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Technical Information
Memosens Wave CAS80E

Spectrometer for water analysis

Application

Memosens Wave CAS80E is a spectrometer for the measurement of a variety of parameters: SAC, TOCeq, CODeq, BODeq, turbidity (TU/TSS), nitrate (NO3-N), APHA Hazen color. The spectrometer ensures reliable measurements and efficient process monitoring in the following areas:

- Drinking water
- Wastewater
- Surface water

Your benefits

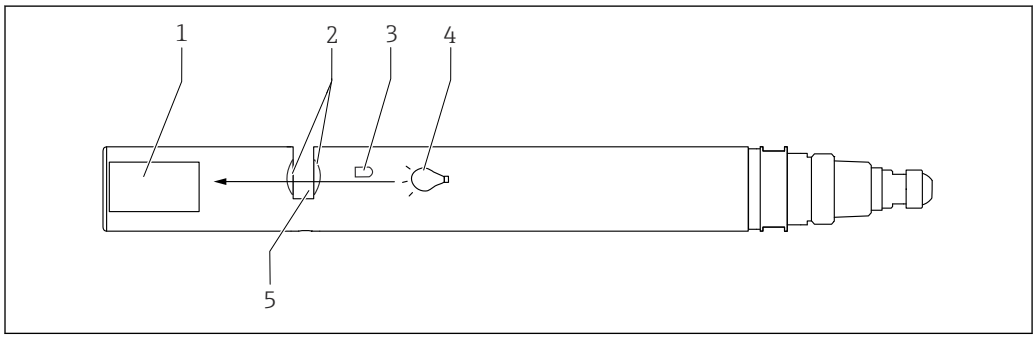
- Optimally adapted to process conditions
- 3 different measuring path lengths
- Titanium version for demanding applications
- Sapphire window for a longer operating life
- Data conditioning in the spectrometer:
  - Minimum sensitivity to interference during signal transmission
  - Short response time
- Early, continuous detection of load peaks without delay
- Out of the box and ready to go: standardized communication (Memosens technology) enables "plug and play"
- Long maintenance intervals by using compressed air cleaning
- Application-specific and customer calibrations - in the laboratory or at place of installation

Endress+Hauser
People for Process Automation

Function and system design

Measuring principle

The spectrometer consists of the following modules:
- Power supply
- High-voltage generation for the strobe lamp
- Xenon strobe lamp
- Monitor diode
- Measurement gap
- Spectrometer: UV/VIS 200 to 800 nm
- Microcontroller

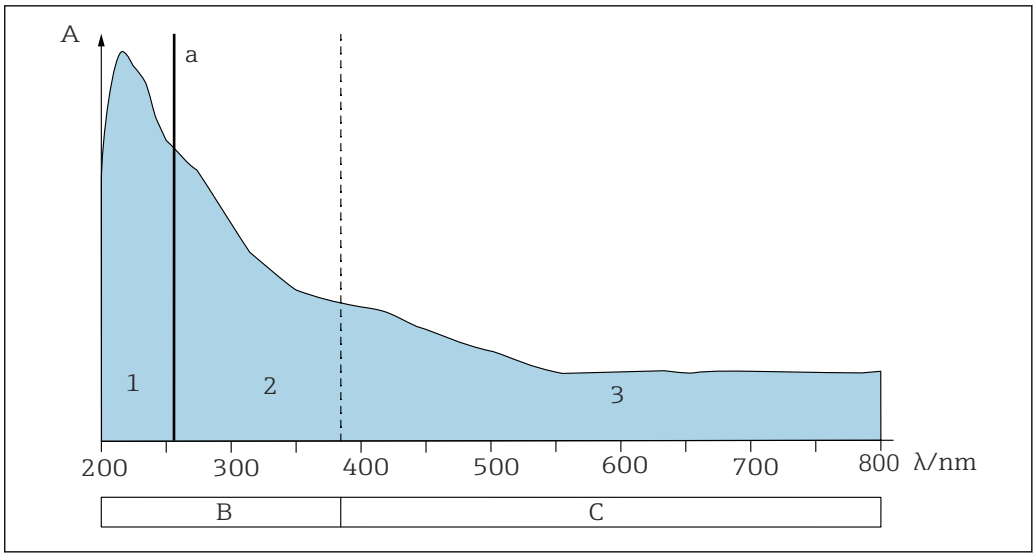


1 Product design

1 Spectrometer module
2 Lens
3 Monitor diode
4 Light source
5 Measurement gap

A light source sends a beam of light through the medium via the lenses. The medium under analysis is located in the measurement gap. In the spectrometer module, the beam of light is converted to electrical, measurable signals → 1, 2.

The spectrometer uses the substance-specific absorption of electromagnetic radiation to indicate the measurement parameters from the recorded spectrum.



2 *Ranges of parameters in the absorption spectrum*

λ Wavelength range
A Absorption
B Ultraviolet light (UV)
C Visible light (VIS)
a 254 nm, SAC
1 Nitrate, nitrite
2 Sum parameters BODeq, CODeq, TOCeq, DOCeq
3 Color, turbidity, TSS

A specific absorption spectrum can be assigned to every molecule. By comparing a zero spectrum I_0 determined previously in ultrapure water and the measuring spectrum with the intensity I, the absorption A can be calculated as follows:

$A = -\log_{10} (I/I_0) = \varepsilon \cdot c \cdot d$

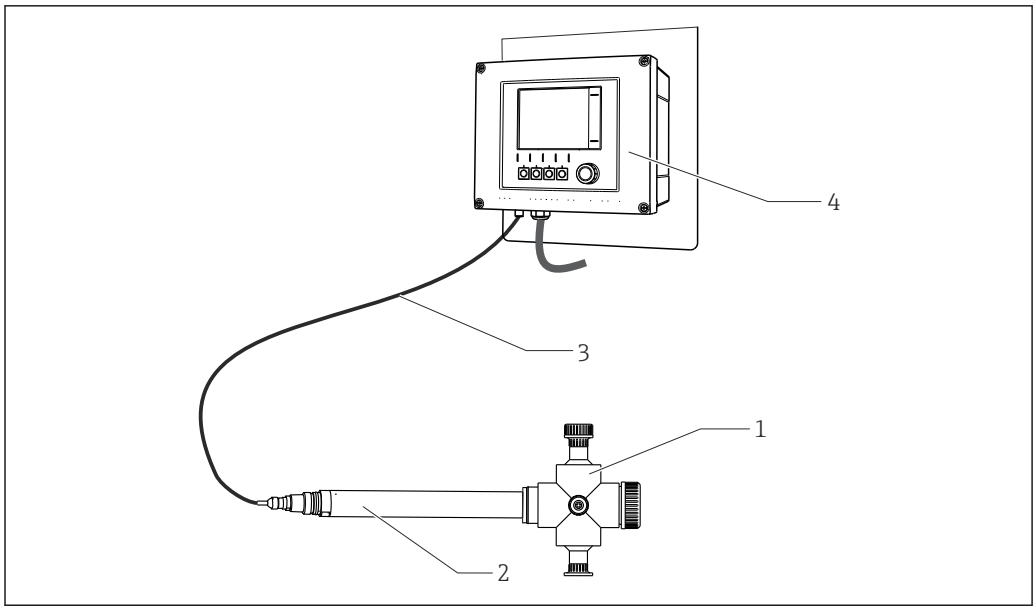
The absorption A depends directly on the concentration c, the measurement gap length d and the extinction coefficient ε.

Analytical models programmed into the spectrometer calculate the concentration of the parameters from the absorption spectra. These analytical models have been determined by correlating known parameter concentrations with their related absorption spectra.

The calculation uses the same wavelengths to determine different parameters. This results in what are termed "cross-sensitivities". For example, if turbidity increases less light is detected when determining the chemical oxygen demand (COD).

