Technical Information
Liquiline System CAT820

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



Control of sample conditioning by means of the Liquiline System CA80 or a time control system

Application

Liquiline System CAT820 enables the fully automatic collection and filtration of aqueous samples. Thanks to the modular concept, the sample preparation system can be adapted to various different process conditions. There are various filters and hose lengths available for this purpose. For installing the filter in the process medium, various assemblies are available as accessories. The heated version of the hoses and of the housing mean that the system can be used at temperatures as low as -20 °C.

The device is designed for use in the following applications:
- Communal and industrial wastewater treatment plants
- Surface waters
- Collection of aqueous samples from industrial processes

Your benefits

- Robust and reliable:
  - Peristaltic pump, sampling takes place free from interference
  - Optional compressed air cleaning system
  - Optional hose and housing heating system
- Simple and user-friendly:
  - Control via a CA80 analyzer
  - Alternatively via a time control function
  - Installation compatible with existing holders
- Cleaning and maintenance:
  Replacement of pump hoses and filter without using tools
- Flexible:
  - Modular filter system
  - Accessories for a range of installation conditions

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Function and system design

Function

A peristaltic pump is used to take the sample. The sample is drawn in via the filter element, filtered and fed to the analyzer. An optional cleaning valve enables backflushing of the filter unit with compressed air.

Measuring system

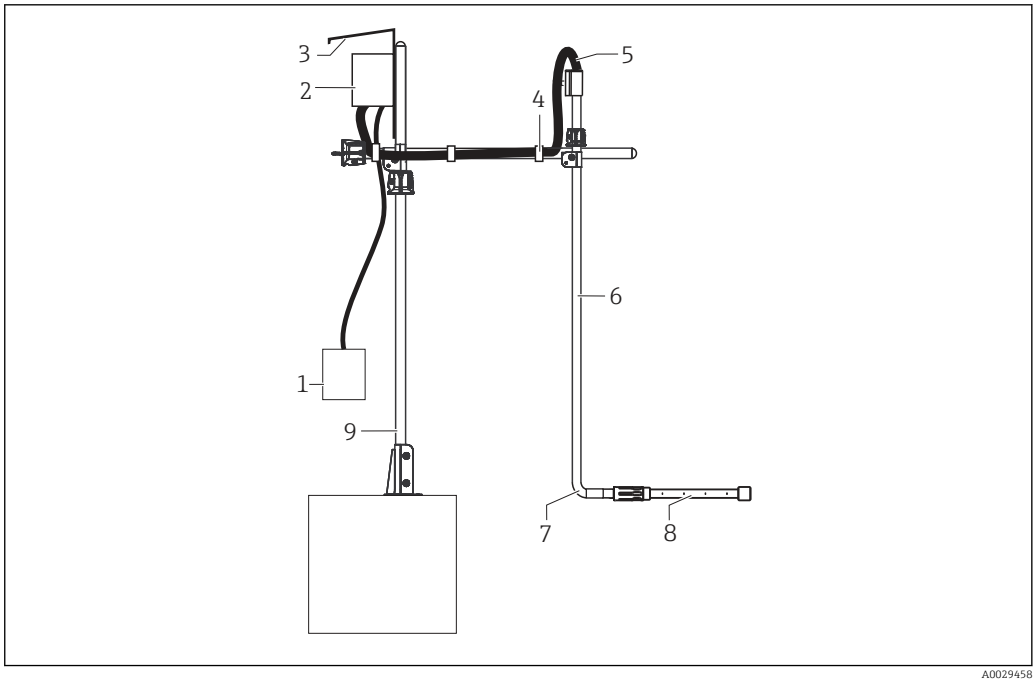
A complete sample conditioning system comprises:

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

Installation examples

Installation example 1: outlet measurement, CAT820 with Memosens technology

- Liquiline System CA80 analyzer
- Liquiline System CAT820 with Memosens technology, heated, with compressor and weather protection cover
- Filter cartridge, membrane, 0.1 µm, ceramic
- Immersion tube 1200 x 40 mm, stainless steel
- Connecting bracket G1, 90 °C, stainless steel
- Quick release fastener, filter, G1
- Hose, filter to pump, 3 m, heated
- Hose, pump to analyzer, 2 m, heated



