spirax sarco

TI-P337-06
MI Issue 7

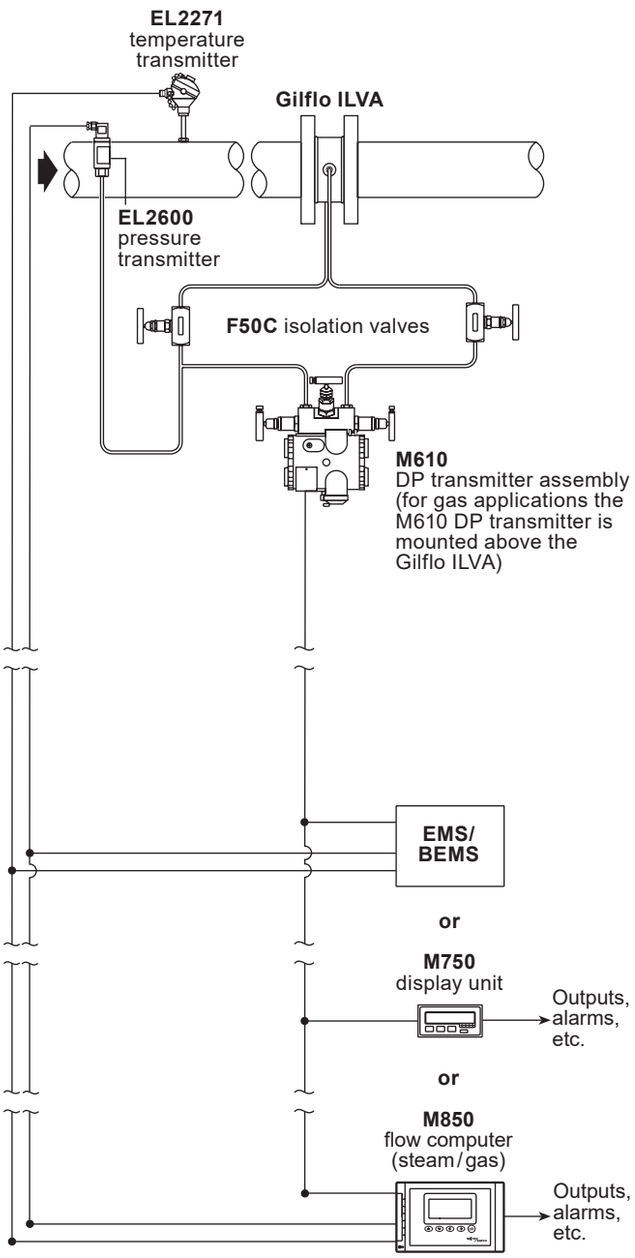
Gilflo ILVA Flowmeters System Overview

Description

The Spirax Sarco Gilflo ILVA flowmetering system consists of two major parts:

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. The M610 DP transmitter assembly. This measures the differential pressure across the Gilflo ILVA pipeline unit and converts it to a 4 -20 mA output signal. This output signal can be used in a number of ways:
   - **i-** To act as a suitable input to an EMS/BEMS which can be programmed by the user to carry out the linearising of the output signal based on the calibration data that is supplied with each Gilflo ILVA flowmeter. Additional inputs from the EL2600 pressure transmitter and EL2271 temperature transmitter can be used to carry out density compensation for compressible flow applications.
   - **ii-** To supply an M750 display unit. This gives a non-compensated display of rate of flow and totalised flow. It is suitable for liquid, gas and steam applications where density compensation is not required.
   - **iii-** To supply a Spirax Sarco M850 flow computer. Use of the pressure and temperature transmitters enables automatic density compensation to be carried out for compressible flow applications. See the relevant TI for details of pressure/temperature limits for flow computers.

The Gilflo ILVA pipeline unit can be used to measure the flow of most industrial liquids, gases and vapours within the pressure and temperature limits detailed in the TI's.



Installation

Care must be taken to meet all the requirements of the Installation and Maintenance Instructions that are included with the equipment. Some installation points to watch are noted overleaf.
In addition, heat metering is possible on saturated steam systems by replacing the EL2600 pressure transmitter with an EL2271 temperature transmitter in the condensate return line (M850 system only).

Electrical wiring

All electrical wiring must be carried out to the appropriate standards. Full wiring interconnection details are included with the equipment.

Associated equipment

Item	Description
EL2271	Temperature transmitter
EL2600	Pressure transmitter
F50C	Isolation valve
Gilflo ILVA	Pipeline unit
M610	DP transmitter assembly
M750	Display unit
M850 Flow computer	Steam or gas flow computer

Installation points to watch:

1. Ensure that all pipework is adequately supported and properly aligned. Special care should be taken to ensure that the Gilflo ILVA pipeline unit is concentrically mounted in the line.
2. The Gilflo ILVA pipeline unit should be selected on capacity rather than line size. Where line size changes on steam systems are necessary, use eccentric reducers to avoid build-up of condensate.
3. The minimum recommended lengths of straight pipe upstream and downstream are 6 D and 3 D respectively. See other literature for more details concerning the Gilflo ILVA.
4. Take care to ensure the correct direction of flow as indicated by the arrow on the flowmeter body.
5. Take care to avoid reverse flow through the flowmeter.
6. Avoid installing the flowmeter downstream of a pressure reducing valve (especially on steam systems) as this may cause inaccurate readings. Similarly, avoid installing the flowmeter downstream of a partially open valve.
7. Remember that actuated valves may cause rapid pressure fluctuations which could cause damage.
8. On steam or liquid systems, the M610 DP transmitter assembly is mounted below the flowmeter. Take care to ensure that all impulse lines remain full to prevent damage to the DP transmitter through contact with steam or high temperature liquid.
9. For steam applications, care should be taken to ensure adequate line drainage, trapping etc., to avoid condensate slugs impacting the flowmeter. Where practicable, steam separators should be fitted. These should be drained using a float trap set.
10. For gas applications, the M610 DP transmitter assembly is installed above the pipework. Ensure that the impulse lines allow free drainage of moisture away from the DP transmitter and back into the pipeline.

