MECON

FLOW-CONTROL-SYSTEMS

Orifice plate flowmeter
F O Turbo-Lux 2



Fig 1 Orifice plate flowmeter Turbo-Lux 2

Application

The orifice plate flowmeter Turbo-Lux 2 is used to measure the volume of transparent fluids in closed pipeline systems. Any mounting position and direction of flow is possible. The main field of application is the utilisation in stationary water extinguishing systems. The flowmeter complies with the requirements of the " Verband der Schadensversicherer e.V. (VdS)" "Association of damage insurers".

Mode of operation and design

The orifice plate flowmeter Turbo-Lux 2 consists of a differential pressure sensor (fig. 2, 1) for stationary installation as well as a portable bypass meter to measure the auxiliary flow (fig. 2, 2). The differential pressure sensor complies essentially with the VDI guidelines 2040. The bypass meter contains a conical glass tube (fig. 2, 3) with a float (fig. 2, 4). The water flows vertically upwards through the glass tube which is equipped with a bypass orifice at the top (fig. 2, 5). A filter (fig. 2, 6) at the inlet side prevents the ingression of foreign particles to a large extent. Inlet and outlet ports for the flow to be measured in the bypass are arranged concentrically to ensure simple assembly and combination with the stationary differential pressure sensor.

Installation of the differential pressure sensor

A straight pipe section to achieve non turbulence with a length in relation to the diametral pitch in accordance with DIN EN ISO 5167 must be provided both upstream and downstream from the differential pressure sensor (see page 4). In the case of installation in sprinkler systems, we refer for example to the VdS CEA guideline for sprinkler systems 4001, in which 10 x D is prescribed upstream of the pressure sensor and 5 x D downstream of the sensor. The installation can be conducted in the direction required by the user - horizontal up to vertical (fig. 4). However, ensure that the flow direction corresponds to the direction of flow indicated by the arrow on the instrument and that the differential pressure sampling tube (fig. 2, 7) is installed in a horizontal position. Adequate free space must be provided for the mounting of the bypass meter. The concentric installation between the flanges of the pipeline is essential to guarantee the adherence to the measuring tolerance. The central offset may not exceed 0.5 mm. A centring assembly (fig. 3) can be supplied for all dimensions of differential pressure sensor to aid centring in installation between flanges.

Mounting the bypass meter

The bypass meter can be used for all specified nominal diameters. The pipeline must be drained before the screw caps are loosened (fig. 2, 10) in order to prevent the leakage of fluid. The bypass meter is connected and screwed into place using the union nut (fig. 2, 9).

It must always be mounted in a truly vertical position to allow the float (fig. 2, 4) to move freely in the measuring tube (fig. 2, 3). Any contaminants which have passed through the filter must be removed. Tighten union nut and the screw cap manually, if possible. The screw threads must run smoothly - e.g. by lubricating with grease. The pipeline must be filled with water slowly to prevent water hammer.

Measurement

Read the exact value as soon as a consistent flow has been attained, i.e. when the float has reached a stable position. Read the value at the greatest diameter of the float. The pipeline must always be filled.
When the bypass meter is commissioned or set into operation, bubbles of air will initially accumulate at the top part, which must be removed. For this purpose, the union nut (fig. 2, 9) must be somewhat loosened during operation and the device must be rotated by 360°, so that the air bubbles can escape. Then tighten the union nut once again.

