

ifm electronic



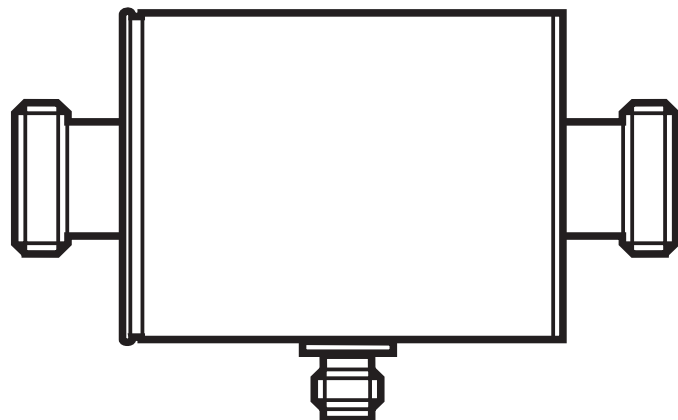
Operating instructions  
Magnetic-inductive flow sensor

**efector 300<sup>®</sup>**

**SM6050**

**UK**

704345 / 00 04 / 2010



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# 1 Preliminary note

## 1. Symbols used

▶ Instruction



Important note

Non-compliance can result in malfunctions or interference.

## 2 Safety instructions

- Please read the product description prior to installing the unit. Ensure that the product is suitable for your application without any restrictions.
- Improper or non-intended use may lead to malfunctions of the unit or to unwanted effects in your application. That is why installation, electrical connection, set-up, operation and maintenance of the unit must be carried out by qualified personnel authorised by the plant operator.
- In all applications test the compatibility of the product materials (see technical data) with the media to be measured.

For the scope of validity cULus:

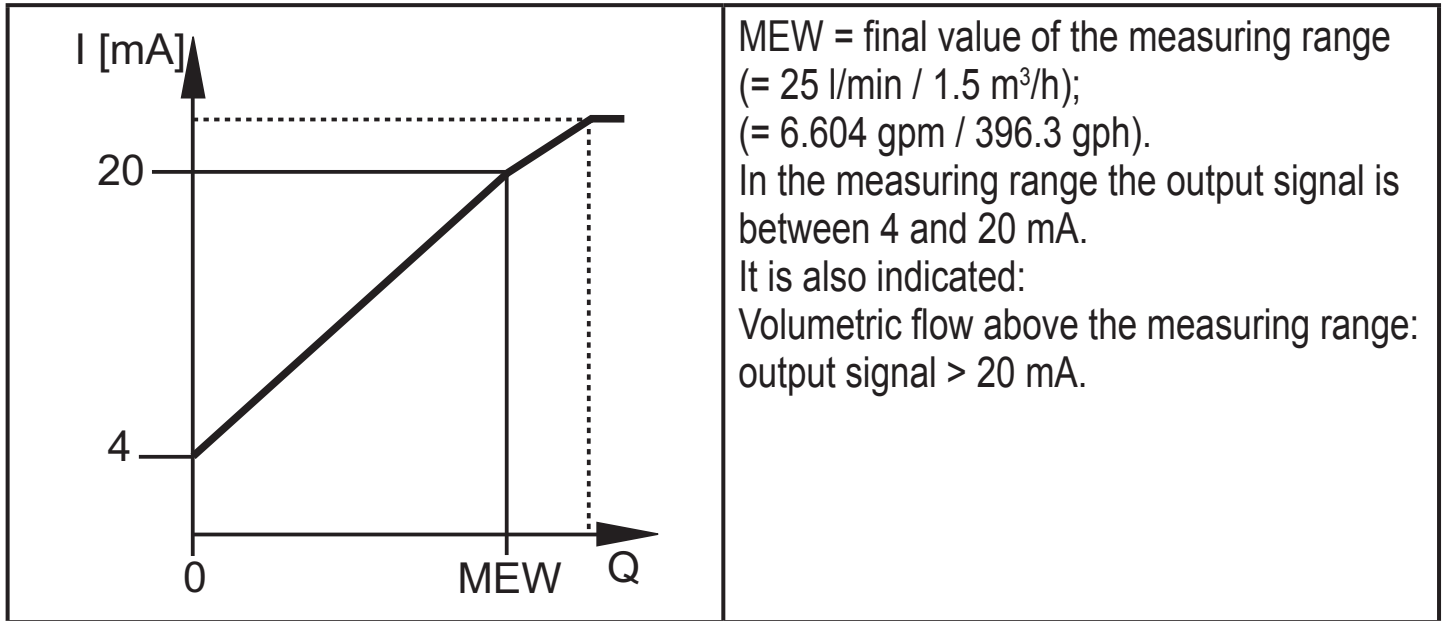
The device shall be supplied from an isolating transformer having a secondary Listed fuse rated either

- a) max 5 amps for voltages 0~20 Vrms (0~28.3 Vp) or
- b) 100/Vp for voltages of 20~30 Vrms (28.3~42.4 Vp).

