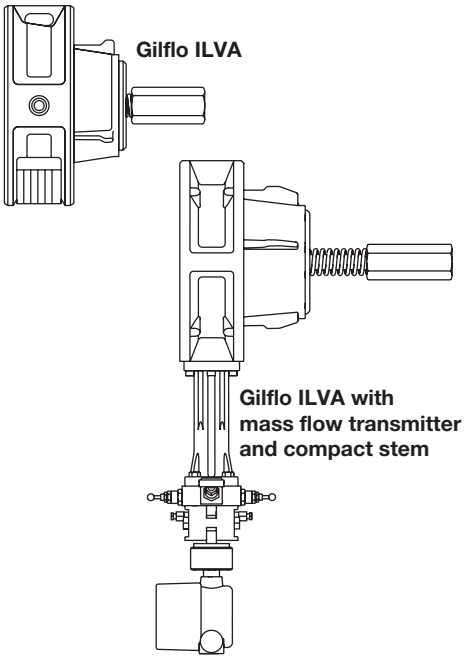
Gilflo ILVA and Gilflo ILVA with Mass Flow Transmitter and Compact Stem Flowmetering Systems

Installation and Maintenance Instructions

IM-P337-04-US **November 2012**



1. Safety information

Safe operation of these products can only be guaranteed if they are properly installed, commissioned, used and maintained by qualified personnel (see Section 1.11) in compliance with the operating instructions. General installation and safety instructions for pipeline and plant construction, as well as the proper use of tools and safety equipment must also be complied with.

1.1 Intended use

Referring to the Installation and Maintenance Instructions, name-plate and Technical Information Sheet, check that the product is suitable for the intended use/application. The products listed below comply with the requirements of the European Pressure Equipment Directive 97/23/EC and carry the CE mark when so required. The products fall within the following Pressure Equipment Directive categories:

Product		Group 1 Gases	Group 2 Gases	Group 1 Liquids	Group 2 Liquids
Gilflo ILVA pipeline unit	DN50 - DN100	2	3	2	SEP
	DN150 - DN200	3	3	2	SEP
	DN250 - DN300	3	3	2	1
Gilflo ILVA with mass flow transmitter and compact stem	DN250 - DN300	3	3	2	1

i) The products have been specifically designed for use on steam, air or condensate which are in Group 2 of the above mentioned Pressure Equipment Directive. It can also be used on propane or methane gases which are in Group 1 of the above mentioned Pressure Equipment Directive. The products' use on other fluids may be possible but, if this is contemplated, Spirax Sarco should be contacted to confirm the suitability of the product for the application being considered.

ii) Check material suitability, pressure and temperature and their maximum and minimum values. If the maximum operating limits of the product are lower than those of the system in which it is being fitted, or if malfunction of the product could result in a dangerous overpressure or overtemperature occurrence, ensure a safety device is included in the system to prevent such over-limit situations.

iii) Determine the correct installation situation and direction of fluid flow.

iv) Spirax Sarco products are not intended to withstand external stresses that may be induced by any system to which they are fitted. It is the responsibility of the installer to consider these stresses and take adequate precautions to minimise them.

v) Remove protection covers from all connections and protective film from all name-plates, where appropriate, before installation on steam or other high temperature applications.

1.2 Access

Ensure safe access and if necessary a safe working platform (suitably guarded) before attempting to work on the product. Arrange suitable lifting gear if required.

1.3 Lighting

Ensure adequate lighting, particularly where detailed or intricate work is required.

1.4 Hazardous liquids or gases in the pipeline

Consider what is in the pipeline or what may have been in the pipeline at some previous time. Consider: flammable materials, substances hazardous to health, extremes of temperature.

1.5 Hazardous environment around the product

Consider: explosion risk areas, lack of oxygen (e.g. tanks, pits), dangerous gases, extremes of temperature, hot surfaces, fire hazard (e.g. during welding), excessive noise, moving machinery.

1.6 The system

Consider the effect on the complete system of the work proposed. Will any proposed action (e.g. closing isolation valves, electrical isolation) put any other part of the system or any personnel at risk?
Dangers might include isolation of vents or protective devices or the rendering ineffective of controls or alarms. Ensure isolation valves are turned on and off in a gradual way to avoid system shocks.

1.7 Pressure systems

Ensure that any pressure is isolated and safely vented to atmospheric pressure. Consider double isolation (double block and bleed) and the locking or labelling of closed valves. Do not assume that the system has depressurised even when the pressure gauge indicates zero.

1.8 Temperature

Allow time for temperature to normalise after isolation to avoid danger of burns.

1.9 Tools and consumables

Before starting work ensure that you have suitable tools and/or consumables available. Use only genuine Spirax Sarco replacement parts.

1.10 Protective clothing

Consider whether you and/or others in the vicinity require any protective clothing to protect against the hazards of, for example, chemicals, high/low temperature, radiation, noise, falling objects, and dangers to eyes and face.

1.11 Permits to work

All work must be carried out or be supervised by a suitably competent person. Installation and operating personnel should be trained in the correct use of the product according to the Installation and Maintenance Instructions.
Where a formal 'permit to work' system is in force it must be complied with. Where there is no such system, it is recommended that a responsible person should know what work is going on and, where necessary, arrange to have an assistant whose primary responsibility is safety.
Post 'warning notices' if necessary.

1.12 Handling

Manual handling of large and/or heavy products may present a risk of injury. Lifting, pushing, pulling, carrying or supporting a load by bodily force can cause injury particularly to the back. You are advised to assess the risks taking into account the task, the individual, the load and the working environment and use the appropriate handling method depending on the circumstances of the work being done.

Safe lifting of Spirax Sarco products

Please note that the Spirax Sarco DN250 and DN300 ILVA are supplied with the provision for eyebolts to BS 4278 (to be supplied by others), with tapped holes located in the body, which may be used for lifting purposes at the sole risk and responsibility of the purchaser.

The purchaser is responsible for the use of the correct eyebolt or shackle combination and is, in whole, responsible for all lifting operations and operator competency at their location.

Spirax Sarco will accept no responsibility for loss or damage real or imagined, caused by incorrect or inappropriate lifting of our products.

Spirax Sarco will also carry out in conjunction with a third party, a test on a sample of each product so provided and make available a copy of the test procedure and test certificate on request.

Furthermore and without obligation Spirax Sarco will attach to each product provided with such holes, threaded or otherwise, a disclaimer affixed to the product explaining the purchaser's duty under the LOLER regulations for safe off-loading and lifting of the product at their premises.

1.13 Residual hazards

In normal use the external surface of the product may be very hot. If used at the maximum permitted operating conditions the surface temperature of some products may reach temperatures of 450°C (842°F).

Many products are not self-draining. Take due care when dismantling or removing the product from an installation (refer to 'Maintenance instructions').

1.14 Freezing

Provision must be made to protect products which are not self-draining against frost damage in environments where they may be exposed to temperatures below freezing point.

1.15 Disposal

Unless otherwise stated in the Installation and Maintenance Instructions, this product is recyclable and no ecological hazard is anticipated with its disposal providing due care is taken.

1.16 Returning products

Customers and stockists are reminded that under EC Health, Safety and Environment Law, when returning products to Spirax Sarco they must provide information on any hazards and the precautions to be taken due to contamination residues or mechanical damage which may present a health, safety or environmental risk. This information must be provided in writing including Health and Safety data sheets relating to any substances identified as hazardous or potentially hazardous.

2. General system information

2.1 Introduction

This booklet gives full details of the recommended procedures for the installation and maintenance of the Spirax Sarco Gilflo ILVA flowmeter. Abbreviated details of how to install the M610 or Multi-variable transmitter assembly (MVT), EL2600 pressure transmitter and EL2271 temperature transmitter are also given. (Full details are supplied with the equipment).

Initial start-up procedures as well as fault finding guidelines are also included.

