

# Technical Information

## Liquiline System CAT860

Automatic sample preparation system for supplying process measuring devices with filtered samples from the inlet or sludge activation area of a wastewater treatment plant



### Application

The Liquiline System CAT860 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. Different assemblies are available as accessories for installing the filter in the process.

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 is designed for use in the following applications:

- Municipal and industrial wastewater treatment plants
- Taking aqueous samples from industrial processes

### Your benefits

- Robust and reliable:
  - Samples free from particles and algae thanks to membrane filtration
  - Sampling takes place free from interference, peristaltic pump
  - Automatic filter backflushing with cleaner
  - Filter backflushing with air
  - Optional hose trace heating system
- Simple and user-friendly:
  - Control via Liquiline System CA80
  - Installation compatible with Flexdip CYH112
- Cleaning and maintenance:
  - Pump hoses easily replaced without tools
  - Tool-free removal of the filter

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## Function and system design

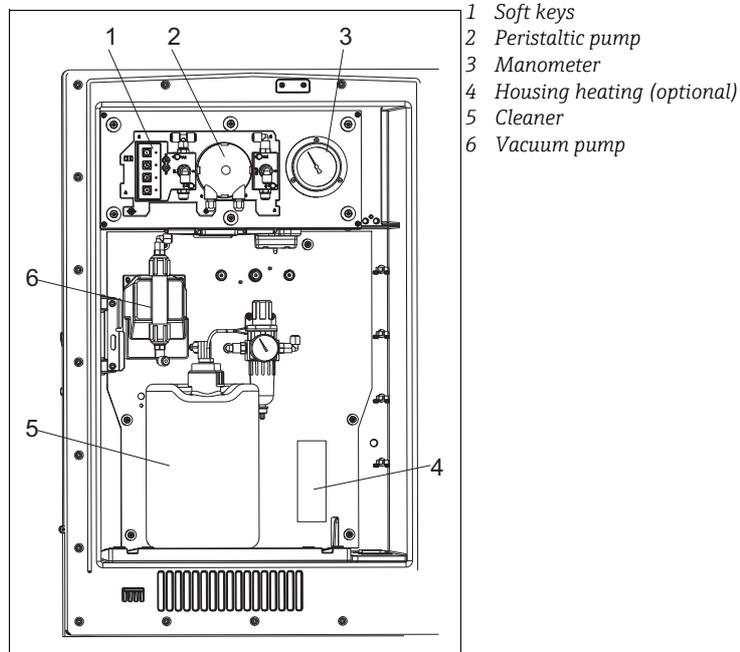
### Function

A peristaltic pump is used to take the sample. The sample is drawn in via the filter element, filtered and fed to the analyzer. The automatic cleaning function backflushes the filter and the sample hoses with a cleaning solution. Backflushing with a cleaning solution is performed using a vacuum pump. The cleaning valve is switched for this purpose. It is also possible to backflush the filter and the sample hoses with compressed air.

### Measuring system

A complete sample preparation system consists of:

- Liquiline System CAT860 sample conditioning
- Local operation with soft keys and status LEDs
- Filter unit with filter and holder in the configuration ordered
- Automatic cleaning function with compressed air (external compressed air supply necessary)
- Peristaltic pump for pumping the sample
- Vacuum pump for the automatic cleaning function
- Housing heating (optional)
- Sample hose, filter to pump in the configuration ordered, optionally heated
- Sample hose, pump to analyzer in the configuration ordered, optionally heated
- Cleaner (to be ordered separately)



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**Installation example****Installation example 1: inlet measurement, CAT860 with Memosens technology, wall installation, filter with immersion tube**

- Liquiline System CA80 analyzer
- Liquiline System CAT860 with Memosens communication, heated, with compressor
- 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 (10 ft), heated
- Hose, pump to analyzer, 2 m (7 ft), heated
- Flexdip CYH112 holder, to be ordered separately

**Installation example 2: measurement in activated sludge basin, CAT860 with Memosens technology, installation with post and post mount clamp, filter with float**