### 3 Functions and features

The unit monitors liquids.

It detects the volumetric flow and generates an and converts it into an analogue output signal.



#### Application area

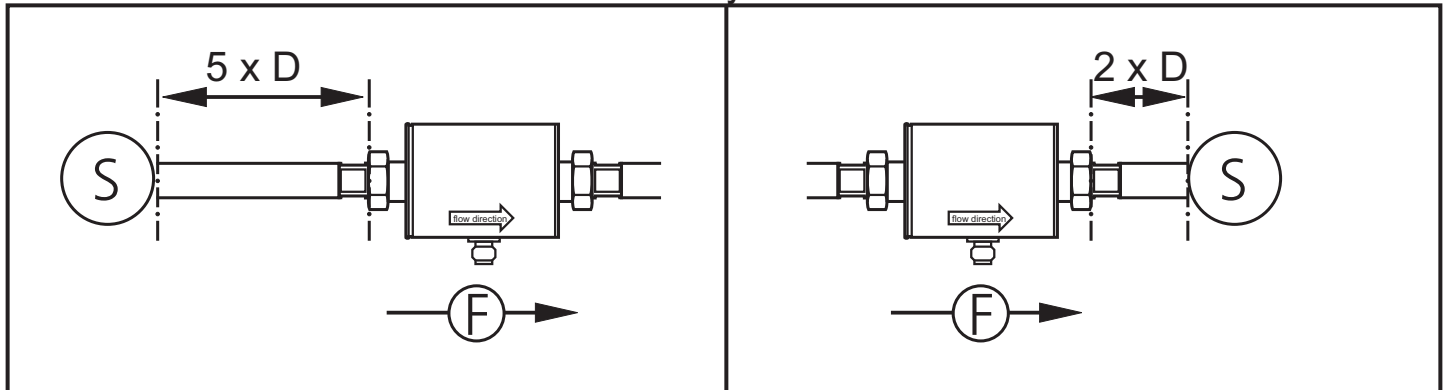
Conductive liquids with the following properties:

- conductivity:  $\geq 20 \mu\text{S}/\text{cm}$
- viscosity:  $< 70 \text{ mm}^2/\text{s}$  at  $40 \text{ }^\circ\text{C}$  ( $< 70 \text{ cSt}$  at  $104^\circ\text{F}$ ).
- flow rate: 0...25 l/min; 0...1.5 m<sup>3</sup>/h; 0...6.604 gpm; 0...396.3 gph.