Measuring system

The complete measuring system comprises at least:
- Memosens Wave CAS80E spectrometer
- Liquiline CM44 transmitter
- Assembly, e.g. Flowfit CYA251 flow assembly



3 Example of a measuring system

1 CYA251 assembly
2 Memosens Wave CAS80E
3 Fixed cable
4 Liquiline CM44 transmitter

Communication and data processing

Communication with the transmitter

Always connect digital sensors with Memosens technology to a transmitter with Memosens technology. Data transmission to a transmitter for analog sensors is not possible.

Digital sensors can store measuring system data in the sensor. These include the following:
- Manufacturer data
  - Serial number
  - Order code
  - Date of manufacture
- Calibration data
  - Calibration date
  - Number of calibrations
  - Serial number of the transmitter used to perform the last calibration or adjustment
- Operating data
  - Temperature application range
  - Date of initial commissioning

Dependability

Reliability

Easy handling

Sensors with Memosens technology have integrated electronics that store calibration data and other information (e.g. total hours of operation or operating hours under extreme measuring conditions). Once the sensor has been connected, the sensor data are transferred automatically to the transmitter and used to calculate the current measured value. As the calibration data are stored in the sensor, the sensor can be calibrated and adjusted independently of the measuring point. The result:
- Easy calibration in the measuring lab under optimum external conditions increases the quality of the calibration.
- Pre-calibrated sensors can be replaced quickly and easily, resulting in a dramatic increase in the availability of the measuring point.
- Thanks to the availability of the sensor data, maintenance intervals can be accurately defined and predictive maintenance is possible.
- The sensor history can be documented with external data carriers and evaluation programs.
- Thus, the current application of the sensors can be made to depend on their previous history.

Input

Measured variable

- CODeq [1] (mg/l)
- BODeq (mg/l)
- TOCeq (mg/l)
- TSS (mg/l)
- TU (FAU)
- APHA Hazen [2] (TU compensated/True Color or TU uncompensated/Apparent Color)
- SAK [3] (1/m)
- Nitrate NO3-N (mg/l)

Measuring range

The measuring range that can actually be achieved can depend on the composition of the water matrix and the application. The data apply for homogeneous media.

Wastewater treatment plant inlet

Measured variable	2 mm (0.08 in) gap	10 mm (0.4 in) gap	50 mm (1.97 in) gap
TSS	0 to 10 000 mg/l	0 to 2 000 mg/l	0 to 400 mg/l
SAC	0 to 1 000 1/m	0 to 200 mg/l	0 to 40 mg/l
CODeq	0 to 20 000 mg/l	0 to 4 000 mg/l	0 to 800 mg/l
BODeq	0 to 5 000 mg/l	0 to 1 000 mg/l	0 to 200 mg/l

1) eq = equivalent
2) According to US Standard Methods 2120C (Single Wavelength Method) 23. Edition
3) SAK_{254} According to DIN ISO 38404-3

Wastewater treatment plant outlet

Measured variable	2 mm (0.08 in) gap	10 mm (0.4 in) gap	50 mm (1.97 in) gap
Turbidity	0 to 4000 FAU	0 to 800 FAU	0 to 160 FAU
TSS	0 to 5000 mg/l	0 to 1000 mg/l	0 to 200 mg/l
SAC	0 to 1000 1/m	0 to 200 1/m	0 to 40 1/m
CODeq	0 to 3000 mg/l	0 to 600 mg/l	0 to 120 mg/l
TOCeq	0 to 1200 mg/l	0 to 240 mg/l	0 to 48 mg/l
BODeq	0 to 450 mg/l	0 to 90 mg/l	0 to 18 mg/l
Nitrate NO3-N	0 to 2500 mg/l	0 to 500 mg/l	0 to 100 mg/l
APHA Hazen true	0 to 12500 Hazen [1)]	0 to 2500 Hazen [1)]	0 to 500 Hazen
APHA Hazen apparent	0 to 12500 Hazen [1)]	0 to 2500 Hazen [1)]	0 to 500 Hazen

1) A minimum path length of 25 mm (0.98 in) is required in US Standard Methods 2120C (Single Wavelength Method) 23. Edition

Drinking water

Measured variable	2 mm (0.08 in) gap	10 mm (0.4 in) gap	50 mm (1.97 in) gap
Turbidity	0 to 4000 FAU	0 to 800 FAU	0 to 160 FAU
TSS	0 to 5000 mg/l	0 to 1000 mg/l	0 to 200 mg/l
SAC	0 to 1000 1/m	0 to 200 1/m	0 to 40 1/m
TOCeq	0 to 8000 mg/l	0 to 400 mg/l	0 to 80 mg/l
Nitrate NO3-N	0 to 2500 mg/l	0 to 500 mg/l	0 to 100 mg/l
APHA Hazen true	0 to 12500 Hazen [1)]	0 to 2500 Hazen [1)]	0 to 500 Hazen
APHA Hazen apparent	0 to 12500 Hazen [1)]	0 to 2500 Hazen [1)]	0 to 500 Hazen

1) A minimum path length of 25 mm (0.98 in) is required in US Standard Methods 2120C (Single Wavelength Method) 23. Edition

Surface water

Measured variable	2 mm (0.08 in) gap	10 mm (0.4 in) gap	50 mm (1.97 in) gap
Turbidity	0 to 4000 FAU	0 to 800 FAU	0 to 160 FAU
TSS	0 to 5000 mg/l	0 to 1000 mg/l	0 to 200 mg/l
SAC	0 to 1000 1/m	0 to 200 1/m	0 to 40 1/m
CODeq	0 to 5000 mg/l	0 to 1000 mg/l	0 to 200 mg/l
BODeq	0 to 750 mg/l	0 to 150 mg/l	0 to 30 mg/l
Nitrate NO3-N	0 to 2500 mg/l	0 to 500 mg/l	0 to 100 mg/l

Power supply

Electrical connection

WARNING

Device is live!

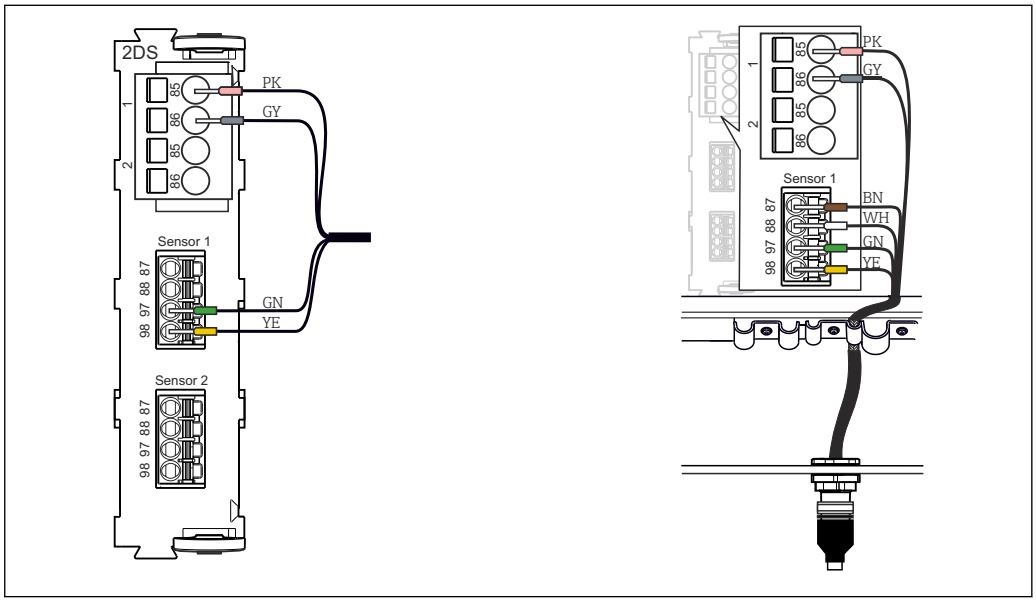
Incorrect connection may result in injury or death!

