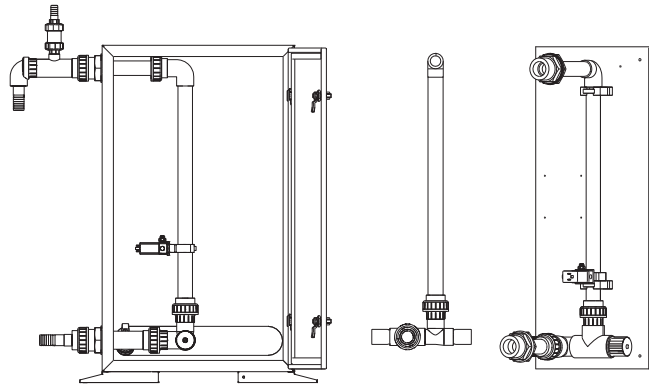


# Operating Instructions

## Liquiline SystemCAT810

Automatic sample preparation system for supplying process measuring devices with filtered samples from pressure pipes





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# 1 Document information

## 1.1 Document function

### 1.1.1 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.



## 1.2 Warnings

Structure of information	Meaning
 <b>Causes (/consequences)</b> Consequences of non-compliance (if applicable) ► Corrective action	This symbol alerts you to a dangerous situation. Failure to avoid the dangerous situation <b>will</b> result in a fatal or serious injury.
 <b>Causes (/consequences)</b> Consequences of non-compliance (if applicable) ► Corrective action	This symbol alerts you to a dangerous situation. Failure to avoid the dangerous situation <b>can</b> result in a fatal or serious injury.
 <b>Causes (/consequences)</b> 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.
 <b>Cause/situation</b> Consequences of non-compliance (if applicable) ► Action/note	This symbol alerts you to situations which may result in damage to property.

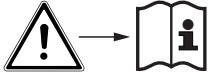
## 1.3 Symbols used

### 1.3.1 Symbols

Symbol	Meaning
	Additional information, tips
	Permitted or recommended
	Not permitted or not recommended
	Reference to device documentation
	Reference to page

Symbol	Meaning
	Reference to graphic
	Result of a step


### 1.3.2 Symbols at the device

Symbol	Meaning
	Reference to device documentation

## 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.
- Measuring point faults may be repaired only by authorized and specially trained personnel.

 Repairs not described in the Operating Instructions provided may only be carried out directly by the manufacturer or by the service organization.

### 2.2 Designated use

The Liquiline System CAT810 sample preparation system is designed to automatically supply process measuring devices with filtered sample from pressure pipes (see Technical data).

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 Occupational safety

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

- Installation guidelines
- Local standards and regulations
- Regulations for explosion protection

### 2.4 Operational safety

1. Before commissioning the entire measuring point, verify that all connections are correct. Ensure that electrical cables and hose connections are undamaged.
2. Do not operate damaged products, and safeguard them to ensure that they are not operated inadvertently. Label the damaged product as defective.
3. If faults cannot be rectified:  
Take the products out of operation and safeguard them to ensure that they are not operated inadvertently.

## **2.5 Product safety**

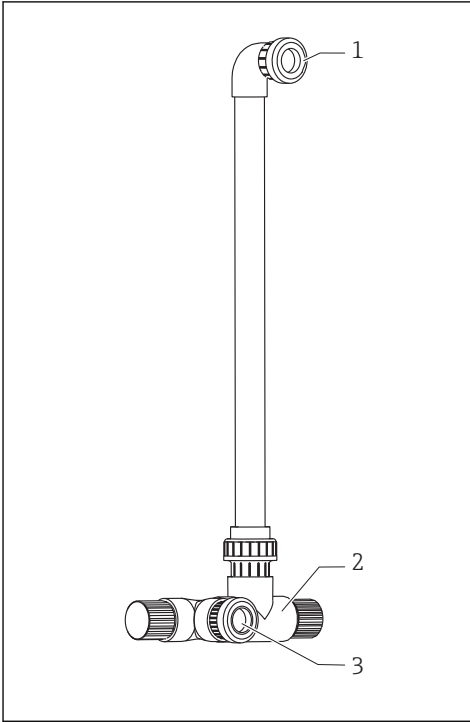
### **2.5.1 State of the art**

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 European standards have been observed.