2.2 The Spirax Sarco Gilflo ILVA flowmetering system consists of 3 major elements:

2.2.1 The Gilflo ILVA pipeline unit

This is installed in the line where the flow is to be measured. Using impulse pipework, this is connected to:

2.2.2 The M610 or MVT assemblies

The M610 measures the differential pressure across the Gilflo ILVA pipeline unit and converts it to a 4-20 mA output signal for onward transmission to other equipment.

The MVT measures the differential pressure and static pressure across the Gilflo ILVA pipeline unit and converts this to a 4-20 mA output signal proportional to mass flow.

2.2.3 Readout equipment

This can be either an M800 flow computer (steam) or an M750 display unit for non density compensated applications on steam, liquids or gases. Note that all these items of equipment are used to linearise the output signal from the Gilflo ILVA pipeline unit.

Caution: MVT steam mass flow transmitters are uniquely configured at the factory to work with a single, specific ILVA flowmeter. For correct operation the configured transmitter must always be installed with its allocated flowmeter. Labels on the packaging give the serial numbers of the matched products. DN250 and DN300 Gilflo ILVA flowmeters can be supplied with a compact stem fitted and calibrated with a Scanner 2000 MVT.

2.3 Additional equipment **(not required for the compact stem versions)**

2.3.1 F50C isolation valves which are installed close to the Gilflo ILVA unit to provide primary isolation.

2.3.2 EL2600 pressure transmitter which is connected to the impulse lines using a 'T' piece in the high pressure (upstream) impulse line. This gives a 4-20 mA output signal proportional to line pressure and is used where density compensation based on pressure is required.

2.3.3 EL2271 temperature transmitter which is installed directly in the pipework upstream of the Gilflo ILVA pipeline unit. This gives a 4-20 mA signal proportional to line temperature and is used where density compensation based on temperature is required.

Standard installation

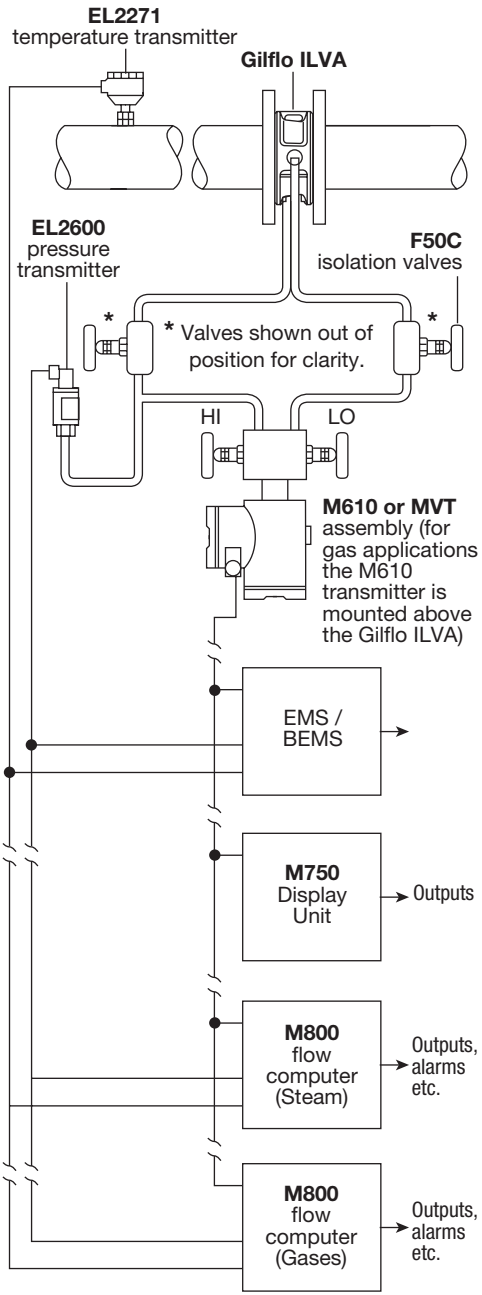


Fig. 1 (Schematic only) See Figure 15 for details

Compact stem installation

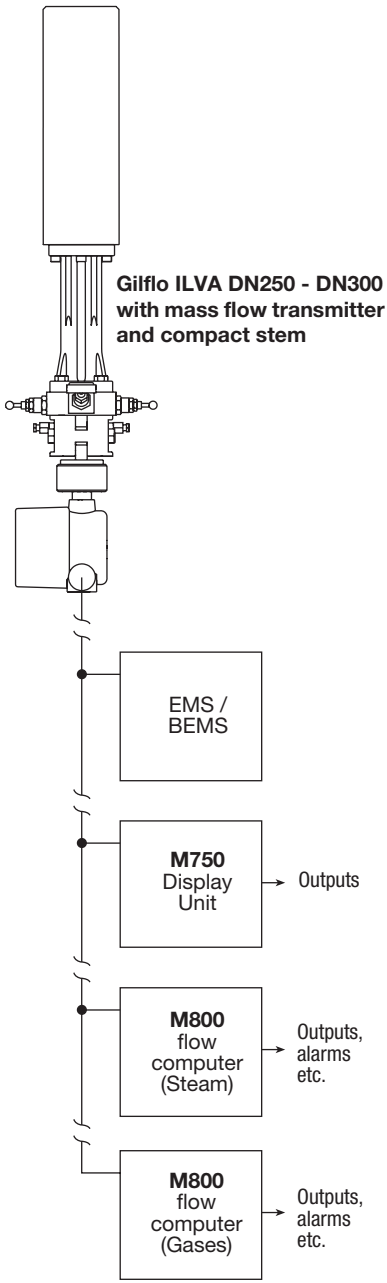


Fig. 2

3. General product information

3.1 Description

The Gilflo ILVA flowmeter operates on the spring loaded variable area principle and produces a differential pressure proportional to the instantaneous rate of flow. It can be used with most industrial fluids, gases and both saturated and superheated steam.

3.2 Sizes and pipe connections

Gilflo ILVA: DN50, DN80, DN100, DN150, DN200, DN250 and DN300 (2", 3", 4", 6", 8", 10", and 12").

Gilflo ILVA with mass flow transmitter and compact stem: DN250 and DN300 (10" and 12"). Suitable for fitting between the following flanges:
ASME (ANSI) B 16.5 class 150, 300 and 600.

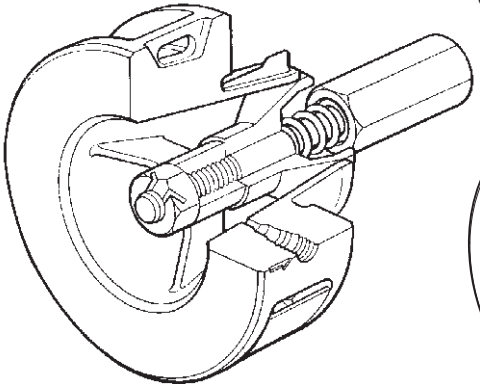
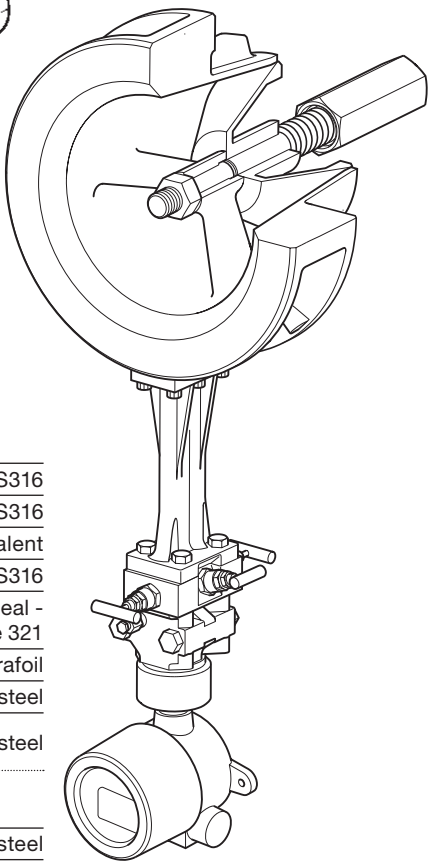