- The electrical connection may be performed only by an electrical technician.
- The electrical technician must have read and understood these Operating Instructions and must follow the instructions contained therein.
- **Prior** to commencing connection work, ensure that no voltage is present on any cable.

Connecting the spectrometer

The following connection options are available:

- Via M12 plug (version: fixed cable, M12 plug)
- Via the cable of the spectrometer to the plug-in terminals of an input of the transmitter (version: fixed cable, end sleeves)



4 *Spectrometer connection to input (left) or via M12 plug (right)*

The maximum cable length is 100 m (328.1 ft).

Connecting the cable shield

Only use terminated original cables where possible. The cable of the spectrometer must be shielded cables.

1. Loosen a suitable cable gland on the bottom of the housing.
2. Remove the dummy plug.
3. Attach the gland to the cable end, making sure the gland is facing the right direction.
4. Pull the cable through the gland and into the housing.
5. Route the cable in the housing in such a way that the **exposed** cable shield fits into one of the cable clamps and the cable cores can be easily routed as far as the connection plug on the electronics module.
6. Unscrew the cable clamp.
7. Clamp the cable.
8. Tighten the screw of the cable clamp again.
9. Connect cable cores as per the wiring diagram.
10. Tighten the cable gland from outside.

Performance characteristics

Reference operating conditions

20 °C (68 °F), 1013 hPa (15 psi)

Long-term reliability

Drift

The drift data were determined in air under laboratory conditions based on DIN ISO 15839.

Wastewater treatment plant inlet

Measured variable	Drift over 100 days in % of end of measuring range
TSS	0.02
SAC	0.02
CODeq	0.002
BODeq	0.0005

Wastewater treatment plant outlet

Measured variable	Drift over 100 days in % of end of measuring range
Turbidity	0.02
TSS	0.02
SAC	0.02
CODeq	0.01
TOCeq	0.004
BODeq	0.0015
Nitrate NO3-N	0.002
APHA Hazen true	0.01
APHA Hazen apparent	0.01

Drinking water

Measured variable	Drift over 100 days in % of end of measuring range
Turbidity	0.02
TSS	0.02
SAC	0.02
TOCeq	0.002
Nitrate NO3-N	0.002
APHA Hazen true	0.01
APHA Hazen apparent	0.01

Surface water

Measured variable	Drift over 100 days in % of end of measuring range
Turbidity	0.02
TSS	0.02
SAC	0.02
CODeq	0.005
BODeq	0.0008
Nitrate NO3-N	0.002

Limit of detection

The detection limits were determined for the individual measured variables in ultrapure water under laboratory conditions based on DIN ISO 15839.

Wastewater treatment plant inlet

Measured variable	2 mm (0.08 in) gap	10 mm (0.4 in) gap	50 mm (1.97 in) gap
TSS	20 mg/l	4 mg/l	0.8 mg/l
SAC	1 1/m	0.2 1/m	0.04 1/m
CODeq	10 mg/l	2 mg/l	0.4 mg/l
BODeq	2.5 mg/l	0.5 mg/l	0.1 mg/l

Wastewater treatment plant outlet

Measured variable	2 mm (0.08 in) gap	10 mm (0.4 in) gap	50 mm (1.97 in) gap
Turbidity	12.5 FAU	2.5 FAU	0.5 FAU
TSS	12.5 mg/l	2.5 mg/l	0.5 mg/l
SAC	1 1/m	0.2 1/m	0.04 1/m
CODeq	2 mg/l	0.4 mg/l	0.08 mg/l
TOCeq	1 mg/l	0.2 mg/l	0.04 mg/l
BODeq	0.5 mg/l	0.1 mg/l	0.02 mg/l
Nitrate NO3-N	1 mg/l	0.2 mg/l	0.04 mg/l
APHA Hazen true	75 Hazen [1)]	15 Hazen [1)]	3 Hazen
APHA Hazen apparent	32.5 Hazen [1)]	7.5 Hazen [1)]	1.5 Hazen

1) A minimum path length of 25 mm (0.98 in) is required in US Standard Methods 2120C (Single Wavelength Method) 23. Edition

Drinking water

Measured variable	2 mm (0.08 in) gap	10 mm (0.4 in) gap	50 mm (1.97 in) gap
Turbidity	12.5 FAU	2.5 FAU	0.5 FAU
TSS	12.5 mg/l	2.5 mg/l	0.5 mg/l
SAC	1 1/m	0.2 1/m	0.04 1/m
TOCeq	1 mg/l	0.2 mg/l	0.04 mg/l
Nitrate NO3-N	1 mg/l	0.2 mg/l	0.04 mg/l
APHA Hazen true	75 Hazen [1)]	7.5 Hazen [1)]	3 Hazen
APHA Hazen apparent	32.5 Hazen [1)]	15 Hazen [1)]	1.5 Hazen

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Surface water

Measured variable	2 mm (0.08 in) gap	10 mm (0.4 in) gap	50 mm (1.97 in) gap
Turbidity	12.5 FAU	2.5 FAU	0.5 FAU
TSS	12.5 mg/l	2.5 mg/l	0.5 mg/l
SAC	1 1/m	0.2 1/m	0.04 1/m

Measured variable	2 mm (0.08 in) gap	10 mm (0.4 in) gap	50 mm (1.97 in) gap
CODeq	2 mg/l	0.4 mg/l	0.08 mg/l
BODeq	0.5 mg/l	0.1 mg/l	0.02 mg/l
Nitrate NO3-N	1 mg/l	0.2 mg/l	0.04 mg/l

Determination limit

The determination limits were determined for the individual measured variables in ultrapure water under laboratory conditions based on DIN ISO 15839.

Wastewater treatment plant inlet

Measured variable	2 mm (0.08 in) gap	10 mm (0.4 in) gap	50 mm (1.97 in) gap
TSS	66.7 mg/l	13.3 mg/l	2.7 mg/l
SAC	3.5 1/m	0.7 1/m	0.15 1/m
CODeq	33.3 mg/l	6.7 mg/l	1.35 mg/l
BODeq	8.3 mg/l	1.7 mg/l	0.35 mg/l

Wastewater treatment plant outlet

Measured variable	2 mm (0.08 in) gap	10 mm (0.4 in) gap	50 mm (1.97 in) gap
Turbidity	42.5 FAU	8.5 FAU	1.7 FAU
TSS	32.5 mg/l	7.5 mg/l	1.5 mg/l
SAC	3.25 1/m	0.75 1/m	0.15 1/m
CODeq	7.5 mg/l	1.5 mg/l	0.3 mg/l
TOCeq	3.25 mg/l	0.75 mg/l	0.15 mg/l
BODeq	1 mg/l	0.2 mg/l	0.04 mg/l
Nitrate NO3-N	3.25 mg/l	0.75 mg/l	0.15 mg/l
APHA Hazen true	167.5 Hazen [1)]	33.5 Hazen [1)]	6.7 Hazen
APHA Hazen apparent	167.5 Hazen [1)]	33.5 Hazen [1)]	6.7 Hazen

1) A minimum path length of 25 mm (0.98 in) is required in US Standard Methods 2120C (Single Wavelength Method) 23. Edition

Drinking water

Measured variable	2 mm (0.08 in) gap	10 mm (0.4 in) gap	50 mm (1.97 in) gap
Turbidity	42.5 FAU	8.5 FAU	1.7 FAU
TSS	32.5 mg/l	7.5 mg/l	1.5 mg/l
SAC	3.25 1/m	0.75 1/m	0.15 1/m
TOCeq	3.25 mg/l	0.75 mg/l	0.15 mg/l
Nitrate NO3-N	3.25 mg/l	0.75 mg/l	0.15 mg/l
APHA Hazen true	167.5 Hazen [1)]	33.5 Hazen [1)]	6.7 Hazen
APHA Hazen apparent	167.5 Hazen [1)]	33.5 Hazen [1)]	6.7 Hazen