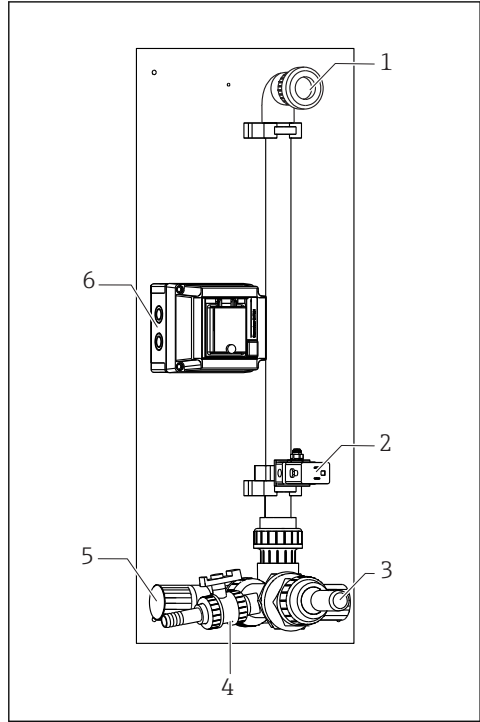
## **3 Product description**

A complete sample preparation system consists of:

- Liquiline System CAT810 sample preparation system
- Compressed-air or water cleaning (optional) for extended filter maintenance intervals



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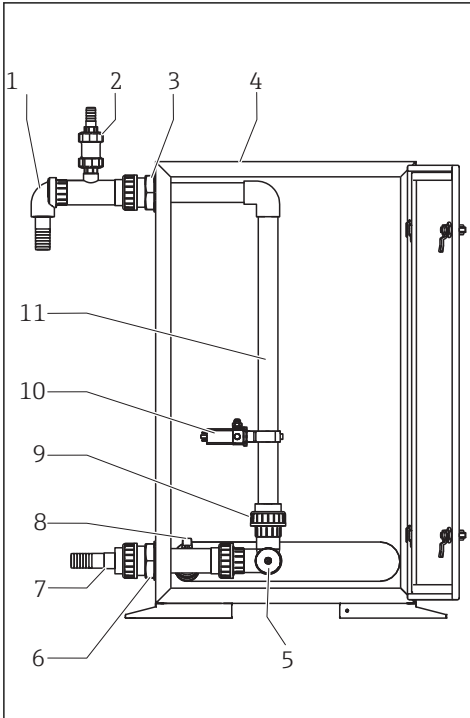
**1** CAT810, basic version

- 1 Outlet
- 2 Filter unit
- 3 Inlet

**2** CAT810 installed on a mounting plate with cleaning valve and drain valve as order options

- 1 Outlet
- 2 Cleaning valve
- 3 Inlet
- 4 Drain valve
- 5 Filter unit
- 6 Time control system (optional)





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- 3 CAT810 installed in the analyzer stand with cleaning valve, drain valve and vent valve as order options

- 1 Outlet pipe
- 2 Vent valve (optional)
- 3 Coupling 1 (outlet)
- 4 Analyzer stand
- 5 Filter unit
- 6 Coupling 2 (inlet)
- 7 Inlet pipe
- 8 Drain valve (optional)
- 9 Coupling 3 (mounting location baffle plate)
- 10 Cleaning valve (optional)
- 11 Ascending pipe for constant pressure

## 4 Incoming acceptance and product identification

### 4.1 Incoming acceptance

1. Verify that the packaging is undamaged.
  - ↳ Notify your supplier of any damage to the packaging.  
Keep the damaged packaging until the matter has been settled.
2. Verify that the contents are undamaged.
  - ↳ Notify your supplier of any damage to the delivery contents.  
Keep the damaged products until the matter has been settled.
3. Check the delivery for completeness.
  - ↳ Check it against the delivery papers and 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.  
The permitted ambient conditions must be observed (see "Technical data").

