EN

**Revision Information**

# 1. Introduction

Thank you for purchasing the Yokogawa's instrument.

The instrument is correctly calibrated at the factory before shipment. To ensure correct and efficient use of the instrument, please read this manual thoroughly and fully understand how to operate the instrument before operating it.

## ■ Regarding This Manual

- This manual should be provided to the end user.
- The contents of this manual are subject to change without prior notice.
- All rights reserved. No part of this manual may be reproduced in any form without Yokogawa's written permission.
- Yokogawa makes no warranty of any kind with regard to this material, including, but not limited to, implied warranty of merchantability and fitness for a particular purpose.
- If any question arises or errors are found, or if any information is missing from this manual, please inform the nearest Yokogawa sales office.
- The specifications covered by this manual are limited to those for the standard type under the specified model number break-down and do not cover custom-made instrument.
- Please note that changes in the specifications, construction, or component parts of the instrument may not immediately be reflected in this manual at the time of change, provided that postponement of revisions will not cause difficulty to the user from a functional or performance standpoint.

## ■ Safety Precautions

- For the protection and safety of the operator and the instrument or the system including the instrument, please be sure to follow the instructions on safety described in this manual when handling this instrument. In case the instrument is handled in contradiction to these instructions, Yokogawa does not guarantee safety.
- Yokogawa assumes no responsibilities for this product except as stated in the warranty.
- If the customer or any third party is harmed by the use of this product, Yokogawa assumes no responsibility for any such harm owing to any defects in the product which were not predictable, or for any indirect damages.
- The following safety symbols are used in this manual:



**WARNING**

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



**CAUTION**

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.



**IMPORTANT**

Indicates that operating the hardware or software in this manner may damage it or lead to system failure.



**NOTE**

Draws attention to information essential for understanding the operation and features.

## 1.1 Safety Precautions

**WARNING**

- Instrument installed in the process is under pressure. Never loosen or tighten the process connector bolts as it may cause dangerous spouting of process fluid.
- During draining condensate or venting gas in transmitter pressure-detector section, take appropriate care to avoid contact with the skin, eyes or body, or inhalation of vapors, if the accumulated process fluid may be toxic or otherwise harmful.
  Since draining condensate or bleeding off gas gives the pressure measurement disturbance, this should not be done when the loop is in operation.
- If the accumulated process fluid may be toxic or otherwise harmful, take appropriate care to avoid contact with the body, or inhalation of vapors even after dismounting the instrument from process line for maintenance.

**IMPORTANT**

- Supply air must be clean and dry.
  - Supply air (pressurized) must not be dewed event at -40°C.
  - Air filter with 5μm (0.0002 inch) of filter element maximum opening shall be recommended.
  - Oil filter should be provided to remove oil in the supply air.
- Maximum supply air pressure of transmitter without fixed pressure regulator (GAS or NAS type) is 215 kPa. Should the pressure exceed 215 kPa, it is possible to break the pneumatic amplifier, bellows etc.
- When weling piping during construction, take care not to allow welding currents to flow through the transmitter.
- Do not step on this instrument after installation.
- Applying a leakag-detecting fluid to the instrument may damage the plastic parts resulting from corrosion or cracking.

## 1.2 Warranty

- The warranty shall cover the period noted on the quotation presented to the purchaser at the time of purchase. Problems occurred during the warranty period shall basically be repaired free of charge.
  - In case of problems, the customer should contact the Yokogawa representative from which the instrument was purchased, or the nearest Yokogawa office.
  - If a problem arises with this instrument, please inform us of the nature of the problem and the circumstances under which it developed, including the model specification and serial number. Any diagrams, data and other information you can include in your communication will also be helpful.
  - Responsible party for repair cost for the problems shall be determined by Yokogawa based on our investigation.
- The Purchaser shall bear the responsibility for repair costs, even during the warranty period, if the malfunction is due to:
  - Improper and/or inadequate maintenance by the Purchaser.
  - Failure or damage due to improper handling, use or storage which is out of design conditions.
  - Use of the product in question in a location not conforming to the standards specified by the Yokogawa, or due to improper maintenance of the installation location.
  - Failure or damage due to modification or repair by the party except Yokogawa or who is requested by Yokogawa.
  - Malfunction or damage from improper relocation of the product in question after delivery.
  - Reason of force majeure such as fires, earthquakes, storms/floods, thunder/lightening, or other natural disasters, or disturbances, riots, warfare, or radioactive contamination.

# 2. General

Model Y/13A is used for the illustrations in this User's Manual.
Model Y/15A and Y/13HA are similar.

## 2.1 Outline

Model Y/13A, Y/15A and Y/13HA Transmitter are pneumatic force-balance instruments that measure differential pressure and transmit it as a proportional pneumatic output signal. The transmitters are available with 0.2 to 1.0kgf/cm$^2$ or bar, 20 to 100 kPa, or 3 to 15 psi output signal. The transmitters are used in flow, liquid level, and other differential pressure applications.

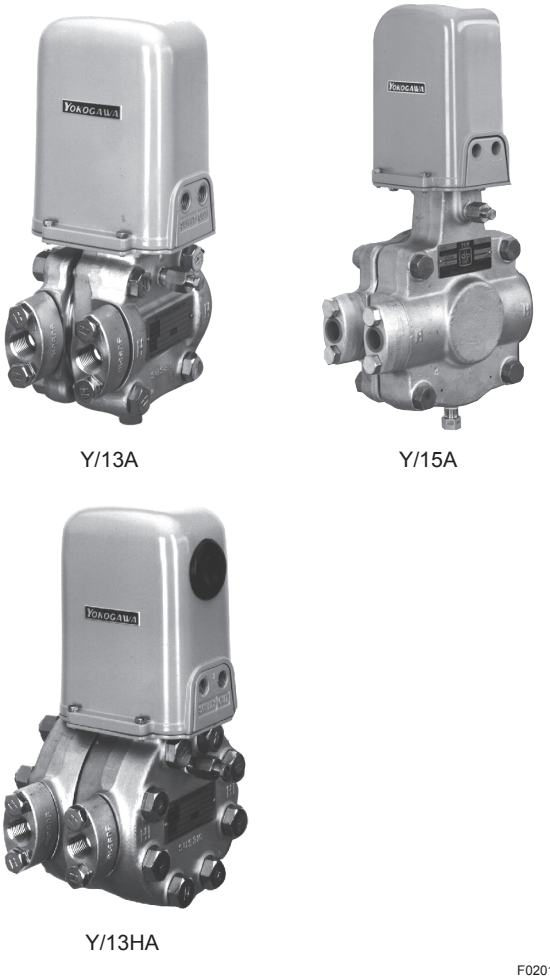



**Figure 2.1 Outline**

## 2.2 Principle of Operation

The high and low pressures are connected to opposite sides of a twin-diaphragm capsule. The force on the capsule is transmitted through a flexure to the lower end of the force bar. The diaphragm seal serves both as a fulcrum for the force bar and as a seal for the pressure chamber. The force is transmitted through the flexure connector to the range bar which pivots on the range adjustment wheel.
Any movement of the range bar causes a minute change in the clearance between the flapper and nozzle. This produces a change in output pressure from the amplifier to the feedback bellows until the force in the feedback bellows balances the force on the diaphragm capsule.
The output pressure which is established by this force balance is the transmitted signal and is proportional to the differential pressure applied to the diaphragm capsule. This signal is transmitted to a pneumatic receiver to record, indicate, and/or control.

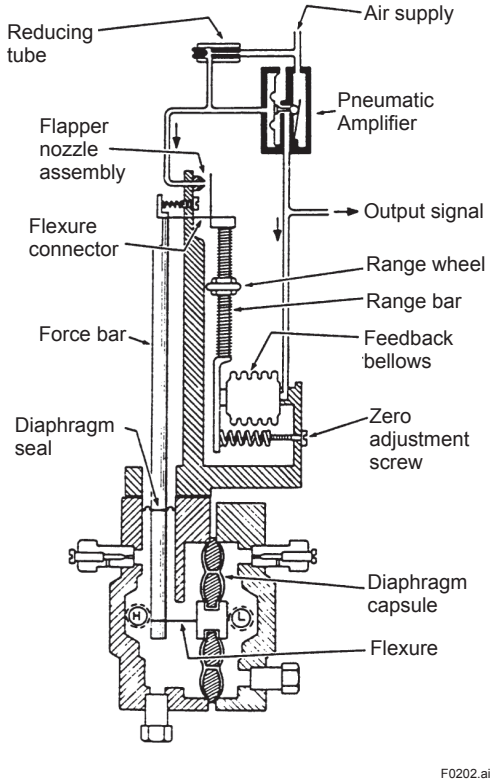



**Figure 2.2 Principle of Operation**

## 2.3 Standard Specifications

**Span Limits:**
Refer to Table 2.1.
Span is continuously adjustable within range limits.

**Range Limits *:**
Refer to Table 2.1.
*: When lower range-value is other than zero optional kit for elevated-zero or suppressed-zero ranges is installed.

**Static Pressure Limits:**
Refer to Table 2.1.

**Output Signal:**
Refer to Table 2.1.

**Accuracy (includes linearity, hysteresis and repeatability):**
Spans between 1.25 and less than 130 kPa, 125 and less than 13400 $mmH_2O$, 12.5 and less than 1300 mbar, or 5 and less than 525 $inH_2O$ differential pressure (ΔP): ±0.5 % of span.
Spans between 130 and 210 kPa, 13400 and 21600 $mmH_2O$, 1300 and 2100 mbar, or 525 and 850 $inH_2O$ differential pressure (ΔP): ±0.75 % of span.

**Repeatability:**
0.1% of span.

**Dead Band:**
0.05% of span.

**Air Supply Pressure:**
140 kPa, 1.4 $kgf/cm^2$ or bar, or 20 psi.

**Air Consumption:**
0.5 $m^3/h$ at 0 °C, 101.3 kPa {1.033 $kgf/cm^2$} absolute (0.3 scfm).

**Ambient Operating Temperature Range:**
-40 to 120 °C (-40 to 250 °F).

**Process Temperature Limits:**
-40 and 120 °C (-40 and 250 °F) at capsule.

**Mounting:**
Bracket for nominal 50 mm (2 inches) horizontal or vertical pipe.

**Air Connection:**
Tapped for JIS R1/4 or 1/4NPT, whichever specified.

**Process Connections:**
JIS Rc1/2, Rc1/4, 1/2NPT, or 1/4NPT female, whichever specified.

**Wetted Parts Material:**
Body: Forged JIS SUS 316 stainless steel.
Process Connectors: Y/13A, Y/15A…SCS 14 A (equivalent to SUS 316 stainless steel casting), Y/13HA…Forged JIS SUS316 stainless steel.
Capsule(Body): SUS 316L stainless steel.
Force Bar: SUS 316 stainless steel.
Force Bar Seal: Cobalt-nickel alloy.
Process Connector Gaskets: Y/13A, Y/15A…Teflon(PTFE).
Y/13HA…Glass reinforced Teflon (TFE)
Capsule Gaskets: SUS 316L stainless steel coated with Teflon.
Force Bar Seal Gasket: Silicone elastomer (Y/13A, Y15A), Buna N (Y/13HA)

**Connection Hardware:**
JIS SCM435 chrome-molybdenum steel cap screws and nuts for body; JIS SCM435 cap screws for process connectors.

**Cover:**
Cast aluminum, finished with gray polyurethane paint.

**Degrees of Protection:**
IP53 (Equivalent to NEMA 3)

**Approximate Weight:**
Y/13A: 9.5 kg (21 lb).
Y/15A, Y/13HA: 15 kg (33 lb).

**Table 2.1 Span, Range and Static Pressure Limits.**

| Capsule | | – | M-calibration | P-calibration | bar-calibration |
|---|---|---|---|---|---|
| L | Span Limits | 1.25 to 6.2 kPa | 125 to 635 $mmH_2O$ | 5 to 25 $inH_2O$ | 12.5 to 62 mbar |
| | Range Limits | -12.5 to 12.5 kPa | -1270 to 1270 $mmH_2O$. | -50 to 50 $inH_2O$ | -125 to 125 mbar |
| | S. P. Limits | 3.5 MPa | 35 $kgf/cm^2$ | 500 psi | 35 bar |
| M | Span Limits | 5 to 51 kPa | 0.5 to 5.2 $mH_2O$ | 20 to 205 $inH_2O$ | 50 to 510 mbar |
| | Range Limits | -51 to 51 kPa | -5.2 to 5.2 $mH_2O$ | -205 to 205 $inH_2O$ | -510 to 510 mbar |
| | S. P. Limits | 10 MPa (Y/13A)<br>41 MPa (Y13HA) | 100 $kgf/cm^2$ (Y/13A)<br>420 $kgf/cm^2$ (Y/13HA) | 1500 psi (Y/13A)<br>6000 psi (Y/13HA) | 100 bar (Y/13A)<br>410 bar (Y/13HA) |
| H | Span Limits | 50 to 210 kPa | 5 to 21.6 $mmH_2O$ | 200 to 850 $inH_2O$ | 0.5 to 2.1 bar |
| | Range Limits | -210 to 210 kPa | -21.6 to 21.6 $mmH_2O$ | -850 to 850 $inH_2O$ | -2.1 to 2.1 bar |
| | S. P. Limits | 10 MPa (Y/13A)<br>41 MPa (Y13HA) | 100 $kgf/cm^2$ (Y/13A)<br>420 $kgf/cm^2$ (Y/13HA) | 1500 psi (Y/13A)<br>6000 psi (Y/13HA) | 100 bar (Y/13A)<br>410 bar (Y/13HA) |
| Output Signal | | 20 to 100 kPa | 0.2 to 1.0 $kgf/cm^2$ | 3 to 15 psi | 0.2 to 1.0 bar |
| Option Code | | Standard Specifications | CAL-M | CAL-E | CAL-B |

## 2.4 Model and Suffix Codes

| Model | Suffix Codes | Description |
|---|---|---|
| **Y/13A** | . . . . . | Medium and High differential pressure use. |
| Diaphragm Capsule | **-M** . . . . . | Medium range capsule.<br>Span: 5 to 51 kPa. |
| | **-H** . . . . . | High range capsule.<br>Span: 50 to 210 kPa. |
| Body Material *1 | **S** . . . . . | Forged SUS 316 stainless steel. |
| Process Connection | **1** . . . . . | JIS Rc 1/4 female. |
| | **2** . . . . . | JIS Rc 1/2 female. |
| | **3** *2 . . . . . | ANSI 1/4 NPT female. |
| | **4** *2 . . . . . | ANSI 1/2 NPT female. |
| | **8** . . . . . | Diaphragm sealed transmitters (Refer to GS 06P01D01-00EN). |
| Options | / □ / □ | |
| Combinations | // □ / □ | |

| Model | Suffix Codes | Description |
|---|---|---|
| **Y/15A** | . . . . . | Low differential pressure use. |
| Diaphragm Capsule | **-L** . . . . . | Low range capsule.<br>Span: 1.25 to 6.2 kPa. |
| Body Material *1 | **S** . . . . . | Forged SUS 316 stainless steel. |
| Process Connection | **1** . . . . . | JIS Rc 1/4 female. |
| | **2** . . . . . | JIS Rc 1/2 female. |
| | **3** *2 . . . . . | ANSI 1/4 NPT female. |
| | **4** *2 . . . . . | ANSI 1/2 NPT female. |
| Options | / □ / □ | |
| Combinations | // □ / □ | |

| Model | Suffix Codes | Description |
|---|---|---|
| **Y/13HA** | . . . . . | Pneumatic differential pressure transmitter, high static pressure use. |
| Diaphragm Capsule | **-M** . . . . . | Medium range capsule.<br>Span: 5 to 51 kPa |
| | **-H** . . . . . | High range capsule.<br>Span: 50 to 210 kPa |
| Body Material *1 | **S** . . . . . | Forged SUS 316 stainless steel. |
| Process Connection | **1** . . . . . | JIS Rc 1/4 female. |
| | **2** . . . . . | JIS Rc 1/2 female. |
| | **3** *2 . . . . . | ANSI 1/4 NPT female. |
| | **4** *2 . . . . . | ANSI 1/2 NPT female. |
| | **6** . . . . . | 1/4 inch Sch80 pipe buttweld. |
| | **7** . . . . . | 1/2 inch Sch160 pipe buttweld. |
| Options | / □ / □ | |
| Combinations | // □ / □ | |

*1: ⚠ Users must consider the characteristics of selected wetted parts material and the influence of process fluids. The use of inappropriate materials can result in the leakage of corrosive process fluids and cause injury to personnel and/or damage to plant facilities. It is also possible that the diaphragm itself can be damaged and that material from the broken diaphragm and the fill fluid can contaminate the user's process fluids.
Be very careful with highly corrosive process fluids such as hydrochloric acid, sulfuric acid, hydrogen sulfide, sodium hypochlorite, and high-temperature steam (150 ºC [302 ºF] or above). Contact Yokogawa for detailed information of the wetted parts material.

*2: Air connections, vent and drain plug connections are also tapped for ANSI NPT threads in addition to the process connections.

## 2.5 Options and Combinations

### ■ Options

| Item | Description | | Code |
|---|---|---|---|
| Kit for elevated-zero or suppressed-zero ranges | Permits adjustments up to range limits of capsule. Upper range-value must not exceed upper range-limit of capsule. | Elevated-zero | **L** |
| | | Suppressed-zero | **R** |
| Air set | Supply pressure: 0.2 to 1 MPa, 2 to 10 kgf/cm$^2$ or bar, or 30 to 150 psi.<br>Output pressure: 140 kPa, 1.4 kgf/cm$^2$ or bar, or 20 psi.<br>Maximum operating temperature: 80 °C (180 °F). Refer to Table 2.2. | | **GAS-F☐**<br>**NAS-F☐** |
| Low differential span | Refer to Table 2.3. | | **LD** |
| Cover color other than standard finish | Specify in color block ☐by color code.<br>Refer to GS22D01F01-00E. | | **SCF-☐** |
| Coating other than standard finish | Epoxy resin-baked coated. | | **EPF** |
| High process temperature*1 | Glass reinforced Teflon gaskets are used in the process connector and force bar seal. Maximum process temperatures to 190 °C(375 °F). | | **DG5** |
| Oxygen service preparation*1 | Degrease cleansing treatment | | **OSW** |
| | Degrease cleansing treatment with fluorinated oilfilled capsule. | | **OSFC** |
| High damping capsule*1 | Filled with high viscosity fluid (time constant is approximate 1.3 sec: Y/13A and Y/13HA, 2.6 sec: Y/15A).<br>Not applicable for high range capsule. | | **HVC** |
| Force bar seal gasket*2 | GF Teflon | | **GFT** |
| Stainless steel bolts and nuts | JIS SUS 630 bolts and nuts for the body and JIS SUS 630 bolts for process connectors | | **SSB** |
| | JIS SUS 630 bolts and nuts for the body and JIS SUS 630 bolts for process connectors and sealant (liquid silicone rubber) are coated on surface of SUS630 nuts. | | **SSB-S** |
| Ammonia service*1 | Force bar gasket: Neoprene rubber | | **AMM** |
| Stainless tube | Tube and connectors between air-set (fixed pressure regulator with filter) and transmitter are made by stainless steel. However, connection of pressure gauge remains as standard material (Bs-Ni3). | | **SST** |
| ANSI connection | Air connections: Tapped for 1/4NPT. Applicable for Y/13A-☐S8, Y/13HA-☐S6 or Y/13HA-☐S7. | | **NPT** |
| Tropicalization | When there is a possibility to generate rusts using under the condition of high temperature and high humidity area, silicone grease is coated on whole screws. Silicon grease which has stronger oil film feature. | | **PSG** |
| M-calibration | Output signal: 0.2 to 1.0 kgf/cm$^2$ | | **CAL-M** |
| P-calibration | Output signal: 3 to 15 psi | | **CAL-E** |
| bar-calibration | Output signal: 0.2 to 1.0 bar | | **CAL-B** |
| Stainless Tag plate | Stainless Tag plate fixed with screws. Up to 16 characters. | | **TP-S** |
| Reverse output signal*3 | Reverse output signal | | **ROUT** |

*1: Not applicable for Diaphragm seal.
*2: Not applicable for option code DG5, OSW, OSFC and Y/13HA.
*3: Not applicable for option code EPF.

**Table 2.2 Air Set**

| Air Connection | Gauge Scale | Option Code |
|---|---|---|
| JIS Rc 1/4 female | 0 to 200 kPa<br>0 to 2 kgf/cm$^2$<br>0 to 30 psi<br>0 to 2 bar | GAS-FP<br>GAS-FM<br>GAS-FE<br>GAS-FB |
| 1/4 NPT female | 0 to 200 kPa<br>0 to 2 kgf/cm$^2$<br>0 to 30 psi<br>0 to 2 bar | NAS-FP<br>NAS-FM<br>NAS-FE<br>NAS-FB |

**Table 2.3 Low Differential Spans**

| Capsule | Span (kPa) | Accuracy (%) | |
|---|---|---|---|
| | | Suffix Code LD | Suffix Code LD+R (L) |
| L | 0.5 to 3.1 | ±0.5 | ±1.0 |
| M | 2.5 to 25 | ±0.5 | |
| H | 25 to 65 | ±0.5 | |
| | 65 to 105 | ±0.75 | |

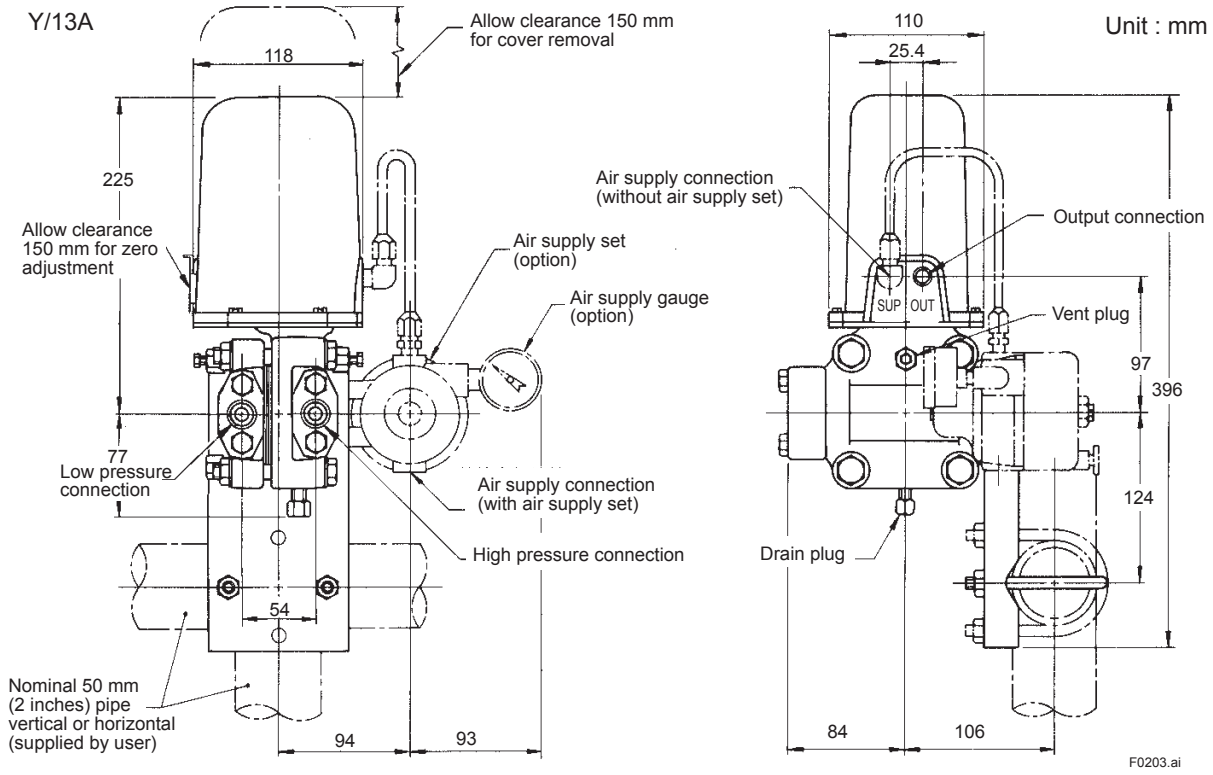
## ■ Combinations

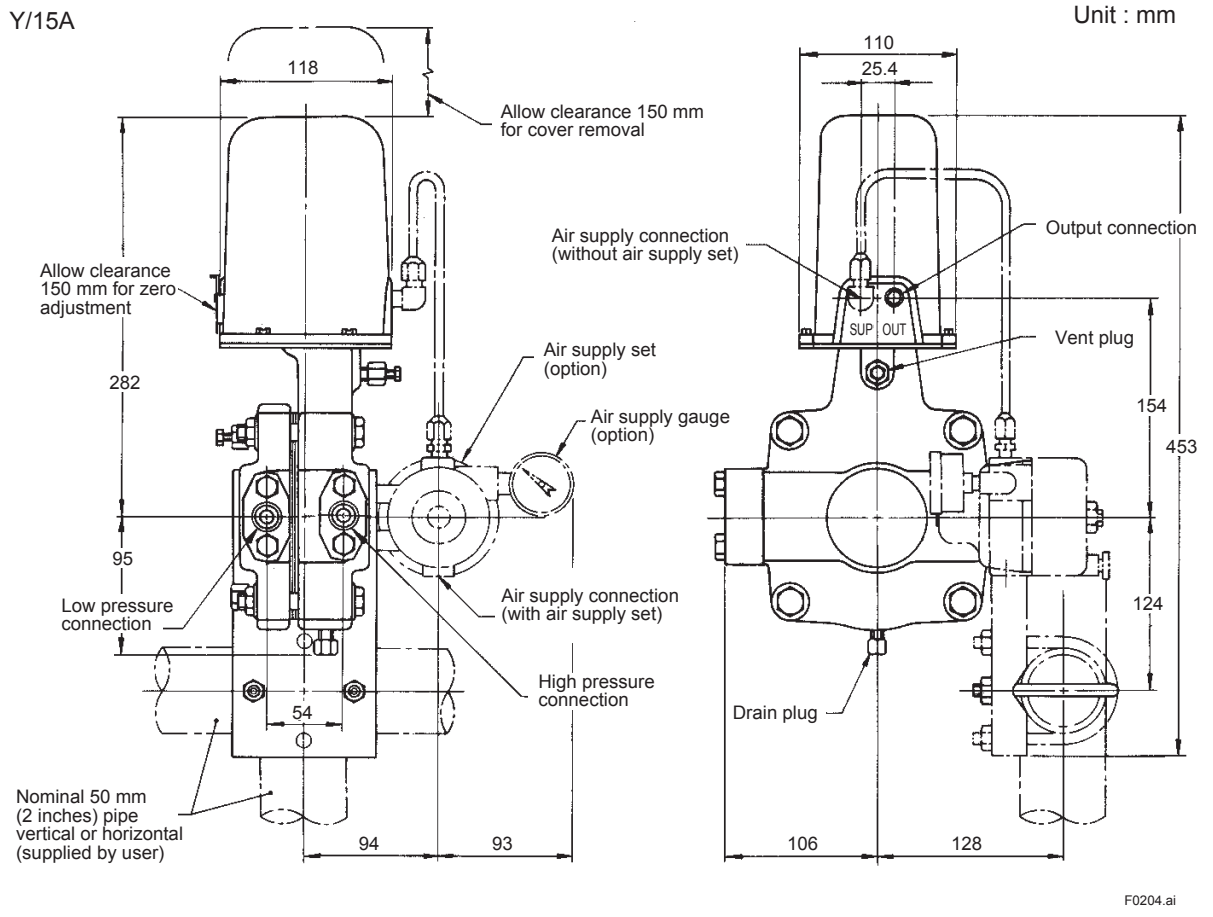
| Item | Description | Code | Applicable model |
|---|---|---|---|
| Diaphragm seal | Refer to GS 06P01D01-00E | **DFS** | **Y/13A** |
| Integral flow orifice | Refer to GS 06P01E01-00E | **IFO** | **Y/13A**<br>**Y/15A**<br>**Y/13HA** |

**<Reference>**

Teflon: Trademark of E.I. DuPont de Nemours & Co.
Buna N: Trademark of Bunawerk Huis Gmbh.