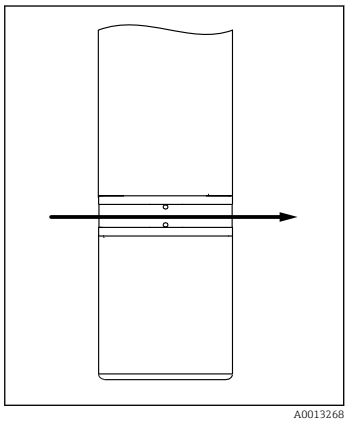
1) A minimum path length of 25 mm (0.98 in) is required in US Standard Methods 2120C (Single Wavelength Method) 23. Edition

Surface water

Measured variable	2 mm (0.08 in) gap	10 mm (0.4 in) gap	50 mm (1.97 in) gap
Turbidity	42.5 FAU	8.5 FAU	1.7 FAU
TSS	32.5 mg/l	7.5 mg/l	1.5 mg/l
SAC	3.25 1/m	0.75 1/m	0.15 1/m
CODeq	7.5 mg/l	1.5 mg/l	0.3 mg/l
BODeq	1 mg/l	0.2 mg/l	0.04 mg/l
Nitrate NO3-N	3.25 mg/l	0.75 mg/l	0.15 mg/l

Installation

Orientation



5 Alignment, arrow points in the flow direction

- Align the spectrometer in such a way that the measurement gap is rinsed with the flow of medium and air bubbles are removed.

Installation instructions

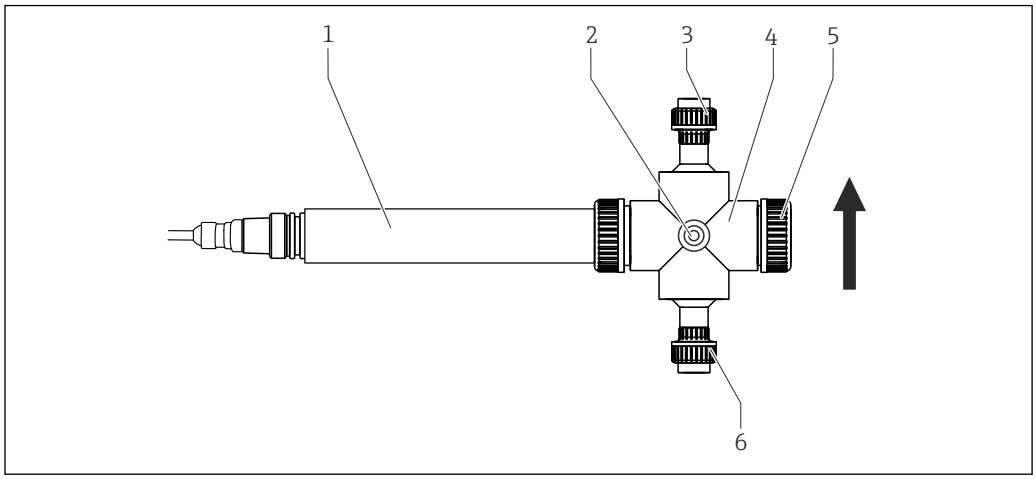
- Choose a mounting location that can be easily accessed at a later stage.
- Align the spectrometer so that the measurement gap is rinsed by the flow of medium.
- Do not install the device in places where air pockets and foam bubbles form.
- Ensure that upright posts and assemblies are fully secured and vibration-free.

To ensure correct measurement, the windows at the measurement gap must be free from any sedimentation. The best way to ensure this is through the use of a cleaning unit (accessory) operated by compressed air.

- In the event of horizontal orientation, mount the spectrometer in such a way that air bubbles can escape from the measurement gap (do not point it downwards).

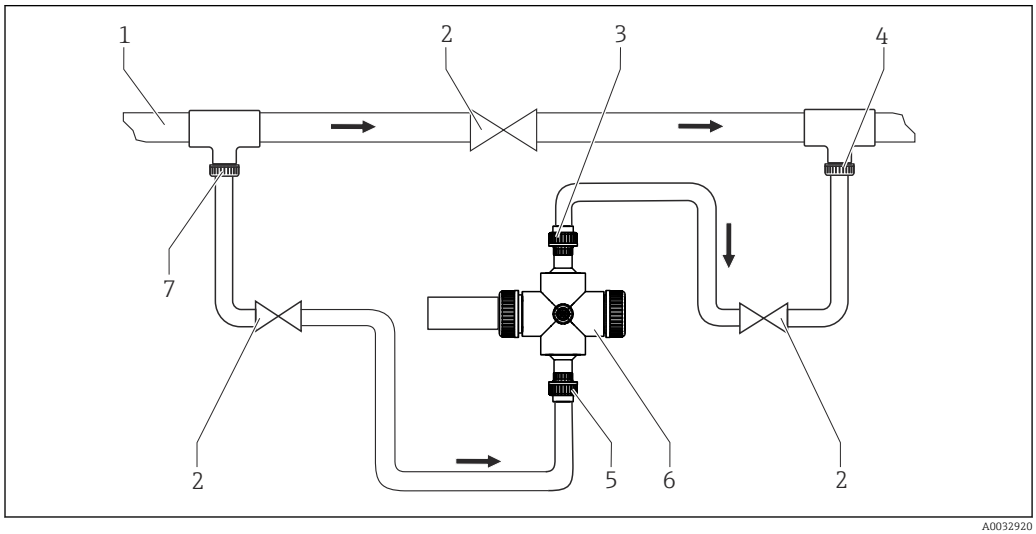
Mounting the spectrometer

Flowfit CYA251 flow assembly



6 *Spectrometer with CYA251 flow assembly, arrow indicates the flow direction*

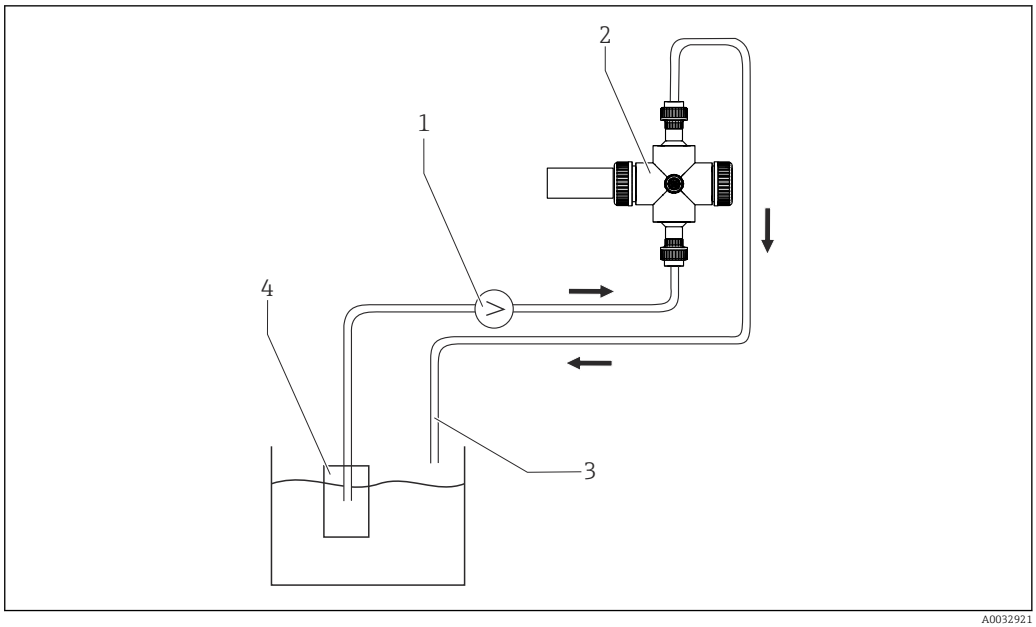
1 *Memosens Wave CAS80E*
2 *Rinse connection*
3 *Medium outlet*
4 *Flow assembly*
5 *Cap*
6 *Medium inflow*



7 *Connection diagram with bypass*

1 *Main pipe*
2 *Manually actuated or solenoid valves*
3 *Medium outlet*
4 *Medium return*
5 *Medium inflow*
6 *Flow assembly*
7 *Medium sampling*

- The flow rate must be at least 100 l/h (26.5 gal/h).
- Take the extended response times into consideration.