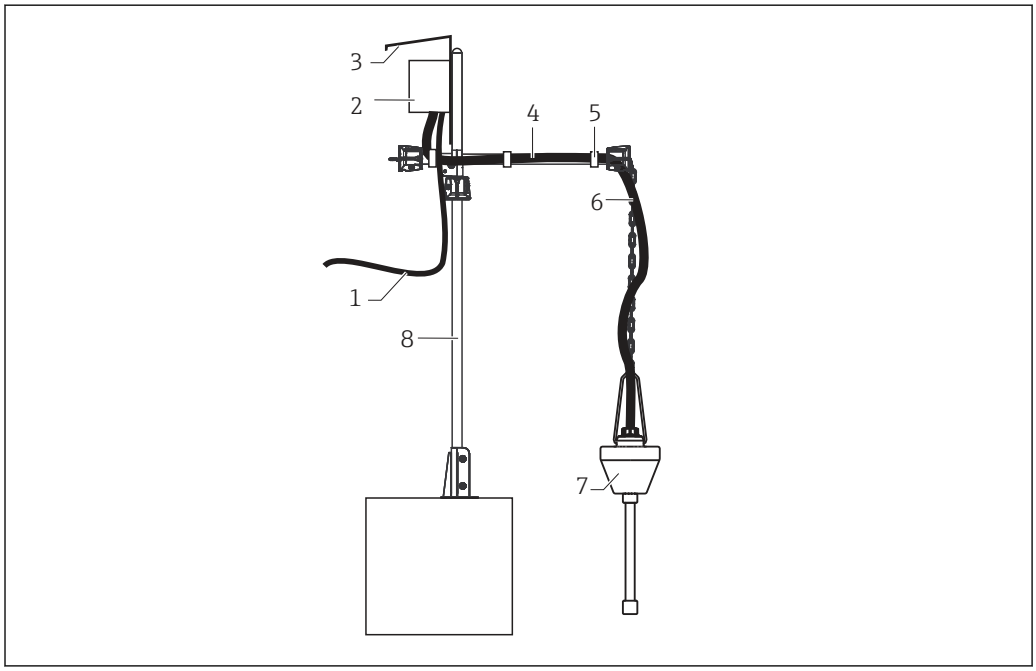
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1 Installation with Liquiline System CA80, CAT820 with Memosens technology, immersion tube, filter (ceramic) and compressor

1 *Compressor + compressed air hose*
2 *Liquiline SystemCAT820*
3 *Protective cover*
4 *Hook-and-loop tape*
5 *Hose, filter to pump, 3 m, heated*
6 *Immersion tube 1200 x 40 mm, stainless steel*
7 *Connecting bracket G1, 90°, stainless steel*
8 *Filter (ceramic) with quick release fastener*
9 *CYH112 holder (order no. 71079139)*

Installation example 2: measurement in the aeration basin, CAT820 with Memosens technology

- Liquiline System CA80 analyzer
- Liquiline System CAT820 with Memosens technology, heated, with compressed air connection for onsite compressed air line and weather protection cover
- Filter cartridge, membrane, 0.1 µm, ceramic
- Float, filter adapter
- Hose, filter to pump, 3 m
- Hose, pump to analyzer, 2 m

