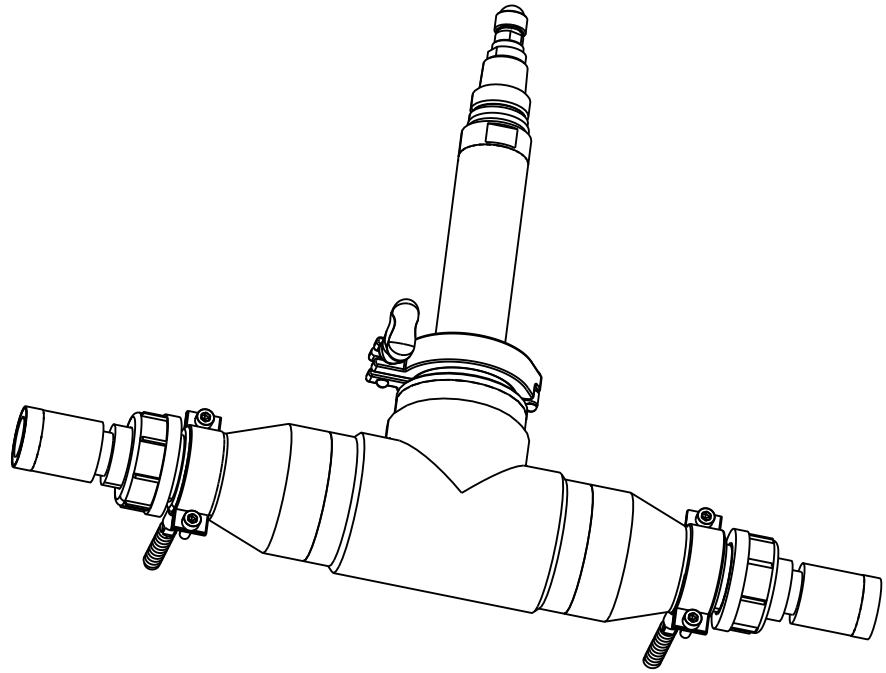


Operating Instructions

Flowfit CUA252





Flow assembly for CUS52D turbidity sensor



Document information

Warnings

The structure, signal words and safety colors of the signs comply with the specifications of ANSI Z535.6 ("Product safety information in product manuals, instructions and other collateral materials").

Safety message structure	Meaning
 DANGER Causes (/consequences) Consequences if safety message is not heeded ▶ Corrective action	This symbol alerts you to a dangerous situation. Failure to avoid the situation will result in a fatal or serious injury.
 WARNING Causes (/consequences) Consequences if safety message is not heeded ▶ Corrective action	This symbol alerts you to a dangerous situation. Failure to avoid the situation can result in a fatal or serious injury.
 CAUTION Causes (/consequences) Consequences if safety message is not heeded ▶ Corrective action	This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or more serious injuries.
 NOTICE Cause/situation Consequences if safety message is not heeded ▶ Action/note	This symbol alerts you to situations that can result in damage to property and equipment.

Symbols




-  Additional information, tips
-  Permitted or recommended
-  Forbidden or not recommended


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1 Basic safety instructions

1.1 Requirements for personnel

- ▶ Installation, commissioning, operation and maintenance of the measuring system must only be carried out by specially trained technical personnel.
- ▶ The technical personnel must be authorized for the specified activities by the system operator.
- ▶ Electrical connection must only be carried out by a certified electrician.
- ▶ Technical personnel must have read and understood these Operating Instructions and must adhere to them.
- ▶ Faults at the measuring point may only be rectified by authorized and specially trained personnel.

 Repairs not described in the enclosed Operating Instructions may only be carried out directly at the manufacturer's or by the service organization.

1.2 Designated use

The CUA252 flow assembly is designed for the installation of the CUS52D turbidity sensor.

Its main areas of application are:

- Final turbidity measurement in the outlet of waterworks
- Turbidity measurement in the inlet of waterworks
- Turbidity measurement at all stages of the process
- Turbidity measurement for filter monitoring and filter backwashing
- Turbidity measurement in drinking water networks

Any other use than the one described here compromises the safety of persons and the entire measuring system and is therefore not permitted.

The manufacturer is not liable for damage resulting from improper or non-designated use.

1.3 Occupational safety

As the user, you are responsible for complying with the following safety conditions:

- Explosion protection guidelines (only devices approved for use in explosion hazardous areas)
- Installation instructions
- Local prevailing standards and regulations

Electromagnetic compatibility

This device has been tested for electromagnetic compatibility in accordance with the applicable European standards for industrial applications.

The electromagnetic compatibility indicated only applies to a device that has been connected in accordance with the instructions in these Operating Instructions.

1.4 Operational safety

- ▶ Before commissioning the entire measuring point, make sure all the connections are correct. Ensure that electrical cables and hose connections are not damaged.
- ▶ Do not operate damaged products, and secure them against unintentional commissioning. Label and identify the damaged product as defective.
- ▶ If faults cannot be rectified, you must take the products out of service and secure them against unintentional commissioning.

1.5 Product safety

The product is designed to meet state-of-the-art safety requirements, has been tested and left the factory in a condition in which it is safe to operate.

Relevant regulations and European standards have been observed.

2 Incoming acceptance and product identification

2.1 Incoming acceptance

- Make sure the packaging is undamaged!
- Notify the supplier of any damage to the packaging. Keep the damaged packaging until the matter has been settled.
- Make sure the contents are not damaged!
- Notify the supplier of any damage to the delivery contents. Keep the damaged products until the matter has been settled.
- Check the delivery to make sure nothing is missing. Compare it against the shipping documents and your order.
- Pack the product for storage and transportation in such a way that it is reliably protected against impact and moisture. The original packaging offers the best protection. Furthermore, the permitted ambient conditions must also be observed (see "Technical data").
- If you have any questions, contact your supplier or your local sales center.