Fig. 3 Gilflo ILVA (DN200 (8") shown)

Fig.4
Gilflo ILVA DN250 - DN300 (10" and 12") with mass flow transmitter and compact stem

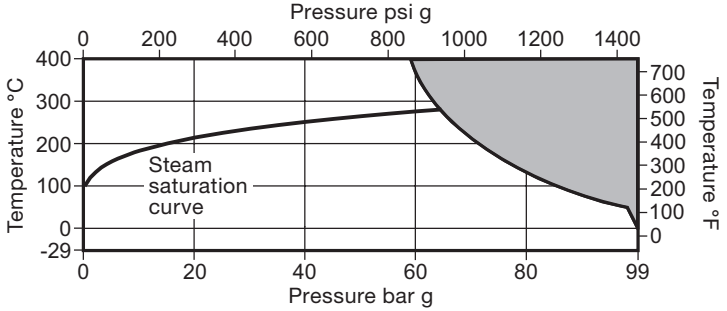


3.3 Materials

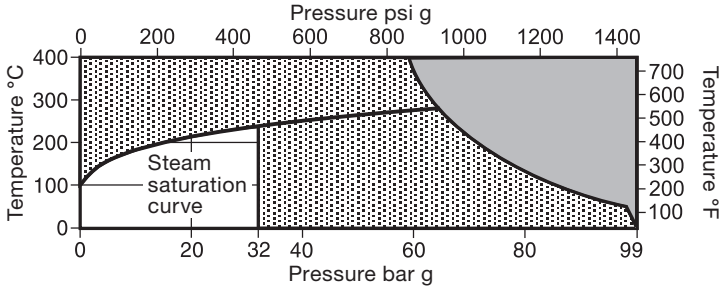
Body		Austenitic stainless steel S316
Internals		431 S29/S303/S304/S316
Spring		Inconel X750 or equivalent
Compact stem		Austenitic stainless steel S316
Gasket	ILVA to Stem	Corruseal - Stainless steel Grade 321
	Compact stem to Manifold	Grafoil
Screws	Compact stem to ILVA	Stainless steel
	Compact stem to Manifold / Scanner 2000*	Stainless steel
	***Note:** for Scanner 2000 materials see product specific literature.	
Spring washers		Stainless steel

3.4 Pressure / temperature limits

Gilflo ILVA



Gilflo ILVA with mass flow transmitter and compact stem



The product **must not** be used in this region.

The product should not be used in this region or beyond its operating range as damage to the internals may occur.

Body design conditions				ASME (ANSI) 600
PMA	Maximum allowable pressure		99 bar g @ 38°C	(1 435 psi g @ 100°F)
TMA	Maximum allowable temperature		400°C @ 59 bar g	(752°F @ 855 psi g)
Minimum allowable temperature			-29°C	(-20°F)
		Compact stem versions	0°C	(32°F)
PMO	Maximum operating pressure		99 bar g @ 38°C	(1 435 psi g @ 100°F)
		Compact stem versions	32 bar g @ 239°C	(464 psi g @ 462°F)
Minimum operating pressure			0.6 bar g	(8.7 psi g)
TMO	Maximum operating temperature		400°C @ 59 bar g	(752°F @ 855 psi g)
		Compact stem versions	239°C @ 32 bar g	(462°F @ 464 psi g)
Minimum operating temperature			-29°C	(-20°F)
		Compact stem versions	0°C	(32°F)
Note: For lower operating temperatures consult Spirax Sarco.				
Maximum viscosity			30 centipoise	30 centipoise
ΔPMX	Maximum differential pressure		498 m bar	(7.2 psi g)
Designed for a maximum cold hydraulic test pressure of: 142 bar g				(2 059 psi g)

3.5 Pressure drop

The pressure drop across the Gilflo ILVA pipeline unit is nominally 498 m bar (200 ins water gauge) at maximum rated flow.

3.6 Dimensions / weights (approximate) in inches and pounds

Gilflo ILVA pipeline unit DN50 - DN300 (2" - 12")

Size	A	B	C	D	E	F	Weight
2”	1.4	2.5	5.5	4.1	0.7		4
3”	1.8	3.1	5.9	5.4	0.9		9
4”	2.4	4.1	8.1	6.4	1.5		18
6”	3.0	5.3	11.8	8.6	1.5		31
8”	3.3	6.3	14.2	10.7	1.7		52
10”	4.1	8.0	17.5	13.0	1.4	1.4	91
12”	4.7	9.8	20.9	15.2	1.7	1.4	148

Note:- Pressure tappings are threaded ¼" NPT.

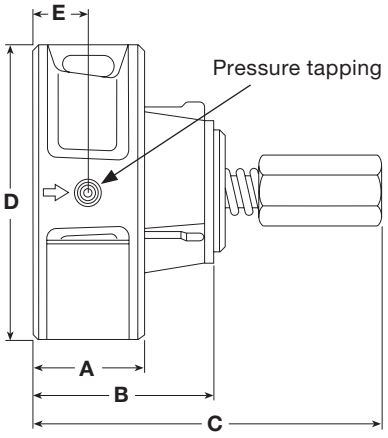


Fig. 5 Gilflo ILVA DN50 – DN200 (2" - 8")

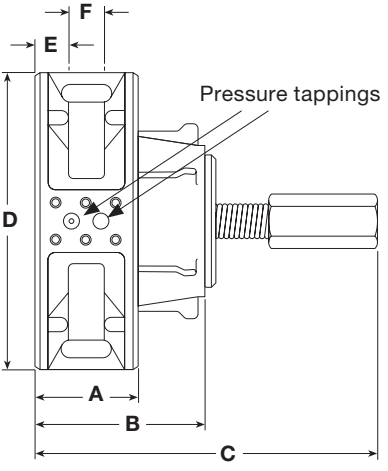


Fig. 6 Gilflo ILVA DN250 – DN300 (10" and 12")

3.7 Dimensions / weights (approximate) in inches and pounds

Gilflo ILVA with mass flow transmitter and compact stem
DN250 - DN300 (10" - 12")

Size	A	B	C	D	E	F	G	H	Weight
10”	4.1	8.0	17.5	13.0	1.4	1.4	25.2	8.3	112
12”	4.7	9.8	20.9	15.2	1.7	1.4	27.4	8.3	165

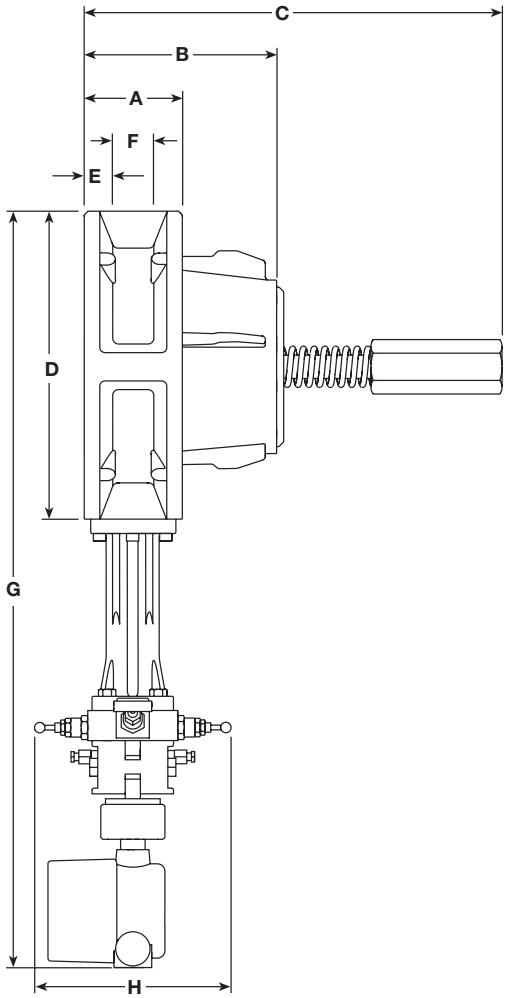


Fig. 7 Gilflo ILVA DN250 - DN300 (10" - 12") with mass flow transmitter and compact stem

4. Mechanical installation of Gilflo ILVA pipeline unit

Caution: In order for the Gilflo ILVA flowmeter to meet its specified accuracy and performance, it is essential that the following guidelines for installation are followed carefully. For steam flow measurement, good basic steam engineering practices should be followed as detailed in Section 6.1.

