



Level



Pressure



Flow



Temperature



Liquid  
Analysis



Registration



Systems  
Components



Services



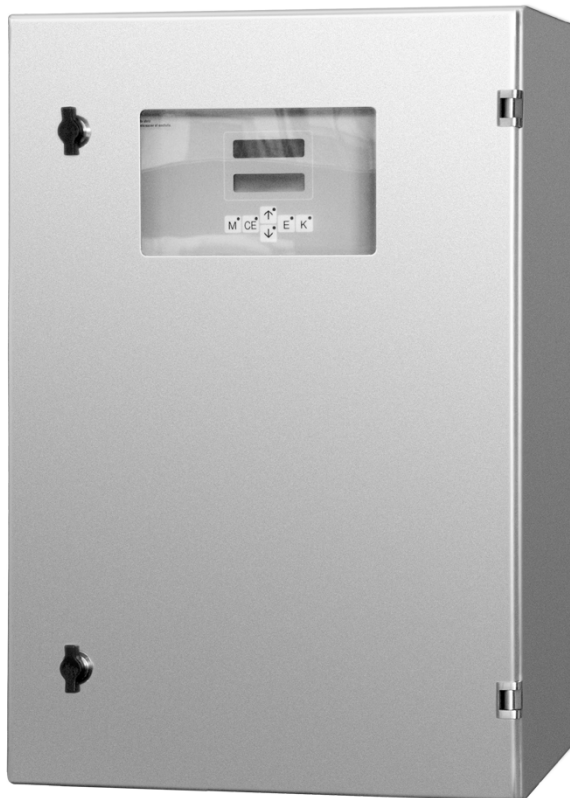
Solutions

Technical Information

## Stamolys CA71FE

Iron analyzer

Compact photometric analysis system for iron measurement in drinking water and sewage treatment plants



### Application

- Residual iron monitoring after precipitation, flocculation and filtration processes
- Iron containing process water monitoring

### Your benefits

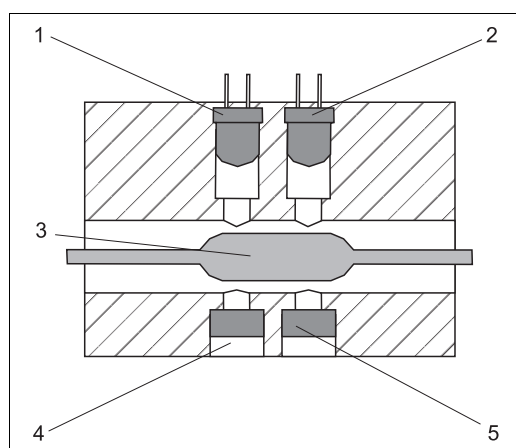
- Stainless steel or glass-fibre reinforced carbon housing available
- Two channel version available
- Measured value storage using integrated data logger
- Automatic calibration and self-cleaning
- Free selectable measuring, cleaning and calibration intervals

## Function and system design

### Measuring principle FE-A/B/C

After sample conditioning, the analyzer sample pump conveys a part of the filtrate to a mixing vessel. The reagent pump adds reagent at a specific ratio. As a result of the reaction, the sample turns a characteristic colour. The photometer determines the sample's absorption of an emitted light at a specific wavelength (s. Fig., Pos. 2). The wavelength is parameter specific. The absorbance is proportional to the concentration of the specified parameter in the sample (Pos. 3). Additionally, the absorption of a reference light is determined to receive a genuine measuring result. The reference signal is subtracted from the measuring signal to prevent any effects due to turbidity, contamination and ageing of the LEDs.

The temperature in the photometer is controlled thermostatically so that the reaction is reproducible and takes place within a short period of time.

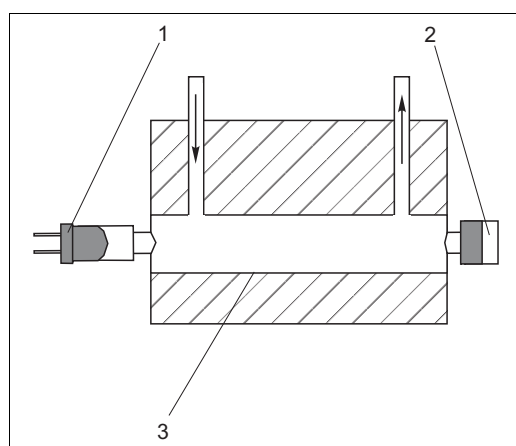


- 1 Reference LED
- 2 Emitter LED
- 3 Sample
- 4 Reference detector
- 5 Measuring detector

Photometric principle

### Measuring principle FE-D

The LED sends light at a defined wavelength through the sample. The intensity of the received light is measured by the detector and converted to an electrical signal. In the analyzer, the respective concentration is calculated from the proportion of light absorbed by the sample.



- 1 LED
- 2 Detector
- 3 Sample

Photometric measuring principle

### Iron

Iron is the second commonest metal after aluminium and is overall the fourth commonest element in the earth's crust. This explains why iron is found everywhere.

Natural bodies of water only contain minor concentrations of iron (II)- or iron (III)-ions. Leaching of natural deposits, wastewater from industry, effluents from tanning works or wastewater from mines cause iron to find its way into the water supply system.

Iron is an important trace element which is obtained in sufficient quantities from a normal diet. It is more of a source of irritation in household water rather than a health hazard. Water containing iron colours washing and porcelain and causes a bitter taste at higher concentrations (0.1 mg/litre  $\text{Fe}^{2+}$  or 0.2 mg/litre  $\text{Fe}^{3+}$ ). The limit value according to the Drinking Water Ordinance (TVO) is therefore 0.2 mg/litre Fe.