2.2 Product identification

2.2.1 Nameplate

You can find the following information on the nameplate:


- Manufacturer details
- Order code
- Extended order code
- Serial number
- Operating conditions
- Safety information symbols

Compare the order code on the nameplate with your order.

2.2.2 Identifying the product

The order code and serial number of your device can be found in the following locations:

- On the nameplate
- In the shipping documents

 To discover what product version you have, enter the order code on the nameplate into the search screen at the following address:
www.products.endress.com/order-ident

2.3 Scope of delivery

The scope of delivery comprises:

- 1 Flowfit CUA252 flow assembly in the version ordered
- 1 Set of Operating Instructions BA01281C/07/EN

If you have any questions, contact your supplier or your local sales center.

2.4 Certificates and approvals

Declaration of Conformity

The product meets the requirements of the harmonized European standards.

As such, it complies with the legal specifications of the EC directives.

The manufacturer confirms successful testing of the product by affixing to it the **CE** mark.

3 Installation

3.1 Dimensions

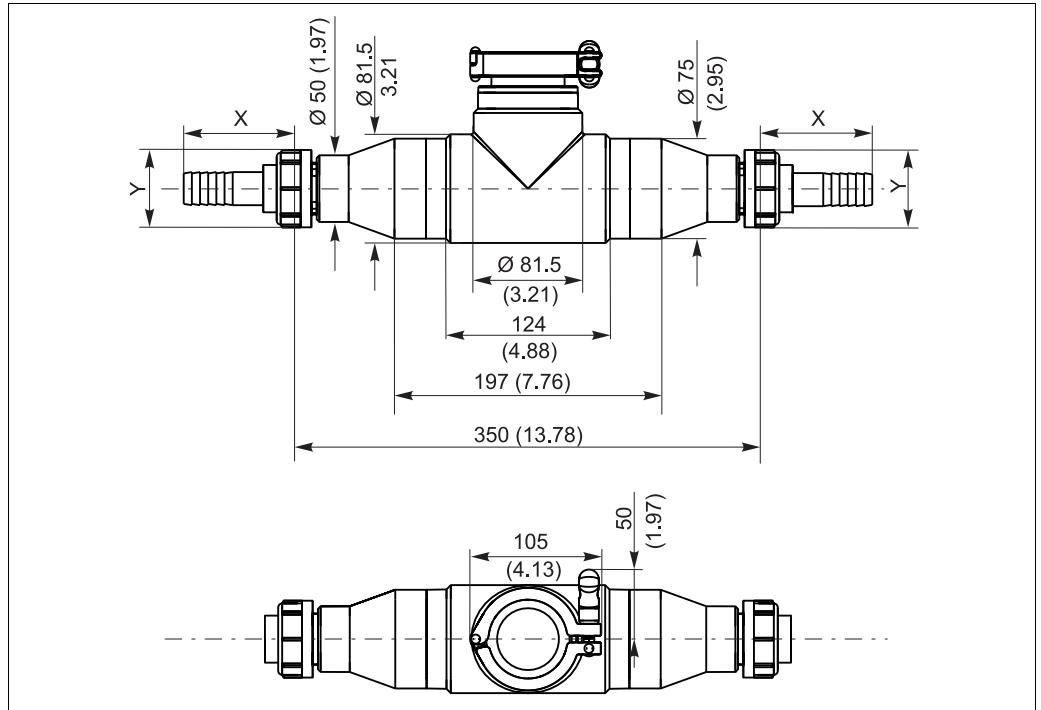


Fig. 1: Dimensions in mm (inch)

Connections	NPT 3/4"	Rp 3/4	Glue-in port D25	ANSI 2"	Hose D25	Hose D12	G1 1/4
X mm(inch)	70 (2.76)	64 (2.52)	22 (0.87)	71 (2.80)	74 (2.91)	74 (2.91)	0
Y mm(inch)	Ø 58(2.28)	Ø 58(2.28)	Ø 58(2.28)	Ø 152 (5.98)	Ø 58(2.28)	Ø 58(2.28)	Ø 58(2.28)

3.2 Installation conditions

To ensure that medium flows through the assembly in a bypass configuration, the pressure p_1 must be greater than the pressure p_2 . This is achieved by installing an orifice plate in the main pipe.

