Instruction Manual

DS12

Variable area flowmeter with glass measuring tube

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Safety Information

General Instructions

To ensure safe operation, the device should only be operated according to the specifications in the instruction manual. The requisite Health & Safety regulations for a given application must also be observed. This statement also applies to the use of accessories.
Every person who is commissioned with the initiation or operation of this device must have read and understood the operating instructions and in particular the safety instructions!

The liability of the manufacturer expires in the event of damage due to improper use, non-observance of this operating manual, use of insufficiently qualified personnel and unauthorized modification of the device.

Proper Usage

The flow meters DS12 are designed to monitor continuous flow rates of liquids or gases which do not attack the device materials. All other usage is regarded as being improper and outside the scope of the device.

In particular, applications in which shock loads occur (for example, pulsed operation) should be discussed and checked in advance with our technical staff.

The series DS12 flow meter devices should not be deployed as the sole agents to prevent dangerous conditions occurring in plant or machinery. Machinery and plant need to be designed in such a manner that faulty conditions and malfunctions do not arise that could pose a safety risk for operators.

Dangerous substances

For dangerous media such as e.g. Oxygen, Acetylene, flammable or toxic substances as well as refrigeration systems, compressors, etc. must comply with the relevant regulations beyond the general rules.

Qualified Personnel

The DS12 devices may only be installed by trained, qualified personnel who are able to mount the devices correctly. Qualified personnel are persons, who are familiar with assembling, installation, placing in service and operating these devices and who are suitably trained and qualified.

Inward Monitoring

Please check directly after delivery the device for any transport damages and deficiencies. Additional with reference to the accompanying delivery note the number of parts must be checked.
Claims for replacement or goods which relate to transport damage can only be considered valid if the delivery company is notified without delay.