**Photometric iron determination****Ferrozine method**

In a pH 3.5 buffered solution, 3-(2-pyridile)-5, 6-bis-(4-phenyle sulfonic acid)-1, 2, 4-triazine and form a purple coloured complex. To determine the total iron content of the sample, Fe(III) has to be reduced to Fe(II) by a reductive contained in the reagent.

The absorption is determined at a wavelength of 565 nm. The absorption intensity is proportional to the iron concentration in the sample.

The reference wavelength is 880 nm.

**Interferences**

no interferences known

**Sample conditioning****Micro/ultrafiltration (Stamoclean CAT430, optional)**

A membrane filter element is suspended directly into the wastewater basin or channel. A hose pump is located in a pump box on the basin rim. The pump creates a vacuum between the membrane and the carrier plate of the filter element. This vacuum makes the filtrate pass through the filter membrane. Suspended materials, particles, algae and bacteria are collected on the surface of the membrane.

Due to alternating pumping and pause, intervals of more than one month are achieved between cleaning cycles. Parallel connection of two or four filter elements increases the sampling quantity up to approx. 1 l/h (0.26 gal/hr).

The hose pump pressure transports the sample to a collecting vessel near the analyzer over a distance of 20 m (66 ft). For distances up to 100 m (330 ft) the sample is transported to the collecting vessel by means of compressed air. The analyzers suck the needed sample volume from the collecting vessel.

**Membrane filtration (Stamoclean CAT411, optional)**

A sample flow of 0.8 to 1.8 m<sup>3</sup>/h (3.5 to 7.9 gal/min) is continuously conducted through the micro filter via a pressure pipe. A part of the sample passes the filter membrane and is then conveyed to the measuring device as filtrate.

Sampling is based on the cross flow filtration principle. The PTFE filter membrane separates particles with sizes > 0.45 µm from the filtrate. These particles are collected in front of the membrane and are washed away with the sample flow.

The medium is conducted in a meander-like channel through the filter element. This results in a constantly high flow rate. The high flow rate generates the self cleaning effect. Therefore, mechanical drives for the generation of a flow at the filter surface are not necessary.

**Backwash filter (Stamoclean CAT221, optional)**

A sample flow of 1 to 2.5 m<sup>3</sup>/h (4.4 to 11 gal/min) is permanently conveyed through the backwash filter by means of a sampling pump or compressed air or rinse water. The filtrate passes through the wedge wire sieve and is then transported to the measuring device.

Clogging is minimized by the flow at the wedge wire sieve. Automatic backwashing results in a filter operating time of several weeks.

The automatic backwashing and a small compressor or compressed air resp. rinse water supply guarantee low-maintenance and low-energy operation.

**Customer specific solution**

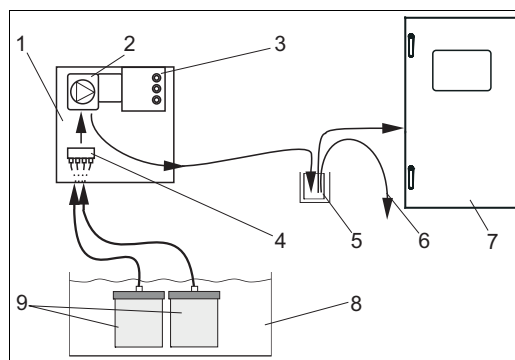
Before analysis, the sample has to be conditioned and to be transported to an external or to the delivered collecting vessel.

## Measuring system

A complete measuring system comprises:

- An analyzer
- A sample conditioning system (optionally):
  - Micro filtration / ultra filtration Stamoclean CAT430 or Stamoclean CAT411
  - Backwash filter Stamoclean CAT221
  - Customer specific solution
- Collecting vessel (see product structure)

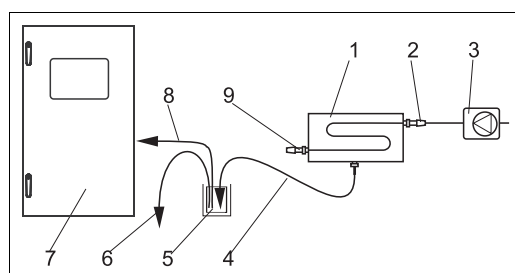
### Micro / ultra filtration



Measuring system with Stamoclean CAT430

a0001016

- 1 Control box
- 2 Pump
- 3 Control unit
- 4 Collecting unit (optional)
- 5 Collecting vessel
- 6 Overflow
- 7 Analyzer
- 8 Aeration basin
- 9 Membrane filter

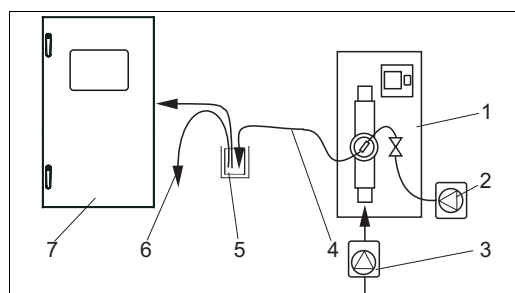


Measuring system with Stamoclean CAT411

a0001015

- 1 Stamoclean CAT411
- 2 Inlet
- 3 Sample pump or hydraulic main
- 4 Filtrate line
- 5 Collecting vessel
- 6 Overflow
- 7 Analyzer
- 8 Analyzer sample line
- 9 Outlet