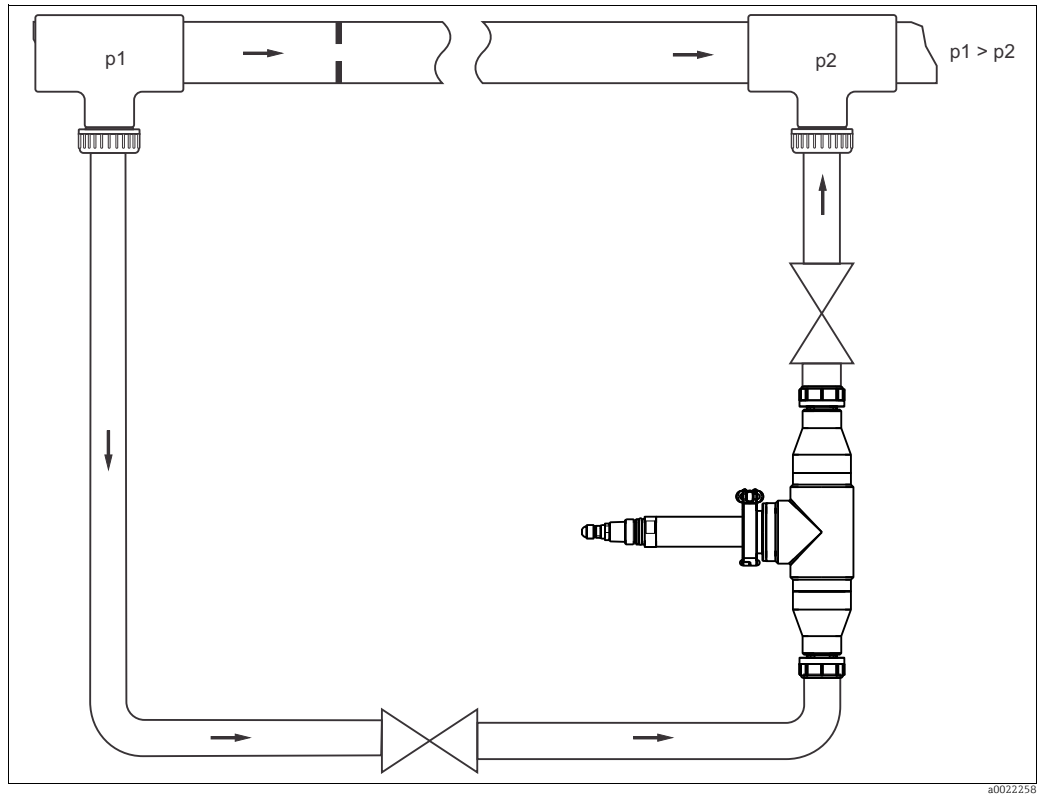


Fig. 2: Connection example involving a bypass and an orifice plate in the main pipe (supply from below)

No measures to increase pressure are required for branch pipes that branch off from the main pipe.

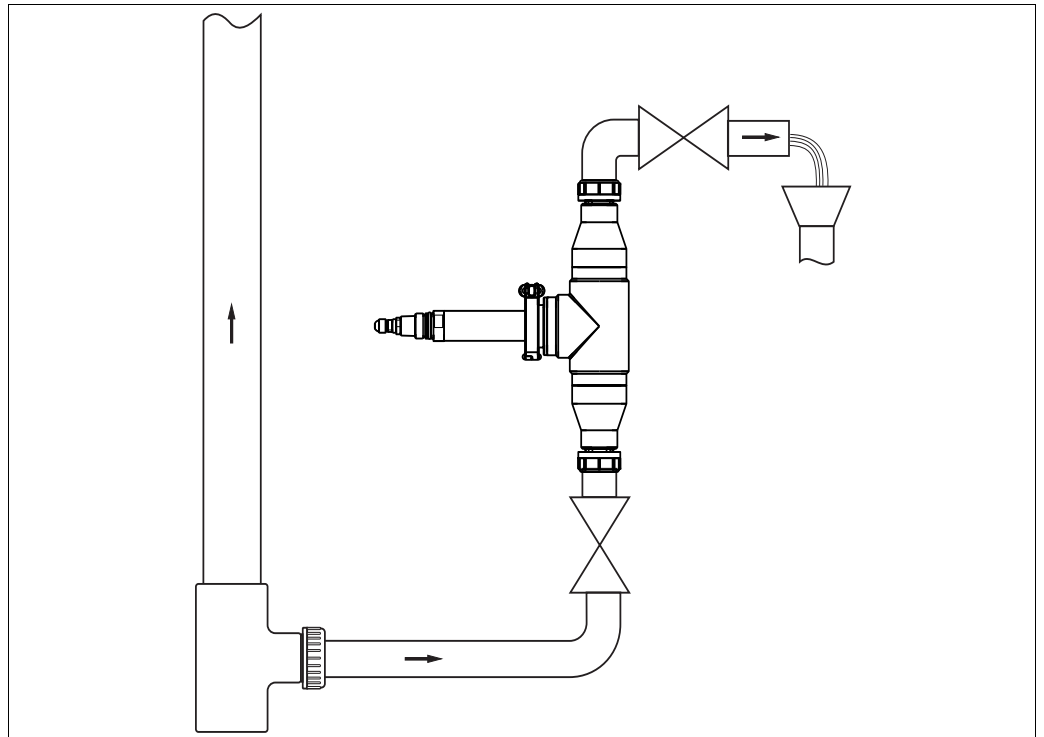


Fig. 3: Connection example involving an open outlet

The inlet and outlet connection of the flow assembly are always identical, the system is symmetrical.

Install the flow assembly vertically.

The supply must be connected at the bottom (upward flow in the pipe).

Avoid buckles and loops in the hose system.