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 connection
  - Degree of protection
  - Ambient and process conditions
- Compare the data on the nameplate with your order.

#### 4.2.2 Product identification

##### Product page

[www.endress.com/cat810](http://www.endress.com/cat810)

##### 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 the product page for your product on the Internet.

2. At the bottom of the page, select the "Online Tools" link followed by "Check your device features".
  - ↳ An additional window opens.
3. Enter the order code from the nameplate into the search field, and then select "Show details".
  - ↳ You will receive information on each feature (selected option) of the order code.

### 4.3 Scope of delivery

The scope of delivery comprises:

- 1 Liquiline System CAT810 in the version ordered
- 1 copy of the Operating Instructions (in the desired language on selection of the order option)
- 1 CD-ROM with Operating Instructions in all available languages
- Optional accessories

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

### 4.4 Certificates and approvals

#### 4.4.1 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.

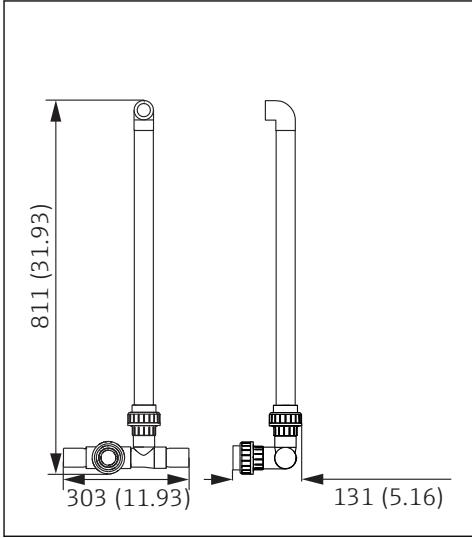
#### 4.4.2 EAC

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.