Reading the measured value

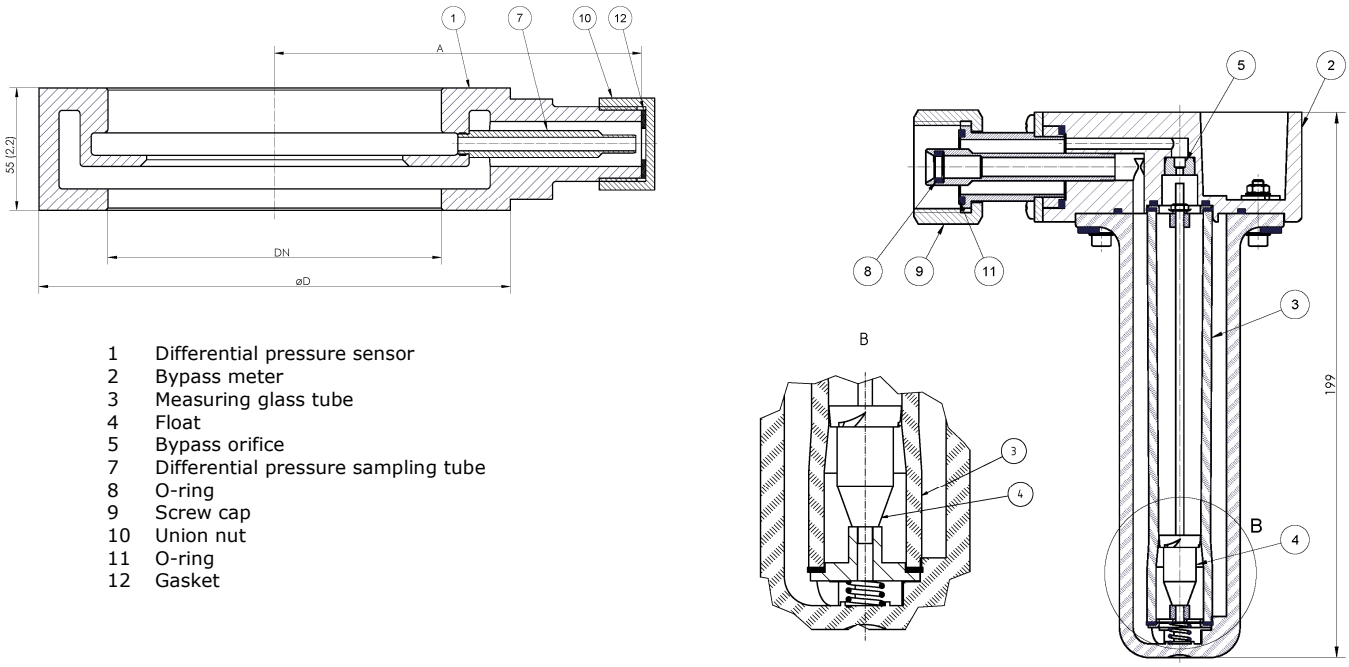
The flow rate is printed in m³/min for the main values (100/ 90/ 80/ 70/ 60/ 50/ 40/ 20 %) on the scale for each nominal diameter. The scale division in brackets is also listed to assist the determination of intermediate values.
An extended table in which a flow value is assigned to each line can be found on page 3.

Maintenance

If the filter is blocked by deposits (fig. 2, 6) the flowmeter must be returned to the manufacturer to be cleaned and tested.
Ensure that the O-ring (fig. 2, 8) and the G 1 thread of the orifice plate are lubricated with grease.

Operating note

The operator of these measuring units is responsible for the suitability, proper use and corrosion resistance of the used materials with regard to the measuring material. In particular, it must be ensured that the materials selected for the parts of the measuring unit coming into contact with the medium are suitable for the process media to be used. The unit may only be used within the pressure and voltage limits specified in the operating instructions. Before replacing the measuring tubes, check that the unit is free from hazardous media and pressures. The instrument complies with the requirements according to Article 3 Paragraph 3 of the guideline relating to pressure instruments 97/23/EU. The most hazardous permissible media are the fluids defined in Group 2.



1 Differential pressure sensor
2 Bypass meter
3 Measuring glass tube
4 Float
5 Bypass orifice
7 Differential pressure sampling tube
8 O-ring
9 Screw cap
10 Union nut
11 O-ring
12 Gasket

Connections	Intermediate flange connection		
	Dimensions		Weight
	A±0.5	øD ±0.5	
DN	mm	mm	kg
50 PN 10/16	-	-	-
80 PN 10/16	130	138	1,3
100 PN 10/16	140	158	1,6
150 PN 10/16	165	212	2,1
200 PN 10/16	190	268	3,0
250 PN 10	215	320	4,0
indicating part	-	-	0,7

Fig.2 Turbo-Lux 2, Position drawing and dimensions in mm (inch)