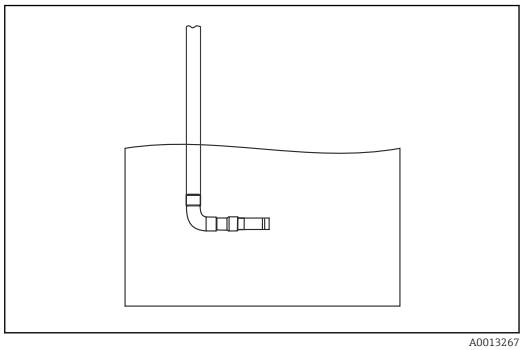
8 *Connection diagram with open outlet, arrow points in the flow direction*

1 *Pump*
2 *Flow assembly*
3 *Open outlet*
4 *Filter unit*

As an alternative to operation in the bypass, it is also possible to direct the sample flow from a filter unit with an open outlet through the assembly → 6, 12.

For detailed information on installing the flow assembly: BA00495C

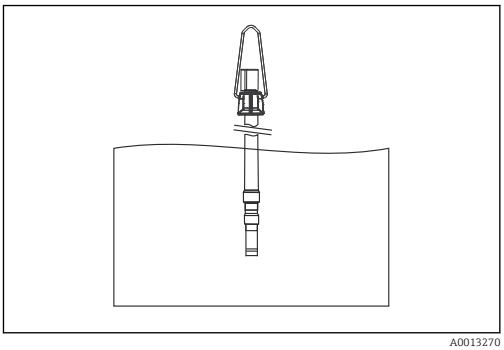
Immersion assembly



9 *CYA112 immersion assembly and CYH112 holder installed horizontally, fixed installation*

The installation angle is 90°.

- Align the spectrometer in such a way that the measurement gap is rinsed with the flow of medium and air bubbles are removed.



10 *CYA112 immersion assembly and CYH112 holder installed vertically, suspended from a chain*

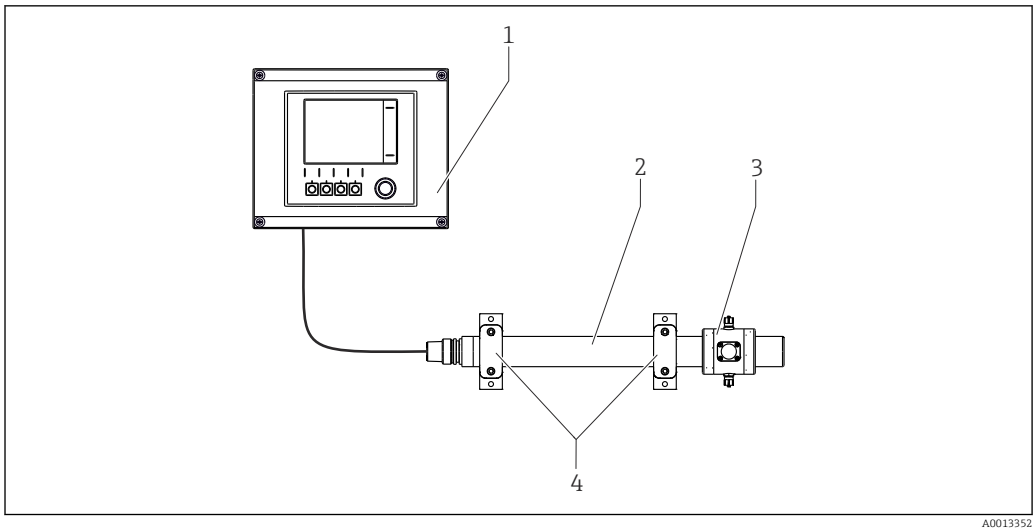
The installation angle is 0°.

- Ensure that the spectrometer is adequately cleaned. There must be no buildup on the optical windows.

For detailed information on installing the immersion assembly and the holder, see BA00432C and BA00430C

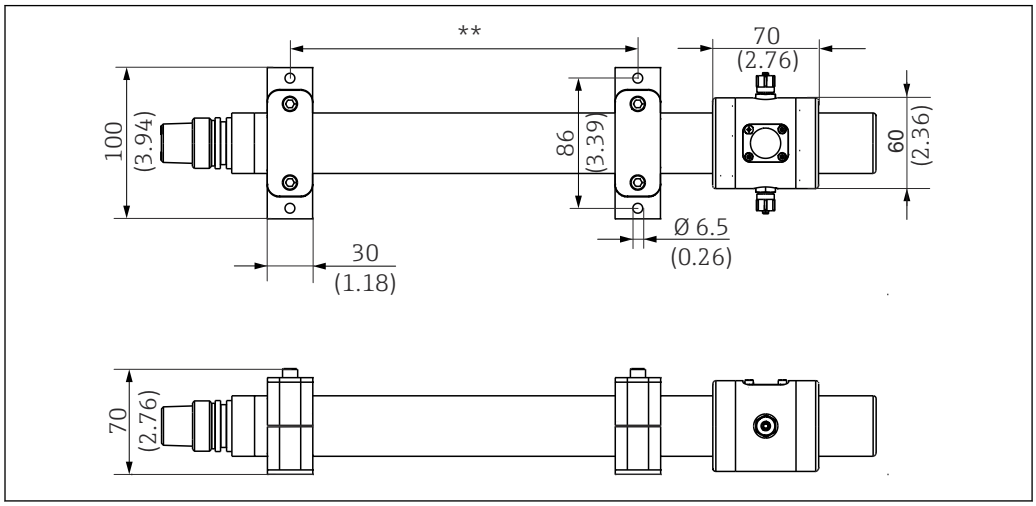
Flow assembly 71110000

Mount the flow assembly only on a spectrometer with a gap of 2 mm (0.08 in) or 10 mm (0.4 in).



11 *Spectrometer with flow assembly*

1 *Transmitter*
2 *Memosens Wave CAS80E*
3 *Flow assembly*
4 *Holder*



12 *Dimensions. Dimensions: mm (in)*

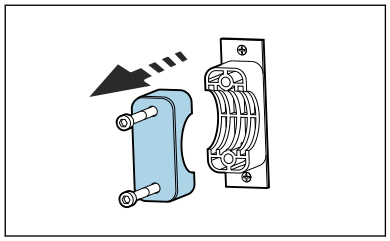
** *Variable length*

Securing the holder

Mount the spectrometer in a horizontal position as follows:

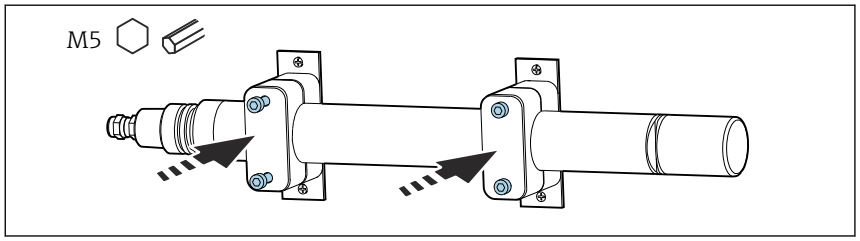
1. Drill holes for the mounting clamps in a wall or panel. In doing so, comply with the dimensions indicated on → 12, 14 .
2. Secure the mounting clamps.