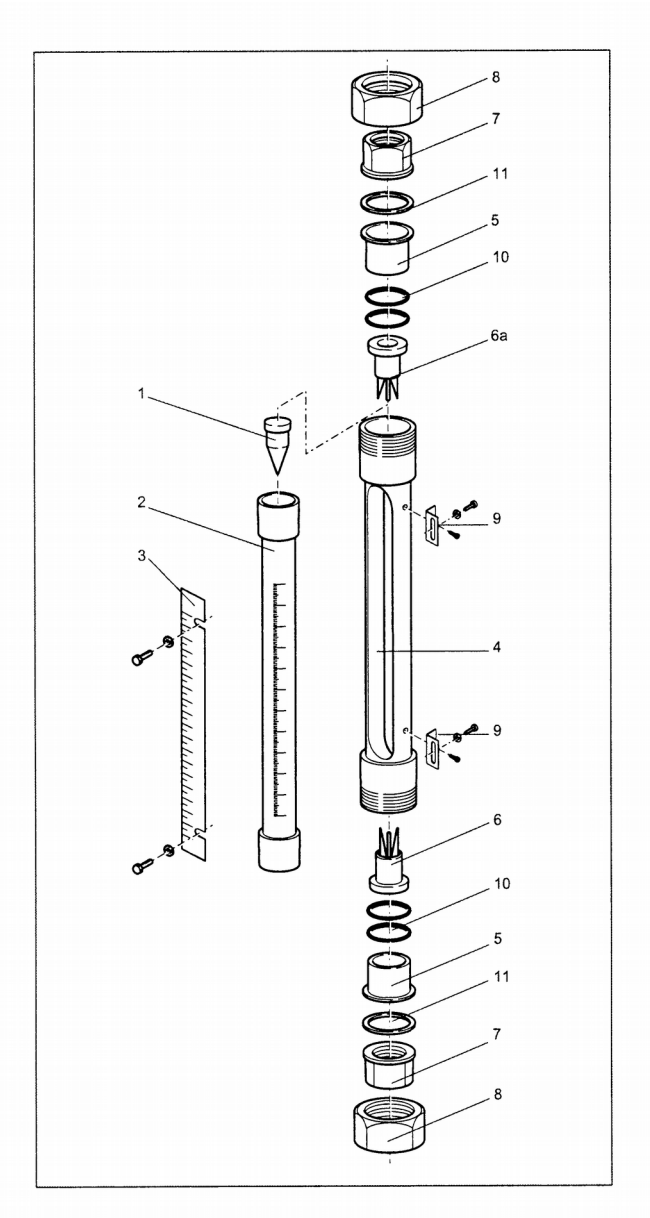
Commissioning

It if functions correctly, the float (1) rotates freely in the flow.
If the float does not rotate, either the device is dirty or the vertical installation has not been observed. This only applies to floats with notches. The scale line on which the upper edge of the float adjusts is decisive for the reading.

Maintenance

To clean the DS12, it must be removed from the line.
After removing the two stops (6, &a) and the float (1), the measuring tube (2) can be cleaned without removing it from the fitting. A bottle brush and soapy water are recommended as cleaning agents. The measuring tube must not be scratched.
If the float or measuring tube shows signs of wear, replacement is recommended. To remove the tube, remove the stops (6, 6a) and the float and press the tube out of its O-ring holder (5) using a plastic round body. The diameter of the round piece corresponds to the outside diameter of the measuring tube.
The installation is carried out in reverse order.

Exploded View and Parts List



Position	Pieces	Designation
1	1	Float
2	1	Meas. tube
3	1	Lapel scale
4	1	Sleeve armature
5	2	O-ring holder
6	1	Bottom stop
6a	1	Top stop
7	2	Inserts
8	2	Union nuts
9	2	Scale attachment
10	4	O-rings
11	2	Flat gasket

DS12

Variable Area Flowmeter with Glass Measuring Tube

- **for liquids and gases**
- **measuring range water: 0,001..0,025 l/h – 1...10 m³/h**
- **measuring range air: 0,1..1,25 Nl/h – 16...160 Nm³/h**
- **accuracy class 1,6**
- **connection thread, flange or clamp**
- **max. pressure 16 bar, max. temperature: 100°C**
- **low pressure drop**
- **optionally with limit switches**
- **Ex-Version acc. to ATEX optionally**

Description:

The flowmeter DS12 operates according to the proven variable area principle. They devices must be mounted vertically with flow direction from bottom to top.
They consist of a tapered glass measuring tube with a free rotating float. Because of the special design the devices have a very low pressure drop a high measuring accuracy. The glass measuring tube allows a direct display of the flow rate and a visual monitoring of the medium. Because of its length of 300 mm it offers a high resolution.
The measured value can be read at the upper edge of the float. Therefore is a scale burned in the measuring tube. Optionally the flowmeter can be equipped with an adjustable limit switch.

Typical applications:

Because of the wide choice of measuring ranges the flowmeter DS12 can be used in the entire industry. for measuring of low flow rates, water from 0.002...0.025 l/h, air from 0.1...1.75 Nl/h, as well as high flow rates, water until 1...10 m³/h, air until 15...160 Nm³/h. The devices are particulary appropriate for a high accuracy, class 1,6, with high resolution or they can indicate low inlet pressures (eg. test rig).
A variety of connections allows universal application. As standard there are BSP and NPT threads available. Optionally the devices can be equipped with a bonded socket, hose fitting in various materials depending on the application.