### 4 Installation

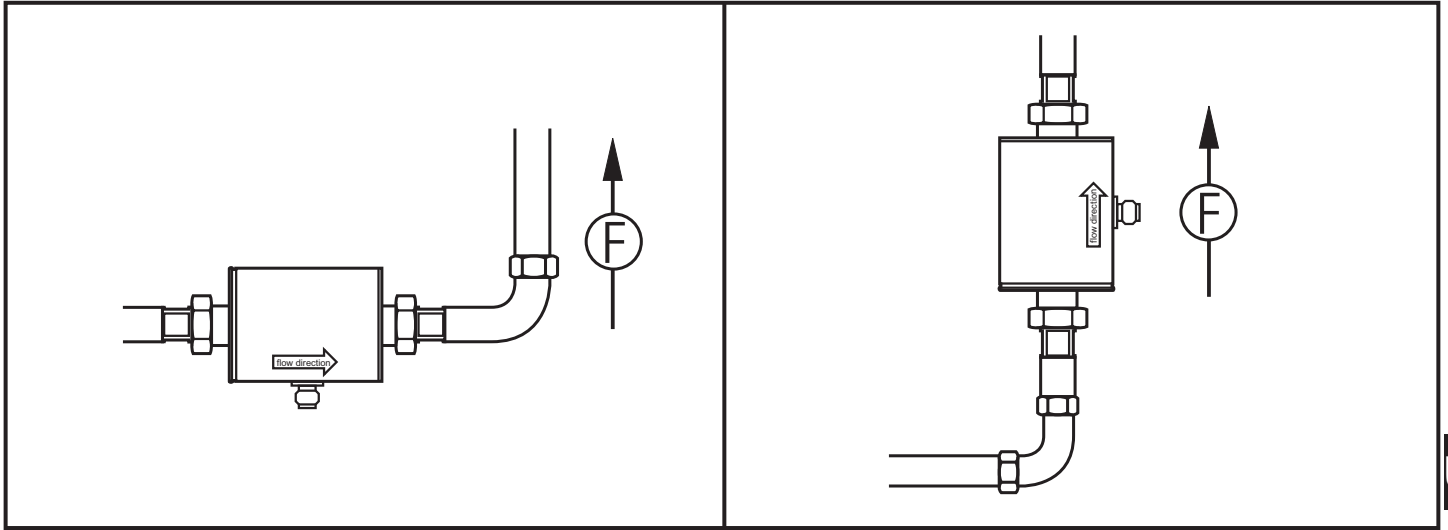
#### 4.1 Installation location

- ▶ Install the unit so that the measuring pipe is always completely filled.
- ▶ Arrange for inlet and outlet pipe lengths. Disturbances caused by bends, valves, reductions, etc. are compensated for. It applies in particular: no shut-off and control devices are allowed directly in front of the unit.



S = disturbance; D = pipe diameter; F = flow direction

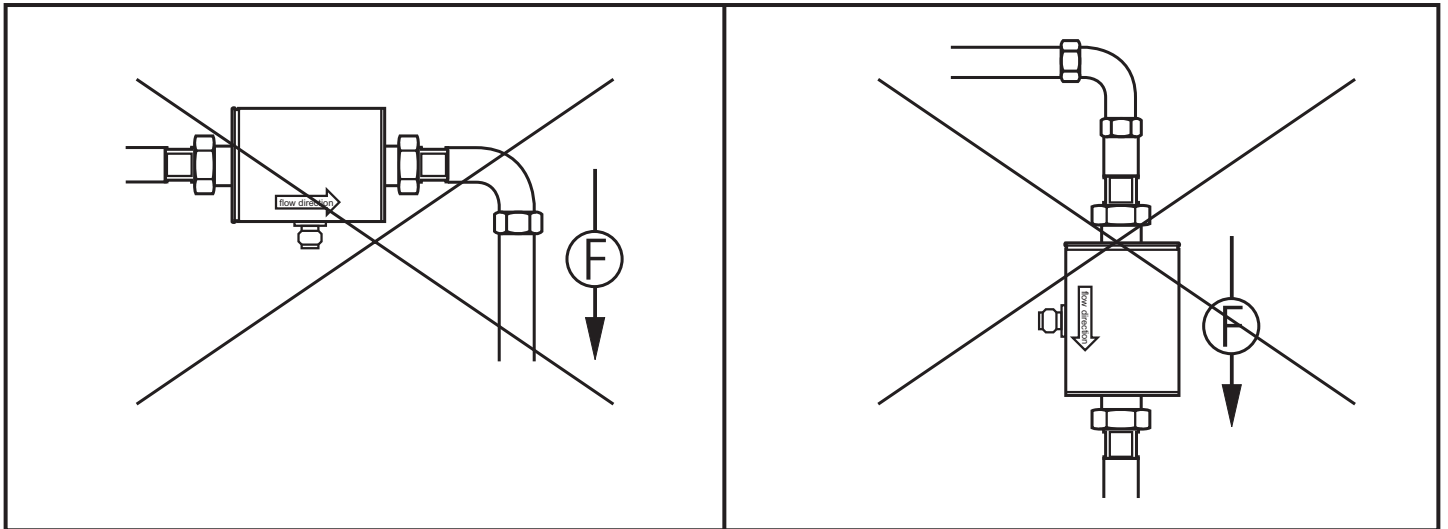
► Install in front of or in a rising pipe.



