

Technical Information

Liquiline System CAT820

Automatic sample preparation system for supplying process measurement devices with filtered sample from sludge activation, secondary clarification or surface waters



Sample preparation controlled via Liquiline System CA80 or time-controlled

Application

The Liquiline System CAT820 enables fully-automated tapping and filtration of aqueous samples. The modular design of the sample preparation system means it can be easily adapted to suit your needs. Various filters and hose lengths are available for this purpose. Different assemblies are available as accessories for mounting the filter in the process medium. 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 sample preparation system is designed for use in the following applications:

- Municipal and industrial wastewater treatment plants
- Surface waters
- Taking 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
- Easy-to-use and user-friendly:
 - Controlled via an CA80 analyzer
 - Alternatively controlled via time function
 - Installation compatible with existing holders
- Cleaning and maintenance:
 - Pump hoses and filters easily replaced without tools
- Flexible:
 - Modular filter system
 - Accessories for different installation positions

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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	<p>The entire sampling system consists of the following:</p> <ul style="list-style-type: none"> ■ Liquiline System CAT820 sample conditioning ■ Controller with soft keys and status LEDs ■ Peristaltic pump ■ Membrane filtration or micro-filtration in the configuration ordered ■ Filter unit with filter and assembly in the configuration ordered ■ Flexdip CYH112 holder for securing the unit ■ 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 (to be ordered separately)
Installation example	<p>Installation example, outlet measurement, CAT820 with Memosens technology</p> <ul style="list-style-type: none"> ■ 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 <p>Installation example, measurement in the aeration basin, CAT820 with Memosens technology</p> <ul style="list-style-type: none"> ■ 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 <p>Installation example, outlet measurement, CAT820 with Memosens technology</p> <ul style="list-style-type: none"> ■ 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 <p>Installation example, measurement in the aeration basin, CAT820, time-controlled</p> <ul style="list-style-type: none"> ■ 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

**Operation with
Memosens technology**

Memosens technology enables the following service and monitoring functions:

1. Call up sample preparation system information
2. Verification of digital communication between sample preparation and analyzer
3. Leakage detection, housing
4. Temperature control of the heating system (optionally available)
5. Peristaltic pump and optional compressed air line controlled from the analyzer

The Liquiline System CAT820 for sample preparation is controlled via the CA80 analyzer.

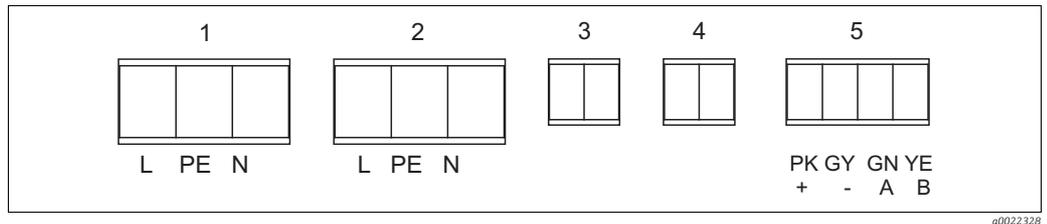
The standard operating mode of the CAT820 is that it is controlled via the CA80 analyzer. The status LED for onsite control is off in this operating mode.

**Operation with time control
function**

The time-controlled version of the Liquiline System CAT820 for sample preparation allows the user to configure different, predefined conveying intervals. Test functions are provided for the peristaltic pump for local operation.

Device architecture

Terminal assignment



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

Communication and data processing

Control

The Liquiline System CAT820 for sample preparation is controlled via a Liquiline System CA80 using Memosens technology, and alternatively via a time control function.