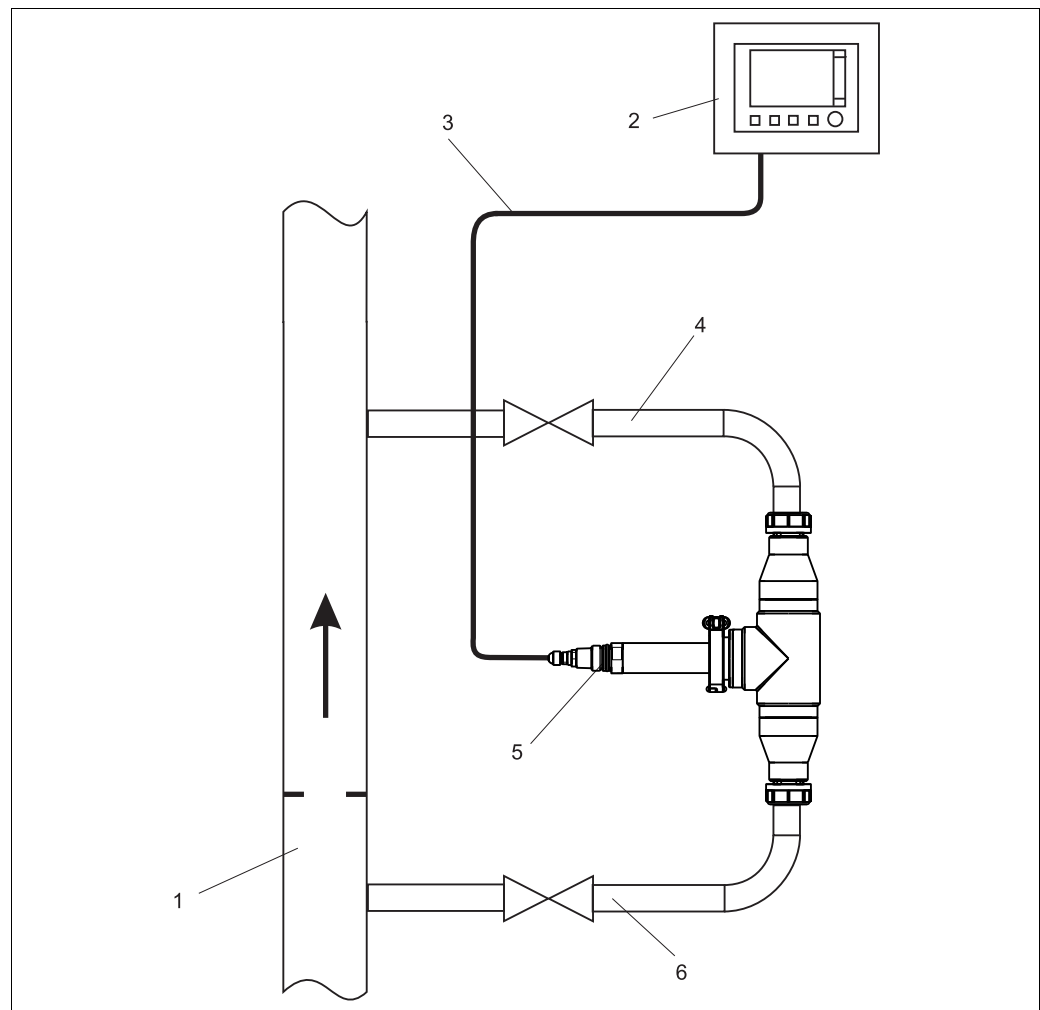
- i** Pay attention to the installation instructions (flow direction) for the sensor.
- i** Many fluids tend to develop gas bubbles in a depressurized state. Operating the flow assembly under pressure (adjustable valve after the flow assembly) prevents this behavior in many cases.

3.3 Installation instructions

3.3.1 Measuring system

A complete measuring system consists of:

- Flowfit CUA252 flow assembly
- Turbimax CUS52D sensor
- Transmitter, e.g. Liquiline CM442
- Measuring cable



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Fig. 4: Measuring system (example)

- 1 Process pipe
- 2 Liquiline CM442 transmitter
- 3 Measuring cable
- 4 Return line with shutoff valve
- 5 CUA252 flow assembly with CUS52D sensor
- 6 Supply line with shutoff valve

3.3.2 Installation with wall holder unit

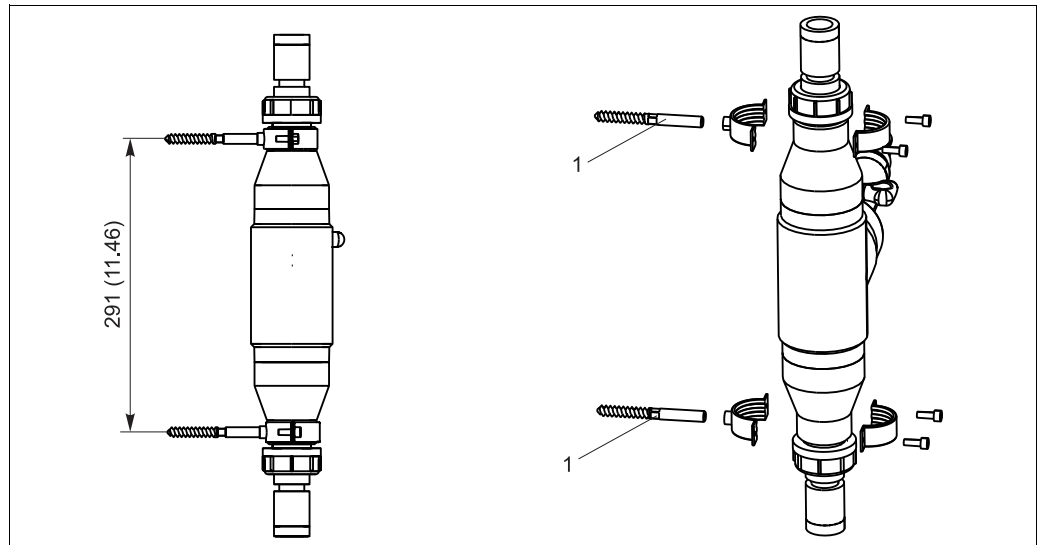


Fig. 5: Wall holder unit

1 Hanger bolt STST 10x60 (included in the delivery for the wall mounting kit)

Please comply with the following instructions when installing the flow assembly:

- Mount the flow assembly either
 - in a bypass
 - In the bypass pipe, install a shutoff valve upstream and downstream of the flow assembly. This makes it possible to clean the sensor or perform other maintenance tasks without affecting the process.
 - or in a branch pipe with an open outlet.
 - Install a shutoff valve upstream of the flow assembly.
- Mount the assembly in a vertical, upright position.
- Establish the medium connection using commercially available connection fittings.