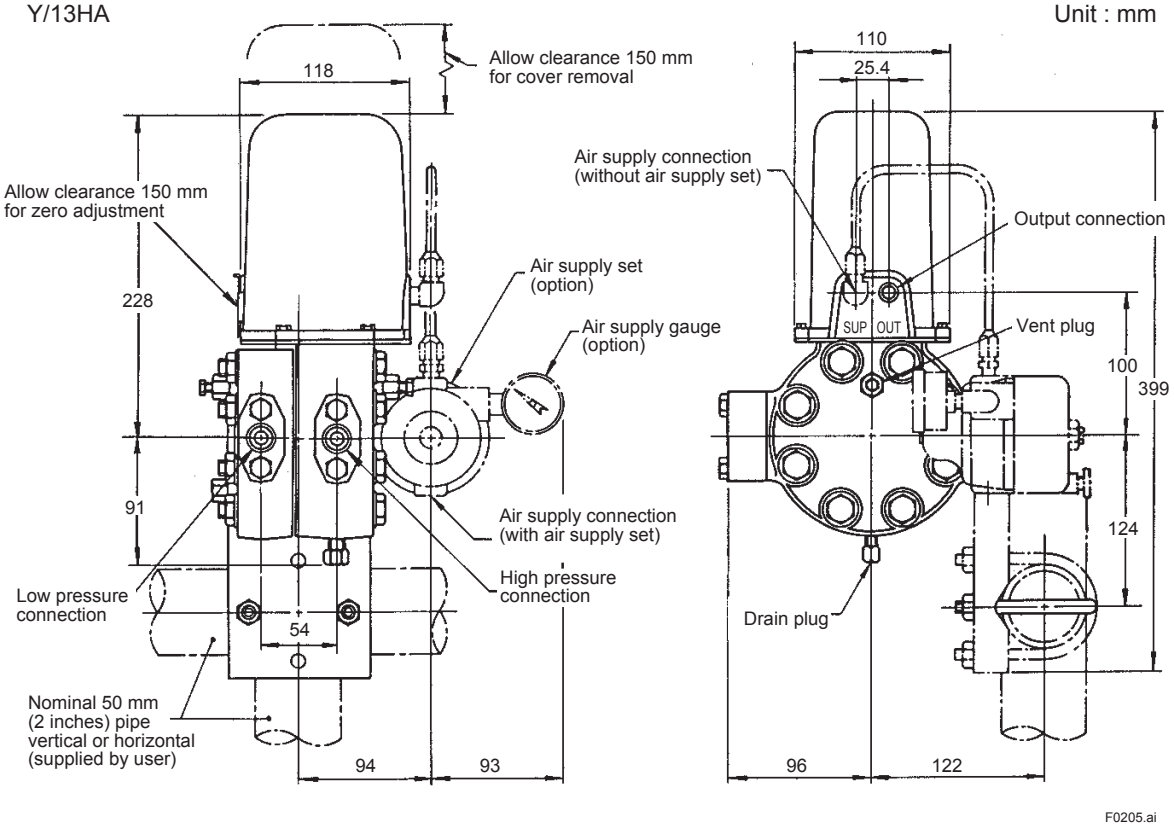
## 2.6 Dimensions



Y/13HA

Unit : mm




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# 3. Installation

## 3.1 Transmitter Mounting

Transmitter may be mounted in any position.
Pressure connections may be made on either side.
Mounting bracket goes on side opposite pressure connectors.
After transmitter is mounted, tighten all bolts.
Pipe may be clamped to another pipe, or flanged and bolted to floor or wall.
U-bolt secures assembly to 50 mm (2 inch pipe).
U-bolt may be revolved 90° for use with horizontal pipe.
Optional air-set can be mounted as illustrated below.
For fixed regulator and associated parts, refer to Customer Maintenance Parts List involved.

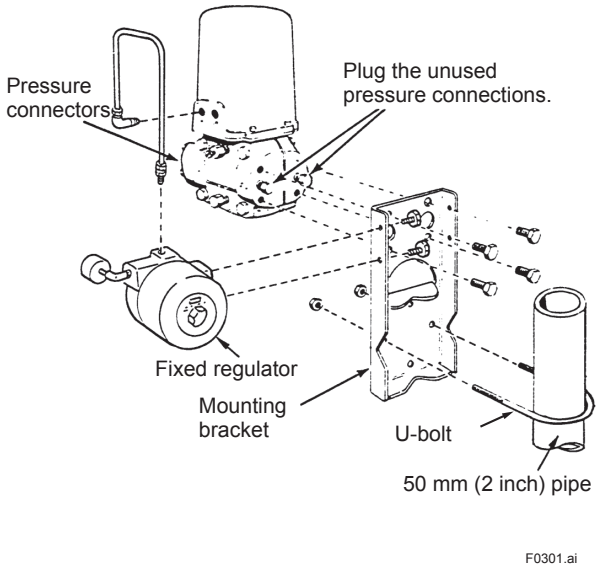



**Figure 3.1 Transmitter Mounting**

## 3.2 Air Supply and Transmission Piping

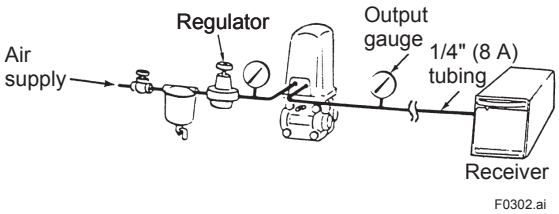



**Figure 3.2 Air Supply and Transmission Piping**

**NOTE**

- Air supply must be regulated at a fixed pressure 1.4 kgf/cm$^2$ or bar, 140 kPa, or 20 psi.
- Transmitter uses 0.5 Nm$^3$/h of air in normal operation.
- Air must be clean and dry. Blow out filter regularly.
- Transmission line must be free of leaks.

## 3.3 Typical Piping for Pressure Applications

(For flow application piping, refer to section 4.1.2, 4.2.2, 4.3.2)

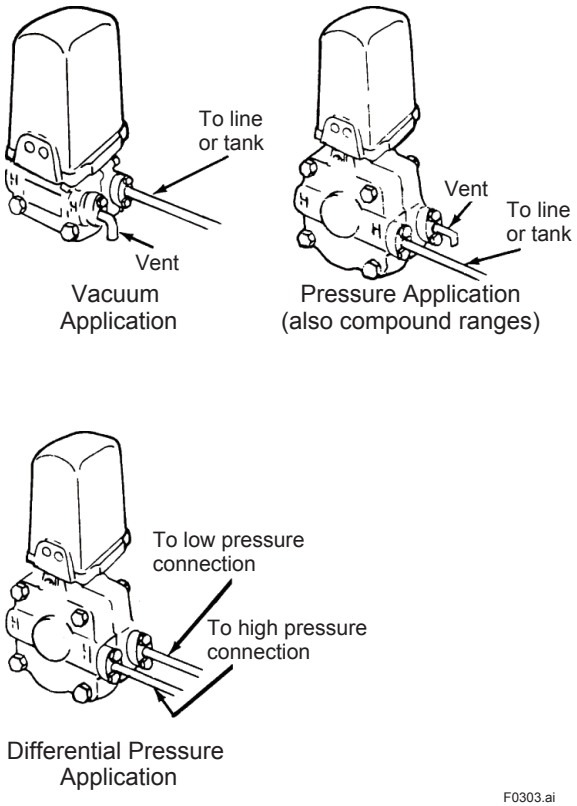



**Figure 3.3 Typical Piping for Pressure Applications**

# 4. Installing Impulse Piping

## 4.1 Gas Flow Measurement

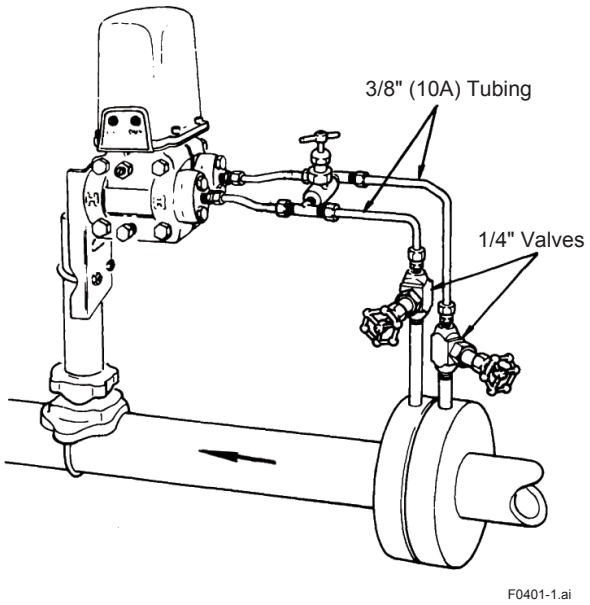
### 4.1.1 Precautions for piping

In measuring gas flow, it is important to keep moisture out of the connecting lines. Therefore, except when a seal liquid is used, make the pressure connections to the TOP of a horizontal flow line, and mount the transmitter ABOVE the connections.

### 4.1.2 Piping

(1) Gas Flow With No Seal Liquid

**Horizontal line**




**Vertical line**

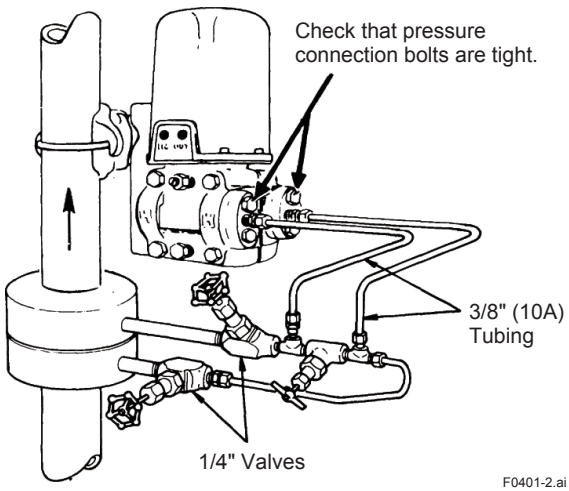



**Figure 4.1 Piping With No Seal Liquid**

**IMPORTANT**

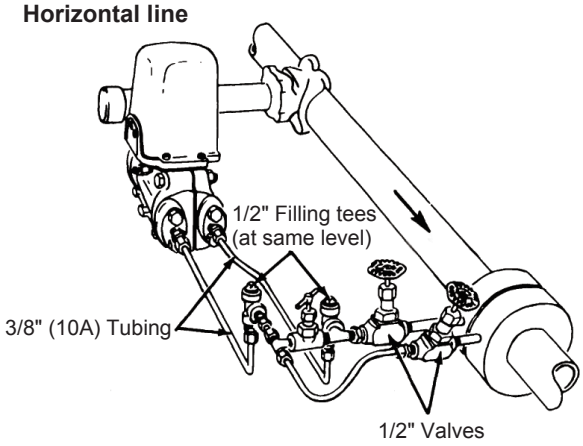
When attaching the connector, tighten bolts by the following torque.

| | |
|---|---|
| Y/13A, Y/15A | : 39 to 49 N·m (4 to 5 kgf·m) |
| Y/13HA | : 49 to 59 N·m (5 to 6 kgf·m) |

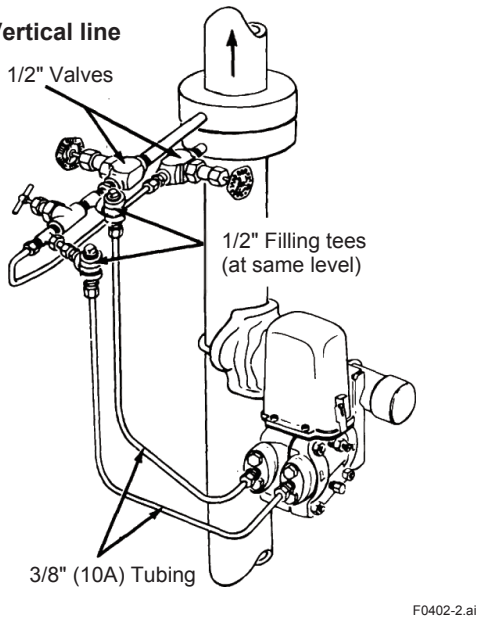
(2) Gas Flow Using a Seal Liquid

If the gas being measured must not come in contact with the transmitter, the connecting tubing and transmitter body must be filled with suitable seal liquid.

**Horizontal line**




**Vertical line**




The two filling tees must be at the same level, so that equal liquid heads exist on the two sides of the transmitter.

**Figure 4.2 Piping Using a Seal Liquid**

## ■ Filling System with Seal Liquid, When Used

1. Close both pressure connection valves and open bypass valve.
2. Remove plugs from filling tees and pour in seal liquid until both tees overflow.
3. Partially open vents until all air has been forced out of transmitter body and lines. Close vents.
4. Refill tee connections. Replace plugs and close bypass valve.
   Check for leaks.

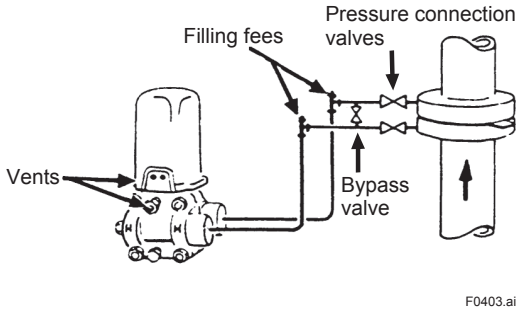



**Figure 4.3 Filling System**

Caution: To prevent loss of seal liquid and contamination by line fluid, never open both pressure connection valves at same time if bypass valve is open.

### 4.1.3 Zero Adjustment

1. Adjust air supply to pressure at which instrument will operate.
2. Close both pressure connection valves and open bypass valve.
3. Connect 0 to 1.5 kgf/cm$^2$ or bar, 0 to 150 kPa, or 0 to 22 psi mercury manometer or test gauge to output connection.
4. Slightly open upstream valve.
5. Adjust zero screw so that output is 0.2 kgf/cm$^2$ or bar, 20 kPa, or 3 psi on manometer.
6. Reconnect air signal line. If necessary change zero adjustment on receiver so that reading is zero.

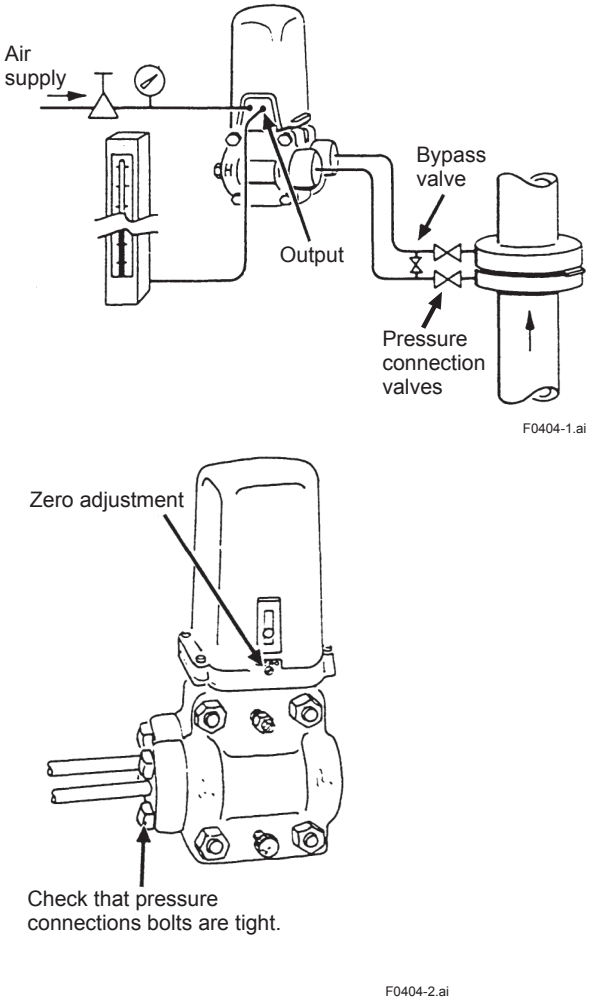



**Figure 4.4 Zero Adjustment**

### 4.1.4 Putting Transmitter into Operation

1. Close both pressure connection valves and then open bypass valve.
2. Slowly open upstream valve.
3. Close bypass valve.
4. Slowly open downstream valve.

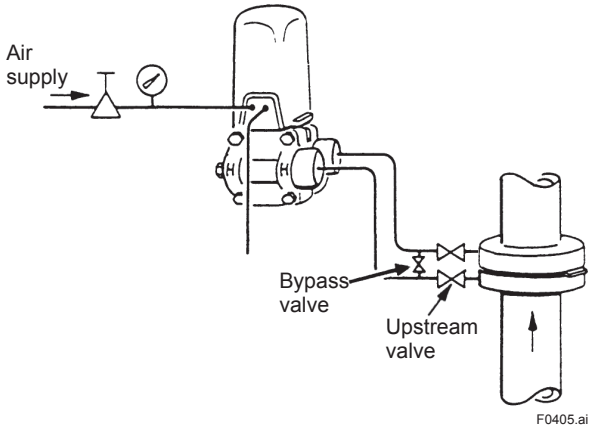



**Figure 4.5 Putting into Operation**

To take the transmitter out of operation, turn off the air supply, and close the downstream and then the upstream valve.
Then open the bypass valve.

## 4.2 Liquid Flow Measurement

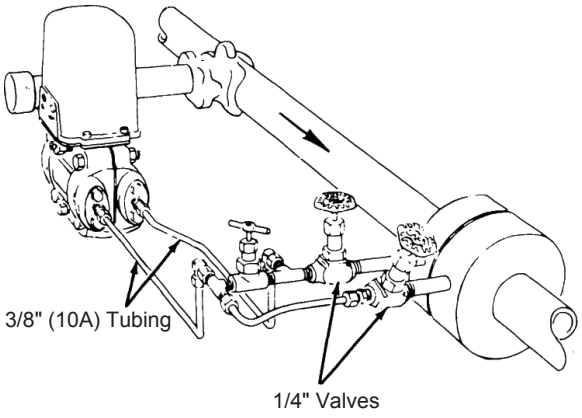
### 4.2.1 Precautions for Piping

With a horizontal line, the pressure connections should be made at the SIDE of the line to allow trapped vapors to escape from the connecting lines, and to prevent sediment from entering these lines. Mount the transmitter LOWER than the pressure connections.

### 4.2.2 Piping

(1) Liquid Flow With No Seal Liquid

**Horizontal line**




**Vertical line**

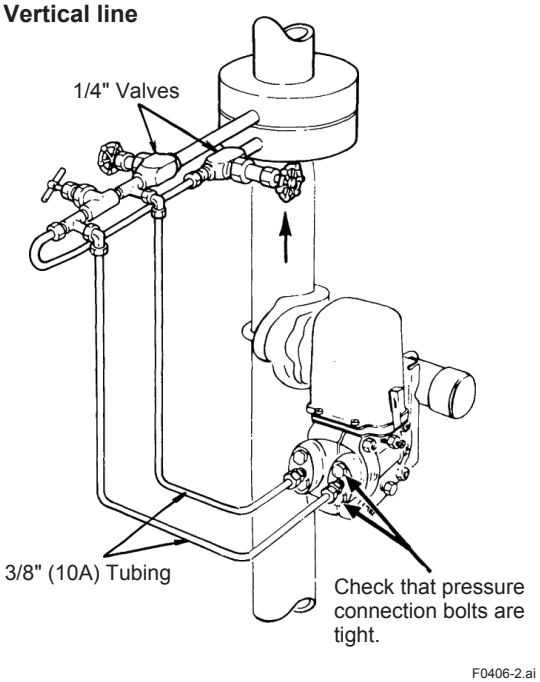


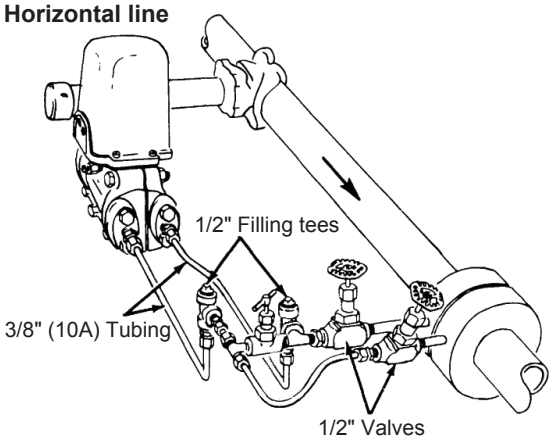

**Figure 4.6 Piping With No Seal Liquid**

## IMPORTANT

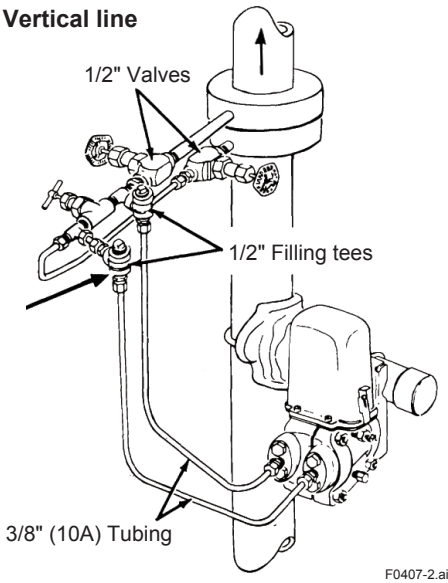
When attaching the connector, tighten bolts by the following torque.
Y/13A, Y/15A : 39 to 49 N·m (4 to 5 kgf·m)
Y/13HA : 49 to 59 N·m (5 to 6 kgf·m)

(2) Liquid Flow Using a Seal Liquid
If liquid being measured must not come in contact with transmitter, 3/8" (10A) tubing and transmitter body must be filled with suitable seal liquid. See below.

**Horizontal line**




**Vertical line**




The two filling tees must be at the same elevation.

**Figure 4.7 Piping Using a Seal Liquid**

## ■ Filling System with Line Liquid (No Seal Liquid Required)

1. Open bypass and both pressure connection valves.
2. Partially open vents until all air has been forced out of transmitter body and lines. Close vents and bypass valve.
   Check for leaks.