F = flow direction

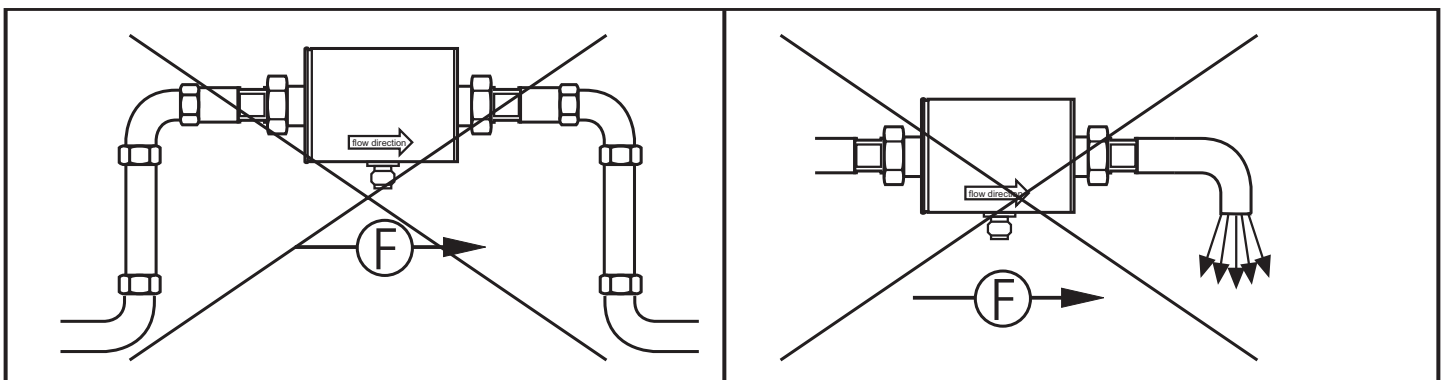
► Avoid the following installation locations:

- Directly in front of a falling pipe.
- In a falling pipe.



F = flow direction

- At the highest point of the pipe system.
- Directly in front of the spout of a pipe.

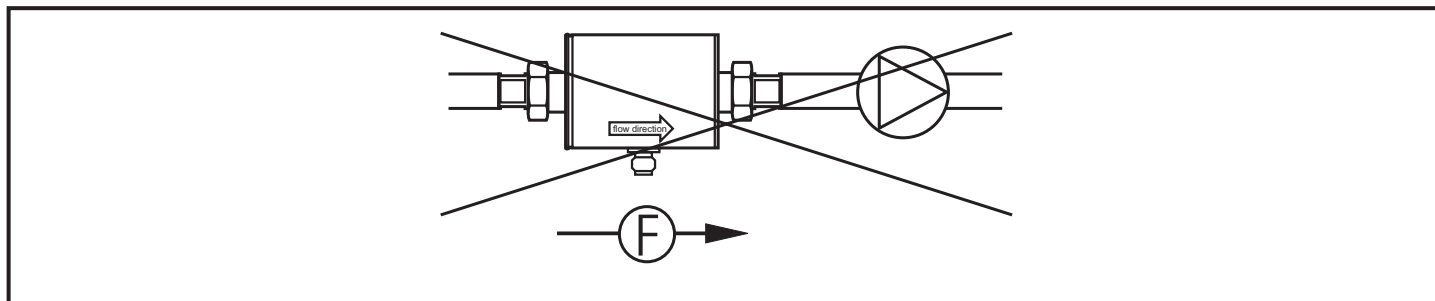


F = flow direction

The unit can be installed independently of the orientation if the following is ensured:

- No air bubbles can form in the pipe system.
- The pipes are always completely filled.

