BA01274C/07/EN/03.21
71530851
2021-07-31

Operating Instructions
Liquiline System CAT820

Automatic sample conditioning system for supplying process measuring devices with filtered sample from sludge activation, secondary clarification or surface water

Endress+Hauser
People for Process Automation

Table of contents

1 About this document 4
1.1 Warnings 4
1.2 Document function 4
1.3 Symbols 4

2 Basic safety instructions 6
2.1 Requirements for personnel 6
2.2 Designated use 6
2.3 Workplace safety 6
2.4 Operational safety 6
2.5 Product safety 7

3 Product description 8

4 Incoming acceptance and product identification 9
4.1 Incoming acceptance 9
4.2 Product identification 9
4.3 Scope of delivery 10

5 Certificates and approvals 10
5.1 CE mark 10
5.2 EAC 10

6 Installation 11
6.1 Installation conditions 11
6.2 Mounting the sample preparation system 14
6.3 Mounting the ceramic filter in the process 19
6.4 Mounting the plate filter in the process 24
6.5 Connecting external compressed air 24
6.6 Post-installation check 25

7 Electrical connection 26
7.1 Version with Memosens technology ... 26
7.2 Time-controlled version 27
7.3 Connecting cables and hoses 27
7.4 Structure of the spiral hose 29

8 Operation options 30
8.1 Version with Memosens technology ... 30
8.2 Time-controlled version 30

9 Commissioning 31
9.1 Function check 31

10 Operation 32
10.1 Setup of version with Memosens technology 32
10.2 Setup of version with time control 32

11 Diagnostics and troubleshooting 34

12 Maintenance 35
12.1 Maintenance schedule 35
12.2 Maintenance tasks 35
12.3 Replacing the pump hose and pump head 37
12.4 Replacing the ceramic filter 38
12.5 Replacing the plate filter 38

13 Repair 39
13.1 Spare parts 39
13.2 Return 41
13.3 Disposal 41

14 Accessories 42
14.1 Cleaner for hoses and filter CY820 42

15 Technical data 43
15.1 Temperature inputs 43
15.2 Power supply 43
15.3 Performance characteristics 44
15.4 Environment 45
15.5 Process 45
15.6 Mechanical construction 46

Index 49

1 About this document

1.1 Warnings

Structure of information	Meaning
DANGER **Causes (/consequences)** If necessary, Consequences of non-compliance (if applicable) ▶ Corrective action	This symbol alerts you to a dangerous situation. Failure to avoid the dangerous situation **will** result in a fatal or serious injury.
WARNING **Causes (/consequences)** If necessary, Consequences of non-compliance (if applicable) ▶ Corrective action	This symbol alerts you to a dangerous situation. Failure to avoid the dangerous situation **can** result in a fatal or serious injury.
CAUTION **Causes (/consequences)** If necessary, Consequences of non-compliance (if applicable) ▶ 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** If necessary, Consequences of non-compliance (if applicable) ▶ Action/note	This symbol alerts you to situations which may result in damage to property.

1.2 Document function

These Operating Instructions contain all the information that is required in various phases of the life cycle of the device: from product identification, incoming acceptance and storage, to mounting, connection, operation and commissioning through to troubleshooting, maintenance and disposal.

1.3 Symbols

- Additional information, tips
- Permitted or recommended
- Not permitted or not recommended
- Reference to device documentation
- Reference to page
- Reference to graphic
- Result of a step

1.3.1 Symbols on the device

- Reference to device documentation

☒ Do not dispose of products bearing this marking as unsorted municipal waste. Instead, return them to the manufacturer for disposal under the applicable conditions.

2 Basic safety instructions

2.1 Requirements for personnel

- Installation, commissioning, operation and maintenance of the measuring system may be carried out only by specially trained technical personnel.
- The technical personnel must be authorized by the plant operator to carry out the specified activities.
- The electrical connection may be performed only by an electrical technician.
- The technical personnel must have read and understood these Operating Instructions and must follow the instructions contained therein.
- Faults at the measuring point may only be rectified by authorized and specially trained personnel.

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

2.2 Designated use

The Liquiline System CAT820 sample preparation system is designed to automatically supply process measuring devices with filtered sample from sludge activation, secondary clarification or surface water.

Use of the device for any purpose other than that described, poses a threat to the safety of people and of the entire measuring system and is therefore not permitted. The manufacturer is not liable for damage caused by improper or non-designated use.

2.3 Workplace safety

As the user, you are responsible for complying with the following safety conditions:
- Installation guidelines
- Local standards and regulations

Electromagnetic compatibility
- The product has been tested for electromagnetic compatibility in accordance with the applicable international standards for industrial applications.
- The electromagnetic compatibility indicated applies only to a product that has been connected in accordance with these Operating Instructions.

2.4 Operational safety

Before commissioning the entire measuring point:

1. Verify that all connections are correct.
2. Ensure that electrical cables and hose connections are undamaged.
3. Do not operate damaged products, and protect them against unintentional operation.
4. Label damaged products as defective.

During operation:

- If faults cannot be rectified:
  products must be taken out of service and protected against unintentional operation.

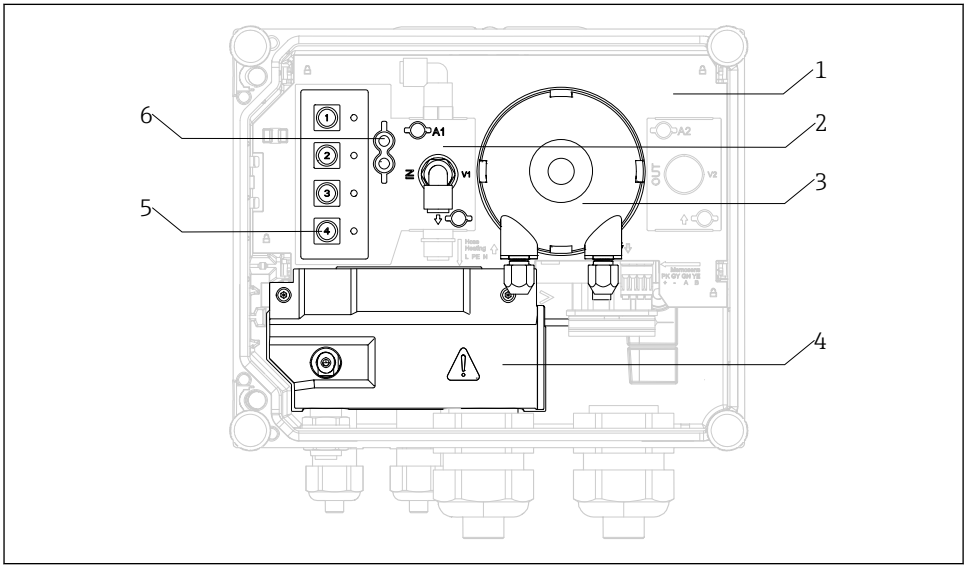
2.5 Product safety

2.5.1 State-of-the-art technology

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. The relevant regulations and international standards have been observed.

3 Product description

A complete sampling unit comprises:
- Liquiline System CAT820 sample preparation system
- Controller with soft keys and status LEDs
- Peristaltic pump
- Filter unit with filter and assembly in the configuration ordered
- Flexdip CYH112 holder for mounting (must be ordered separately)
- Compressed air cleaning (optional) for longer filter maintenance intervals
- Sample hose, filter to pump in the configuration ordered
- Sample hose, pump to analyzer in the configuration ordered
- Cleaner (must be ordered separately)



A0046022

1 CAT820 open

1 Carrier board
2 Cleaning valve (optional, identifiable by the additional hose fittings)
3 Peristaltic pump
4 Protective cover
5 Soft keys
6 Status LEDs

4 Incoming acceptance and product identification

4.1 Incoming acceptance

1. Verify that the packaging is undamaged.
   ↳ Notify the supplier of any damage to the packaging.
   Keep the damaged packaging until the issue has been resolved.
2. Verify that the contents are undamaged.
   ↳ Notify the supplier of any damage to the delivery contents.
   Keep the damaged goods until the issue has been resolved.
3. Check that the delivery is complete and nothing is missing.
   ↳ Compare the shipping documents with your order.
4. Pack the product for storage and transportation in such a way that it is protected against impact and moisture.
   ↳ The original packaging offers the best protection.
   Make sure to comply with the permitted ambient conditions.

If you have any questions, please contact your supplier or your local Sales Center.

4.2 Product identification

4.2.1 Nameplate

The nameplate provides you with the following information on your device:
- Manufacturer identification
- Order code
- Serial number
- Power supply
- Degree of protection
- Ambient and process conditions

► Compare the information on the nameplate with the order.

4.2.2 Product identification

Product page

www.endress.com/cat820

Interpreting the order code

The order code and serial number of your product can be found in the following locations:
- On the nameplate
- In the delivery papers

Obtaining information on the product

1. Go to www.endress.com.
2. Call up the site search (magnifying glass).

3. Enter a valid serial number.
4. Search.
   ↳ The product structure is displayed in a popup window.
5. Click on the product image in the popup window.
   ↳ A new window (**Device Viewer**) opens. All of the information relating to your device is displayed in this window as well as the product documentation.

4.3 Scope of delivery

The scope of delivery comprises:
- 1 Liquiline System CAT820 in the version ordered
- 1 copy of the Operating Instructions (in the desired language on selection of the order option)
- Optional accessories

▶ If you have any queries:
Please contact your supplier or local sales center.

5 Certificates and approvals

5.1 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.