4.1 Orientation

The Gilflo ILVA should be installed in a horizontal line. As it has been calibrated in a horizontal attitude, mounting it in a vertical line (flow downwards) may introduce a small flow measurement error. If installation with flow vertically downwards is unavoidable, please consult Spirax Sarco for advice. The flowmeter should not be installed with flow vertically upwards (see Figure 8).

The pressure tappings should be horizontal and located as shown in Figure 9.

Note: The versions with a compact stem are NOT suitable for vertical flow applications. The Gilflo ILVA is clearly marked with a direction of flow arrow.

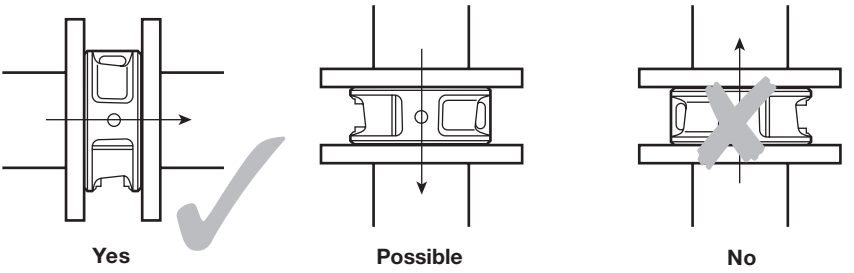
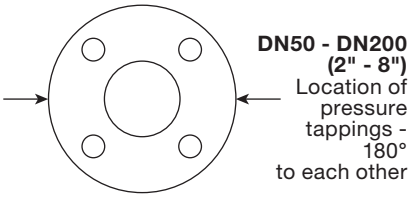


Fig. 8



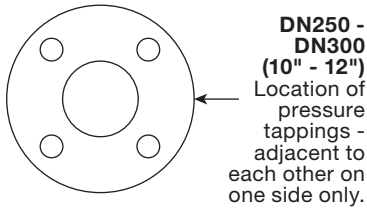


Fig. 9

4.2 Upstream / downstream pipework

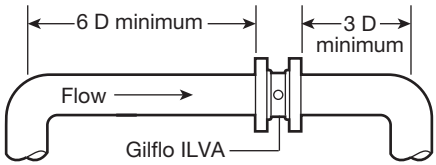
The Gilflo ILVA flowmeter should be installed in pipework manufactured to BS 1600 or ASME (ANSI) B 36.10 Schedule 40, which corresponds to the following pipeline internal diameters.

Nominal diameter (inches)	Nominal internal diameter (inches)
2	2.07
3	3.07
4	4.03
6	6.07
8	7.98
10	10.02
12	11.94

For different pipe standards/schedules, if the flowmeter is being operated at the extreme of its published maximum range, downstream spool pieces manufactured from BS 1600 or ASME (ANSI) B 36.10 Schedule 40 should be used. If this is not possible, please contact Spirax Sarco Ltd. It is important that the internal upstream and downstream diameters of pipe are smooth. Ideally seamless pipes should be used and there should be no intrusive weld beads on the internal diameter. It is recommended that slip-on flanges be used to avoid any intrusive weld beads on the internal diameter of the pipe.

The Gilflo ILVA normally only requires a minimum of 6 pipe diameters upstream and 3 downstream of clear straight pipe. These dimensions assume a measurement from a single 90° bend. See Figure 10

Fig. 10



D = Pipe inside diameter

If any of the following configurations are present upstream of the Gilflo ILVA, then it is recommended that the minimum upstream clear pipework is doubled to 12 diameters.

Two right angled bends in two planes.
Pressure reducing valve.
Partly open valve.

Avoid installing the Gilflo ILVA flowmeter downstream of an actuated valve as rapid cycling of the valve could give rise to inaccurate results or damage the flowmeter. See Figure 11.

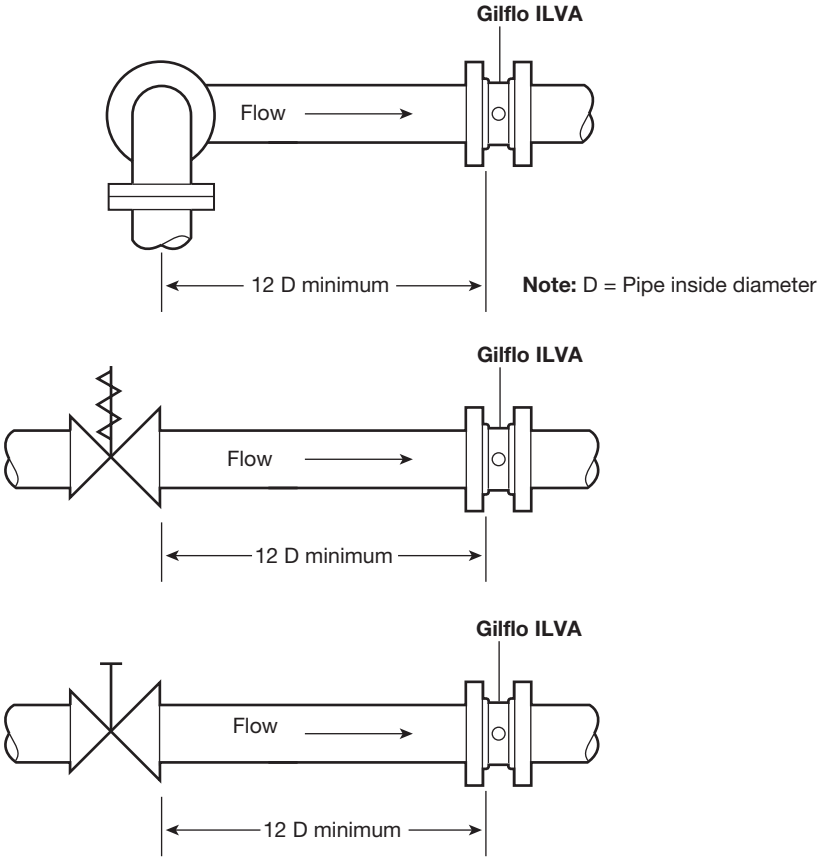


Fig. 11

We recommend that a spool piece is used to aid installation and removal (see Figure 12).

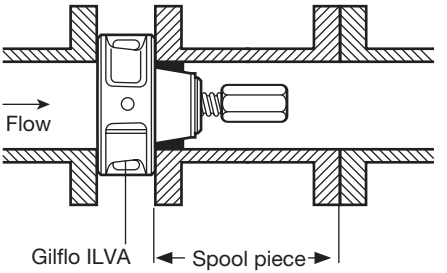


Fig. 12

4.3 Location in pipework

Bolt ring gaskets having the same internal diameter of the pipework are recommended. This will prevent possible inaccuracies being created by the gasket protruding into the pipe.