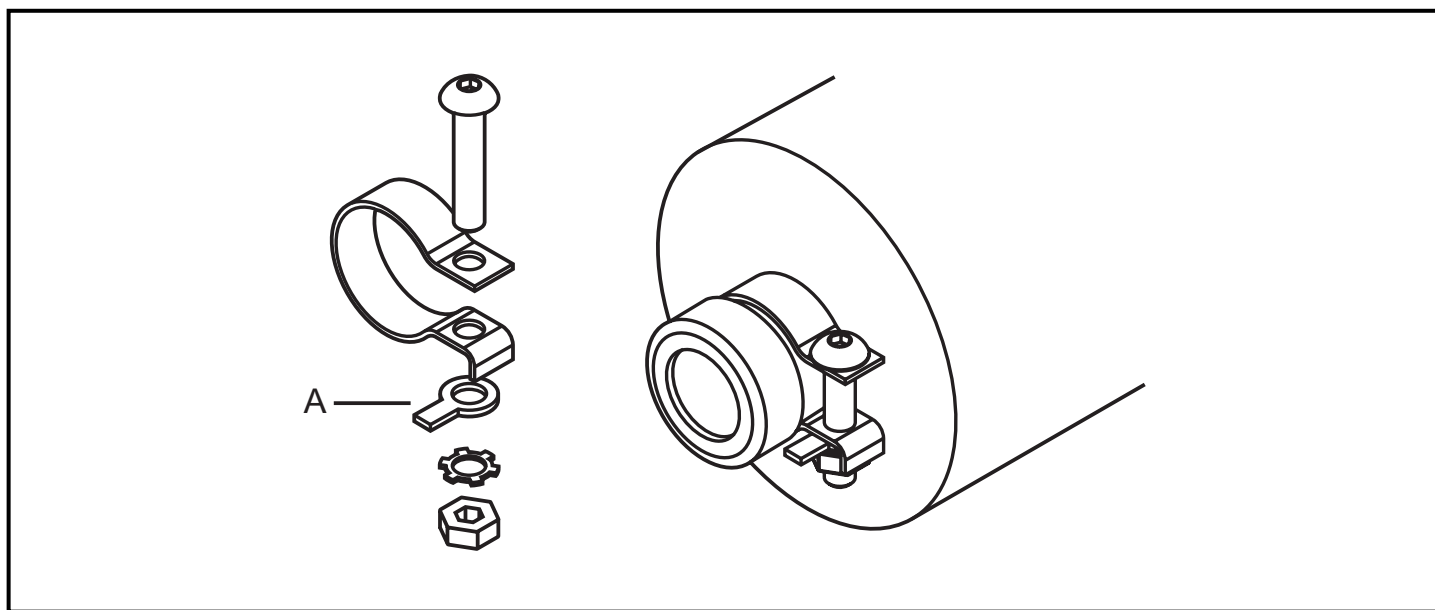
- On the suction side of a pump.



F = flow direction



If installed in an ungrounded pipe system (e.g. plastic pipes) the unit must be grounded.

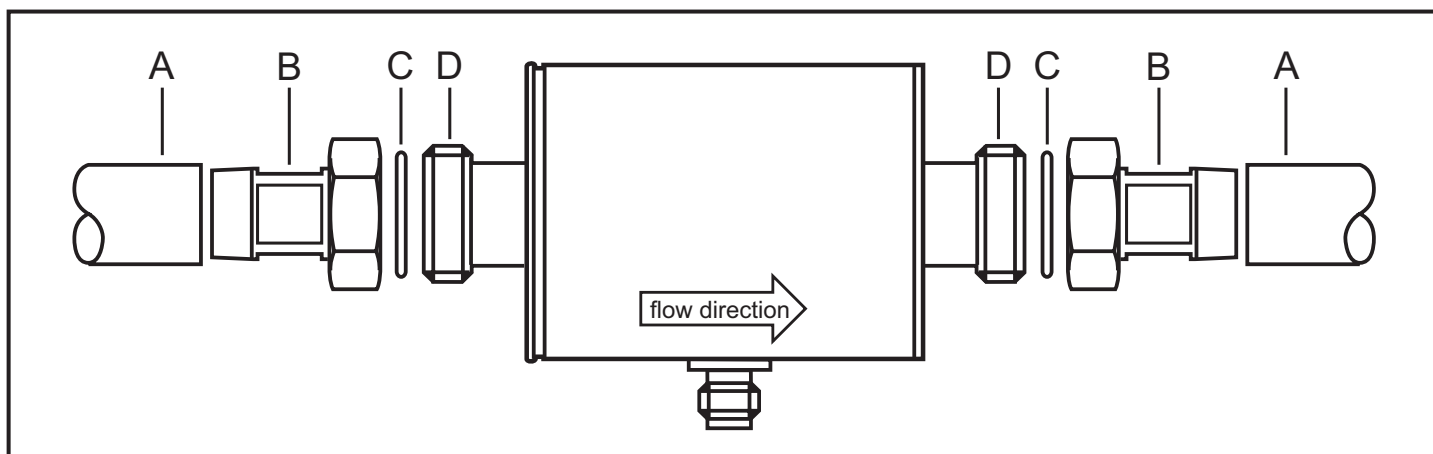


Ground brackets for the G $\frac{1}{2}$  thread are available as accessories (order number E40196).  
A = cable lug (not included in the scope of supply).

## 4.2 Installation in pipes

The unit is installed in the pipe using adapters. Adapters have to be ordered separately as accessories.