### Backwash filter



Measuring system with Stamoclean CAT221

a0001017

- 1 Stamoclean CAT221
- 2 Compressor or compressed air
- 3 Sample pump or hydraulic main
- 4 Sample outlet
- 5 Collecting vessel
- 6 Overflow
- 7 Analyzer

## Standard applications

### Drinking water quality monitoring at the outlet of the water treatment plant

Sampling from hydraulic main, pressureless collecting vessel with level monitoring:

- Analyser with collecting vessel, Stamolys CA71FE-A1xC2A1

### Outlet monitoring in the water treatment plant

Sampling from hydraulic main, pressureless collecting vessel with level monitoring:

- Backwash filter Stamoclean CAT221 (order no. CAT221-Axxx)
- Compressor for CAT221 (order no. 5151143)
- Analyser with collecting vessel, Stamolys CA71FE-C1xB2A1

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## Input

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<b>Measured variable</b>	Fe [ $\mu\text{g/l}$ ] / [ $\text{mg/l}$ ]
<b>Measuring ranges</b>	<ul style="list-style-type: none"><li>■ FE-A 10 to 500 <math>\mu\text{g/l}</math></li><li>■ FE-B 0.05 to 2.00 <math>\text{mg/l}</math></li><li>■ FE-C 0.10 to 5.00 <math>\text{mg/l}</math></li><li>■ FE-D 2 to 250 <math>\mu\text{g/l}</math></li></ul>
<b>Wavelength</b>	<ul style="list-style-type: none"><li>■ FE-A/B/C 565 nm</li><li>■ FE-D 555 nm</li></ul>
<b>Reference wavelength</b>	880 nm (FE-A/B/C only)

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## Output

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<b>Output signal</b>	0/4 to 20 mA
<b>Signal on alarm</b>	Contacts: 2 limit contacts (per channel), 1 system alarm contact optional: end of measurement (with two channel version display of channel no. available)
<b>Load</b>	max. 500 $\Omega$
<b>Data interface</b>	RS 232 C
<b>Data logger</b>	1024 data pairs per channel with date, time and measured value 100 data pairs with date, time and measured value for calibration factor determination (diagnostic tool)
<b>Load capacity</b>	230 V / 115 V AC max. 2 A, 30 V DC max. 1 A


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## Power supply

### Electrical connection



Caution!

The following figure (→  1) shows the connection department sticker as an example. Terminal assignment and cable core colors can be different to the originals.

For connecting your analyzer only use the terminal assignment of the connection department sticker **in the device** (→  2)!

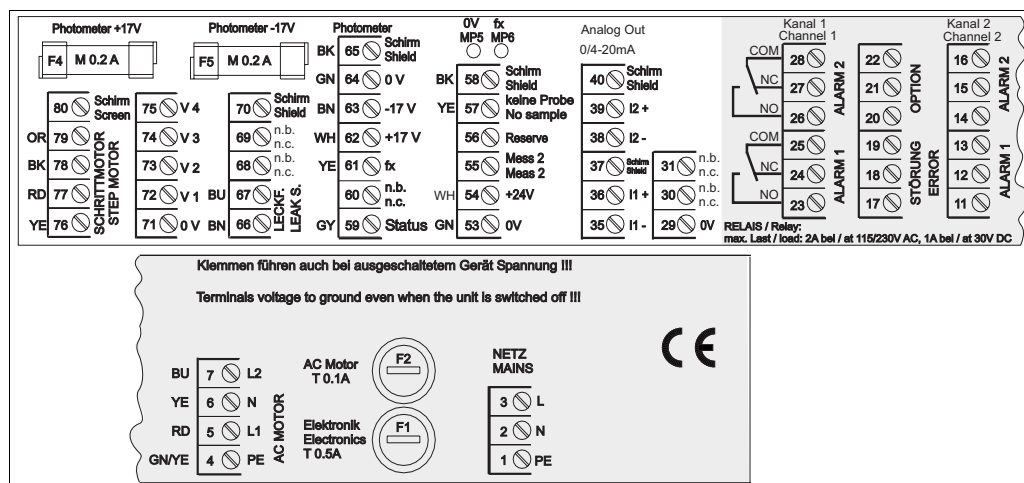


Fig. 1: Example of the connection sticker

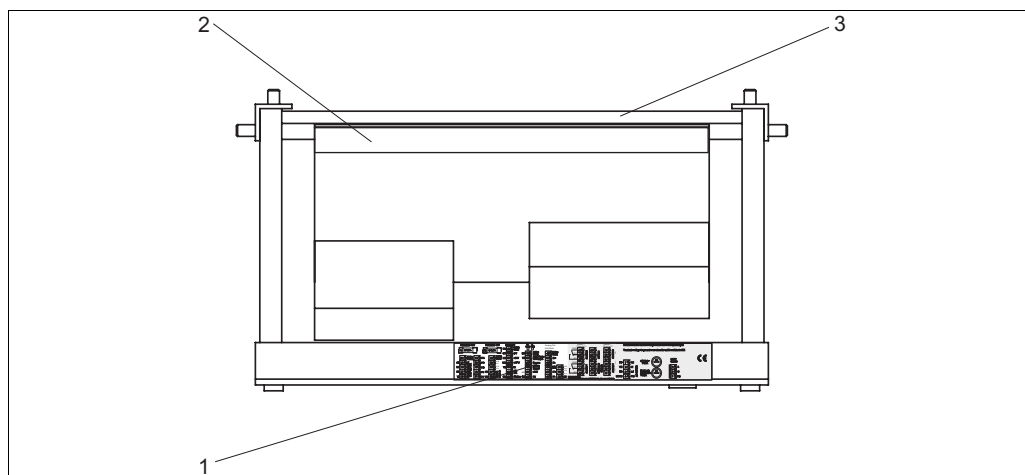


Fig. 2: Analyzer from top (open version resp. swung out)