The required fastening fixtures (e.g. screws and wall plugs) are not included in the scope of delivery of the kit and must be provided by the customer.

3. 

Loosen the hexagonal nuts of the pipe clamps.

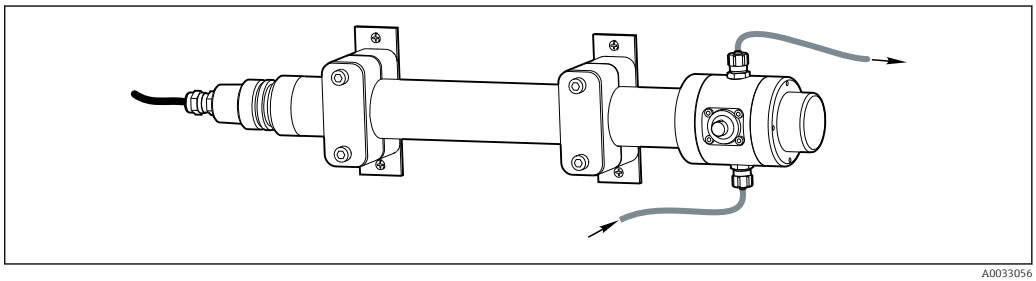
4. Remove the top part.

5. 

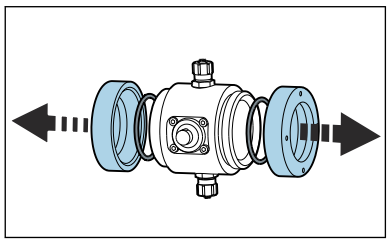
Place the spectrometer in the pipe clamps.

6. Screw on the top parts and tighten by hand (it should still be possible to move the spectrometer).

Mounting the flow assembly



13 Flow assembly mounted on the spectrometer

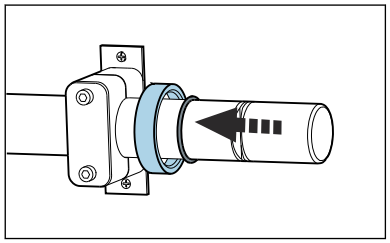
1. 

Loosen the threaded rings of the flow assembly.

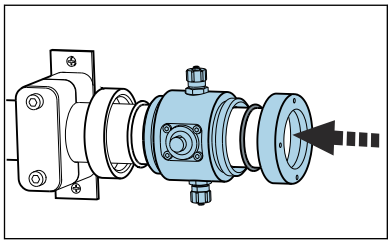
2. Remove both O-rings.

3. Check if the silicone grease provided with the kit is permitted for use in your application. If it is not permitted for this application, use a grease that suits the application instead.

Grease the O-rings.

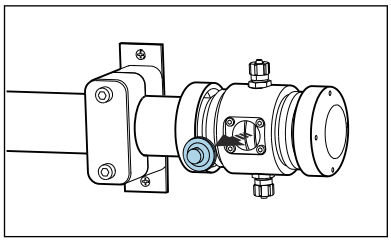
4. 

First slide a threaded ring (thread in the direction of the assembly) onto the spectrometer, followed by an O-ring.

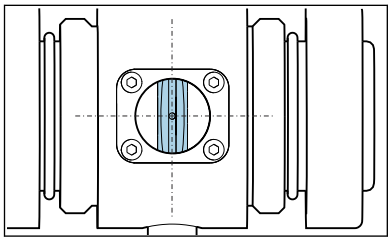
5. 

Slide the assembly onto the spectrometer.

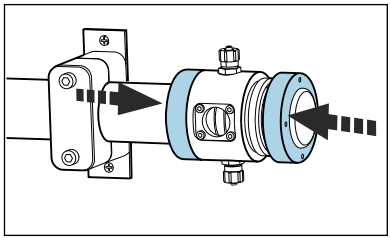
6. Fit the second O-ring and the second threaded ring onto the spectrometer.

7. 

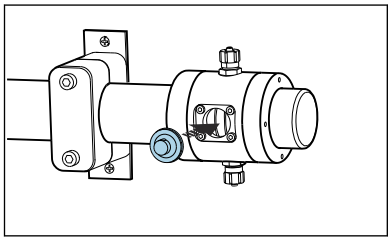
Open the cap on the viewing window.

8. 

Position the assembly on the spectrometer in such a way that the measurement gap is visible in the center of the window.

9. 

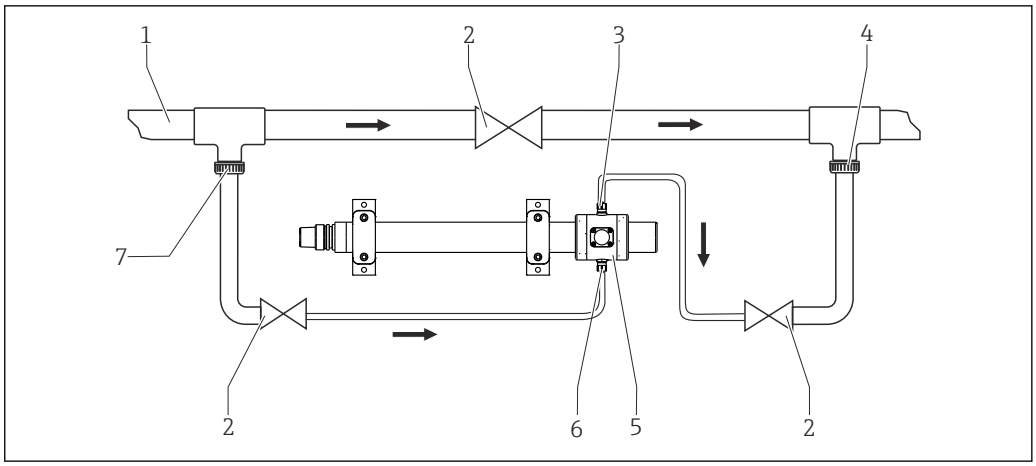
Tighten the two threaded rings. Ensure that the assembly does not change position.

10. 

Close the viewing window with the cap.

11. To secure the viewing window, fasten the viewing window to one of the hose connections (no diagram) using the transparent cord.

Mounting the assembly in the bypass

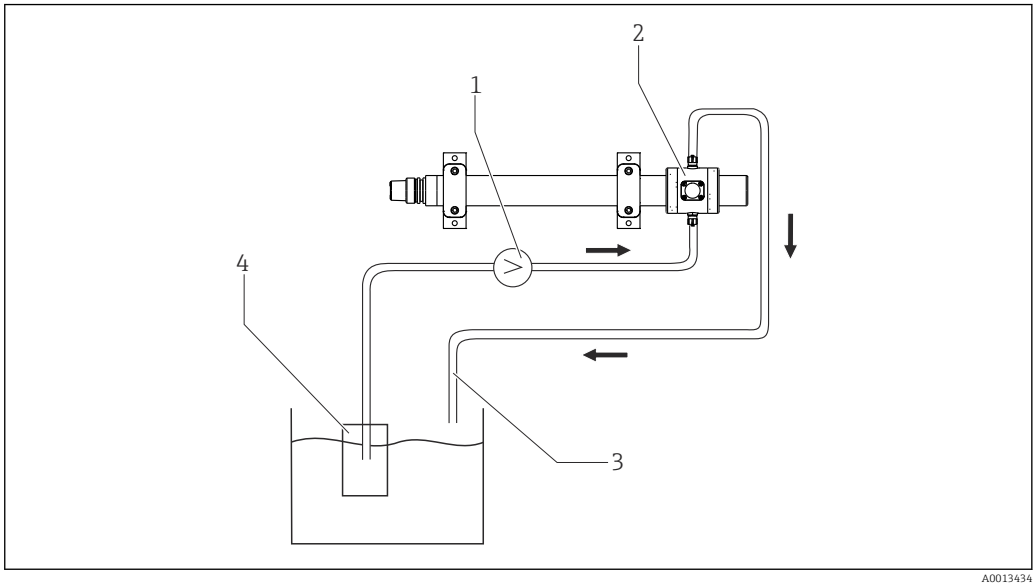


14 *Connection diagram with bypass*

1 *Main pipe*
2 *Manually actuated or solenoid valves*
3 *Medium outlet*
4 *Medium return*
5 *Flow assembly*
6 *Medium inflow*
7 *Medium sampling*

- ▶ Connect the medium inflow and outlet to the hose connections of the assembly → 14, 17.
  - ↳ This fills the assembly from below and ensures that the assembly is self-venting.