TI-P337-05
EMM Issue 17

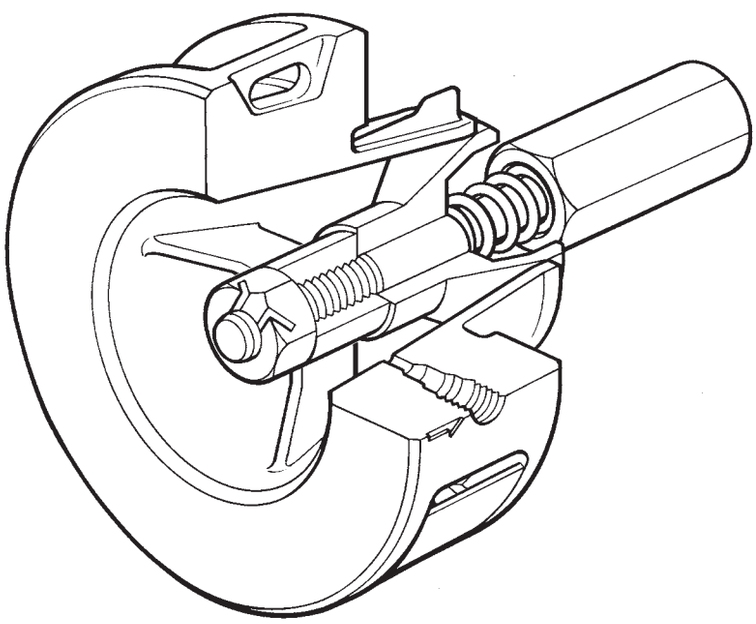
ILVA
Flowmeter

Description

The ILVA flowmeter operates on the spring loaded variable area principle and produces a differential pressure related to the rate of flow. It can be used with most industrial fluids, gases and both saturated and superheated steam. A general description of the ILVA flowmetering system and its associated equipment is given in a separate TI sheet.

Sizes and pipe connections

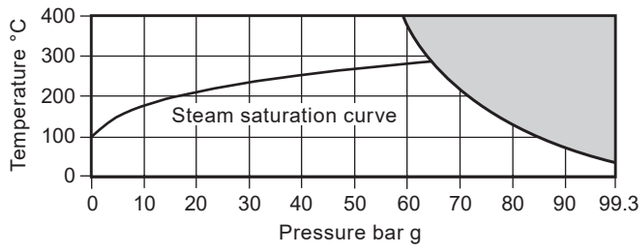
DN50, DN80, DN100, DN150, DN200. For DN250 and DN300 sizes see separate literature.
Suitable for fitting between the following flanges:
EN 1092 PN16, PN25 and PN40.
BS 10 Table H.
ASME B 16.5 Class 150, 300 and 600.
JIS 20.
KS 20.
The ILVA flowmeter should be installed in pipework manufactured to BS 1600 or ASME B 36.10 Schedule 40.
For different pipe standards / schedules downstream spool pieces with equivalent internal diameter as in BS 1600 or ASME B 36.10 Schedule 40 should be used. If this is not possible, please contact Spirax-Sarco Limited.



Materials

Part	Material
Body	Cast stainless steel S.316 (CF8M / 1.4408)
Internals	431 S29 / S303 / S304 / S316
Spring	Inconel X750

Pressure/temperature limits



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

Body design conditions	ASME 600
PMA Maximum allowable pressure	99.3 bar g @ 38 °C
TMA Maximum allowable temperature	400 °C @ 58.9 bar g
Minimum allowable temperature	-29 °C
PMO Maximum operating pressure is dependant on the flange specification	
Minimum operating pressure	0.6 bar g
TMO Maximum operating temperature	400 °C @ 58.9 bar g
Minimum operating temperature **Note:** For lower operating temperatures consult Spirax Sarco.	-29 °C
Maximum viscosity	30 centipoise
ΔPMX Maximum differential pressure	498 m bar
Designed for a maximum cold hydraulic test pressure of:	149 bar g

Performance

The ILVA is designed to be used in conjunction with linearising electronics such as the range of flow computers or M750 display unit. Alternatively the output signal linearisation can be performed on an EMS / BEMS or equivalent.
Accuracy when used with Spirax Sarco flow computers or M750:
±1% of measured value from 5% to 100% of maximum rated flow.
±0.1% FSD from 1% to 5% of maximum rated flow.
Repeatability better than 0.25%
Turndown: up to 100:1
Caution: Scanner 2000 steam mass flow transmitters are uniquely configured at the factory to work with a single, specific ILVA flowmeter. For correct operation the configured Scanner 2000 transmitter must always be installed with its allocated flowmeter. Labels on the packaging give the serial numbers of the matched products.

Pressure drop

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

Flow capacity

To determine the capacity of the ILVA for different fluids, it is necessary to calculate the equivalent water flowrate Q_E (in l/min) as described in Step 1, under the section 'sizing the ILVA' then selecting the appropriate size of flowmeter from the Table under Step 2 overleaf.

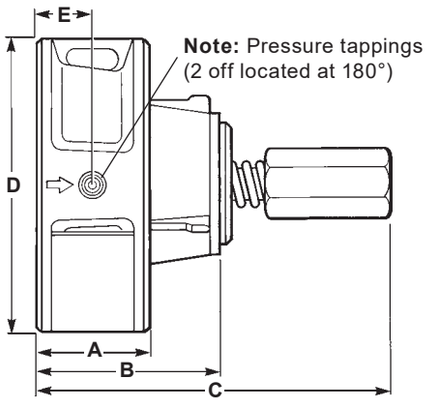
How to order

Example: 1 off Spirax Sarco DN150 ILVA flowmeter for installation between flanges to EN 1092 PN40. Body material 316 stainless steel. Flow medium saturated steam at 10 bar g, maximum flow 8 000 kg / h.