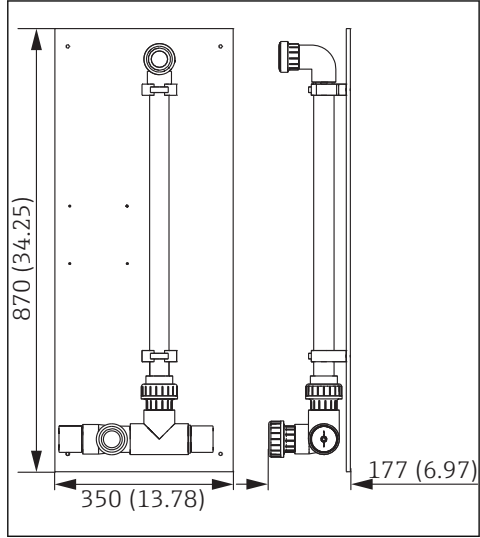
# 5 Installation

## 5.1 Installation conditions

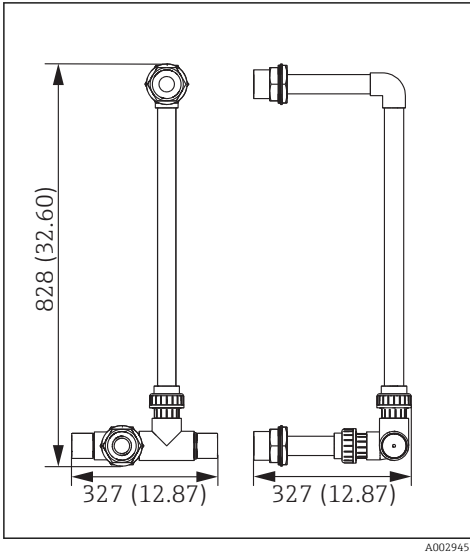
### 5.1.1 Dimensions



4 CAT810 basic version, dimensions in mm (in)

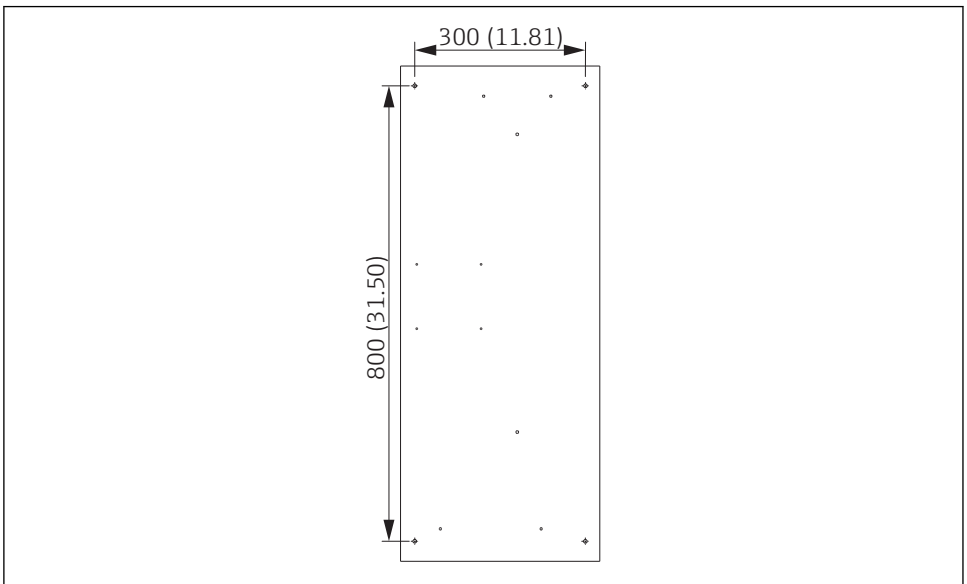


5 CAT810 version with mounting plate, dimensions in mm (in)



6 CAT810 version for analyzer stand, dimensions in mm (in)

### 5.1.2 Mounting plate



7 Mounting plate, dimensions in mm (inch)

Fasteners 4 x M 6.5

### 5.1.3 Orientation



Note the orientation of the sample preparation system.

To ensure that the medium reaches the analyzer without problems, there must be a water column of at least 72 cm. This is guaranteed with the vertical installation of the hydraulic pressure pipe for versions "prepared for analyzer stand (CA80)" and "installed on mounting plate". Take suitable measures when installing the "basic version" to ensure that there is a water column of at least 72 cm to guarantee sufficient hydraulic counterpressure.

The medium drain must be connected to one of the following process connections:  
See the "Process connections" section

The medium must be able to flow without pressure into an approved container.





Ensure that the medium can drain freely. Avoid siphon effects at the outlet. If this is not guaranteed use the optional vent valve.

## 5.2 Mounting the sample preparation system

### Mounting basic version

1. Connect the inlet of the CAT810 to the pressure pipe for the sample.
2. Connect the outlet of the CAT810 to an unpressurized drain that is approved for this purpose.
3. Connect the sample hose of the CAT810 to the collecting vessel of the downstream analyzer.

### Mounting pre-installed mounting plate

1. Mount the mounting plate on the wall using four screws as illustrated in the drawing (→  7,  13).
2. Connect the inlet of the CAT810 to the pressure pipe for the sample.
3. Connect the outlet of the CAT810 to an unpressurized drain that is approved for this purpose.
4. Connect the sample hose of the CAT810 to the collecting vessel of the downstream analyzer.

### Mounting in the analyzer stand (CA80)

1. Secure the CAT810 to the analyzer stand of the CA80 analyzer with couplings 1 +2.
2. Connect the inlet of the CAT810 to the pressure pipe for the sample. Use the flat seal supplied.
3. Connect the outlet of the CAT810 to an unpressurized drain that is approved for this purpose. Use the flat seal supplied.
4. Connect the sample hose of the CAT810 to the collecting vessel of the downstream analyzer.

