



Operating instructions

Flow meter

autosen AS006 - AS011

Safety instructions

- If the operating instructions or the technical data are not adhered to, personal injury and/or damage to property can occur.
- In order to guarantee correct operation of the device, it is necessary to use the device only for media against which it is sufficiently resistant (→ Technical data).
- The responsibility as to the suitability of the device for the application lies with the operator. The manufacturer assumes no liability for consequences of misuse by the operator. Improper installation and use of the devices result in a loss of the warranty claims.

⚠ ATTENTION

At medium temperatures above 50 °C, some parts of the housing can heat up to over 65 °C.

- ▶ In this case, do not touch the device.
- ▶ Protect the housing against contact with flammable substances and unintentional contact.

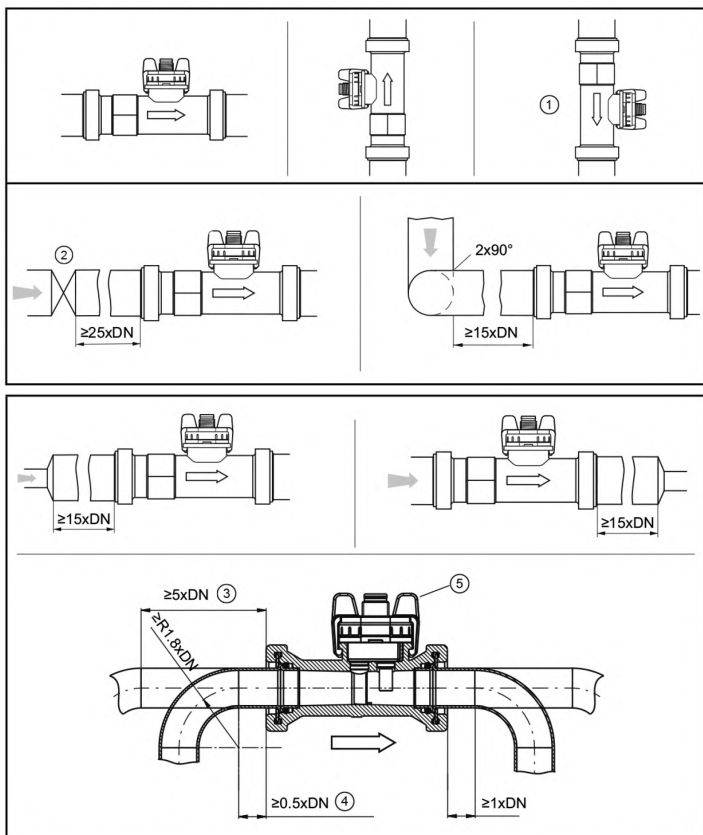
Intended use

The device monitors the flow of liquids.

Pressure Equipment Directive (PED): The devices comply with article 3, section 3 of the Directive 97/23/EC and must be designed and manufactured for non-superheated liquids of group 2 fluids according to sound engineering practice.

Installation

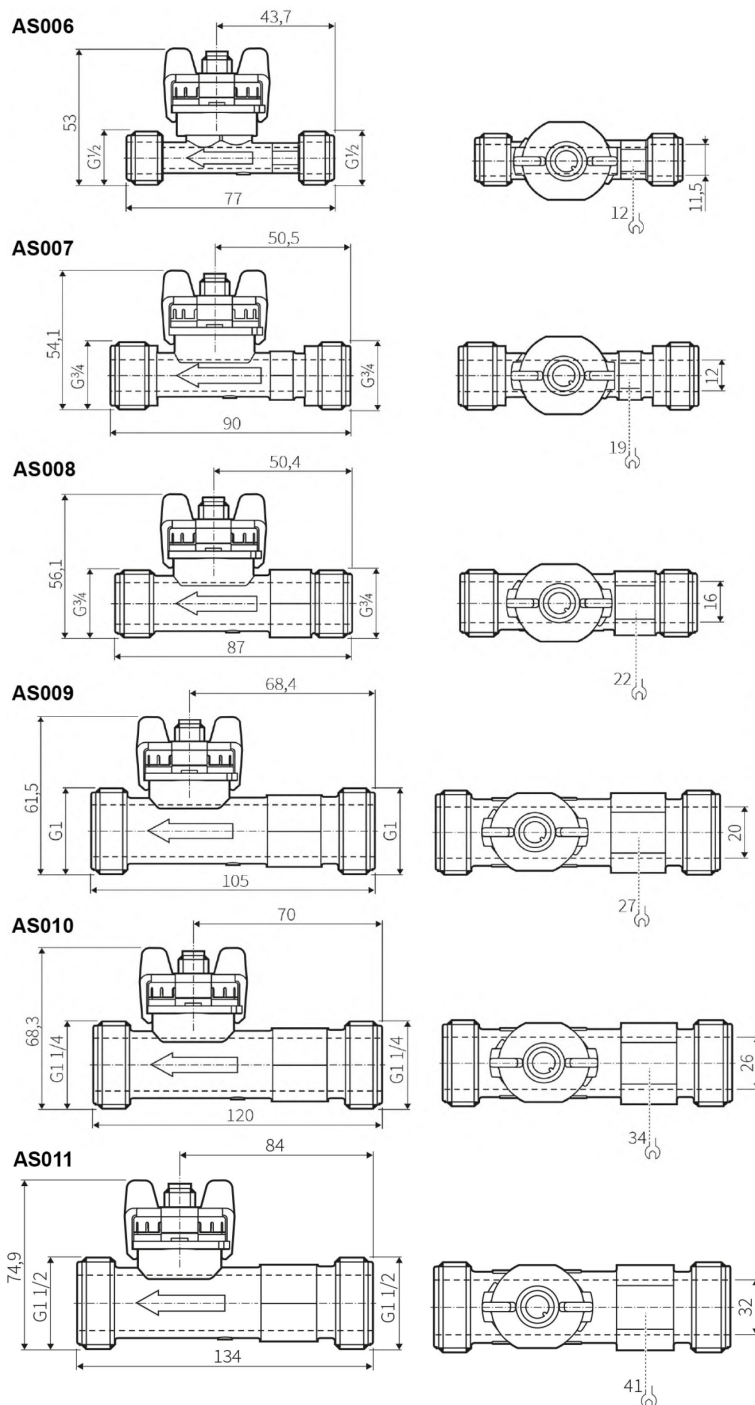
- ▶ Mount the device in a way that no mechanical forces are exerted on the pipe. Use a mounting bracket if necessary.
- ▶ Tightening torque DN 8/10/15/20: ≤ 12 Nm.