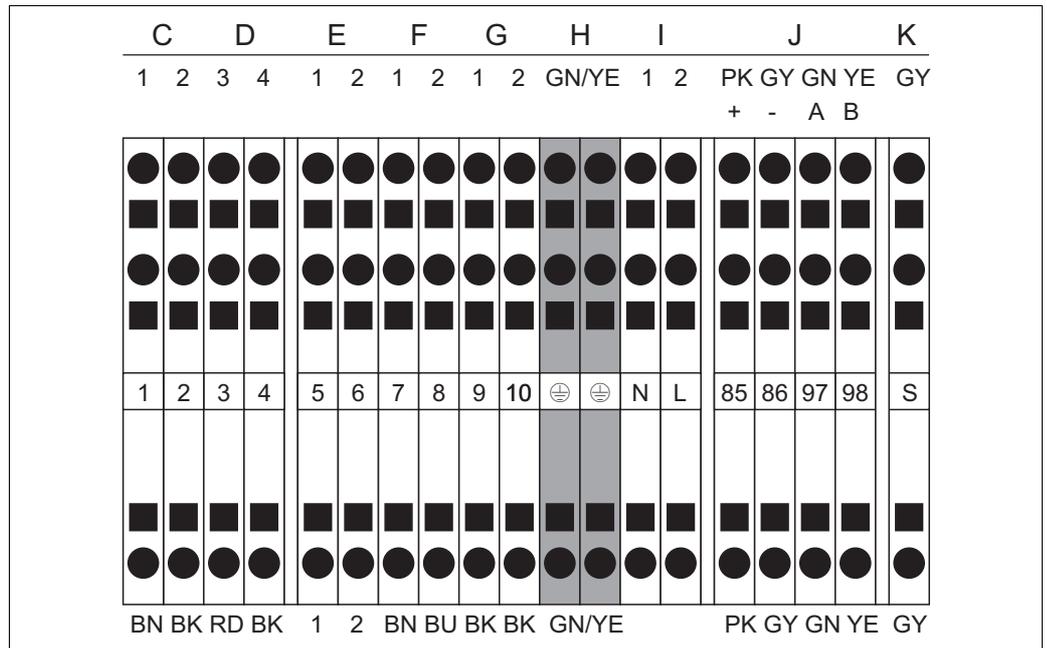
- Liquiline System CA80 analyzer
- Liquiline System CAT860 with Memosens technology, heated, with compressed air connection for external compressed air line
- Post, stainless steel, reinforced
- Post mount clamp
- Filter cartridge, membrane, 0.1 µm, ceramic
- Float, filter adapter
- Hose, filter to pump, 3 m (10 ft)
- Hose, pump to analyzer, 2 m (7 ft)
- Flexdip CYH112 holder, to be ordered separately

**Installation example 3: inlet measurement, CAT860 with Memosens technology, wall installation, filter with chain retainer**

- Liquiline System CA80 analyzer
- Liquiline System CAT860 with Memosens communication, heated, with compressor
- Filter cartridge, membrane, 0.1 µm, ceramic
- Chain retainer 600 x 40 mm, PVC, adapter G1
- Quick release fastener, filter, G1
- Hose, filter to pump, 3 m (10 ft), heated
- Hose, pump to analyzer, 2 m (7 ft), heated
- Flexdip CYH112 holder, to be ordered separately

## Equipment architecture

### Terminal assignment



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- |   |                            |   |                |
|---|----------------------------|---|----------------|
| C | Level monitoring           | H | Grounding      |
| D | Valve 3                    | I | Supply voltage |
| E | Housing heating (optional) | J | Memosens       |
| F | Vacuum pump                | K | Shield         |
| G | Hose heating (optional)    |   |                |

## Communication and data processing

### Control

The Liquiline System CAT860 for sample preparation is controlled via a Liquiline System CA80 using Memosens technology.

### Reliability

#### 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
  - Hours of operation at high temperatures
  - Hours of operation of the vacuum pump
  - Operating times of the pump hoses

### 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
- Outdoor temperature sensor and housing heater upgrades

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## Temperature inputs

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Measuring range	-30 to 70 °C (-20 to 160 °F)
Type of input	Pt1000
Accuracy	± 2.5 K

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## Power supply

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Electrical connection	--> Please refer to the Liquiline System CAT860 Operating Instructions for a more detailed wiring diagram
Supply voltage	100 to 120/200 to 240 V AC ± 10 %, 50/60 Hz

**NOTICE****The device does not have a power switch**

- ▶ The customer must provide a fuse with a maximum rating of 10 A at the installation location. Please observe local installation regulations.
- ▶ The circuit breaker must be a switch or a power-circuit breaker and you must label it as the circuit breaker for the device.