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"))



You will need the post mounting kit (optional) for mounting on a pipe, post or railing.

### 5.2.1 Process connections

The sample preparation system is designed for mounting on pipework. Suitable process connections must be available for this.

The sample preparation system is available with the following process connections:

Inlet

- External thread G2", straight
- Hose nozzle OD 30 mm, straight
- Adhesive fitting, ID 40 mm, straight

Procedure

- External thread G2", straight
- Hose nozzle OD 30 mm, 90°
- Adhesive coupling, ID 40 mm, 90°



### 5.2.2 Mounting adhesive fittings

Proceed as follows to attach the adhesive couplings:

1. Clean the surfaces to be glued (exterior pipe end, sleeve or internal angle piece) with the cleaning cloth.
2. Allow the cleaned surfaces to dry for approx. 5 minutes.
3. Apply the glue evenly (closed adhesive layer) to the adhesive surfaces (first sleeve, then pipe).
4. Join the parts together immediately (screw them together as far as possible).
5. Remove any surplus glue.
6. Allow the glued parts to harden for at least 24 hours before exposing the system to sample.

### 5.2.3 Mounting baffle plates

Three baffle plates with apertures of different sizes (15 mm, 17 mm and 19 mm) are included in the delivery. These are used to create the backpressure needed to pump the sample through the filter.

1. Insert the baffle plate with the largest aperture (19 mm) into coupling 3 (mounting location baffle plate) (→  3,  9).
  - ↳ If sufficient medium is pumped in the test run, no additional measures are needed.
2. If too little medium is pumped, insert a baffle plate with a smaller aperture (15 mm or 17 mm) .

## 5.3 Cleaning valve (optional)

### CAUTION

#### **An incorrect connection can cause injuries and damage the device**

- ▶ Connect a pressure regulator upstream if the water or air pressure can rise to above 5 bar (72.5 psi) (even for very short periods).

The cleaning valve enables the filter to be backflushed with water or compressed air. The automatic backflushing of the filter extends the intervals for manual filter cleaning.

### 5.3.1 External water connection

Prerequisites:

- Water pressure of 2.0 to 5.0 bar (29.0 to 72.5 psi); but at least 0.5 bar (7.3 psi) > process pressure
- Drinking water quality, free from particles
- Connection: hose nozzle, OD 12 mm, secure hose with worm drive hose clip

 When installing the external water connection, use a backflow valve to prevent the wastewater from flowing back into the freshwater system.

Set the response pressure as a function of the applied process pressure.

### 5.3.2 External compressed air connection

Prerequisites:

- Air pressure of 2.0 to 5.0 bar (29.0 to 72.5 psi); but at least 0.5 bar (7.3 psi) > process pressure
- Air must be filtered (40 µm) and free from water and oil
- No continuous air consumption
- Connection: hose nozzle, OD 12 mm, secure hose with worm drive hose clip

## 5.4 Post-installation check

- Check that all connections have been established correctly.
- After installation, check the sample preparation system and hoses for damage.
- After mounting, check all the connections to ensure they are secure and leak-tight.
- Ensure that the hoses cannot be removed without force.
- Ensure that the supply voltage matches the voltage indicated on the nameplate (version with cleaning valve or time control)
- Ensure that the suction line and outlet are connected without siphoning effects and that the medium can drain freely.



## 6 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.
- ▶ The customer must provide a protected circuit breaker in the vicinity of the device.
- ▶ The circuit breaker must be a switch or power switch, and you must label it 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 ground connection must be made before all other connections. Danger may arise if the protective ground is disconnected.



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#### **8** *Wiring diagram for cleaning valve at the Liquiline System CA80*

- 1 *Supply voltage 115/230 VAC for cleaning valve or time control for cleaning valve*
- 2 *Are not used*

- ▶ Connect the power supply to terminals L1, N and PE (= mains).



For more information on the electrical connection, please refer to BA01240C.

