Level | Pressure | Flow | Temperature | Liquid Analysis | Registration | Systems Components | Services | Solutions

Technical Information

Stamoclean CAT430

Micro/Ultra filtration system
Long-term stable membrane filter for immersion operation in activated sludge basins or in the outlet channel of sewage treatment plants



Application

CAT430 is a patented ultra filtration system for process instruments in sewage treatment plants.
CAT430 transports clear samples from the activated sludge basin to the measuring devices. Expensive pump installation in the activated sludge basin is no longer necessary.

Applications are:
- In activated sludge basins
- Outlets of sewage treatment plants

Your benefits

- Ultra filtration without the disadvantages of conventional ultra filtration
- No additional pump necessary
- Minimum energy consumption
- Minimum maintenance required
- Filtrate quantity can be optimized by number of filter elements
- Minimum dead volume ensuring a representative sample
- Large carrying distance up to 100 m (330 ft)
- Cleaning without chemicals

TI338C/07/EN/13.11
71140032

Endress+Hauser
People for Process Automation

Function and system design

Measuring principle

The centrepiece of the system is a flat membrane filter element which is suspended directly in the wastewater basin or channel. A hose pump, located in a pump box on the rim of the basin, is connected to the filter element by means of a thin PE tube. The pump creates a vacuum between the membrane and the carrier plate of the filter element. This vacuum causes the filtrate to pass through the filter membrane. Suspended materials, particles, algae and bacteria are collected on the surface of the membrane. However, thanks to an alternating pumping action with time delays, the layer on the surface of the membrane is never allowed to build up which means that intervals of more than one month are achieved between cleaning cycles.
The filter elements must be installed in an area with good flow conditions to increase the self-cleaning effect. If the filters are installed in basins with low or no flow, the interval for manual cleaning may reduce to a few days.

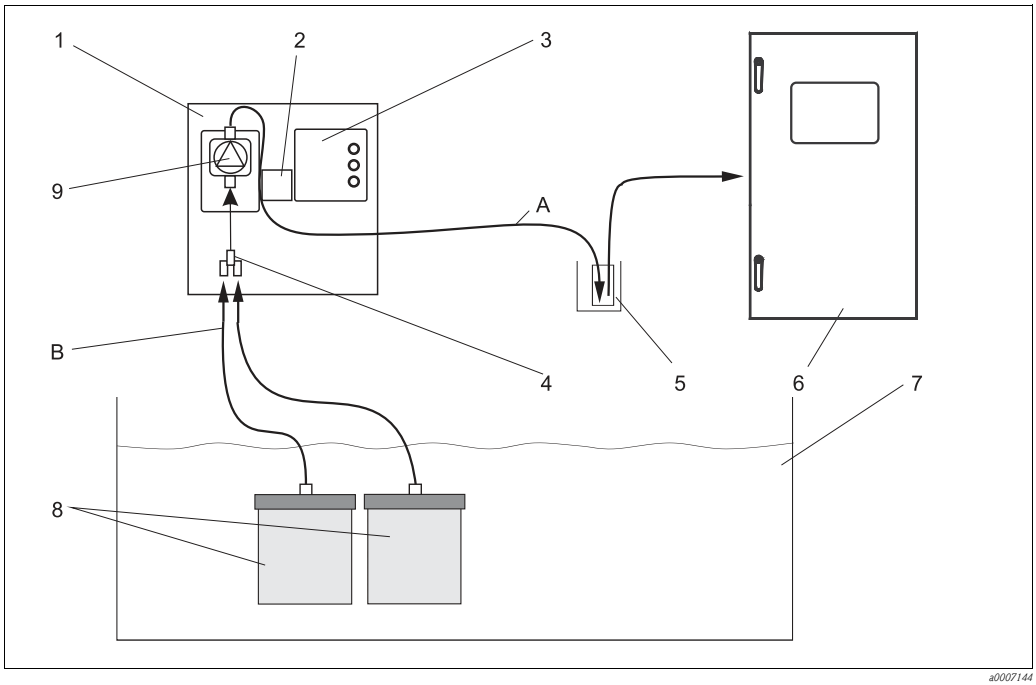
The minimum specified intervals must be maintained. Parallel connection of two or four filter elements means that the sampling quantity can be increased to up to 1 l/h (0.26 gal/hr) approx.
The sample transport from the pump to the analyzer is carried out with a membrane pump, which type is adapted to the distance. A collecting vessel is used to collect the sample on the analyzer side. This vessel is mounted as close as possible to the analyzer and also serves to filter out air bubbles. The individual measuring devices draw in samples from this vessel while surplus samples can drain away by means of a tube attached to the centre of the collecting vessel.

Measuring system

Version with low-power membrane pump

A complete measuring system comprises:
- a CAT430 filter system
- a collecting vessel
- a CA71xx analyzer

If an assembly with low dead volume and flow resistance is used (see "Accessories"), the sensor can be installed in line with the analyzer's inlet.