- 1: Not recommended. The pipe must be free from any bubbles and always be completely filled with medium.
- 2: Valve or pump
- 3: For non-ideal bends
- 4: For ideal 90° bends with at least R 1.8 x DN
- 5: Do not remove the locking clamp during operation!

- ⚠ ▶ Avoid faults in the inlet and outlet.
- ▶ Make sure that pipe and sensor have the same internal diameter.

Technical drawings



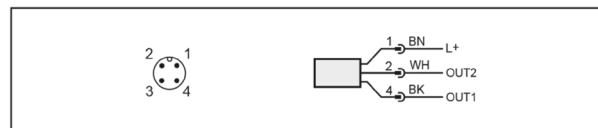
Electrical connection

! The device must be connected by a qualified electrician.

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

Supply voltage SELV, PELV according to the technical data sheet.

- Disconnect and de-energise the system.
- Connect the device as follows:



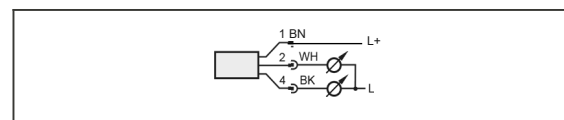
Pin	Core colour	
1:	BN	Brown
2:	WH	White
4:	BK	Black
OUT1: 4...20 mA (flow)		
OUT2: 4...20 mA (relative temperature)		
Colours according to DIN EN 60947-5-2		

! Operation only with the relative temperature output OUT2:

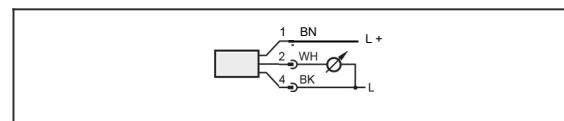
- Connect the output OUT1 (pin 4, flow output) to L-

Circuit examples:

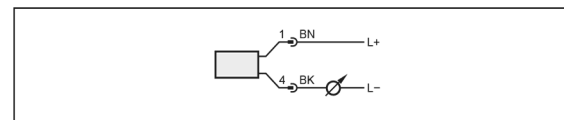
Using both outputs OUT1 and OUT2:



Using only OUT2 (relative temperature):



Using only OUT1 (flow):