Dimensions/weights
(approximate) in mm and kg

Size	A	B	C	D	E	Weight
DN50	35	63	140	103	17.5	2.0
DN80	45	78	150	138	22.5	3.9
DN100	60	103	205	162	30.0	8.3
DN150	75	134	300	218	37.5	14.2
DN200	85	161	360	273	42.5	23.6

Note:- Pressure tappings are threaded ¼" NPT



Safety information, installation and maintenance
For full details see the Installation and Maintenance Instructions supplied with the product.

Installation note
The following main points are given here for guidance:

1. The ILVA should be mounted with a minimum of 6 straight pipe diameters upstream and 3 downstream. No valves, fittings or cross sectional changes are permitted within these pipe lengths. Where an increase in nominal pipe diameter is required upstream of the flowmeter, the length of straight pipe should be increased to 12 diameters. Similarly, where a ILVA is installed downstream of two 90 degree bends in two planes, a pressure reducing valve or a partially open valve, 12 upstream pipe diameters should be allowed.
2. It is important that the internal upstream and downstream diameters of pipe are smooth. Ideally seamless pipes should be used. It is recommended that slip-on flanges be used to avoid any intrusive weld beads on the internal diameter of the pipe.
3. Care should be taken to install the ILVA concentrically in the line. If this is not done, flow measurement errors may occur.
4. The ILVA should be mounted horizontally. For vertical installations, consult Spirax Sarco.
5. For steam applications, good basic steam engineering practices should be followed:
   - Correct line drainage through adequate trapping.
   - Good alignment and support of associated pipework.
   - Line size changes achieved by the use of eccentric reducers

Maintenance note
There are no user serviceable parts in the ILVA. A visual check together with confirmation that the orifice/cone reference dimension is within tolerance is possible.

Sizing the ILVA for saturated steam - kg/h

Minimum and maximum flowrates in kg/h at different pressures (bar g)
Note: Maximum steam flowrates are calculated at maximum differential pressure.

Size		Steam pressure bar g										
		1	3	5	7	10	12	15	20	25	30	40
DN50	Maximum	307	427	517	594	693	752	832	952	1 060	1 160	1 341
	Minimum	3	4	5	6	7	8	8	10	11	12	13
DN80	Maximum	1 206	1 675	2 032	2 332	2 721	2 951	3 268	3 740	4 163	4 554	5 265
	Minimum	12	17	20	23	27	30	33	37	42	46	53
DN100	Maximum	2 475	3 435	4 167	4 784	5 581	6 054	6 703	7 671	8 540	9 341	10 800
	Minimum	25	34	42	48	56	61	67	77	85	93	108
DN150	Maximum	5 981	8 301	10 071	11 562	13 487	14 631	16 119	18 538	20 639	22 573	26 101
	Minimum	60	83	101	116	135	146	162	185	206	226	261
DN200	Maximum	11 756	16 317	19 796	22 726	26 509	28 757	31 840	36 437	40 566	44 368	51 301
	Minimum	118	163	198	227	265	288	318	364	406	444	513

Sizing the ILVA flowmeter

3.2
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In order to determine the flow capacity of a ILVA pipeline unit, it is necessary to calculate the equivalent water flowrate (Q_E) based on the anticipated actual flow (see Step 1). The Table below is used to select the appropriate unit (steam only).

Step 1.

Determine equivalent water flowrate (Q_E) in l/min:-

	Mass flow units	Volumetric units
Liquids	$Q_E = \frac{q_m}{\sqrt{SG}}$	$Q_E = Q_L\sqrt{SG}$
Gases and steam actual flow conditions	$Q_E = q_M\sqrt{\frac{1000}{D_F}}$	$Q_E = Q_F\sqrt{\frac{D_F}{1000}}$
Gases standard conditions	$Q_E = \frac{q_M}{\sqrt{\frac{D_S}{1000} \times \frac{P_F}{P_S} \times \frac{T_S}{T_F}}}$	$Q_E = Q_S\sqrt{\frac{D_S}{1\,000} \times \frac{P_S}{P_F} \times \frac{T_F}{T_S}}$

Where:

Q_E = Equivalent water flowrate (litres / min)

q_m = Mass flowrate (kg / min)

Q_L = Maximum liquid flowrate (litres / min)

Q_S = Maximum gas flowrate at standard conditions (litres / min)

Q_F = Maximum gas flowrate at actual flow conditions (litres / min)

SG = Specific gravity

D_S = Density of gas at standard conditions (kg / m³)

D_F = Density of gas at actual flow conditions (kg / m³)

P_S = Standard pressure: 1.013 bar a, 1.033 kg/cm² a, 14.70 psi a

P_F = Actual flow pressure in same absolute units as P_S

T_S = Standard temperature (K) = °C + 273

T_F = Actual flow temperature (K) = °C + 273

Step 2.

Using the value of Q_E as determined in Step 1, select the correct size of the ILVA flowmeter using the Table below.

In practice, it will often be the line size that determines the choice of the flowmeter.