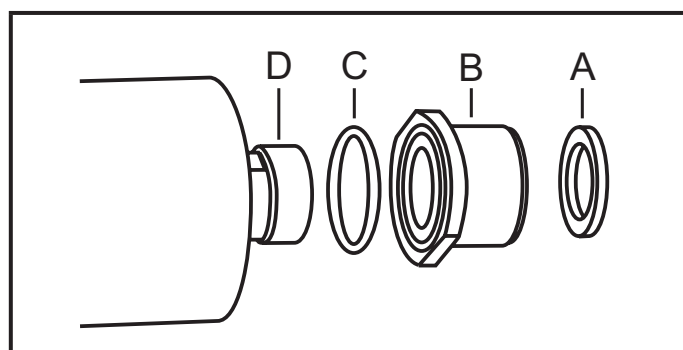
- Order no. E40199: 2 adapters for R $\frac{1}{2}$  pipes + 2 seals.
- Order no. E40200: 2 adapters for  $\frac{1}{2}$ " NPT pipes + 2 seals.



1. Screw the adapter (B) into the pipe (A).
2. Place the seals (C) and install the unit according to the marked flow direction.
3. Screw the adapter (B) with the threads (D) until it is hand-tight.
4. Tighten the two adapters in opposite direction (tightening torque: 30 Nm).

The unit can also be used in G $\frac{3}{4}$  fittings. To do so, first screw an adapter G $\frac{1}{2}$  - G $\frac{3}{4}$  (B) with O-ring (C) on both threads (D) of the unit.

Place the seals (A) and install the unit according to the marked flow direction.



Adapters have to be ordered separately as accessories.

- Order no. E40189: 2 adapters G $\frac{1}{2}$  - G $\frac{3}{4}$  + 2 O-rings + 2 seals).

After installation air bubbles in the system can affect the measurement. Help:

- Rinse the system after installation for ventilation (rinsing quantity > 3 l/min / 1 gpm).

In cases of horizontal installation: As a result of design requirements a small quantity of the medium always remains in the measuring channel after switching off the pump.

## 4.3 Protection against high medium temperatures

For medium temperatures over 50°C (122°F) some parts of the housing can heat up to over 65°C (140°F).

- ▶ Protect the housing against contact with flammable substances and unintentional contact.

## 5 Electrical connection

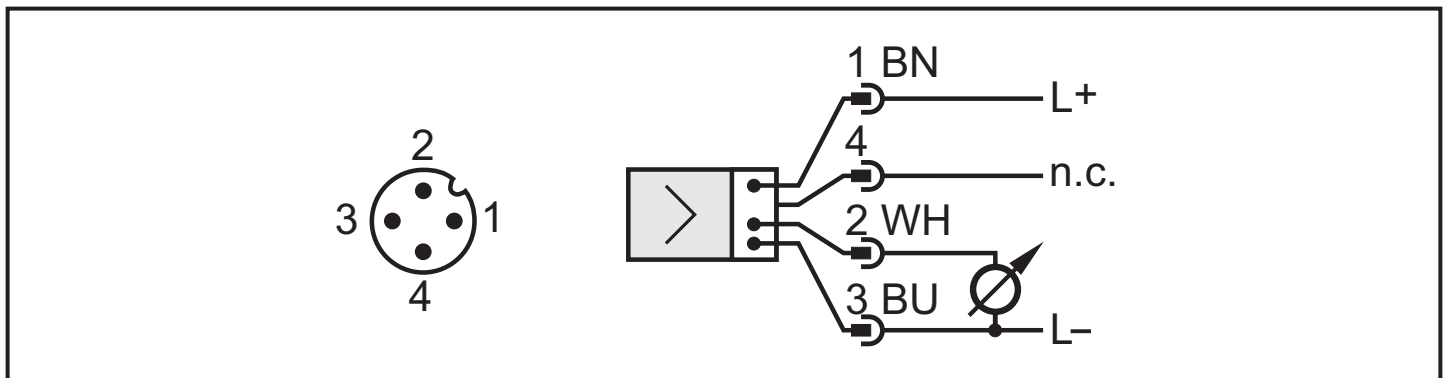


The unit must be connected by a qualified electrician.

The national and international regulations for the installation of electrical equipment must be adhered to.

Voltage supply to EN50178, SELV, PELV.

- ▶ Disconnect power.
- ▶ Connect the unit as follows:



Core colours of ifm sockets:

1 = BN (brown), 2 = WH (white), 3 = BU (blue), 4 = BK (black).