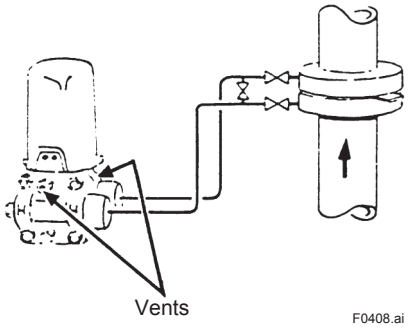



**Figure 4.8 Filling System with Line Liquid**

## ■ Filling System with Seal Liquid

1. Close both pressure connection valves and open bypass valve.
2. Remove plugs from filling tees and pour in seal liquid until both tees overflow.
3. Partially open vents until all air has been forced out of transmitter body and lines. Close vents.
4. Refill tee connections. Replace plugs and close bypass valve.
   Check for leaks.

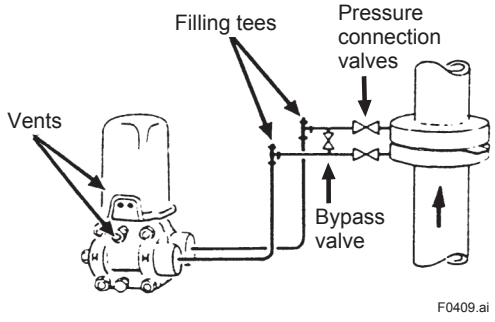
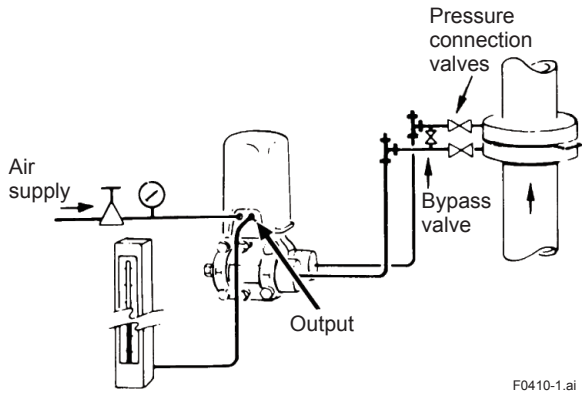



**Figure 4.9 Filling System with Seal Liquid**

Caution: To prevent loss of seal liquid and contamination by line fluid, never open both pressure connection valves at same time if bypass valve is open.

### 4.2.3 Zero Adjustment

1. Adjust air supply to pressure at which instrument will operate.
2. Close both pressure connection valves and open bypass valve.
3. Connect 0 to 1.5 kgf/cm$^2$ or bar, 0 to 150 kPa, or 0 to 22 psi mercury manometer or test gauge to output connection.
4. Slightly open upstream valve.
5. Adjust zero screw so that output is 0.2 kgf/cm$^2$ or bar, 20 kPa, or 3 psi on manometer.
6. Reconnect air signal line. If necessary change zero adjustment on receiver so that reading is zero.



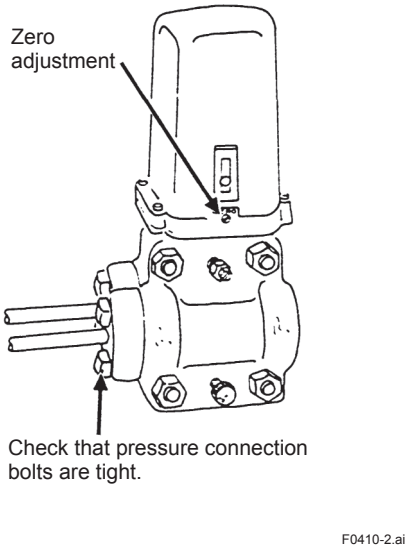




**Figure 4.10 Zero Adjustment**

### 4.2.4 Putting Transmitter into Operation

1. Close both pressure connection valves and then open bypass valve.
2. Slowly open upstream valve.
3. Close bypass valve.
4. Slowly open downstream valve.

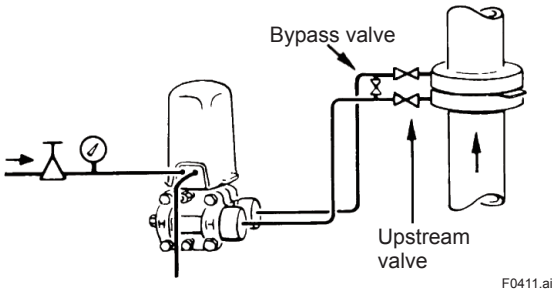



**Figure 4.11 Putting into Operation**

To take the transmitter out of operation, turn off the air supply, and close the downstream and then the upstream valve. Then open the bypass valve.

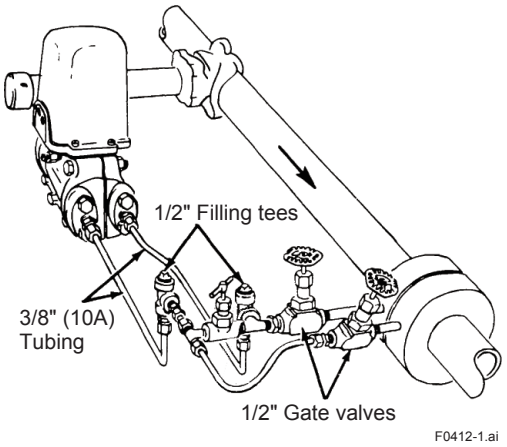
## 4.3 Steam Flow Measurement

### 4.3.1 Precautions for Piping

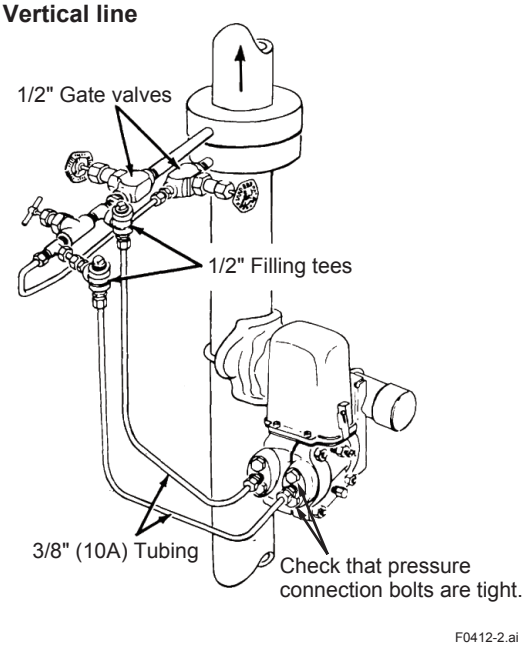
In measuring steam flow, the vapor pressures at the primary element are conveyed to the measuring instrument through two equal liquid heads. Condensing chambers are not necessary, as the transmitter has essentially zero displacement and sufficient vapor will condense in the piping to insure a constant liquid head. It is important, however, to insure that condensation occurs at the same level in both connecting lines, thus preventing error due to unequal liquid columns on the two sides of the instrument. Full-opening 1/2" gate valves should be employed at the connections to permit free counter-current flow of vapors and condensate.
With a horizontal line, the pressure connections should be made at the SIDE to allow trapped vapors to escape from the connecting lines, and to prevent sediment from entering these lines.
Mount the transmitter LOWER than the pressure connections.

### 4.3.2 Piping

**Horizontal line**




**Vertical line**




The two filling tees must be at the same elevation.
The lines from the tees to the transmitter body must be filled with water.

**Figure 4.12 Piping**

**IMPORTANT**

When attaching the connector, tighten bolts by the following torque.

| | |
|---|---|
| Y/13A, Y/15A | : 39 to 49 N·m (4 to 5 kgf·m) |
| Y/13HA | : 49 to 59 N·m (5 to 6 kgf·m) |

## ■ Filling System with Water

1. Close both pressure connection valves and open bypass valve.
2. Remove plugs from filling tees and pour in water until both tees overflow.
3. Partially open vents until all air has been forced out of transmitter body and lines. Close vents.
4. Refill tee connections. Replace plugs and close bypass valve. Check for leaks.

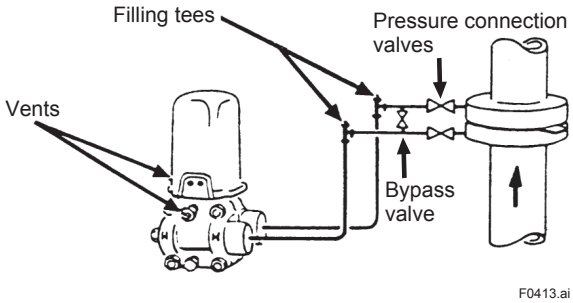



**Figure 4.13 Filling System with Water**

### 4.3.3 Zero Adjustment

1. Adjust air supply to pressure at which instrument will operate.
2. Close both pressure connection valves and open bypass valve.
3. Connect 0 to 1.5 kgf/cm$^2$ or bar, 0 to 150 kPa, or 0 to 22 psi mercury manometer or test gauge to output connection.
4. Slightly open upstream valve.
5. Adjust zero screw so that output is 0.2 kgf/cm$^2$ or bar, 20 kPa, or 3 psi on manometer.
6. Reconnect air signal line. If necessary change zero adjustment on receiver so that reading is zero.

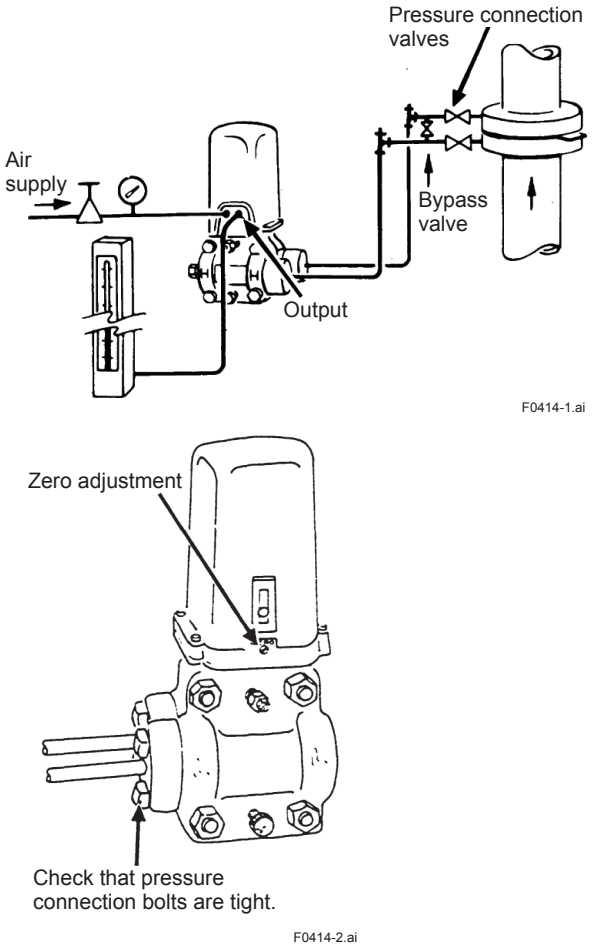



**Figure 4.14 Zero Adjustment**

### 4.3.4 Putting Transmitter into Operation

1. Close both pressure connection valves and then open bypass valve.
2. Slowly open upstream valve.
3. Close bypass valve.
4. Slowly open downstream valve.

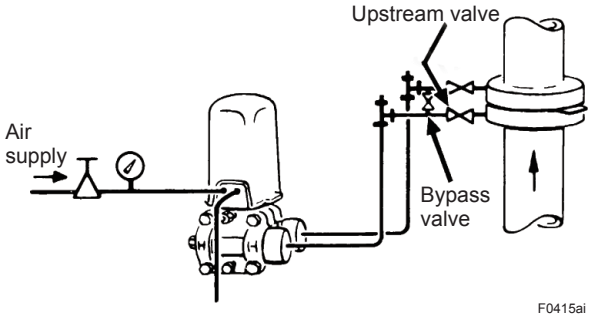



**Figure 4.15 Putting into Operation**

To take the transmitter out of operation, turn off the air supply, and close the downstream and then the upstream valve. Then open the bypass valve.

## 4.4 Liquid Level Measurement (Open Tank)

### 4.4.1 Determination of differential pressure range

With an open tank, the pressure at the high-pressure side of the transmitter is a measure of the liquid level.

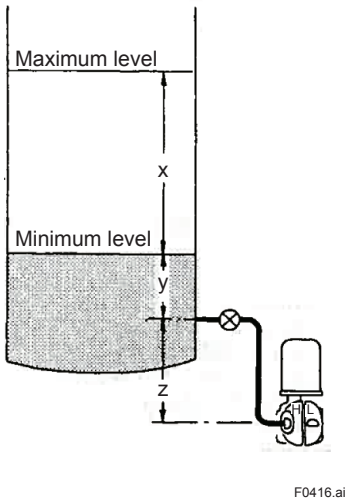



**Figure 4.16 Differential Pressure Range (Open Tank)**

$$\text{Span} = xG_L$$
$$\text{Zero Suppression} = yG_L + zG_S$$

Where $G_L$ = specific gravity of liquid in tank
$G_S$ = specific gravity of liquid in outside filled line

If transmitter is at level of lower tank tap, or if air purge is used, z = 0.
(Note: The density of the gas in the tank has been disregarded in these calculations.)

Example: Assume an open tank with x = 2 m, y = 0.125 m, and z = 0.25 m. The specific gravity of the tank liquid is 0.8; the specific gravity of the liquid in the connecting leg is 0.9.

$$\text{Span} = 2\ (0.8) = 1.6\ mH_2O$$
$$\text{Zero Suppression} = 0.125\ (0.8) + 0.25\ (0.9)$$
$$= 0.1 + 0.225 = 0.325\ mH_2O$$
$$\text{Range} = 0.325 \text{ to } 1.925\ mH_2O$$

### 4.4.2 Piping

**NOTE**

- Use 1/2"(15A) pipe or 3/8"(10A) tubing for the lines between the cell and the tank.
- To prevent entrance of dirt through the vented connection, install a pipe elbow in the opening with the elbow pointing downward.

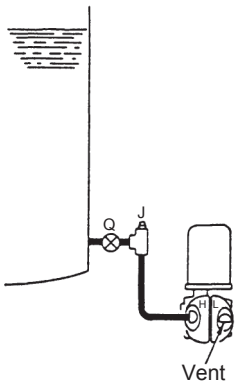



**Figure 4.17 Direct Connected or with Seal Liquid**

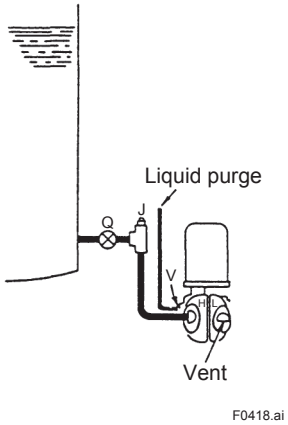



**Figure 4.18 Purge Liquid Heavier than Tank Liquid**

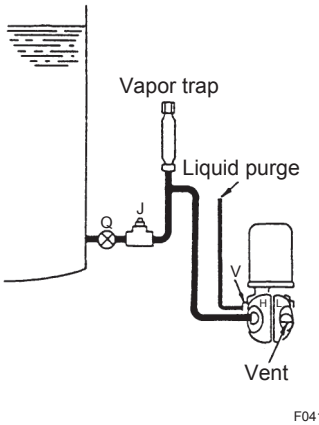



**Figure 4.19 Purge Liquid Lighter than Tank Liquid**

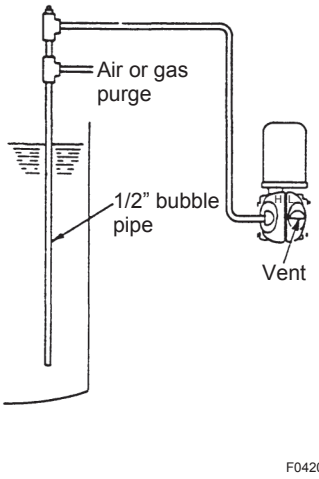



**Figure 4.20 Air or Gas Purge Using Bubble Pipe**

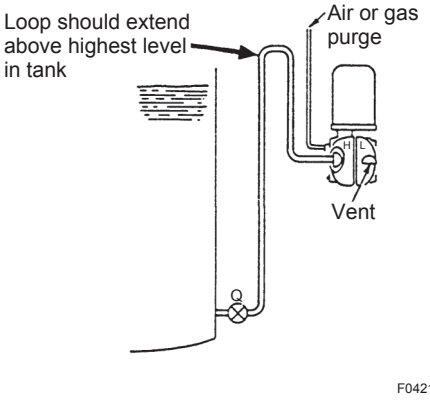



**Figure 4.21 Air or Gas Purge Directly Into Side of Tank**

### 4.4.3 Preparation for Zeroing

(1) Direct Connect or Liquid Purge (Refer to Figure 4.17, 4.18, 4.19)
Make sure that the high-pressure side of the cell and all piping is filled with liquid, free of air bubbles. Open valve Q. If a purge is used, turn on the purge. Establish a known level of liquid in the tank.
If the minimum level is at the vessel tap, a simple way to establish a known head of liquid for zeroing is to close valve Q and open plug J. Turn on the purge, if used.

(2) Air or Gas Purge (Refer to Figure 4.20, 4.21)
Open valve Q, if used. Turn on the purge. Establish a known level of liquid in the tank.

# 4.5 Liquid Level Measurement (Closed Tank - Dry Outside Leg)

## 4.5.1 Determination of differential pressure range

With a closed tank, the effect of tank pressure on the measurement is cancelled by piping this pressure to the low-pressure side of the transmitter.

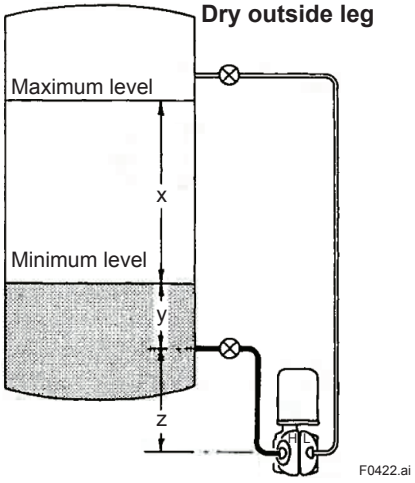



**Figure 4.22 Differential Pressure Range (Closed Tank - Dry Outside Leg)**

$$\text{Span} = xG_L$$
$$\text{Zero Suppression} = yG_L + zG_S$$

Where $G_L$ = specific gravity of liquid in tank
$G_S$ = specific gravity of liquid in outside filled line

## 4.5.2 Piping

**NOTE**

- Use 1/2"(15A) pipe or 3/8"(10A) tubing for the lines between the cell and the tank.

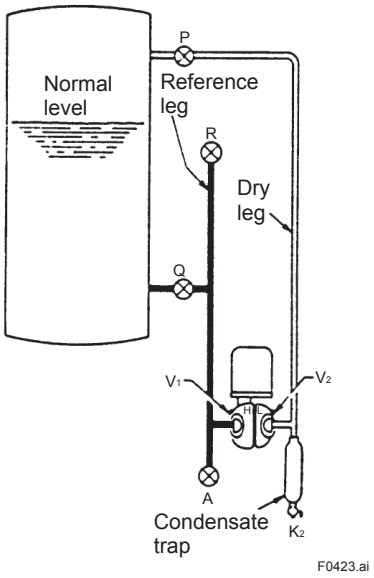



**Figure 4.23 Direct Connected**

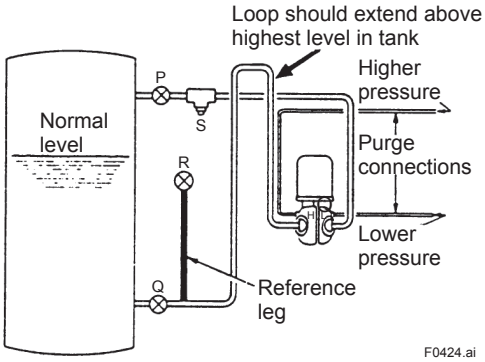



**Figure 4.24 Air or Gas Purge**

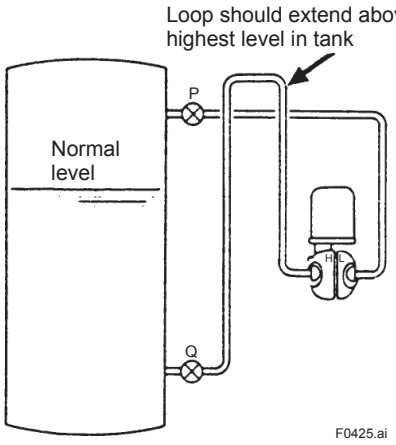



**Figure 4.25 Self Purge (for Liquefied Gases)**

### 4.5.3 Preparation for Zeroing

(1) Direct Connection (Refer to Figure 4.23)
Close valves P and Q. Open R and the cell vent screws $V_1$ and $V_2$. Pour tank liquid at ambient temperature through R until liquid, free of air bubbles, flows from $V_1$. Shut $V_1$ and continue filling with liquid until it overflows at R. Open $K_2$ and drain the condensate trap.

(2) Air or Gas Purge (Refer to Figure 4.24)
Close valves P and Q. Open S and R. Through R, fill the reference leg with tank liquid at ambient temperature. Start the flow of purge gas in the two purge lines.

(3) Self Purge (Refer to Figure 4.25)
Establish a known level of liquid in the tank. Open valves P and Q.

Note: Temperature of the lines between cell and tank must be high enough to vaporize any tank liquid that runs into the lines. Heat the lines if necessary. Temperature of the vapor in contact with the diaphragm capsule must be greater than -40 °C.

### ■ Reference Leg

A reference leg is a convenient device for establishing a check point for the cell. Locate valve R at a height equivalent to the check level (usually normal or minimum level in the tank).
If the liquid in the reference leg is of different density than the tank liquid, alter the length of the reference leg to compensate for this difference by an amount equal to the ratio of densities.

Example: If the specific gravity of the tank liquid is 0.6 and the specific gravity of the liquid in the reference leg is 0.8, make the length of the reference leg 0.6/0.8 or 3/4 of the vertical distance from the bottom of the reference leg to the reference level in the tank.

## 4.6 Liquid Level Measurement (Closed Tank-Wet Outside Leg)

### 4.6.1 Determination of differential pressure range

With a closed tank, the effect of tank pressure on the measurement is cancelled by piping this pressure to the low-pressure side of the transmitter.

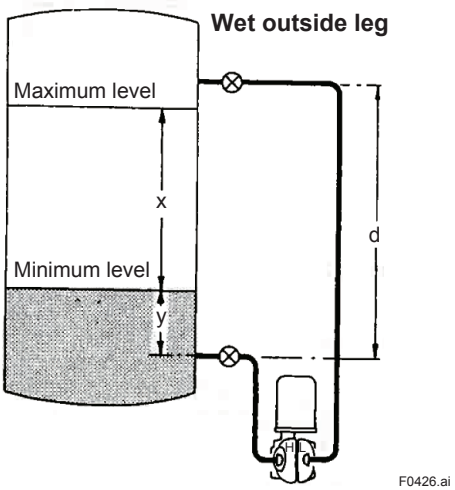



**Figure 4.26 Differential Pressure Range (Closed Tank-Wet Outside Leg)**

$$\text{Span} = xG_L$$
$$\text{Zero Elevation} = dG_S - yG_L$$

Where $G_L$ = specific gravity of liquid in tank
$G_S$ = specific gravity of liquid in outside filled line

Example: Assume a closed tank with x = 2 m, y = 0.5 m, and d = 3 m. The specific gravity of the tank liquid is 0.8; a sealing liquid with a specific gravity of 0.9 is used.

$$\text{Span} = 2\ (0.8) = 1.6\ mH_2O$$
$$\text{Zero Elevation} = 3\ (0.9) - 0.5\ (0.8)$$
$$= 2.7 - 0.4 = 2.3mH_2O$$
$$\text{Range} = -2.3 \text{ to } -0.7\ mH_2O$$

(Minus sign indicates that the higher pressure is applied to the low side of the cell.)

### 4.6.2 Piping

**NOTE**

- Use 1/2"(15A) pipe or 3/8"(10A) tubing for the lines between the cell and the tank.
- Refer to section 4.5.3 titled Reference Leg.