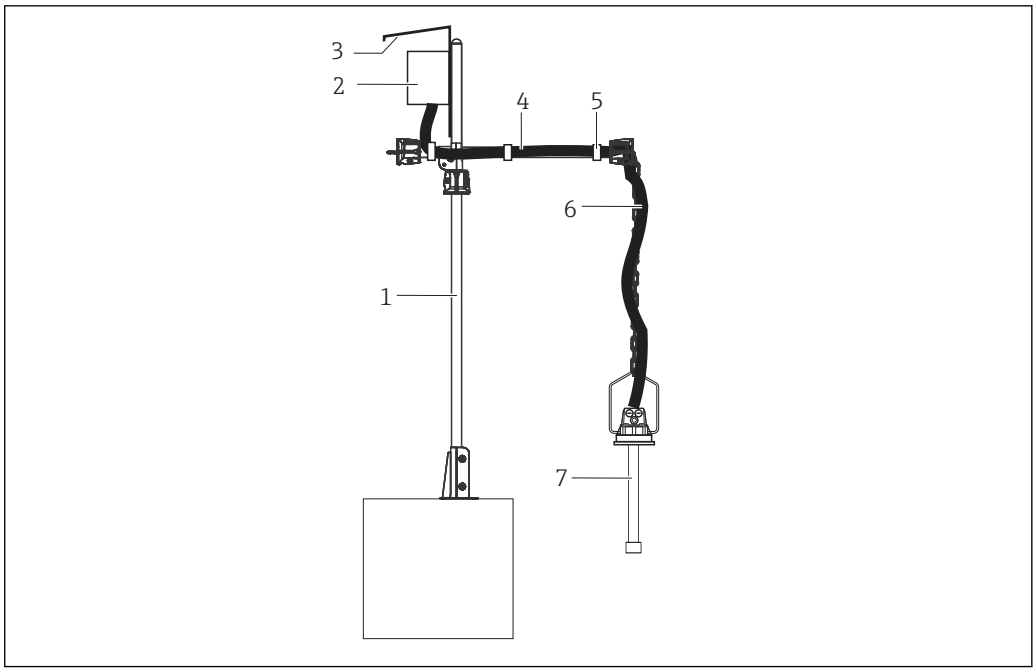


2 Installation with Liquiline System CA80, CAT820 with Memosens technology, float and filter (ceramic)

1 Compressed air connection for onsite compressed air line
2 Liquiline SystemCAT820
3 Protective cover
4 Hose, filter to pump, 3 m
5 Hook-and-loop tape
6 Chain
7 Filter (ceramic) with float, filter adapter
8 CYH112 holder (order no. 71079139)

Installation example 3: outlet measurement, CAT820 with Memosens technology

- Liquiline System CA80 analyzer
- Liquiline System CAT820 with Memosens technology, heated, with weather protection cover
- Filter cartridge, membrane, 0.1 µm, ceramic
- Chain retainer 600 x 40 mm, PVC, adapter G1
- Hose, filter to pump, 3 m, heated
- Hose, pump to analyzer, 2 m, heated

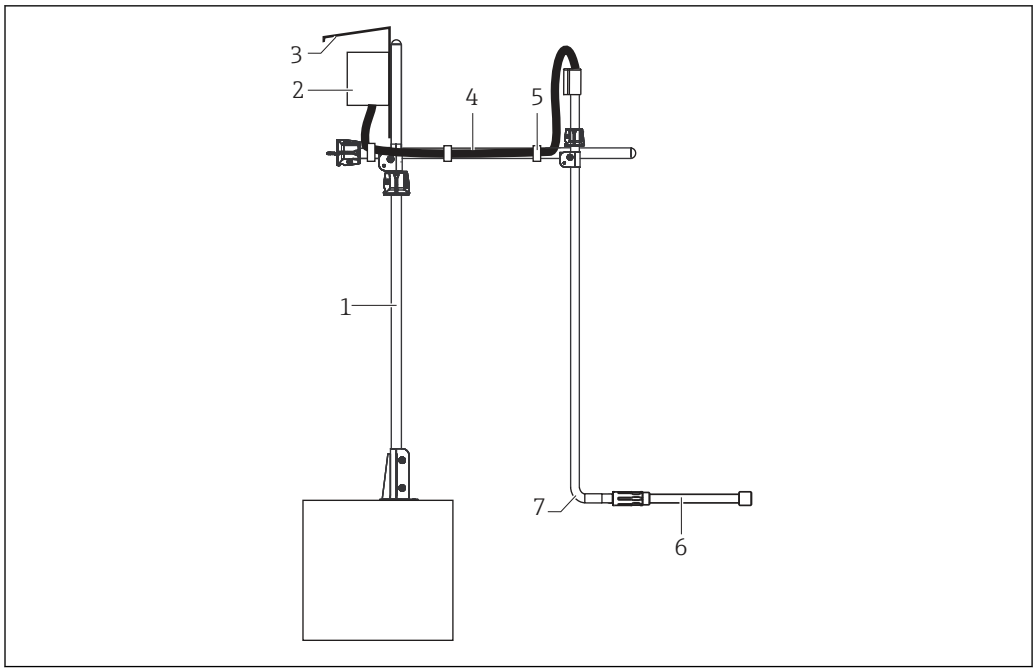


3 Installation with Liquiline System CA80, CAT820 with Memosens technology, chain retainer and filter (ceramic)

1 CYH112 holder (order no. 71079139)
2 Liquiline SystemCAT820
3 Protective cover
4 Hose, filter to pump, 5 m, heated
5 Hook-and-loop tape
6 Chain
7 Filter (ceramic) with chain retainer, 600 x 40 mm, PVC, CYA112 (order no.: 71079140)

