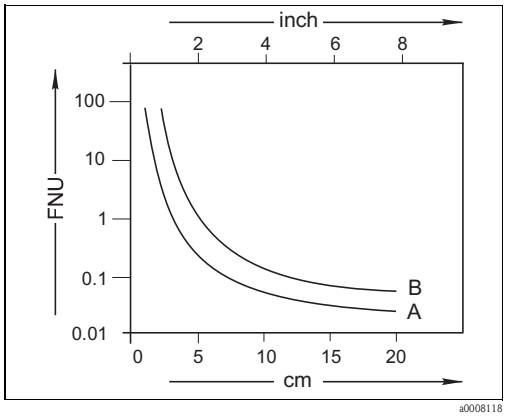
Installation

Wall distance

Installing the sensor in pipework or very close to the wall can cause backscatter which results in a higher sensor signal.
The effective wall or bottom distance can be optimized by aligning the flat sensor side.



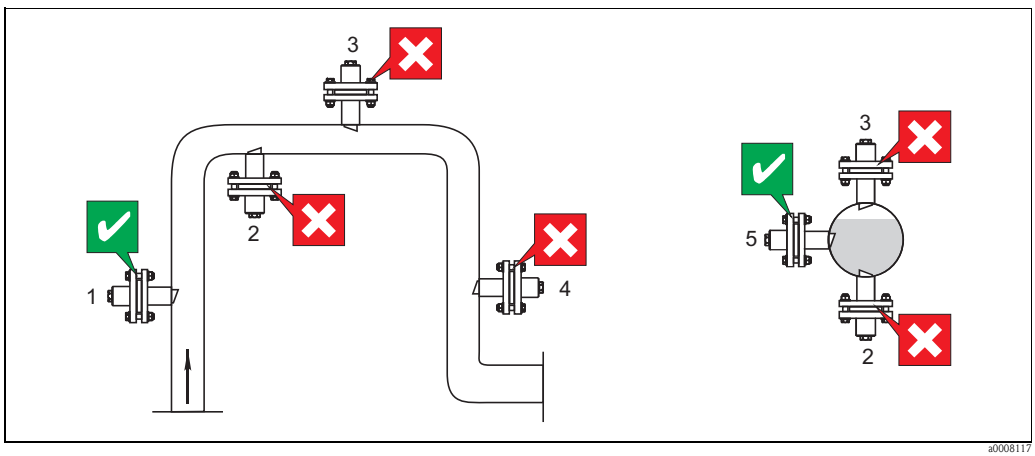
Effect of the distance from the wall or bottom

A Dark wall or bottom (non-reflective)
B Bright wall or bottom (reflective)

Note!
The following generally applies: The lower the turbidity to be measured, the darker the vessel walls should be and the greater the wall distance should also be.
When measuring in drinking water, the wall distance to a dark wall must be **at least 8 cm** (3"). Bright pipes are not suitable for the drinking water sector.

Pipe installation

The following figure illustrates various installation positions in pipes and indicates whether they are permitted or not.



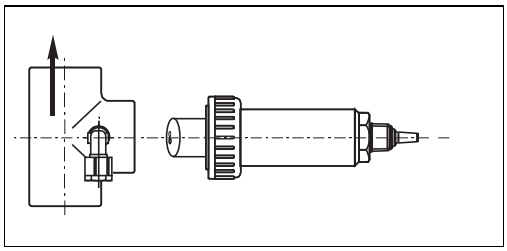
Orientation and installation positions (with adapter CUA120-A/B resp. retractable assembly CUA451)

- The pipeline diameter must be at least 100 mm (4") if reflective materials (e.g. stainless steel) are used.
- Install the sensor in places with uniform flow conditions.
- Orientate the sensor surface against the medium flow (self-cleaning effect).
- The best installation location is in the ascending pipe (→ , it. 1). Installation is also possible in the horizontal pipe (it. 5).
- Do not install the sensor in places where air may collect or foam bubbles form (it. 3) or where suspended particles may settle (it. 2).
- Avoid installation in the down pipe (it. 4).