- 1 Connection department sticker
- 2 Printed circuit board with terminal strip
- 3 Backside of the analyzer

**Supply voltage** 115 V AC / 230 V AC  $\pm 10\%$ , 50/60 Hz

**Power consumption** approx. 50 VA

**Current consumption** approx. 0.2 A at 230 V  
approx. 0.5 A at 115 V

**Fuses** 1 x time-lag 0.5 A for electronics  
2 x medium time-lag 0.2 A for photometer  
1 x time-lag 0.5 A for motors

## Performance characteristics

<b>Time between two measurements</b>	$t_{mes}$ = reaction time + rinse time + waiting time + rinse again time + filling time + sampling time + reagent refusal time (min. waiting time = 0 min)
<b>Maximum measured error</b>	±2 % of measuring range end
<b>Repeatability</b>	<ul style="list-style-type: none"> <li>■ FE-A: up to 100 µg/l: ± 5 µg/l (ppb) &gt; 100 µg/l: ± 10 µg/l (ppb)</li> <li>■ FE-B: up to 0.25 mg/l: ± 0.02 mg/l (ppm) &gt; 0.25 mg/l: ± 0.04 mg/l (ppm)</li> <li>■ FE-C: up to 0.50 mg/l: ± 0.03 mg/l (ppm) &gt; 0.50 mg/l: ± 0.06 mg/l (ppm)</li> <li>■ FE-D: up to 100 µg/l: ± 1 µg/l (ppb) &gt; 100 µg/l: ± 2% of measured value</li> </ul>
<b>Measuring interval</b>	$t_{mes}$ to 120 min
<b>Reaction time</b>	<p><b>FE-A/B/C</b> 1 minute</p> <p><b>FE-D</b> 180 s</p>
<b>Sample requirement</b>	<p><b>FE-A/B/C</b> 15 ml (0.51 fl.oz.) per measurement</p> <p><b>FE-D</b> 40 ml (1.4 fl.oz.) per measurement</p>
<b>Reagent requirement</b>	<ul style="list-style-type: none"> <li>■ FE-A/B/C 1 x 0.21 ml (0.007 fl.oz.) 0.91 l (0.24 gal) per reagent per month with 10 minute measuring interval</li> <li>■ FE-D 1 x 0.21 ml (0.007 fl.oz.) 0.78 l (0.21 gal) per reagent per month with 12 minute measuring interval</li> </ul>
<b>Calibration interval</b>	0 to 720 h
<b>Rinse interval</b>	0 to 720 h
<b>Rinse time</b>	selectable from 20 to 300 s (standard = 60 s)
<b>Rinse again time</b>	<p><b>FE-A/B/C</b> 30 s</p> <p><b>FE-D</b> 60 s</p>

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<b>Filling time</b>	<b>FE-A/B/C</b>
	22 s
	<b>FE-D</b>
	32 s

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<b>Maintenance interval</b>	6 months (typical)
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<b>Servicing requirement</b>	15 minutes per week (typical)
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## Environment

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<b>Ambient temperature</b>	5 to 40 °C (40 to 100 °F), avoid strong fluctuations
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<b>Humidity</b>	below the condensation limit, installation in usual, clean rooms outdoor installation only possible with protective devices (customer supplied)
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<b>Ingress protection</b>	IP 43
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## Process

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<b>Sample temperature</b>	5 to 40 °C (40 to 100 °F)
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<b>Sample flow rate</b>	min. 5 ml (0.0013 US.gal.) per min
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<b>Consistence of the sample</b>	low solid content (< 50 ppm)
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<b>Sample inlet</b>	pressureless
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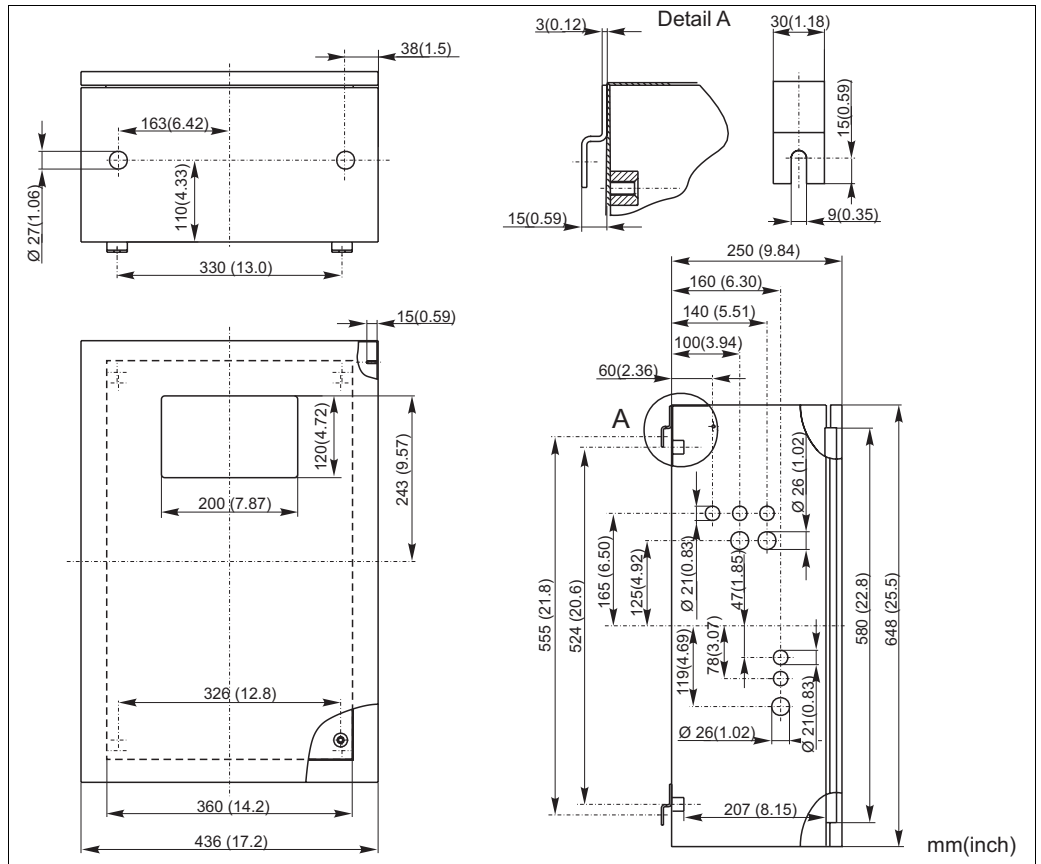
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# Mechanical construction

