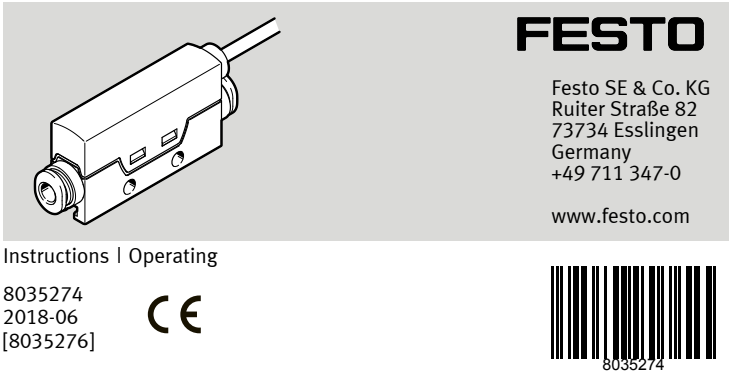


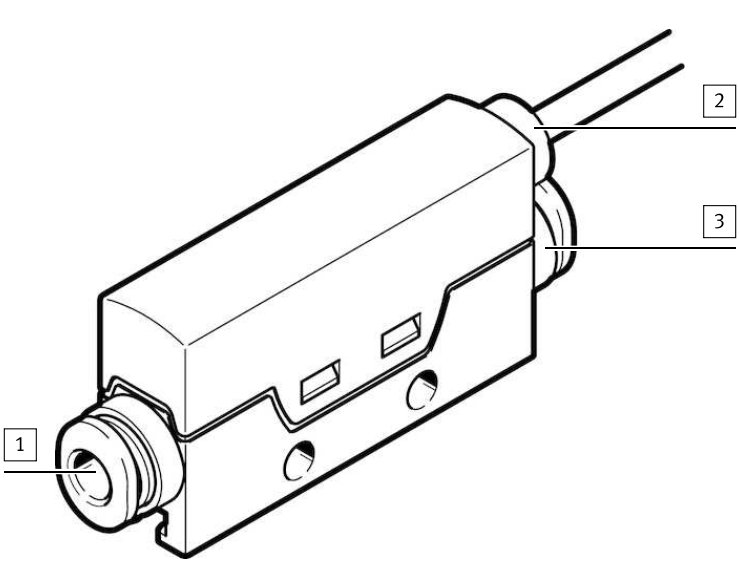
SFTE
Flow Transmitter



Translation of the original instructions

- 1 Further applicable documents
All available documents for the product -> www.festo.com/pk.
- 2 Safety
2.1 Intended use
The SFTE is intended for detecting the flow of gaseous media in piping systems or terminals in the industry sector.
WARNING!
Risk of injury from prohibited media.
Use of the product in combination with prohibited media can result in personal injury.
Do not use the product with flammable or corrosive gases.
NOTICE!
Product damage due to incorrect air quality class.
Condensation water, oil mist, foreign matter and other dirt in the compressed air can damage the product and cause incorrect measurements and malfunctions.
Adhere to the specified air quality class for the operating medium.
- 2.2 General safety instructions
The product may only be used in its original status without unauthorised modifications.
Only use the product if it is in perfect technical condition.
Take into consideration the ambient conditions at the location of use.
Comply with all applicable national and international regulations.
Do not use the product in combination with inflammable, caustic, vapour-emitting or other hazardous media.
Check the operating medium to determine compatibility with the materials it contacts.
Observe the specifications on the product labelling.
Remove all transport packaging. Recycle packaging material.
- 3 Service
If you have technical questions, contact the regional Festo contact at -> www.festo.com.
- 4 Accessories
Accessories -> www.festo.com/catalogue.

5 Product overview
5.1 Design



- 1 Pneumatic connection (inlet)
- 2 Electrical connection
- 3 Pneumatic connection (outlet)