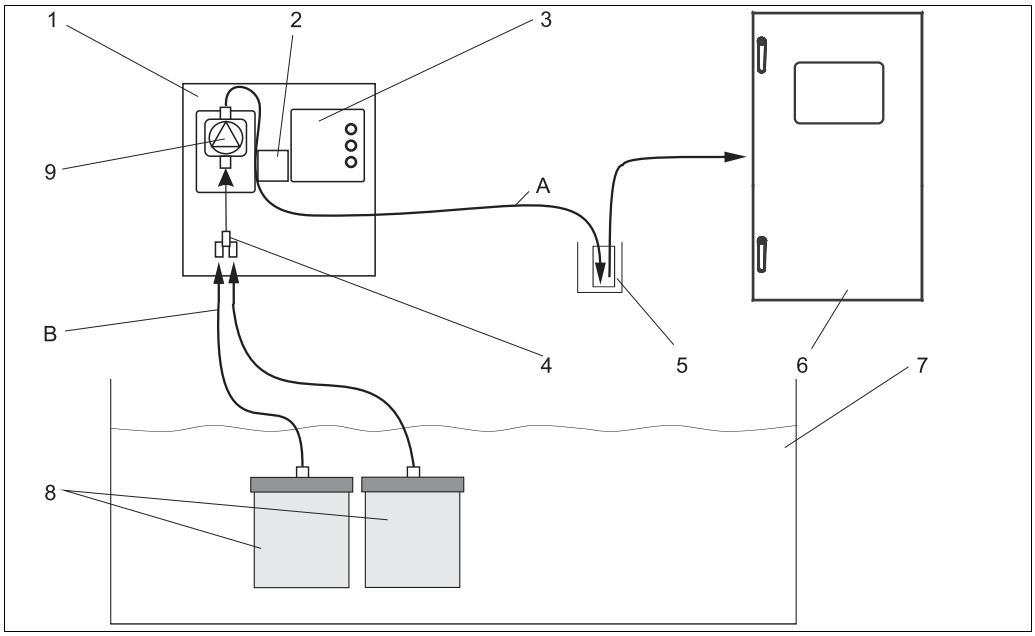
Measuring system

1 Control box
2 Timer
3 Control unit
4 Y-piece
5 Collecting vessel
6 Analyzer
7 Activated sludge basin
8 Membrane filter
9 Membrane pump
A Sample line to the analyzer (discharge side of the pump, PE, max. 20 m (66 ft)
B Filtrate line from the filter elements (suction side of the pump, PE, 4.5 m (15 ft), with heating)

Version with high-power membrane pump

A complete measuring system comprises:
- a CAT430 filter system
- a collecting vessel
- a CA71xx analyzer

If an assembly with low dead volume and flow resistance is used (see "Accessories"), the sensor can be installed in line with the analyzer's inlet.



Measuring system

1 Control box
2 Timer
3 Control unit
4 Y-piece
5 Collecting vessel
6 Analyzer
7 Activated sludge basin
8 Membrane filter
9 Membrane pump
A Sample line to the analyzer (discharge side)[1)]
B Filtrate line from the filter elements (suction side of the pump, PE, 4.5 m (15 ft), with hose heating)

1) Two sample hoses are integrated in a protecting hose: 1 x 1.5/3 mm (0.06/0.12 inch) PTFE hose (standard) and 1 x 2/4 mm (0.08/0.16 inch) PE hose (spare).

Power supply

Control box connection

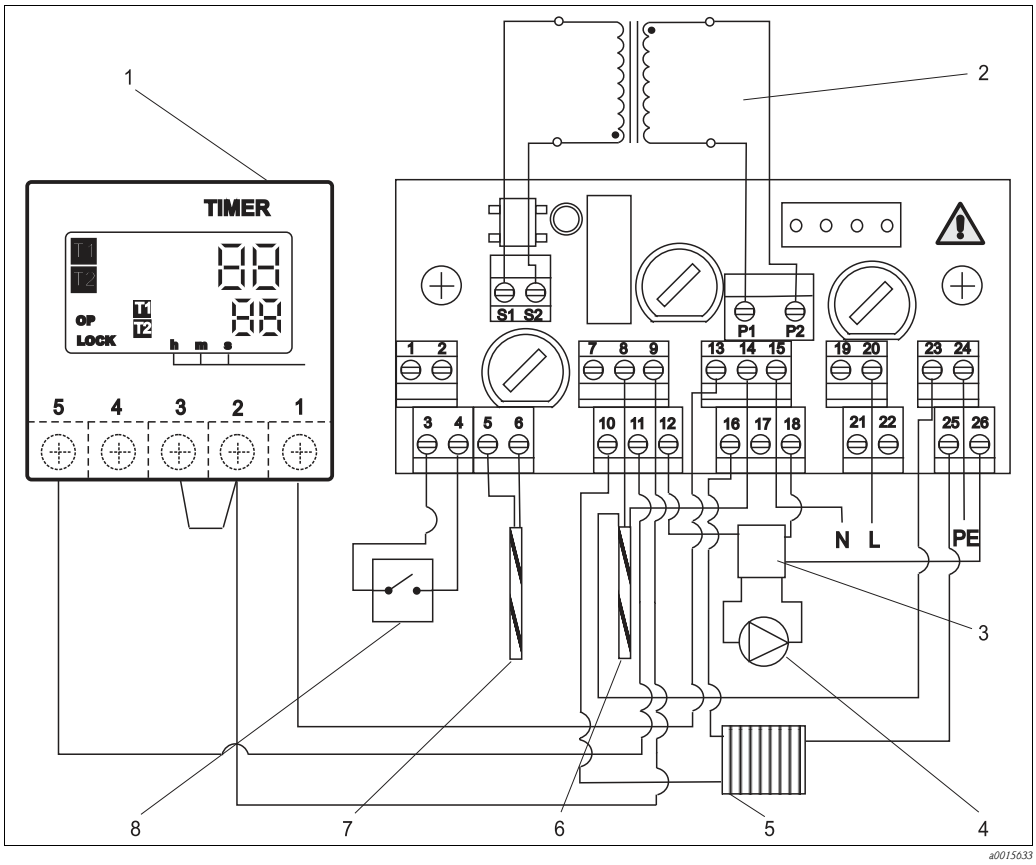
230 V AC, 50/60 Hz, 500 VA with band heater connected
must be protected with a 30 mA error current protective switch (Ground Fault Circuit Interrupter, GFCI)

A suitable circuit breaker must be provided by the customer. It must be placed directly upstream of the supply cable for the device.