Installation example 4: measurement in the aeration basin, CAT820, time-controlled

- Stamolys CA71 analyzer
- Liquiline System CAT820, time-controlled, heated, with weather protection cover
- Filter cartridge, membrane, 0.1 µm, ceramic
- Immersion tube 600 x 40 mm, stainless steel
- Quick release fastener, filter, G1
- Hose, filter to pump, 3 m, heated
- Hose, pump to analyzer, 2 m, heated
- Connection kit, CA71 heated hose version



4 *Installation with Stamolys CA71, CAT820 time-controlled with quick release fastener and filter (ceramic)*

1 CYH112 holder (order no. 71079139)
2 Liquiline SystemCAT820
3 Protective cover
4 Hose, filter to pump, heated
5 Hook-and-loop tape
6 Filter (ceramic) with quick release fastener, immersion tube 1200 x 40 mm, stainless steel
7 Connecting bracket G1, 90 °, stainless steel

Functioning with Memosens technology

The Memosens technology enables the following service and monitoring functions:
- Call up sample preparation system information
- Verification of digital communication between sample preparation and analyzer
- Leakage detection, housing
- Temperature control of the heating system (optionally available)
- Peristaltic pump and optional compressed air line controlled from the analyzer

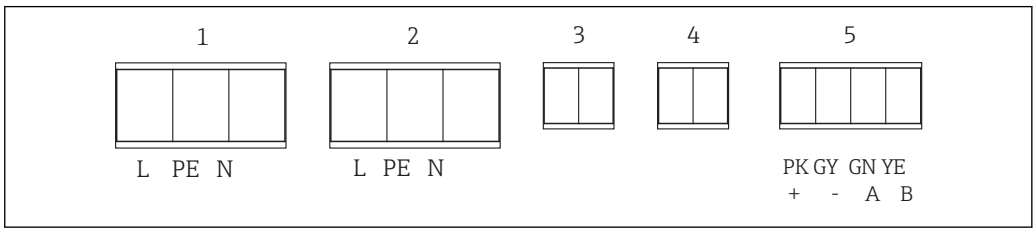
The Liquiline System CAT820 sample preparation system is controlled via the CA80 analyzer. The standard operating mode of the CAT820 is that it is controlled via the CA80 analyzer. The status LED for onsite control is off in this operating mode.

Functioning with time control system

The time-controlled Liquiline System CAT820 sample preparation system enables the configuration of different conveying intervals. For onsite operation, test functions for the peristaltic pump are stored in the device.

Equipment architecture

Terminal assignment



5 Terminal assignment

1 115/230VAC (for version with heater)
2 Hose heating, filter to pump
3 Shielding
4 Temperature sensor
5 Memosens

Communication and data processing

Controller

The Liquiline System CAT810 sample preparation system is controlled by a Liquiline System CA80. The sample preparation system is configured using the display and operating elements of the analyzer.

Dependability

Reliability thanks to Memosens technology

Memosens

Memosens makes your measuring point safer and more reliable:

- Non-contact, digital signal transmission enables optimum galvanic isolation
- Completely watertight
- Sensor can be calibrated in a lab, thus increasing the availability of the measuring point in the process
- Intrinsically safe electronics mean operation in hazardous areas is not a problem.
- Predictive maintenance thanks to recording of sensor data, e.g.:
  - Total hours of operation
  - Hours of operation with very high or very low measured values
  - Hours of operation at high temperatures
  - Number of steam sterilizations
  - Sensor condition

Maintainability

Modular design
The sample preparation system can be adapted to suit your needs:
- Upgrade from unheated to heated hoses and outdoor temperature sensor
- Upgrade of electronics module with time control system to electronics module with Memosens technology
- Upgrade with automatic compressed air cleaning (version with Memosens technology)
- Upgrade with housing heating

Please note that it is not possible to fit a CA71 analyzer with connection kit CA71 for heated hose version and Modbus RS485 at the same time.