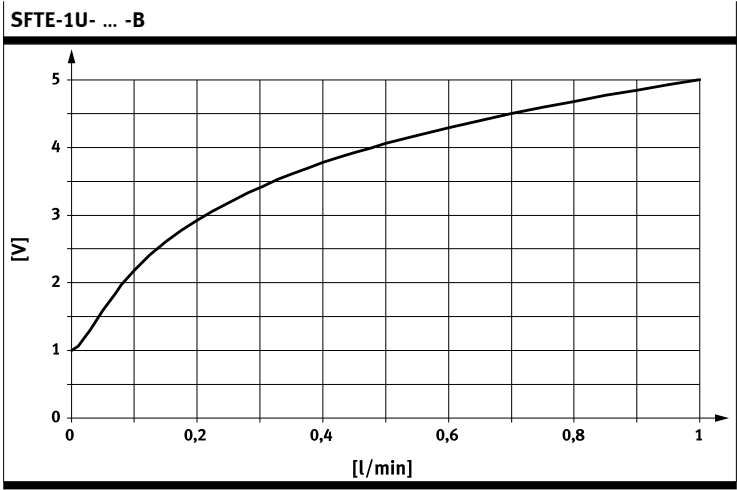
Fig. 1

5.2 Product variants and type code

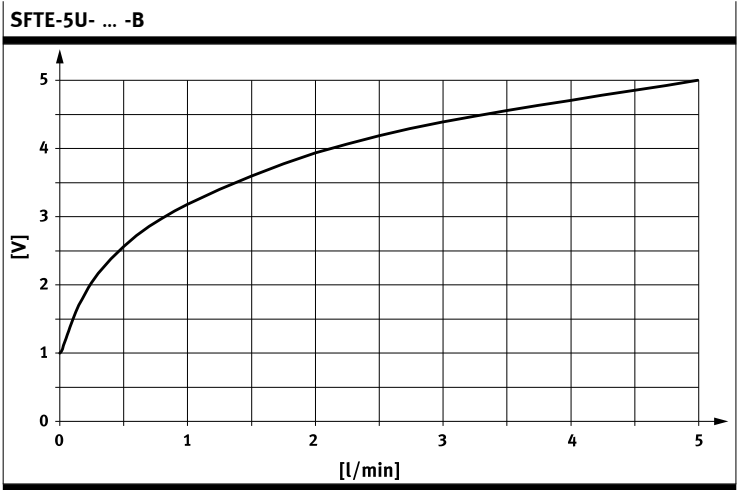
Feature	Value	Description
Type	SFTE	Flow transmitter
Flow measuring range	-1	Max. 1 l/min
	-2	Max. 2l/min
	-5	Max. 5 l/min
	-10	Max. 10 l/min
Flow input	r	Unidirectional
Pneumatic connection	-Q3	Push-in connector 3 mm
	-Q4	Push-in connector 4 mm
	-M5	M5
Thread type		None
	F	Female thread
Electrical output	-B	1 ... 5 V
	-V	0 ... 10 V
Electrical connection	-2.5K	Cable 2.5 m, open end
	-0.3M8	Cable 0.3 m, with plug connect- or M8

Tab. 1

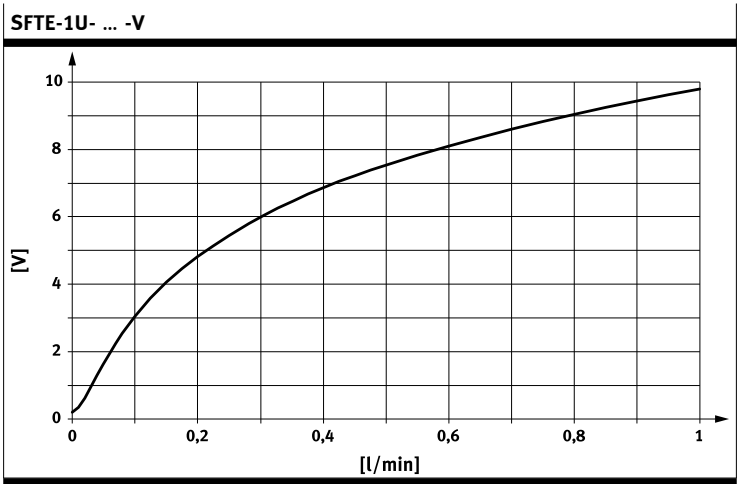
- 6 Function
The SFTE detects the flow rate (standard flow rate, mass flow rate) with the aid of a thermal procedure. Measurements are carried out using a micromechanical sensor element with a downstream electronic evaluation unit. The connection to higher-level systems is implemented through a non-linearized analogue output. The analogue output is calibrated at zero point and at the maximum flow rate -> 12 Technical data. The characteristic curve of the analogue output results from the raw signal of the sensor element. In addition to a fast response time, the non-linearized characteristic has the advantage of high sensitivity in the lower flow range.
NOTICE!
Damage as a result of overflow.
Strong overflow can destroy the sensor element.
Do not exceed the maximum overflow -> 12 Technical data.
Avoid rapid changes in pressure, which cause impermissible overflow.
- 6.1 Characteristic curve
The following figures show the typical characteristic curve.