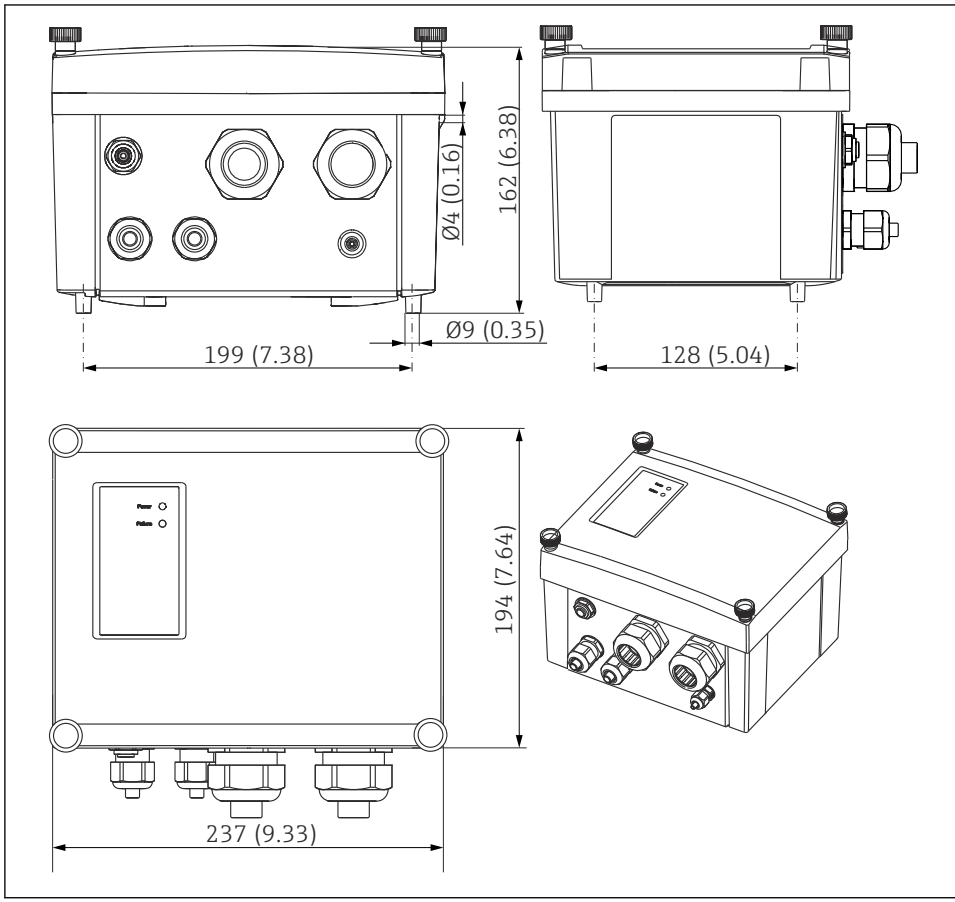
5.2 EAC

The product has been certified according to guidelines TP TC 004/2011 and TP TC 020/2011 which apply in the European Economic Area (EEA). The EAC conformity mark is affixed to the product.

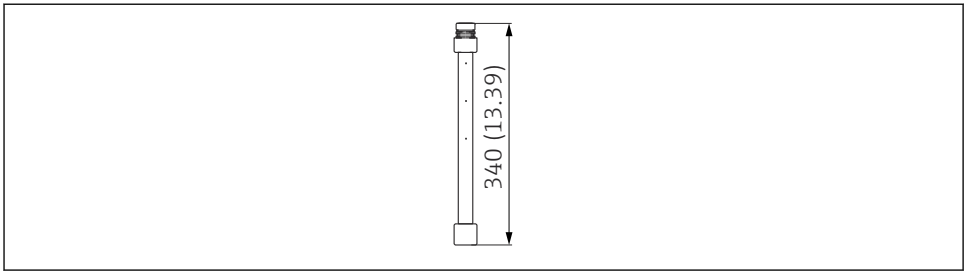
6 Installation

6.1 Installation conditions

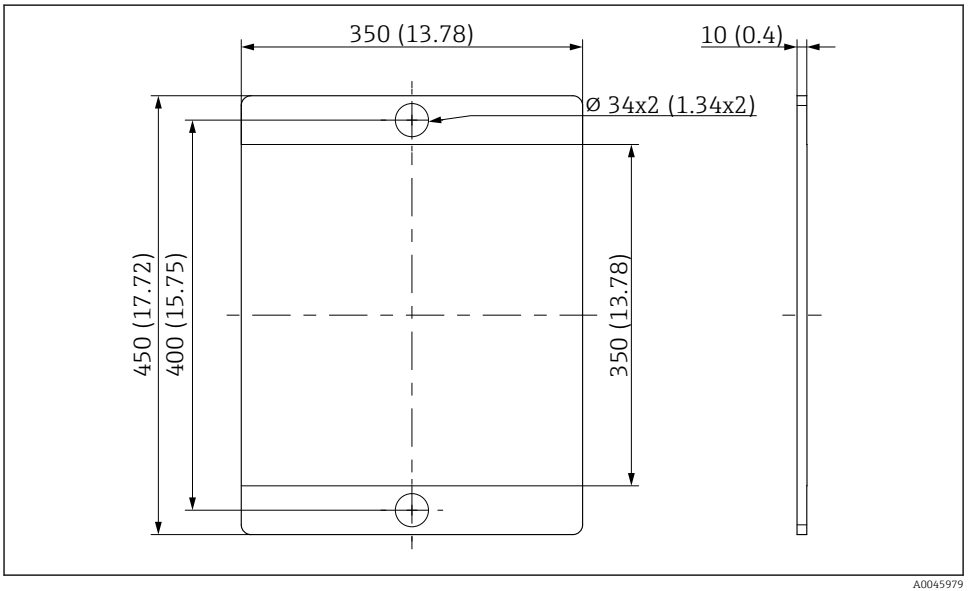
6.1.1 Dimensions



2 Liquiline System CAT820. Engineering unit: mm (in)

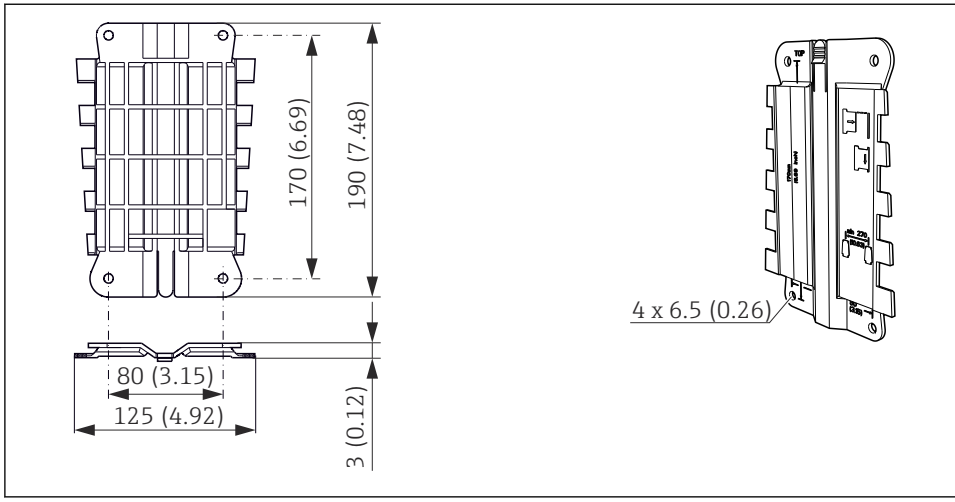


3 Ceramic filter. Engineering unit: mm (in)



4 Plate filter. Engineering unit: mm (in)

6.1.2 Mounting plate



5 Mounting plate. Engineering unit: mm (in)

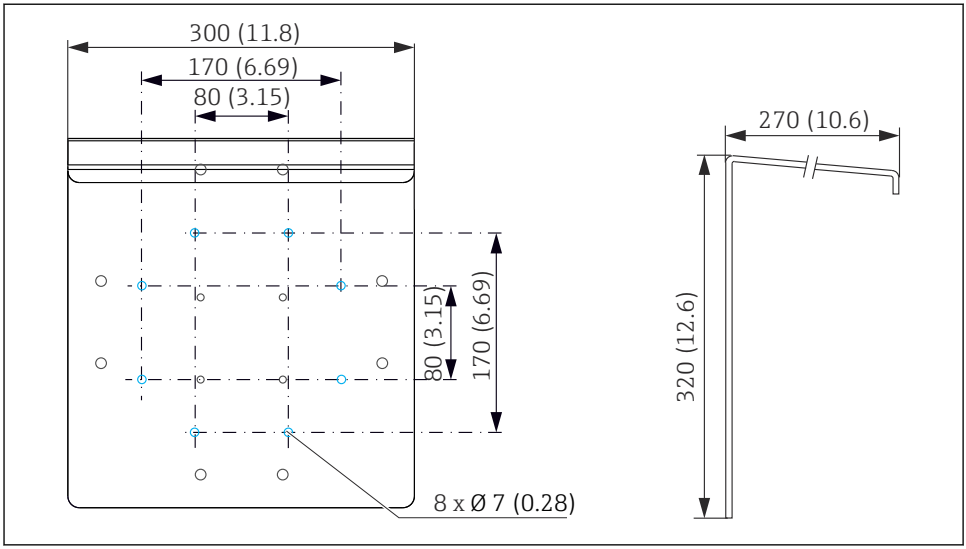
6.1.3 Weather protection cover (optional)

NOTICE

Effect of climatic conditions (rain, snow, direct sunlight etc.)

Malfunctions through to complete failure of the sample preparation system

► Always use the weather protection cover (accessory) when installing the device outdoors.



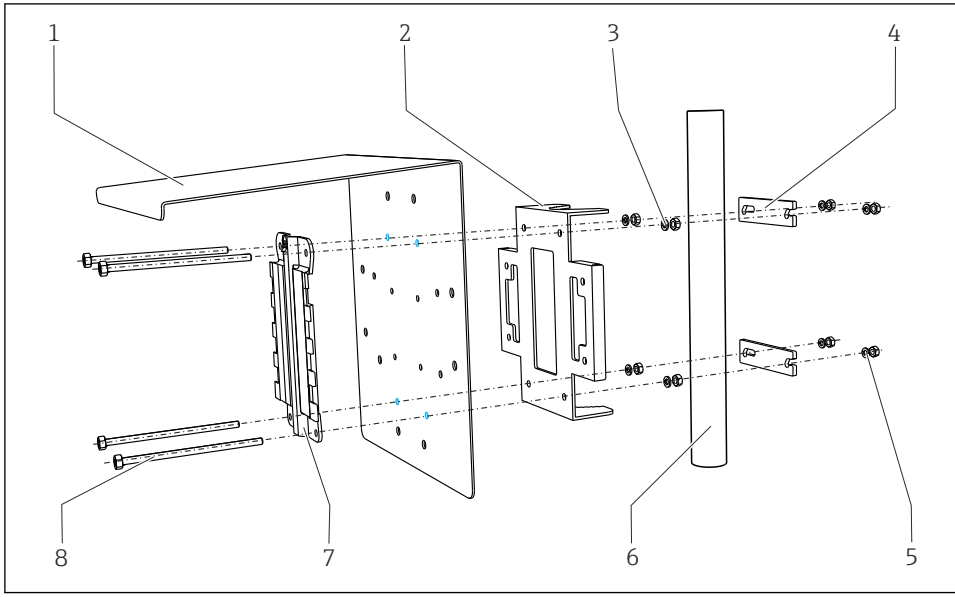
6 *Weather protection cover. Engineering unit: mm (in)*

6.2 Mounting the sample preparation system

The sample preparation system can be installed in 3 ways:
- on a pipe
- on a post
- on a railing (round or square, clamping range 20 to 61 mm (0.79 to 2.40 in)

The post mounting kit (optional) is required for mounting the device on a pipe, post or railing.