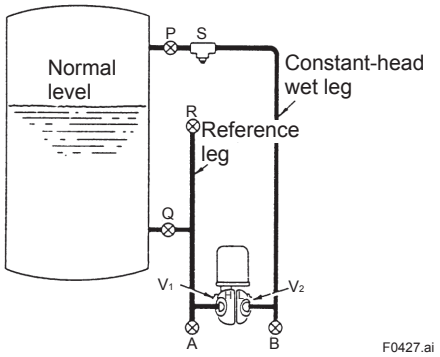



**Figure 4.27 Direct-Connected, with Constant-Head Leg**

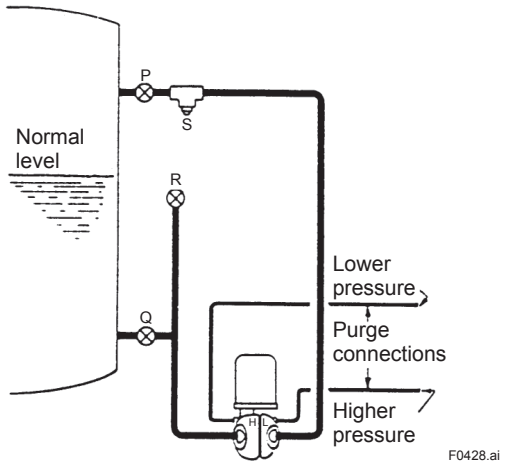



**Figure 4.28 Purge Liquid Heavier Than Tank Liquid**

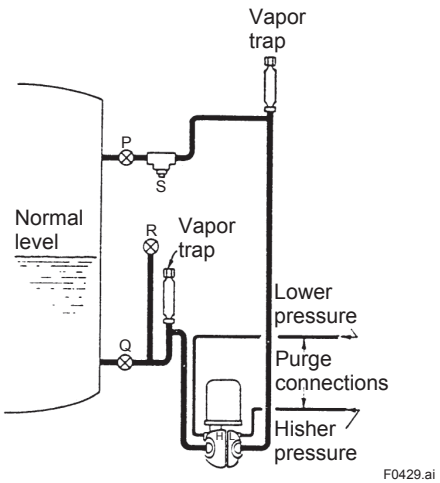



**Figure 4.29 Purge Liquid Lighter Than Tank Liquid**

### 4.6.3 Preparation for Zeroing

Using tank liquid, sealing liquid, or liquid purge fluid, fill the piping system from low points in such a way that no air or vapor remains in the system. In Figure 4.27, A and B are filling valves. Valves P and Q should be closed.
With R and S open, and with liquid just at the point of overflowing from them, the cell is under a differential pressure corresponding to normal or minimum level.

## 4.7 Transmitter with Zero Elevation or Zero Suppression Kit

If the transmitter requires zero elevation or zero suppression (see equations and examples in Section 4.4.1, 4.5.1, 4.6.1), it is equipped with a zero elevation or zero suppression kit. The spring exerts a force through the force bar to the diaphragm capsule. The tension of a zero suppression spring can be adjusted to cancel any initial force or pressure exerted on the high-pressure side of the diaphragm capsule; the tension of a zero elevation spring can be adjusted to cancel any initial force on the low-pressure side of the capsule. Procedures for making these adjustments are given in Sections 4.7.1 and 5.1.3.

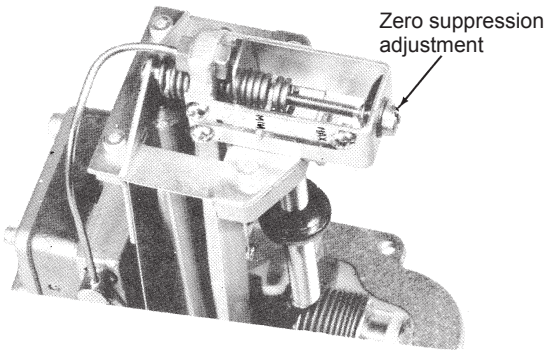



**Figure 4.30 Zero Suppression Kit**

Note: During manufacture, each transmitter with a zero elevation spring is calibrated with the spring adjusted for a specified amount of zero elevation. (If the sales order does not specify the amount of zero elevation desired, the transmitter is calibrated for an amount of zero elevation equal to zero.) A change in the amount of zero elevation causes the span of the transmitter to change by a small amount. If, in Section 4.7.1, it is necessary to change the zero elevation by more than 25% of span, the transmitter should be recalibrated if maximum accuracy is desired.

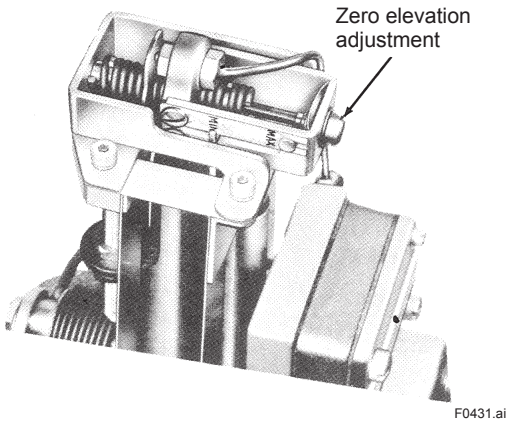
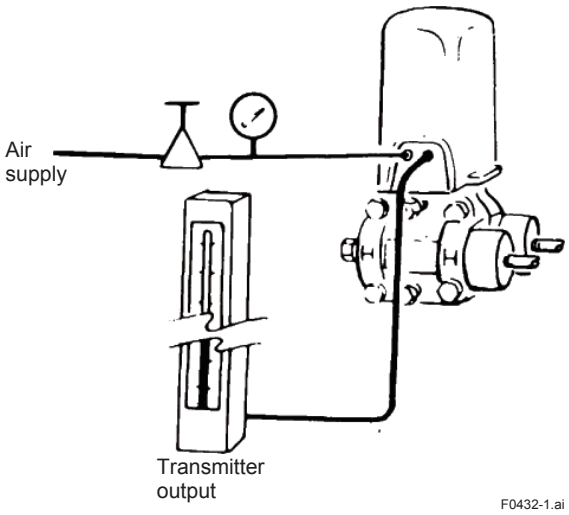



**Figure 4.31 Zero Elevation Kit**

### 4.7.1 Zero Adjustment

1. Perform Preparation for Zeroing described in Section 4.4.3, 4.5.3, or 4.6.3.
2. Adjust air supply to pressure at which transmitter will operate.
3. Connect a 0 to 1.5 kgf/cm$^2$ or bar, or 0 to 150 kPa, or 0 to 22 psi mercury manometer or test gauge to output connection.
4. If a differential pressure corresponding to minimum level is applied to transmitters, adjust output reading to 0.2 kgf/cm$^2$ or bar, 20 kPa, or 3 psi. If the differential pressure corresponds to a level above minimum level, output reading should be adjusted to the calculated value (see formula below). Make the adjustment as follows:
   a. For transmitters without zero suppression or zero elevation kit, adjust zero screw until correct output is obtained.
   b. For transmitter with zero suppression or zero elevation kit, adjust zero suppression or zero elevation screw until correct reading is obtained. Fine adjustments may be made with zero screw.
5. Reconnect output line. If necessary, adjust receiver screw until reading is correct.



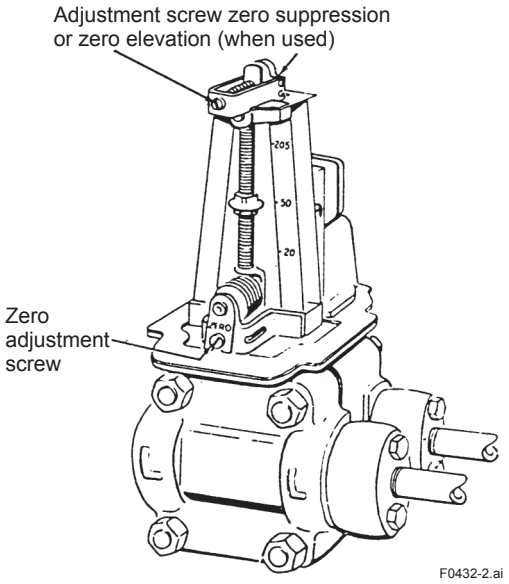




**Figure 4.32 Zero Adjustment**

### ■ To Calculate Output

Output pressure =

$$(0.8)\left(\frac{\text{reference level} - \text{minimum level}}{\text{maximum level} - \text{minimum level}}\right) + 0.2$$

Example: Reference level is 1200 mm$H_2O$ above minimum level.
Maximum level is 2000 mm$H_2O$ above minimum level.
Output pressure =

$$(0.8)\left(\frac{1200}{2000}\right) + 0.2 = 0.68 \text{ kgf/cm}^2$$

Note: With 20 to 100 kPa or 3 to 15 psi output, substitute 20 and 80 or 3 and 12 for 0.2 and 0.8 respectively, in the equation above.

# 5. Maintenance

## 5.1 Calibration Notes

Calibration is required if transmitter has been taken apart for cleaning or parts replacement, if range is to be changed, or if amount of zero elevation or zero suppression is to be changed substantially. Transmitter can be calibrated to 0.2 to 1.0 kgf/cm$^2$ or bar, 20 to 100 kPa, or 3 to 15 psi, signal pressure range. These ranges are not exactly equivalent; therefore transmitter must be calibrated to same signal pressure range as receiver with which it is used.

### 5.1.1 Piping for Bench Calibration

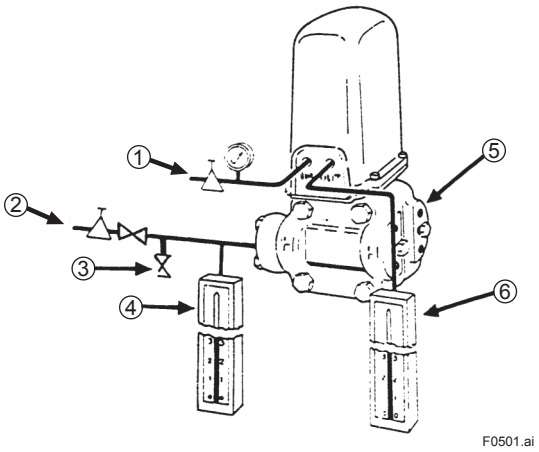



**Figure 5.1 Piping for Calibration**

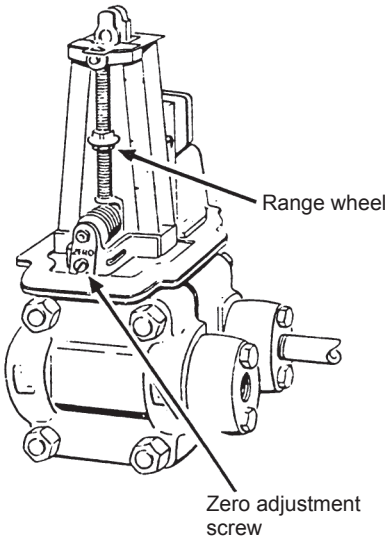
① Regulate air supply to pressure at which transmitter will be operating.
② Calibrating Air Supply
③ Bleeder Valve (needle type)
④ Manometer for reading input signal pressure. Use water column for differentials up to 2.0 m$H_2O$, 20 kPa, 2.0 bar, 80 in$H_2O$. Use mercury column for differentials of 2.0 to 21.6 m$H_2O$, 20 to 210 kPa, 2 to 2.1 bar, or 80 to 850 in$H_2O$ water.
⑤ Vent low-pressure side of transmitter.
⑥ 0 to 1.5 kgf/cm$^2$ or bar, 0 to 150 kPa, or 0 to 22 psi output test gauge or manometer.

**NOTE**

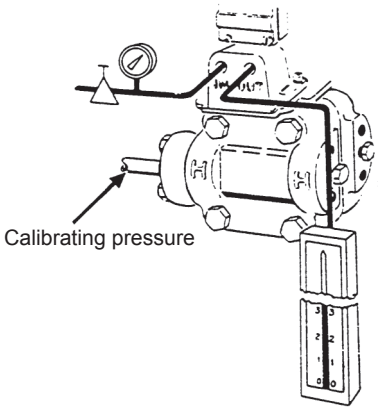
- The standard transmitter operation is for the output to increase as the measurement (input) increases. If desired, the transmitter can have the opposite action by installing the optional zero elevation attachment and reversing the transmitter pressure connections.
- All calibration and adjustment procedures remain the same except that the output is 0.2 kgf/cm$^2$ or bar, 20 kPa, or 3 psi with a maximum measurement and 1.0 kgf/cm$^2$ or bar, 100 kPa, or 15 psi with a minimum measurement.

### 5.1.2 Bench Calibration Procedure (Transmitter WITHOUT Optional Zero Elevation or Zero Suppression Kit)

1. Set up calibration equipment as shown on section 5.1.1.
   If diaphragm capsule was removed or if flexure locknut was loosened, adjust locknut (see section below).
2. Position range wheel at desired differential range.
   Tighten locknut under wheel.
3. With no pressure differential on transmitter, adjust zero screw so that output on manometer reads 0.2 kgf/cm$^2$ or bar, 20 kPa, or 3 psi.
4. Raise air pressure at high-pressure connection to maximum value of desired range. Output reading on manometer should be 1.0 kgf/cm$^2$ or bar, 100 kPa, or 15 psi.
   If output reading is not correct, adjust range wheel until reading is correct (raising range wheel will lower output reading). Tighten range wheel locknut after each adjustment.
5. Repeat Steps 3 and 4 until both outputs are within desired accuracy without adjustment. Check that range wheel locknut is securely tightened.




F0502-1.ai



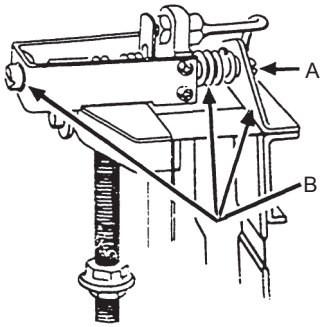

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**Figure 5.2 Calibration Procedure**

### 5.1.3 Bench Calibration Procedure (Transmitter WITH Optional Zero Elevation or Zero Suppression Kit)

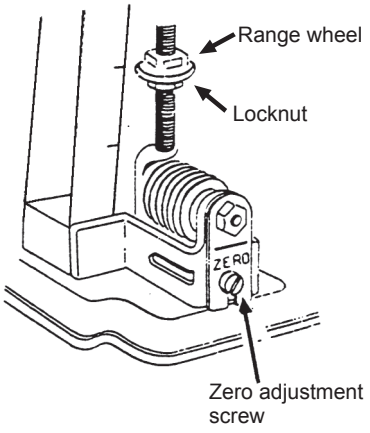
Note: Illustration for Steps 2 and 6 show zero suppression kit. If transmitter has zero elevation kit, location of screws mentioned in Step 2 are reversed.

1. Set up calibration equipment as shown on section 5.1.1.
   If capsule was removed or flexure locknut was loosened, adjust locknut (Refer to section 5.1.5).
2. Disconnect zero elevation or zero suppression spring from force bar as follows:
   A. Remove screw from end of spring.
   B. Turn adjustment screw clockwise until spring is clear of bracket. Spring must not bind against flapper or casting.




F0503-1.ai

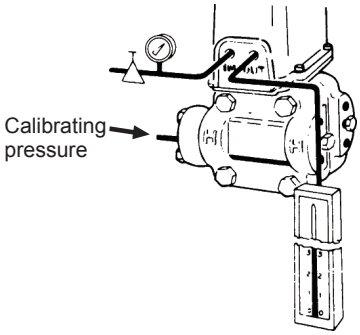
3. Position range wheel at desired differential range. Tighten locknut under wheel.




F0503-2.ai

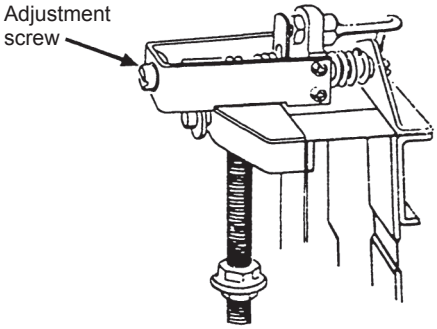
4. With no differential pressure on transmitter, adjust zero screw so that output on manometer reads 0.2 kgf/cm$^2$ or bar, 20 kPa, or 3 psi. Reinstall screw removed in Step 2-A.

5. Set calibrating pressure equal to lower differential limit.
   With zero elevation kit, apply pressure to low-pressure side of transmitter and vent high-pressure side.




F0503-3.ai

6. Turn adjustment screw so that output is 0.2 kgf/cm$^2$ or bar, 20 kPa, or 3 psi. Fine adjustment can be made with zero screw.




F0503-4.ai

7. Set calibrating pressure equal to upper differential limit. Output should be 1.0 kgf/cm$^2$ or bar, 100 kPa, or 15 psi.
8. If output is not correct, adjust range wheel until reading is correct (raising range wheel will lower OUT reading). Tighten range wheel locknut after each adjustment.
9. Repeat Steps 5 through 8 until both outputs are within desired accuracy without adjustment. Check that range wheel locknut is securely tightened.

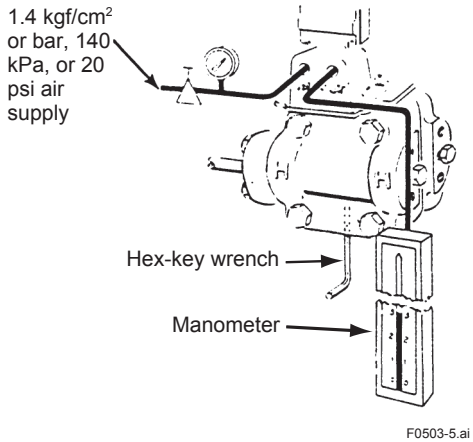
### 5.1.4 To Change Range of Transmitter

The range of the transmitter, as calibrated at the factory, is stamped on the data plate. By recalibration, the range can be changed to any values within the limits of the diaphragm capsule. If the desired range is outside the limits of the particular capsule installed in the transmitter, but within the range of the other available capsule, install this new capsule. (Note that there is only one capsule available for Model Y/15A.) The data plate should be altered to indicate the new range.
Refer to section 2.3 (Table 2.1) about the Span Limits, Range Limits and static Pressure Limits for the various capsules.

### 5.1.5 Flexure Locknut Adjustment

Make this adjustment if capsule was removed or if flexure locknut was loosened.

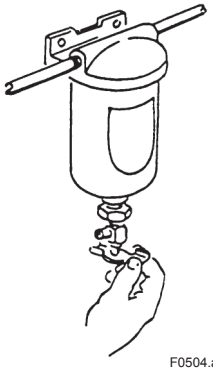
1. Remove bottom drain plug, and loosen flexure locknut with a 1/4" hex-key wrench.
2. With no differential on capsule, adjust zero screw so that output pressure on manometer is 0.2 kgf/cm$^2$ or bar, 20 kPa, or 3 psi.
3. Carefully tighten flexure locknut so that output pressure does not change by more than 0.027 kgf/cm$^2$ or bar, 2.7 kPa, or 0.4 psi.
   If output pressure is not within these limits, loosen locknut and carefully retighten.
   If output pressure is still not within limits, it indicates that index marks on capsule and body are not aligned. Correct by repositioning capsule (Refer to section 5.6).
4. When output pressure is within limits with the locknut tightened, replace bottom plug.
5. Calibrate transmitter.




F0503-5.ai

**Figure 5.3 Flexure Locknut Adjustment**

## 5.2 Supply Air Filter




Blow filter out at least once a day.

**Figure 5.4 Air Filter**

## 5.3 To Clean Restrictor

A plugged restrictor will cause low output pressure.

1. Remove amplifier (Refer to section 5.9).
2. Lift out restrictor with tweezers.
3. Clean with a 0.18 mm dia. wire
4. Apply thin film of Vaseline, or similar lubricant to O-ring.

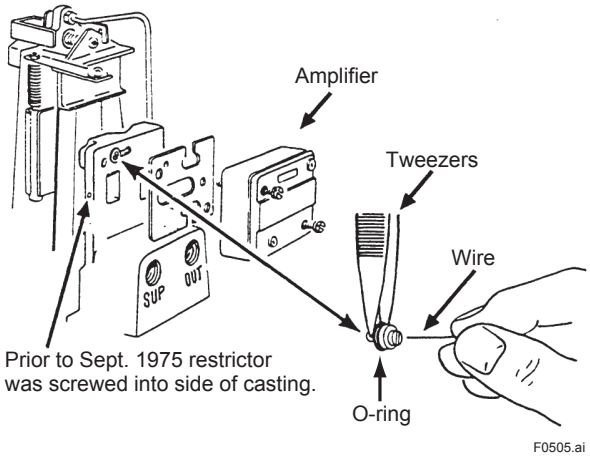
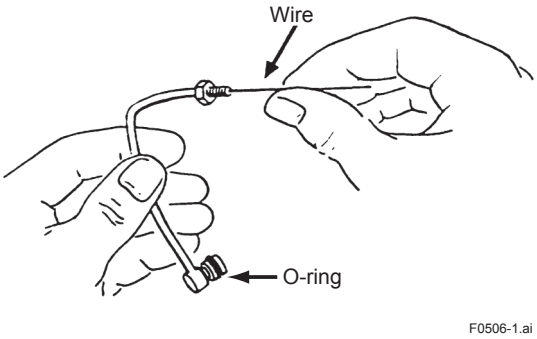



**Figure 5.5 Cleaning of Restrictor**

## 5.4 To Clean Nozzle Assembly

An accumulation of dirt at the flapper nozzle may cause a zero shift.

1. Unscrew nozzle nut. Do not let soldered nut on opposite side of casting turn.
2. Ease nozzle out of casting.
3. Loosen clamp screw and rotate S-clamp. Withdraw nozzle O-ring connection with twisting motion. Do not bend tubing.
4. Clean nozzle with 0.45 mm dia. wire, compressed air, or suitable solvent. Wipe top of flapper clean.




5. Before replacing, apply a thin film of Vaseline or similar lubricant to O-ring. Replace nozzle assembly in reverse order. Check reference adjustment. (Refer to section 4.1.3, 4.2.3, 4.3.3)

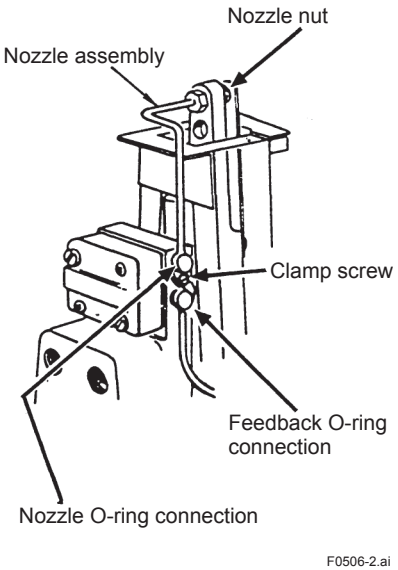
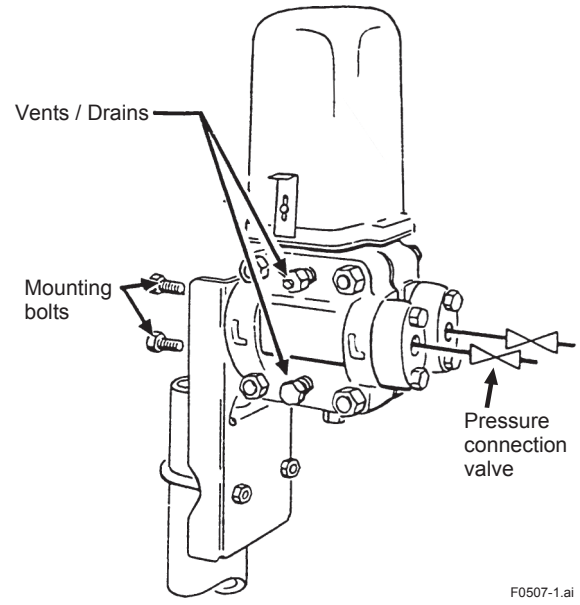



**Figure 5.6 Cleaning of Nozzle Assembly**

## 5.5 To Remove Diaphragm Capsule

1. Close pressure connection valve.
2. Open vents and drains on pressure side.
3. If unit is mounted, remove 2 mounting bolts from low pressure side.
4. Remove bottom plug. Insert 1/4" hex-key wrench in opening and loosen, but do not remove, flexure locknut.
5. Remove the 4 body nuts (Model Y/13HA has 8 nuts) and lift off low-pressure side of unit. Do not remove bolts.
6. Lift out capsule. Do not bend flexure.



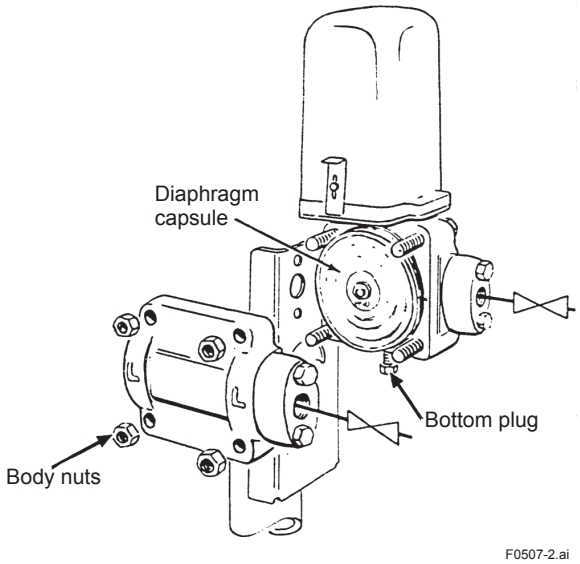
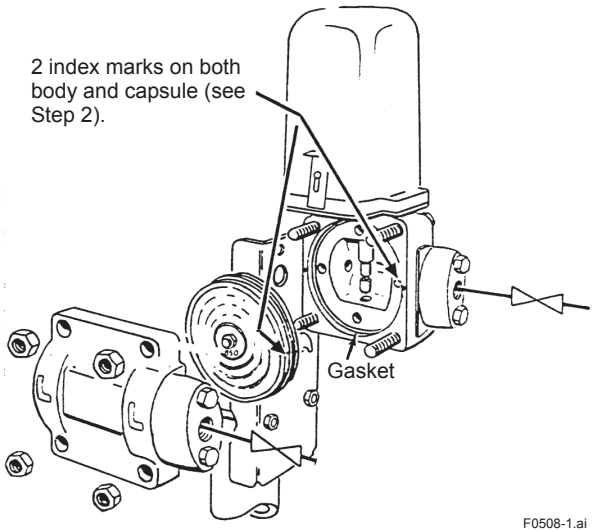




**Figure 5.7 Remove the Diaphragm Capsule**

## 5.6 To Replace Diaphragm Capsule

1. Use new gaskets in castings on both sides of capsule.
2. Position capsule in its cavity so that flexure fits on force bar.
   Align index marks on capsule and body and tighten flexure locknut with wrench.
3. Replace low-pressure side of unit, tightening the 4 nuts finger tight.
   Loosen flexure locknut and then complete tightening the 4 nuts gradually and uniformly to 90 N·m torque. (With Model Y/13HA tighten the 8 bolts gradually to 110 N·m.)
4. Replace remaining parts in reverse order. Make flexure locknut adjustment and then calibrate transmitter (Refer to section 5.1.5).