Dependability

Reliability thanks to Memosens technology



Memosens technology guarantees the reliability of your measuring point:

- Digital communication
- Predictive maintenance with recording of functional data, e.g.:
 - Total hours of operation
 - Duration of use of filter
 - Operating times of the pump hoses
 - Hours of operation at high temperatures

Maintainability

Modular design

The modular design of the sample preparation system means it can be easily adapted to suit your needs:

- Upgrade from unheated to heated hoses and outdoor temperature sensor
- Upgrade of electronics module with time-control function 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

Measuring range

-30 to 70 °C (-20 to 160 °F)

Type of input

Pt1000

Accuracy

± 2.5 K

Power supply

Electrical connection

--> Please refer to the Liquiline System CAT820 Operating Instructions for a more detailed wiring diagram

Supply voltage

NOTICE

The device does not have a power switch

- ▶ You must provide a protected circuit breaker in the vicinity of the device.
- ▶ This must be a switch or a power-circuit breaker and you must label it 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, unheated:

- Power supply from Liquiline System CA80

Version with Memosens technology and housing or hose heating

- 100 to 120/200 to 240 V AC \pm 10 %, 50/60 Hz

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 \pm 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 entry

Depending on the 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

- 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

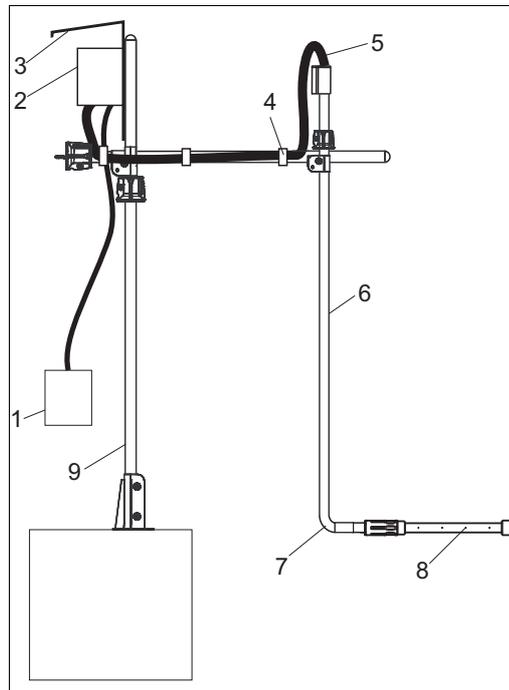
Version with time control function:

- 4.7 to 11 ml/min
- Factory setting: 6.6 ml/min

All the values have been determined with new filters.