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Cable entries	Depending on the version: <ul style="list-style-type: none"><li>▪ 2 x M32 cable gland (assigned internally)</li><li>▪ 1 x M20 cable gland (for power cable)</li><li>▪ 1 x M12 (used by temperature sensor, optional)</li></ul> <b>Permitted cable diameter:</b> <ul style="list-style-type: none"><li>▪ M20 x 1.5 mm: 7 to 13 mm (0.28 to 0.51")</li></ul>
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Fuse	5x20 mm, 250 V, 3.15 A slow-blow (T3.15A)
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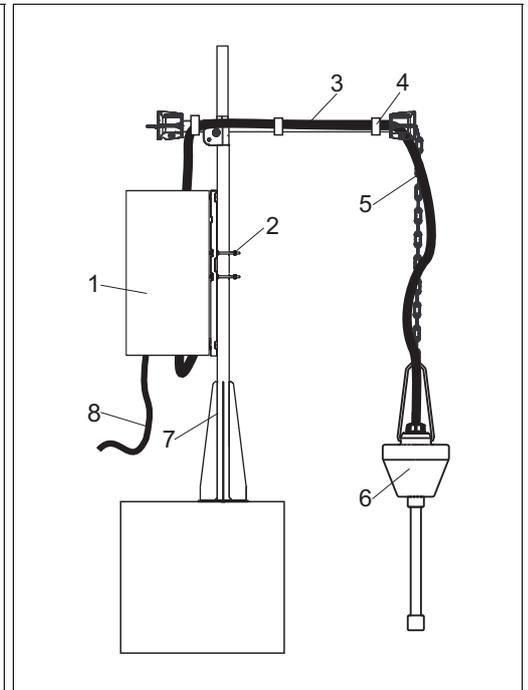
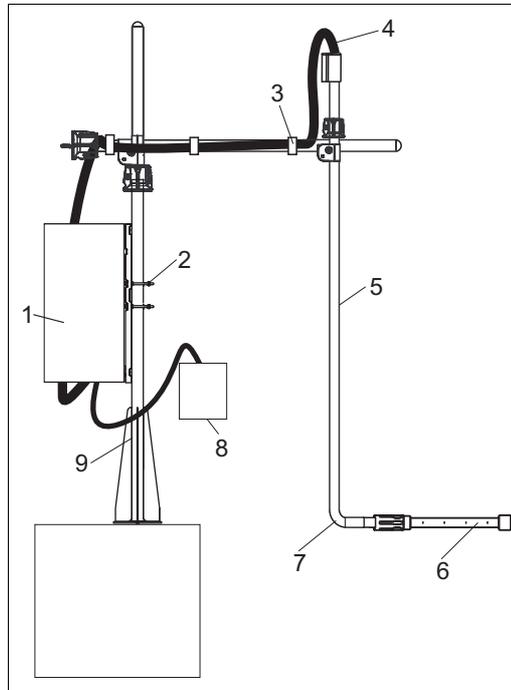
Power consumption	300 VA (with housing heating)
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## Performance characteristics

<b>Type of sampling</b>	Control unit, Liquiline System CA80 analyzer
<b>Filtrate quantity</b>	<ul style="list-style-type: none"> <li>■ 5.5 to 16.5 ml/min</li> <li>■ Factory setting: 8.25 ml/min</li> </ul> <p>All the values have been determined with new filters.</p>
<b>Suction height of peristaltic pump</b>	Max. 5 m (16 ft)
<b>Hose length, filter to pump</b>	Max. 5 m (16 ft)
<b>Hose length, pump to analyzer</b>	Max. 30 m (98 ft)