Required connection possibilty in the analyzer compartment

For electric band heater > 20 m (66 ft):
15 VA per meter (4.5 VA per ft) electric band heater, socket 230 V AC, 50/60 Hz, ground leakage breaker protected
(to be provided by the customer)

Control unit terminal assignment



Wiring diagram

1	*Timer*	*4*	*Pump*	*7*	*Filtrate hose heater 24 V AC*
2	*Transformer*	*5*	*Housing heater*	*8*	*Micro thermostat 24 V*
3	*Line filter*	*6*	*Band heater 240 V AC*		

T	Assignment	T	Assignment	T	Assignment
1	not connected	10	Phase L housing heater	19	not connected
2	not connected	11	Phase L from timer T5	20	Phase L mains supply
3	24 V to micro thermostat	12	Phase L line filter pumpe	21	not connected
4	24 V from micro thermostat	13	Zero conductor, timer T1	22	not connected
5	24 V to hose heater	14	Electric band heater zero cond.	23	PE electric band heater
6	24 V from hose heater	15	Mains supply zero conductor	24	PE mains supply
7	not connected	16	Housing heater zero conductor	25	PE housing heater
8	Phase L electric band heater	17	not connected	26	PE line filter pump
9	Phase L to timer T2 and 3	18	Zero conductor, line filter pump		

For power supply:
You have to connect terminals 15, 20 and 24.
All other connections have been made at the factory.

For electric band heater connection:
You have also to connect terminals 8, 14 and 23 if using an electric band heater for the sample line to the analyzer (pressure side of the pump).
The heater for the hose to the suction side is included in versions CAT430-****A**. The connections (terminals 5 and 6) have been made at the factory.

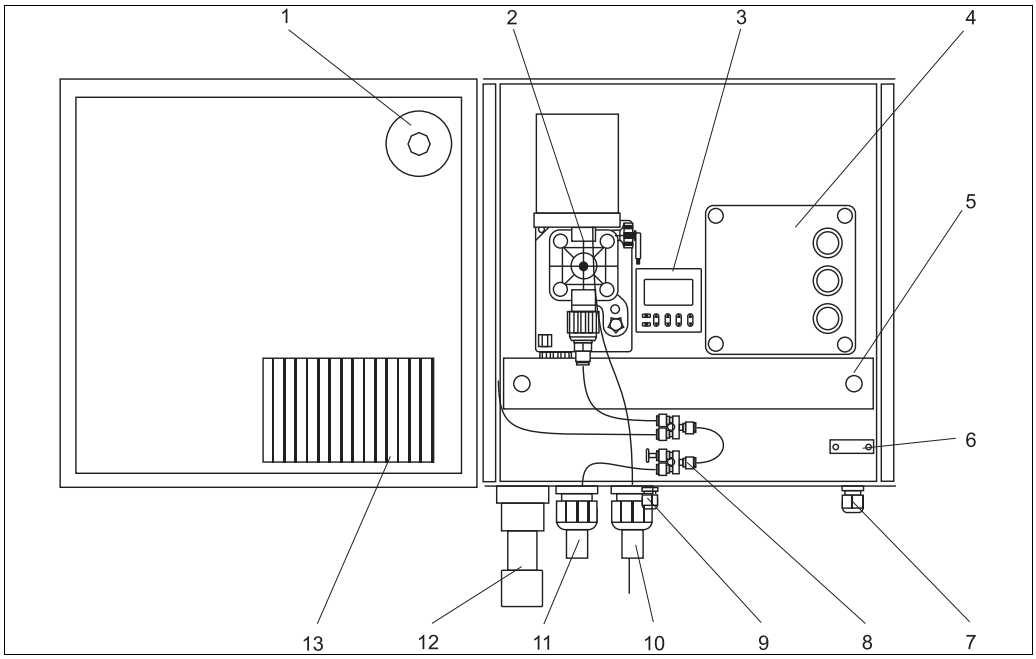
Performance characteristics

Filtrate volume (suction side of the pump)	**Low-power membrane pump versions** approx. 250 ml/h (0.07 gal/hr) per filter element **High-power membrane pump versions** approx. 450 ml/h (0.12 gal/hr) per filter element	
Sample transportation distance to the analyzer	**Low-power membrane pump versions** max. 20 m (66 ft) without additional pressurized air **High-power membrane pump versions** max. 100 m (330 ft)	
Separation performance	Precipitation of particles, colloids and bacteria (> 0.1 µm)	
Life cycle of the filter elements	approx. 1 to 2 years, maybe more if careful handled	
Cleaning interval	Filter element: Sample line: PTFE hose PE hose	2 to 6 months, depending on contamination level 3 months 6 weeks
Chemical resistance of the filter elements	pH 1.5 to 12	