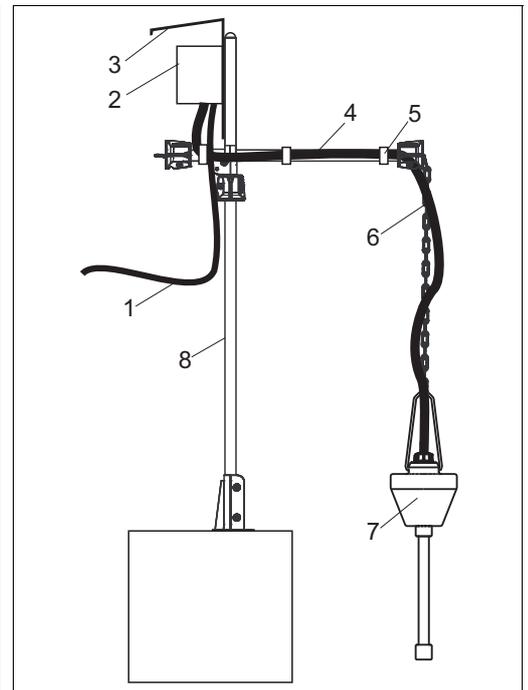
Installation

Installation example



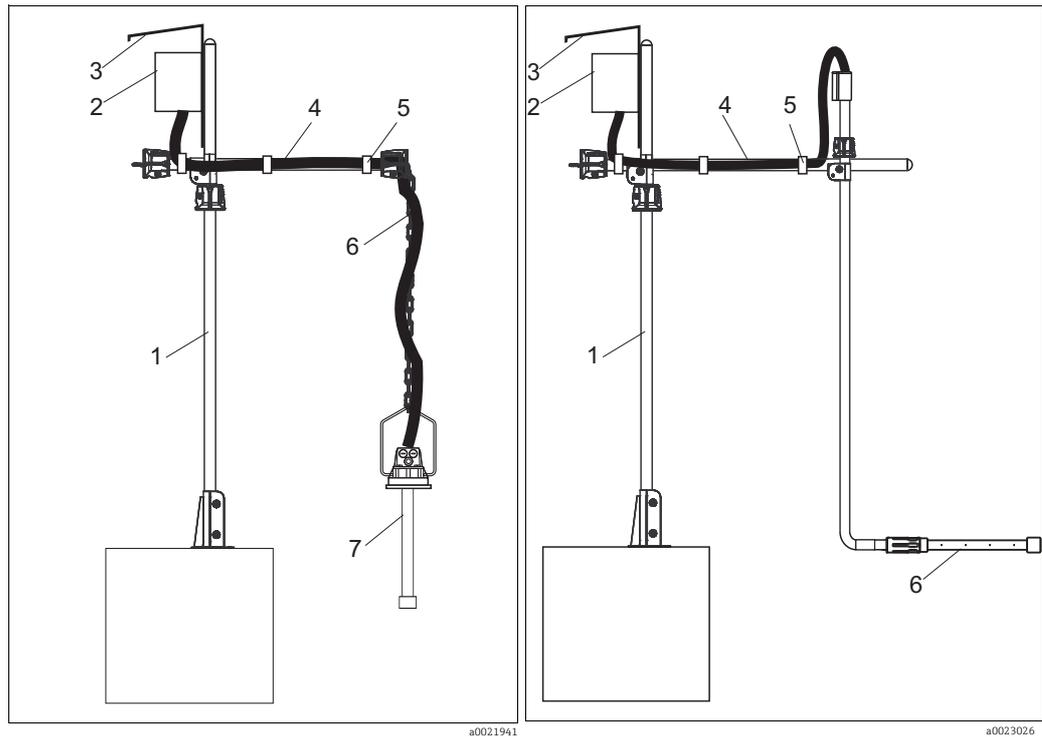
Installation with Liquiline System CA80, CAT820 with Memosens technology, immersion tube, filter (ceramic) and compressor

- 1 Compressor + compressed air hose
- 2 Liquiline System CAT820
- 3 Weather protection 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 system



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

- 1 Compressed air connection for onsite compressed air line
- 2 Liquiline System CAT820
- 3 Weather protection 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 system



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

- 1 CYH112 holder system
- 2 Liquiline System CAT820
- 3 Weather protection 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

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

- 1 CYH112 holder system
- 2 Liquiline System CAT820
- 3 Weather protection 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 Connection kit, CA71 heated hose version (not shown)