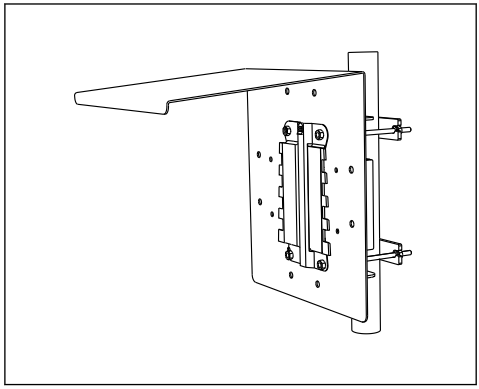
6.2.1 Mounting the sample preparation system on a post



A0029941

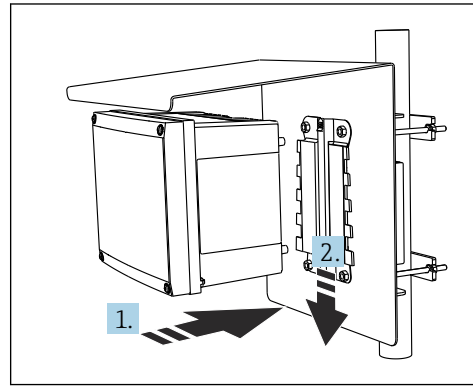
7

1	*Weather protection cover (optional)*	5	*Spring washers, nuts (post mounting kit)*
2	*Post mounting plate (post mounting kit)*	6	*Pipe or railing (circular/square)*
3	*Spring washers, nuts (post mounting kit)*	7	*Mounting plate*
4	*Pipe clamps (post mounting kit)*	8	*Threaded rods (post mounting kit)*



A0029949

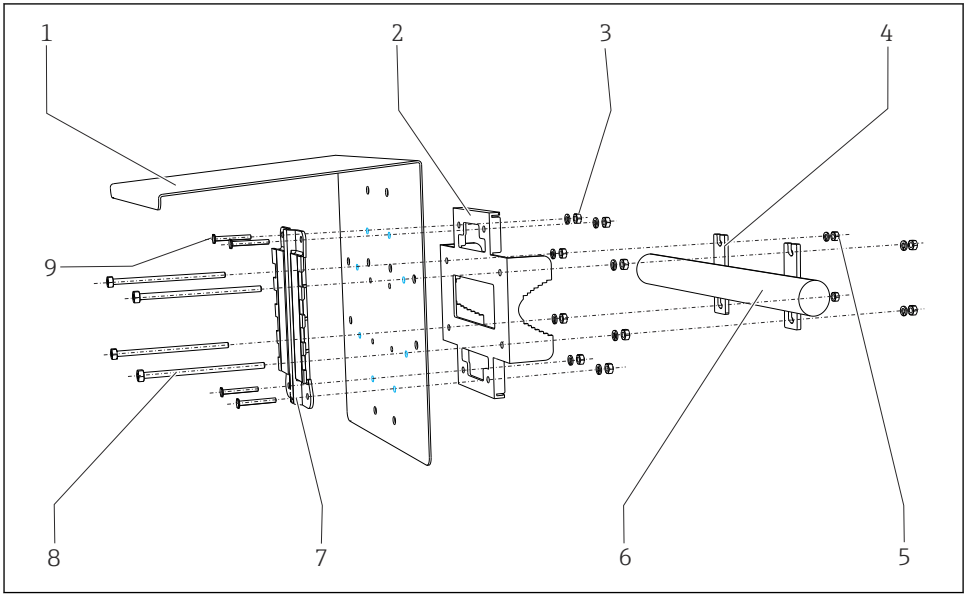
8 *Post mounting*



A0029950

9 *Attach the device and click it into place*

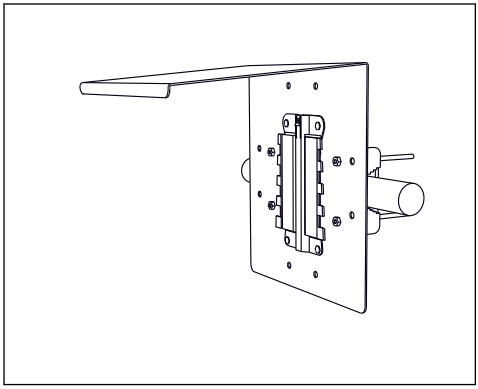
6.2.2 Mounting the sample preparation system on a railing



A0032012

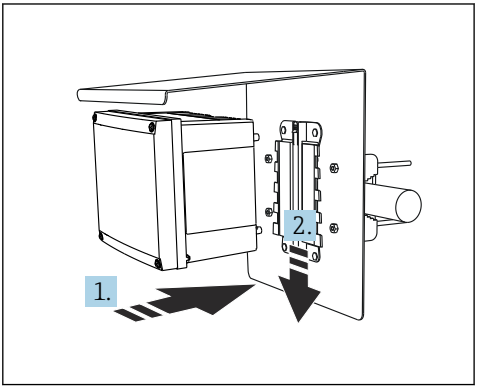
10

1	*Weather protection cover (optional)*	5	*Spring washers, nuts (post mounting kit)*
2	*Post mounting plate (post mounting kit)*	6	*Pipe or railing (circular/square)*
3	*Spring washers, nuts (post mounting kit)*	7	*Mounting plate*
4	*Pipe clamps (post mounting kit)*	8	*Threaded rods (post mounting kit)*



A0029952

11 *Rail mounting*

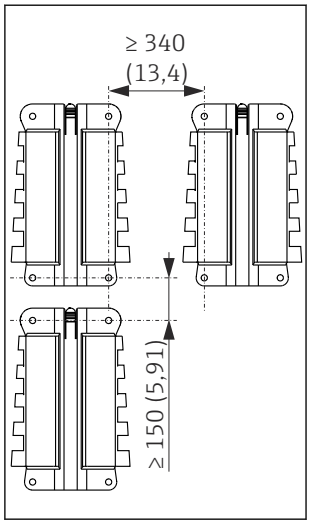


A0029953

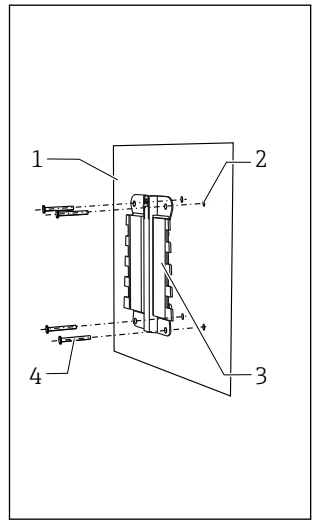
12 *Attach the device and click it into place*

6.2.3 Mounting the sample preparation system on a wall

Mount the sample preparation system in such a way that the wall support surface is the size of the rear housing panel at least.

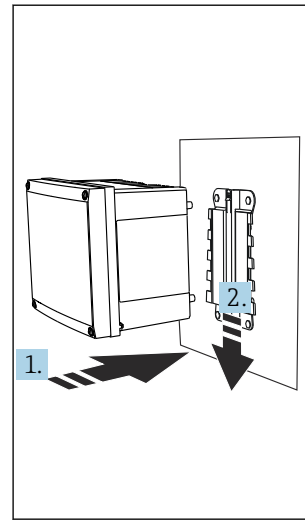


13 Installation clearance. Engineering unit: mm (in)



14 Wall mounting

1 Wall
2 Drill holes
3 Mounting plate
4 Screws Ø 6 mm (0.24 in) (not included in scope of supply) [1]



15 Attach the device and click it into place

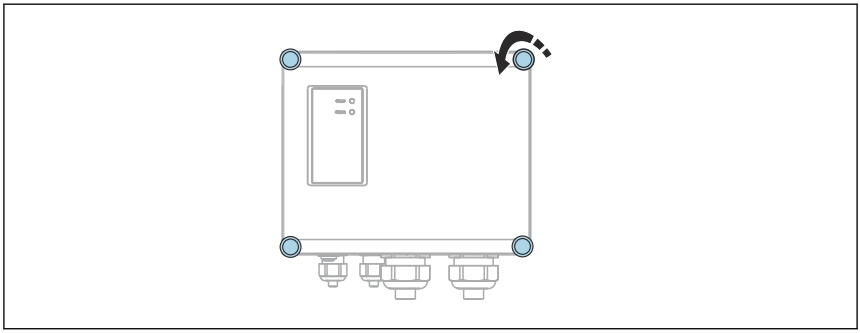
1) The size of the drill holes depends on the wall plugs used. The wall plugs and screws must be provided by the customer.

6.2.4 Securing the temperature sensor (version with heated housing or heated hoses)

The sample preparation system has a temperature sensor for measuring the ambient temperature. By measuring the ambient temperature, the device controls the heating of the housing and hoses. At time of delivery, the temperature sensor is located in the housing of the sample preparation system.