## 7 Operation

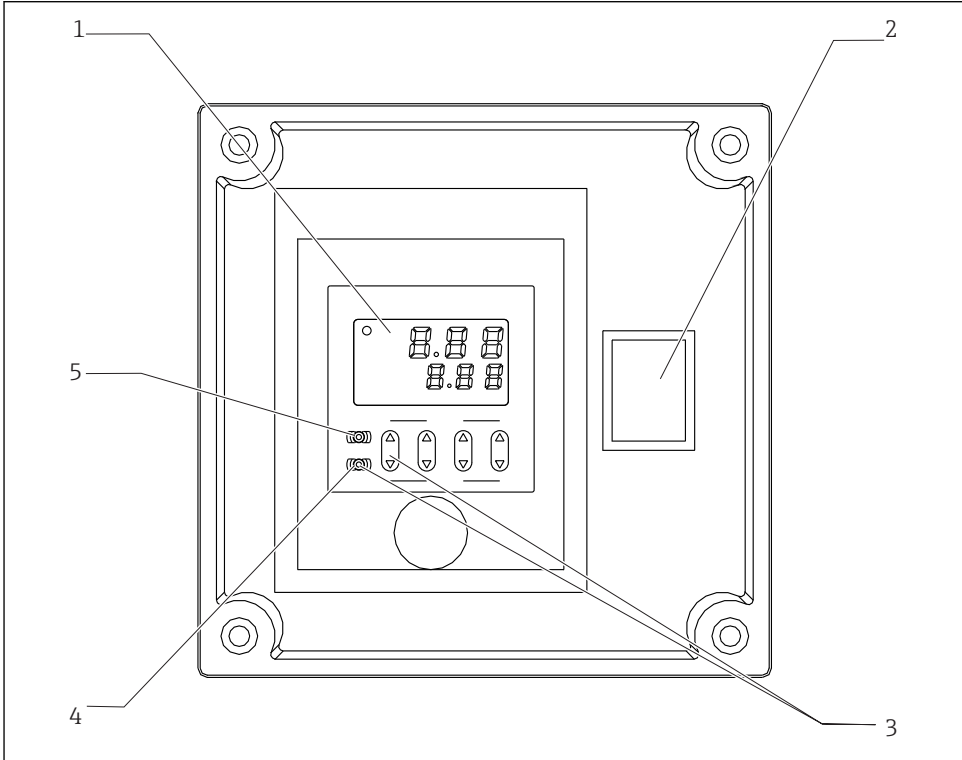


The operation of a Liquiline System CAT810 with an analyzer is possible only in combination with a sample collecting vessel.

## 7.1 Setup of the version with cleaning valve

The sample preparation menu is configured via the display and operating elements of a Liquiline System CA80 analyzer. For more information please refer to documentation BA01240C.

## 7.2 Setup of the version with time control



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### 9 Display and operating elements

- 1 Display
- 2 Power switch
- 3 LOCK function (press both keys at the same time)
- 4 SET button
- 5 RESET button

You can use the timer to configure the flushing interval and the duration of the flushing process. The **flushing interval** is the time between two flushing processes (from the end of the last to the start of the next flushing process). The three-way valve is open between the flushing processes. Sample flows across the filter to the collection vessel or the analyzer.

The **flushing duration** is the time during which the solenoid valve (right) opens for the supply of flushing medium. This initiates the backflushing process. Any residues on the filter are removed and flushed away. The left-hand side of the solenoid valve is closed during this time. No sample is processed.



The timer allows the user to set several modes that are not required. Therefore do not change the mode setting once selected!

Two time settings (flushing interval and flushing duration) can be configured in Pu-b mode. The switching operation is carried out without delay in accordance with the set times.

### 7.2.1 Programming default parameters

The following table provides an overview of the configuration options.