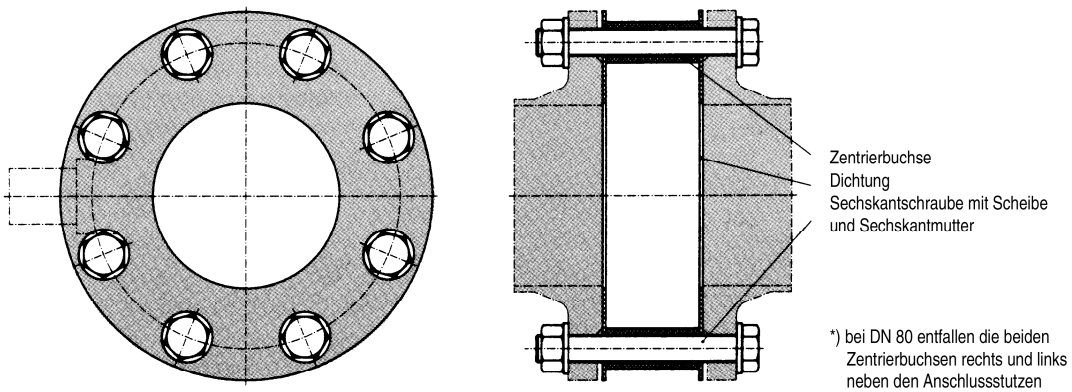


Fig. 3 centring assembly (only for the intermediate flange model)