Design, dimensions

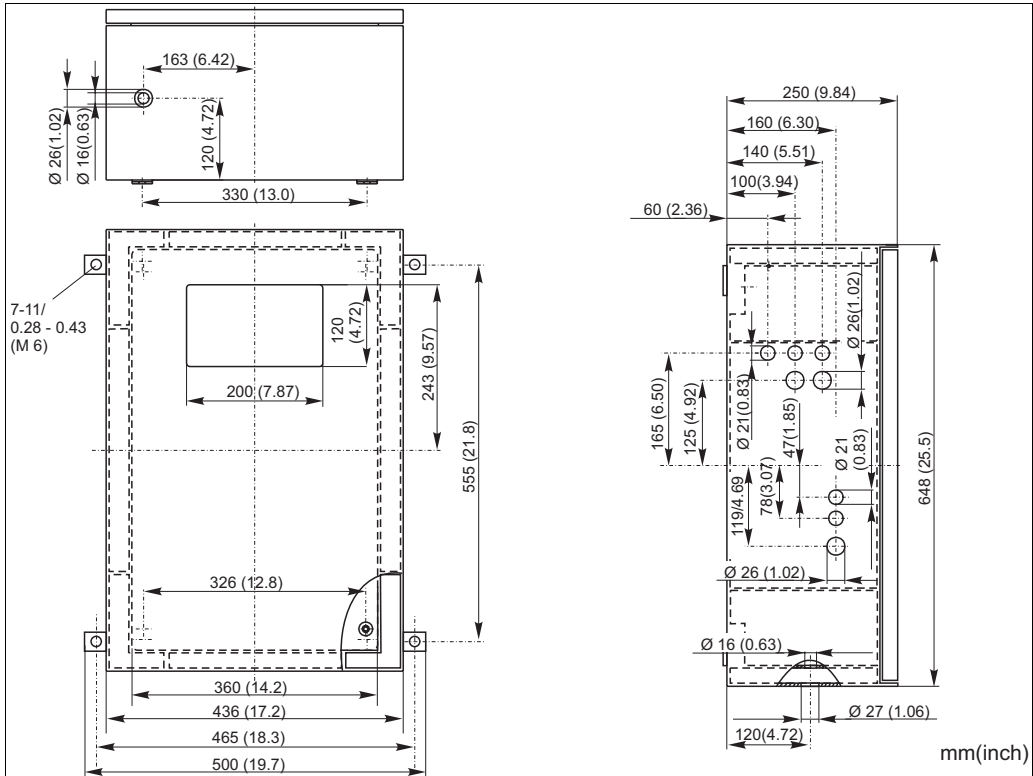
Stainless steel housing, FE-A/B/C/D



Stainless steel version

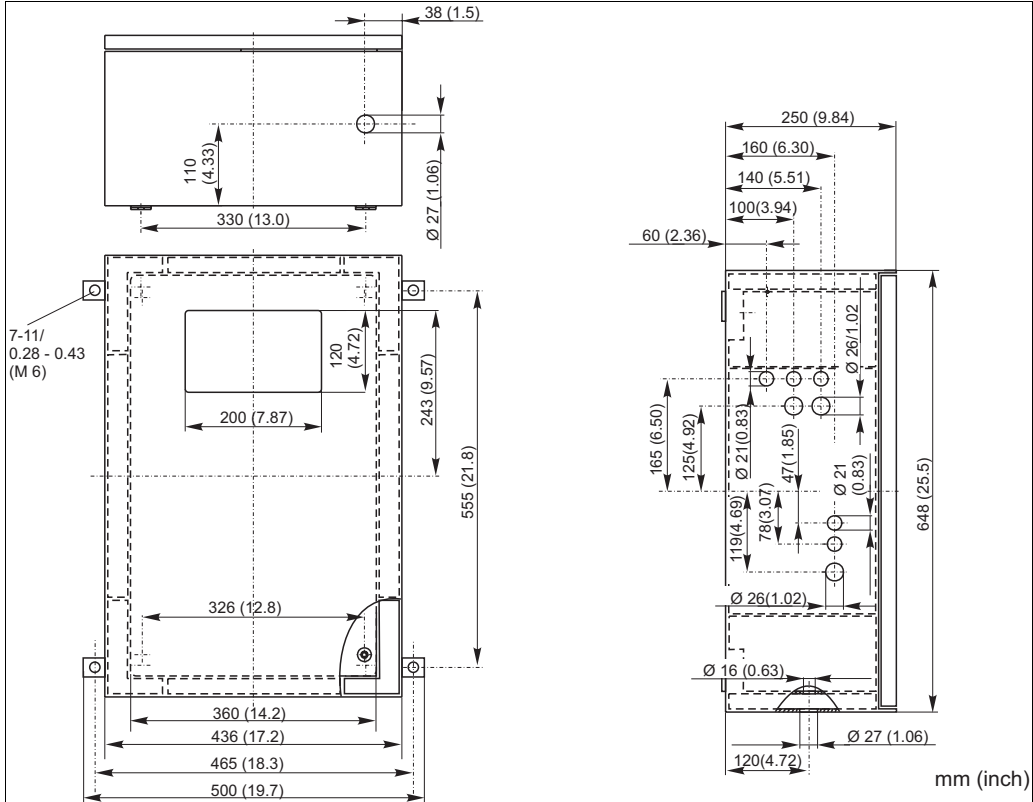
#0001361

GFR housing, FE-A/B/C



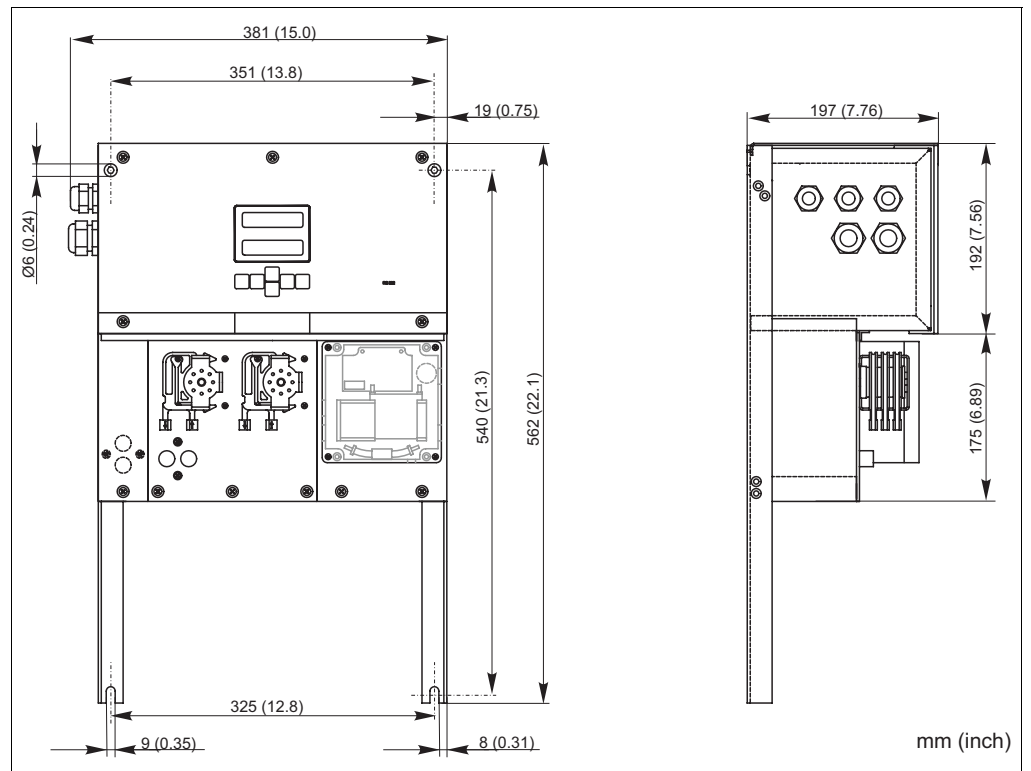
GFR version

GFR housing, FE-D



GFR version

## Open version, FE-A/B/C/D



Open version (without housing)