Parameters	Configuration options (recommended setting in bold)							Note
Mode	Pu-A, <b>Pu-b</b> , Pu-c, In-A, In-b, In-c							Use only Pu-b mode. It is only possible to set two times in this mode.
Time range	0.01 to 99.99 s 0.1 to 999.9 s 1 to 9999 s 0:01 to 99:59 min:s <b>0.1 to 999.9 min</b> 0:01 to 99:59 h:min 0.1 to 999.9 h 1 to 9999 h	DIP switch no.						The timer is set with the combination of DIP switch 1-3 and 6-8 on the side of the timer housing.
		1	2	3	6	7	8	
		On	On	On	On	On	On	
		Off	Off	Off	Off	Off	Off	
		On	Off	Off	On	Off	Off	
		Off	On	Off	Off	On	Off	
		On	On	Off	On	On	Off	
		Off	Off	On	Off	Off	On	

### Configuring the default parameters

1. Set the power switch to "1" (power supply on).
2. Press "SET" and the 1st rocker key (top or bottom) at the same time until the previously used mode appears (on the bottom line).
3. You can select a different mode with the 4th rocker key. You should only do this if Pu-b has not been previously selected.
4. Press "RESET". This will save the selected mode.

## Changing the time range

1. Set the power switch to "0" (off).
2. Set DIP switches 1-3 and 6-8 on the timer housing to the desired combination (= time range, see table above).
3. Reset the power switch to "1" (on).


### 7.2.2 Configuring the flush interval and flush duration

You can also change the times for the flushing interval and the flushing duration during operation (power supply "1").

#### Recommended settings:

Discharge measurement:

Flushing interval 30 minutes, flushing duration 10 seconds

 Select a suitable flushing interval to ensure that all of the flushing water is replaced by a fresh sample before the next analysis. Between backflushing the filter and the next sampling process there should be a minimum interval of two minutes to exclude the possibility of unwanted dilution.

#### Configuring the flush interval

1. If "LOCK" lights up on the display, press "SET" and the first rocker key at the same time.
2. Press "SET" until time **T1** (flushing interval) is shown on the display.
3. Use all 4 rocker keys to set the time. Each rocker key changes one digit in the time display.
4. After setting the last digit, save the value for the flushing interval by pressing "RESET".

#### Configuring the flush duration

1. If "LOCK" lights up on the display, press "SET" and the first rocker key at the same time.
2. Press "SET" until time **T2** (flushing duration) is shown on the display.
3. Use all 4 rocker keys to set the time. Each rocker key changes one digit in the time display.
4. After setting the last digit, save the value for the flushing duration by pressing "RESET".

## 8 Maintenance

### WARNING

#### Electrical voltage

Risk of serious or fatal injury

- ▶ Make sure the device is de-energized before you open it.

**⚠ CAUTION****Risk of injury/infection from escaping medium or uncleaned filters**

- ▶ Before carrying out any maintenance work, ensure that the automatic cleaning function is deactivated.
- ▶ Before carrying out any maintenance work, ensure that the sample line is depressurized, empty, and flushed.
- ▶ Clean the filter immediately after a sample has been taken; only store cleaned filters.

## 8.1 Cleaning

**⚠ CAUTION****Risk of injury from cleaning solutions**

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

**NOTICE****Cleaning agents not permitted**

Damage to the plastic surfaces

- ▶ 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 purposes.

### 8.1.1 Cleaning agent

The choice of cleaning agent depends on the degree and type of contamination. The most common types of contamination and the appropriate cleaning agents can be found in the following table.

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

### 8.1.2 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. High levels of contamination are removed 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.

## 9 Repairs

### 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.

### 9.1 Spare parts



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

Detailed information on the spare parts kits is available from the "Spare Part Finding Tool" on the internet at: [www.products.endress.com/spareparts\\_consumables](http://www.products.endress.com/spareparts_consumables)