Proceed as follows to secure the temperature sensor outdoors:

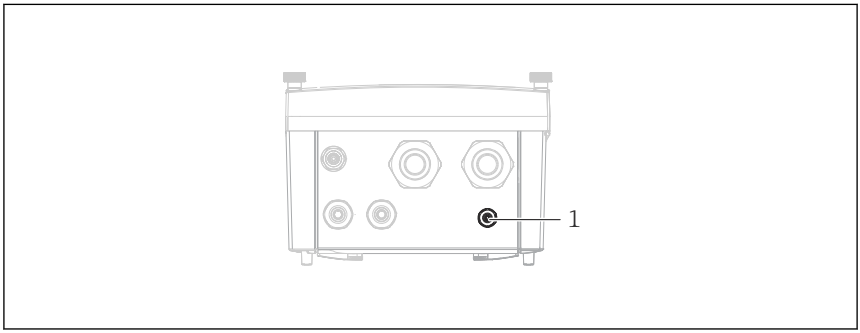
1. Release the 4 screws on the housing of the sample preparation system.



A0029977

16 Releasing 4 screws on housing

2. Guide the cable of the temperature sensor through the cable entry and out of the housing. The total cable length is 1 m (3.28 ft).



A0031726

1 Cable entry to guide the temperature sensor cable out

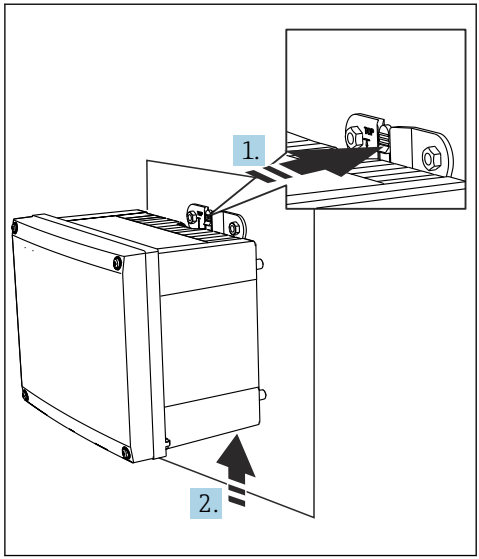
3. Secure the temperature sensor outside.

6.2.5 Disassembling (for conversion, cleaning)

NOTICE

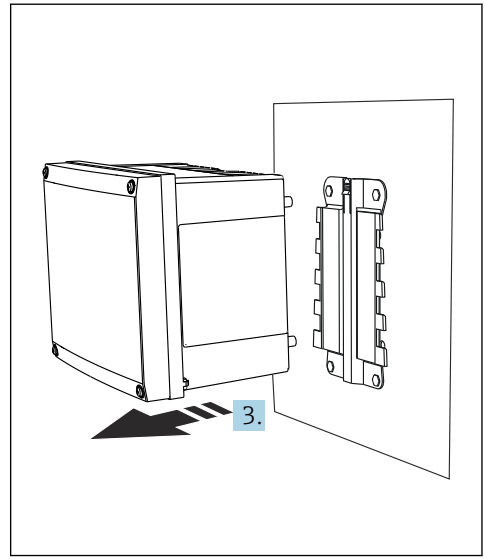
The device can be damaged if dropped

- When pushing the housing out of the holder, secure the housing to prevent it from falling. If possible, ask a second person to help you.



17 Disassembling

1 *Hold down the latch*
2 *Push up the housing to remove it from the holder*



18 Disassembling

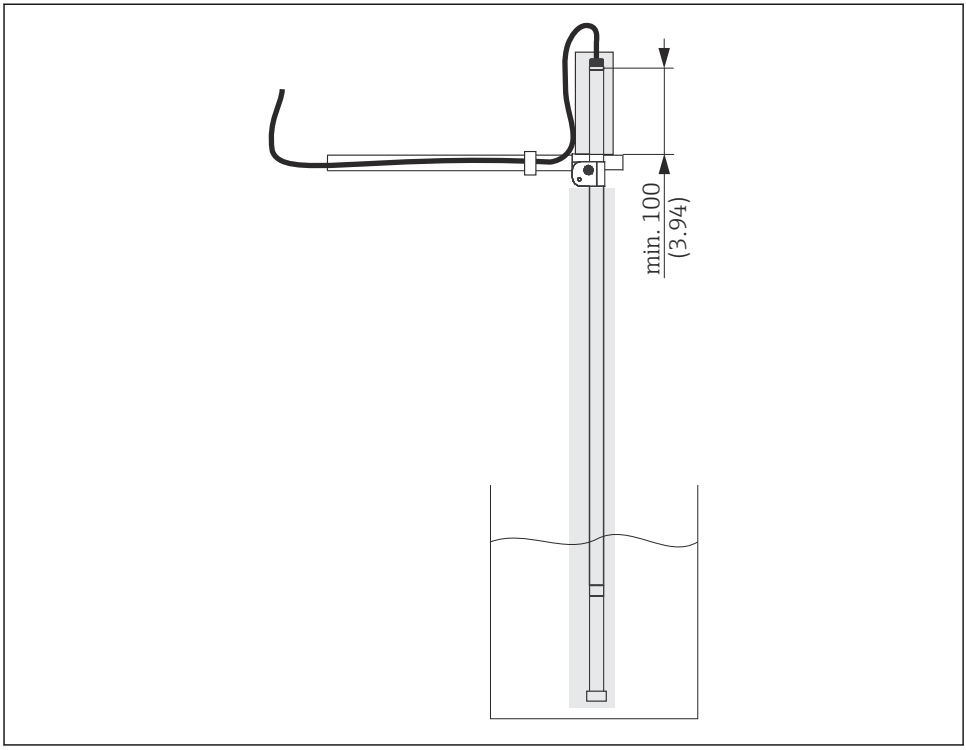
3 *Remove the device from the front*

6.3 Mounting the ceramic filter in the process

Select the installation location so that a suitable distance from fixed installations is maintained, and the ceramic filter cannot be damaged even when the medium is moving.

For fixed installation, select the retaining point so that the proper operation and maintenance of the assembly is guaranteed. The immersion tube must protrude by at least 100 mm (3.94 in) over the retaining point (→ 19, 20).

The ceramic filter may only be installed with an assembly. Use Endress+Hauser assemblies to install the ceramic filter correctly.

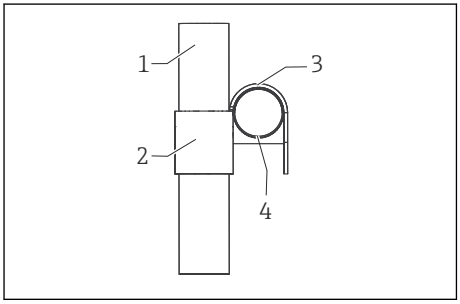


19 *Retaining point (shown without splash protection cap)*

6.3.1 Mounting as a fixed installation with immersion tube

The cross clamp is mounted in such a way that one closed side faces the center of the basin while the other closed side faces upwards.

Mount the immersion tube as follows:



1 *Immersion tube*
2 *Cross clamp, closed side facing center of basin*
3 *Cross clamp, closed side facing upwards*
4 *Holder transverse pipe*

20

1. Adjust the clamps on the cross clamp.
2. Slide the cross clamp over the immersion tube, making sure that the closed side of the cross clamp faces upwards.
3. Mount the multifunctional clamp ring (funnel-shaped side facing upwards) on the immersion tube above the cross clamp. The multifunctional clamp ring acts as an anti-slip lock.
4. Attach the cross clamp, along with the immersion tube, to the transverse pipe. Make sure that the closed side of the cross clamp faces the basin.
5. Align the assembly and the holder.
6. Tighten the clamp screws finger-tight (finger-tight corresponds to 13 Nm (9.6 lbf ft).

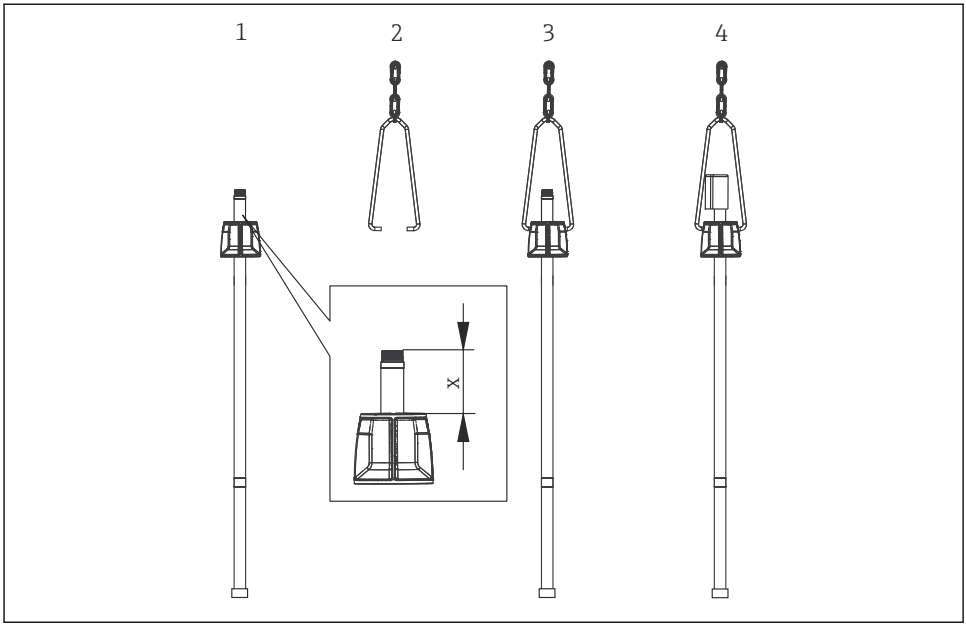
Mount the ceramic filter as follows:

1. Screw the immersion tube connection (straight, 90 °) onto the immersion tube.
2. Where applicable, screw the quick fastener onto the immersion tube connection (optional).
3. Remove the thread adapter nut from the hose. The thread adapter nut is not required when installing with an immersion tube.
4. Guide the "filter to pump" hose with the connection for sample preparation through the splash protection cap from below.
5. Guide the "filter to pump" hose with the connection for the ceramic filter through the immersion tube from above.
6. If a quick fastener is used, slide the inner sleeve into the quick fastener (→ 🖹 23).
7. Connect the PTFE sample hose, 4 mm (0.16 in), blue to the ceramic filter (alternatively connect the PTFE replacement hose, 4 mm (0.16 in), black).
8. Screw the ceramic filter onto the immersion tube connection or onto the quick fastener if one is used.

Screw the tubes together finger-tight (no gaps). The threads are lubricated and provided with an O-ring.