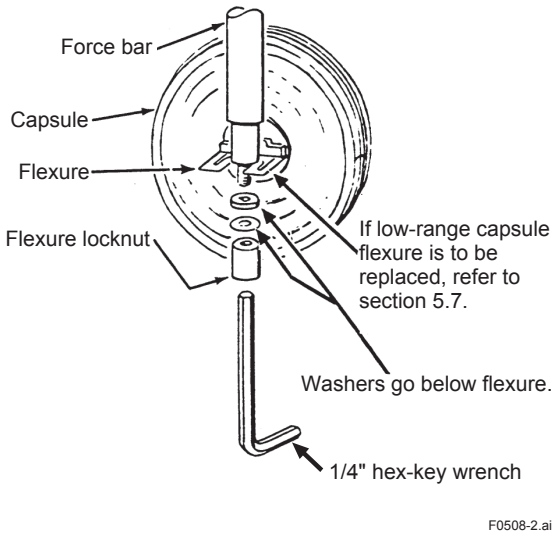
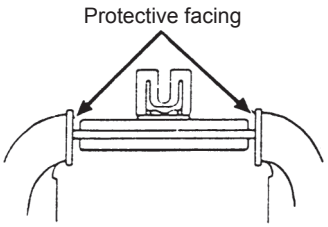




**Figure 5.8 Replace the Diaphragm Capsule**

## 5.7 To Replace Capsule Flexure

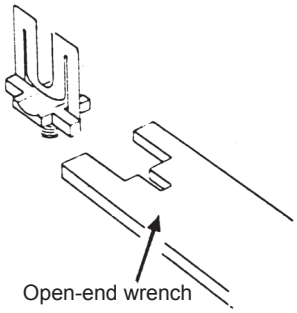
Note: Flexures of high range capsules cannot be replaced.

1. Remove capsule from unit (Refer to section 5.5).
   Use protective facing on jaws of vise to prevent damaging capsule.



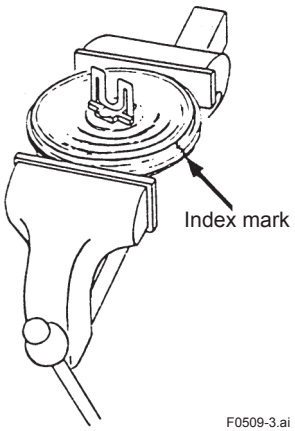

F0509-1.ai

2. Use open-end wrench (preferably one shaped to fit flexure base) to remove and replace flexure. Tighten to 5 to 5.5 N·m torque. Do not bend flexure.




F0509-2.ai

3. After flexure is replaced, scribe 2 new index marks on opposite edges of capsule in line with flexure. Use new index marks when replacing capsule. Adjust flexure locknut (Refer to section 5.1.5).




F0509-3.ai

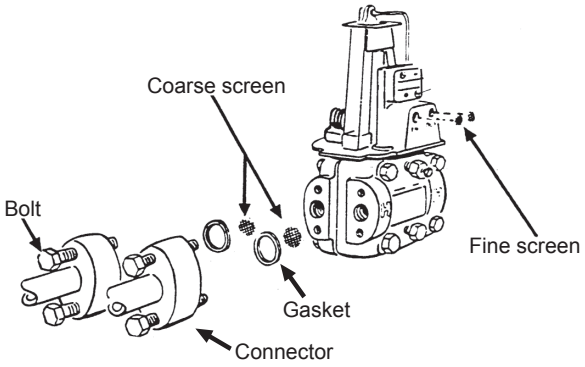
## 5.8 To Clean or Replace Screen Filters

Remove coarse screen filter with pointed tool for cleaning or replacement.
If fine screen air filters become clogged, remove with pointed tool and replace.
Use new gasket each time connection is broken. In replacing assembly, tighten bolts uniformly.

**IMPORTANT**

When attaching the connector, tighten bolts by the following torque.

| | |
|---|---|
| Y/13A, Y/15A | : 39 to 49 N·m (4 to 5 kgf·m) |
| Y/13HA | : 49 to 59 N·m (5 to 6 kgf·m) |




F0509-4.ai

**Figure 5.9 Clean or Replace Screen Filters**

## 5.9 To Remove Pneumatic Amplifier

To remove amplifier, remove 2 large screws and pry off. A gasket is furnished with each replacement amplifier. When replace the pneumatic amplifier, tighten the screws by the torque of 1.6 to 1.8 N·m (16 to 18 kgf·cm).

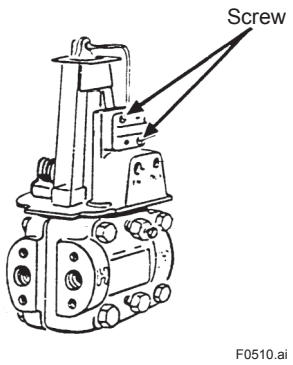
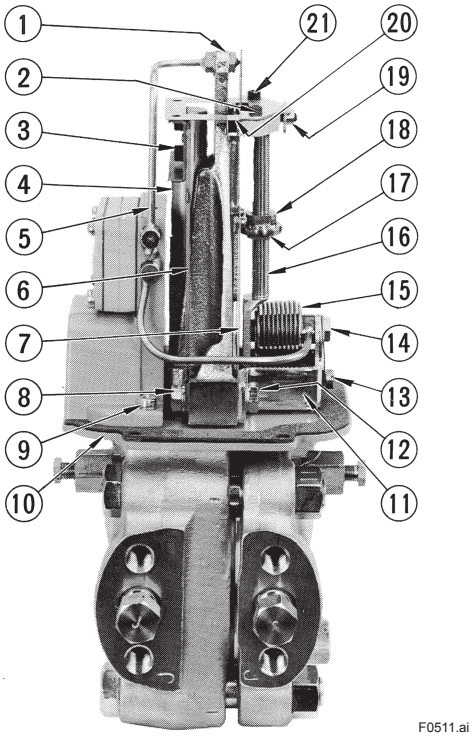



**Figure 5.10 Remove Pneumatic Amplifier**

## 5.10 Further Disassembly

**IMPORTANT**

Normal servicing of the transmitter does not require the removal of any parts other than those already mentioned. Further disassembly is not recommended by YOKOGAWA. The following procedures are described for emergency use only and the user must assume responsibility for loss of accuracy or damage to the transmitter.




### 5.10.1 To Remove Feedback Bellows and Zero Spring (behind Zero Screw)

1. Carefully pry out feedback O-ring connection at amplifier (Refer to section 5.4).
2. Using 7/16" open-end wrench, remove the two 1/4" cap screws ⑫ holding bracket ⑪.
3. Unscrew completely zero adjustment screw ⑬ to release zero spring. Bracket ⑪ and feedback bellows ⑮ can now be removed.
4. Remove nut ⑭ to disconnect feedback bellows from bracket.
5. Remove zero spring by unscrewing it from range bar ⑯. Be careful not to change alignment on the spring clamp.

6. Reverse this procedure to reassemble, making sure that post on bracket is within zero spring alignment clamp. Tighten zero adjustment screw until about 6 mm of thread remains exposed. When replacing feedback connection, apply a thin film of Vaseline or similar lubricant to O-ring.
7. Calibrate transmitter (Refer to section 5.1).

### 5.10.2 To Remove Back Flexures

Unless front flexure ⑥ has already been removed, 7/64" hex-key wrench used in Step 2 must be cut down to fit into screws ⑳.

1. Using 7/16" open-end wrench, remove 1/4" cap screws ⑫ holding bracket ⑪.
2. Using a 7/64" hex-key wrench, remove two screws and plates ⑳ holding back flexures ⑦, and remove back flexures.
3. Reverse this procedure to reassemble. Do not tighten cap screws ⑫.
4. Loosen cap screws ⑧ and force bar screws ③. Apply 10 kgf/cm$^2$ or bar, 1 MPa, or 150 psi to both side of transmitter. Tap the body lightly and tighten all screws.
5. Calibrate transmitter (Refer to section 5.1).

### 5.10.3 To Remove Force Balance Unit

1. Remove relay mounting assembly ⑤ (Refer to section 5.10.4).
2. Remove capsule (Refer to section 5.5).
3. Using a 3/16" hex-key wrench, remove the three socket-head screws holding force balance unit to body. In removing screws, be careful not to damage flexures ⑥ and ⑦. Withdraw force balance unit from body.
4. Reverse this procedure to reassemble. When tightening screws removed in Step 3, follow procedure on section 5.10.9 to maintain original static alignment accuracy. Replace O-ring that fits around force bar on top of body, and the two gaskets that go on each side of diaphragm capsule.
   Apply a thin film of Vaseline or a similar lubricant to the O-ring.
5. Calibrate transmitter (Refer to section 5.1).

### 5.10.4 To Remove Relay Mounting Assembly

1. Carefully pry out nozzle and feedback O-ring connections at amplifier (Refer to section 5.4).
2. Remove relay mounting assembly ⑤ by unscrewing the two screws ⑨ above mounting plate and small screw ⑩ beneath mounting plate.
3. Reverse this procedure to reassemble. When replacing O-ring connections, apply a thin film of Vaseline or similar lubricant to O-rings.

### 5.10.5 To Remove Front Flexure

1. If transmitter has optional zero elevation or zero suppression kit, remove this assembly.
2. Carefully pry out both feedback and nozzle O-ring connections at amplifier and remove nozzle tubing from casting ① (Refer to section 5.4).
3. Remove relay mounting assembly ⑤ (Refer to section 5.10.4).
4. Using a 7/64" hex-key wrench, remove top plate ② by removing two plate screws ㉑.
5. Using a 9/64" hex-key wrench, remove force bar screws ③.
6. Remove cap screws ⑧ and plates and lift front flexure ⑥ off of dowel.
7. Reverse this procedure to reassemble. If force bar has been removed or force balance unit loosened from body, top of front flexure should be visually lined up with casting ①, so that there is no twist evident in flexures. Then tighten plate screws ㉑. Do not tighten cap screws ⑧.
8. Loosen cap screws ⑫ and force bar screws ③. Apply 10 kgf/cm$^2$ or bar, 1 MPa, or 150 psi to both sides of transmitter. Tap body lightly and tighten all screws.
9. Check static alignment (Refer to section 5.10.7).

### 5.10.6 To Remove Force Bar

1. Remove force balance unit (Refer to section 5.10.3).
2. Using a 9/64" hex-key wrench, remove the two force bar screws ③. Force bar ④ can now be removed. This unit should not be further disassembled; if its diaphragm seal is removed from force bar, leaks are likely to occur after reassembly. If either force bar or its seal requires replacing, they both should be replaced as a unit.

3. Reverse this procedure to reassemble. Replace O-ring at force bar seal. Before inserting force bar into top-works, lubricate O-ring and top of force bar with Vaseline or similar lubricant. Carefully ease force bar into O-ring recess to avoid damaging O-ring.
4. When reassembled, loosen the four cap screws ⑧ and ⑫ and two force bar screws ③. Apply 10 kgf/cm$^2$ or bar, 1 MPa, or 150 psi to both sides of transmitter.
   Tap body lightly and tighten all screws.
5. Calibrate transmitter (Refer to section 5.10.7).

### 5.10.7 Static Alignment

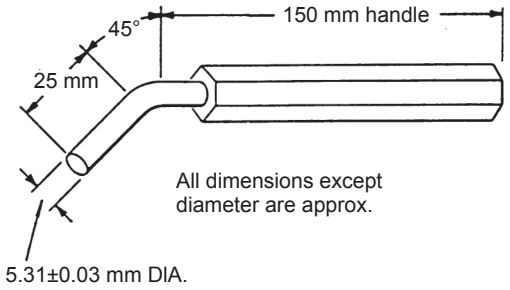
This adjustment is required if front flexure or force bar is replaced.

1. Connect transmitter to an input air supply regulated at a fixed value 1.4 kgf/cm$^2$ or bar, 140 kPa, or 20 psi.
2. Check with a 1/4" hex-key wrench through bottom plug hole that capsule flexure locknut is tightly fastened to force bar. Replace bottom plug.
3. Rotate range wheel ⑱ to approximate operating position. Tighten locknut ⑰.
4. Vent both sides of transmitter and adjust zero screw ⑬ so that output is 0.2 kgf/cm$^2$ or bar, 20 kPa, or 3 psi.
5. Apply gradually and simultaneously to both sides of transmitter (output must not go off scale), a pressure equal to highest static pressure anticipated during normal operation.
   Note: Do not exceed static pressure limits.
6. After 2 minutes observe transmitter output. If output has not changed, static alignment is correct. If output change is more than desired, slowly vent pressure and make static alignment as follows.
   Loosen the two plate screws ㉑ and adjust static alignment wheel ⑲ to bring output back to 0.2 kgf/cm$^2$ or bar, 20 kPa, or 3 psi. Turn wheel clockwise to lower output. Tighten plate screws ㉑ after each adjustment of alignment wheel.
7. Remove bottom plug and loosen, then carefully retighten capsule flexure locknut.
8. Repeat Steps 6 and 7 until output change is satisfactory. Calibrate transmitter (Refer to section 5.1).

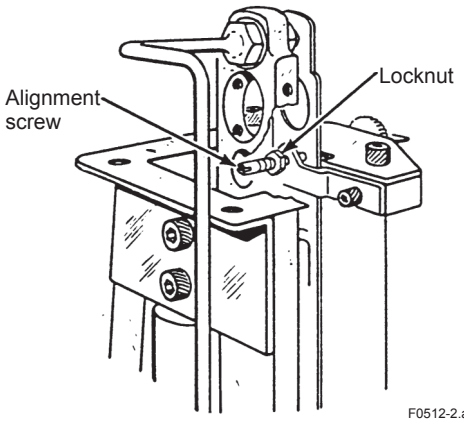
### 5.10.8 Flapper Alignment

The flapper is aligned at the factory; a realignment is required only if the force balance unit has been disassembled. This alignment procedure requires a spacing tool (see illustration), a 1/8" open-end wrench, and a small screwdriver.

Caution: Use care in turning thin flexure alignment screw to prevent shearing.




F0512-1.ai



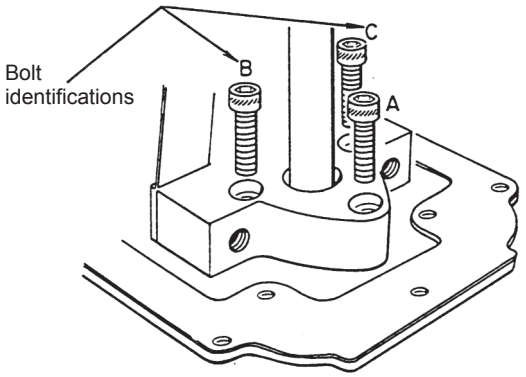

F0512-2.ai

1. If transmitter has optional zero elevation or zero suppression kit, remove this assembly.
2. Connect an air supply regulated at a fixed pressure 1.4 kgf/cm$^2$ or bar, 140 kPa, or 20 psi to input, and a 0 to 1.5 kgf/cm$^2$ or bar, 0 to 150 kPa, or 0 to 22 psi test gauge or manometer to output.
3. Loosen flexure locknut at bottom of force bar (Refer to section 5.6).
4. Turn range wheel to top of range bar.
5. Using spacing tool as feeler gauge, insert tool at lower end of range bar between threaded surface and machined casting surface. Adjust zero screw to get correct spacing for tool.
6. Loosen flapper alignment screw locknut and adjust screw so that output is 0.2 kgf/cm$^2$ or bar, 20 kPa, or 3 psi.

7. Repeat Step 5. If output is not between 0.23 and 0.33 kgf/cm$^2$ or bar, 23 and 33 kPa, or 3.4 and 4.8 psi, repeat Steps 5 and 6 until output is within these limits.
8. Retighten flapper alignment screw locknut. Reinstall optional zero elevation or zero suppression kit. Tighten flexure locknut and check calibration. (Refer to section 5.1.5).

### 5.10.9 Bolt Tightening Procedure - Force Balance Unit

When reinstalling the 3 socket-head bolts that hold the force balance unit to the transmitter body, follow the bolt tightening procedure shown below.

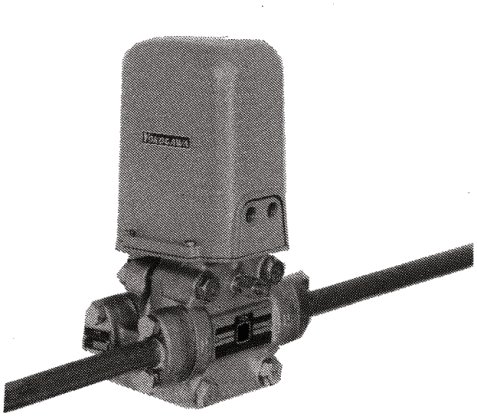



F0513.ai

| Step No. | Bolt | Torque (kgf·cm/N·m) | | | |
|---|---|---|---|---|---|
| | | Models Y/13A & Y/15A | | Model Y/13HA | |
| 1 | A | 6 | 0.6 | 11 | 1.1 |
| 2 | B | 6 | 0.6 | 11 | 1.1 |
| 3 | C | 6 | 0.6 | 11 | 1.1 |
| 4 | B | 35 | 3.5 | 34 | 3.4 |
| 5 | C | 35 | 3.5 | 46 | 4.6 |
| 6 | A | 23 | 2.3 | 46 | 4.6 |
| 7 | B | 52 | 5.2 | 74 | 7.4 |
| 8 | C | 52 | 5.2 | 74 | 7.4 |
| 9 | A | 35 | 3.5 | 91 | 9.1 |
| 10 | B | 75 | 7.5 | 103 | 10.3 |
| 11 | C | 75 | 7.5 | 103 | 10.3 |
| 12 | A (B) | 58 | 5.8 | 137 | 13.7 |
| 13 | C | | | 137 | 13.7 |
| 14 | A | | | 126 | 12.6 |

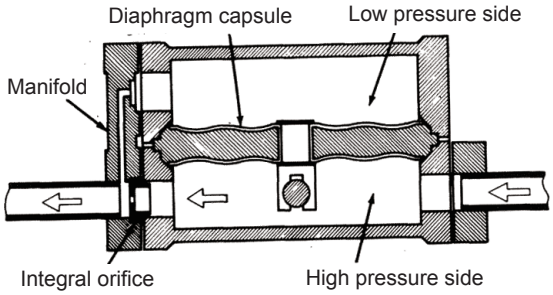
(B); available for Model Y/13HA

# Appendix 1. Integral Flow Orifice



Pneumatic transmitter

F005.ai




F006.ai

**Figure A1. Sectional View of Bottom Works**

## A1.1 General

Integral orifice manifold assemblies are designed to be fitted to pneumatic transmitters and measure very low flow rates: ranges of 1.0 to 1920 litre/h (equivalent water flow at 4°C, 1 atm.) and 0.03 to 55 $Nm^3/h$ (equivalent air flow at STP 0°C, 1 atm.).
The integral orifice is mounted on the bottom work (pressure chamber) using integral orifice assemblies, and so, the orifice can be replaced without disassembling the bottom work.
The integral orifice equipped transmitters do not require pressure taps like ordinary orifice flowmeters and are mounted directly in process pipes. Fluids flow through the high pressure chamber of the transmitters and the integral orifice as shown in Figure A4.
The Integral Orifice Manifold Assembly can be used with the following transmitters.

| Pneumatic model | Normalized equivalent flow | | Span Limits (ΔP) | | | | Max. Working Pressure | | |
|---|---|---|---|---|---|---|---|---|---|
| | water | air | $mmH_2O$ | kPa | mbar | $inH_2O$ | $kgf/cm^2$ or bar | MPa | psi |
| Y/15A | 1 to 330 litre/h | 0.03 to 9 $Nm^3$ /h | 125 and 635 | 1.25 and 6.2 | 12.5 and 62 | 5 and 25 | 35 | 3.5 | 500 |
| Y/13A | 2 to1920 litre/h | 0.05 to 55 $Nm^3/h$ | 500 and 5200 * 5000 and 21600 | 5 and 51 * 50 and 210 | 50 and 510 * 500 and 2100 | 20 and 205 * 200 and 850 | 100 | 10 | 1500 |
| Y/13HA | | | | | | | 420 | 41 | 6000 |

* Specified either range at order time

## A1.2 Principles of Operation

When fluid passes through an integral orifice, a pressure difference will occur between upstream and downstream sides of the orifice. This differential pressure is proportional to the square of the flow rate and moves the transmitter capsule to operate transmitters.

## A1.3 Installation

The Model Y15A transmitter must be mounted so that the diaphragm capsule is vertical.
Other models can be mounted in any position.
For other mounting details, refer to the transmitter installation instructions.

## A1.4 Calibration

Yokogawa determines differential range of the transmitter from the fluid conditions provided by the customer, calculating equivalent flow rates and using nomographs. The instrument is calibrated according to the calculation and the nomograph so that its tolerance is ±5% of span. However, if more accurate measurement is required, recalibrate the instrument in-site with known fluid rates.
For calibration, the instrument should be checked at least at 0% and 70% of the rated flow. For calibration details, refer to the transmitter calibration procedure in the relevant transmitter Instruction Manual.

## A1.5 Orifice Selection Nomograph

Figure A5 is a nomograph (based on metric (SI) units) and determination of defferential pressure for a given flow rate. To use the nomograph all fluid rates must be converted to water or air equivalents at standard temperature and pressure. Equations for approximate conversions are as follows:

(1) Equivalent Air Flow

$$= Q \sqrt{\frac{T}{273.15} \times G \times \frac{1.0332}{P}} \quad \ldots\ldots (1A)$$

Where Q = process gas flow rate at 0°C and atmospheric pressure – the flow unit is normal (standard) cubic meters per hour ($Nm^3/h$)
T = absolute temperature of process gas, K = °C + 273.15
G = ratio of process gas density to the density of air at the same conditions.
P = absolute pressure of the process gas – the pressure unit is $kgf/cm^2$ abs.

(2) Equivalent Water Flow

$$= V \times G_B \sqrt{\frac{1}{G_F}} \quad \ldots\ldots\ldots\ldots\ldots (2A)$$

Where V = process liquid flow rate at base temperature (4°C) – the flow unit is liters per hour (litre/h)
$G_B$ = process liquid specific gravity at base temperature
$G_F$ = process liquid specific gravity at flowing temperature

NOTE: The above equations are approximate. Viscosity and Reynolds Number corrections are disregarded. Precise calculations must include these factors.

## A1.6 How to Use Nomograph

In Figure A5 enter the calculated flow rate (equivalent air or water flow) on the EQUIVALENT FLOW SCALE and select one of the six orifice sizes. Extend a line from the center of orifice mark through the calculated flow rate value to the differential pressure scale.
Figure A5 shows orifice selection and determination of differential range using a 200 litre/h flow. If a 4.039 mm bore orifice is selected, (dotted line (b)) differential range obtained is 1.58 $mH_2O$ – if a 2.527 mm bore orifice is selected, (dotted line (a)) differential range obtained is 9.2 $mH_2O$.
The dotted lines (c) and (d) in Figure A5 indicate maximum or minimum flow rate of integral orifices. For flow rate higher than the maximum line (c), an ordinary orifice must be used. For flow rate lower than the minimum line (d), a special integral orifice must be used – for details, contact Yokogawa.

## A1.7 Operating Cautions

To maximize instrument life and maintain accuracy, the fluid to be measured must not contain suspended solids. The fluid temperature limit is 120°C.