Environment

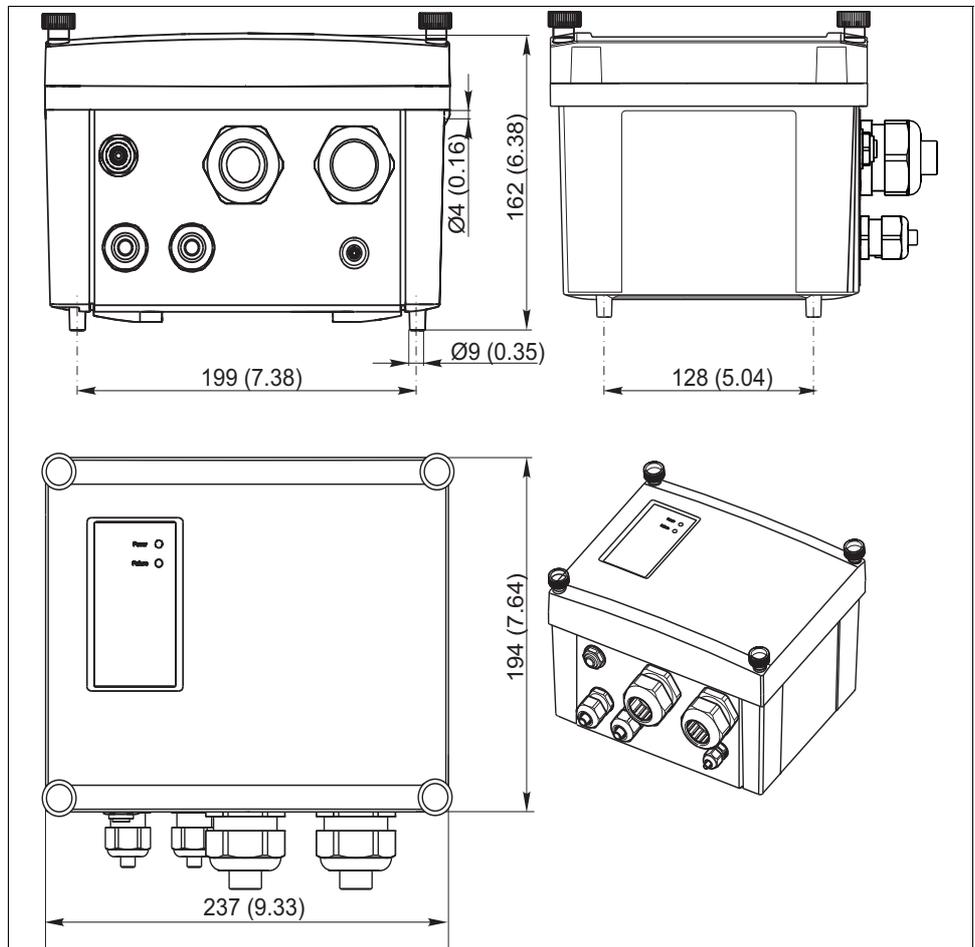
Ambient temperature	Unheated <ul style="list-style-type: none"> ■ 5 to 50 °C (41 to 122 °F) Heated <ul style="list-style-type: none"> ■ -20 to 50 °C (-4 to 122 °F)
Storage temperature	-20 to 60 °C (-4 to 140 °F)
Humidity	10 to 95%, not condensing
Degree of protection	IP66/67
Electromagnetic compatibility	Interference emission and interference immunity as per EN 61326-1: 2006, class A for industry
Electrical safety	IEC 61010-1, Class I equipment Low voltage: overvoltage category II Environment < 2000 m (< 6562 ft) above MSL
Pollution degree	The product is suitable for pollution degree 4.

Process

Sample temperature	4 to 40 °C (39 to 104 °F)
Sample consistency	TS < 8 g/l
Sample supply	Unpressurized
pH value of the sample	pH 4 to 14
Salt content of the sample	NaCl concentration < 10,000 mg/l (ppm)
Compressed air	2 to 5 bar (29 to 73 psi)

Mechanical construction

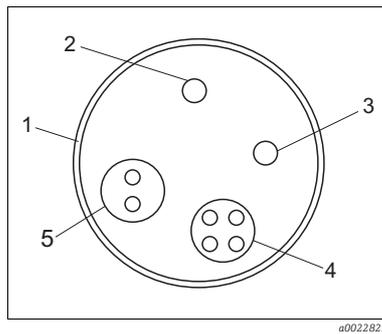
Dimensions



Liquiline System CAT820 dimensions. Engineering unit mm (in).

a0021925

Spiral hose



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

Structure of the spiral hose

Weight

Approx. 2.5 kg (5.51 lbs), depends on version

Materials

Housing material	
Lower housing section	PC-FR
Display cover	PC-FR
Housing seal	EPDM

Process-wetted parts	
Filter (ceramic)	Al ₂ O 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 at 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 in sample preparation)
 - 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

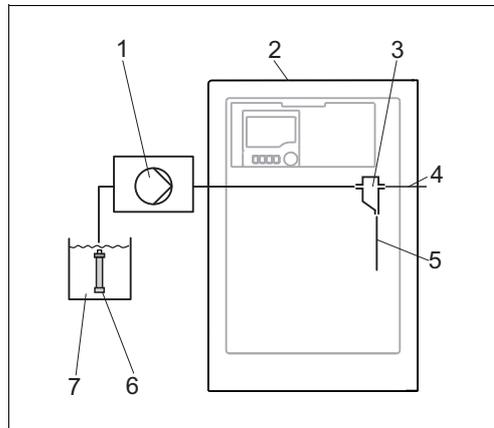
Compressed air hoses for optional compressed air cleaning