Installation

Installation instructions control box

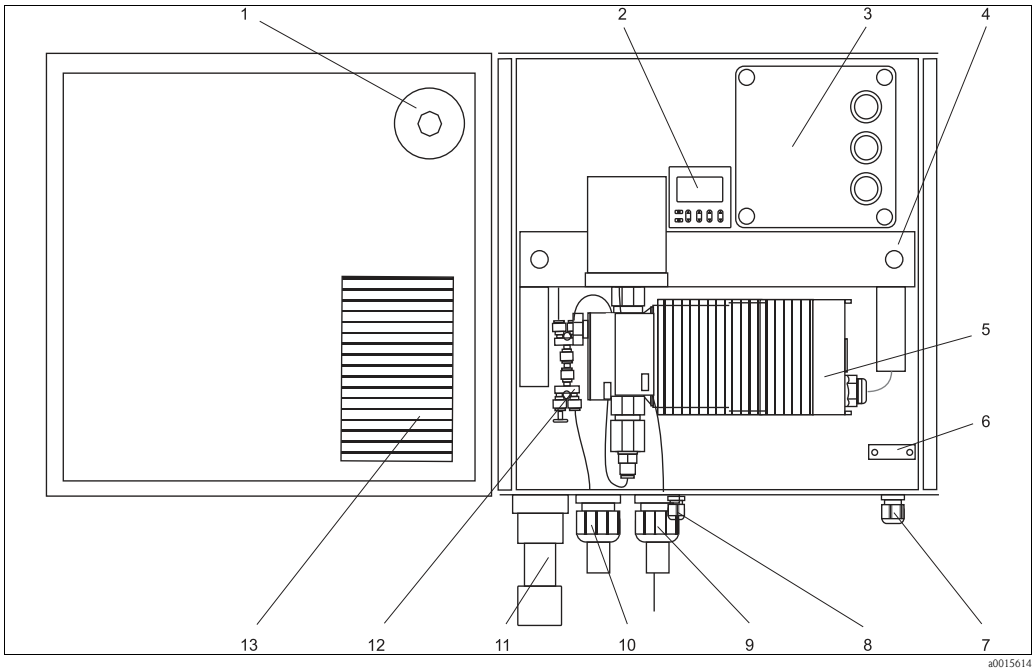
Version with low-power membrane pump



Control box

1 Manometer
2 Membrane pump
3 Timer
4 Control unit with connection box inside
5 Cable duct
6 Strain relief for power cable
7 Cable gland for power cable
8 Y fitting
9 Vent hose gland
10 Gland for sample line to the analyzer
11 Gland for filtrate line from filter
12 Pipe socket with thermal switch
13 Housing heater

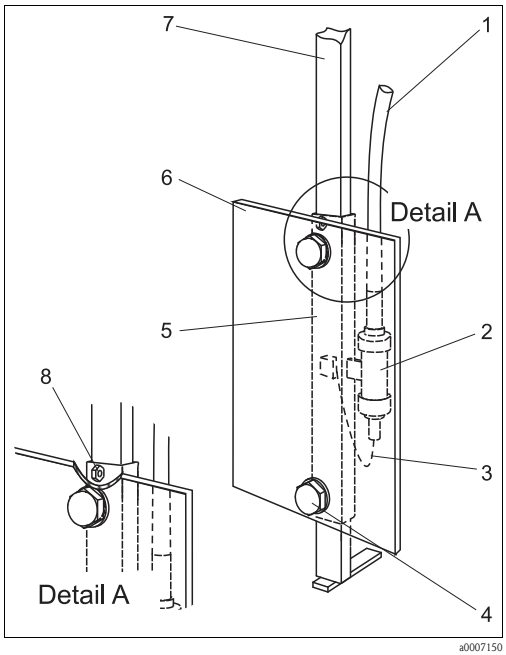
Version with high-power membrane pump



Control box

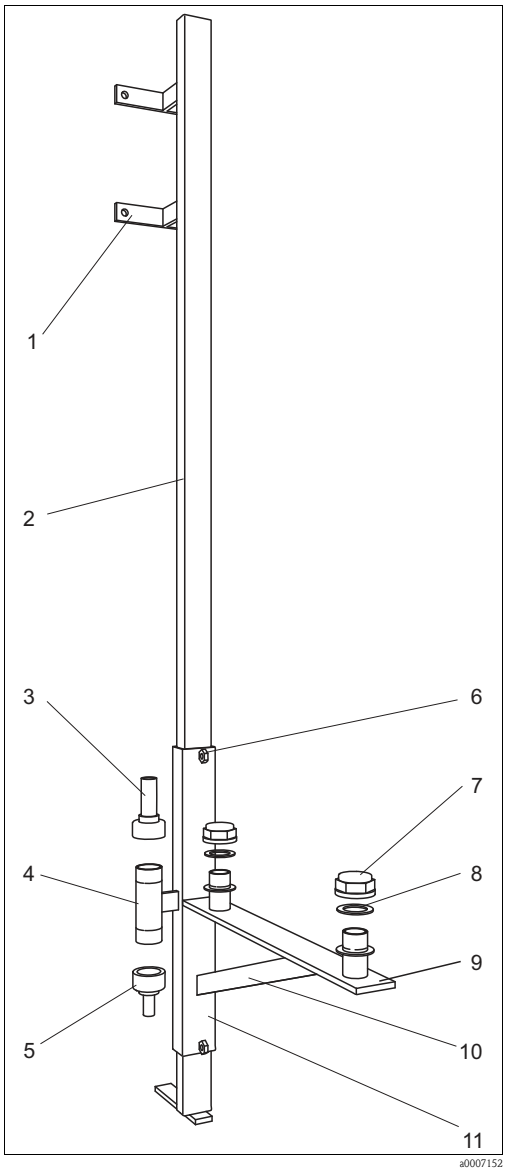
1 Manometer
2 Timer
3 Control unit with connection box inside
4 Cable duct
5 Membrane pump
6 Strain relief for power cable
7 Cable gland for power cable
8 Vent hose gland
9 Gland for sample line to the analyzer
10 Gland for filtrate line from filter
11 Pipe socket with thermal switch
12 Y-fitting
13 Housing heater