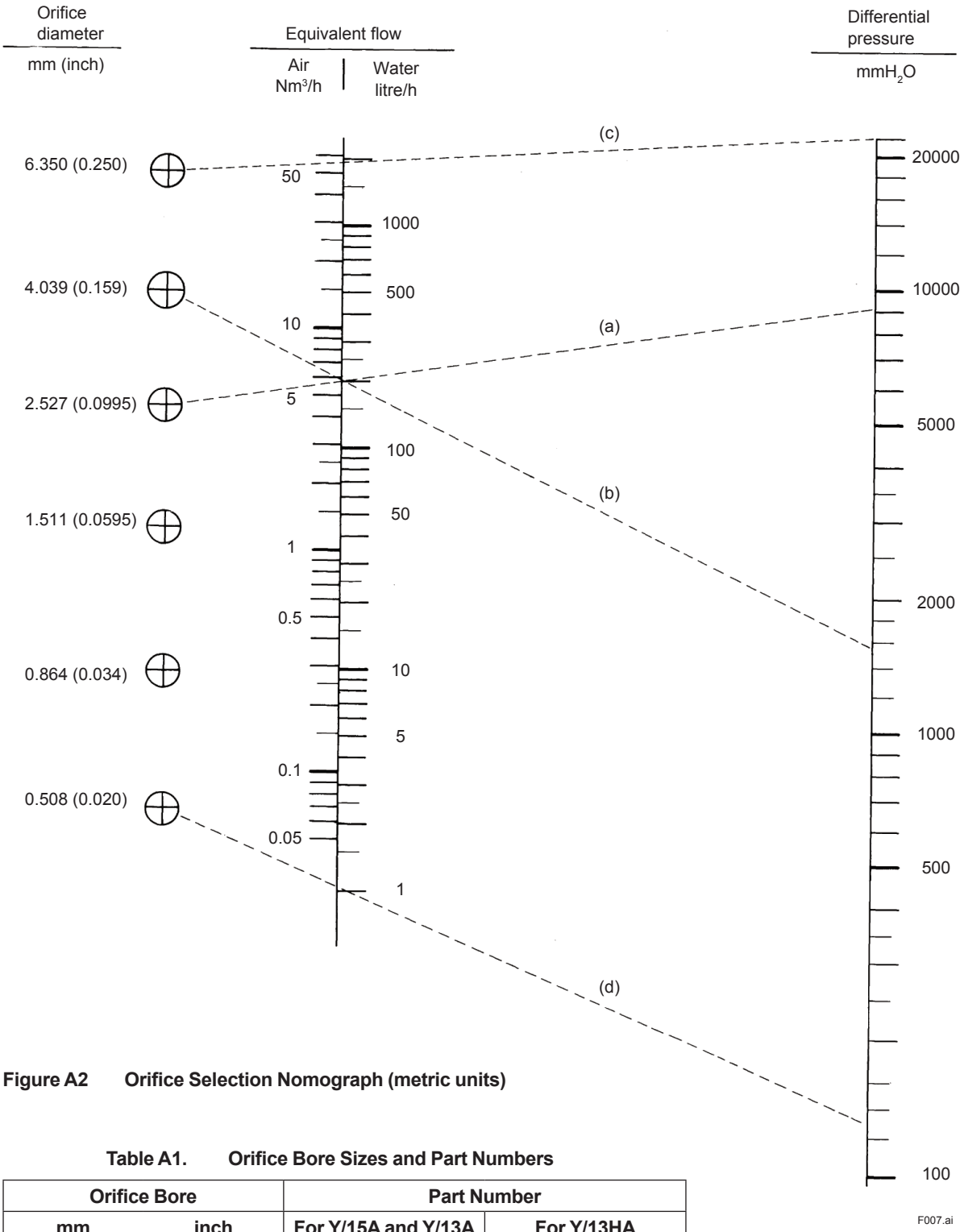


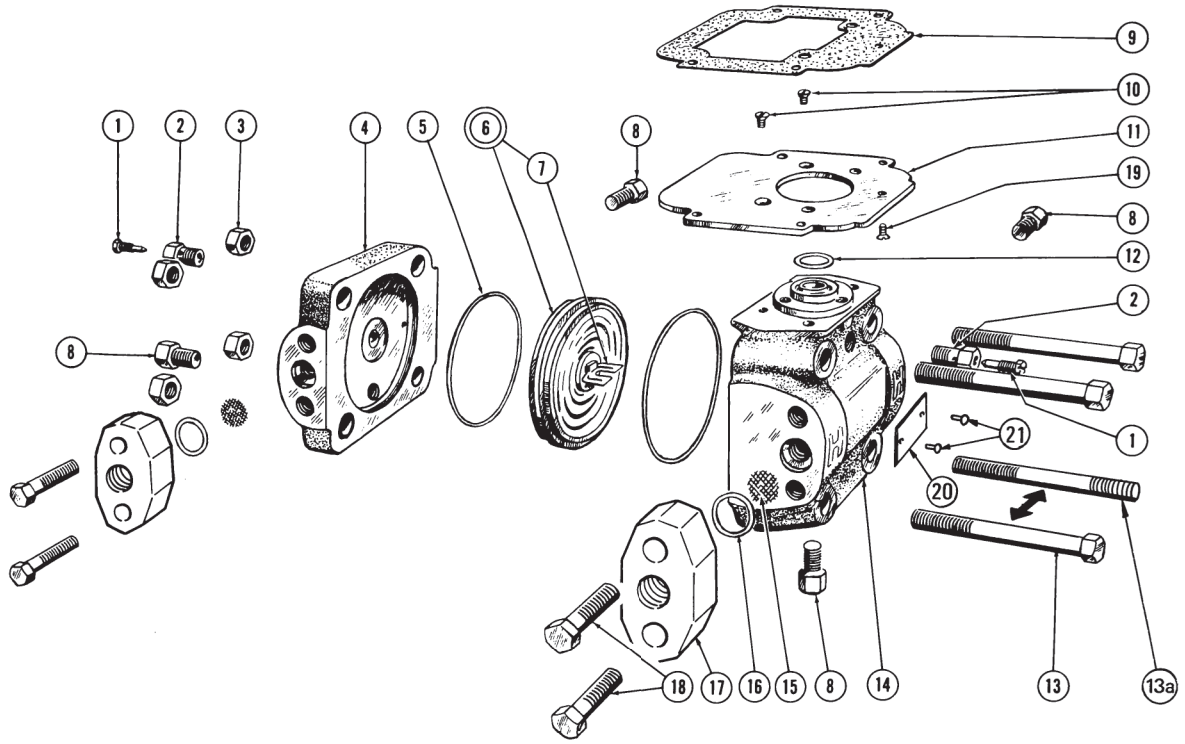

**Figure A2 Orifice Selection Nomograph (metric units)**

**Table A1. Orifice Bore Sizes and Part Numbers**

| Orifice Bore | | Part Number | |
|---|---|---|---|
| **mm** | **inch** | **For Y/15A and Y/13A** | **For Y/13HA** |
| 0.508 | 0.020 | D0117BW | 0051066 |
| 0.864 | 0.034 | D0117BX | 0051067 |
| 1.511 | 0.0595 | D0117BY | 0051068 |
| 2.527 | 0.0995 | D0117BZ | 0051069 |
| 4.039 | 0.159 | D0117CA | 0051070 |
| 6.350 | 0.250 | D0117CB | 0051071 |
| Set of six orifices (as described above) | | D0117BT | F9101ZG |

# Customer Maintenance Parts List

## Model Y/13A
## PNEUMATIC DIFFERENTIAL PRESSURE TRANSMITTER (Style C)




F0601.ai

| Item | Part No. | Qty | Description |
|---|---|---|---|
| 1 | D0114PB | 2 | Vent Screw<br>SUS316 Stainless Steel (standard) |
| 2 | Below | 2 | Vent Plug<br>(SUS316 Stainless Steel) |
| | D0114PA | | ANSI connection |
| | F9101AB | | JIS connection |
| 3 | Below | | Nut |
| | X0104AB | 4 | SCM435 (standard) |
| | X0118AP | 8 | SUS630 Stainless Steel (/SSB) |
| 4 | See Table 1 | 1 | Cover (see page 4) |
| 5 | Below | 2 | *Gasket |
| | F9202XQ | | Teflon Coating SUS316 L s.s. (standard) |
| | D0114TP | | Teflon (PTFE) (used for special material diaphragm assembly) |
| | F9101ZK | | Teflon Coating SUS316L s.s. (for /OSW or /OSFC) |
| 6 | See Table 2 | 1 | Diaphragm Assemlby (see page 4) |
| 7 | See Table 2 | 1 | Flexure Assembly (see page 4) |
| 8 | See Table 1 | 4 | Plug (see page 4) |
| 9 | F9100AT | 1 | Gasket |
| 10 | 0030597 | 2 | 10-32 × 3/8 F.H.Screw |
| 11 | U0102MK | 1 | Plate |

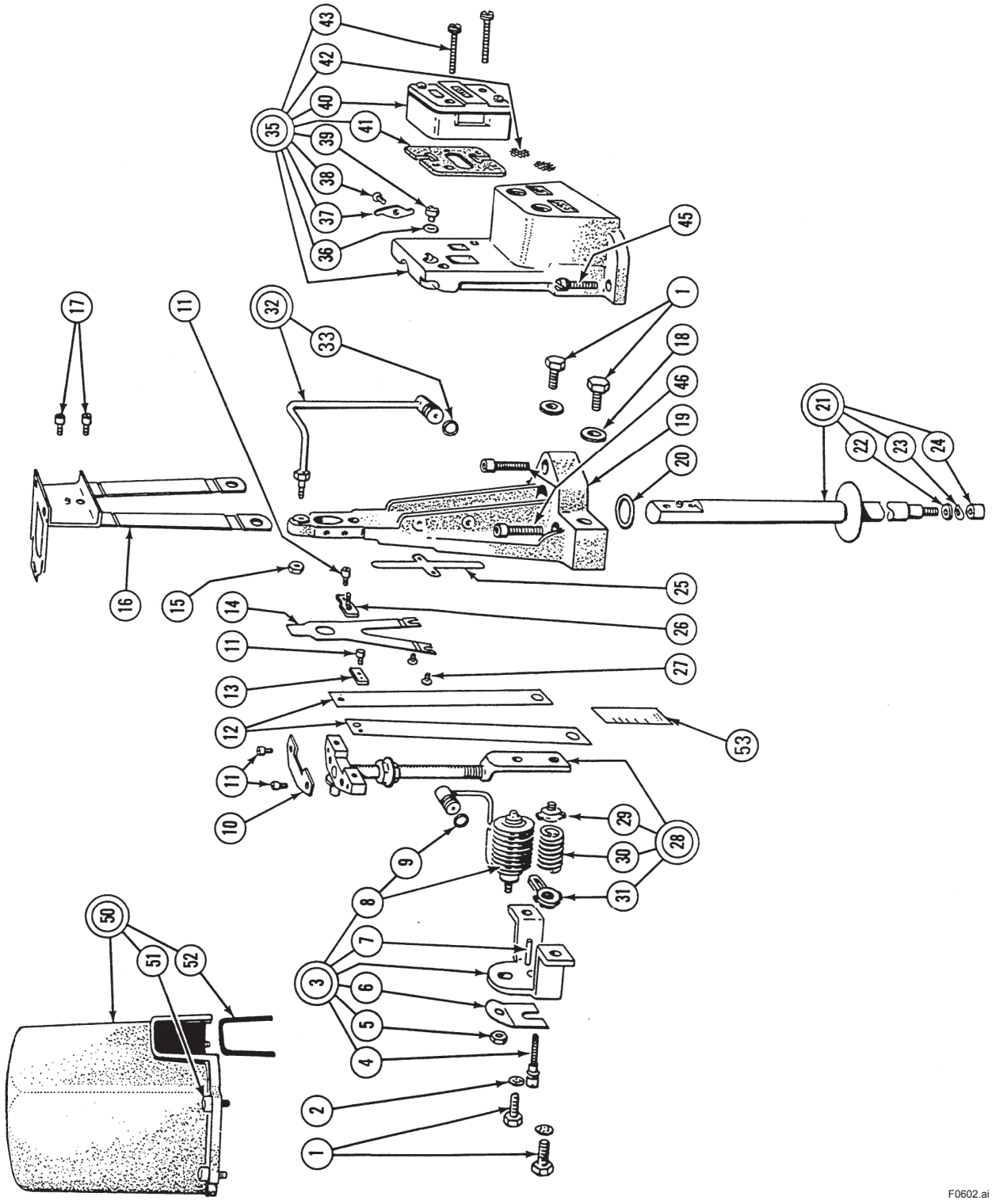
| Item | Part No. | Qty | Description |
|---|---|---|---|
| 12 | Below | 1 | *O-Ring |
| | U0102MY | | Silicone Elastomer (standard) |
| | 0051652 | | Glass Fiber Filled Teflon (for /DG5 or /GFT) |
| | F9101ZJ | | Glass Fiber Filled Teflon (for /OSW or /OSFC) |
| | F9202LZ | | Neoprene (for ammonia service) |
| 13 | X0100BM | 4 | Bolt<br>SCM435 (standard) |
| 13a | F9101YA | 4 | Bolt<br>SUS630 Stainless Steel (/SSB) |
| 14 | See Table 1 | 1 | Body (see page 4) |
| 15 | D0114FL | 2 | *Screen<br>SUS316 Stainless Steel (standard) |
| 16 | Below | 2 | *Gasket |
| | D0114RB | | Teflon (PTFE) (standard) |
| | D0120AC | | Chemloy (for /DG5) |
| | U0102XC | | Teflon (for /OSW or /OSFC) |
| 17 | See Table 1 | 2 | Connector (see page 4) |
| 18 | Below | 4 | Cap Screw |
| | X0100MN | | SCM435 (standard) |
| | F9273DZ | | SUS630 Stainless Steel (/SSB) |
| 19 | X0100BX-J | 1 | Screw |
| 20 | — | 1 | Data Plate |
| 21 | 0046879 | 2 | Salf-tapping Screw |

*Denotes parts more frequently replaced.

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**CMPL 02C01C02-01EN**
12th Edition: Feb. 2025 (KP)


F0602.ai

## Force Balance Unit (items 1 through 33)

Part No.N0999SH: for Y/13A-M

Part No.N0999SM: for Y/13A-H

Part No.N0999SE: Low Spans

(for Y/13A- ☐ /LD)

| Item | Part No. | Qty | Description |
|---|---|---|---|
| 1 | U0102LN | 4 | 1/4-28 × 1/2 Hex H.Screw |
| 2 | 0048219 | 2 | Lockwasher |
| 3 | U0119TA | 1 | Bracket Assembly (N0999SH, N0999SM) |
| | U0119TF | 1 | Bracket Assembly (N0999SE) |
| 4 | U0102FY | 1 | Screw |
| 5 | 0017611 | 1 | Nut |
| 6 | U0102FZ | 1 | Spring |
| 7 | U0102NA | 1 | Pin |
| 8 | U0119TC | 1 | Bellows Assembly (N0999SH, N0999SM) |
| | U0119TG | 1 | Bellows Assembly (N0999SE) |
| 9 | D0123MZ | 1 | *O-Ring |
| 10 | U0102KP | 1 | Plate |
| 11 | X0100MK | 4 | 6-32 × 3/16 Socket H.Cap Screw |
| 12 | U0102KL | 2 | Flexure |
| 13 | U0102LP | 1 | Plate |
| 14 | N0999MH | 1 | Flapper |
| 15 | X0104EB | 1 | Nut |
| 16 | N0999FM | 1 | Flexure Assembly |
| 17 | X0100ML | 2 | 8-32 × 1/4 Socket H.Cap Screw |
| 18 | X0166MX | 2 | Washer |
| 19 | N0999ML | 1 | Base |
| 20 | N0143XN | 1 | O-Ring |
| 21 | N0143NL | 1 | Force Bar Assembly (SUS316 s.s.) |
| 22 | N0143SB | 1 | Washer (SUS316 s.s.) |
| 23 | U0102MX | 1 | Dished Washer (inconel) |
| 24 | U0102LE | 1 | Nut (SUS316 s.s.) |
| 25 | N0142NY | 1 | Spacer |
| 26 | U0102TE | 1 | Bracket Assembly |
| 27 | 0023442 | 2 | 3-48 × 3/16 Fil.H.Screw |
| 28 | N0999MP | 1 | Range Bar Assembly (N0999SE) |
| | N0999QA | 1 | Range Bar Assembly (N0999SH, N0999SM) |
| 29 | U0102KR | 1 | Spring Holder |
| 30 | N0999MG | 1 | Spring (N0999QA) |
| | N0999MC | 1 | Spring (N0999MP) |
| 31 | U0102KC | 1 | Spring Holder |
| 32 | U0119TB | 1 | *Nozzle Assembly (N0999SH, N0999SE) |
| | U0119TD | 1 | *Nozzle Assembly (N0999SM) |
| 33 | D0123MZ | 1 | *O-Ring |

## Other Parts (items 35 through 53)

| Item | Part No. | Qty | Description |
|---|---|---|---|
| 35 | D0124JD | 1 | Relay Mounting Assembly (ANSI connection) |
| | F9101DF | 1 | Relay Mounting Assembly (JIS connection) |
| 36 | A037744 | 1 | *O-Ring |
| 37 | U0102MF | 1 | Clamp |
| 38 | X0100AA | 1 | 6-32 × 7/32 Fil.H.Screw |
| 39 | D0124JG | 1 | *Restrictor |
| 40 | F9138YA | 1 | *Pneumatic Amplifier, 80A |
| 41 | C0100EM | 1 | *Gasket |
| 42 | U0103FP | 2 | *Screen |
| 43 | X0116CS | 2 | 10-32 × 1 Pan H.Screw |
| 45 | 0006535 | 2 | 10-32 × 3/4 Fil.H.Screw |
| 46 | X0100MM | 3 | 1/4-28 × 3/4 Cap Screw |
| 50 | U0102MM | 1 | Cover Assembly |
| 51 | X0100RP | 4 | 10-32 × 9/16 Hex H.Screw |
| 52 | U0102MS | 1 | Gasket |
| 53 | Below | 1 | Scale |
| | F9103AE | | for M Range (kPa) (standard) |
| | F9103AF | | for H Range (kPa) (standard) |
| | D0117BL | | for M Range (psi) |
| | D0117FC | | for H Range (psi) |
| | D0117BL-J | | for M Range (kgf/cm$^2$) |
| | D0117FC-J | | for H Range (kgf/cm$^2$) |
| - | N0138GA | 1 | Dashpot Assembly (not shown) (for /OSFC) |

*Denotes parts more frequently replaced.

### Table 1. Cover, Plug, Body and Connector Part Number

| Item No. | Description | SUS316 Stainless Steel | |
|---|---|---|---|
| | | ANSI | JIS |
| 4 | Cover | D0114RY | F9101AJ |
| | Cover (with /TP-S) | W9150WQ | W9150WN |
| 8 | Plug | D0114RZ | F9200CS |
| 14 | Body | D0114RX | F9101AF |
| 17 | Connector,1/2 | F9277YZ* | F9277YY* |
| | Connector,1/4 | F9277YX* | F9277YW* |

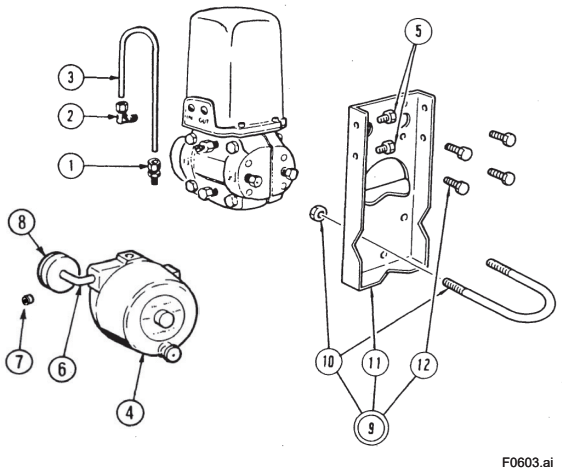
*:SCS14A

### Table 2. Diaphragm Assembly Part Number

| Capsule | Material | Diaphragm Assembly (item 6) | Flexure Assembly (item 7) |
|---|---|---|---|
| Medium Range Capsule | SUS316L Stainless Steel (standard) | N0142NU | F9200LL |
| | SUS316L s.s. (for /OSFC) | N0148UB | F9200LL |
| | SUS316L s.s. (for /HVC) | F9200SR | F9200LL |
| High Range Capsule | SUS316L Stainless Steel (standard) | F9200MM | Not Removable |
| | SUS316L s.s. (for /OSFC) | A0129CA | |

## Integral Air Filter Set and Mounting Set

| Item | Part No. | Qty | Description |
|---|---|---|---|
| 1 | 0050386 | 1 | Connector Assembly (JIS connection) (prior to Aug.1987) |
| | 0050325 | 1 | Connector Assembly (ANSI connection) (prior to Aug.1987) |
| | G9611AD | 1 | Connector Assembly (JIS connection) (since Aug.1987) |
| | G9611AW | 1 | Connector Assembly (ANSI connection) (since Aug.1987) |
| 2 | 0050392 | 1 | Elbow Assembly (JIS connection) (prior to Aug.1987) |
| | 0050332 | 1 | Elbow Assembly (ANSI connection) (prior to Aug.1987) |
| | G9611CD | 1 | Elbow Assembly (JIS connection) (since Aug.1987) |
| | G9611CN | 1 | Elbow Assembly (ANSI connection) (since Aug.1987) |
| 3 | 0051229 | 1 | Tube (prior to Aug.1987) |
| | F9101EK | 1 | Tube (since Aug.1987) |
| 4 | F9140DA-C | 1 | Filter-Regulator (JIS connection) |
| | F9140DB-C | 1 | Filter-Regulator (ANSI connection) |
| 5 | F9147MQ | 2 | 1/4-20 × 1/2 H.H.Screw |
| 6 | Below | 1 | Elbow |
| | G9612DB | | For JIS connection } Prior to |
| | G9612DD | | For ANSI connection } Apr.1998 |
| | F9140FH | | For JIS connection } Since |
| | F9140FJ | | For ANSI connection } Apr.1998 |
| 7 | F9135LC | 1 | Plug (JIS connection) |
| | X0100WP | 1 | Plug (ANSI connection) |
| 8 | See Table 3 | 1 | Pressure Gauge |
| 9 | D0117XL | 1 | Mounting Set |
| 10 | D0117XL-A | 1 | U-Bolt/Nut Assembly |
| 11 | F9270AX | 1 | Bracket |
| 12 | Below | 4 | 7/16-20 × 5/8 Cap Screw |
| | F9270AY | | S10C,S12C or S15C Carbon Steel (standard) |
| | F9273CZ | | SUS304 Stainless Steel (/SSB) |



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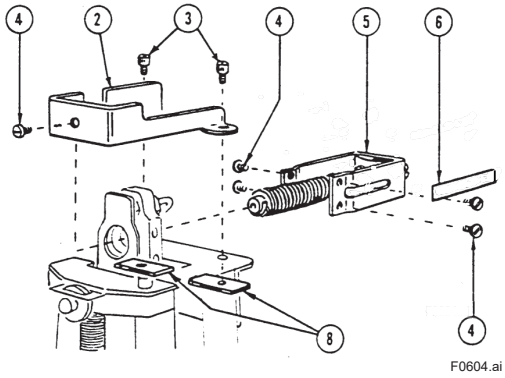
### Table 3. Pressure gauge

| Suffix Code | Prior to Apr.1998 | Since Apr.1998 |
|---|---|---|
| /G(N)AS-FM | G9615AA | G9615AT |
| /G(N)AS-FE | G9615AE | G9615EK |
| /G(N)AS-FP(0 to 200 kPa) | G9615AH | G9615EA |
| /G(N)AS-FB(0 to 2 bar) | G9615AM | G9615EC |

Note) In order for gauge shipped befor April, 1998 to be replaced, please use gauge and elbow, which part numbers are effective April,1998.