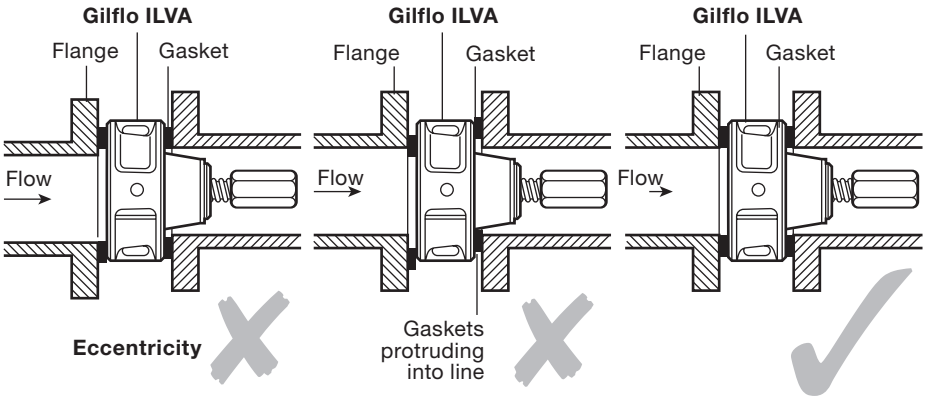


Fig. 13

It is important that the Gilflo ILVA is located centrally in the pipework as any eccentricity may cause inaccurate readings. The ILVA has been designed with integral centering webs which locate on the internal diameter of the pipework. In applications where large pipe schedule has been used, it is possible to remove some of the material from these webs to fit the pipework. This should be done with utmost care to prevent any contamination or damage to the flowmeter.

Note: material should be removed from all three webs equally to ensure that the flowmeter remains concentric to the pipe.

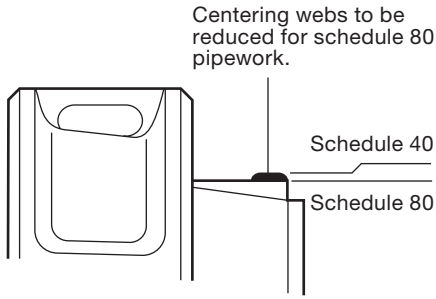


Fig. 14

4.4 Pressure tappings

The Gilflo ILVA has integral pressure tappings for connection to the M610/MVT transmitter assembly using impulse lines. These are threaded ¼" NPT and are clearly marked HI (upstream) and LO (downstream). Care should be taken to ensure that these are correctly connected. DN250 and DN300 (10" and 12") Gilflo ILVA's with compact stem can be supplied assembled and calibrated with the stem and Scanner 2000 (MVT).

5. Impulse lines

5.1 Versions with standard impulse lines

The standard ILVA installation has two impulse lines, a high pressure side and a low pressure side. These are supplied separately from the ILVA and DP cell, by the installer.

5.1.1 These should be of a suitable pressure rating and be as short as possible. However, for high temperature applications they should be long enough to prevent damage to the M610 or MVT through excessive temperature (85°C (185°F) maximum).

5.1.2 Recommended minimum inside diameter is 9.5 mm (0.375").

5.1.3 Lines should run vertically downwards for steam and liquids applications and upwards for gases wherever possible but in no case should a gradient less than 1 in 12 be permitted.

5.1.4 Lines should run over the same route (preferably clipped together) to avoid temperature differentials.

5.1.5 Consideration should be given to allowing the impulse lines to be blown through or 'rodded' to remove excessive build-up of dirt or sludge.

5.1.6 If impulse lines are filled with water and may be subject to freezing, trace heating or use of antifreeze is recommended.

5.1.7 The orientation of the impulse lines and M610/MVT assembly depends on the service application. See Figures 17 to 21.

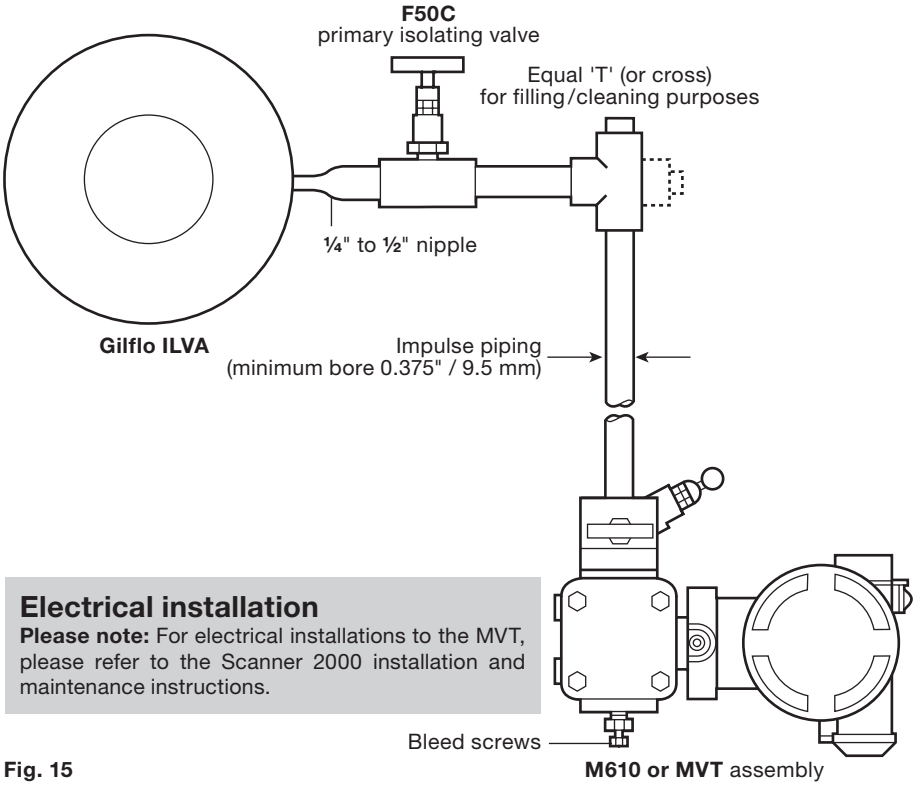


Fig. 15 **M610 or MVT** assembly

Electrical installation

Please note: For electrical installations to the MVT, please refer to the Scanner 2000 installation and maintenance instructions.

5.2 Compact stem versions

The DN250 and DN300 (10" and 12") Gilflo ILVA's are available with a compact stem. The stem replaces the requirement for the impulse lines and F50C isolation valves. As standard the flowmeter is supplied as individual elements calibrated and configured separately (Gilflo ILVA and MVT are paired).
Alternatively, it can be supplied as a complete assembly with Gilflo ILVA pipeline element, stem and MVT, fully assembled and calibrated.

5.2.1 The ILVA must be fitted so that the stem is pointing downwards, with the MVT below the pipeline.

5.3 How to assemble the system from individual components

5.3.1 Install the Gilflo ILVA pipeline element to pipeline as per Section 4. Ensuring that the pressure tappings are facing downwards.

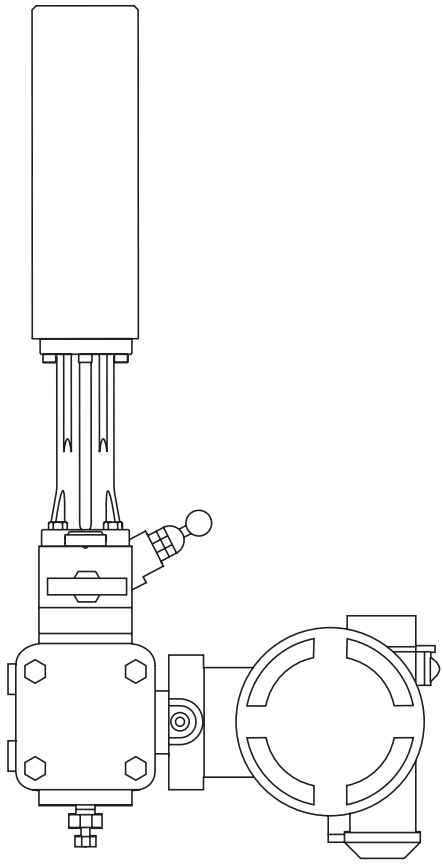
5.3.2 Push the corruseals in to the recesses on the end of the compact stem (the end with six screw holes).