3.3.3 Installation with bubble trap

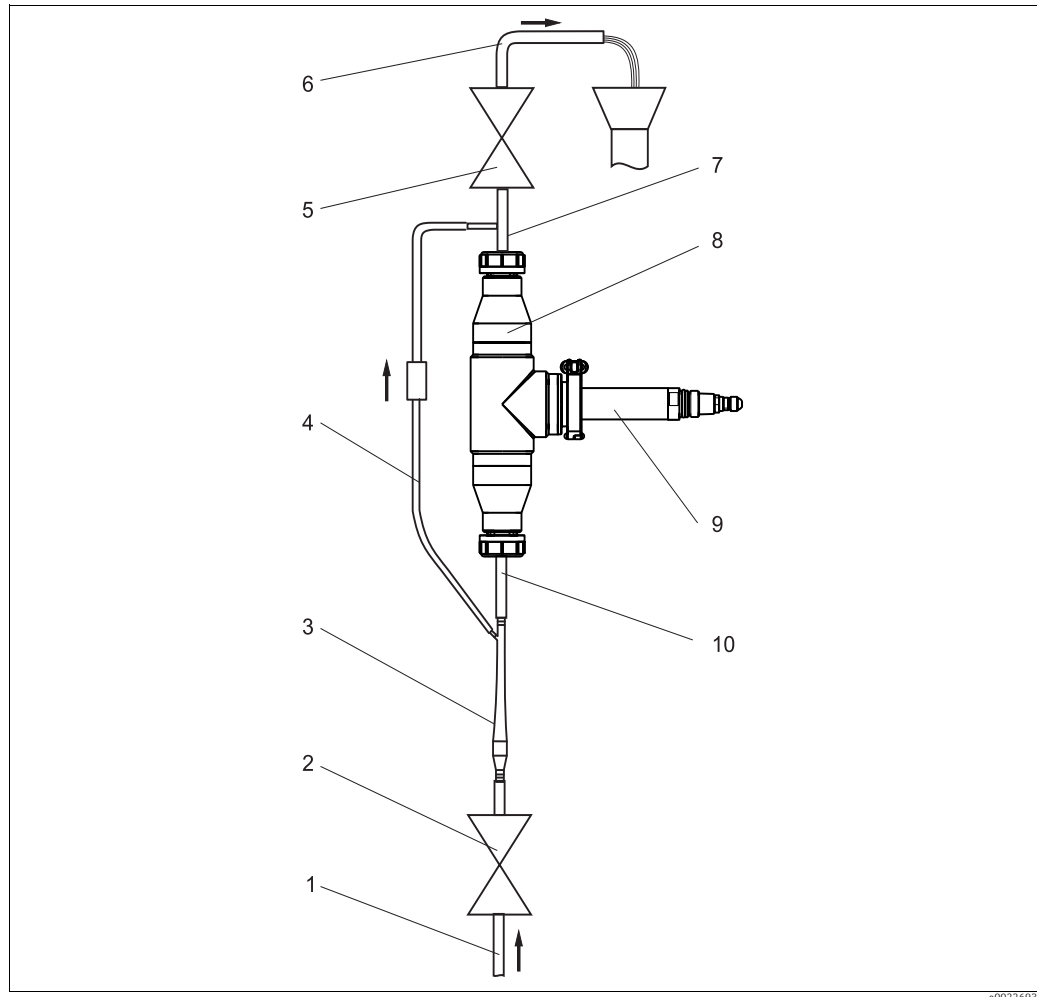


Fig. 6: Connection example with bubble trap

- | | |
|----|---|
| 1 | Supply from below |
| 2 | Shutoff valve |
| 3 | Bubble trap |
| 4 | Bubble trap venting (included in the delivery) |
| 5 | Shutoff valve (throttle to increase pressure) |
| 6 | Outlet |
| 7 | Transition to D 12 with connection for vent line (included in the delivery) |
| 8 | CUA252 flow assembly |
| 9 | CUS52D turbidity sensor |
| 10 | Transition to D 12 |


i The lost water resulting from the bubble trap is not suitable for feedback into the process.

For the hose system, use PVC hoses with an internal diameter of 12 mm (3/8"). Secure the hose system with worm drive hose clips (not included in the delivery).

The inlet and outlet connection of the flow assembly are always identical, the system is symmetrical.

Install the flow assembly vertically.

The supply must be connected at the bottom (upward flow in the pipe).

Insert a orifice plate into the upper process connection (→  6, item 7) of the flow assembly to get the desired volume flow rate (included in the delivery):

- 1 mm for volume flow rate < 60 l/h (15.8 gal/hr)
- 3 mm for volume flow rate 60 to 100 l/h (15.8 to 26.4 gal/hr)
- 5 mm for volume flow rate > 100 l/h (26.4 gal/hr)

Avoid buckles and loops in the hose system.

- i** Pay attention to the installation instructions (flow direction) for the sensor.
- i** Observe the maximum pressure and maximum temperature when operating the bubble trap.

3.4 Sensor installation

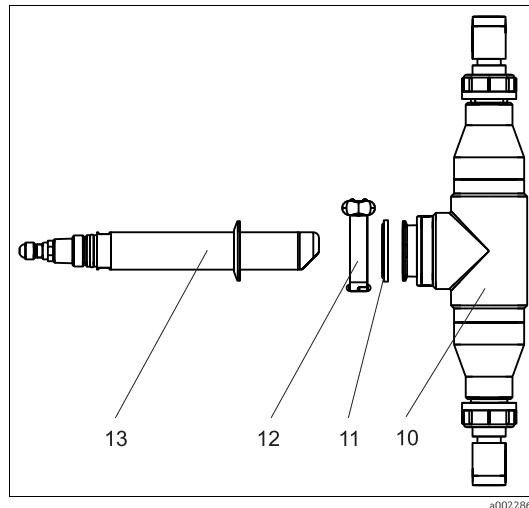


Fig. 7: Sensor installation
 10 CUA252 flow assembly
 11 Clamp seal
 12 Locking clamp
 13 CUS52D turbidity sensor