## Installation

### Installation example

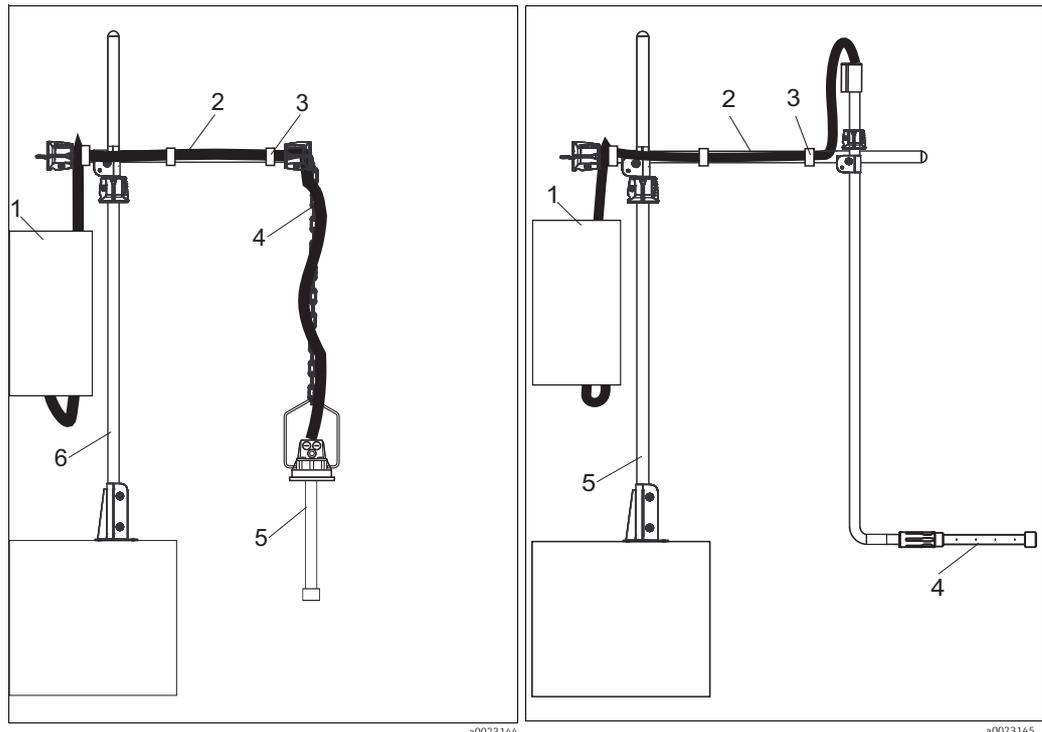


Installation with Liquiline System CA80, CAT860 with immersion tube, filter (ceramic) and compressor

Installation with Liquiline System CA80, CAT860 with float and filter (ceramic)

- 1 Liquiline System CAT860
- 2 Post mount clamp
- 3 Hook-and-loop tape
- 4 Hose, filter to pump, 3 m, heated
- 5 Immersion tube 1200 x 40 mm, stainless steel
- 6 Filter (ceramic) with quick release fastener
- 7 Connecting bracket G1, 90°, stainless steel
- 8 Compressor + compressed air hose
- 9 Post, stainless steel, reinforced

- 1 Liquiline System CAT860
- 2 Post mount clamp
- 3 Hose, filter to pump, 3 m
- 4 Hook-and-loop tape
- 5 Chain
- 6 Filter (ceramic) with float, filter adapter
- 7 Post, stainless steel, reinforced
- 8 Compressed air connection for onsite compressed air line



Installation with Liquiline System CA80, CAT860 with chain retainer and filter (ceramic)

- 1 Liquiline System CAT860 (wall mounting)
- 2 Hose, filter to pump, 5 m, heated
- 3 Hook-and-loop tape
- 4 Chain
- 5 Filter (ceramic) with chain retainer, 600 x 40 mm, PVC
- 6 CYH112 holder system

Installation with Liquiline System CA80, CAT860 with quick release fastener and filter (ceramic)

- 1 Liquiline System CAT860 (wall mounting)
- 2 Hose, filter to pump, heated
- 3 Hook-and-loop tape
- 4 Filter (ceramic) with quick release fastener, immersion tube 1200 x 40 mm, stainless steel
- 5 CYH112 holder system

### Installation conditions

1. **False**  
The sample preparation system should never be mounted in a place where it is exposed to aggressive gases.
2. **False**  
When routing the suction line ensure siphoning effects do not occur.
3. **False**  
The intake pipe must not be laid with an upward incline to the collection point.

When installing the device, observe the following:

- Make sure that the wall has sufficient load-bearing capacity.
- Mount the device on a level surface.
- Protect the device against additional heating (e.g. from heaters).
- Protect the device against strong magnetic fields.
- Protect the device against mechanical vibrations.
- Make sure air can circulate freely at the side panels of the cabinet. Do not mount the device directly against a wall. Allow at least 150 mm (5.9") from the wall to the left and right.
- Do not erect the device directly above the inlet channel of a wastewater treatment plant.

## Environment

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<b>Ambient temperature range</b>	Unheated ■ 5 to 50 °C (41 to 122 °F)  Heated ■ -20 to 50 °C (-4 to 122 °F)
<b>Storage temperature</b>	-20 to 60 °C (-4 to 140 °F)
<b>Humidity</b>	10 to 95%, not condensing
<b>Degree of protection</b>	IP55
<b>Electromagnetic compatibility</b>	Interference emission and interference immunity as per EN 61326-1: 2006, class A for industry
<b>Electrical safety</b>	IEC 61010-1, Class I equipment Low voltage: overvoltage category II Environment < 2000 m (< 6562 ft) above MSL
<b>Pollution degree</b>	The product is suitable for pollution degree 2.