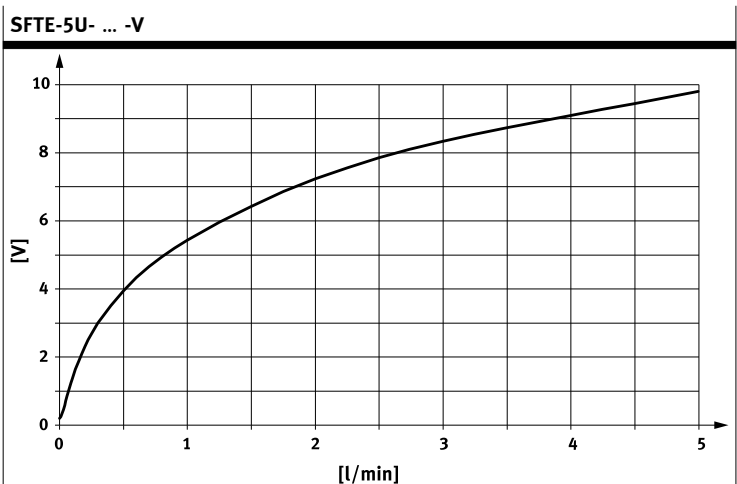
Tab. 2



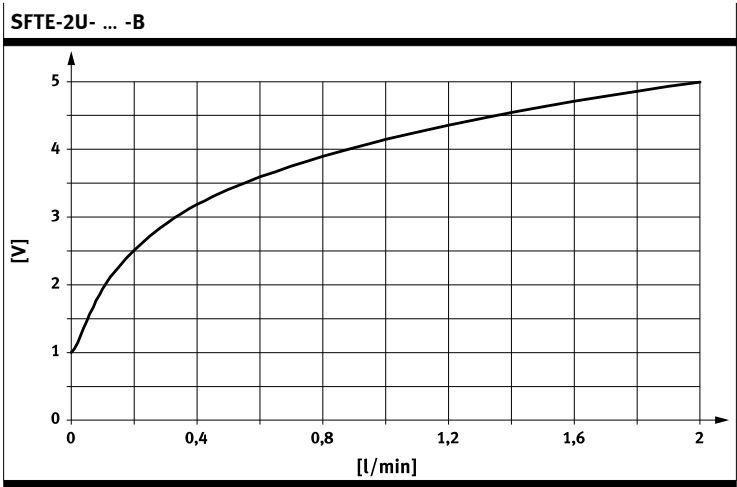
Tab. 6



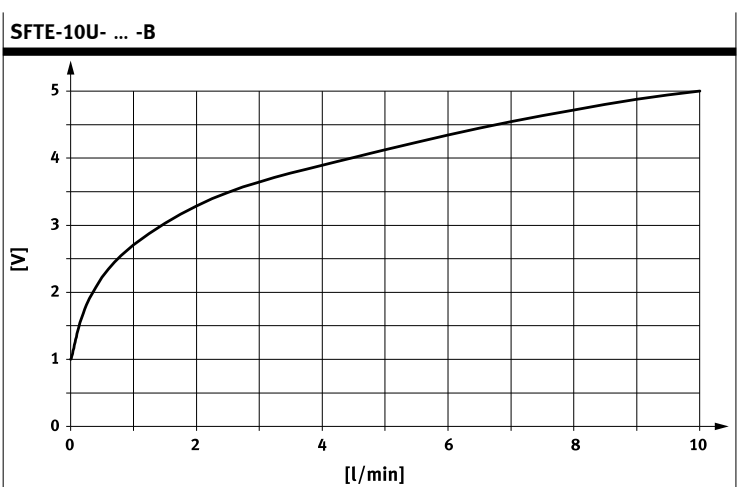
Tab. 3



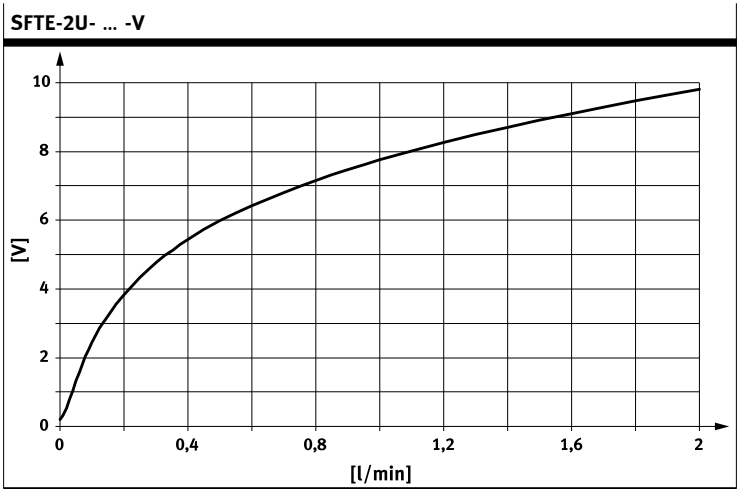
Tab. 7



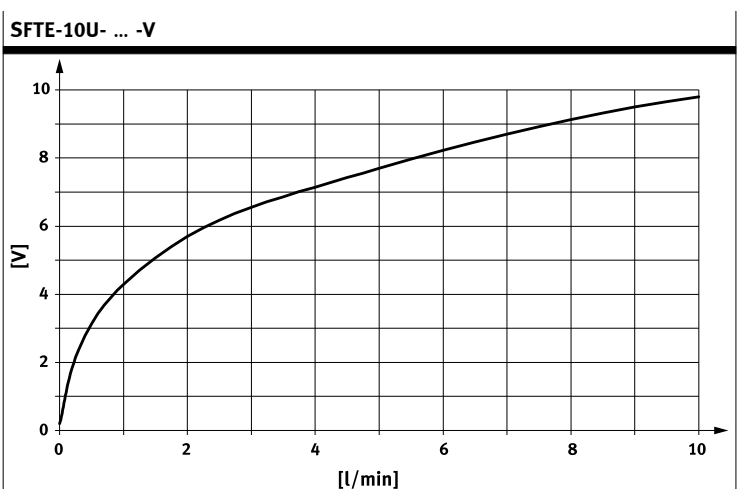
Tab. 4



Tab. 8



Tab. 5

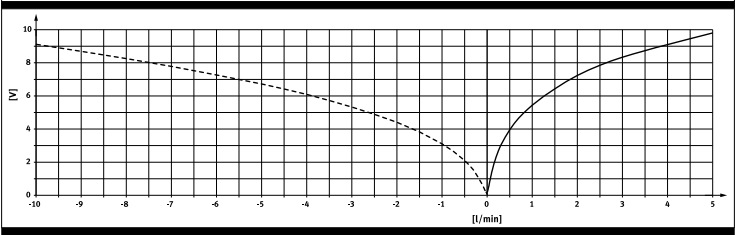


Tab. 9

6.2 Return flow characteristics

The STFE does not detect the flow direction. With a return flow, it issues a voltage signal with another characteristic curve, which is not calibrated.