Temperature inputs

Type of input

Pt1000

Accuracy

± 2.5 K

Power supply

Electrical connection of

--> For detailed wiring diagram, see Operating Instructions for the Liquiline System CAT820

Supply voltage

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.
- ▶ At the supply point, the power supply for the 24-volt 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

To install heated hoses, a supply voltage of 200 to 240 V AC or 100 to 120 V AC is required. It is not possible to install heated hoses with the 24-volt version.

Time-controlled version:
- Power supply from CA71 analyzer (1-channel version) or other 12 W power supply source at 24 V
- Heating from CA71 analyzer, 100 to 120/200 to 240 V AC ± 10 %, 50/60 Hz with connection kit CA71 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.

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")

Power consumption of

- Maximum 12 Watt for 24 V
- Maximum 85 VA (with 5 m heating cable) + 20 VA (with housing heater)

Fuse

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

Performance characteristics

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

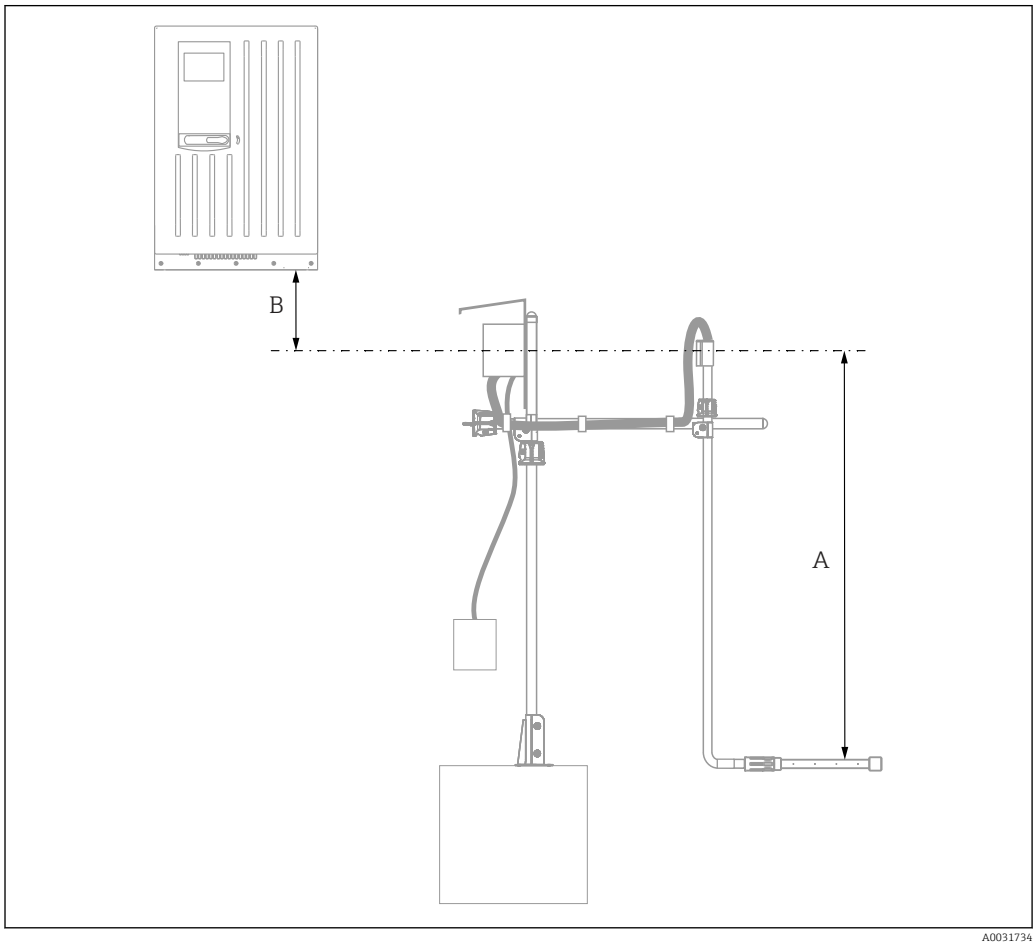
All the values have been determined with new filters.

