



Level



Pressure



Flow



Temperature



Liquid
Analysis



Registration



Systems
Components



Services



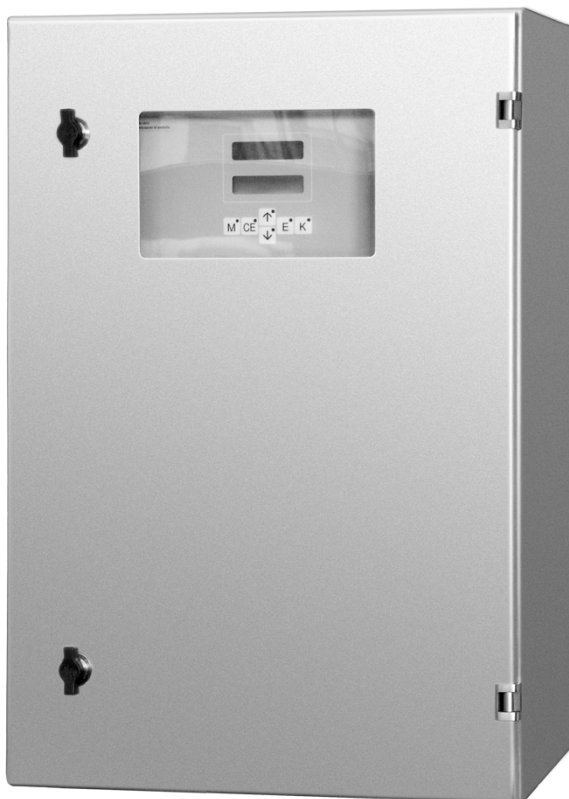
Solutions

Technical Information

Stamolys CA71AM

Ammonium analyser

Compact photometric analysis system for the ammonium measurement in sewage treatment plants, in drinking water and in industrial water treatments



Application

- Monitoring and optimising the cleaning capacity of sewage treatment plants
- Monitoring activated sludge basins
- Monitoring sewage treatment plant outlets
- Monitoring of drinking water inlets
- Monitoring of industrial water treatments

Your benefits

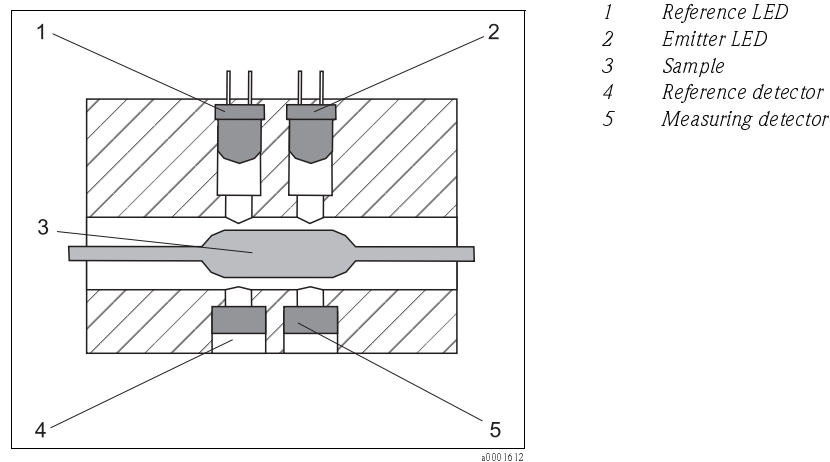
- Trace measurement from 1 µg/l possible
- Stainless steel or glass-fibre reinforced carbon housing available
- Two channel version available
- Measured value storage using integrated data logger
- Automatic calibration and self-cleaning
- Free selectable measuring, cleaning and calibration intervals

Function and system design

Measuring principle AM-A/B/C

After sample conditioning, the analyser 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.