- The flow rate must be at least 100 ml/h (0.026 gal/h).
- Take the extended response times into consideration.



15 *Connection diagram with open outlet, arrow points in the flow direction*

1 *Pump*
2 *Flow assembly*
3 *Open outlet*
4 *Filter unit*

As an alternative to operation in the bypass, it is also possible to direct the sample flow from a filter unit with an open outlet through the assembly → 15, 17.

Cleaning unit

CAUTION

Residual medium and high temperatures

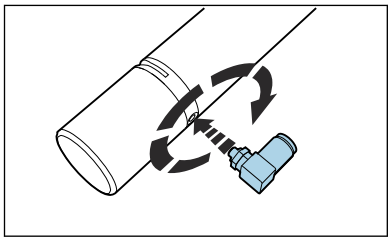
Risk of injury!

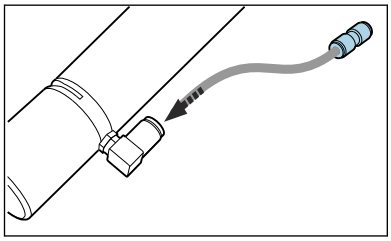
- When working with parts that are in contact with the medium, protect against residual medium and elevated temperatures.
- Wear protective goggles and safety gloves.

Preparatory steps:

1. Mount the compressed air cleaning on the spectrometer before installing in the measuring point.
2. Remove the spectrometer from the medium if the device is already in the process.
3. Clean the spectrometer.

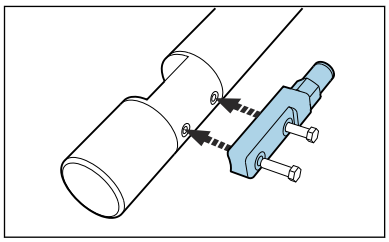
Spectrometer with 2 mm (0.08 in) or 10 mm (0.4 in) gap:

1. 

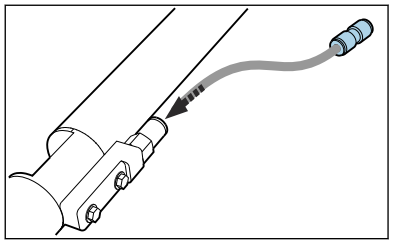
   Insert the elbow plug into the mounting borehole behind the measurement gap as far as the end stop (hand-tight).
2. Screw the elbow plug tight.
3. 

   Connect the hose of the compressed air supply at the installation location to the opening of the elbow plug.
4. Use the hose piece with hose coupling provided with the sensor if desired.

Spectrometer with 50 mm (2 in) gap:

1. 

   Insert the air distributor into the mounting boreholes behind the measurement gap as far as the end stop (hand-tight).

2. 

Connect the hose of the compressed air supply to the opening of the elbow plug.

3. Use the hose piece with hose coupling provided with the sensor if desired.

Environment

Ambient temperature range	−20 to 60 °C (−4 to 140 °F)
Storage temperature	−20 to 70 °C (−4 to 158 °F)
Degree of protection	IP 68 (1 m (3.3 ft) water column over 60 days, 1 mol/l KCI
Electromagnetic compatibility (EMC)	Interference emission and interference immunity as per ▪ EN 61326-1:2013 ▪ EN 61326-2-3:2013 ▪ EN 61326-2-5: 2013 ▪ NAMUR NE21: 2012

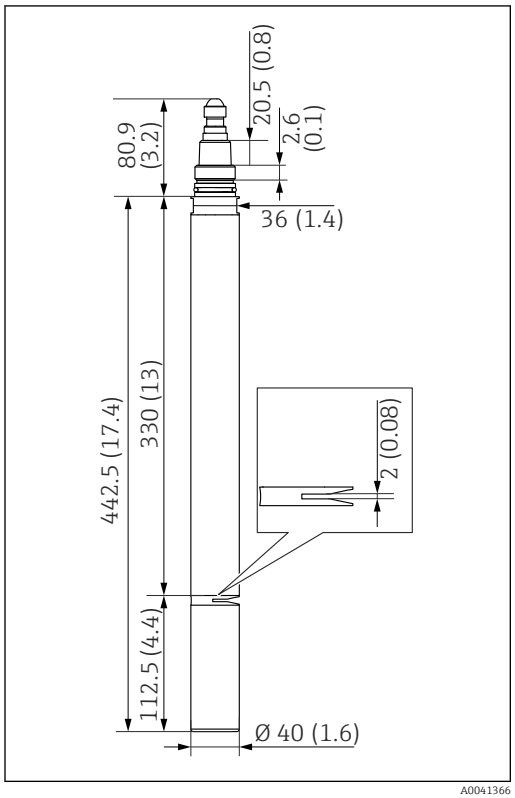
Process

Process temperature range	0 to 50 °C (32 to 122 °F)
Process pressure range	0.5 to 10 bar (7.3 to 145 psi) (absolute)
Flow limit	**Minimum flow** No minimum flow required. For media that have a tendency to form deposits, ensure that the medium is mixed sufficiently.

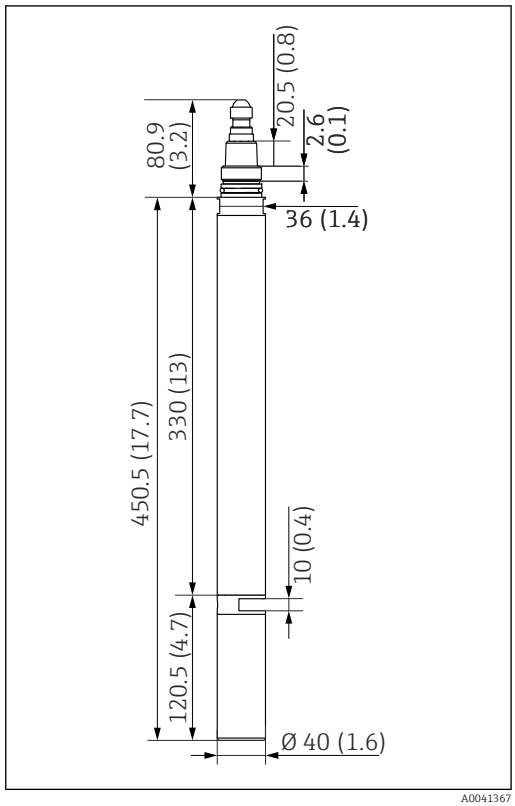
Mechanical construction

Design, dimensions	Measurement gap with 3 different gap widths: ▪ 2 mm (0.08 in) ▪ 10 mm (0.4 in) ▪ 50 mm (1.97 in) Spectrometers with 1 mm (0.04 in) and 100 mm (3.9 in) gap widths are available on request.