Item No.	Description and contents	Order number Spare parts kit
209	CAT8xx kit: filter O-ring set (20 x) Kit instructions: CAT8xx filter	71222206
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
219	CAT8xx kit: PTFE hose, transparent, 5m Kit instructions: CAT820 / 860, electronics compartment	71222222
232	CAT810 kit: cleaning valve, 230 V Kit instructions: CAT810	71222225
233	CAT810 kit: cleaning valve, 115 V Kit instructions: CAT810	71222226
234	CAT810 kit: gauze filter holder, PVC Kit instructions: CAT810	71222228
236	Kit CAT810: 10 hose conn. G1/4", 90° Kit instructions: CAT810	71222236
237	CAT810 kit: control relay, 100-240 V AC Kit instructions: CAT810	71235287

Item No.	Description and contents	Order number Spare parts kit
238	CAT810/820 kit: PU hose, 4 mm, black, 5m Kit instructions: CAT810	71235288
239	CAT810 kit: sieve filter 50 µm, complete Kit instructions: CAT810	71242664
251	CAT8xx kit: compressor 230 V	71249987

Maintenance kit	Order number Spare parts kit
CAT810 kit: 3 year maintenance	71242670

## 9.2 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 swift, safe and professional device returns, please read the return procedures and conditions at [www.endress.com/support/return-material](http://www.endress.com/support/return-material).

## 9.3 Disposal

The device contains electronic components and must therefore be disposed of in accordance with regulations on the disposal of electronic waste.

Observe the local regulations.



Always dispose of batteries in accordance with local regulations on battery disposal.

## 10 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 office.

CAT810 kit: inlet pipe with cock, basic, panel  
Order No. 71251165

CAT810 kit: inlet pipe without cock, basic, panel  
Order No. 71251167

CAT810 kit: vent valve, base, basic, panel  
Order No. 71251168

## 11 Technical data

### 11.1 Power supply

#### 11.1.1 Electrical connection of optional cleaning valve

See the "Electrical connection" section

#### 11.1.2 Supply voltage

- 100 to 120 V AC / 200 to 240 V AC
- 50 or 60 Hz

#### NOTICE

#### The device does not have a power switch

- ▶ The customer must provide a protected circuit breaker in the vicinity of the device.
- ▶ The circuit breaker must be a switch or power switch, and you must label it as the circuit breaker for the device.

#### 11.1.3 Power consumption of optional cleaning valve

Max. 30 VA

### 11.2 Performance characteristics

#### 11.2.1 Sampling methods

Depending on version:

- Program-controlled ( Liquiline System CA80 control unit)
- Time-controlled



## 11.3 Environment

### 11.3.1 Ambient temperature range

+5 to +40 °C (41 to 104 °F)

### 11.3.2 Storage temperature

-20 to +60 °C (-4 to 140 °F)

### 11.3.3 Humidity

10 to 95%, not condensing

### 11.3.4 Degree of protection

IP65

### 11.3.5 Electromagnetic compatibility

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

### 11.3.6 Electrical safety

IEC 61010-1, Class I equipment

Low voltage: overvoltage category II

Environment < 2000 m (< 6562 ft) above MSL

### 11.3.7 Degree of contamination

The product is suitable for pollution degree 2.

## 11.4 Process

### 11.4.1 Sample temperature

4 to 40 °C (39 to 104 °F)

### 11.4.2 Process pressure

1.5 to 4.0 bar (21.76 to 58.01 psi)

### 11.4.3 Pressure for optional automatic cleaning

2.0 to 5.0 bar (29.0 to 72.5 psi); but at least 0.5 bar (7.3 psi) > process pressure

## 11.5 Mechanical construction

### 11.5.1 Dimensions

--> "Installation" section

### 11.5.2 Weight

Order version	Weight
Basic version	1 kg (2.2 lbs)
Installed on a mounting plate	4 kg (8.8 lbs)
Installed on a mounting plate, time control for cleaning valve	6 kg (13.2 lbs)
Prepared for a CA80 analyzer stand	2 kg (4.4 lbs)

### 11.5.3 Materials

Parts not in contact with medium	
Mounting plate	PVC

Parts in contact with medium	
Pipes	PVC
Cleaning valve Seal	PP EPDM
Drain valve	PVC
Glue	Tangit
Vent valve	PVC

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