6.3.2 Mounting on a chain retainer

Prerequisite:
- The immersion tube is fitted with a ceramic filter
- The transverse pipe is fitted with a chain



21 *Mounting the chain retainer*

1 Mount the multifunctional clamping ring
2 Guide the bracket into the chain
3 Hook the bracket into the multifunctional clamping ring
4 Fit the splash protection cap
x 60 to 80 mm (2.35 to 3.15 in)

1. Immersion tube made of PVC:
   If necessary, insert the stainless steel pipe supplied with the CYA112 assembly as a weight into the PVC immersion tube.
2. Mount the weight on the filter cap.
3. Screw the multifunctional clamp ring onto the immersion tube.
4. Guide the bracket into the bottom chain link.
5. Hook the bracket into the multifunctional clamp ring.
6. Guide the "filter to pump" hose through the splash protection cap from below (do not bend).
7. Fit the Teflon hose onto the filter connection.
8. Secure the chain on the holder with the triangular carabiner.

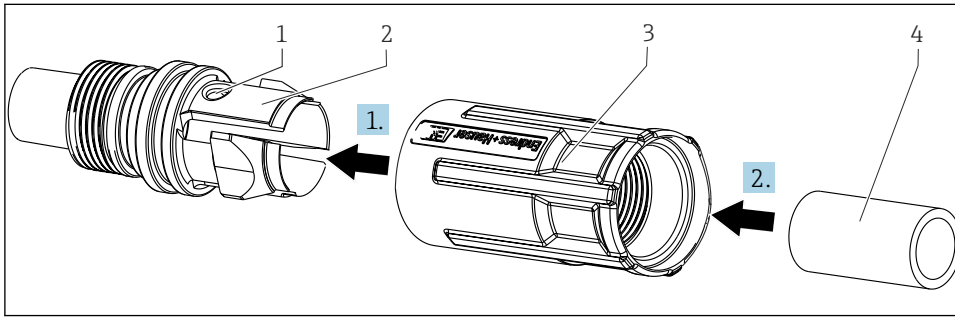
6.3.3 Mounting with a float

Mounting the ceramic filter

1. Screw the thread adapter nut onto the plastic insert of the float.
2. Connect the PTFE sample hose, 4 mm (0.16 in), to the ceramic filter.
3. Screw the filter adapter into the plastic insert of the float.
4. Guide the metal bracket through the bottom link in the chain.
5. Secure the metal bracket at the bores provided for this purpose.
6. Fix the "filter to pump" hose to the transverse pipe of the CYH112 holder using hook and loop Velcro fasteners.

Make sure that the ceramic filter is vertical and medium flows over it fully.

6.3.4 Quick fastener



22 *Quick release fastener*

1 Bore hole - makes it easier to screw the adapter on tightly
2 Adapter
3 Thread adapter nut
4 Inner sleeve

Installing the quick release fastener

1. Screw the adapter (item 2) into the immersion tube connection bracket.
2. Insert the Allen key or a similar tool through the bores (item 1) to secure the adapter.
3. Slide the thread adapter nut (item 3) over the adapter until the thread adapter nut engages with a click.
4. Guide the inner sleeve (item 4) through the thread adapter nut into the adapter as far as it will go.
5. First guide the hose for "filter to pump" through the immersion tube and then through the quick release fastener.

6. Connect the sample hose (PTFE, 4 mm, blue) to the filter.
7. Screw the filter into the quick release fastener as far as it will go. In doing so, turn the thread adapter nut, not the filter.

6.4 Mounting the plate filter in the process

Select the installation location so that a suitable distance from the fixed installations is maintained, and the filter cannot be damaged even when the medium is moving.

The filter may only be installed with an assembly. Use Endress+Hauser assemblies to install the filter correctly.

6.5 Connecting external compressed air

CAUTION

Incorrect connection can cause injuries and damage the device!

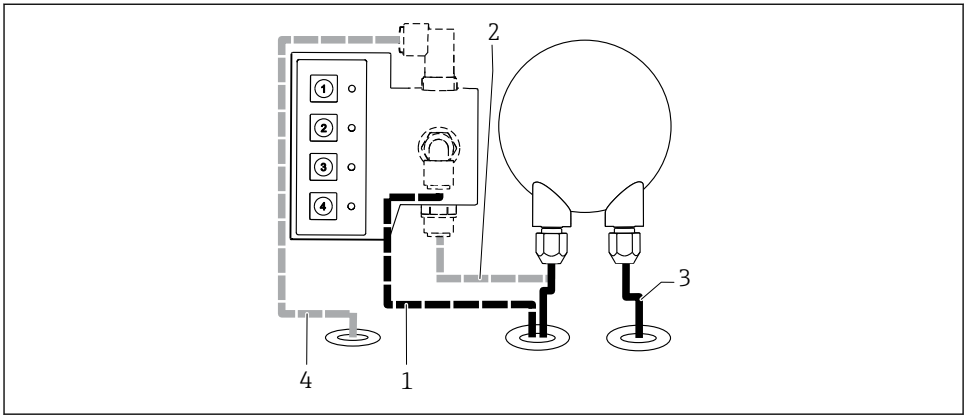
- Install a pressure-reducing valve upstream if the air pressure can increase to more than 4 bar (58 psi) (even short pressure surges).

NOTICE

Compressed air backflushing in conjunction with the plate filter can damage the device!

- Do not use compressed air backflushing.

6.5.1 Hose connection diagram



A0029975

23 Connecting external compressed air

1 Hose, filter to pump (1/2)
2 Hose, filter to pump (2/2)
3 Hose, pump to analyzer
4 Hose, compressed air cleaning (order option)

Prerequisites:
- Compressed air with 2.0 to 4.0 bar (29 to 58 psi)
- The compressed air must be filtered (40 µm) and free from water and oil
- No continuous air consumption
- Minimum nominal diameter of compressed air lines: 4 mm (0.16 in)

1. Connect the compressed air line to the connection provided on the bottom of the housing.
2. Operate the purge air connection of the valve with an air pressure of 2.0 to 4.0 bar (29 to 58 psi).

6.6 Post-installation check

1. After installation, check the sample preparation system and hoses for damage.
2. Check all connections to ensure they are secure and leak-tight.
3. Ensure that the hoses cannot be removed without force.
4. Check whether the sample preparation system is protected against precipitation and direct sunlight (e.g. by the weather protection cover).
5. Check that all screws are firmly tightened.
6. Check whether the compressed air is connected correctly.

7 Electrical connection

⚠ WARNING

Device is live!

Incorrect connection may result in injury or death!

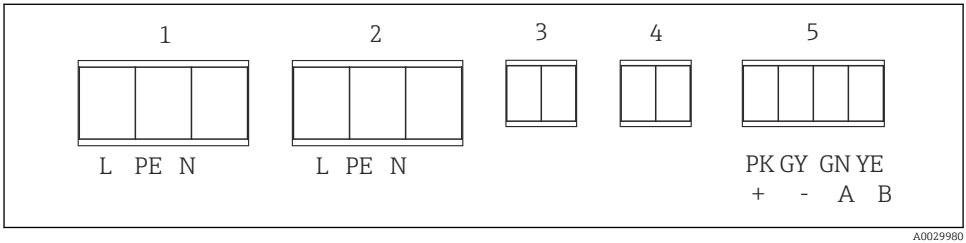
- The electrical connection may be performed only by an electrical technician.
- The electrical technician must have read and understood these Operating Instructions and must follow the instructions contained therein.
- **Prior** to commencing connection work, ensure that no voltage is present on any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

NOTICE

The device does not have a power switch

- The device starts as soon as it is supplied with power.
- Provide a protected circuit breaker in the vicinity of the device at the place of installation.
- The circuit breaker must be a switch or power switch, and must be labeled as the circuit breaker for the device.
- A fuse with a maximum rating of 6.0 A must be provided by the customer. Observe the local regulations for installation.
- The protective ground connection must be made before all other connections. Danger may arise if the protective ground is disconnected.

7.1 Version with Memosens technology

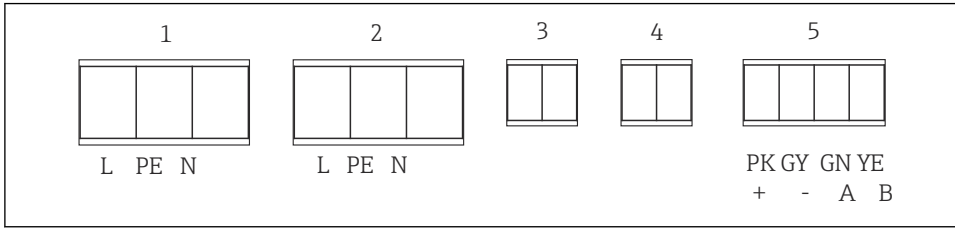


A0029980

1 *Supply voltage for housing or hose heater 115/230 V_{AC} (for version with housing heater or hose heater, filter to pump)*
2 *Hose heating, filter to pump*
3 *Shielding*
4 *Temperature sensor*
5 *Memosens*

1. Connect the Memosens cable (integrated in the hose) to the CAT820 (socket 5) and CA80.
   ↳ This is used to power (with 24 V via Memosens) and control the sample preparation system.
2. Connect the power supply of the hose/housing heater (if provided) to L1, N1 and PE1.

7.2 Time-controlled version



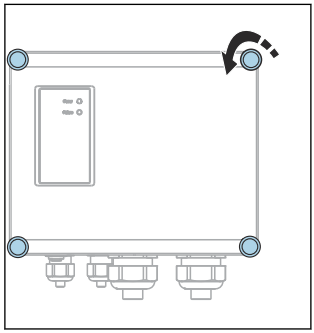
A0029980

1 *Supply voltage for housing or hose heater 115/230 V_{AC} (for version with housing heater or hose heater)*
2 *Hose heating, filter to pump*
3 *Shielding*
4 *Temperature sensor*
5 *Supply voltage 24 V to PK (+) and GY (-) (terminals A and B are not required)*

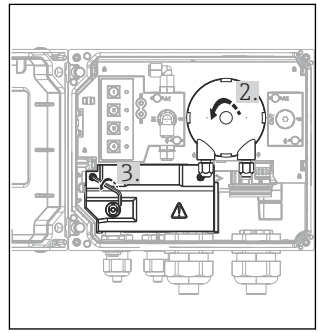
1. Power supply is via CA71 or an external power supply (24 V, 12 W) at the + and – terminals at socket 5.
2. Connect the power supply of the hose/housing heater (if provided) to L1, N1 and PE1

The supply voltage with 24 V is always required.