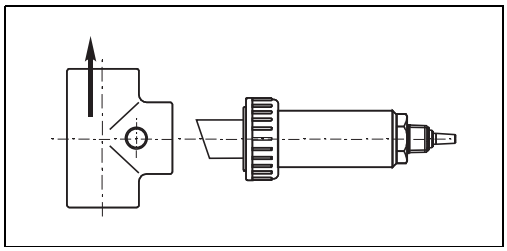
Flow operation

In general

- Install the flow assembly as vertical as possible so that the medium flows to the sensor from below.
- Two sensor orientations are possible for every installation:
  - Parallel to the medium flow
    Orientation parallel to the medium flow is required when using the CUR 3 spray head.
  - Against the medium flow
    Orientation against the medium flow is used to increase the self-cleaning effect in heavily-soiled media (> 15 FNU). The wall reflection is negligible here due to the high absorption.



Parallel to the medium flow

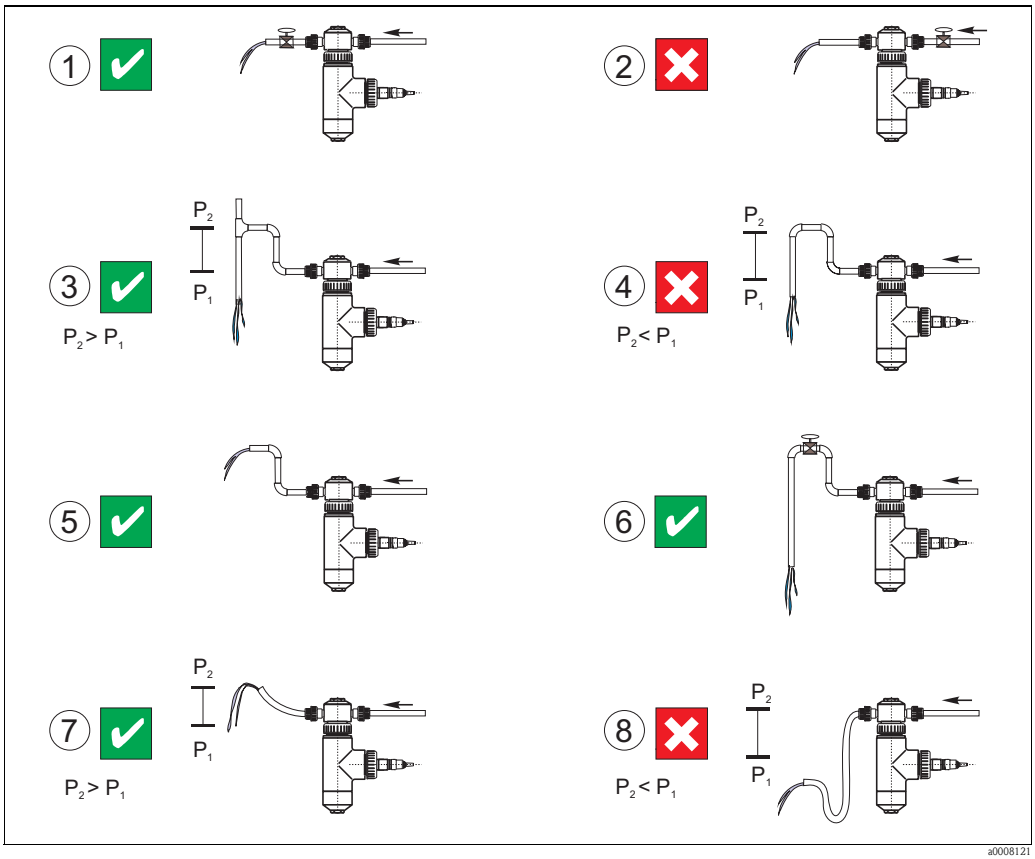


Against the medium flow

Note!
For turbidities < 5 FNU, use the sensor versions CUS31-**E or CUS31-**S.

Flow operation in the drinking water sector (with special calibration)

When the sensor is ordered with assembly E or S, the sensor is **individually calibrated** in the factory with the assembly ordered.
Therefore, no initial calibration on site is necessary.



Installation situations with flow assembly E resp. S

1. Correct: pressure reduction after measurement
   Degassing is avoided. The gas in the water remains dissolved.
2. Incorrect: Pressure reduction before measurement
   The pressure reduction creates favourable conditions for gas bubble formation.