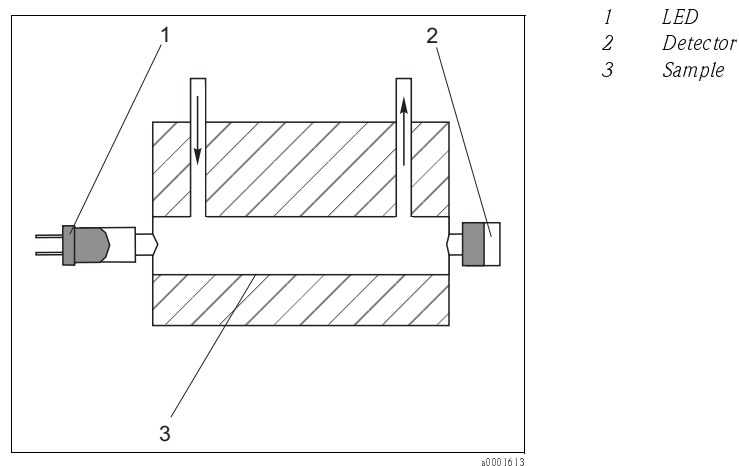
The temperature in the photometer is controlled thermostatically so that the reaction is reproducible and takes place within a short period of time.



Photometric principle

Measuring principle AM-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 analyser, the respective concentration is calculated from the proportion of light absorbed by the sample.



Photometric measuring principle

Ammonium and ammonia

Ammonium occurs in a number of ways including biological decomposition of organic nitrogen compounds. The chemical balance in water shifts with an increasing pH value from ammonium to poisonous ammonia. Natural bodies of water do not normally contain any ammonia. The higher concentrations occurring in drinking water indicate the influence of waste water and landfill leachate. Ammonium is therefore an important parameter for water quality.

Bacteria use oxygen to convert ammonium to nitrites which are then further oxidised to create nitrates (nitrification). The oxygen balance of a body of water is therefore negatively effected in a powerful way.

Photometric ammonium determination**Indophenole blue method acc. to ISO 11732**

Sodium dichloric isocyanurate and sodium salicylate form a blue dye in conjunction with ammonium. The absorption is determined at a wavelength of 660 nm (AM-A/B/D) resp. of 565 nm (AM C). The absorption intensity is proportional to the ammonium concentration in the sample. The reference wavelength is 880 nm.

Interferences

No interferences up to the given concentration:

Concentration [mg/l]	Interference
2,500	Ca^{2+} (as CaCO_3)
1,500	Mg^{2+} (as CaCO_3)
300	SO_4^{2-}
250	NO_3^- -N, PO_4^{3-}
30	NO_2^- -N

The pH value should be between 5 and 9. Strong acid or strong alkaline samples may result in false measuring values.

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. The hose pump pressure transports the sample to a collecting vessel near the analyzer over a distance of 20 m. For distances up to 100 m 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 m³/h 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 m³/h 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 minimised 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

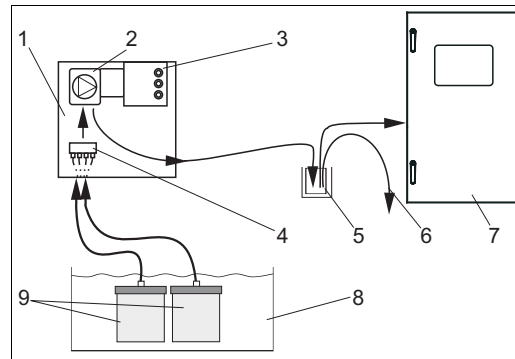
Before analysis, the sample has to be conditioned and to be transported to an external or to the delivered collecting vessel.

Measuring system

A complete measuring system comprises:

- An analyser
- 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)

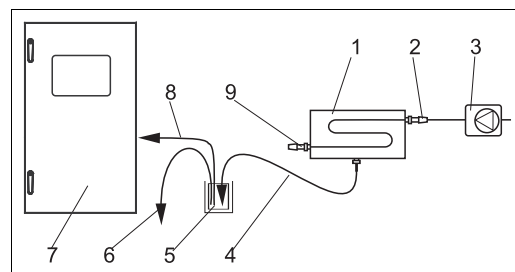
Micro / ultra filtration



Measuring system with Stamoclean CAT430

a0001616

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

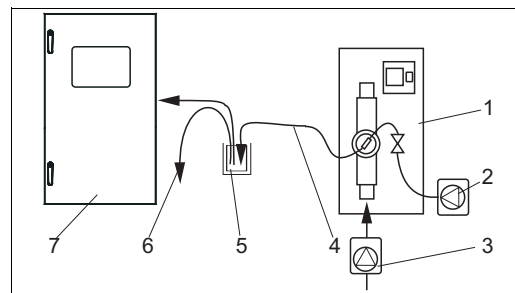


Measuring system with Stamoclean CAT411

a0001615

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

Backwash filter



Measuring system with Stamoclean CAT221

a0001617

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

Standard applications

Sewage treatment plant outlet monitoring

Sampling from hydraulic main and analyser in measuring station:

- Backwash filter Stamoclean CAT221 (order no. CAT221-Axxx)
- Compressor for CAT221 (order no. 51511143)
- Analyser with collecting vessel, Stamolys CA71AM-A1xB2A1

Sampling from open channel

Local filtration and analyser in measuring station (up to 20 m distance):

- Ultra filtration Stamoclean CAT430, plate filter with hose heating for max. 20 m distance to the analyser (order no. CAT 430-A1F0A3A)
- Filter element holder with horizontal slide (order no. 51511374)
- Analyser with collecting vessel, Stamolys CA71AM-A1xB2A1

Ammonium content monitoring in the biology

Local filtration and analyser in measuring station (up to 100 m distance):

- Ultra filtration Stamoclean CAT430, plate filter with hose heating over 18 m, remaining distance freeze free installed, sample transportation by means of compressed air up to 100 m (order no. CAT 430-A3F0A3A)
- Filter element holder with vertical slide (order no. 51511354)
- Analyser with collecting vessel, Stamolys CA71AM-B1xB2A1

Ammonium content monitoring in the biology

Local filtration and analyser in measuring station (up to 20 m distance):

- Ultra filtration Stamoclean CAT430, plate filter with hose heating over max. 20 m distance to the analyser (order no. CAT 430-A1F0A3A)
- Filter element holder with vertical slide (order no. 51511354)
- Analyser with collecting vessel, Stamolys CA71AM-B1xB2A1

Monitoring of the drinking water quality before the net inlet or of well water to avoid an expensive water treatment

Sampling from hydraulic main resp. from well and analyser in the measuring station:

- No filtration needed
- Analyser with collecting vessel Stamolys CA71AM-D1xB2A1

Input

Measured variable	NH ₄ -N [mg/l]
Measuring ranges	0.02 ... 5 mg/l (AM-A) 0.2 ... 15 mg/l (AM-B) 0.2 ... 100 mg/l (AM-C) 1 ... 500 µg/l (AM-D)
Wavelength	660 nm (AM-A/B/D) 565 nm (AM-C)
Reference wavelength	880 nm (AM-A/B/C only)

Output

Output signal	0/4 ... 20 mA
Signal on alarm	Contacts: 2 limit contacts (per channel), 1 system alarm contact optional: end of measurement (with two channel version display of channel no. available)
Load	max. 500 Ω
Data interface	RS 232 C
Data logger	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)
Load capacity	230 V / 115 V AC max. 2 A, 30 V DC max. 1 A