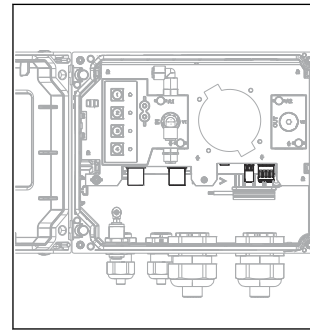
7.3 Connecting cables and hoses



A0029977



A0029978

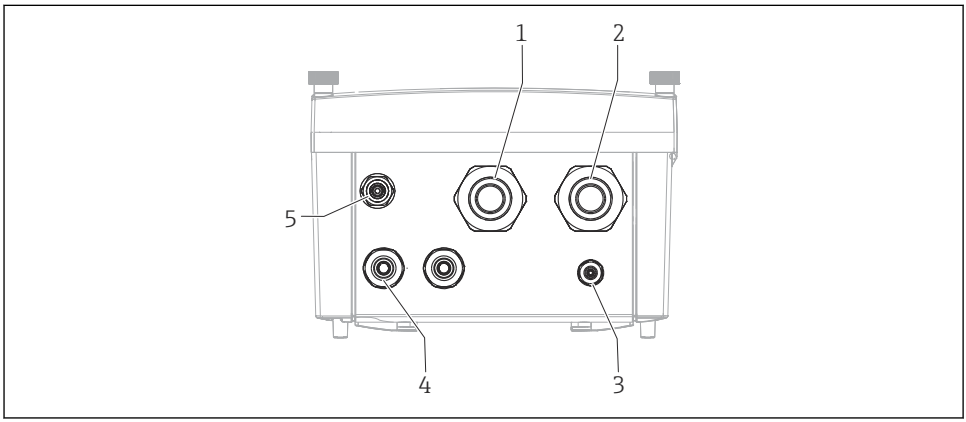


A0029979

1. Release the 4 screws.
2. Remove the diaphragm pump with a rotational movement.
3. Release the 2 screws on the protective cover.
   ↳ All connections should be accessible.

4. Secure the protective cover after connecting.

A supply voltage of 200 to 240 V_{AC} or 100 to 120 V_{AC} is required to install heated hoses. It is not possible to install heated hoses with the 24 V version.

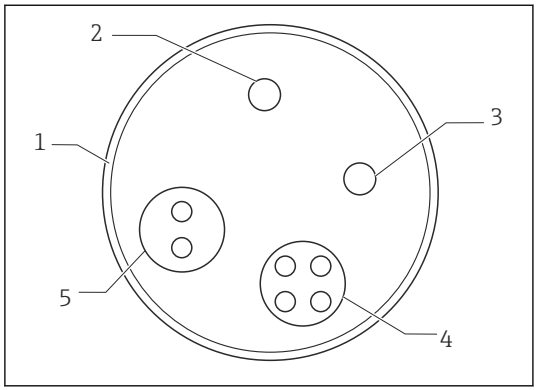


24 Underside of housing

1 Hose (filter to pump)
2 Hose (pump to analyzer)
3 Temperature sensor
4 Power cable
5 External compressed air line

1. Release a suitable cable or hose gland on the underside of the housing and remove the dummy plug from the entry.
2. Making sure the gland is facing in the right direction, thread the gland onto the cable or hose end and pull the cable or the hose through the entry and into the housing.
3. Connect the cables according to the wiring diagram.
4. Lastly, tighten the cable gland or hose gland from the outside.

7.4 Structure of the spiral hose

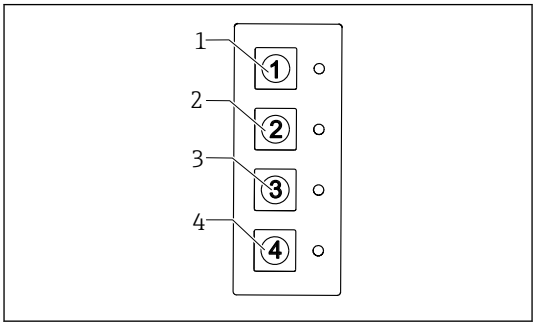


25

1 *Spiral hose, PVC*
2 *PTFE, blue*
3 *PTFE, black*
4 *Memosens and power supply*
5 *Hose heating*

8 Operation options

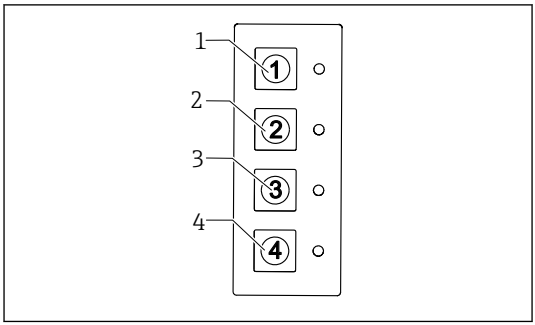
8.1 Version with Memosens technology



1 *Onsite mode*
2 *Sample pump forwards*
Sample pump backwards (press for longer)
3 *Backflush filter with compressed air (order option)*
4 *Not assigned*

26

8.2 Time-controlled version



1 *Sample pump on / off*
2 *Sample pump forwards*
Sample pump backwards (press for longer)
3 *Pulse/pause 1 10 s / 60 s (press briefly, on)*
Pulse/pause 2 10 s / 50 s (press for longer, flashes)
4 *Pulse/pause 3 10 s / 30 s (press briefly, on)*
Pulse/pause 4 10 s / 20 s (press for longer, flashes)

Factory setting: 10 s / 40 s

27

Key functions

Press once:	Function 1	= LED on
Press for longer:	Function 2	= LED flashes
Press twice:	Stop button	= LED off

9 Commissioning

9.1 Function check

WARNING

Risk of injury from medium leakage, incorrect supply voltage, no protective cover
Safety risks for staff and device malfunctions
- ► Check all the connections to ensure that the device has been properly connected.
- ► Ensure that the supply voltage matches the voltage indicated on the nameplate.
- ► Ensure that the protective cover is mounted.

10 Operation

10.1 Setup of version with Memosens technology

The sample preparation menu is configured via the display and operating elements of a Liquiline System CA80 analyzer. The status and the current process step of the Liquiline System CAT820 sample preparation system are also displayed here. For further information please refer to the relevant documentation.

To ensure optimum synchronization of the measuring point, all of the components (analyzer, sensors, sample preparation system) are controlled in automatic mode by the Liquiline System CA80 analyzer. If key 1 on the Liquiline System CAT820 is pressed, this results in a request to activate onsite mode. If this conflicts with a program cycle that has already begun, the system waits until the cycle is finished before the necessary activation is performed.

This process can take a few minutes, and sometimes even up to 20 minutes (e.g. if cleaning the sample preparation system). Status LED 1 flashes during this time.

10.2 Setup of version with time control

10.2.1 Controlling the pump manually

With key 2, the sample pump can be switched on permanently forwards or backwards. This function can be used for diagnostic purposes for filling or draining the hoses quickly.

- Switch off the selected function on completion of the maintenance work. The sample pump once again follows the set pulse/pause interval.

10.2.2 Selecting the pulse/pause interval of the sample pump

The sample preparation system is configured using the operating elements in the sample preparation system.

The time-controlled version is always in the onsite mode.

1. Open the cover of the sample preparation system.
2. Use keys 3 and 4 to select the required pulse/pause ratio for the sample pump.
   ↳ The settings are adopted immediately.

The following predefined interval options are available:

Key	Action	Status LED	Program	Interval
1	Sample pump on / off			
2	Sample pump forwards	On		
	Sample pump backwards	Flashing		
3	Press briefly	On	Pulse/pause 1	10 s / 60 s
	Press and hold key down	Flashing	Pulse/pause 2	10 s / 50 s
4	Press briefly	On	Pulse/pause 3	10 s / 30 s

Key	Action	Status LED	Program	Interval
	Press and hold key down	Flashing	Pulse/pause 4	10 s / 20 s
Factory setting: interval - 10 s / 40 s (all LEDs off)				

3. Close the cover of the sample preparation system.

11 Diagnostics and troubleshooting

The Liquiline System CAT820 sample preparation system with Memosens technology supports you with diagnostic messages when diagnosing and remedying faults in accordance with NAMUR NE 107. The relevant diagnostic message is output on the display of the Liquiline System analyzer.

If a diagnostic message from error category "F" occurs, the status LED of the Liquiline System CAT820 is lit red and the background of the Liquiline System CA80 display changes to red.

BA01240C

12 Maintenance

⚠ WARNING

Electrical voltage

Risk of serious or fatal injury

- ▶ Before opening, ensure the device is de-energized.

⚠ CAUTION

Risk of injury/infection from escaping medium or uncleaned filters

- ▶ Before each maintenance task, ensure that the automatic cleaning function is deactivated.
- ▶ Before each maintenance task, ensure that the suction line is unpressurized, empty and rinsed.
- ▶ Clean the filter immediately each time it is removed from the process. Only store cleaned filters.

12.1 Maintenance schedule

Interval	Maintenance work
Every 1 to 8 weeks (depends on the application)	Check the ceramic and plate filter for damage and replace or clean: ▪ If the filter is damaged, replace it ▪ If the filter is undamaged, clean it
After every filter replacement	Check the ceramic and plate filter for scratches and other damage and replace the filter if damaged ⓘ The plate filter must be kept wet. It may not dry out.
Every 4 to 8 weeks	Clean the hoses to the ceramic and plate filter and analyzer
Every 2 months	Lubricate the Viton O-ring on the ceramic filter; replace if necessary
Every 6 months	Replace the following components: ▪ Pump head ▪ O-rings ▪ Connector to peristaltic pump ▪ PTFE hoses

12.2 Maintenance tasks

⚠ CAUTION

Risk of injury from cleaning solutions

- ▶ Wear protective gloves, protective goggles and protective clothing.
- ▶ When disposing of unused cleaning solutions, observe local regulations.