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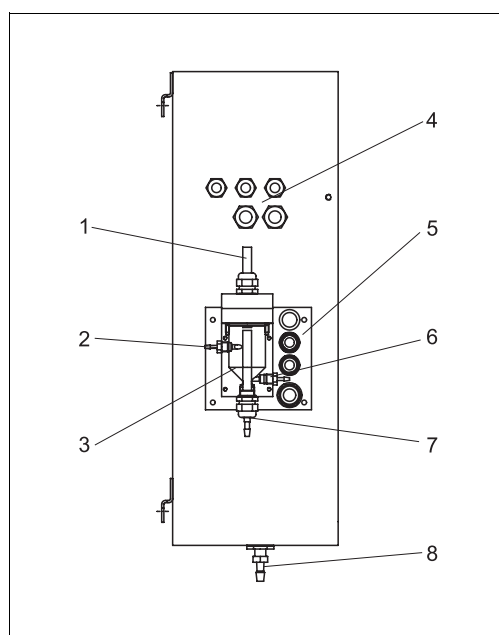
**Note!**

With the open version, you need an additional platform for the reagents. Mount this platform max. 35 cm (13.8 inch) below the pumps. The reagent bottles have the following dimensions: 90 x 90 x 215 mm (3.54 x 5.54 x 8.46 inch). The number of bottles varies from 2 to 5 depending on the analyzer version.