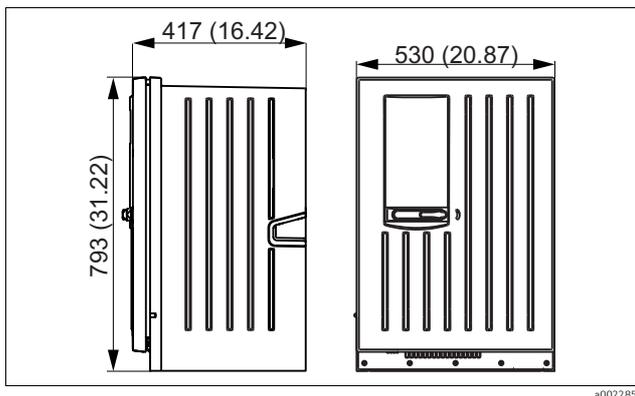
## Process

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<b>Sample temperature</b>	4 to 40 °C (39 to 104 °F)
<b>Process pressure</b>	Unpressurized
<b>Sample consistency</b>	TS < 8 g/l
<b>pH value of the sample</b>	pH 4 to 14
<b>Salt content of the sample</b>	NaCl concentration < 10,000 mg/l (ppm)

## Mechanical construction

### Dimensions



Liquiline System CAT860 dimensions. Engineering unit mm (in).

### Weight

33 kg (73 lbs)

### Materials

Housing material	
Housing exterior cover	Plastic ASA+PC
Housing inner lining	Plastic PP

Process-wetted parts	
Filter (ceramic) ■ End caps	Al <sub>2</sub> O <sub>3</sub> , coated ■ PVC
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 valves	EPDM
Seal, valve sample collecting vessel	FKM
Solenoid valve for backflushing	PEEK
Hose from solenoid valve to sample collecting vessel	NORPRENE
Cleaning solution canister	PE

## 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

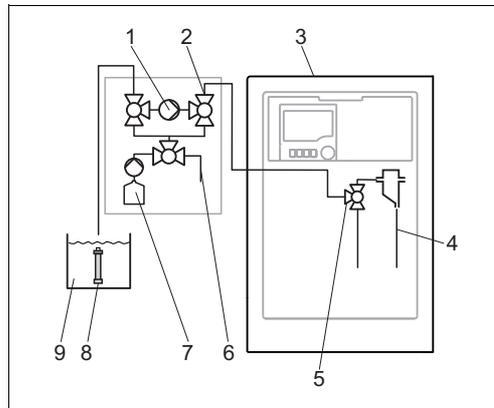
### Compressed air hoses

- 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

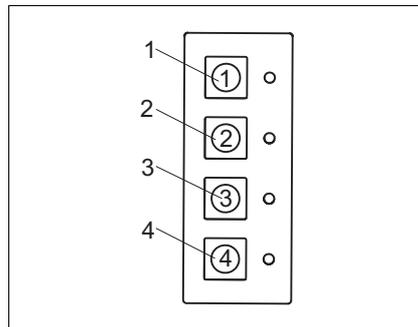


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### Measuring system

- 1 Pump
- 2 Valve
- 3 Liquiline System CA80
- 4 Sample
- 5 Valve
- 6 Compressed air
- 7 Cleaning solution
- 8 Filter (ceramic)
- 9 Medium

## Local operation



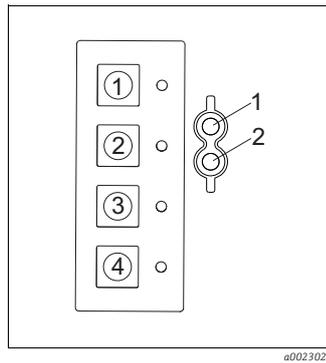
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- 1 Local control system
- 2 Sample pump forwards  
Sample pump backwards (press for longer)
- 3 Backflush filter with air
- 4 Backflush filter with cleaner

### 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

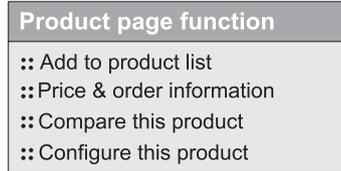
### Product page

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/cat860](http://www.products.endress.com/cat860)

### 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 CAT860 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 mark

#### 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 the successful testing of the product by attaching the CE mark.

## Accessories

 The most important accessories available at the time this document went to print are listed below. Contact your Service Department or sales center for accessories that are not listed here.

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### Device-specific accessories

Quick release fastener, filter, G1

- Order no. 71238203

Post

- Order no. 71221053

Post mount clamp

- For securing the sample preparation to horizontal and vertical posts and pipes
- Order no. 71214646

Kit CAT820/860: ceramic filter, complete

- Order no. 71241492

Kit CAT820/860: compressor 230 V

- Order no. 71249987

 Please refer to TI00432C for the order numbers of accessories for the Flexdip CYA112 assembly.

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

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