## 6 Operation

After power on and expiry of the power-on delay time (approx. 5 s) the unit is in the Run mode (= normal operating mode). It carries out its measurement and evaluation functions and generates an analogue output signal.

### General operating conditions

► Avoid deposits, accumulated gas and air in the pipe system.



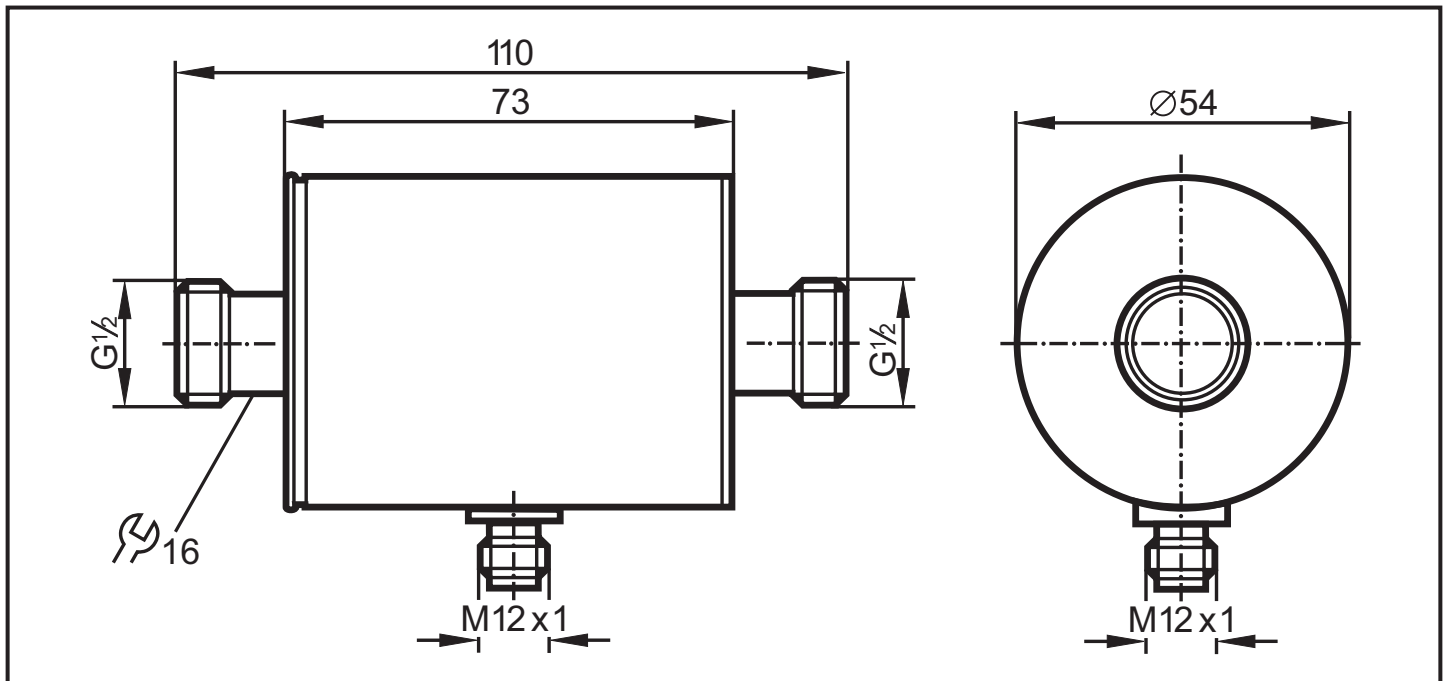
For medium temperatures over 50°C (122°F) some parts of the housing can heat up to over 65°C (140°F).

► In this case do not touch the unit.

► Protect the housing against contact with flammable substances and unintentional contact.