12.2.1 Cleaning agent

NOTICE

Cleaning agents not permitted

Damage to the housing surface or housing seal

- Never use concentrated mineral acids or alkaline solutions for cleaning.
- Never use organic cleaners such as acetone, benzyl alcohol, methanol, methylene chloride, xylene or concentrated glycerol cleaner.
- Never use high-pressure steam for cleaning.

The choice of cleaning agent depends on the degree and type of contamination. The most common types of contamination and the cleaning agents used in each case are shown in the following table.

Type of contamination	Cleaning agent
Greases and oils	CY820 basic cleaning solution
Limescale deposits, metal hydroxide buildup	CY820 acidic cleaning solution
Protein buildup	CY820 acidic cleaning solution
Fibers, suspended substances	CY820 basic cleaning solution
Light biological buildup	CY820 oxidizing cleaning solution + basic cleaning solution
Antisoluble biological buildup	CY820 oxidizing + basic cleaning solution, then CY820 acidic cleaning solution

12.2.2 Cleaning parts in contact with medium

For stable and safe sampling, the parts of the sample preparation system that come into contact with media must be cleaned regularly. The frequency and intensity of the cleaning process depend on the medium. A typical filter cleaning interval for discharge applications, for example, is 8 weeks.

1. Remove light soiling with suitable cleaning solutions (see section "Cleaning agents").
2. Remove heavy soiling using a soft brush and a suitable cleaning agent.
3. For very persistent dirt, soak the parts in a cleaning solution. Then clean the parts with a brush.

Cleaning the ceramic filter manually

A typical filter cleaning interval is 12 weeks, e.g. for installations in the aeration basin.

Clean the filter as soon as possible after it is removed from the process.

1. Release the ceramic filter tube from the filter holder.
2. Rinse the ceramic filter tube thoroughly with water.
3. Use the transport packaging of the filter as the cleaning vessel.

4. First clean the ceramic filter pipe for 1 to 2 days in a combination of basic (1.5 %) and oxidizing cleaner (1.0 %).
   ↳ For detailed information on the "Cleaner", see the Special Documentation for the CY820 cleaner.
5. Rinse the ceramic filter tube thoroughly with water.
6. Then clean the ceramic filter pipe for 2 days in an acidic cleaning solution (1.5 %).
7. Rinse the ceramic filter tube thoroughly with water.

Cleaning the plate filter manually

Clean the filter as soon as possible after it is removed from the process.

In most cases, it suffices to clean with a soft cleaning sponge. If this does not suffice (e.g. applications with a high concentration of fat/protein), take the following steps. These steps can be repeated several times if necessary.

Clean the filter as soon as it is removed from the process and protect it from direct sunlight. The filter must not be allowed to dry out.

1. Remove the plate filter from the process.
2. Pre-clean the plate filter using a water hose. Make sure the water pressure is not too high so that the filter membrane is not damaged (do not use a high-pressure cleaner).
3. Using a spray bottle, spray the suitable cleaning agent (→ 🖹 36) completely onto the plate filter.
4. Spread the cleaning agent with a soft sponge and let it soak in for around 5 min.
5. Before you put the plate filter back into the process, spray it again with a water hose.

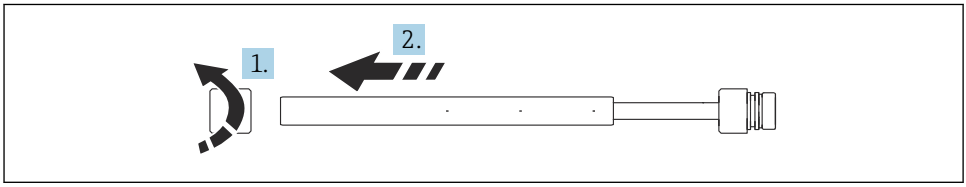
The effect of the cleaning is noticeable immediately as the brown coating comes away from the bright membrane surface.

12.3 Replacing the pump hose and pump head

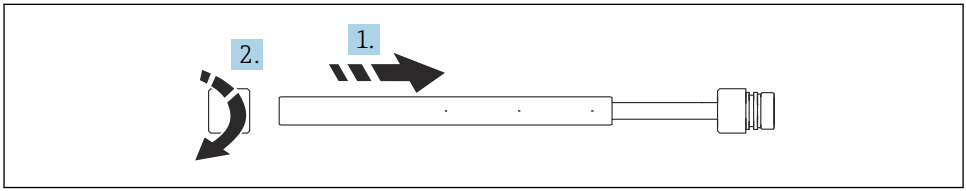
1. Open the cover of the sample preparation system.
2. For the version with Memosens technology: press key 1 to go to the onsite mode.
   ↳ The status LED beside key 1 first starts flashing and is then lit continuously once the onsite mode has been enabled. This may take some time → 🖹 32.
3. Remove the filter from the medium.
4. Press key 2.
   ↳ The status LED beside key 2 comes on and the peristaltic pump rotates forward. The medium in the hoses is now replaced by intake air.
5. Wait until all the hoses have been completely emptied.
6. Press key 2 again.
   ↳ The pump stops and the status LED goes off.
7. Open the bayonet lock of the peristaltic pump.

8. Replace the hose and, if necessary, replace the pump head.
9. Close the bayonet lock of the peristaltic pump.
10. Make sure all the hoses and connectors are seated correctly.
11. Press key 1 to return to the automatic mode.
    ↳ The settings are accepted, the status LED beside operating key 1 goes out.
12. Close the cover of the sample preparation system.

12.4 Replacing the ceramic filter



28 *Removing the filter cartridge*



29 *Installing the new filter cartridge*

The filter unit can stay on the assembly when replacing. Only the ceramic is replaced.

▶ Lubricate O-rings regularly.

12.5 Replacing the plate filter

1. Remove the assembly from the process.
2. Release the thread adapter nut.
3. Loosen the hose connection on the back.
   ↳ The plate filter can be replaced.

13 Repair

⚠ CAUTION

Danger resulting from improper repair

- Following all repair and maintenance work, suitable measures must be taken to ensure that the sample preparation system is leak-tight. Once the work is complete, the sample preparation system must once again meet the specifications in the technical data. Replace all other damaged components immediately.

13.1 Spare parts

Contact your Endress+Hauser Service Department if you have any questions about the spare parts.

For more detailed information on spare parts kits, please refer to the "Spare Part Finding Tool" on the Internet: www.products.endress.com/spareparts_consumables

Item no.	Description and contents	Order number Spare parts kit
201	CAT820/860 kit: solenoid valve (1 pc) Kit instructions: CAT820 / 860, electronics compartment	71218548
202	CAT820/860 kit: control module 100-240 V Kit instructions: CAT820 / 860, electronics compartment	71222174
203	CAT820/860 kit: 10 pc. plug-in connector L Kit instructions: CA8x / CAT8xx hose connection	71222175
204	CAT820/860 kit: key electronics Kit instructions: CAT820 / 860, electronics compartment	71222179
205	Kit CAT820/860: filter cartridge 0.1 µm Kit instructions: CAT8xx filter	71222181
205	Kit CAT820/860: filter cartridge 0.4 µm Kit instructions: CAT8xx filter	71383467
206	Kit CAT820/860: 10 x conn. Peristaltic pump Kit instructions: CA8x / CAT8xx hose connection	71241442
208	CAT820/860 kit: pump head (10 x) Kit instructions: CAT820 / 860, electronics compartment	71222201
209	CAT8xx kit: filter O-ring set (20 x) Kit instructions: CAT8xx filter	71222206
210	CAT820/860 kit: pump hoses (10 pc) Kit instructions: CAT820 / 860, maintenance	71222209
212	Kit CAT820/860: 10 hose conn. straight Kit instructions: CA8x / CAT8xx hose connection	71222213

Item no.	Description and contents	Order number Spare parts kit
213	Kit CAT8xx: 10 x hose conn. 90° Kit instructions: CA8x / CAT8xx hose connection	71222214
214	Kit CAT8xx: 10 x hose conn. G1/4" Kit instructions: CA8x / CAT8xx hose connection	71222216
217	CAT820/860 kit: peristaltic pump, complete Kit instructions: CAT820 / 860, electronics compartment	71218549
218	CAT820 kit: small fan 40x40 mm Kit instructions: CAT820 / 860, electronics compartment	71218551
219	CAT8xx kit: PTFE hose, transparent, 5m Kit instructions: CAT820 / 860, electronics compartment	71222222
220	CAT820 kit: housing cover Kit instructions: CAT820 / 860, electronics compartment	71218552
221	CAT820 kit: CPU module Kit instructions: CAT820 / 860, electronics compartment	71218553
222	CAT820 kit: heater, complete Kit instructions: CAT820 / 860, electronics compartment	71218554
224	CAT820 kit: upgrade set for compressed air rinsing CAT820 instruction kit: compressed air rinsing	71229925
238	CAT810/820 kit: PU hose, 4 mm, black, 5m Kit instructions: CAT810	71235288
244	Kit CAT820/860: complete filter 0.1 µm ▪ Ceramic filter cartridge 0.1 µm and filter holder ▪ Kit instructions: CAT8xx filter	71241492
244	Kit CAT820/860: complete filter 0.4 µm ▪ Ceramic filter cartridge 0.4 µm and filter holder ▪ Kit instructions: CAT8xx filter	71374136
247	CAT820/860 kit: T-sensor (1 pc.) Kit instructions: CAT820 / 860, electronics compartment	71247278
248	CAT820 kit: CPU module, time-controlled Kit instructions: CAT820 / 860, electronics compartment	71247280
249	CAT820/860 kit: ceramic filter, PVC holder Kit instructions: CAT8xx filter	71222217
251	CAT8xx kit: compressor 230 V	71249987

Item no.	Description and contents	Order number Spare parts kit
	Kit CAT820: filter plate 0.04 mm PAN	71482285
	Kit CAT820: filter plate holder	71482277

Maintenance kit	Order number Spare parts kit
CAT820 kit: 3 year maintenance	71229924

13.2 Return

The product must be returned if repairs or a factory calibration are required, or if the wrong product was ordered or delivered. As an ISO-certified company and also due to legal regulations, Endress+Hauser is obliged to follow certain procedures when handling any returned products that have been in contact with medium.