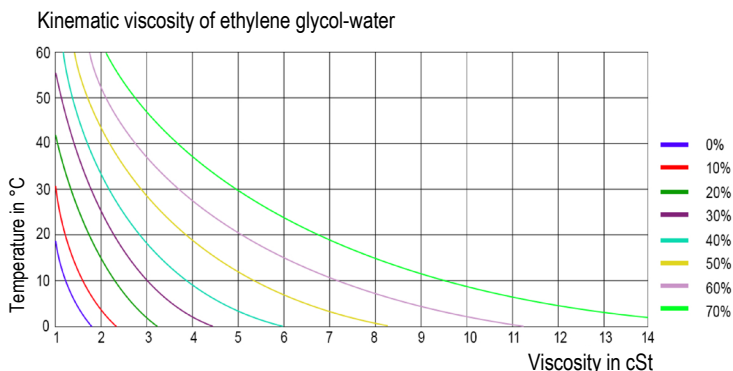


Influence of glycol on the flow measurement

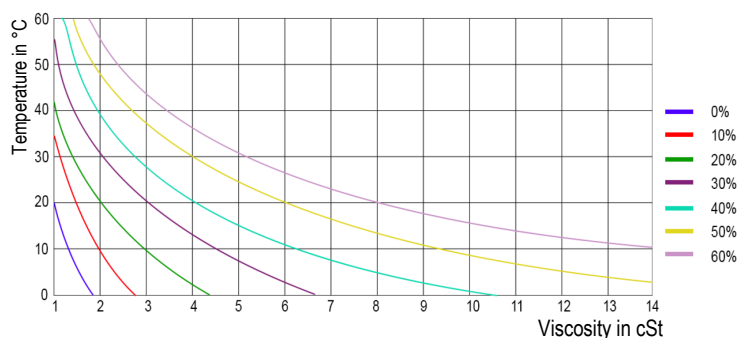
The following information largely corrects the influence of media with a higher viscosity than water (= media viscosity > 1.8 cSt), so that a measuring accuracy of 3% FS is achieved in the range of 1.8 - 4 cSt, and of 4% FS in the range of 4 - 14 cSt (u = viscosity in cSt).

1. Determination of the viscosity of glycol-water mixtures

The following information largely corrects the influence of media with a higher viscosity than water (= media viscosity > 1.8 cSt), so that a measuring accuracy of 3% FS is achieved in the range of 1.8 - 4 cSt, and of 4% FS in the range of 4 - 14 cSt (u = viscosity in cSt).



Kinematic viscosity of propylene glycol-water



2. Determination of the response threshold Q_{min}

A reliable measurement result is only guaranteed if the actual flow is greater than the minimum response threshold Q_{min} . If the response threshold is undershot, the measuring accuracy is not given.

a. Formula for the response threshold Q_{min} (l/min) (< DN 10):

u = kinematic viscosity in cSt with $1.8 \text{ cSt} < u < 14 \text{ cSt}$

AS007 - DN10: $Q_{min} = u + 0.8$

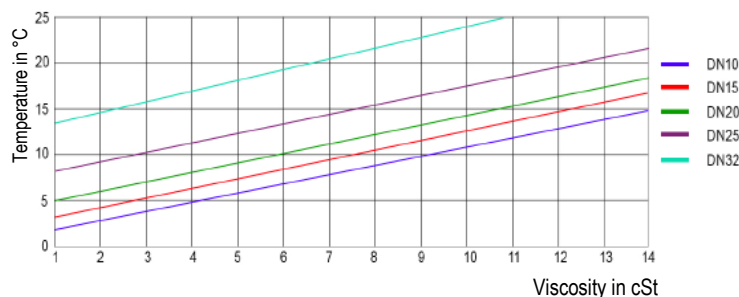
AS008 - DN15: $Q_{min} = u + 2.5$

AS009 - DN20: $Q_{min} = u + 4.0$

AS010 - DN25: $Q_{min} = u + 8.0$

AS011 - DN32: $Q_{min} = u + 13.0$

b. Response threshold diagram (alternative to the formula)



3. Formula for the flow (l/min) with current output 4 ... 20 mA (< DN 10):

u = kinematic viscosity in cSt with $1.8 \text{ cSt} < u < 14 \text{ cSt}$

AS007 - DN10: $Q = 2.000 * (I - 4 \text{ mA}) - 0.40u + 0.40$

AS008 - DN15: $Q = 3.125 * (I - 4 \text{ mA}) - 0.45u + 0.45$

AS009 - DN20: $Q = 5.313 * (I - 4 \text{ mA}) - 0.55u + 0.55$

AS010 - DN25: $Q = 9.375 * (I - 4 \text{ mA}) - 0.80u + 0.80$

AS011 - DN32: $Q = 15.000 * (I - 4 \text{ mA}) - 0.80u + 0.80$

4. Measuring accuracy

The measuring accuracy depends on the kinematic viscosity of the medium.

- 3% MEW for $u < 4 \text{ cSt}$
- 4% MEW for $4 < u < 14 \text{ cSt}$ MEW = final value of the measuring range

Operation

Function check

After switching on the supply voltage, the device is in operating mode. It carries out its measurement and evaluation functions and generates output signals according to the measured values.

- Check whether the device operates correctly.

Maintenance / Transport

- Check the device at regular intervals and replace it, if necessary.
- It is not possible to repair the device.
- In case of return shipment, ensure that the device is free from soiling, especially from dangerous and toxic substances.
- For transport, only use appropriate packaging to avoid damaging the device.
- After use, dispose of the device in an environmentally friendly way according to the applicable national regulations.

Technical data and scale drawing

- Technical data sheet and scale drawing at: www.autosen.com