## Zero Elevation Kit

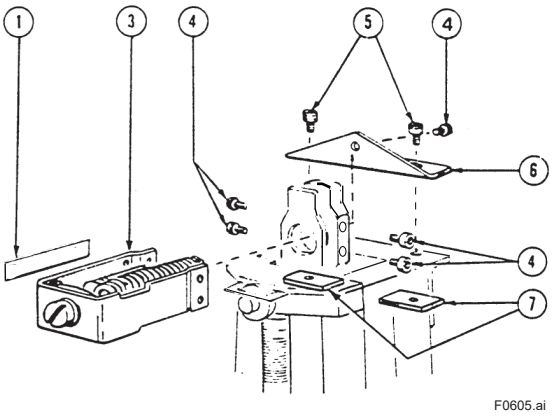
## (Suffix Code : L)




| Item | Part No. | Qty | Description |
|---|---|---|---|
| — | U0122BS | 1 | Zero Elevation Kit (standard) |
| 2 | U0122BT | 1 | Bracket |
| 3 | A0100YC | 2 | 6-32 × 1/4 Socket H.Screw |
| 4 | F9147CV | 5 | 5-40 × 3/16 Screw |
| 5 | U0122BB | 1 | Spring Assembly |
| 6 | U0102TF | 1 | Scale (MIN-MAX) |
| 8 | N0138BS | 2 | Plate |

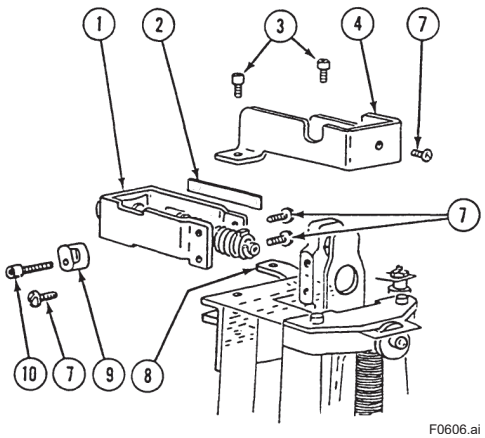
## Zero Suppression Kit

## (Suffix Code : R)



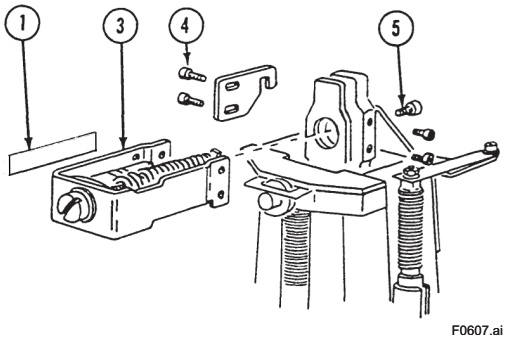

| Item | Part No. | Qty | Description |
|---|---|---|---|
| — | U0122BA | 1 | Zero Suppression Kit (standard) |
| 1 | U0102TF | 1 | Scale (MIN-MAX) |
| 3 | U0122BB | 1 | Spring Assembly |
| 4 | F9147CV | 5 | 5-40 × 3/16 Screw |
| 5 | A0100YC | 2 | 6-32 × 1/4 Socket H.Screw |
| 6 | U0102RW | 1 | Bracket |
| 7 | N0138BS | 2 | Plate |

(OSFC)




| Item | Part No. | Qty | Description |
|---|---|---|---|
| — | U0122BZ | 1 | Zero Elevation Kit (for /OSFC) |
| 1 | U0122BB | 1 | Spring Assembly |
| 2 | U0102TF | 1 | Scale (MIN-MAX) |
| 3 | A0100YC | 2 | 6-32 × 1/4 Socket H.Screw |
| 4 | U0122BT | 1 | Bracket |
| 7 | F9147CV | 4 | 5-40 × 3/16 Screw |
| 8 | F9100EW | 1 | Bracket |
| 9 | U0122BX | 1 | Stop |
| 10 | U0122BY | 1 | 5-40 × 1/2 Socket H.Screw |

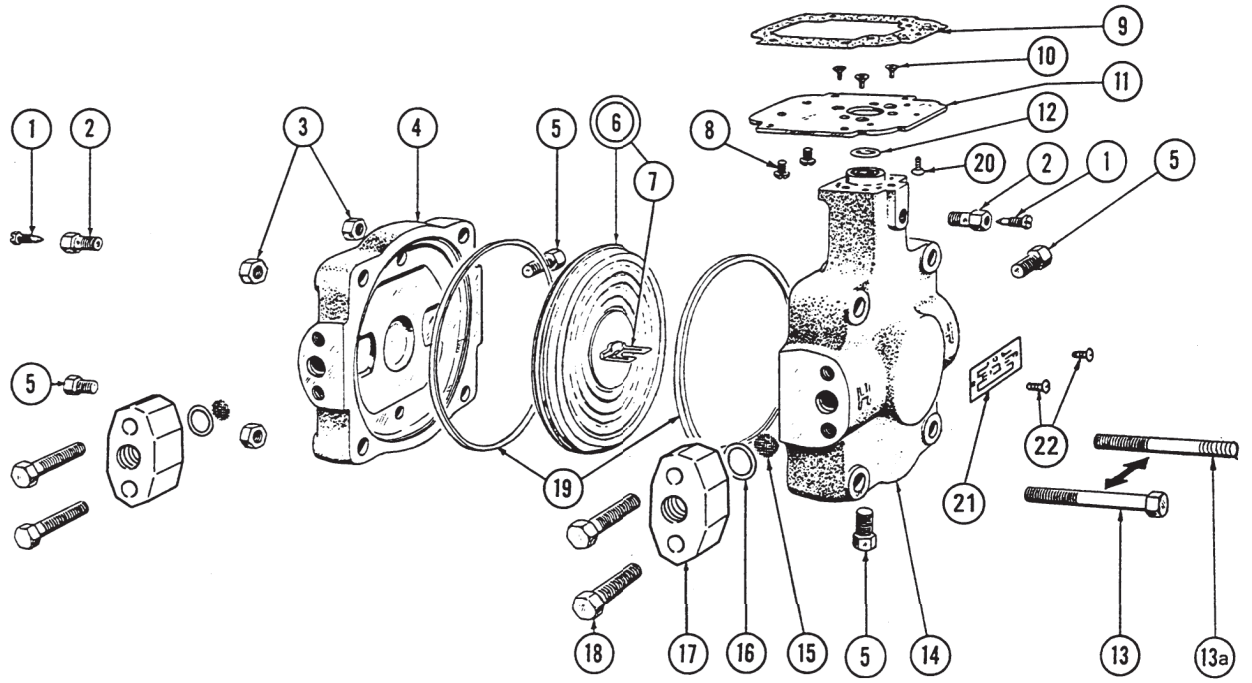
(OSFC)




| Item | Part No. | Qty | Description |
|---|---|---|---|
| — | U0122BN | 1 | Zero Suppression Kit (for /OSFC) |
| 1 | U0102TF | 1 | Scale (MIN-MAX) |
| 3 | U0122BB | 1 | Spring Assembly |
| 4 | X0116ET | 2 | 5-40 × 1/4 Screw |
| 5 | F9147CV | 3 | 5-40 × 3/16 Screw |

# Customer Maintenance Parts List

## Model Y/15A
## PNEUMATIC DIFFERENTIAL PRESSURE TRANSMITTER (Style C)




F0701.ai

| Item | Part No. | Qty | Description |
|---|---|---|---|
| 1 | D0114PB | 2 | Vent Screw (SUS 316 Stainless Steel) |
| 2 | Below | 2 | Vent Plug (SUS 316 Stainless Steel) |
| | F9101AB | | JIS connection |
| | D0114PA | | ANSI connection |
| 3 | Below | | Nut |
| | X0104AB | 4 | SCM435 (standard) |
| | X0118AP | 8 | SUS630 Stainless Steel (/SSB) |
| 4 | See Table 1 | 1 | Cover (see page 5) |
| 5 | See Table 1 | 4 | Plug (see page 5) |
| 6 | Below | 1 | Diaphragm Assembly (SUS 316L s.s.) |
| | N0150TN | | Silicone Filled (standard) |
| | N0150TP | | Fluorolube Filled (for /OSFC) |
| | F9200SQ | | High Viscosity Fill (/HVC) |
| 7 | F9200LL | 1 | Flexure Assembly |
| 8 | X0100SB | 2 | 1/4-28 x 3/8 R.H.Screw |
| 9 | F9100AT | 1 | Gasket |
| 10 | 0012691 | 3 | 8-32 x 3/8 F.H.Screw |
| 11 | U0102RC | 1 | Plate |
| 12 | Below | 1 | *O-Ring |
| | U0102MY | | Silicone Elastomer (standard) |
| | 0051652 | | Glass Fiber Filled Teflon (for /DG5 or /GFT) |
| | F9101ZJ | | Glass Fiber Filled Teflon (for /OSW or /OSFC) |
| | F9202LZ | | Neoprene (for ammonia service) |

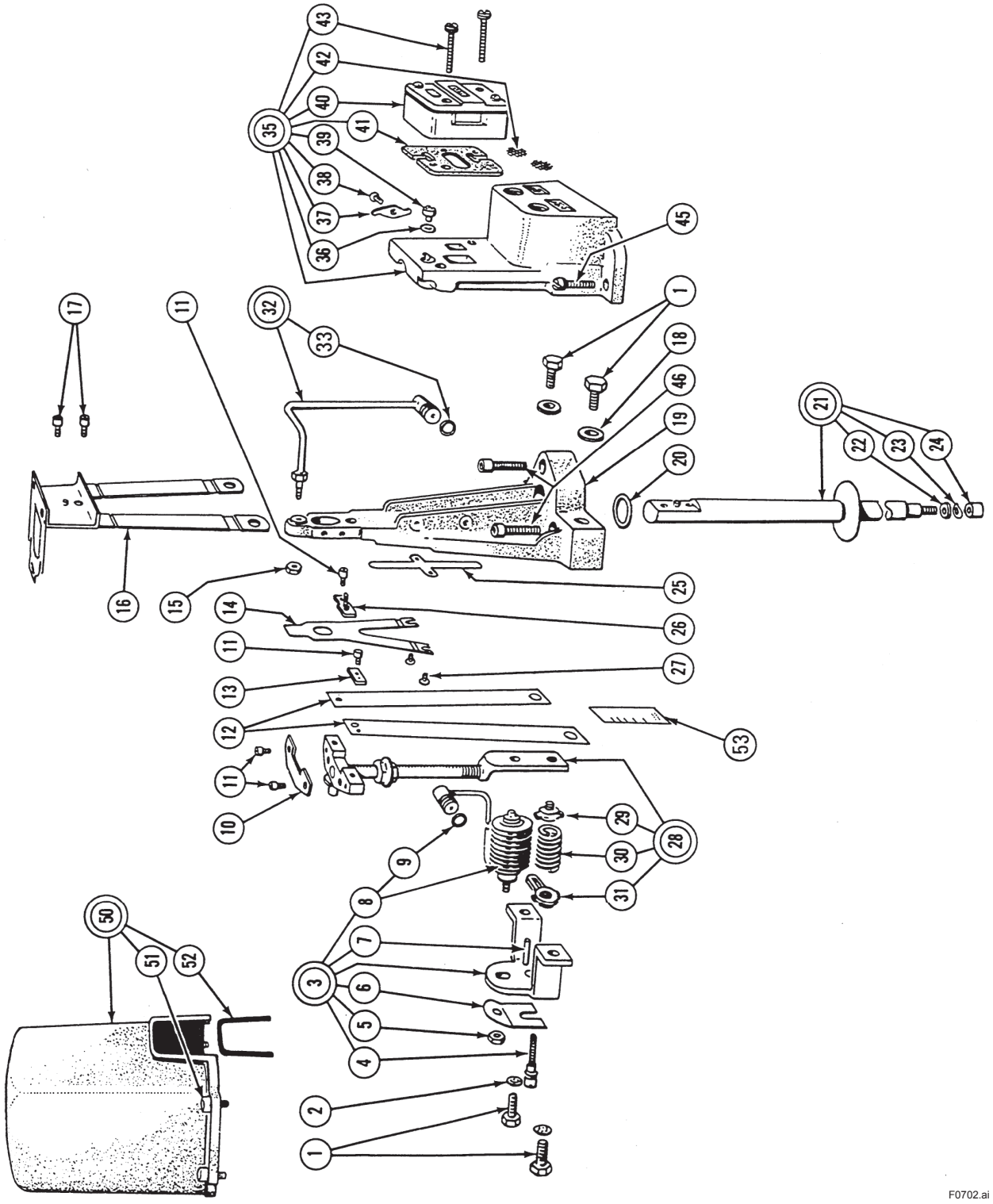
| Item | Part No. | Qty | Description |
|---|---|---|---|
| 13 | X0100BM | 4 | Bolt (SCM435) (standard) |
| 13a | F9101YA | 4 | Bolt (SUS630 Stainless Steel) (/SSB) |
| 14 | See Table 1 | 1 | Body (see page 5) |
| 15 | D0114FL | 2 | *Screen (SUS 316 Stainless Steel) |
| 16 | Below | 2 | *Gasket |
| | D0114RB | | Teflon (PTFE) (standard) |
| | D0120AC | | Chemloy (for /DG5) |
| | U0102XC | | Teflon (for /OSW or /OSFC) |
| 17 | See Table 1 | 2 | Connector (see page 5) |
| 18 | Below | 4 | Cap Screw |
| | X0100MN | | SCM435 (standard) |
| | F9273DZ | | SUS630 Stainless Steel (/SSB) |
| 19 | Below | 2 | *Gasket |
| | F9202QW | | Teflon Coating SUS 316 L s.s. (standard) |
| | F9101ZL | | Teflon Coating SUS 316 L s.s. (for /OSW or /OSFC) |
| 20 | X0100BX-J | 1 | Screw |
| 21 | — | 1 | Data Plate |
| 22 | 0046879 | 2 | Self-tapping Screw |

Note: *Denotes parts more frequently replaced.

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## Force Balance Unit (items 1 through 33)

Part No.N0999SL: Standard

Part No.N0999SG: Low Spans
(for Y/15A-□ /LD)

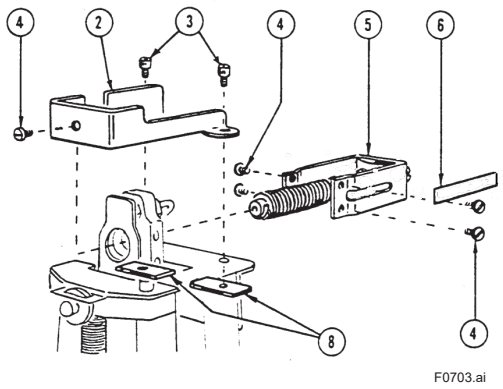
| Item | Part No. | Qty | Description |
|---|---|---|---|
| 1 | U0102LN | 4 | 1/4-28 × 1/2 Hex H.Screw |
| 2 | 0048219 | 2 | Lockwasher |
| 3 | U0119TA | 1 | Bracket Assembly (N0999SL) |
| | U0119TF | 1 | Bracket Assembly (N0999SG) |
| 4 | U0102FY | 1 | Screw |
| 5 | 0017611 | 1 | Nut |
| 6 | U0102FZ | 1 | Spring |
| 7 | U0102NA | 1 | Pin |
| 8 | U0119TC | 1 | Bellows Assembly (N0999SL) |
| | U0119TG | 1 | Bellows Assembly (N0999SG) |
| 9 | D0123MZ | 1 | *O-Ring |
| 10 | U0102KP | 1 | Plate |
| 11 | X0100MK | 4 | 6-32 × 3/16 Socket H.Cap Screw |
| 12 | U0102KL | 2 | Flexure |
| 13 | U0102LP | 1 | Plate |
| 14 | N0999MH | 1 | Flapper |
| 15 | X0104EB | 1 | Nut |
| 16 | N0999FM | 1 | Flexure Assembly |
| 17 | X0100ML | 2 | 8-32 × 1/4 Socket H.Cap Screw |
| 18 | X0166MX | 2 | Washer |
| 19 | N0999ML | 1 | Base |
| 20 | N0143XN | 1 | O-Ring |
| 21 | N0143MK | 1 | Force Bar Assembly (SUS 316 s.s.) |
| 22 | N0143SB | 1 | Washer (SUS 316 s.s.) |
| 23 | U0102MX | 1 | Dished Washer (inconel) |
| 24 | U0102LE | 1 | Nut (SUS 316 s.s.) |
| 25 | N0142NY | 1 | Spacer |
| 26 | U0102TE | 1 | Bracket Assembly |
| 27 | 0023442 | 2 | 3-48 × 3/16 Fil.H.Screw |
| 28 | N0999MP | 1 | Range Bar Assembly (N0999SG) |
| | N0999QA | 1 | Range Bar Assembly (N0999SL) |
| 29 | U0102KR | 1 | Spring Holder |
| 30 | N0999MG | 1 | Spring (N0999QA) |
| | N0999MC | 1 | Spring (N0999MP) |
| 31 | U0102KC | 1 | Spring Holder |
| 32 | U0119TB | 1 | *Nozzle Assembly |
| 33 | D0123MZ | 1 | *O-Ring |

## Other Parts (items 35 through 53)

| Item | Part No. | Qty | Description |
|---|---|---|---|
| 35 | D0124JD | 1 | Relay Mounting Assembly (ANSI connection) |
| | F9101DF | 1 | Relay Mounting Assembly (JIS connection) |
| 36 | A037744 | 1 | *O-Ring |
| 37 | U0102MF | 1 | Clamp |
| 38 | X0100AA | 1 | 6-32 × 7/32 Fil.H.Screw |
| 39 | D0124JG | 1 | *Restrictor |
| 40 | F9138YA | 1 | *Pneumatic Amplifier,80A |
| 41 | C0100EM | 1 | *Gasket |
| 42 | U0103FP | 2 | *Screen |
| 43 | X0116CS | 2 | 10-32 × 1 Pan H.Screw |
| 45 | 0006535 | 2 | 10-32 × 3/4 Fil.H.Screw |
| 46 | X0100YC | 3 | 1/4-28 × 7/8 Cap Screw |
| 50 | U0102MM | 1 | Cover Assembly |
| 51 | X0100RP | 4 | 10-32 × 9/16 Hex H.Screw |
| 52 | U0102MS | 1 | Gasket |
| 53 | Below | 1 | Scale |
| | F9103AD | | (kPa) (standard) |
| | D0117TX | | (psi) |
| | D0117TX-J | | (kgf/cm$^2$) |
| — | N0138GA | 1 | Dashpot Assembly (not shown) (for /OSFC) |

* Denotes parts more frequently replaced.

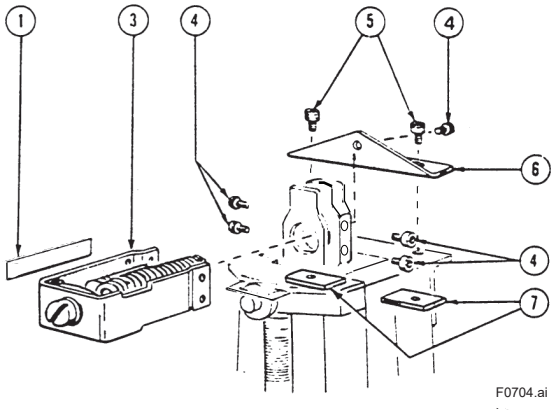
## Zero Elevation Kit
## (Suffix Code : L)



F0703.ai

| Item | Part No. | Qty | Description |
|---|---|---|---|
| — | U0122BS | 1 | Zero Elevation Kit (standard) |
| 2 | U0122BT | 1 | Bracket |
| 3 | A0100YC | 2 | 6-32 × 1/4 Socket H.Screw |
| 4 | F9147CV | 5 | 5-40 × 3/16 Screw |
| 5 | U0122BB | 1 | Spring Assembly |
| 6 | U0102TF | 1 | Scale (MIN-MAX) |
| 8 | N0138BS | 2 | Plate |

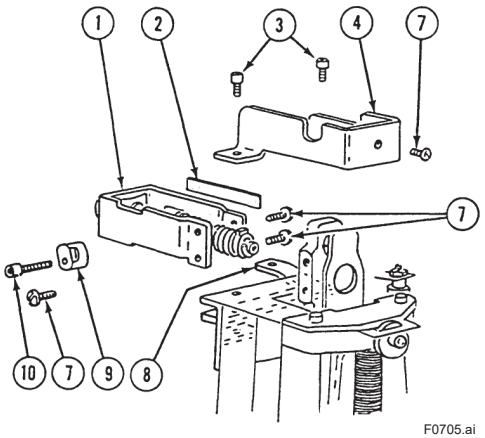
## Zero Suppression Kit
## (Suffix Code : R)



F0704.ai

| Item | Part No. | Qty | Description |
|---|---|---|---|
| — | U0122BA | 1 | Zero Suppression Kit (standard) |
| 1 | U0102TF | 1 | Scale (MIN-MAX) |
| 3 | U0122BB | 1 | Spring Assembly |
| 4 | F9147CV | 5 | 5-40 × 3/16 Screw |
| 5 | A0100YC | 2 | 6-32 × 1/4 Socket H.Screw |
| 6 | U0102RW | 1 | Bracket |
| 7 | N0138BS | 2 | Plate |

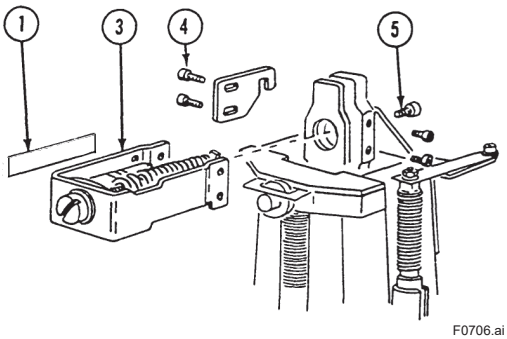
(OSFC)



F0705.ai

| Item | Part No. | Qty | Description |
|---|---|---|---|
| — | U0122BZ | 1 | Zero Elevation Kit (for /OSFC) |
| 1 | U0122BB | 1 | Spring Assembly |
| 2 | U0102TF | 1 | Scale (MIN-MAX) |
| 3 | A0100YC | 2 | 6-32 × 1/4 Socket H.Screw |
| 4 | U0122BT | 1 | Bracket |
| 7 | F9147CV | 4 | 5-40 × 3/16 Screw |
| 8 | F9100EW | 1 | Bracket |
| 9 | U0122BX | 1 | Stop |
| 10 | U0122BY | 1 | 5-40 × 1/2 Socket H.Screw |

(OSFC)

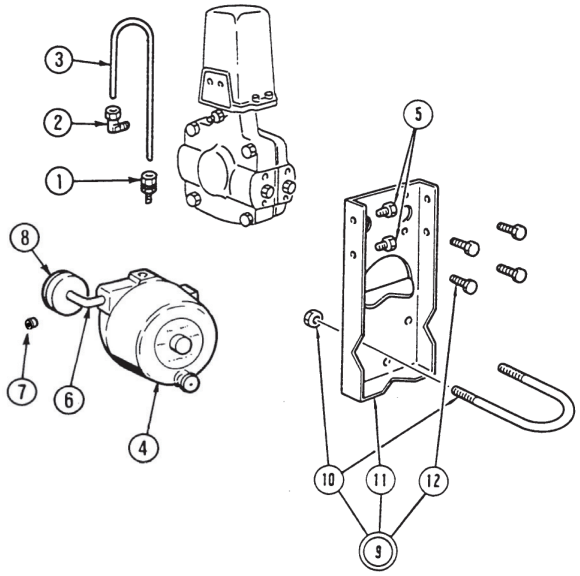


F0706.ai

| Item | Part No. | Qty | Description |
|---|---|---|---|
| — | U0122BN | 1 | Zero Suppression Kit (for /OSFC) |
| 1 | U0102TF | 1 | Scale (MIN-MAX) |
| 3 | U0122BB | 1 | Spring Assembly |
| 4 | X0116ET | 2 | 5-40 × 1/4 Screw |
| 5 | F9147CV | 3 | 5-40 × 3/16 Screw |

## Integral Air Filter Set and Mounting Set

| Item | Part No. | Qty | Description |
|---|---|---|---|
| 1 | 0050386 | 1 | Connector Assembly (JIS connection) (prior to Aug.1987) |
| | 0050325 | 1 | Connector Assembly (ANSI connection) (prior to Aug.1987) |
| | G9611AD | 1 | Connector Assembly (JIS connection) (since Aug.1987) |
| | G9611AW | 1 | Connector Assembly (ANSI connection) (since Aug.1987) |
| 2 | 0050392 | 1 | Elbow Assembly (JIS connection) (prior to Aug.1987) |
| | 0050332 | 1 | Elbow Assembly (ANSI connection) (prior to Aug.1987) |
| | G9611CD | 1 | Elbow Assembly (JIS connection) (since Aug.1987) |
| | G9611CN | 1 | Elbow Assembly (ANSI connection) (since Aug.1987) |
| 3 | 0051231 | 1 | Tube (prior to Aug.1987) |
| | F9101EL | 1 | Tube (since Aug.1987) |
| 4 | F9140DA-C | 1 | Filter-Regulator (JIS connection) |
| | F9140DB-C | 1 | Filter-Regulator (ANSI connection) |
| 5 | F9147MQ | 2 | 1/4-20 × 1/2 H.H.Screw |
| 6 | Below | 1 | Elbow |
| | G9612DB | | For JIS connection } Prior to |
| | G9612DD | | For ANSI connection } Apr.1998 |
| | F9140FH | | For JIS connection } Since |
| | F9140FJ | | For ANSI connection } Apr.1998 |
| 7 | F9135LC | 1 | Plug (JIS connection) |
| | X0100WP | 1 | Plug (ANSI connection) |
| 8 | See Table 2 | 1 | Pressure Gauge |
| 9 | D0117XL | 1 | Mounting Set |
| 10 | D0117XL-A | 1 | U-Bolt/Nut Assembly |
| 11 | F9270AX | 1 | Bracket |
| 12 | Below | 4 | 7/16-20 × 5/8 Cap Screw |
| | F9270AY | | S10C,S12C or S15C Carbon Steel (standard) |
| | F9273CZ | | SUS304 Stainless Steel (/SSB) |




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### Table 1. Cover, Plug, Body and Connector Part Number (Parts are illustrated on Page 1)

| Item No. | Description | SUS 316 Stainless Steel | |
|---|---|---|---|
| | | ANSI | JIS |
| 4 | Cover | D0117TT | F9101GD |
| 5 | Plug | D0114RZ | F9200CS |
| 14 | Body | D0117TS | F9101GB |
| | Body (with /TP-S) | W9150WZ | W9150WX |
| 17 | Connector,1/2 | F9277YZ* | F9277YY* |
| | Connector,1/4 | F9277YX* | F9277YW* |

*: SCS14A

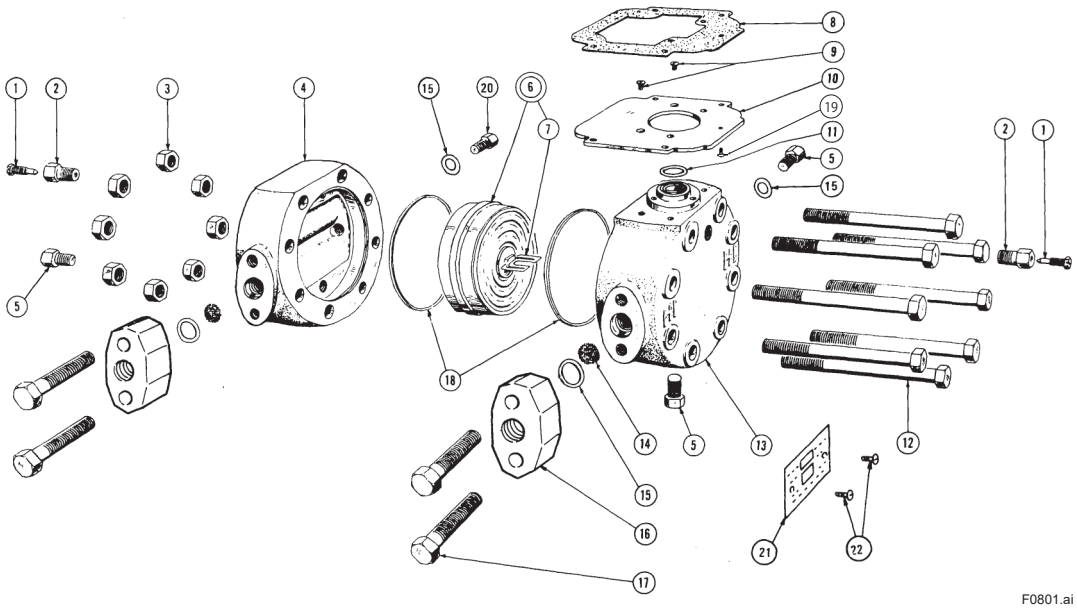
### Table 2. Pressure Gauge

| Suffix Code | Prior to Apr.1998 | Since Apr.1998 |
|---|---|---|
| /G(N)AS-FM | G9615AA | G9615AT |
| /G(N)AS-FE | G9615AE | G9615EK |
| /G(N)AS-FP(0 to 200 kPa) | G9615AH | G9615EA |
| /G(N)AS-FB(0 to 2 bar) | G9615AM | G9615EC |

Note) In order for gauge shipped befor April, 1998 to be replaced,please use gauge and elbow, which part numbers are effective April, 1998.