For these versions, the outlet pipe must be installed right of the analyzer. See the supplement to the Operating Instructions.

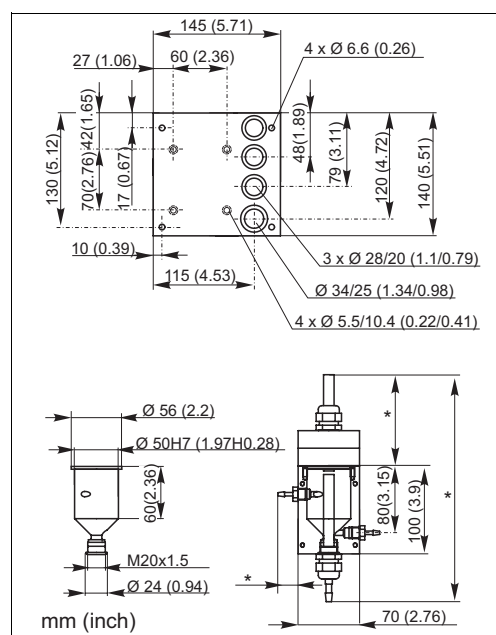
The outlet pipe must be mounted to a wall so that the sample outlet hoses from the photometer have a gradient of 5 to 10 %. If necessary, extend the hoses.

### Collecting vessel



Collecting vessel at analyzer (optional)

- 1 Ventilation
- 2 Sample inlet from sampling
- 3 Collecting vessel
- 4 Electrical connections
- 5 Analyzer sample inlet



Collecting vessel dimensions

- \* variable, freely adjustable dimensions
- 6 Sampling for analyzer
- 7 Sample overflow
- 8 Analyzer outlet

Weight		
	GFR housing	approx. 28 kg (62 lbs)
	Stainless steel housing	approx. 33 kg (73 lbs)
	Without housing	approx. 25 kg (55 lbs)

Materials		
	Housing:	Stainless steel 1.4301 (AISI 304) or glass-fibre reinforced carbon(GFR)
	Front windows:	Polycarbonate®
	Endless hose:	C-Flex®, Norprene®
	Pump hose:	Tygon®, Viton®
	Valves:	Tygon®, silicone

### Connecting the sample line

#### One channel version

Collecting vessel (at analyzer, with or without level measurement)  
 Connection hose ID 3.2 mm (0.13 inch)

Customer collecting vessel  
 Connection hose ID 1.6 mm (0.06 inch)  
 Max. distance from collecting vessel to analyzer 1 m (3.3 ft)  
 Max. height difference from collecting vessel to analyzer 0.5 m (1.6 ft)

#### Two channel version

- Depending on the ordered version, one or two collecting vessels (with or without level measurement) are included in the scope of delivery.
- Level measurement is only possible for one channel.
- Only one collecting vessel can be mounted at the housing. The second is to be placed nearby the analyzer.

**Sample outlet**

**FE-A/B/C**

Connection                      Hose ID 6.4 mm (0.25 inch)  
 – Max. length of closed loop: 1 m (3.28 ft)  
 – Open outlet downgrade installed  
 – No combination of several devices to a closed-loop system

Min. volume per measurement    20 ml (0.68 fl.oz.)

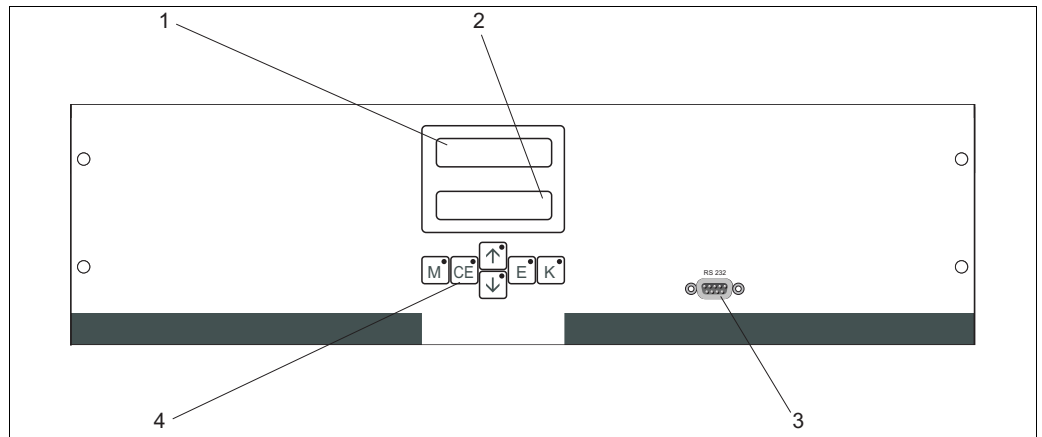
**FE-D**

Connection                      Hose ID 16 mm (0.63 inch)  
 – Max. length of closed loop: 1 m (3.3 ft)  
 – Open outlet downgrade installed  
 – No combination of several devices to a closed-loop system

Min. volume per measurement    40 ml (1.4 fl.oz.)

## Human Interface

**Display and operating elements**



*Display and operating elements*

- 1    LED (measured value)
- 2    LC display (measured value and status)
- 3    Serial interface RS 232
- 4    Operating keys and control LEDs

## Certificates and approvals

**CE approval**

**Declaration of conformity**

The product meets the legal requirements of the harmonized European standards.  
 The manufacturer confirms compliance with the standards by affixing the **CE** symbol.

**Test reports**

**Quality certificate**

Depending on the order code, you receive a quality certificate.  
 With the certificate the manufacturer confirms compliance with all technical regulations and the successful individual testing of your product.