Flowmeter type	Q_E litres/min		Maximum DP	
	Maximum	Minimum	Wg	m bar
DN50	149	1	200	498
DN80	585	6	200	498
DN100	1200	12	200	498
DN150	2900	29	200	498
DN200	5700	57	200	498

Example: Determine which ILVA pipeline unit is required to measure the flow of compressed air when:
1: Estimated maximum rate of flow = 500 s m³/h at 7 bar g and 20 °C

Note: Standard conditions = 1.013 bar a, 0 °C giving a standard density of 1.29 kg/m³

2: Calculate Q_E from: $$Q_E = Q_S \sqrt{\frac{D_S}{1\,000} \times \frac{P_S}{P_F} \times \frac{T_F}{T_S}}$$

$$Q_E = (500 \times 16.667) \times \sqrt{\frac{1.29}{1000} \times \frac{1.013}{8.013} \times \frac{293}{273}}$$

$$Q_E = 110 \text{ litres/min}$$

So a DN50 ILVA is recommended.
Note: 1 m³/h = 16.667 litres/min

How to order example

1 off Spirax Sarco DN50 ILVA flowmeter suitable for fitting between EN 1092 PN40 connections.

TI-P337-46
EMM Issue 5

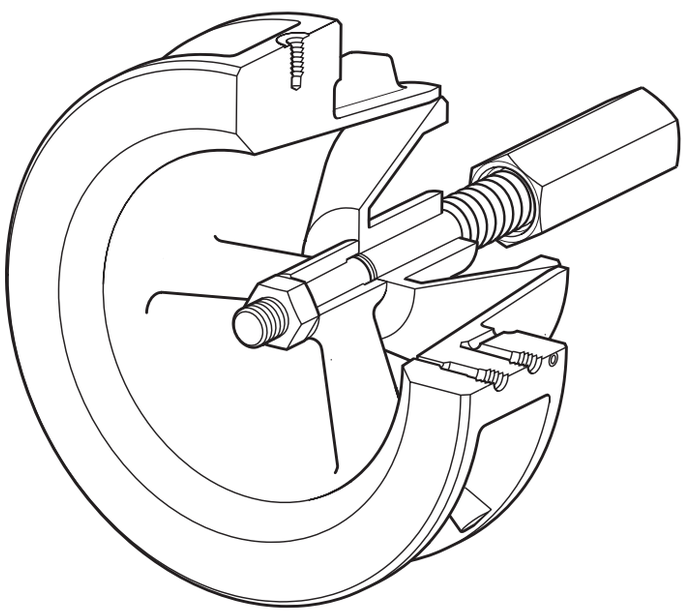
ILVA Flowmeter DN250 and DN300

Description

The ILVA flowmeter operates on the spring loaded variable area principle and produces a differential pressure related to the rate of flow. It can be used with most industrial fluids, gases and both saturated and superheated steam. A general description of the ILVA flowmetering system and its associated equipment is given in a separate TI sheet.

Sizes and pipe connections

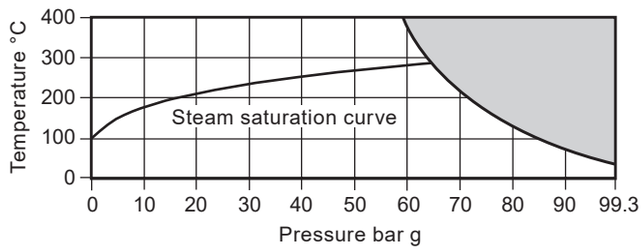
DN250 and DN300. For DN50, DN80, DN100, DN150 and DN200 sizes see separate literature.
Suitable for fitting between the following flanges:
EN 1092 PN16, PN25 and PN40.
ASME B 16.5 Class 150, 300 and 600.
JIS 20.
KS 20.
The ILVA flowmeter should be installed in pipework manufactured to BS 1600 or ASME B 36.10 Schedule 40.For different pipe standards/ schedules, downstream spool pieces with an equivalent internal diameter to BS 1600 or ASME B 36.10 Schedule 40 should be used. If this is not possible, please contact
Spirax Sarco Limited.



Materials

Part	Material
Body	Cast stainless steel S.316 (CF8M/1.4408)
Internals	431 S29/S303/S304/S316
Spring	Inconel X750

Pressure/temperature limits



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

Body design conditions	ASME 600
PMA Maximum allowable pressure	99.3 bar g @ 38 °C
TMA Maximum allowable temperature	400 °C @ 58.9 bar g
Minimum allowable temperature	-29 °C
PMO Maximum operating pressure is dependant on the flange specification	
Minimum operating pressure	0.6 bar g
TMO Maximum operating temperature	400 °C @ 58.9 bar g
Minimum operating temperature **Note:** For lower operating temperatures consult Spirax Sarco.	-29 °C
Maximum viscosity	30 centipoise
ΔPMX Maximum differential pressure	498 m bar
Designed for a maximum cold hydraulic test pressure of:	149 bar g

Performance

The ILVA is used in conjunction with linearising electronics such as Spirax Sarco flow computers or M750 display unit. Alternatively the output signal linearisation can be performed on an EMS/BEMS or equivalent.

Accuracy when used with Spirax Sarco flow computers or M750:
±1% of measured value from 5% to 100% of maximum rated flow.
±0.1% FSD from 1% to 5% of maximum rated flow.
Repeatability better than 0.25%
Turndown: up to 100:1

Caution: The Scanner 2000 mass flow transmitters can be 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.

Pressure drop

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

Flow capacity

To determine the capacity of the ILVA for different fluids, it is necessary to calculate the equivalent water flowrate Q_E (in l/min) as described in Step 1, under the section 'sizing the ILVA' then selecting the appropriate size of flowmeter from the Table under Step 2 overleaf.