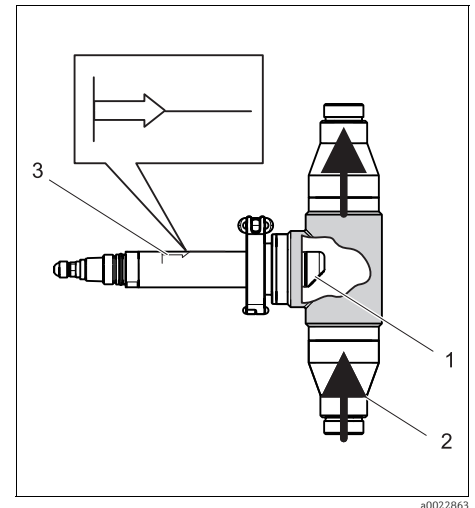



Fig. 8: Sensor orientation
 1 Optical windows
 2 Flow direction
 3 Installation marking

Install the sensor so that the optical windows of the sensor (→ , item 1) are aligned against the flow direction (item 2). The installation marking (item 3) helps you ensure the correct sensor orientation.

3.5 Post-installation check

- ▶ After installation, check all the connections to ensure they are secure and leak-tight.
- ▶ Is the orientation correct?
- ▶ Make sure that the hoses can only be removed by force.
- ▶ Check all hoses for damage.

4 Commissioning

Prior to initial commissioning, make sure that:

- All the seals are seated correctly (on the assembly and the process connection)
- The sensor is correctly installed and connected

⚠ WARNING

Medium incorrectly connected to the assembly

Danger of medium leaking

- ▶ Before applying pressure to an assembly, make sure the medium is connected correctly!
Otherwise do not introduce the assembly into the process!

5 Maintenance

You must perform maintenance tasks at regular intervals.

We recommend setting the maintenance times in advance in an operations journal or calendar.

The maintenance cycle primarily depends on the following:

- The facility
- The installation conditions
- The medium being measured

⚠ CAUTION

Risk of injury if medium escapes

- ▶ Prior to performing any maintenance task, make sure that the process pipe is unpressurized, empty and rinsed.

5.1 Cleaning the assembly

- Use suitable cleaning solutions (see "Cleaning agents" section) to remove light dirt and fouling.
- Heavy dirt can be removed with a soft brush and a suitable cleaning agent.
- To remove stubborn dirt, soak the parts in a cleaning solution. Then clean the parts with a brush.

i Six months is a typical cleaning interval for drinking water, for example.

5.2 Cleaning the sensor

Cleaning with the ultrasonic cleaning system

If the (optional) CYR52 ultrasonic cleaning system is installed, you can clean the sensor surfaces during operation.

Enter the following parameters to prevent the ultrasonic transducer from overheating:

Cleaning time: max. 5 seconds
 Cleaning interval: min. 5 minutes

Cleaning without the ultrasonic cleaning system

If the assembly is not fitted with an ultrasonic cleaning system, you must remove the sensor in order to clean it.

Type of fouling	Cleaning measure
Lime deposits	Immerse the sensor in 1%-5 % hydrochloric acid (for a few minutes).
Dirt particles on the optical windows	Use a cleaning cloth to clean the optical windows.

i You must rinse the sensor thoroughly with water after cleaning it.

5.3 Cleaning agent

The choice of cleaning agent depends on the degree and type of fouling. The most common types of dirt and fouling and the suitable cleaning agents are listed in the following table.

Type of fouling	Cleaning agent
Greases and oils	Agents containing surfactants (alkaline agents) or water-soluble organic solvents (halogen-free, e.g. ethanol)
Limescale deposits, metal hydroxide buildup, lyophobic biological buildup	Approx. 3% hydrochloric acid
Sulfide deposits	Mixture of 3% hydrochloric acid and thiocarbamide (commercially available)
Protein buildup	Mixture of 3% hydrochloric acid and pepsin (commercially available)
Fibers, suspended substances	Pressurized water, possibly surface-active agent
Light biological buildup	Pressurized water

⚠ CAUTION

Solvents can pose a health hazard

- ▶ Never use acetone or any organic solvents containing halogens. Such solvents can damage plastic parts and some are suspected of causing cancer (e.g. chloroform).

5.4 Checking and replacing the seals

Check the seals at regular intervals and replace the seals where necessary.

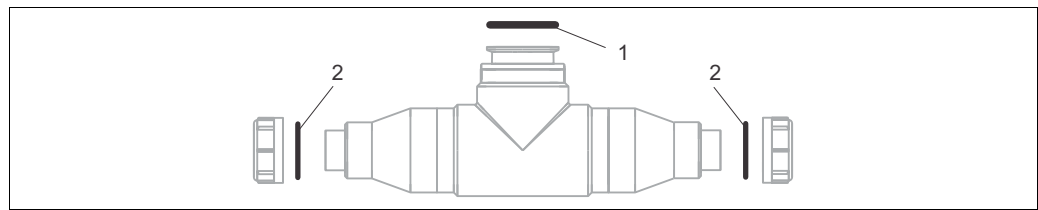


Fig. 9: Position of the seals

- 1 Clamp seal
- 2 O-rings

The seals are available as a spare parts kit (see the "Spare parts kits" section).