## Ordering information

### Product structure

Measuring range	
A	10 to 500 µg/l Fe
B	0.05 to 2 mg/l Fe
C	0.1 to 5 mg/l Fe
D	2 to 250 µg/l Fe
Y	Special version acc. to customer's specification
Sample transfer	
1	Sample transfer from one measuring point (one-channel version)
2	Sample transfer from two measuring points (two-channel version)
Power supply	
0	230 V AC / 50 Hz
1	115 V AC / 60 Hz
2	115 V AC / 50 Hz
3	230 V AC / 60 Hz
Collecting vessel for up to 3 analysers	
A	Without collecting vessel
B	With collecting vessel without level measurement
C	With collecting vessel with level measurement (one-channel version only)
D	With two collecting vessels without level measurement (two-channel version)
Housing version	
1	Open design
2	GFR housing
3	Stainless steel (1.4301 / AISI 304) + purge
8	Stainless steel (1.4301 / AISI 304) + without purge
Communication	
A	0/4 to 20 mA, RS 232
B	Profibus DP
Reagents	
1	To order separately
2	One set, inactive
3	Three sets, inactive
CA71FE -	<b>complete order code</b>

### Scope of delivery

#### FE-A/B/C

The scope of delivery comprises:

- an analyzer with mains plug
- a cleaning injector
- a tin of silicone spray
- a Norprene hose, length 2.5 m (8.2 ft), ID 1.6 mm (0.06 inch)
- a C-flex hose, length 2.5 m (8.2 ft), ID 6.4 mm (0.25 inch)
- a C-flex hose, length 2.5 m (8.2 ft), ID 3.2 mm (0.13 inch)
- two hose fittings of each size:
  - 1.6 mm x 1.6 mm (0.06 inch x 0.06 inch)
  - 1.6 mm x 3.2 mm (0.06 inch x 0.13 inch)
  - 6.4 mm x 3.2 mm (0.25 inch x 0.13 inch)
- two T-hose fittings of each size:
  - 1.6 mm x 1.6 mm x 1.6 mm (0.06 inch x 0.06 inch x 0.06 inch)
  - 3.2 mm x 3.2 mm x 3.2 mm (0.13 inch x 0.13 inch x 0.13 inch)
- an interference suppressor for the current output
- 4 edge covers
- a quality certificate
- Operating Instructions (English).

**FE-D**

The scope of delivery comprises:

- an analyzer with mains plug
- a cleaning injector
- a tin of silicone spray
- a Norprene hose, length 2.5 m (8.2 ft), ID 1.6 mm (0.06 inch)
- a Grifflex hose, length 2.0 m (6.6 ft), ID 19 mm (0.75 inch)
- a C-flex hose, length 2.5 m (8.2 ft), ID 3.2 mm (0.13 inch)
- two hose fittings of each size:
  - 1.6 mm x 1.6 mm (0.06 inch x 0.06 inch)
  - 1.6 mm x 3.2 mm (0.06 inch x 0.13 inch)
- two T-hose fittings of each size:
  - 1.6 mm x 1.6 mm x 1.6 mm (0.06 inch x 0.06 inch x 0.06 inch)
  - 3.2 mm x 3.2 mm x 3.2 mm (0.13 inch x 0.13 inch x 0.13 inch)
- an interference suppressor for the current output
- a screwed socket for the outlet pipe
- 4 edge covers
- a quality certificate
- Operating Instructions (English).



Note!

Please, order reagents separately with analyzer version CA71XX-XXXXXX1.

With all other versions, inactive reagents are included in the scope of delivery. You have to mix the reagents before using them. Please, read the instructions attached to the reagents.

## Accessories

### Reagents and standard solutions

- Reagent, 1 l reagent FE1; order no. CAY840-V10AAE
- Standard solution 0.5 mg/l Fe; order no. CAY842-V10C05AAE
- Standard solution 2.0 mg/l Fe; order no. CAY842-V10C20AAE
- Standard solution 0.1 mg/l Fe; order no. CAY842-V10C01AAE

### Cleaner for hoses

- Cleaning agent, alkaline, 100 ml (3.4 fl.oz.); order no. CAY746-V01AAE
- Cleaning agent, acidic, 100 ml (3.4 fl.oz.); order no. CAY747-V01AAE

### Collecting vessel

- for sampling from pressurised systems
- results in an unpressurised continuous sample stream
- Collecting vessel without level measurement; order no. 51512088
- Collecting vessel with level measurement (conductive); order no. 51512089

### Maintenance kit

#### FE-A/B/C

- Maintenance kit CAV 740:
  - 1 set pump hoses yellow/blue
  - 1 set pump hoses black/black
  - 1 set hose connectors per hose set
 order no. CAV 740-1A

#### FE-D

- q Maintenance kit CAV 740:
  - 1 set pump hoses yellow/blue
  - 1 set pump hoses black/black
  - 1 set hose connectors per hose set
 order no. CAV 740-5C

### Additional accessories

- Interference suppressor for control, power and signal lines  
order no. 51512800
- Silicon spray  
order no. 51504155
- Valve set, 2 pieces, for two-channel version  
order no. 51512234
- Upgrade kit for upgrading from one-channel to two-channel version  
order no. 51512640

### Documentation

- Technical Information Stamoclean CAT430, TI 338C/07/en
- Technical Information Stamoclean CAT411, TI 349C/07/en
- Technical Information Stamoclean CAT221, TI 384C/07/en

### International Headquarters

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