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## 7 Scale drawing



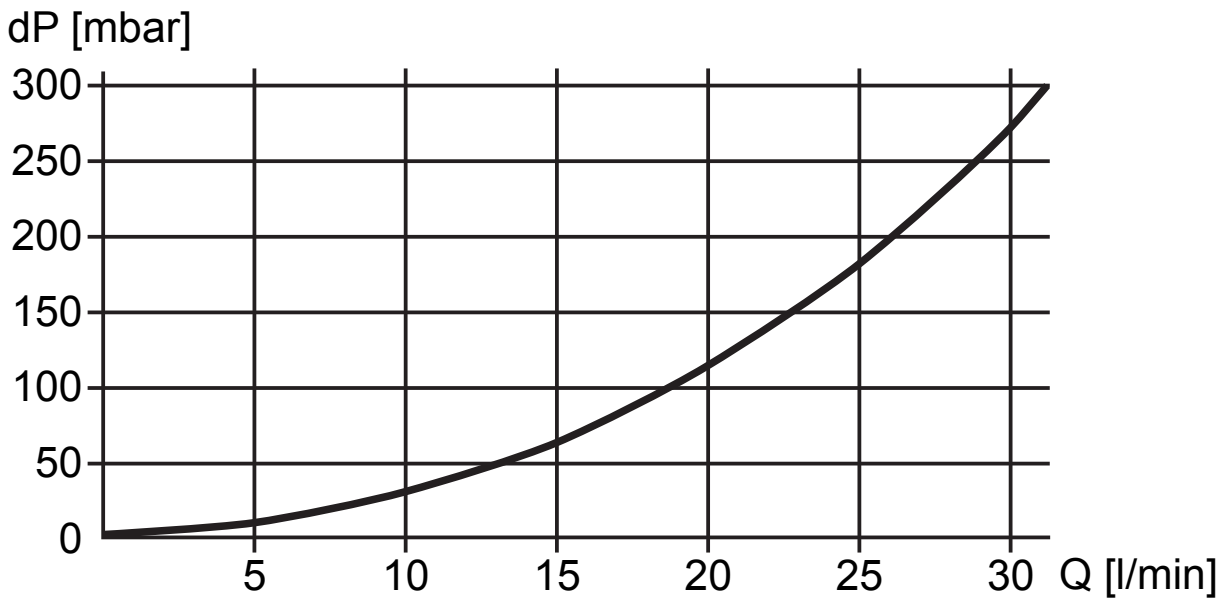
## 8 Technical data

Application ..... conductive liquids  
 Conductivity .....  $\geq 20 \mu\text{S/cm}$   
 Viscosity .....  $< 70 \text{ mm}^2/\text{s}$  at  $40^\circ\text{C}$  ( $< 70 \text{ cSt}$  at  $104^\circ\text{F}$ )

Operating voltage [V] .....  $19\text{...}30 \text{ DC}^{1)}$   
 Protection: reverse polarity, overload  
 Current consumption typ. [mA] ..... 90  
 Analogue output .....  $4\text{...}20 \text{ mA}$   
 Max. load current output [ $\Omega$ ] ..... 500  
 Power-on delay time [s] ..... 5

### Flow monitoring

Measuring range [l/min /  $\text{m}^3/\text{h}$ ] .....  $0\text{...}25 / 0\text{...}1.5$   
 Measuring range [gpm / gph] .....  $0\text{...}6.604 / 0\text{...}396.3$   
 Response time [ms] .....  $< 150$   
 Accuracy .....  $< \pm (2\% \text{ MV} + 0.5\% \text{ VMR})$   
 Repeatability [% VMR] .....  $\pm 0,2$   
 Pressure loss (dP) / flow rate (Q)



|                                       |  |
|---------------------------------------|--|
| Operating temperature [°C / °F] ..... | -10...60 / 14...140                                      |
| Medium temperature [°C / °F].....     | -10...70 / 14...158                                      |
| Pressure resistance [bar / PSI].....  | 16 / 232   |
| Material (wetted parts).....          | stainless steel (316S12); PEEK; FKM                      |
| Housing materials.....                | stainless steel (316S12); PBT-GF 20; EPDM/X (Santoprene) |
| Protection .....                      | IP 67 / III  |
| Insulation resistance [MΩ] .....      | > 100 (500 V DC)   |
| Shock resistance [g] .....            | 20 (DIN / IEC 68-2-27, 11ms)                             |
| Vibration resistance [g] .....        | 5 (DIN / IEC 68-2-6, 55 - 2000 Hz)                       |
| EMC                                   |  |
| IEC 1000/4/2 ESD: .....               | 4 / 8 KV   |
| IEC 1000/4/3 HF radiated:.....        | 10 V/m   |
| IEC 1000/4/4 Burst: .....             | 2 KV   |
| IEC 1000/4/5 Surge:.....              | 0.5 / 1 KV   |
| IEC 1000/4/6 HF conducted: .....      | 10 V   |

<sup>1)</sup> to EN50178, SELV, PELV

MV = measured value; VMR = final value of the measuring range

More information at [www.ifm.com](http://www.ifm.com)

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