Filter elements



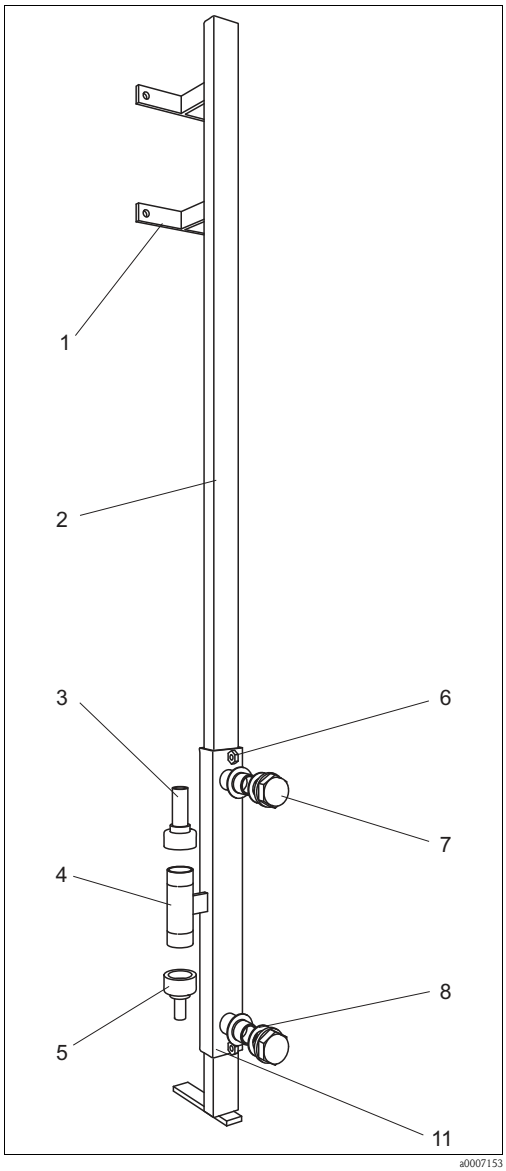
Filter element with retaining slide

1 Filtrate line to pump
2 T-piece
3 Filtrate hose
4 PVC thread cap
5 Retaining slide
6 Filter element
7 Mounting guide pipe
8 Hexagon nut



Filter element holder for open channel

1 Wall mounting, flat steel 30 x 8 mm (1.18 x 0.31")
2 Square pipe 50 x 30 x 3 mm (1.97 x 1.18 x 0.12")
3 Thread adapter nut G1¼, hose nozzle D25
4 Taper nipple R1¼
5 Thread adapter nut G1¼, cable gland Pg 7
6 Hexagon nut M10



Filter element holder for basin

7 Cap G1
8 Flat seal 48 x 33 x 2 mm (1.89 x 1.30 x 0.08")
9 Flat steel 60 x 8 mm (2.36 x 0.31")
10 Flat steel 30 x 8 mm (1.18 x 0.31")
11 Slide for filter element, square pipe 50 x 30 x 3 mm (1.97 x 1.18 x 0.12")

Environment

Ambient temperature range	–20 to 40 °C (-4 to 100 °F)
Humidity	0 to 95 %, no splash water
Ingress protection	IP 54

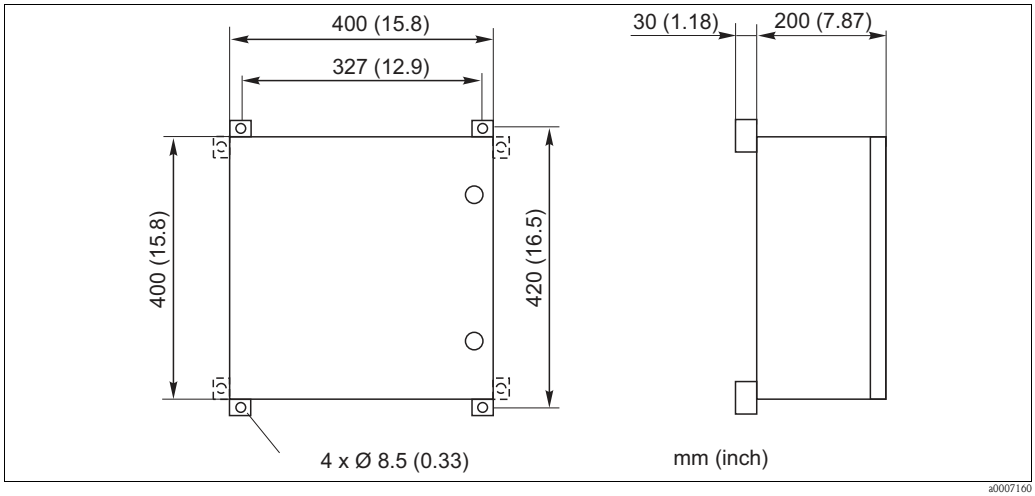
Process

Process temperature range 5 to 40 °C (40 to 100 °F)