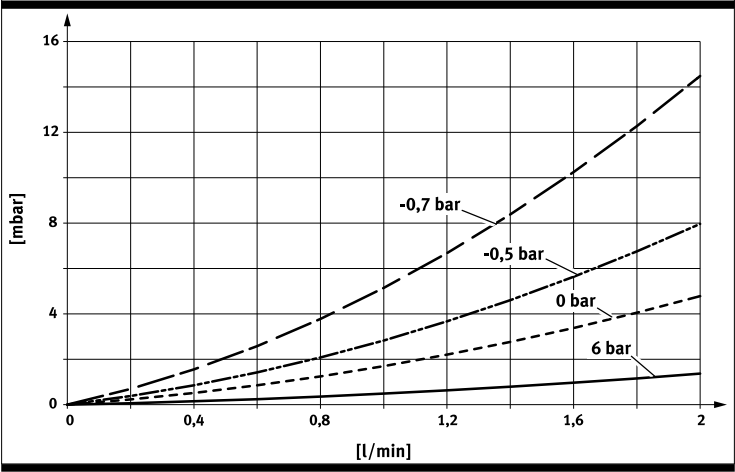
Example SFTE-5U ... -V



Tab. 10

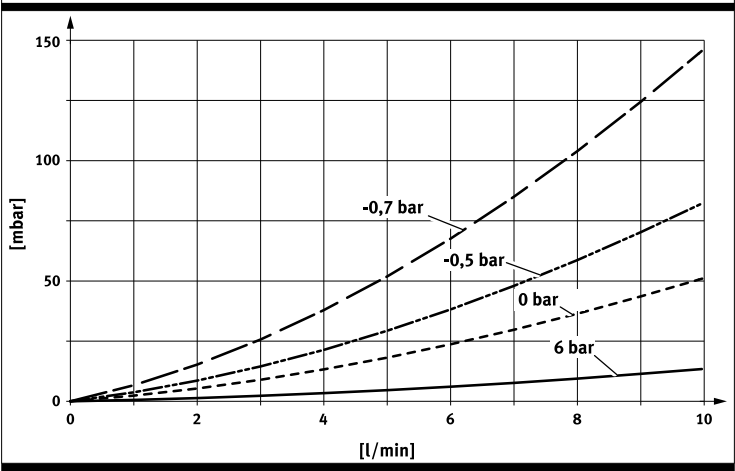
6.3 Pressure drop characteristics

SFTE-1U-Q4 | SFTE-2U-Q4



Tab. 11

SFTE-5U-Q4 | SFTE-10U-Q4



Tab. 12

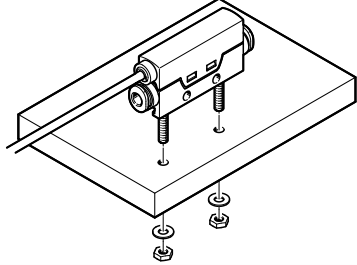
7 Installation

Work on the product should only be conducted by qualified personnel.

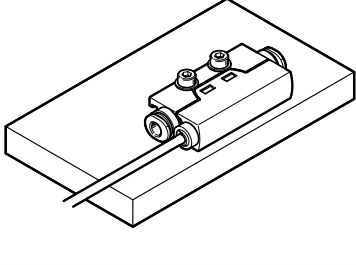
7.1 Mechanical installation

i Screws and nuts are not included in the scope of delivery.

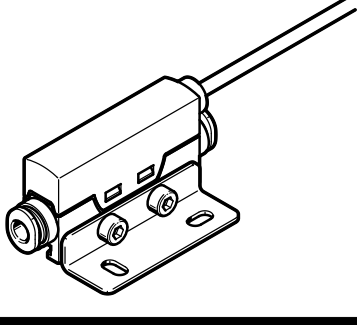
Plate mounting
Screws in accordance with ISO 4017-M3
Torque: 0.5 Nm
Distance between holes: 27 ... 35 mm



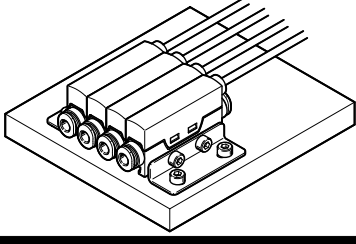
Side plate mounting
Screws M3
Torque: 0.5 Nm
Distance between holes: 14 mm



Single bracket mounting
Screws: M3x14
Nuts: M3



Multiple bracket mounting
Screws:
2-fold: M3x25
3-fold: M3x35
4-fold: M3x45
etc.
Nuts: M3



Tab. 13

7.2 Pneumatic installation

- The direction of flow is indicated on the sensor by an arrow.
- Attach both tubings to the connections. Screw on M5F with max. 1.5 Nm.

i If the tubing of the SFTE is incorrectly connected, flow rate values are also detected and issued by the analogue output. The voltage values in the negative flow direction are not the same as the voltage values in the positive flow direction → 6.2 Return flow characteristics.

7.3 Electrical installation

⚠ WARNING!

Risk of injury due to electric shock.

- For the electric power supply, use only PELV circuits that ensure a reliable electric disconnection from the mains network.
- Observe IEC 60204-1/EN 60204-1.

i Long signal lines reduce the resistance to interference.

- Adhere to the maximum permissible cable length of 30 m.

Connection -0.3M8	Pin	Function	Wire colour -2.5K-1)
	1	Operating voltage +24 V	Brown (BN)
	3	0 V	Blue (BU)
	4	Analogue output	Black (BK)

1) Colours also apply for connecting cables NEBU- M8 ...

Tab. 14

Circuit diagrams

SFTE- ... -2.5K	SFTE- ... -0.3M8

Tab. 15

8 Commissioning

- Switch on the operating voltage. Take the standby time and the warm-up period into account → 12 Technical data.

9 Service and care

1. Turn off energy source and compressed air.
2. Clean sensor with non-abrasive cleaning agents.

10 Disassembly

- 1. Turn off energy source and compressed air.
- 2. Separate connections from the sensor.
- 3. Loosen the mountings.