5.3.3 Offer the compact stem to the Gilflo ILVA and secure with the six screws to 25 - 28 N m (19 - 20.5 lbf ft) in sequence.

5.3.4 Push the Graphoil gaskets into the recesses at the other end of the compact stem, and into the recesses in the underside of the manifold to the MVT.

5.3.5 Offer the MVT and manifold to the stem and secure with the four screws to 50 - 55 N m (37 - 40 lbf ft).

5.3.6 For electrical connections see the Scanner 2000 Installation and Maintenance Instructions.



Tighten the compact stem to ILVA screws in sequence, starting with a torque of 5 N m (3.7 lbf ft) and then 15 N m (11 lbf ft) and finally 25 - 28 N m (19 - 20.5 lbf ft).

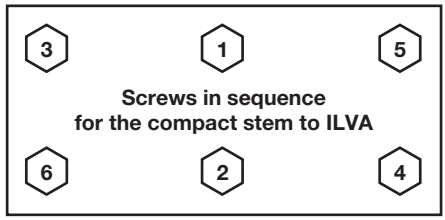


Fig. 16

Fig. 17 Liquids, vapours, steam

For liquids, vapours and steam where the Gilflo ILVA is installed in a horizontal line, the M610/MVT should be mounted below the Gilflo as shown below.

Note:
The MVT is for saturated steam applications only.

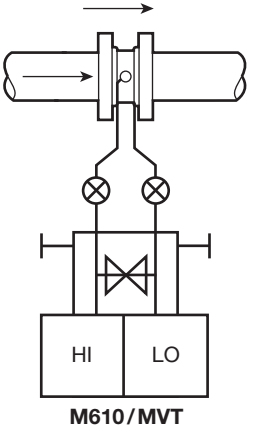


Fig. 18 Saturated Steam only

DN250 and DN300 versions with compact stem must be fitted with the stem and MVT below the Gilflo ILVA.

Note:
The MVT is for saturated steam applications only.

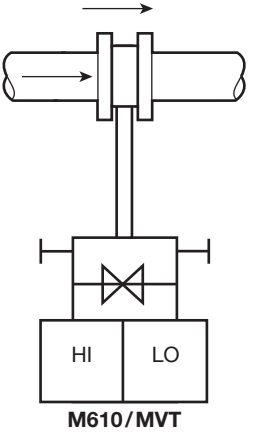


Fig. 19 Liquids, vapours, steam

If for space limitations, the configuration described in Figure 17 is not possible then the arrangement shown below should be used (with vented gas collecting chambers at **A** for liquids).

Note:
The MVT is for saturated steam applications only.

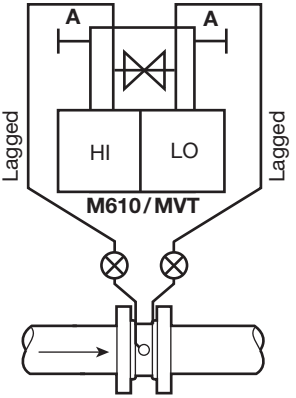


Fig. 20 Gases

For gases where the ILVA is installed in a horizontal line, the M610 should be mounted above the ILVA as shown below.

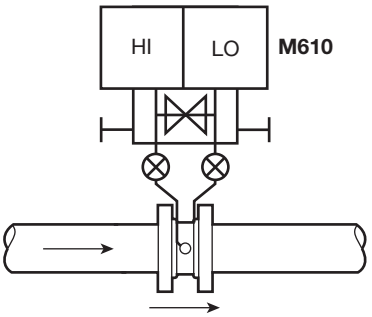
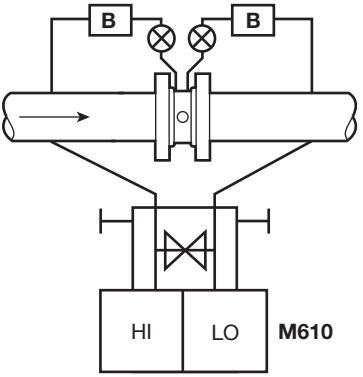


Fig. 21 Gases

If, for space limitations the configuration described in Figure 20 is not possible, then the arrangement shown below should be used. The condensate pots shown at **B** are only required if the gas is wet.



6. Initial start-up

After all mechanical and electrical work has been completed, the initial start-up procedures should be followed.

Standard installation

6.1 Steam systems, vapour systems and all applications where the impulse lines must be filled with water

6.1.1 Close both F50C isolation valves adjacent to the Gilflo ILVA pipeline unit.

6.1.2 Open all the valves on the 3-way manifold on the M610/MVT assembly.

6.1.3 Fill both impulse lines with water (with antifreeze if required) through the equal 'T' (Figure 15).

6.1.4 Ensure that no air bubbles are trapped in the impulse lines by using the bleed screws on the M610/MVT.

6.1.5 Where an EL2600 pressure transmitter is fitted to the system, remove the pressure transmitter and fill the vertical cooling leg with water. Refit the pressure transmitter and ensure that its isolation valve is open.

6.1.6 Reassemble all impulse pipework (if applicable).

6.1.7 Close the LO valve on the 3-way manifold.

6.1.8 Open both F50C isolation valves. Adjust zero on M610/MVT to read 4.00 mA (see Sections 7.2 and 7.3).

6.1.9 Close the central equalisation valve on the 3-way manifold.

6.1.10 Open LO valve on the 3-way manifold.

The system is now operational.

Note: To commission the flow computer, the 'ILVA commissioning option' should be chosen on the M800 series flow computer, and coefficients 'VWXYZ' should be used.

For flow computers without the 'ILVA commissioning option', (M200 version flow computers with software version V905 - 12.00 and below), the 'ABCDE' coefficients should be used in the 'Gilflo commissioning option'. Please refer to separate literature and the ILVA calibration pack supplied with the flowmeter.

6.2 Liquids, gases and all applications where the impulse lines are filled with the fluid/gas being metered

Note: for all applications where the working fluid is above 85°C (185°F), care should be taken to avoid subjecting the M610 to excessive temperatures as this could result in permanent damage. The impulse line configuration shown in Figure 21 is suitable.

6.2.1 Close both F50C isolation valves adjacent to the ILVA pipeline unit.

6.2.2 Close the LO valve on the 3-way manifold.

6.2.3 Open the central equalisation valve and HI valve on the 3-way manifold.

6.2.4 Open both the F50C isolation valves adjacent to the ILVA pipeline unit.

6.2.5 Slowly bleed the air/gases from the system using the bleed screws on the M610. Adjust zero on M610 to read 4.00 mA (see Section 7.2).

6.2.6 Close the central equalisation valve on the 3-way manifold.

6.2.7 Open the LO valve on the 3-way manifold.

6.2.8 Where an EL2600 pressure transmitter is being used for density compensation, ensure that its isolation valve is open.

The system is now operational.

Note: To commission the flow computer, the 'ILVA commissioning option' should be chosen on the M800 series flow computer, and coefficients 'VWXYZ' should be used.

For flow computers without the 'ILVA commissioning option', (M200 version flow computers with software version V905 - 12.00 and below), the 'ABCDE' coefficients should be used in the 'Gilflo commissioning option'. Please refer to separate literature and the ILVA calibration pack supplied with the flowmeter.

6.3 Versions fitted with compact stem - **for saturated steam applications only**

6.3.1 Close the Hi and Lo isolation valves on the 3-way manifold (outside valves).

6.3.2 Open the bypass valve on the manifold (centre).

6.3.3 Adjust zero on the MVT to read 4.0 mA. (See Scanner 2000 IMI).

6.3.4 Close the bypass valve on the manifold.

6.3.5 Open the HI and Lo isolation valves on the manifold.

7. Maintenance

There are several basic checks that should be carried out on a regular basis:

7.1 Impulse lines

We at Spirax Sarco recommend periodic cleaning of the impulse lines to prevent excessive build-up of sludge or deposits.