- 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 Liquiline System CA80

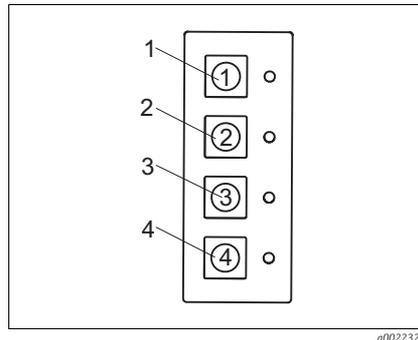


Measuring system

- 1 Liquiline System CAT820 with pump
- 2 Liquiline System CA80
- 3 Collecting vessel
- 4 Collecting vessel overflow
- 5 Sample
- 6 Filter (ceramic)
- 7 Medium

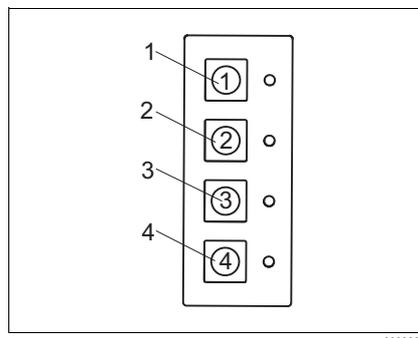
Local operation

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



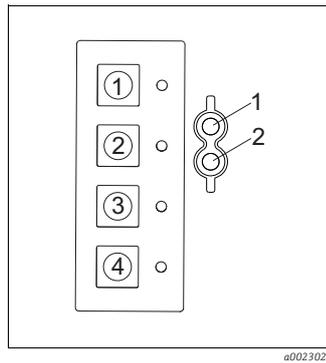
- 1 Sample pump on / off
- 2 Sample pump forwards
Sample pump backwards (press for longer)
- 3 Pulse/pause 1 10 s/60 s (press briefly, on)
Pulse/pause 2 10 s/50 s (press for longer, flashes)
- 4 Pulse/pause 3 10 s/30 s (press briefly, on)
Pulse/pause 4 10 s/20 s (press for longer, flashes)

Factory setting: 10 s / 40 s

Key assignment

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

Status LEDs



- 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)

Status LEDs

 Detailed diagnostic messages are visible on Liquiline System CA80.

Ordering information

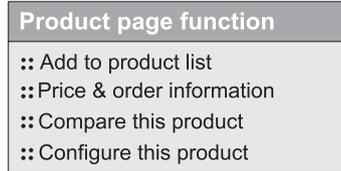
Product page

You can create a valid and complete order code on the Internet using the Configurator tool.

Enter the following address in the browser to launch the product page:
www.products.endress.com/cat820

Product structure

1. On the right-hand side of the product page, you will find the following selection options:



2. Click "Configure this product".

3. The Configurator opens in a new window. You can now configure your device, and you will receive the valid and complete order code for it.

4. Now export the order code as a PDF or Excel file. To do so, click the specific button at the top of the page.

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
- Optional accessories

Certificates and approvals

CE symbols

Declaration of Conformity

The product meets the requirements of the harmonized European standards.

It therefore complies with the statutory requirements of the EC directives.

The manufacturer confirms successful testing of the product by affixing the CE symbol.

Accessories

-  The most important accessories available at the time this document went to print are listed below. Contact your service representative or Sales Center for accessories that are not listed here.

Device-specific accessories

Weather protection cover

- Absolutely essential if operating outdoors
- Order No. 51510040

Pipe mounting 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

Kit CAT820/860: Compressor 230 V

- Order No. 71249987

Kit CA71 Retrofit CAT820

- Order No. 71236534

Cleaner for hoses 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

www.addresses.endress.com