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Technical Data:

Mounting position: vertically, from bottom to top

Accuracy: acc. to VDI 3513 class 1.6
(class 2.5: ranges 113- 123)

Max. pressure:

Order code:	113...147	16 bar
Order code:	144 B...161C	10 bar
Order code:	162...163B	9 bar
Order code:	164...171B	6 bar

Medium temperature: -25 °C...+100 °C
-10...+70 °C (with contact)

Protection class: IP 65

Connection: 1 m cable

Contacts: reed or inductive switch, bistable

Contact rating: 230 $V_{AC/DC}$, 2 A, 40 VA / W

Reed:

Materials:

Process connection: stainless steel 1.4404

Housing stainless steel 1.4301

Float: titanium, stainless steel 1.4571, PTFE, PVDF

Glass: borosilicate

Gaskets: NBR, FKM, EPDM

Options:

Description:	Code:
Oil- and grease free for oxygen applications	OF
Stainless steel type plate	T
Gasket of EPDM	EP

Order Code:

Order number:	DS12.	G.	L.	123.	1.	0.	0

Variable Area Flowmeter with glass measuring tube

Process connection:
Gxx = BSP
Nxx = NPT
Fxx = Flange acc. to DIN- EN 1092
Axx = Flange acc. to ANSI
Cxx = Clamp connection
The nominal size is determined by the individual design of the instrument in relation to the measuring range.

Scale:
L = Scale for air
W = Scale for water
S = Scale for special medium please specify

Measuring range:
see table “Measuring ranges”

Float type:
1 = Titanium
2 = Titanium (with magnet for limit switch)
3 = stainless steel
4 = stainless steel (with magnet for limit switch)
5 = PVDF
6 = PVDF (with magnet for limit switch)
7 = PTFE
8 = PTFE (with magnet for limit switch)

Contacts (float with magnet required):
0 = without
1 = limit switch, N/O increasing
(from measuring range147B)
2 = limit switch, N/C increasing
(from measuring range 147B)
3 = Inductive contact (measuring range 124 - 147)

Options:
0 = none
x = see table „Options“
9 = please specify in plain text

Accessories:

- Needle valves SNV01, SNV02
- Ball valves SKG01
- Dirt trap SF00, SF01, SF02
- Protection relay for reed contacts MSR01

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Measuring ranges:

Nominal size	Water at 20 °C [l/h]	Pressure drop at float [mbar]	Order Code: W...
1/2“ to 2 1/2“ DN 15 to DN 65 by dimen-sioning	0,002...0,025	1	**113**
	0,002...0,04	1	**114**
	0,004...0,063	2	**117**
	0,005...0,1	2	**121**
	0,01...0,16	3	**122**
	0,02...0,25	4	**123**
	0,02...0,4	1	**124**
	0,04...0,63	1	**127**
	0,05...1	2	**131**
	0,1...1,6	3	**132**
	0,2...2,5	4	**133**
	0,2...4	2	**134**
	0,4...6,3	2	**137**
	0,5...10	3	**141**
	1...16	4	**142**
	2...25	5	**143**
	2...40	5	**144**
	4-63	10	**147**
	10...100	16	**151**
	16...160	24	**152**
	25...250	15	**153**
	40...400	16	**154**
	63...630	18	**157**
	100...1000	26	**161**
	160...1600	26	**162**
	250...2500	30	**163**
	400...4000	40	**164**
	600...6300	44	**167**
	1000...10000	53	**171**

Nominal size	Air at 20 °C and 1 bar abs. [Nl/h]	Pressure drop at float [mbar]	Order Code: L...
1/2“ to 2 1/2“ DN 15 to DN 65 by dimen-sioning	0,1...1,75	1	**113**
	0,2...2,7	1	**114**
	0,2...4	2	**117**
	0,4...6	2	**121**
	0,5...9	3	**122**
	1...13	4	**123**
	2...21	2	**124**
	2...30	2	**127**
	4...46	2	**131**
	4...64	3	**132**
	5...90	4	**133**
	10...165	3	**134**
	20...230	3	**137**
	20...360	3	**141**
	40...580	4	**142**
	50...900	5	**143**
	100...1450	5	**144**
	200...2200	10	**147**
	220...2200	8	**152**
	340...3400	11	**153**
	560...5600	6	**157**
	900...9000	8	**163**
	1500...15000	10	**167**
	2300...23000	6	**174**
	3000...32000	5	**172**
	3600...36000	8	**177**
	5000...50000	5	**173**
	8000...82000	29	**181**
	9000...90000	14	**187**
	13000...130000	32	**182**
	15000...150000	17	**191**
	20000...200000	34	**183**

The specified measurement ranges above -especially for air- serve for orientation.
Please indicate in your inquiry following process conditions:

- **Medium**
- **Pressure**
- **Temperature**
- **desired connection size** (not all connection sizes can be combined with all measuring ranges)

We compile an individual scale for you without any extra charge.