7.2 M610 DP transmitter

Zero and span checks on the DP transmitter should be carried out on a regular basis (ideally every 6 months). The 3-way manifold that forms part of the M610 assembly makes this easy. The procedure for checking the DP transmitter without removing it from site or shutting down the flow is as follows:

7.2.1 Ensure that the DP transmitter is powered up.

7.2.2 Close the F50C primary isolation valves adjacent to the ILVA flowmeter.

7.2.3 Open all the valves on the 3-way manifold. This will allow the pressure in the two impulse lines to equalise.

7.2.4 Using a suitable milliammeter, check that the output of the DP transmitter is 4.00 mA across terminals CK+ and CK- as shown in Figure 16. (If a flow display is being used, it should read zero.) Set the mode switch (SW1) to the 'zero' position and adjust the zero output using the output adjustment until a value of exactly 4.00 mA is achieved.

Fig. 22

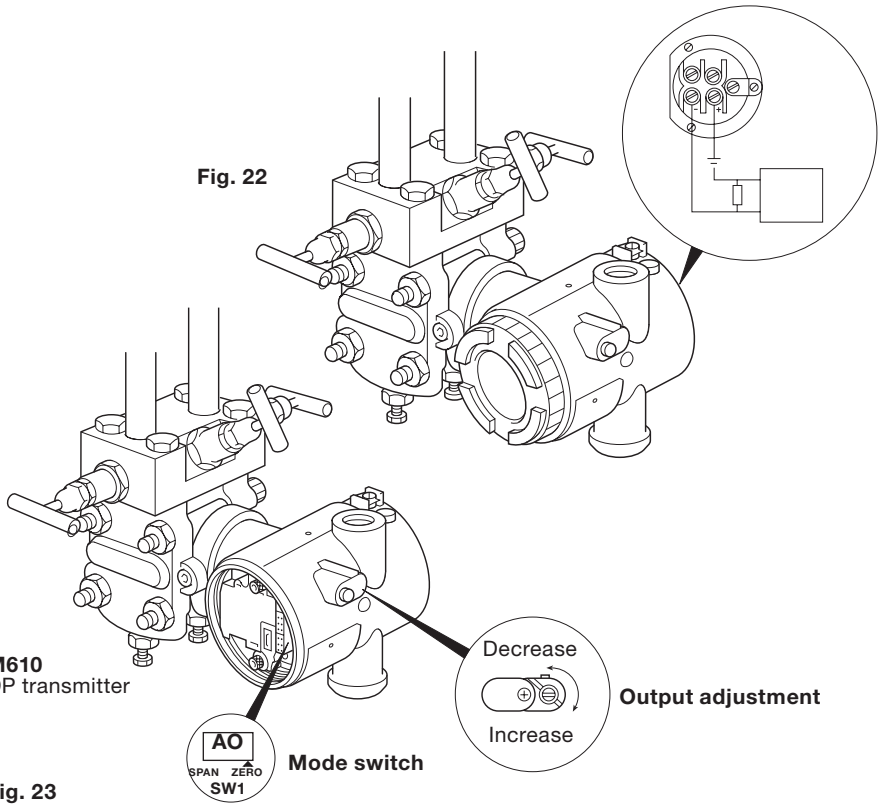


Fig. 23

7.2.5 Open central equalisation valve on 3-way manifold.

7.2.6 Remove both bleed plug assemblies on the DP transmitter.

7.2.7 Close central equalisation valve on 3-way manifold.

7.2.8 Using a suitable precision pressure source attached to the HI pressure port of the DP transmitter as shown in Figure 24, apply a pressure corresponding to the set pressure of the unit. (For ILVA flowmeters, this is normally factory set to 498 mbar/200 inches water gauge).

7.2.9 Set the mode switch (SW1) to the 'span' position and adjust the span output using the output adjustment until a value of exactly 20.00 mA is achieved.

7.2.10 Remove pressure source, open the central equalisation valve and then refit and tighten the bleed plug assemblies.

7.2.11 Close the LO valve on the 3-way manifold.

7.2.12 Open both the F50C isolation valves adjacent to the ILVA pipeline unit.

7.2.13 Close the central equalisation valve on the 3-way manifold.

7.2.14 Open the LO valve on the 3-way manifold.

7.2.15 Where an EL2600 pressure transmitter is being used for density compensation, ensure that its isolation valve is open.

7.2.16 Remove test leads and replace all covers on the M610 transmitter.

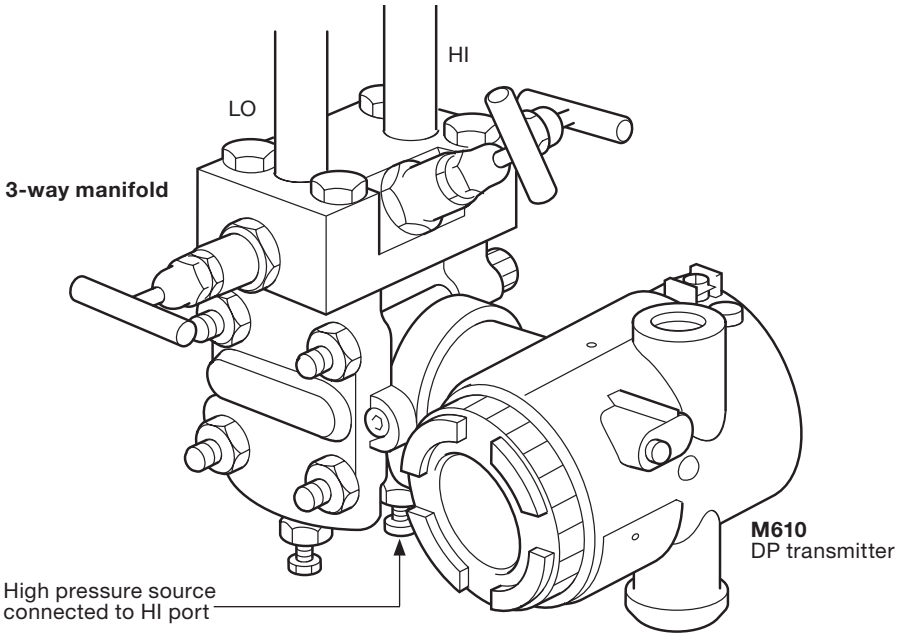


Fig. 24

7.3 Multi-variable transmitter (MVT)

See the product specific Installation and Maintenance Instructions for details.

7.4 Versions fitted with compact stem -
for saturated steam applications only

7.4.1 Close the Hi and Lo isolation valves on the 3-way manifold (outside valves).

7.4.2 Open the bypass valve on the manifold (centre).

7.4.3 Adjust zero on the MVT to read 4.0 mA. (See Scanner 2000 IMI).

7.4.4 Close the bypass valve on the manifold.

7.4.5 Open the HI and Lo isolation valves on the manifold.

7.5 Optional 5-way manifold

An optional 5-way manifold is available with two additional isolating valves. These can be used as impulse line/compact stem drain/blow down points. The outlet ports must be hard piped to a safe area, as line pressure will be discharged.

7.5.1 To blow down the impulse lines close the Hi, Lo and bypass valves.

7.5.2 Slowly open either of the vent isolation valves for few seconds until dirt/sludge has cleared.

7.5.3 Close the vent isolation valve and repeat the process (Section 7.5.2) on the other side.

7.5.4 Refill the impulse lines as per Section 6. For the version with compact stem allow time for the compact stem to refill with condensate before continuing.

7.5.5 Zero the M610 or MVT following instructions as per Sections 7.2 to 7.4.

7.6 Gilflo ILVA pipeline unit

It is also possible to carry out some simple checks on the ILVA flowmeter on site to confirm its correct operation. To do this, it is necessary to remove the unit from the line.