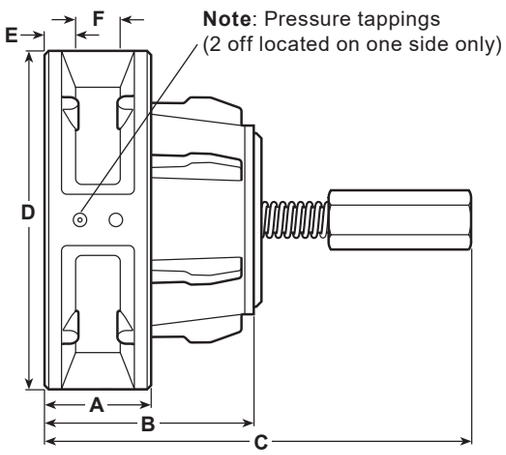
How to order

Example: 1 off Spirax Sarco DN250 ILVA flowmeter for installation between EN 1092 PN40 flanges. The body material is to be 316 stainless steel. The flow medium will be saturated steam at 10 bar g and the maximum flow will be 28 000 kg/h.

Dimensions/weights
(approximate) in mm and kg

Size	A	B	C	D	E	F	Weight
DN250	104	204	444	330	35.0	35	41.5
DN300	120	250	530	385	42.5	35	67.0

Note:- Pressure tappings are threaded ¼" NPT



Safety information, installation and maintenance
For full details see the Installation and Maintenance Instructions supplied with the product.

Installation note:
The following main points are given here for guidance:

1. The ILVA should be mounted with a minimum of 6 straight pipe diameters upstream and 3 downstream. No valves, fittings or cross sectional changes are permitted within these pipe lengths. Where an increase in nominal pipe diameter is required upstream of the flowmeter, the length of straight pipe should be increased to 12 diameters. Similarly, where a ILVA is installed downstream of two 90 degree bends in two planes, a pressure reducing valve or a partially open valve, 12 upstream pipe diameters should be allowed.
2. It is important that the internal upstream and downstream diameters of pipe are smooth. Ideally seamless pipes should be used. It is recommended that slip-on flanges be used to avoid any intrusive weld beads on the internal diameter of the pipe.
3. Care should be taken to install the ILVA concentrically in the line. If this is not done, flow measurement errors may occur.
4. The ILVA should be mounted horizontally. For vertical installations, consult Spirax Sarco.
5. For steam applications, good basic steam engineering practices should be followed:
   - Correct line drainage through adequate trapping.
   - Good alignment and support of associated pipework.
   - Line size changes achieved by the use of eccentric reducers

Maintenance note:
There are no user serviceable parts in the ILVA. A visual check together with confirmation that the orifice/cone reference dimension is within tolerance is possible.

Sizing

ILVA flowmeter minimum and maximum saturated steam flowrates in kg/h

Notes:
1. These capacities are based on a differential pressure across the flowmeter of 498 m bar H_20 (200 Inches).
2. Minimum flow is 1% of maximum (100:1 turndown).
3. The table below is a guide only.

Size		Q_E	Steam pressure bar g										
			1	3	5	7	10	12	15	20	25	30	40
DN250	Max	7 750	15 985	22 185	26 915	30 899	36 043	39 099	43 292	49 541	55 155	60 325	69 758
	Min	78	160	222	269	309	433	391	433	495	552	603	698
DN300	Max	10 975	22 637	31 417	38 115	43 758	51 042	55 369	61 307	70 157	78 107	85 428	98 778
	Min	110	226	314	381	438	510	554	613	702	781	854	988

Sizing the ILVA flowmeter

In order to determine the flow capacity of a ILVA pipeline unit, it is necessary to calculate the equivalent water flowrate (Q_E) based on the anticipated actual flow (see Step 1). The Table below is used to select the appropriate unit (steam only).

3.2
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Step 1.

Determine equivalent water flowrate (Q_E) in l/min:-

	Mass flow units	Volumetric units
Liquids	$Q_E = \frac{q_m}{\sqrt{SG}}$	$Q_E = Q_L\sqrt{SG}$
Gases and steam actual flow conditions	$Q_E = q_M\sqrt{\frac{1000}{D_F}}$	$Q_E = Q_F\sqrt{\frac{D_F}{1000}}$
Gases standard conditions	$Q_E = Q_S\sqrt{\frac{D_S}{1000} \times \frac{P_F}{P_S} \times \frac{P_F}{T_S}}$	$Q_E = Q_S\sqrt{\frac{D_S}{1\,000} \times \frac{P_S}{P_F} \times \frac{T_F}{T_S}}$

Where:

Q_E = Equivalent water flowrate (litres/min)

q_m = Mass flowrate (kg/min)

Q_L = Maximum liquid flowrate (litres/min)

Q_S = Maximum gas flowrate at standard conditions (litres/min)

Q_F = Maximum gas flowrate at actual flow conditions (litres/min)

SG = Specific gravity

D_S = Density of gas at standard conditions (kg/m³)

D_F = Density of gas at actual flow conditions (kg/m³)

P_S = Standard pressure: 1.013 bar a, 1.033 kg/cm2 a, 14.70 psi a

P_F = Actual flow pressure in same absolute units as P_S

T_S = Standard temperature (K) = °C + 273

T_F = Actual flow temperature (K) = °C + 273

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Step 2.

Using the value of QE as determined in Step 1, select the correct size of the ILVA flowmeter using the Table below.

In practice, it will often be the line size that determines the choice of the flowmeter.