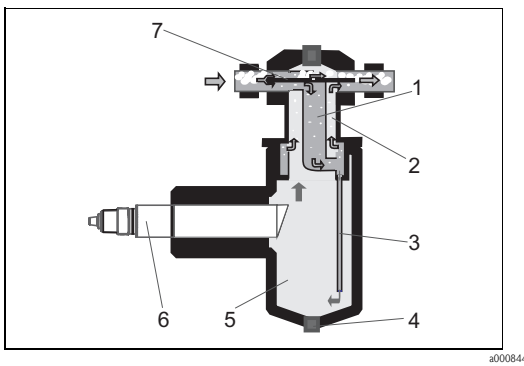
3. Correct: Outlet of the assembly raised and vented
   Gas cannot collect in the upper section of the assembly. The outlet pipe is vented at the highest point. A slight overpressure forms in the assembly as a result of the height difference of the raised outlet.
4. Incorrect: Outlet raised but not vented
   A low pressure forms in the assembly if venting via the downcomer outlet pipe does not take place due to too small a cross-section.
5. Correct: Standard application in event of little initial pressure
   Slight overpressure due to raised outlet level, no gas collecting in the upper section of the assembly.
6. Limited application: The valve reduces the volume flow

   ✎ Note!
   The outlet line may not be too thin or too long as otherwise a low pressure forms in the assembly. A vent for the drain line must be present. The outlet must be completely opened at regular intervals as otherwise the raising of the outlet level would not make any sense.
   If using a tube as the drain line, avoid formation of siphon draw (low points in the tube)! Otherwise venting does not take place.
7. Correct: Tube as outlet line
   Must be raised!
8. Incorrect: Tube not raised
   A low pressure forms in the assembly which favours gas bubble formation. In addition, low points in the tube result in siphon draw and thereby prevent venting. This results in pressure changes in the assembly.

Gas bubble elimination

Conventional turbidity measurements are carried out in an unpressurised sample. When the pressure on a sample (which was pressurised beforehand) is released, fine bubbles are produced which distort the turbidity measurement.

There are several methods of eliminating these gas bubbles:
- Pressurized measurement in the bypass (pressure is not released until after the measurement).
- For measurements without overpressure or with slight overpressure:
  Free medium flow above the assembly level. The mounting location should be as low as possible to take advantage of the maximum possible pressure.
- Unpressurized measurement and gas bubble elimination using wiper cleaning.
  The wiping duration and interval can be programmed for optimum results.
- Reduction of the flow to the lowest possible value (50 l/h).
  Slight flow prolongs the period in which the medium is in the assembly. This means that gas bubbles have more time to rise to the top. The sensor response time increases slightly due to the lower flow.
- Flow assembly S with integrated gas bubble trap (CUS31-**S)
  Most of the gas bubbles are sent directly to the assembly outlet in the upper half of the separated inlet (7). The other half of the medium flows into a ring channel (1) by means of the central pipe. The remaining bubbles rise here and are conveyed out of the measuring chamber by means of holes in the outlet (2) located in the centre of the assembly. Bubble-free medium (3) is pushed down into the measuring chamber (5). This also leads to a high flow which results in a quick response time. In addition, this almost completely prevents dirt particles settling.



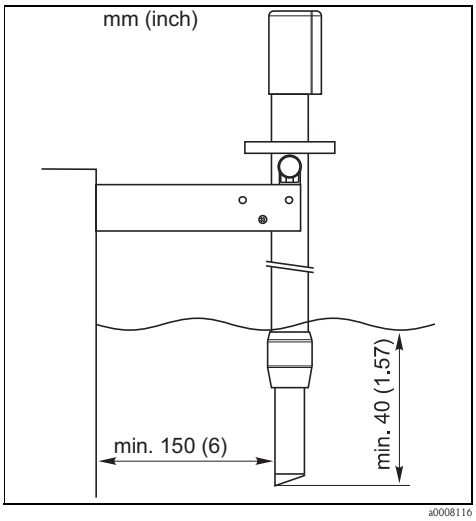
Flow assembly S with gas bubble trap

1 Ring channel
2 Outlet
3 Bubble-free medium
4 Drain screw (G1 thread)
5 Measuring chamber
6 Sensor CUS31
7 Separated inlet

Immersion operation

When installing the sensor in immersion assemblies, please ensure that a sufficient wall distance is observed during operation.

- For this reason, select an installation location in which **a minimum wall distance of 150 mm (6")** is observed even with varying levels or altered flow profiles.
  Mounting in a suspended assembly with chain must therefore be avoided.
- The sensor must immerse at least 40 mm (1.5") into the medium.



CYA611 with pendulum frame

Environment

Storage temperature

-20 to 60 °C (0 to 140 °F)

Ingress protection

IP 68