Installation

Installation instructions

Suction height

The maximum permitted suction height is:



A0031734

Item number	permitted suction height
A	between filter and sample preparation: Max. 5 m (16.41 ft)
A+B	between filter and analyzer: ▪ max. total of 10 m (31.81 ft) ▪ however: A must **always be 5 m max.**, the following examples are possible: – A = 0.5 m, B = 9.5 m – A = 5 m, B = 5m

Environment

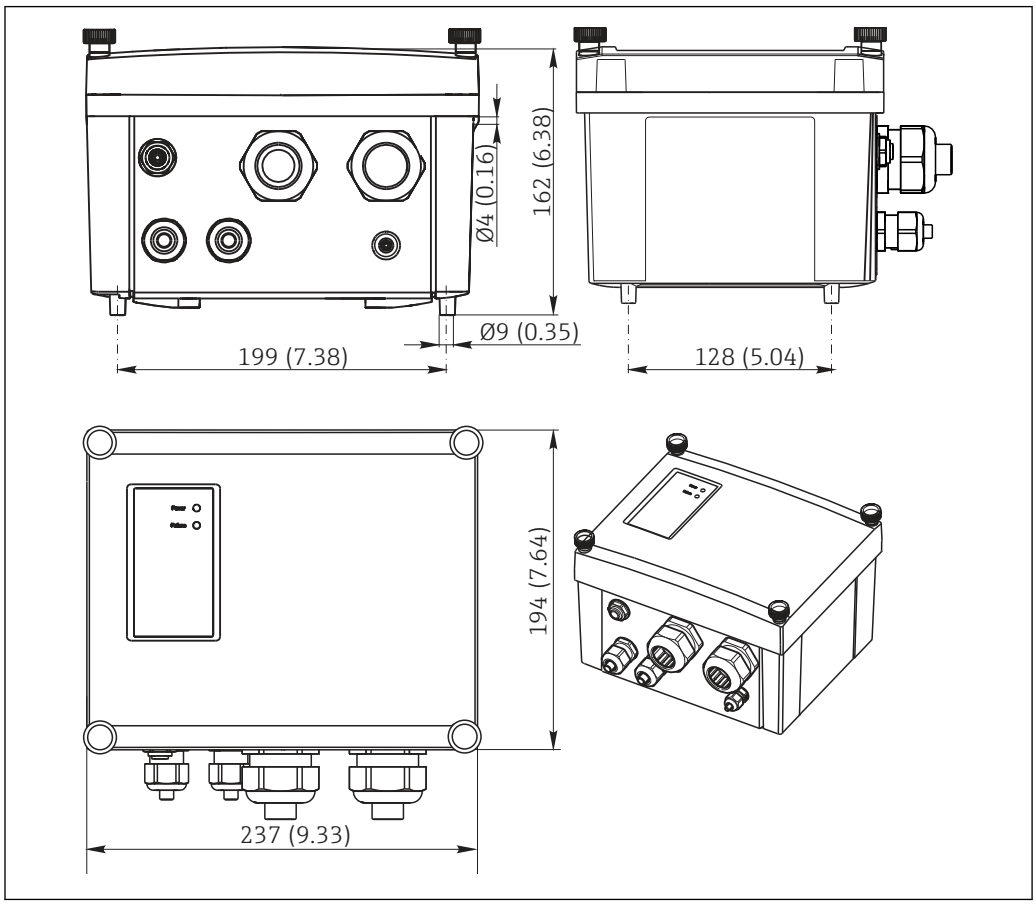
Ambient temperature range	Unheated +5 to +50 °C (41 to 122 °F) Heated -20 to +50 °C (-4 to +122 °F)
Storage temperature	-20 to +60 °C (-4 to 140 °F)
Humidity	10 to 95%, not condensing
Degree of protection	IP67
Electromagnetic compatibility	Interference emission and interference immunity as per EN 61326-1:2006, class A for industrial sectors
Electrical safety	IEC 61010-1, Class I equipment Low voltage: overvoltage category II Environment < 2000 m (< 6562 ft) above MSL
Degree of contamination	The product is suitable for pollution degree 4.