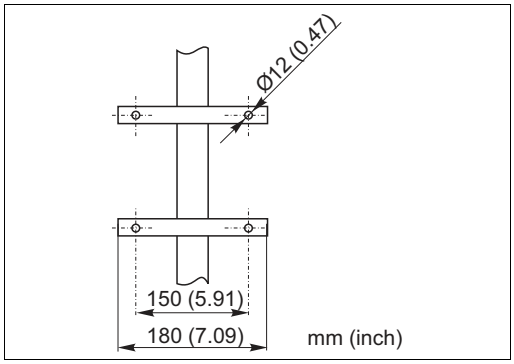
Mechanical construction

Design, dimensions

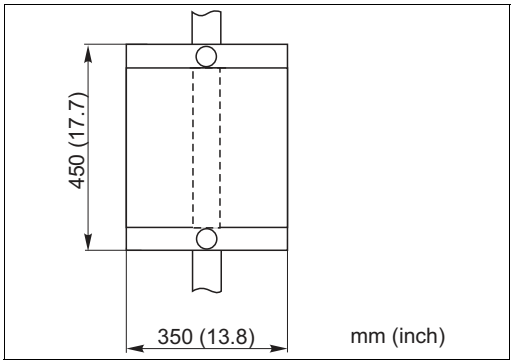
Control box and filter element



Control box dimensions, left front view, right side view

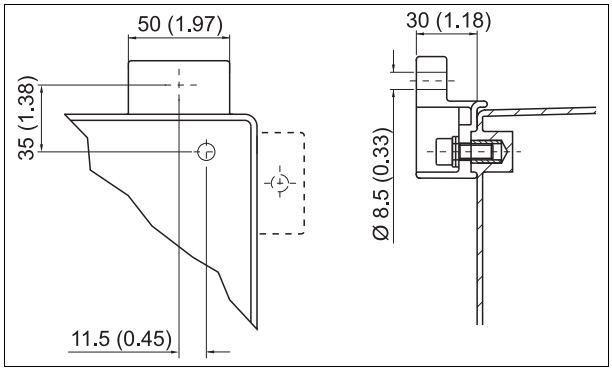


Detail: Wall mounting of filter holder (accessories)

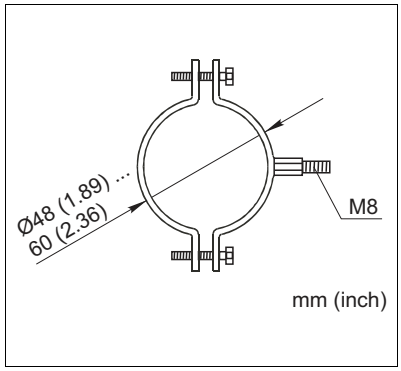


Filter element

Mounting kit (in scope of delivery of each version)



Wall brackets



Pipe clamp for rail mounting

Weight

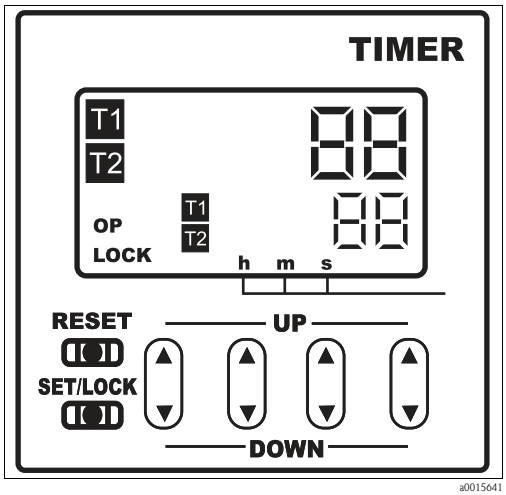
Control box with membrane pump	15 kg (33 lbs)
Housing CAT430-A1A*A4A	16 kg (35 lbs)
Filter element	1 kg (2.2 lbs)
Filter element holder	18 kg (40 lbs)

Materials

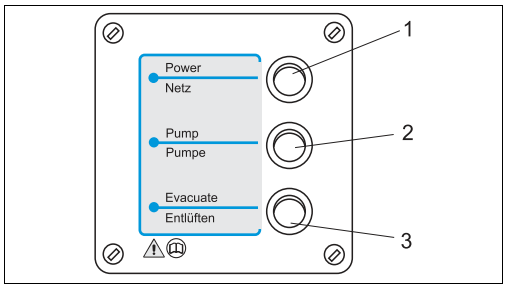
Control box housing and housing (CAT430-A1A*A4A)	Glass-fibre reinforced polyester, self-quenching acc. to ASTM D 635 resp. UL 94-VO
Filter element	PVC carrier plate, PAN membrane[1)]
Filter element holders	Stainless steel, 1.4301 (AISI 304)

1) PAN ... polyacryl nitrile

Human interface



Timer



Operating elements

1 Heating / Power on
2 Control
3 Evacuate (pump continous operation)

Certificates and approvals

CE approval

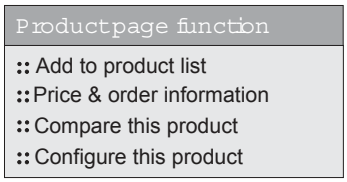
Declaration of conformity
The product meets the requirements of the harmonized European standards. It thus complies with the legal requirements of the EC directives.
The manufacturer confirms successful testing of the product by affixing the CE symbol.

Ordering information

Order code

You can create a valid and complete order code online with the configurator.
Enter the URL www.products.endress.com/cat430 into your browser to get to the product page.

1. You can choose from the following options on the product page located on the right:



2. Click "Configure this product".
3. The configurator opens in a separate window. You can now configure your device and receive the complete order code that applies for the device.
4. Afterwards, export the order code as a PDF or Excel file. To do so, click the appropriate button at the top of the page.