Flowmeter type	Max. Q_E litres/min	Max. pressure drop Wg
DN250	7 750	200
DN300	10 975	200

Example: Determine which ILVA pipeline unit is required to measure the flow of compressed air when:

1: Estimated maximum rate of flow = 28 000 s m³/h at 7 bar g and 20 °C.
Note: Standard conditions = 1.013 bar a, 0°C giving a standard density of 1.29 kg/m³

2: Calculate Q_E from: $$Q_E = Q_S \sqrt{\frac{D_S}{1\,000} \times \frac{P_S}{P_F} \times \frac{T_F}{T_S}}$$

$$Q_E = (28\,000 \times 16.667) \times \sqrt{\frac{1.29}{1\,000} \times \frac{1.013}{8.013} \times \frac{293}{273}}$$

$$Q_E = 6\ 174 \text{ litres/min}$$

So a DN250 ILVA is recommended.
Note: 1 m³/h = 16.667 litres/min

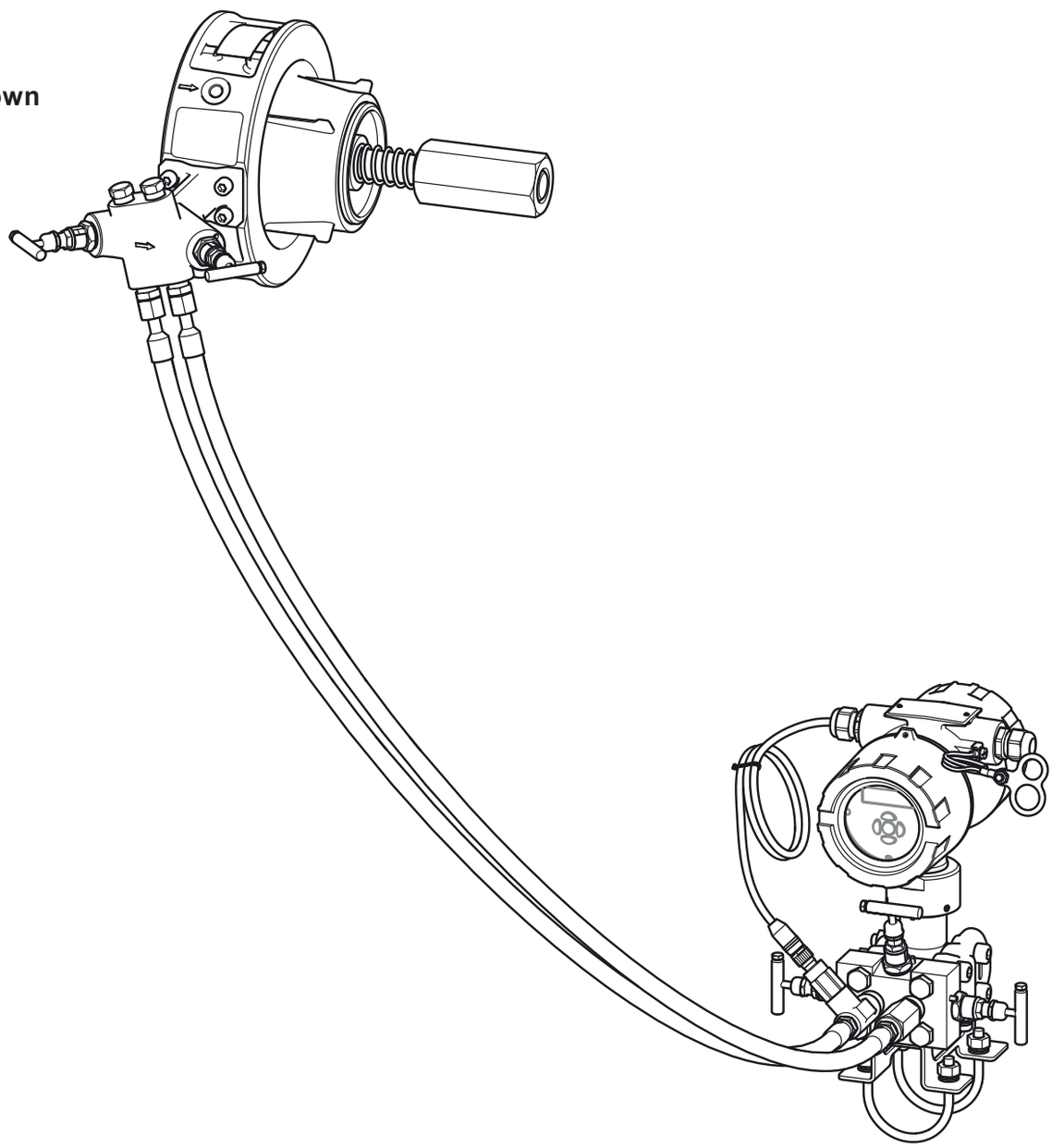
How to order example

1 off Spirax Sarco DN250 ILVA flowmeter suitable for fitting between EN 1092 PN16 connections.

TI-P337-70
EMM Issue 6

ILVA20 Flowmeter and MVT10 Differential Pressure Transmitter for Saturated and Superheated Steam Service

DN150 shown



Description

The Spirax Sarco DN150 to DN300 flowmeter with MVT10 is a calibrated system designed for use on saturated and superheated steam only, and can also be used as a net energy meter on steam applications. It operates on the spring loaded variable area principle and produces a differential pressure related to the rate of flow. The Electronics provide current loop, frequency, RS485 and Modbus outputs. Steam flow is density corrected. Pipeline pressure is also measured.

Standards

This flowmeter complies with the requirements of the EU Pressure Equipment Directive/UK Pressure Equipment (Safety) Regulations, carries the CE / UKCA marks and falls within the following PED categories:

Product		Group 1 Gases	Group 2 Gases	Group 1 Liquids	Group 2 Liquids
ILVA20	DN150 - DN200	3	3	2	SEP
	DN250 - DN300	3	3	2	1

IP rating	IP65 with correct cable glands
Electromagnetic Compatibility Directive	2014/30/EU
UK Electromagnetic Compatibility Regulations 2016	
Calibration	ISO 17025
Designed to ASME BPVC section V111	
Safety requirement for electrical equipment for measurement, control, and laboratory use	EN61010-1:2010 UL/CSA 61010-1:2012 (third edition)
IP Testing	EN60529:1992/A2:2013
Electromagnetic Compatibility – Emissions and Immunity	EN 61326-2-3:2013
Sine Vibration Sequence	EN61298-3:2008 Section 7
Transportation Vibration	EN60068-2-6:2008

Certification

This product is available with certification to EN 10204 3.1.
Note: All certification/inspection requirements must be stated at the time of order placement.