11 Fault clearance

Fault description	Cause	Remedy
No voltage or unexpected voltage at the analogue output	No operating voltage or impermissible operating voltage.	Switch on the operating voltage. Comply with permissible operating voltage range.
	Connections are swapped (reverse polarity).	Wire in accordance with the circuit diagram.
	Wire break in the supply line	Replace device.
	Short circuit/overload at the analogue output	Eliminate short circuit/overload.
	Flow rate outside the specified range (overflow)	Eliminate the excess overflow.
	Pressure drop/failure	Check the pneumatic connection. Eliminate pressure failure.
	Operation with prohibited medium.	Replace device and only operate with a permitted medium.
	Device defective	Replace device.

Tab. 16

12 Technical data

General	
Approvals	RCM compliance mark
CE marking (➔ declaration of conformity)	in accordance with EU EMC Directive in accordance with EU RoHS Directive

Tab. 17

Input signal/measuring element	-1U-	-2U-	-5U-	-10U-
Measured variable	Volumetric flow rate, mass flow rate			
Flow direction	Unidirectional			
Measuring principle	Thermal			
Warm-up time [min]	3			
Method of measurement	Heat loss			
Flow rate detection range, starting value [l/min]	0	0	0	0
Flow rate detection range, end value [l/min]	1	2	5	10
Flow rate detection range, end value [g/min]	1.293	2.586	6.47	12.93
Flow standard	DIN 1343 (0 °C; 1,01325 bar; 0 %RH)			
Operating pressure [bar]	-0.9 ... 10			
Maximum permissible over-flow [l/min]	20		100	
Operating medium	Compressed air in accordance with ISO 8573-1:2010 [6:4:4], nitrogen ¹⁾			
Temperature of medium [°C]	0 ... 50			
Ambient temperature [°C]	0 ... 50			
Nominal conditions, factory-calibrated	– Medium: compressed air – Operating pressure: 0 bar – Room temperature: 20 ... 25 °C			

1) The use of inert gases is also possible. In this case, however, the characteristic curve and the detection range change.

Tab. 18

Analogue output	-V-	-B-
Analogue output [V]	0 ... 10	1 ... 5
Rise time [ms]	3	
Min. load resistance of voltage output [kOhm]	20	
Deviation from typical characteristic [±%FS]	5	
[V]	± 0.5	± 0.2
Repetition accuracy [±%FS]	1	
[V]	± 0.1	± 0.04
Temperature co-efficient zero point [±%FS/ K]	Typical 0.15	
Pressure influence zero point [±%FS]	Typically 2 (in pressure range -0.7...6 bar) ¹⁾	

1) In pressure range -0,9 ... -0.7 bar and 6 ... 10 bar, a pressure influence zero point of typically ± 5 % FS can be expected.

Tab. 19

Output, additional data	
Short circuit protection	Yes
Overload protection	Available

Tab. 20

Electronics		
Operating voltage range [V DC]	22 ... 26	
Idle current [mA]	≤ 17 mA (with 100 % flow rate)	
Standby time ¹⁾ [ms]	25	
Reverse polarity protection	For all electrical connections	

1) The time required after switching on the supply voltage until the analogue output detects a stable defined status

Tab. 21

Electromechanics	-0.3M8-	-2.5K-
Connection type	Plug connector	Cable
Connection technology	M8x1 A-coded in accordance with EN61076-2-104	Open end
Number of pins/wires	3	
Max. connecting cable length [m]	30	

Tab. 22

Mechanics	-Q...-	-M5F-
Mounting position	Any	
Product weight without cable [g]	12	9
Product weight with 0.3M8 [g]	20	17
Product weight with 2.5K [g]	40	37
Information on housing materials	Reinforced polyamide	
Materials in contact with medium	– NBR – Reinforced polyamide – High-alloy stainless steel – Nickel-plated brass – Polyamide – Epoxy	– NBR – Reinforced polyamide – High-alloy stainless steel – Anodised wrought aluminium alloy – Polyamide – Epoxy

Tab. 23

Immissions/emissions	-1U-	-1U-	-2U-	-2U-	-5U	-10U
Storage temperature [°C]	-20 ... 80					
Degree of protection	IP40					
Pressure drop with 0 bar at the output and q _{max} [mbar]	2		5		18	50

Tab. 24