Scope of delivery

Version with low-power membrane pump

The scope of delivery comprises:
- 1 Control box, complete with
  - Filtrate line connected, length 4.5 m (14.8 ft), hose heating 24 VAC
  - 4 Plastic brackets for wall mounting
  - 2 Pipe clamps 44 - 49 mm (1.73 - 1.93 inch), set screw M8, for rail mounting
  - 1 Rubber stop with screw, for rail mounting
- Accessories bag with:
  - 1 Collecting vessel with PE hose 10/8 mm (0.31/0.39 inch), length 2.5 m (8.2 ft)
  - 1 PE hose roll 4/2 mm (0.16/0.08 inch), length 2.5 m (8.2 ft)
  - 1 PVC hose roll 4/2 mm (0.16/0.08 inch), length 2.0 m (6.7 ft)
  - 1 PVC vent hose 6/4 mm (0.24/0.16 inch), length 4 m (13.1 ft)
  - 1 Housing key
  - 1 Knurled nut
  - 1 Dummy plug
  - 1 Pressure surge reducer
  - 1 Screw-in connector 4 - 1/8 inch
  - 1 Straight connector 4 mm (0.16 inch)
  - 1 Reducing fitting 4 mm outside/ 3 mm inside
- 1 or 2 Filter plate(s) (depending on ordered version)
- 1 or no assembly (depending on ordered version)
- 1 Filtrate line with PE filtrate hose 4/2 mm (0.16/0.08 inch), min. length 20 m (66 ft) (depending on version)
- 1 Acceptance certificate
- 1 Operating Instructions BA338C/07/EN

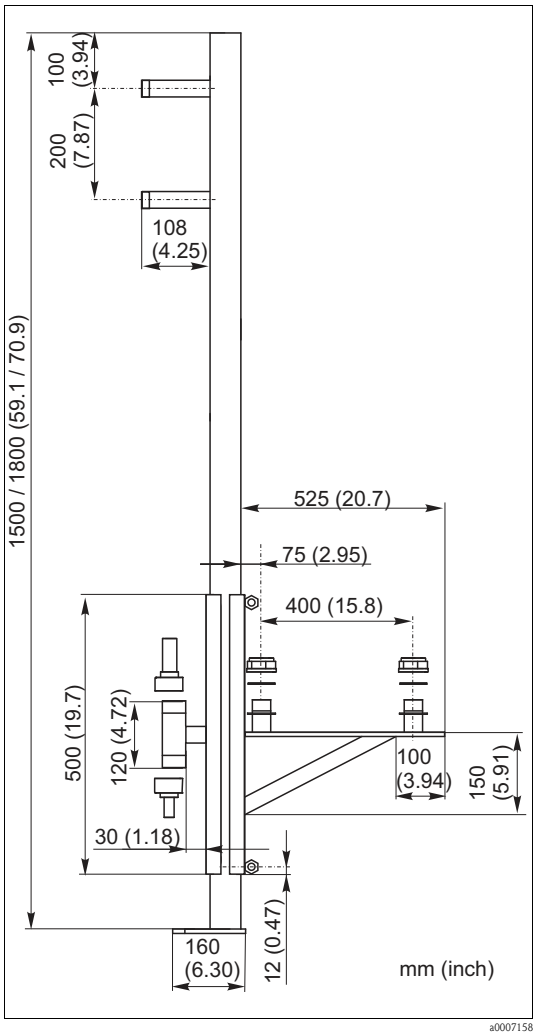
Version with high-power membrane pump

The scope of delivery comprises:
- 1 Control box, complete with
  - Filtrate line connected, length 4.5 m (14.8 ft), hose heating 24 VAC
  - 4 Plastic brackets for wall mounting
  - 2 Pipe clamps 44 - 49 mm (1.73 - 1.93 inch), set screw M8, for rail mounting
  - 1 Rubber stop with screw, for rail mounting
- Accessories bag with:
  - 1 Collecting vessel with PE hose 10/8 mm (0.31/0.39 inch), length 2.5 m (8.2 ft)
  - 1 PE hose roll 4/2 mm (0.16/0.08 inch), length 2.5 m (8.2 ft)
  - 1 PVC hose roll 4/2 mm (0.16/0.08 inch), length 2.0 m (6.7 ft)
  - 1 PTFE hose roll 3/1.5 mm (0.12/0.06 inch), length 2.5 m (8.2 ft) (only with filtrate line length > 20 m (66 ft))
  - 1 Housing key
  - 1 Allen key 4 mm
  - 1 Allen key 4 mm with handle, 200 mm
  - 1 Dummy plug
  - 1 Pressure surge reducer
  - 1 Screw-in connector 4 - 1/8 inch
  - 1 Straight connector 4 mm (0.16 inch)
  - 1 Reducing fitting 4 mm outside/ 3 mm inside
- 1 or 2 Filter plate(s) (depending on ordered version)
- 1 or no assembly (depending on ordered version)
- 1 Filtrate line with PE filtrate hose 4/2 mm (0.16/0.08 inch), min. length 20 m (66 ft) (depending on version)
- 1 Acceptance certificate
- 1 Operating Instructions BA380C/07/EN