Sizes and pipe connections

Available in DN150, DN200, DN250 and DN300 pipeline sizes.
This flowmeter is a wafer design suitable for fitting between the following flanges:

- EN 1092-1 PN16, PN25 and PN40
- ASME B 16.5 Class 150 and 300
- Japanese Industrial Standard JIS 20
- Korean Standard KS 20

Note: The Spirax Sarco flowmeter should be installed in pipework manufactured to BS 1600, ASME B 36.10 Schedule 40 or EN 10216-2/EN10216-5 equivalent.

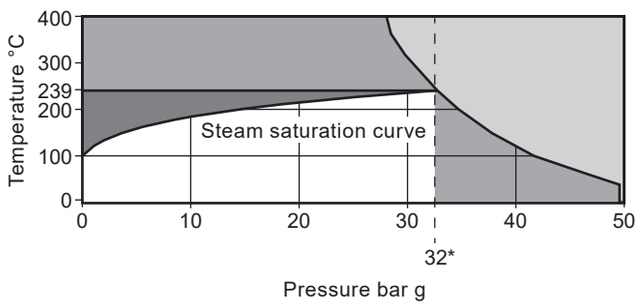
Materials

Flowmeter body	Stainless steel	
Internals	Stainless steel	316
2 way manifold	Stainless steel	1.4408 CF8M
3 way manifold	Stainless steel	316L
Impulse hoses	Stainless steel	
MVT housing	Aluminium	Copper free aluminium, max 0.5 mg
Pressure sensor	Stainless steel	
Spring	Inconel X750	

Technical data

Power supply	24 Vdc if it is loop powered
	24 Vdc, 0.25 A when using an RS 485
Outputs	4-20 mA loop (proportional to mass flow)
Pulsed output	V max. 28 Vdc, R min. 10 kΩ
Communications port	RS485/Modbus

Pressure/temperature limits



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

Outside of operating range.

Steam is superheated in this area.

Maximum design pressure	49.6 bar g @ 21 °C
Maximum design temperature	400 °C @ 29.4 bar g
Minimum design temperature	0 °C (non-freezing)
Maximum operating pressure	* 32 bar g @ 239 °C
Minimum operating pressure	0.6 bar g
Maximum operating temperature (saturation)	239 °C
Minimum operating temperature	0 °C (non-freezing)
Maximum electronics ambient temperature	55 °C
Minimum ambient temperature	0 °C
Maximum electronics humidity level	90% RH (non-condensing)
Designed for a maximum cold hydraulic test pressure of:	50 bar g
Glass on the display is rated for impact of maximum	4J
Environment Protection	IP65

Pressure drop

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

Performance

The Flowmeter is a calibrated system and consists of two parts, the ILVA20 (pipeline element) and the MVT10 (differential pressure transmitter) that includes the electronics, display and static pressure transmitter.

The MVT10 flowmeter has inbuilt electronics which give a density compensated output. An LCD display is incorporated within the electronics head. The M750 display unit can be used to provide a remote display function if required, utilising the 4 - 20 mA output.

±2% of measured value from 12% to 100% of maximum rated flow.
±0.5 %FSD from 2%-12% of flow.

Turndown	50:1 typical
Flowmeter sizing	To view the sizing suite, please go to http://prs.spiraxsarco.com/sizingsuite.

Flow (kg/h)													
		Pressure bar g											
		0.6	1	3	5	7	10	12	15	20	25	30	32
DN150	Max	5526	6137	8519	10335	11866	10692	15017	16627	19007	21183	23157	23915
	Min	110	122	170	206	237	213	300	332	380	423	463	478
DN200	Max	10436	11591	16090	19520	22411	26144	28361	31403	35898	40008	43736	45167
	Min	208	231	321	390	448	522	567	628	717	800	874	903
DN250	Max	14969	16627	23079	27999	32147	37500	40682	45044	51492	57387	62735	64788
	Min	299	332	461	559	642	750	813	900	1029	1147	1254	1295
DN300	Max	20894	23207	32213	39080	44869	52341	56781	62870	71869	80098	87561	90427
	Min	417	464	644	781	897	1046	1135	1257	1437	1601	1751	1808