6 Repair

6.1 Spare parts kits

Order number	Description
71241882	Clamp seal, DN 50, FDA, 2 pcs
71241892	O-ring, EPDM, 2 set

Detailed information on the spare parts kits is available in the "Spare Part Finding Tool", which can be accessed on the Web at:

www.products.endress.com/spareparts_consumables

6.2 Return

The product must be returned if repairs or a factory calibration are required, or if the wrong product has been ordered or delivered. According to legal regulations Endress+Hauser, as an ISO-certified company, is required to follow certain procedures when handling returned products that are in contact with the medium.

To ensure swift, safe and professional device returns:

Visit our website to obtain information about the return procedure and basic conditions:

www.services.endress.com/return-material

6.3 Disposal

Comply with local regulations when disposing of the product.

7 Accessories

7.1 Connection accessories

Description	Order number
Dummy cover for clamp connection; 1 pc	71242180
Adapter, internal thread, RP 3/4", material: PE; 1 pc	71242172
Adapter, internal thread, NPT 3/4", material: PE; 1 pc	71242173
Adapter, welded connection, D 25, material: PE; 1 pc	71242174
Adapter, hose connection nipple, D 25, material: PE; 1 pc	71242175
Adapter, hose connection nipple, D 12, material: PE; 1 pc	71242176
Adapter, flange ANSI 2", 1 pc	71242177

7.2 Bubble trap

Bubble trap

- For sensor CUS52D
- Process pressure: up to 3 bar (43.5 psi)
- Process temperature: 0 to 50 °C (32 to 122 °F)
- Adapter to D 12 with connection for vent line (top connection on CUA252), is included in the delivery.
- Orifice plates for the following volume flow rates:
 - < 60 l/h (15.8 gal/hr)
 - 60 to 100 l/h (15.8 to 26.4 gal/hr)
 - > 100 l/h (26.4 gal/hr)
- The vent line is fitted with a PVC hose, hose check valve and a Luer lock adapter.
- Order number, suitable for assembly CUA252: 71242170
- Order number, suitable for assembly S of CUS31: 71247364

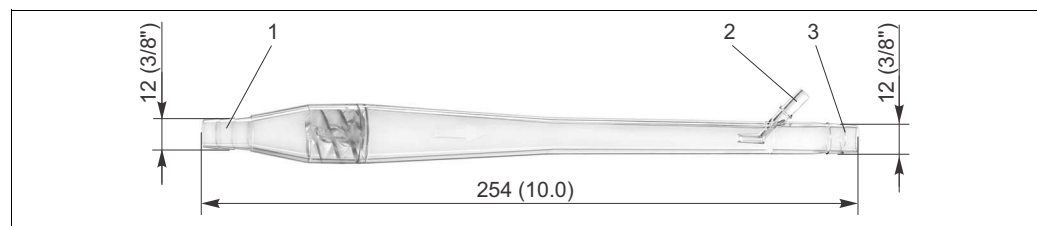


Fig. 10: Bubble trap, dimensions in mm (inch)

- 1 Medium inlet (without hose system)
- 2 Air bubble exit (hose system is included in the delivery)
- 3 Medium exit (without hose system)

7.3 Wall mounting kit

Wall mounting kit for CUA252

- Order number: 71242171

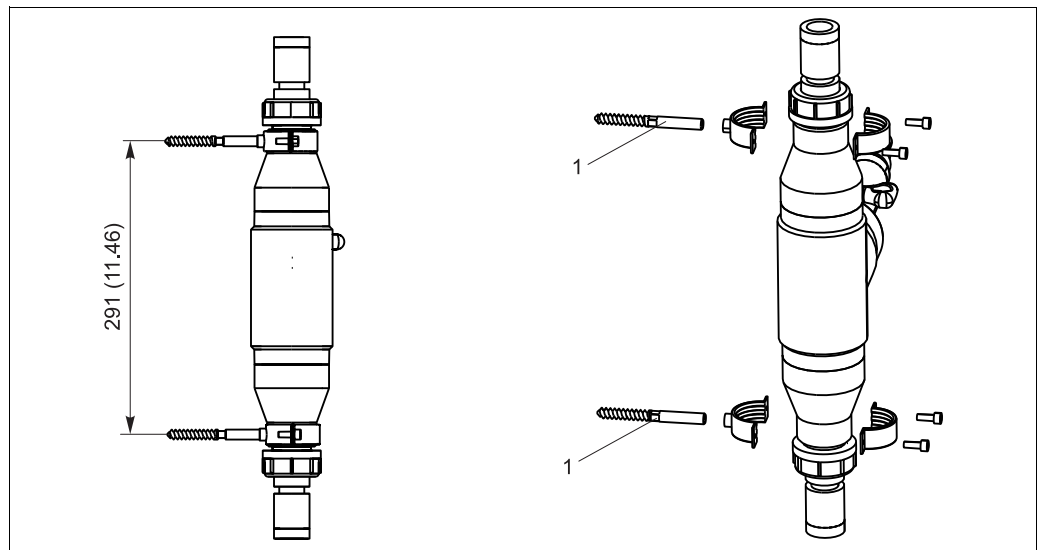


Fig. 11: Wall mounting kit

- 1 Hanger bolt STST 10x60 mm (included in the delivery)

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8 Technical data

8.1 Environment

Ambient temperature range 0 to 55 °C (32 to 131 °F)

Storage temperature 0 to 60 °C (32 to 140 °F), in the original packaging

8.2 Process

Process temperature 0 to 60 °C (32 to 140 °F)

Process pressure 0 to 6 bar (0 to 87 psi)