Process

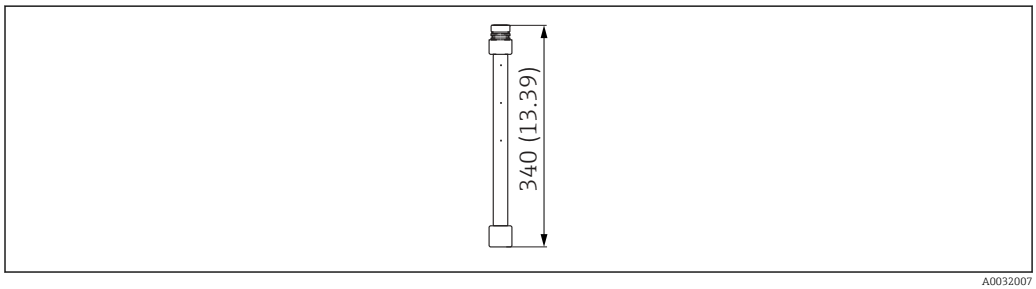
Sample temperature	4 to 40 °C (39 to 104 °F)
Consistency of the sample	TS < 8 g/l
pH value of the sample	pH 4 to 14
Salt content of the sample	NaCl concentration < 10,000 mg/l (ppm)
Process pressure	Unpressurized
Compressed air	2 to 4 bar (29 to 58 psi)

Mechanical construction

Dimensions

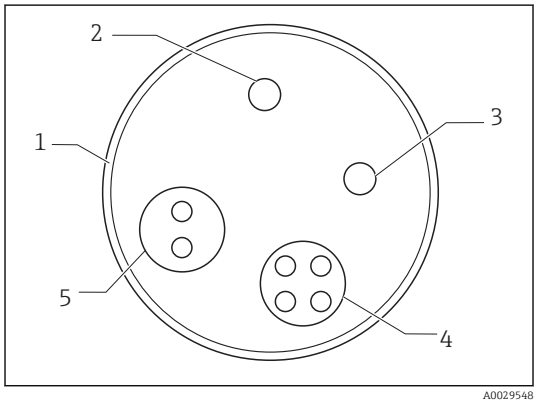


6 *Liquiline System CAT820, dimensions in mm (in)*



7 *Filter, dimensions in mm (in)*

Spiral hose



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

8

Weight

Approx. 2.5 kg (5.51 lbs), depending on the version

Materials

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

Parts in contact with medium	
Filter (ceramic)	Al_2O_3, coated
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
Solenoid valve for backflushing	PEEK
Hose from solenoid valve to sample collecting vessel	NORPRENE

Hoses and cables

Hose, filter to pump

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

If a 2400 mm immersion pipe is used, a 5 m hose must be selected from the filter to the pump.

Hose, pump to analyzer

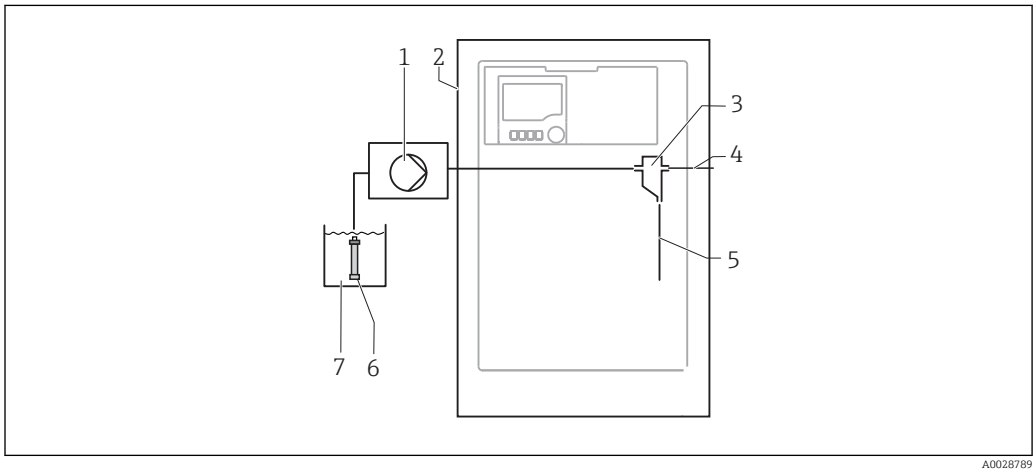
- Lengths: 2 m (6.6 ft), 5 m (16.4 ft), 10 m (32.8 ft), 15 m (49.2 ft), 20 m (65.6 ft), 30 m (98.4 ft)
- Spiral hose:
  - PVC material
  - OD 24.6 mm (0.97")
  - ID 19 mm (0.75")
- Memosens cable
- Sample hose 1 / 2:
  - PTFE material
  - OD 4 mm (0.16")
  - ID 2 mm (0.08")
  - Color: blue/black
- Heated version:
  - Hose heating: 115V/230V (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
- Permitted hose lengths: 5 m (16.4 ft)(included in 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)