3.2
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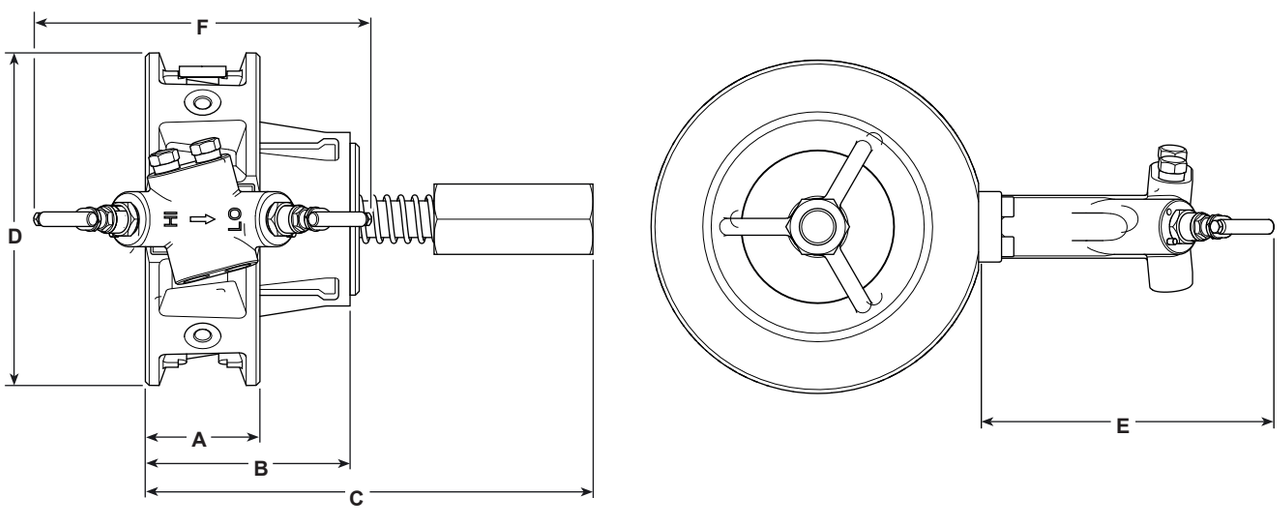
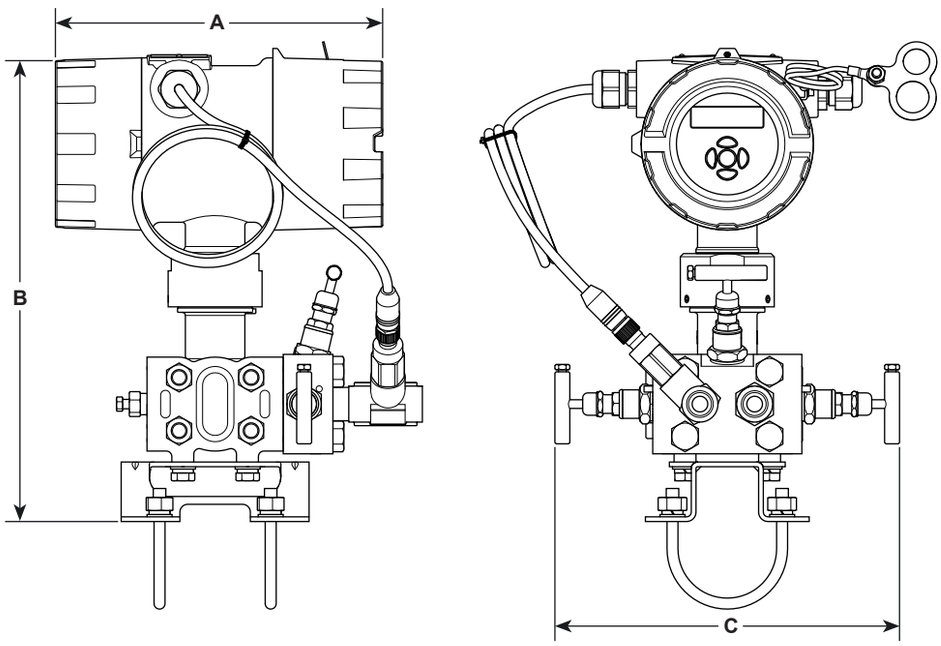
ILVA20 Dimensions/weights (approximate) in mm and kg



Size	A	B	C	D	E	F	Weight
DN150	75	134	293	218	193	221	18
DN200	85	161	354	273			28
DN250	104	204	443	330			47
DN300	120	250	540	385			70

MVT10 Dimensions/weights (approximate) in mm and kg



'U' bolts to suit DN50 pipe

MVT10 mass flow transmitter, manifold, impulse hoses and fixing clamp

A	B	C	Weight
209	264	220	8

The ILVA20/MVT10 can be supplied with either 1 m or 2 m long impulse hoses, with ⅜" NPT screwed ends.
It can also be supplied without hoses (Hard piping supplied by customer).

Impulse hoses

		Weight
⅜" NPT	1 m	0.5 (pair)
	2 m	1 (pair)

Safety information, installation and maintenance

For full details see the Installation and Maintenance Instructions (IM-P337-69) supplied with the product.

Installation note

The following main points are given here for guidance only:

The flowmeter should be mounted with a minimum of 6 straight pipe diameters upstream and 3 downstream. No valves, fittings or cross sectional changes are permitted within these pipe lengths. Where a single plain bend or an increase in nominal pipe diameter is required upstream of the flowmeter, the length of straight pipe should be increased to 12 diameters. Similarly, where a flowmeter is installed downstream of two 90° bends in two planes, a pressure reducing valve or a partially open valve, 12 pipe diameters should be allowed upstream and 6 downstream.

It is important that the internal upstream and downstream diameters of pipe are smooth. Ideally seamless pipes should be used. It is recommended that slip-on flanges be used to avoid any intrusive weld beads on the internal diameter of the pipe.

Care should be taken to install the flowmeter concentrically in the line. If this is not done, flow measurement errors may occur.

The flowmeter should be mounted horizontally. For vertical installations, consult Spirax Sarco.

For steam applications, good basic steam engineering practices should be followed:

- Correct pipeline drainage through adequate trapping.
- Good alignment and support of associated pipework.
- Pipeline size changes achieved by the use of eccentric reducers.

Spare parts

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

3374380 - Gasket and fastener spares kit

3374381 - 2 way manifold and fastener spares kit

3374382 - Pressure sensor and cable spares kit

3374383 - Electronics spares kit

3374384 - MVT10 spares kit (Option 1)

A new MVT10 with the original ILVA20 calibration data downloaded.
Note: The system accuracy cannot be guaranteed.

3374385 - MVT10 spare (Option 2) - Full Recalibration (DN150)

3374485 - MVT10 spare (Option 2) - Full Recalibration (DN200)

3374585 - MVT10 spare (Option 2) - Full Recalibration (DN250)

3374685 - MVT10 spare (Option 2) - Full Recalibration (DN300)

The original ILVA20 returned for recalibration and a new MVT10 supplied with recalibration data.

Disposal

The product is recyclable. No ecological hazard is anticipated with the disposal of this product providing due care is taken.

How to order

Example: 1 off Spirax Sarco DN150 flowmeter for installation between EN 1092 PN40 flanges. The flow medium is saturated steam at 10 bar g, maximum flow 10 692 kg/h.