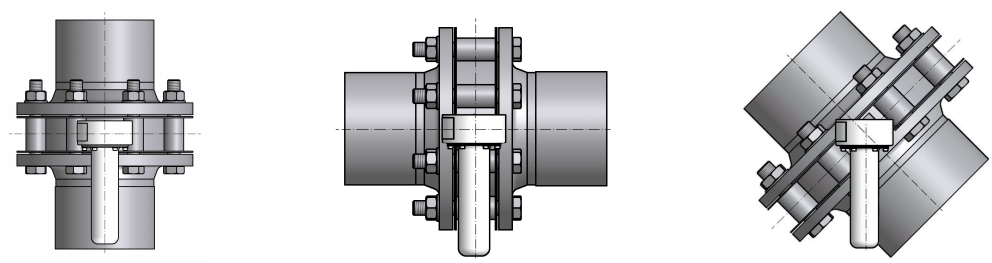


Fig.4 Examples of installation

Flow table for the bypass meter Turbo-Lux 2

Flowrate - Water

Orifice for intermediate flange model

Anzeige	DN 80		DN 100		DN 150		DN 200		DN 250	
in %	m³/min	l/min	m³/min	l/min	m³/min	l/min	m³/min	l/min	m³/min	l/min
100	2,10	2100	3,00	3000	6,00	6000	12,00	12000	18,00	18000
98	2,06	2058	2,94	2940	5,88	5880	11,76	11760	17,64	17640
96	2,02	2016	2,88	2880	5,76	5760	11,52	11520	17,28	17280
94	1,97	1974	2,82	2820	5,64	5640	11,28	11280	16,92	16920
92	1,93	1932	2,76	2760	5,52	5520	11,04	11040	16,56	16560
90	1,89	1890	2,70	2700	5,40	5400	10,80	10800	16,20	16200
88	1,85	1848	2,64	2640	5,28	5280	10,56	10560	15,84	15840
86	1,81	1806	2,58	2580	5,16	5160	10,32	10320	15,48	15480
84	1,76	1764	2,52	2520	5,04	5040	10,08	10080	15,12	15120
82	1,72	1722	2,46	2460	4,92	4920	9,84	9840	14,76	14760
80	1,68	1680	2,40	2400	4,80	4800	9,60	9600	14,40	14400
78	1,64	1638	2,34	2340	4,68	4680	9,36	9360	14,04	14040
76	1,60	1596	2,28	2280	4,56	4560	9,12	9120	13,68	13680
74	1,55	1554	2,22	2220	4,44	4440	8,88	8880	13,32	13320
72	1,51	1512	2,16	2160	4,32	4320	8,64	8640	12,96	12960
70	1,47	1470	2,10	2100	4,20	4200	8,40	8400	12,60	12600
68	1,43	1428	2,04	2040	4,08	4080	8,16	8160	12,24	12240
66	1,39	1386	1,98	1980	3,96	3960	7,92	7920	11,88	11880
64	1,34	1344	1,92	1920	3,84	3840	7,68	7680	11,52	11520
62	1,30	1302	1,86	1860	3,72	3720	7,44	7440	11,16	11160
60	1,26	1260	1,80	1800	3,60	3600	7,20	7200	10,80	10800
58	1,22	1218	1,74	1740	3,48	3480	6,96	6960	10,44	10440
56	1,18	1176	1,68	1680	3,36	3360	6,72	6720	10,08	10080
54	1,13	1134	1,62	1620	3,24	3240	6,48	6480	9,72	9720
52	1,09	1092	1,56	1560	3,12	3120	6,24	6240	9,36	9360
50	1,05	1050	1,50	1500	3,00	3000	6,00	6000	9,00	9000
48	1,01	1008	1,44	1440	2,88	2880	5,76	5760	8,64	8640
46	0,97	966	1,38	1380	2,76	2760	5,52	5520	8,28	8280
44	0,92	924	1,32	1320	2,64	2640	5,28	5280	7,92	7920
42	0,88	882	1,26	1260	2,52	2520	5,04	5040	7,56	7560
40	0,84	840	1,20	1200	2,40	2400	4,80	4800	7,20	7200
35	0,74	735	1,05	1050	2,10	2100	4,20	4200	6,30	6300
30	0,63	630	0,90	900	1,80	1800	3,60	3600	5,40	5400
25	0,53	525	0,75	750	1,50	1500	3,00	3000	4,50	4500
20	0,42	420,00	0,60	600,00	1,20	1200,00	2,40	2400,00	3,60	3600,00

Pressure loss particulars

Flow	Δp mbar (psi)
20	13.6 (0.19)
50	85.0 (1.23)
100	340.0 (4.93)

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Technical Data Turbo-Lux 2

Application field	see page 1
Mode of operation and design	see page 1
Measuring principle	Orifice plate as differential pressure sensor with bypass meter
Inlet	
Nominal diameters	DN 80 PN 10/16 DN 100 PN 10/16 DN 150 PN 10/16 DN 200 PN 10/16 DN 250 PN 10
Nominal pressure	PN 16
Pressure limit	max. 16 bar
Measuring accuracy:	± 2.5% final value ± 5% starting value
Operational conditions	
Temperature limits	max. 50 °C
Constructive design	
Materials (fig. 2)	
- Differential pressure sensor (1)	Aluminium M.-No. 3.2582.05
-Differential pressure sampling tube (7)	M.-No. 2.0380 (Ms58)
- Float (4)	Stainless steel
- Bypass orifice (5)	Stainless steel
- Filter (6)	Stainless steel
- Gasket (11/12)	Perbunan
Certificates and approvals	
Classification in accordance with guideline for pressure instruments 97/23/EU	For liquids of fluid group 2; complies with requirements of article 3, paragraph 3 (sound engineering practice SEP)
Vds certification number	G4060003

Ordering data

F O Turbo-Lux 2
Orifice plate flowmeter

7ME5834- ☐☐☐ **0** ☐ **-** ☐☐ **A 0**

Orifice plate for installation between flange	
without	**0**
DN 80 (Qv: 0.42 - 2.1 m³/min.)	**1**
DN 100 (Qv: 0.6 - 3.0 m³/min.)	**2**
DN 150 (Qv: 1.2 - 6.0 m³/min.)	**3**
DN 200 (Qv: 2.4 - 12.0 m³/min.)	**4**
DN 250 (Qv: 3.6 - 18.0 m³/min.)	**5**
Centering assembly orifice plate for installation between flanges	
without	**A**
DN 80	**B**
DN 100	**C**
DN 150	**E**
DN 200	**F**
DN 250	**G**
Bypass meter FO Turbo-Lux 2	
without	**A**
for orifice plate to be installed between flange	**B**
Replacement union cap	
without union cap	**0**
with union cap including gasket	**1**
Calibration certificate	
without calibration certificate	**0**
with calibration certificate	**1**