Pressure-temperature chart

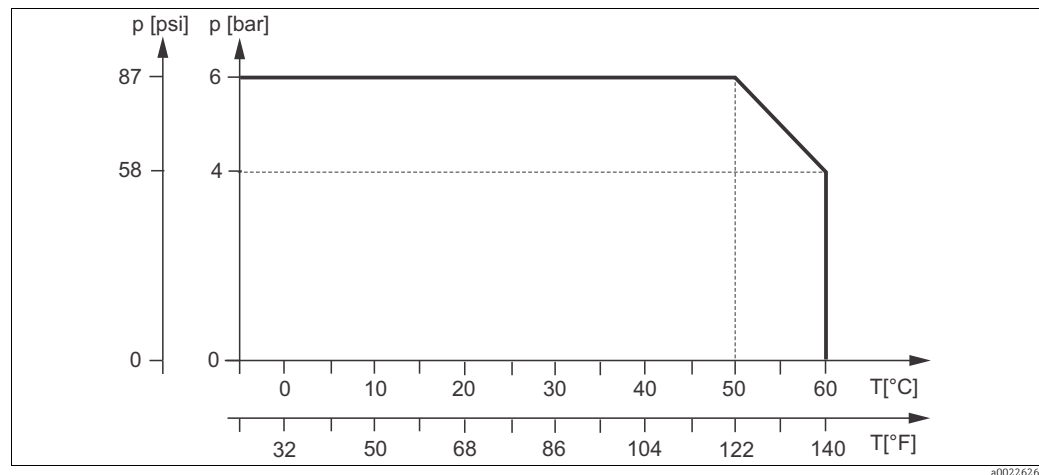


Fig. 12: Pressure-temperature chart

Flow velocity Max. 2 m/s (6.6 ft/s) for low-viscosity media in pipe DN 50

Flow Recommended flow: 60 l/h (15.84 gal/hr)
 Range: 10 to 100 l/h (2.64 to 26.4 gal/hr)
 When operating with lost sample (lost water)

Pressure loss < 0.05 bar (0.7 psi) for flow up to 100 l/h (26.4 gal/hr)

8.3 Mechanical construction

Dimensions	See "Installation conditions"
Weight	1.17 kg (2.58 lbs) without process connection

Materials	Assembly housing:	PE
	Seals:	EPDM
	Flange:	PP-GF
	Dummy cover:	Stainless steel 1.4404 (AISI 316 L)
	Bubble trap:	Polycarbonate
	Process connections:	PE
	Bubble trap process connection:	PVC

Process connections

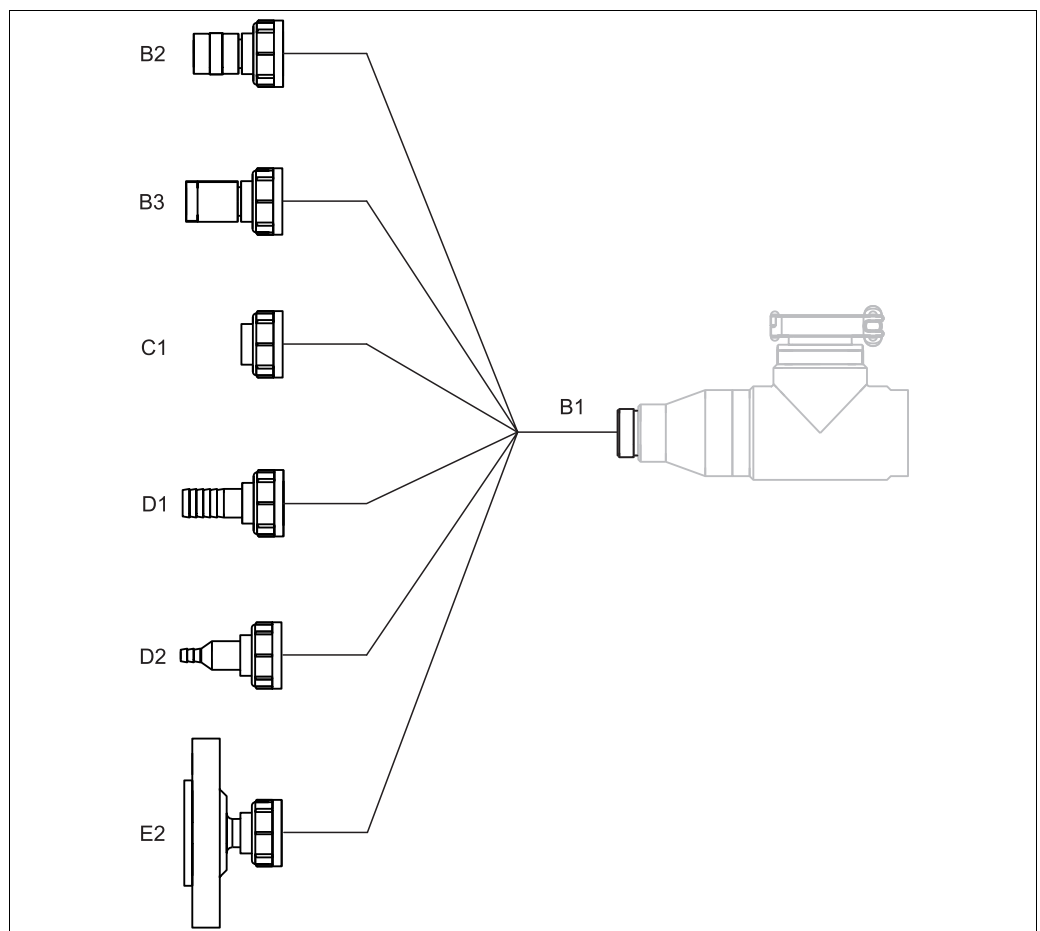


Fig. 13: Process connections

B1	External thread G1¼ (standard)
B2	Internal thread Rp ¾"
B3	Internal thread NPT ¾"
C1	Glue-in port D 25 PVC
D1	Hose D 25 PVC
D2	Hose D 12 PVC
E2	Flange ANSI 2"

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