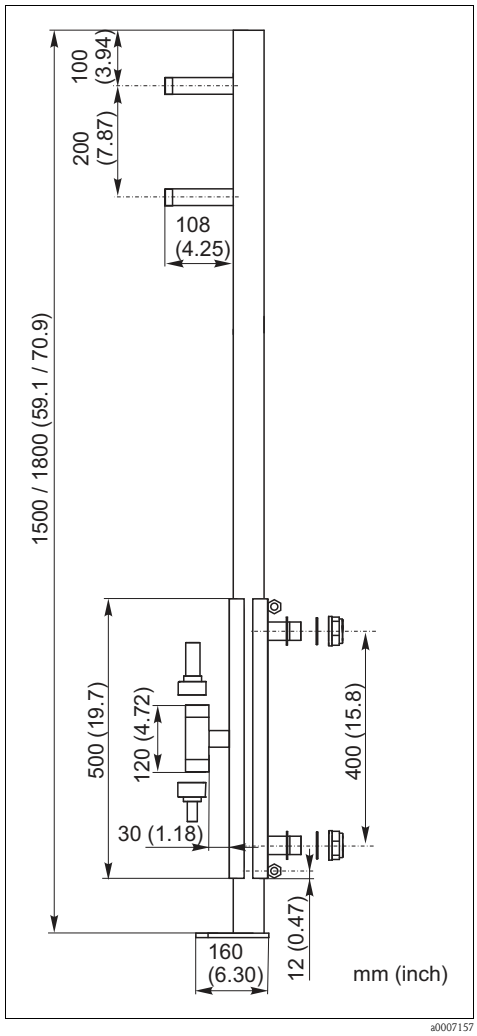
Accessories

Filter element holders

Filter element holders
- with vertical retaining slide, for basin
  - 1.50 m (4.9 ft)
  - order no. 51511353
- with vertical retaining slide, for basin
  - 1.80 m (5.9 ft)
  - order no. 51511354
- with horizontal retaining slide, for open channel
  - 1.50 m (4.9 ft)
  - order no. 51511373
- with horizontal retaining slide, for open channel
  - 1.80 m (5.9 ft)
  - order no. 51511374



Holder for open channel, side view

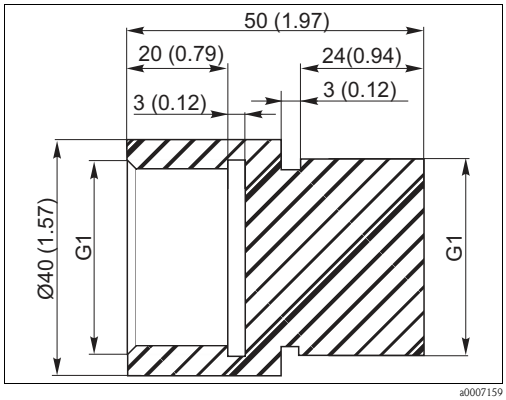


Holder for basin, side view

Accessories for filters

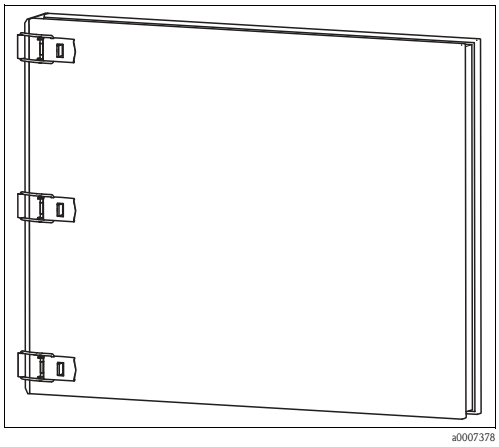
Kit CAT430: Filter element
- Filter element incl. threaded elbow joint
- order no. 51509236

Adapter
- for mounting a 2nd filter plate (2 adapters needed per filter plate)
- order no. 51511355



Dimensions

Transportation box for filter elements
- for secure transportation resp. storage of 1 or 2 filter plates
- 500 x 400 x 50 mm (19.7 x 15.8 x 1.97 inch)
- oder no. 51512477



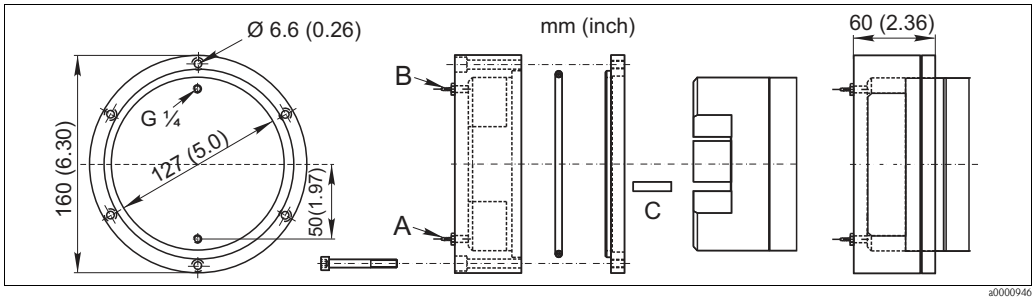
Transportation box

Spare hoses for low-power membrane pump versions

Kit CAT430: Hose set
- Spare hoses for low-power membrane pump version
- order no. 51509225

Assembly for CAT430-***4**

Flow assembly
- with reduced dead volume
- materials:
  - assembly: PVDF
  - clamping ring: stainless steal 1.4571 (AISI 316Ti)
- order no. 51509332



Flow assembly

A Hose connection inlet, ID 1.6 mm (0.06")
B Hose connection outlet, ID 1.6 mm (0.06")
C Splint pin for dead volume reduction

Conversion kit for low-power membrane pump versions

Conversion kit into high-power membrane pump

- For conversion from low-power membrane pump to high-power membrane pump
- High-power mebrane pump including:
  - Splash protection cap
  - PVC suction hose
  - Pressure hose extension
  - Scriber template
  - Pressure reducer
  - Twist drill and screws
- order no. 71039524

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