To ensure the swift, safe and professional return of the device:

- Refer to the website www.endress.com/support/return-material for information on the procedure and conditions for returning devices.

13.3 Disposal

If required by the Directive 2012/19/EU on waste electrical and electronic equipment (WEEE), the product is marked with the depicted symbol in order to minimize the disposal of WEEE as unsorted municipal waste. Do not dispose of products bearing this marking as unsorted municipal waste. Instead, return them to Endress+Hauser for disposal under the applicable conditions.

14 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.

Post holder kit
- For securing the sample preparation to horizontal and vertical posts and pipes
- Order No. 71096920

Kit CAT820/860: compressor 230 V
Order No. 71249987

The order numbers for accessories for the Flexdip CYA112 assembly can be found in TI00432C.

CYY101
- Weather protection cover for field devices
- Absolutely essential for field installation
- Material: stainless steel 1.4301 (AISI 304)
- Order No. CYY101-A

14.1 Cleaner for hoses and filter CY820

Cleaning concentrates to clean the hoses of the sample preparation system and the sample collecting vessel
- Base cleaner, concentrate 1 l (33.81 fl.oz.), Order No. CY820-1+TA
- Acid cleaner, concentrate 1 l (33.81 fl.oz.), Order No. CY820-1+T1
- Oxidizing cleaning solution, concentrate 1 l (33.81 fl.oz.), Order No. CY820-1+UA

15 Technical data

15.1 Temperature inputs

15.1.1 Type of input

Pt1000

15.1.2 Accuracy

±2.5 K

15.2 Power supply

15.2.1 Electrical connection

See the "Electrical connection" section

15.2.2 Supply voltage

NOTICE

The device does not have a power switch

- ▶ Provide a protected circuit breaker in the vicinity of the device at the place of installation.
- ▶ The circuit breaker must be a switch or power switch, and must be labeled as the circuit breaker for the device.
- ▶ At the supply point, the power supply for the 24 V versions must be isolated from dangerous live cables by double or reinforced insulation.

Version with Memosens technology, not heated:
Power supply via Liquiline System CA80

Version with Memosens technology and housing or hose heating:
100 to 120/200 to 240 V_{AC} ±10 %, 50/60 Hz

A supply voltage of 200 to 240 V_{AC} or 100 to 120 V_{AC} is required to install heated hoses. It is not possible to install heated hoses with the 24 V version.

Time-controlled version:

- The power supply requires an external supply point 12 W for 24 V
- Heaters via CA71 analyzer, 100 to 200/200 to 240 V_{AC} ±10 %, 50/60 Hz with connection kit CA71 for heated hose version

The power consumption of the CA71 analyzer increases accordingly. On account of the power consumption, it is not possible to use the connection kit CA71 for heated hose version with module CA71 Modbus RS485.

15.2.3 Cable entries

Depending on order version:

- 2 x M32 cable gland (assigned internally)
- 2 x M20 cable gland (1 x assigned internally)
  M20 x 1.5 mm / NPT1/2" / G1/2
- 1 x M12 (temperature sensor, optional)

Permitted cable diameter:
M20 x 1.5 mm: 7 to 13 mm (0.28 to 0.51 in)

15.2.4 Power consumption of

- Maximum 12 W at 24 V
- Maximum 85 VA (with 5 m (16.4 ft) heating line) + 20 VA (with housing heating)

15.2.5 Fuse

5x20 mm, 250 V, 3.15 A slow-blow (T3.15A)

15.3 Performance characteristics

15.3.1 Filtrate quantity

Version with Memosens technology:
- 5.5 to 16.5 ml/min
- Factory setting: 8.25 ml/min

Version with time control function:
- 4.7 to 11 ml/min
- Factory setting: 6.6 ml/min

All the values have been determined with new filters.

15.3.2 Suction height of peristaltic pump

Max. 5 m (16 ft)

15.4 Environment

15.4.1 Ambient temperature

Unheated
5 to 50 °C (41 to 122 °F)

Heated
−20 to +50 °C (−4 to +122 °F)

15.4.2 Storage temperature

−20 to 60 °C (−4 to 140 °F)

15.4.3 Humidity

10 to 95 %, non-condensing

15.4.4 Degree of protection

IP67

15.4.5 Electromagnetic compatibility

Interference emission and interference immunity as per EN 61326-1:2006, class A for industrial sectors

15.4.6 Electrical safety

IEC 61010-1, Class I equipment
Low voltage: overvoltage category II
Environment < 2000 m (< 6562 ft) above MSL

15.4.7 Pollution degree

The product is suitable for pollution degree 4.

15.5 Process

15.5.1 Sample temperature

4 to 40 °C (39 to 104 °F)

15.5.2 Consistency of the sample

TS < 8 g/l

15.5.3 pH value of the sample

pH 4 to 14

15.5.4 Salt content of the sample

NaCl concentration < 10,000 mg/l (ppm)

15.5.5 Process pressure

Unpressurized

15.5.6 Compressed air

2 to 4 bar (29 to 58 psi)

15.5.7 Compatible compressors

Configurable compressor (required pressure: 4 bar (58 psi))

Recommended specifications:

Suction capacity	> 95 l/min (25.1 gal/min)
Filling capacity	> 50 l/min (13.2 gal/min)
Vessel volume	> 5 l (1.32 gal)

15.6 Mechanical construction

15.6.1 Dimensions

--> "Installation" section

15.6.2 Weight

Approx. 2.5 kg (5.51 lb), depending on version

15.6.3 Materials

Housing material	
Housing base	PC-FR
Display cover	PC-FR
Housing seal	EPDM

Parts in contact with medium	
Ceramic filter	Al_2O_3, coated
Plate filter	▪ Plate: PVC ▪ Membrane: PVDF/PAN
Hose, sample preparation	PTFE
Couplings, peristaltic pump Nut + sleeve	PP
Hose, peristaltic pump	PHARMED
Coupling, solenoid valve and T-section	POM
Solenoid valve on sample collecting vessel	PVDF
Seal, solenoid valve	FKM
Seal, valve backflushing	EPDM
Seal, valve sample collecting vessel	FKM

Parts in contact with medium	
Solenoid valve for backflushing	PEEK
Hose from solenoid valve to sample collecting vessel	NORPRENE

15.6.4 Hoses and cables

If using an immersion tube 2 400 mm (94.5 in), select a filter-to-pump hose with a length of 5 m (16.4 ft).

Hose, filter to pump	
Permitted hose lengths	▪ 3 m (9.8 ft) ▪ 5 m (16.4 ft)
Spiral hose	▪ PVC material ▪ OD 21.6 mm (0.85 in) ▪ ID 16 mm (0.63 in)
Sample hose 1 / 2	▪ PTFE material ▪ OD 4 mm (0.16 in) ▪ ID 2 mm (0.08 in) ▪ Color: blue/black
Heated version	Hose heater: 115 V/230 V (connection in sample preparation system) Heating capacity 17 Watt per meter, self-limiting

Hose, pump to analyzer	
Permitted hose lengths	▪ 2 m (6.6 ft) ▪ 5 m (16.4 ft) ▪ 10 m (32.8 ft) ▪ 15 m (49.2 ft) ▪ 20 m (65.6 ft) ▪ 30 m (98.4 ft)
Spiral hose	▪ PVC material ▪ OD 24.6 mm (0.97 in) ▪ ID 19 mm (0.75 in)
Memosens cable	
Sample hose 1 / 2	▪ PTFE material ▪ OD 4 mm (0.16 in) ▪ ID 2 mm (0.08 in) ▪ Color: blue/black
Heated version	Hose heating: 115 V/230 V (connection to CA80 or CA71; in the case of CA71, connection kit for CA71 heated hose version required) Heating capacity 17 Watt per meter, self-limiting

Compressed air hoses for optional compressed air cleaning	
Outer diameter	6 mm (0.24 in)
Permitted hose lengths	▪ 5 m (16.4 ft) (included in the delivery) ▪ 10 m (32.8 ft) ▪ 15 m (49.2 ft) ▪ 20 m (65.6 ft) ▪ 30 m (98.4 ft) ▪ 50 m (164.0 ft)

Index

A
Accessories 42

C
Cables
  Connection 27
Check
  Function 31
  Installation 25, 31
Cleaning
  Filter 36
Cleaning agent 36
Commissioning 31
Compressed air
  External 24
Connection
  Electrical 26

D
Description
  Product 8
Designated use 6
Diagnostics 34
Dimensions 11
Disassembly 18
Disposal 41
Document
  Function 4
Document function 4

E
Electrical connection 26

F
Filter
  Cleaning 36
  Replacement 38
Filter in the process
  Mounting 19
Function check 31
Fuse 44

H
Hoses
  Connection 27

I
Incoming acceptance 9
Installation
  Check 25
Installation check 31
Installation conditions 11

M
Maintenance 35
Mounting
  As a fixed installation with immersion tube 20
  Filter in the process 19
  On a chain retainer 21
  Sample preparation 14
  With float 23
Mounting plate 13

N
Nameplate 9

O
Operation 32
Operation options 30
Operational safety 6

P
Performance characteristics 44
Post mounting 15
Power consumption 44
Product description 8
Product identification 9
Product safety 7
Pulse/pause interval 32
Pump
  Manual control 32
  Selecting the pulse/pause interval 32
Pump head
  Replacement 37
Pump hose
  Replacement 37

Q
Quick fastener 23

R

Rail mounting 16
Repair 39
Replacement
Filter 38
Pump head 37
Pump hose 37
Requirements for personnel 6
Return 41

S

Safety
Operational 6
Product 7
Workplace safety 6
Safety instructions 6
Sample preparation
Mounting 14
Sample pump
Selecting the pulse/pause interval 32
Scope of delivery 10
Setup
Time-controlled version 32
Version with Memosens technology 32
Spare parts 39
Spiral hose
Structure 29
State-of-the-art technology 7
Structure
Spiral hose 29
Supply voltage 43
Symbols 4

T

Technical data
Environment 45
Mechanical construction 46
Power supply 43
Process 45
Technical personnel 6
Troubleshooting 34

U

Use
Designated 6

W

Wall mounting 17
Warnings 4
Weather protection cover 13
Workplace safety 6

www.addresses.endress.com

Endress+Hauser

People for Process Automation