# Customer Maintenance Parts List

## Model Y/13HA
## PNEUMATIC DIFFERENTIAL PRESSURE TRANSMITTER (Style C)




| Item | Part No. | Qty | Description |
|---|---|---|---|
| 1 | D0114PB | 2 | Vent Screw (SUS 316 Stainless Steel) |
| 2 | Below | 2 | Vent Plug (SUS 316 Stainless Steel) |
| | D0114PA | | ANSI connection |
| | F9101AB | | JIS connection |
| 3 | Below | 8 | Nut |
| | X0104ET | | SCM435 (standard) |
| | X0118AW | | SUS630 Stainless Steel (/SSB) |
| 4 | Below | 1 | Cover (SUS 316 Stainless Steel) |
| | 0051027 | | ANSI connection |
| | W9150WW | | ANSI connection (with /TP-S) |
| | F9101ED | | JIS connection |
| | W9150WT | | JIS connection (with /TP-S) |
| 5 | Below | 2 | Plug (SUS 316 Stainless Steel) |
| | D0114RZ | | ANSI connection |
| | F9200CS | | JIS connection |
| 6 | See Table 1 | 1 | Diaphragm Assembly (SUS 316L s.s.) |
| 7 | See Table 1 | 1 | Flexure Assembly (SUS 316L s.s.) |
| 8 | F9100AT | 1 | Gasket |
| 9 | 0030597 | 2 | 10-32 × 3/8 F.H.Screw |
| 10 | U0102MK | 1 | Plate |
| 11 | Below | 1 | *O-Ring |
| | U0102TB | | Buna N (standard) |
| | 0051652 | | Glass Fiber Filled Teflon (for /DG5) |
| | F9101ZJ | | Glass Fiber Filled Teflon (for /OSW or /OSFC) |
| | F9202LZ | | Neoprene (for ammonia service) |
| 12 | Below | 8 | Bolt |
| | X0116AR | | SCM435 (standard) |
| | X0118AT | | SUS630 Stainless Steel (/SSB) |
| 13 | Below | 1 | Body (SUS 316 Stainless Steel) |
| | 0051025 | | ANSI connection |
| | F9101EB | | JIS connection |
| 14 | F9101EJ | 2 | Screen (SUS 316 Stainless Steel) |

| Item | Part No. | Qty | Description |
|---|---|---|---|
| 15 | Below | 4 | *Gasket |
| | 0051024 | | Chemloy (standard) |
| | F9101ZT | | For /OSW or /OSFC |
| 16 | Below | 2 | Connector (SUS 316 Stainless Steel) |
| | 0051022 | | ANSI 1/2 NPT female |
| | 0051021 | | ANSI 1/4 NPT female |
| | F9101EG | | JIS Rc 1/2 female |
| | F9101EF | | JIS Rc 1/4 female |
| | 0051062 | | 1/2 inch Sch. 160 Pipe Butt Weld |
| | 0051059 | | 1/4 inch Sch. 80 Pipe Butt Weld |
| 17 | Below | 4 | Cap Screw |
| | F9147BP | | SCM435 (standard) |
| | F9101YZ | | SUS630 Stainless Steel (/SSB) |
| 18 | Below | 2 | *Teflon Coating Metal Gasket |
| | F9202XQ | | Standard |
| 19 | X0100BX-J | 1 | Screw |
| | F9101ZK | | For /OSW or /OSFC |
| 20 | Below | 2 | Plug (SUS 316 Stainless Steel) |
| | F9101EH | | JIS connection |
| | 0051031 | | ANSI connection |
| 21 | — | 1 | Data Plate |
| 22 | 0046879 | 2 | Self-tapping Screw |

Note: *Denotes parts more frequently replaced.

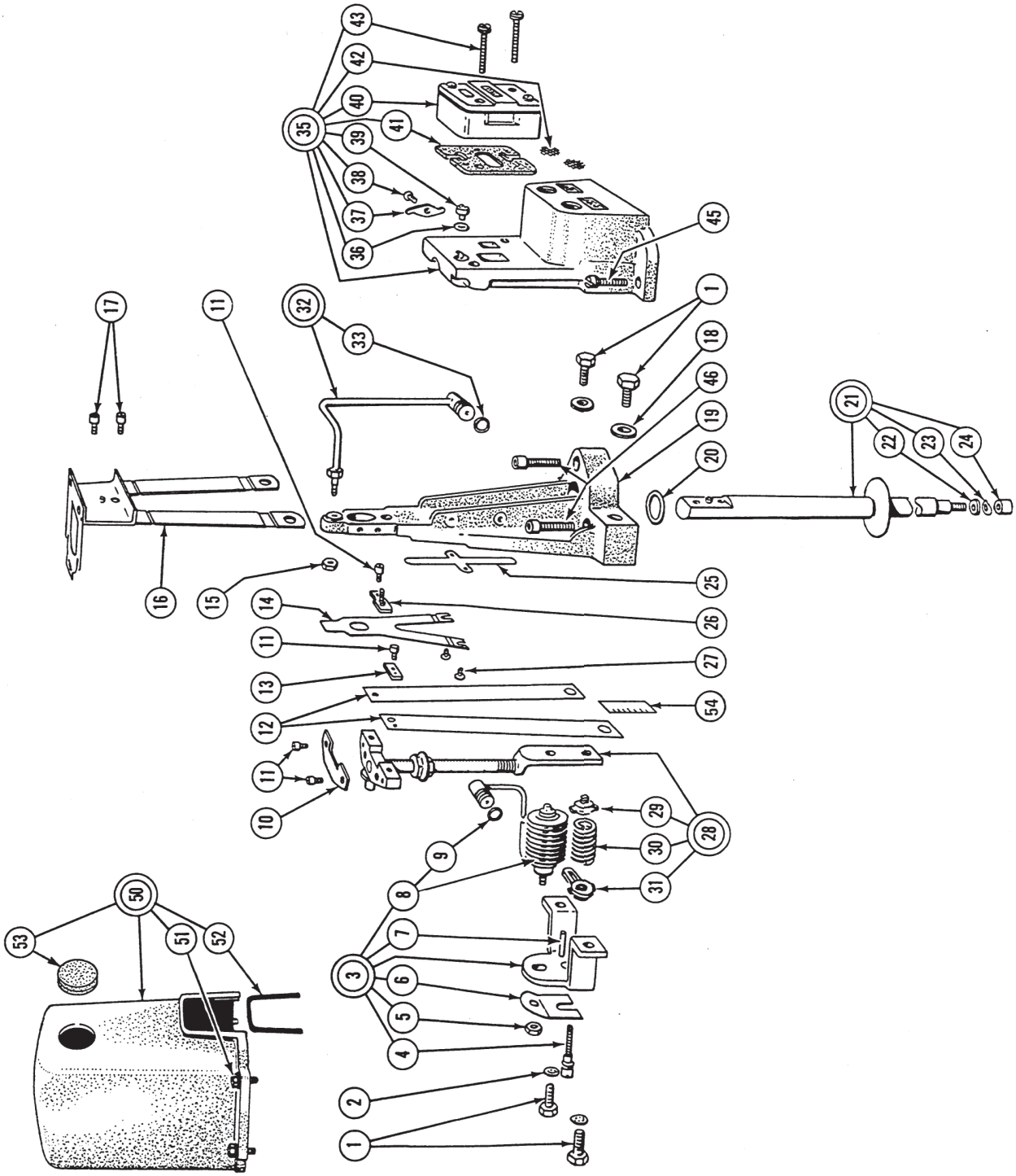
**Table 1.**

| Model | Description | Diaphragm Assembly Item 6 | Flexure Assembly Item 7 |
|---|---|---|---|
| Y/13HA-M | Silicone Filled (standard) | F9200NP | F9200LL |
| | Fluorolube Filled (for /OSFC) | N0148RZ | |
| | High Viscosity Fill (/HVC) | F9200LW | |
| Y/13HA-H | Silicone Filled (standard) | F9200NA | Not Removable |
| | Fluorolube Filled (for /OSFC) | A0129CE | |

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## Force Balance Unit (items 1 through 33)

Part No. N0999SJ: Standard

Part No. N0999SF: Low Spans
(for Model Y/13HA- ☐ /LD)

| Item | Part No. | Qty | Description |
|---|---|---|---|
| 1 | U0102LN | 4 | 1/4-28 × 1/2 Hex H.Screw |
| 2 | 0048219 | 2 | Lockwasher |
| 3 | U0119TA | 1 | Bracket Assembly (N0999SJ) |
| | U0119TF | 1 | Bracket Assembly (N0999SF) |
| 4 | U0102FY | 1 | Screw |
| 5 | 0017611 | 1 | Nut |
| 6 | U0102FZ | 1 | Spring |
| 7 | U0102NA | 1 | Pin |
| 8 | U0119TC | 1 | Bellows Assembly (N0999SJ) |
| | U0119TG | 1 | Bellows Assembly (N0999SF) |
| 9 | D0123MZ | 1 | *O-Ring |
| 10 | U0102KP | 1 | Plate |
| 11 | X0100MK | 4 | 6-32 × 3/16 Socket H.Cap Screw |
| 12 | U0102KL | 2 | Flexure |
| 13 | U0102LP | 1 | Plate |
| 14 | N0999MH | 1 | Flapper |
| 15 | X0104EB | 1 | Nut |
| 16 | N0999FM | 1 | Flexure Assembly |
| 17 | X0100ML | 2 | 8-32 × 1/4 Socket H.Cap Screw |
| 18 | X0166MX | 2 | Washer |
| 19 | N0999ML | 1 | Base |
| 20 | N0143XN | 1 | O-Ring |
| 21 | N0143ML | 1 | Force Bar Assembly (SUS 316 s.s.) |
| 22 | N0143SB | 1 | Washer (SUS 316 s.s.) |
| 23 | U0102MX | 1 | Dished Washer (cobalt alloy) |
| 24 | U0102LE | 1 | Nut (SUS 316 s.s.) |
| 25 | N0142NY | 1 | Spacer |
| 26 | U0102TE | 1 | Bracket Assembly |
| 27 | 0023442 | 2 | 3-48 × 3/16 Fil.H.Screw |
| 28 | N0999MP | 1 | Range Bar Assembly (N0999SF) |
| | NO999QA | 1 | Range Bar Assembly (N0999SJ) |
| 29 | U0102KR | 1 | Spring Holder |
| 30 | N0999MG | 1 | Spring (N0999QA) |
| | N0999MC | 1 | Spring (N0999MP) |
| 31 | U0102KC | 1 | Spring Holder |
| 32 | U0119TB | 1 | *Nozzle Assembly |
| 33 | D0123MZ | 1 | *O-Ring |

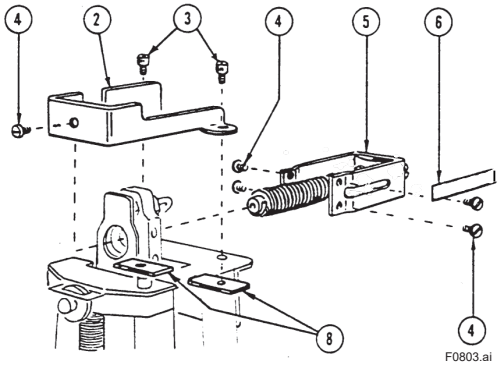
## Other Parts (items 35 through 54)

| Item | Part No. | Qty | Description |
|---|---|---|---|
| 35 | D0124JD | 1 | Relay Mounting Assembly (ANSI connection) |
| | F9101DF | 1 | Relay Mounting Assembly (JIS connection) |
| 36 | A037744 | 1 | *O-Ring |
| 37 | U0102MF | 1 | Clamp |
| 38 | X0100AA | 1 | 6-32 × 7/32 Fil.H.Screw |
| 39 | D0124JG | 1 | *Restrictor |
| 40 | F9138YA | 1 | *Pneumatic Amplifier, 80A |
| 41 | C0100EM | 1 | *Gasket |
| 42 | U0103FP | 2 | *Screen |
| 43 | X0116CS | 2 | 10-32 × 1 Pan H.Screw |
| 45 | 0006535 | 2 | 10-32 × 3/4 Fil.H.Screw |
| 46 | X0100YC | 3 | 1/4-28 × 7/8 Cap Screw |
| 50 | U0102TL | 1 | Cover Assembly |
| 51 | — | 4 | 10-32 × 9/16 Hex H.Screw |
| 52 | — | 1 | Gasket |
| 53 | F9100GM | 1 | Safety Plug (glomet) |
| 54 | Below | 1 | Scale |
| | F9103AE | | for M Range (kPa) (standard) |
| | F9103AF | | for H Range (kPa) (standard) |
| | D0117BL | | for M Range (psi) |
| | D0117FC | | for H Range (psi) |
| | D0117BL-J | | for M Range (kgf/cm$^2$) |
| | D0117FC-J | | for H Range (kgf/cm$^2$) |
| — | N0138GA | 1 | Dashpot Assembly (not shown) (for /OSFC) |

* Denotes parts more frequently replaced.

## Zero Elevation Kit

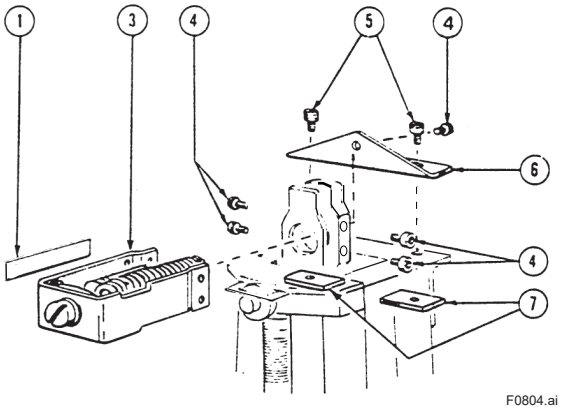
## (Suffix Code : L)




| Item | Part No. | Qty | Description |
|---|---|---|---|
| - | U0122BS | 1 | Zero Elevation Kit (standard) |
| 2 | U0122BT | 1 | Bracket |
| 3 | A0100YC | 2 | 6-32 × 1/4 Socket H.Screw |
| 4 | F9147CV | 5 | 5-40 × 3/16 Screw |
| 5 | U0122BB | 1 | Spring Assembly |
| 6 | U0102TF | 1 | Scale (MIN-MAX) |
| 8 | N0138BS | 2 | Plate |

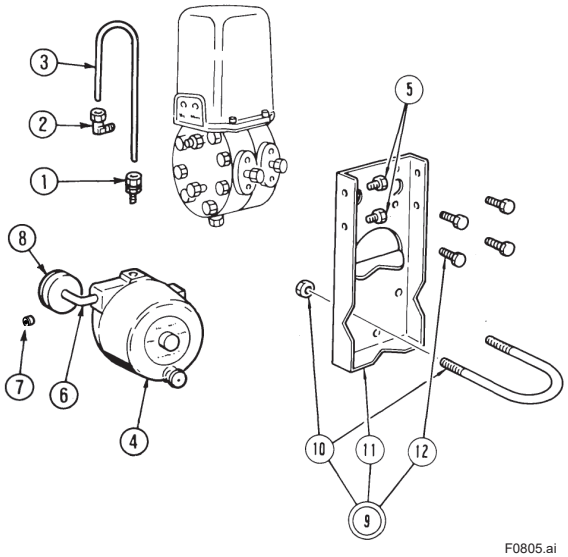
## Zero Suppression Kit

## (Suffix Code : R)




| Item | Part No. | Qty | Description |
|---|---|---|---|
| - | U0122BA | 1 | Zero Suppression Kit (standard) |
| 1 | U0102TF | 1 | Scale (MIN-MAX) |
| 3 | U0122BB | 1 | Spring Assembly |
| 4 | F9147CV | 5 | 5-40 × 3/16 Screw |
| 5 | A0100YC | 2 | 6-32 × 1/4 Socket H.Screw |
| 6 | U0102RW | 1 | Bracket |
| 7 | N0138BS | 2 | Plate |

## Integral Air Filter Set and Mounting Set




| Item | Part No. | Qty | Description |
|---|---|---|---|
| 1 | 0050386 | 1 | Connector Assembly (JIS connection) (prior to Aug.1987) |
| | 0050325 | 1 | Connector Assembly (ANSI connection) (prior to Aug.1987) |
| | G9611AD | 1 | Connector Assembly (JIS connection) (since Aug.1987) |
| | G9611AW | 1 | Connector Assembly (ANSI connection) (since Aug.1987) |
| 2 | 0050392 | 1 | Elbow Assembly (JIS connection) (prior to Aug.1987) |
| | 0050332 | 1 | Elbow Assembly (ANSI connection) (prior to Aug.1987) |
| | G9611CD | 1 | Elbow Assembly (JIS connection) (since Aug.1987) |
| | G9611CN | 1 | Elbow Assembly (ANSI connection) (since Aug.1987) |
| 3 | 0051235 | 1 | Tube (prior ro Aug.1987) |
| | F9101EM | 1 | Tube (since Aug.1987) |
| 4 | F9140DA-C | 1 | Filter-Regulator (JIS connection) |
| | F9140DB-C | 1 | Filter-Regulator (ANSI connection) |
| 5 | F9147MQ | 2 | 1/4-20 × 1/2 H.H.Screw |
| 6 | Below | 1 | Elbow |
| | G9612DB | | For JIS connection } Prior to |
| | G9612DD | | For ANSI connection } Apr.1998 |
| | F9140FH | | For JIS connection } Since |
| | F9140FJ | | For ANSI connection } Apr.1998 |
| 7 | F9135LC | 1 | Plug (JIS connection) |
| | X0100WP | 1 | Plug (ANSI connection) |
| 8 | See Table 2 | 1 | Pressure Gauge |
| 9 | D0117XL | 1 | Mounting Set |
| 10 | D0117XL-A | 1 | U-Bolt/Nut Assembly |
| 11 | F9270AX | 1 | Bracket |
| 12 | Below | 4 | 7/16-20 × 5/8 Cap Screw |
| | F9270AY | | S10C,S12C or S15C Carbon Steel (standard) |
| | F9273CZ | | SUS XM7 or SUS304 Stainless Steel (/SSB) |

### Table 2. Pressure Gauge

| Suffix Code | Prior to Apr.1998 | Since Apr.1998 |
|---|---|---|
| /G(N)AS-FM | G9615AA | G9615AT |
| /G(N)AS-FE | G9615AE | G9615EK |
| /G(N)AS-FP (0 to 200 kPa) | G9615AH | G9615EA |
| /G(N)AS-FB (0 to 2 bar) | G9615AM | G9615EC |

Note) In order for gauge shipped befor April,1998 to be replaced, please use gauge and elbow, which part numbers are effective April,1998.

# Revision Information

- Title : Y/13A, Y/13HA and Y/15A
  Pneumatic Differential Pressure Transmitters
- Manual No. : IM 02C01C02-01EN

| Edition | Date | Page | Revised Item |
|---|---|---|---|
| 8th | Apr. 2017 | — | Incorporate Manual Change 16-026. |
| | | CONTENTS | “2.5 Options”→“2.5 Options and Combinations”.<br>Add “2.7 Control of Pollution Caused by the Product”.<br>Add “Revision Information”. |
| | | 1-3 | Add “1.3 Control of Pollution Caused by the Product”. |
| | | 2-2 | Revised Standard Specifications. |
| | | 2-3 | Revised options. |
| | | 2-4 | Add Combinations. |
| | | CMPL 02C01C02-01E | |
| | | P.3 | Add N0999SH.<br>Add Item 32 U0119TD. |
| | | P.4 | Delete F9200WG and D0120KK from Table 2. |
| | | CMPL 02C01C01-01E | |
| | | P.1 | Item 6 N0105TN→N0150TN |
| | | Revision Information | Add Revision Information. |
| 9th | Feb. 2025 | — | Incorporate Manual Change No. 19-28 |
| | | CONTENTS | Delete “1.3 Control of Pollution Caused by the Product”<br>Delete “Appendix 1. 80A Pneumatic Amplifier (Part No. F9138YA)” |
| | | 1-3 | Delete “1.3 Control of Pollution Caused by the Product” |
| | | 2-2 | 2.3 Standard Specifications Cover<br>Delete “Gasketed for National Electrical Manufacturers Association (NEMA) (USA) Type3 weatherproof service.” |
| | | 2-2 | 2.3 Standard Specifications<br>Add “Degrees of Protection: IP53 (Equivalent to NEMA 3)” |
| | | 2-4 | 2.5 Options (and Combinations) Air set<br>Delete Option code “GAS-F and NAS-F” |
| | | 5-4 | 5.4 To Clean Nozzle Assembly:<br>Section 4.“0.73 → 0.45mm dia. Wire,” |
| | | 5-7 | 5.9 To Remove Pneumatic Amplifier:<br>Delete “refer to Appendix 1” |
| | | 5-9 | 5.10.8 Flapper Alignment:<br>Delete “tool kit Model 6925-6000” |
| | | A-1 A-2 | Delete “80A Pneumatic Amplifier (Part No. F9138YA)” |
| | | CMPL 02C01C02-01EN | 11th Edition → 12th Edition |
| | | P.1 | Item 2 P0101AB → F9101AB |
| | | P.4 | Table 1. Item 17 Description<br>Item 7 F9145BF → F9135LC D0114PN → X0100WP F0603.ai |
| | | P.5 | Suffix Code: L, R Item 4 Description<br>Part No.U0122BZ Item 7 Description<br>F0604.ai, F0605.ai, F0606.ai, F0607.ai<br>F0606.ai, F0607.ai Add “(OSFC)” |
| | | CMPL 02C01C01-01EN | 10th Edition → 11th Edition |
| | | P.4 | Suffix Code: L, R Item 4 Description<br>Delete “Part No.U0122BA Item 8”<br>Part No.U0122BZ Item 7 Description<br>F0703.ai, F0704.ai, F0705.ai, F0706.ai<br>F0705.ai, F0706.ai Add “(OSFC)” |
| | | P.5 | Item 7 F9145BF → F9135LC D0114PN → X0100WP F0707.ai |
| | | CMPL 02C01C03-01EN | 10th Edition → 11th Edition |
| | | P.1 | Item 2 P0101AB → F9101AB<br>Add “Item 19 X0100BX-J”<br>F0801.ai |
| | | P.3 | Add “Item 53 Part No.F9100GM” |
| | | P.4 | Suffix Code: L, R Item 4 Description<br>F0803.ai, F0804.ai |
| | | P.5 | Item 7 F9145BF → F9135LC D0114PN → X0100WP F0805.ai |