Operability

Operating concept

Operation via the Liquiline System CA80

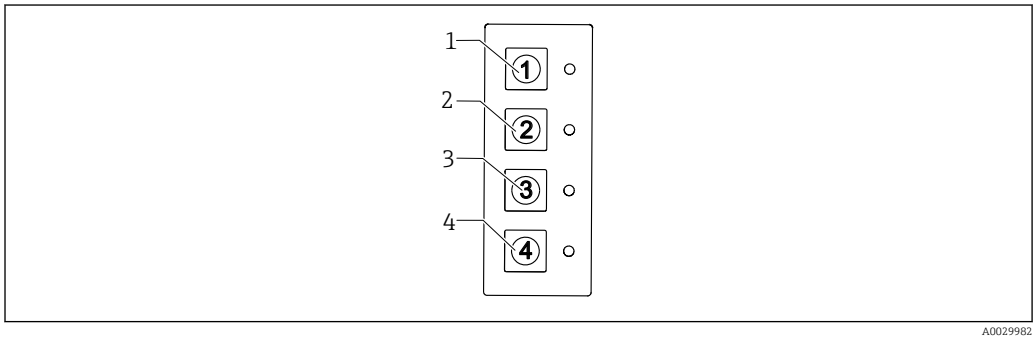


9 *Measuring system with Liquiline System CAT820*

1 *Pump*
2 *Liquiline System CA80*
3 *Sample collecting vessel*
4 *Sample collecting vessel overflow*
5 *Sample*
6 *Filter (ceramic)*
7 *Medium*

Local operation

Version with Memosens technology



Version with Memosens technology

1 Local control system
2 Sample pump forwards
Sample pump backwards (press for longer)
3 Backflush filter with air (order option)
4 Not assigned

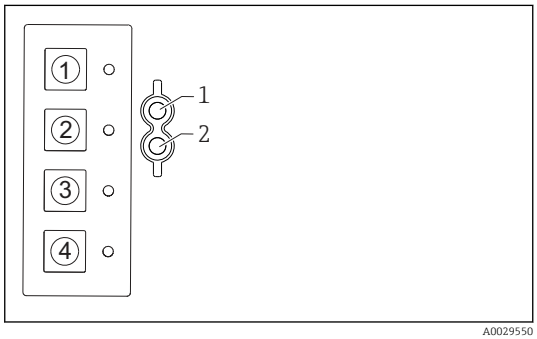
Version with time control function

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

Key assignment

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



1 *Green LED on: device in operation*
2 *Red LED on: fault, Category F diagnostic message*
Red LED flashing: Category M, C or S diagnostic message
(Messages are divided into different error categories in accordance with NAMUR NE 107)

Detailed diagnostic messages are displayed on the Liquiline System CA80.

Certificates and approvals

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.

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.

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.

Ordering information

Product page

www.endress.com/cat820

Product Configurator

On the product page there is a "Configuration" 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. To do so, click the "CAD" tab and select the desired file type using drop-down lists.

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)
- 1 CD-ROM with Operating Instructions in all available languages
- Optional accessories

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.

Device-specific accessories

Protective cover
- Absolutely essential if operating outdoors
- Order No. 51510040

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

Kit CAT820/860: ceramic filter, complete
Order No. 71241492

CA71 kit: CAT820 upgrade
Order No. 71236534

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

Quick release fastener, filter, G1
Order No. 71254159

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

Cleaner for hoses and filters 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

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