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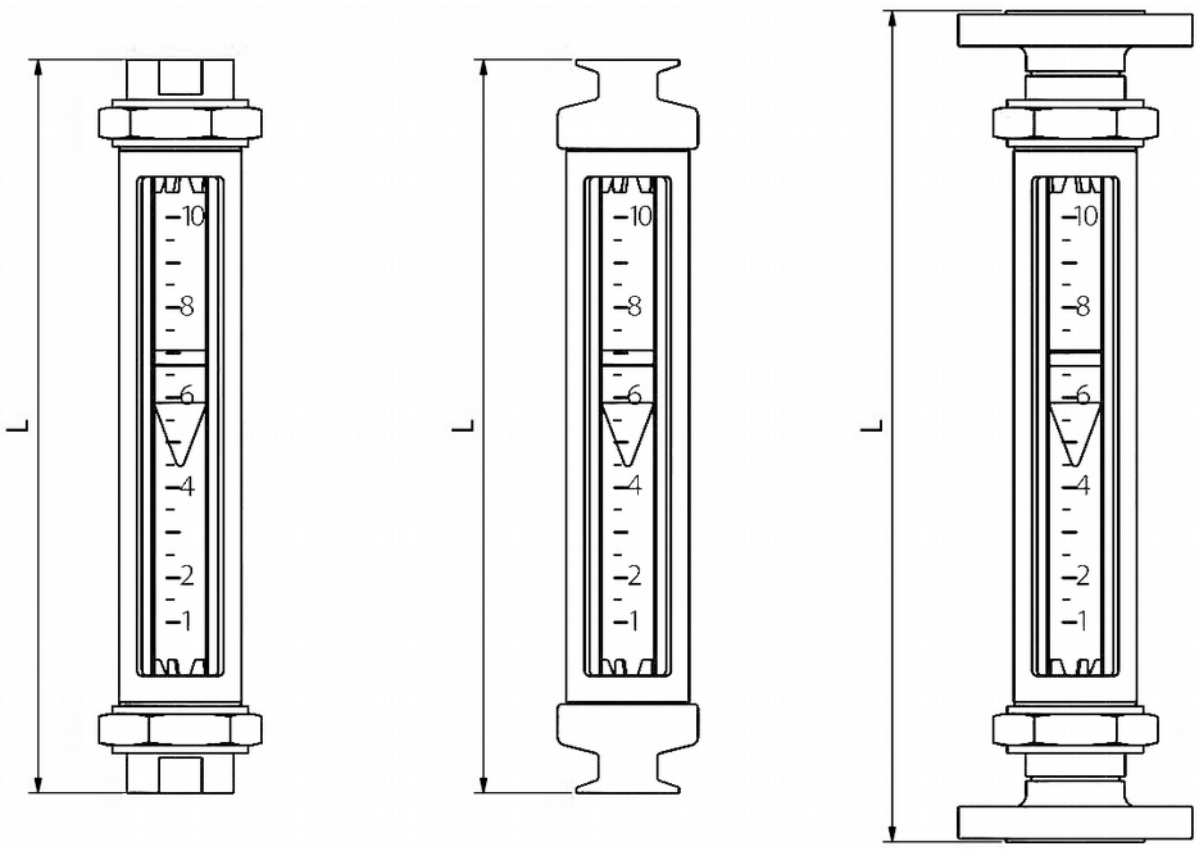
Dimensions:



Process connection:	Length L: [mm]
Female thread	375
Clamp	375
Flange	425

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