Checks possible:

1. **Cone free to move on shaft.**
2. **Reference dimensional check.**
3. **DP tappings clear.**

7.6.1 Cone free on shaft
With the ILVA positioned vertically as shown in Figure 25, check that the cone is free to move up and down the shaft against the resistance of the spring.

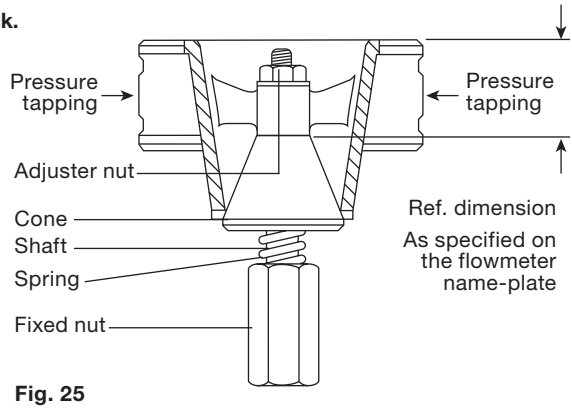


Fig. 25

7.6.2 Reference dimensional check.

Having confirmed that the cone is free to move on the shaft, it is possible to check the initial production setting of the flowmeter. The 'Ref. dimension' referred to in the diagram (Figure 26) (and specified on the name-plate) is the machined dimension to the back of the body centre boss - which acts as the cone forward travel stop. All Gilflo ILVA flowmeters are factory set to have little to no free travel or pre-load on this stop when the flowmeter is in the vertical orientation shown (that is, with the cone compressing the spring under gravity).

To check the setting:

Position the flowmeter vertically as indiacted in Figure 26. Try lifting the cone against gravity and there should be little to no free perceptible movement of the cone.

If there is perceptible movement:

- Within 1% of the 'Ref. dimension' - no adjustment is necessary.
- Within 3% of the 'Ref. dimension' - readjust to remove the free travel.
- Greater than 3% of the 'Ref. dimension' - please consult Spirax Sarco.

To adjust the cone setting:

1. Loosen the adjuster nut on the front of the Gilflo ILVA.
2. Rotate the shaft clockwise ⅛ of a turn at a time using the fixed nut at the rear of the flowmeter.
3. Retighten the adjuster nut to the correct torque (see Table 1 below).
4. Recheck free travel/pre-load.
5. If necessary, repeat steps (1) to (4) until the correct setting is obtained.

Important: Ensure that the adjuster nut is correctly torqued after completion of the adjustment.

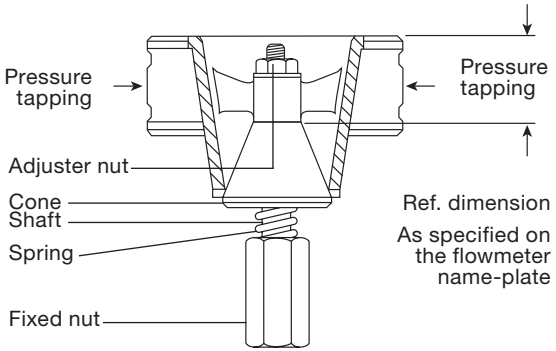


Fig. 26

7.6.3 DP tappings clear

Check that the DP tappings are not blocked. The Gilflo ILVA is now ready to be reinstalled in the line.

Table 1 Adjuster nut minimum tightening torques

Size	Torque	
	N m	lbf ft
DN50 (2")	7	5.2
DN80 (3")	30	22.1
DN100 (4")	114	84.0
DN150 (6")	373	275.0
DN200 (8")	373	275.0
DN250 (10")	373	275.0
DN300 (12")	634	468.0

8. Spare parts

Please note: There are no available spare parts for the Gilflo ILVA. The only available spares are for the Gilflo ILVA with mass flow transmitter and compact stem.

Spare parts

The spare parts available are detailed below. No other parts are supplied as spares.

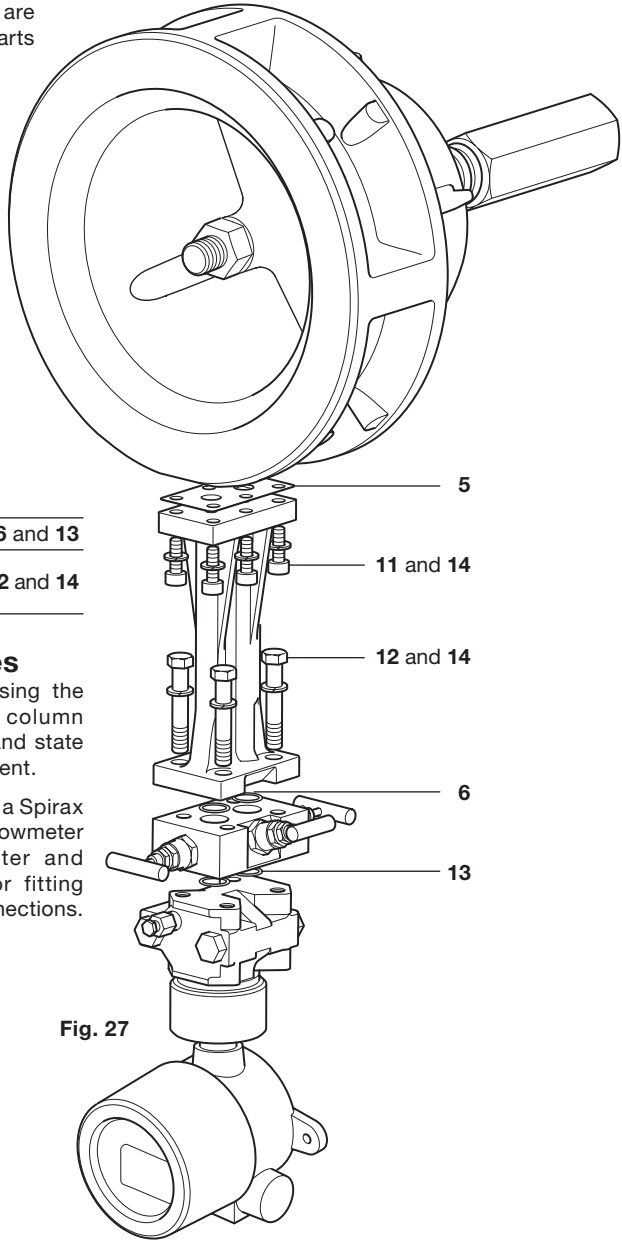


Fig. 27

Available spares	
Gasket set	**5, 6** and **13**
Compact stem screws and spring washers	**11, 12** and **14**

How to order spares

Always order spares by using the description given in the column headed 'Available spares' and state the size and type of equipment.

Example: 1 - Gasket set for a Spirax Sarco DN250 Gilflo ILVA flowmeter with mass flow transmitter and compact stem suitable for fitting between EN 1092 PN16 connections.

9. Fault finding

Symptom	Possible cause	Action
1. With flow in line, system reads zero.	Primary isolation valves adjacent to the Gilflo ILVA closed	Commission system (see Section 6)
	Isolation valves on 3-way manifold closed	Commission system (see Section 6)
	Equalisation valve on 3-way manifold open	Commission system (see Section 6)
	M610/MVT incorrectly wired	Check wiring (see flow computer IMI)
	Impulse line(s) blocked	Clear lines and commission system (see Section 6)
	Impulse lines reversed (HI to LO, LO to HI)	Rectify and commission system (see Section 6)
	Gilflo ILVA unit fitted the wrong way round	Reinstall and commission system (see Section 6)
2. With no flow in line, system does not read zero.	M610/MVT out of calibration	See Section 7
	Zero drift on M610/MVT	See Section 7
	Dirt /air in impulse lines	Clear lines and commission system (see Section 6)
	Impulse lines blocked	Clear lines and commission system (see Section 6)
3. System appears to read incorrectly.	Any one or combination of the above causes	See relevant actions above
	Damaged / jammed Gilflo ILVA pipeline unit	Remove and check (see Section 7)