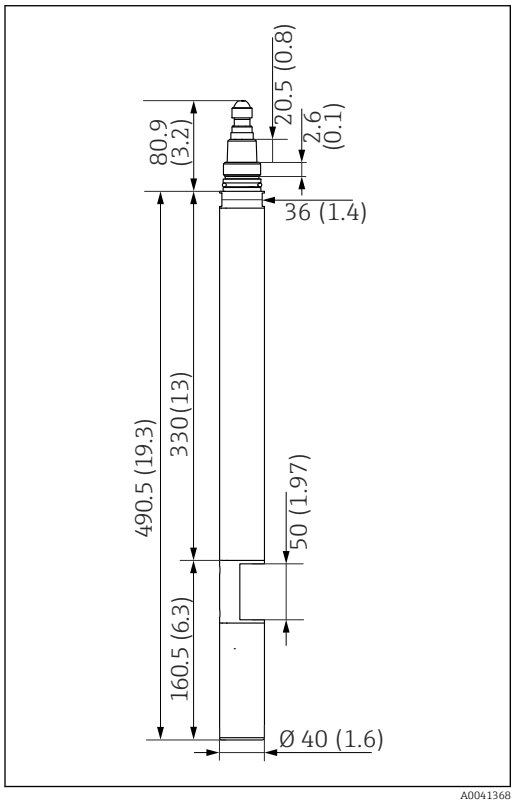
Dimensions



16 *Dimensions of spectrometer with 2 mm (0.08 in) gap. Dimensions: mm (in)*



17 *Dimensions of spectrometer with 10 mm (0.4 in) gap. Dimensions: mm (in)*



18 *Dimensions of spectrometer with 50 mm (1.97 in) gap. Dimensions: mm (in)*

Weight

1.6 kg (3.5 lb), without cables

Materials

Materials in contact with the medium

Housing:	Stainless steel 1.4404 / AISI 316L and 1.4571 / AISI 316Ti or titanium 3.7035
Optical windows:	Quartz glass or sapphire
O-rings:	EPDM

Process connections

G1 and NPT ¾"

Certificates and approvals

CE mark

The product meets the requirements of the harmonized European standards. As such, it complies with the legal specifications of the EU directives. The manufacturer confirms successful testing of the product by affixing to it the CE mark.

Ordering information

Scope of delivery

The delivery comprises:
- Spectrometer, version as ordered
- Cleaning brush (x 2)
- 32GB SD card for data logging
- Operating Instructions

Product page

www.endress.com/cas80e

Product Configurator

On the product page there is a **Configure** button to the right of the product image.

1. Click this button.
   ↳ The Configurator opens in a separate window.
2. Select all the options to configure the device in line with your requirements.
   ↳ In this way, you receive a valid and complete order code for the device.
3. Export the order code as a PDF or Excel file. To do so, click the appropriate button on the right above the selection window.

For many products you also have the option of downloading CAD or 2D drawings of the selected product version. Click the **CAD** tab for this and select the desired file type using picklists.

Accessories

The following are the most important accessories available at the time this documentation was issued.

► For accessories not listed here, please contact your Service or Sales Center.

Device-specific accessories

Assemblies

Flexdip CYA112
- Immersion assembly for water and wastewater
- Modular assembly system for sensors in open basins, channels and tanks
- Material: PVC or stainless steel
- Product Configurator on the product page: www.endress.com/cya112

Technical Information TI00432C

Flowfit CYA251
- Connection: See product structure
- Material: PVC-U
- Product Configurator on the product page: www.endress.com/cya251

Technical Information TI00495C

Sensor adapter for CAS80E
Order number: 71475982

Spray nozzle for CAS80E with measurement gap length 2 mm (0.08 in) or 10 mm (0.4 in)
- Material: stainless steel
- Order number: 71144328

Spray nozzle for CAS80E with measurement gap length 50 mm (1.97 in)
- Material: PVC
- Order number: 71144330

Assembly 71110000 for CAS80E
- Assembly for small flow volumes
- Material: PVC-U
- Order number: 71110000

The assembly is only suitable for the spectrometer with 2 mm (0.08 in) or 10 mm (0.4 in) gap sizes.

Holder

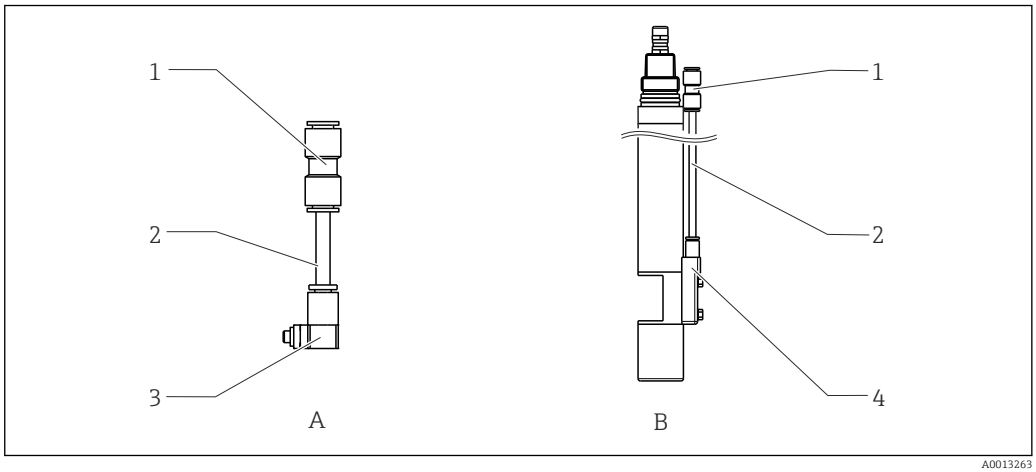
Flexdip CYH112
- Modular holder system for sensors and assemblies in open basins, channels and tanks
- For Flexdip CYA112 water and wastewater assemblies
- Can be affixed anywhere: on the ground, on the coping stone, on the wall or directly onto railings.
- Stainless steel version
- Product Configurator on the product page: www.endress.com/cyh112

Technical Information TI00430C

Cleaning

Cleaning brushes
- Cleaning brushes to clean the measurement gap (for all gap sizes)
- Order number: 71485097

Compressed air cleaning for CAS80E
- Connection: 6 mm (0.24 in) or 8 mm (0.31 in) (metric) or 6.35 mm (0.25 in)
- Measurement gap 2 mm (0.08 in) or 10 mm (0.4 in):
  - 6 mm (0.24 in) (with 300 mm (11.81 in) hose and 8 mm (0.31) adapter)
    Order number: 71485094
  - 6.35 mm (0.25 in)
    Order number: 71485096
- Measurement gap 50 mm (1.97 in):
  - 6 mm (0.24 in) (with 300 mm (11.81 in) hose and 8 mm (0.31) adapter)
    Order number: 71485091
  - 6.35 mm (0.25 in)
    Order number: 71485093



19 Compressed air cleaning

A Cleaning for 2 mm (0.08 in) and 10 mm (0.4 in) measurement gap
B Cleaning for 50 mm (1.97 in) measurement gap
1 Adapter 8 mm (0.31)
2 300 mm (11.81 in) hose (Ø = 6 mm (0.24 in))
3 Gland 6 mm (0.24 in) or 6.35 mm (0.25 in) for measurement gap 2 mm (0.08 in) and 10 mm (0.4 in)
4 Gland 6 mm (0.24 in) or 6.35 mm (0.25 in) for measurement gap 50 mm (1.97 in)

The air cleaning system is not suitable for use in drinking water according to NSF/ANSI Standard 61.

Compressor
- For compressed air cleaning
- 230 V AC, order number: 71072583
- 115 V AC, order number: 71194623

SD card

32GB SD card
Order number: 71467522

www.addresses.endress.com

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