Power supply

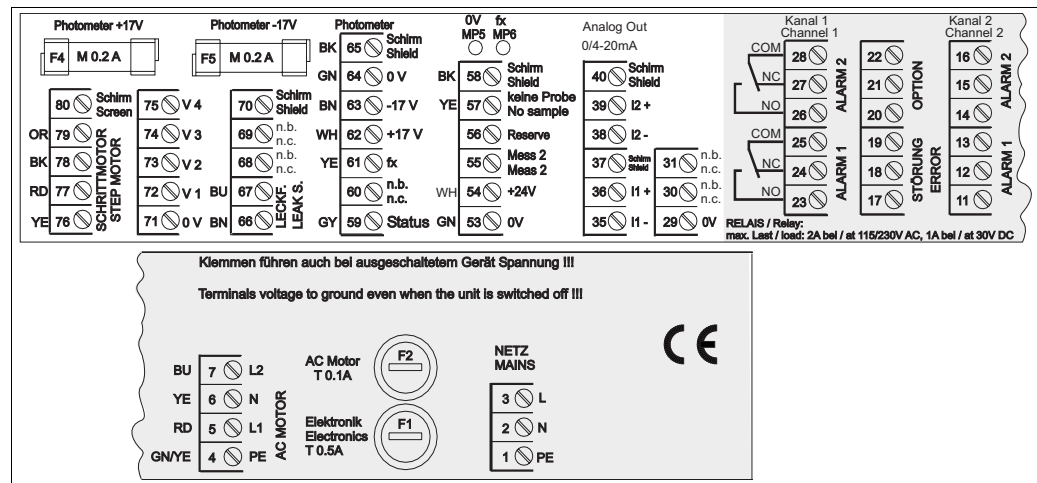
Electrical connection



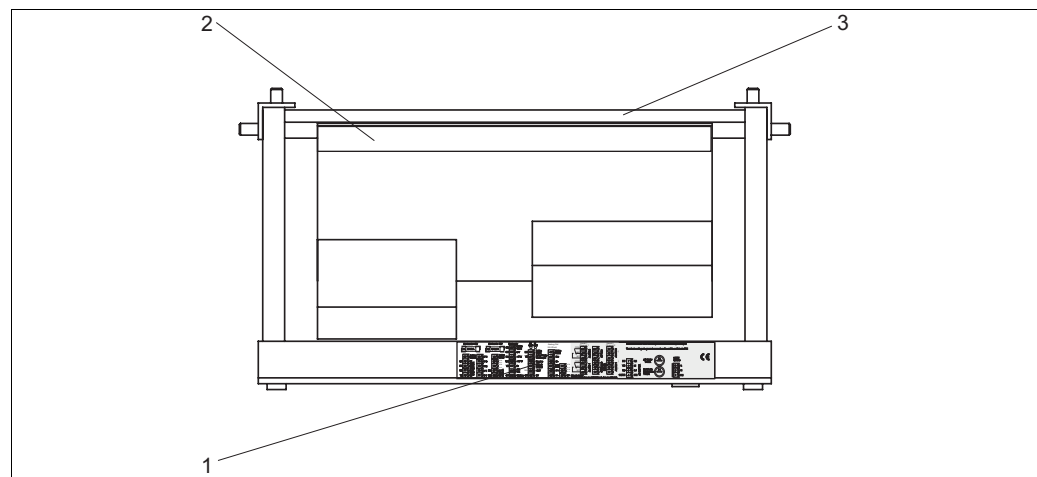
Caution!

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

For connecting your analyser only use the terminal assignment of the connection department sticker **in the device** (Fig.)!



Example of the connection sticker



Analyser from top (open version resp. swung out)

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

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

Time between two measurements	t_{mes} = reaction time + rinse time + waiting time + rinse again time + filling time + sampling time + reagent refusal time (min. waiting time = 0 min)
Maximum measured error	2 % of measuring range end
Repeatability	<ul style="list-style-type: none"> ■ AM-A: up to 2 mg/l: ± 0.03 mg/l > 2 mg/l: ± 0.1 mg/l ■ AM-B: up to 5 mg/l: ± 0.05 mg/l > 5 mg/l: ± 0.1 mg/l ■ AM-C: up to 40 mg/l: ± 0.5 mg/l > 40 mg/l: ± 2 mg/l ■ AM-D: ± 2 µg/l
Measuring interval	t_{mes} to 120 min
Reaction time	<ul style="list-style-type: none"> ■ AM-A/B: 180 s ■ AM-C: 90 s ■ AM-D: 600 s
Sample requirement	20 ml (0.0053 US.gal.) per measurement
Reagent requirement	<ul style="list-style-type: none"> ■ AM-A/B/D: 2 x 0.5 ml (0.00013 US.gal) 2.59 l (0.68 US.gal) per reagent per month with 10 minute measuring interval ■ AM-C: 2 x 0.6 ml (0.00016 US.gal) 2.16 l (0.57 US.gal) per reagent per month with 10 minute measuring interval
Calibration interval	0 to 720 h at ambient temperatures < 30 °C (86 °F) max. 6 h at ambient temperatures > 30 °C (86 °F)
Rinse interval	0 to 720 h
Rinse time	selectable from 20 to 300 s (standard = 60 s)
Rinse again time	30 s
Filling time	<ul style="list-style-type: none"> ■ AM-A/B: 15 s ■ AM-C: 18 s ■ AM-D: 40 s
Maintenance interval	6 months (typical)
Servicing requirement	15 minutes per week (typical)

Environment

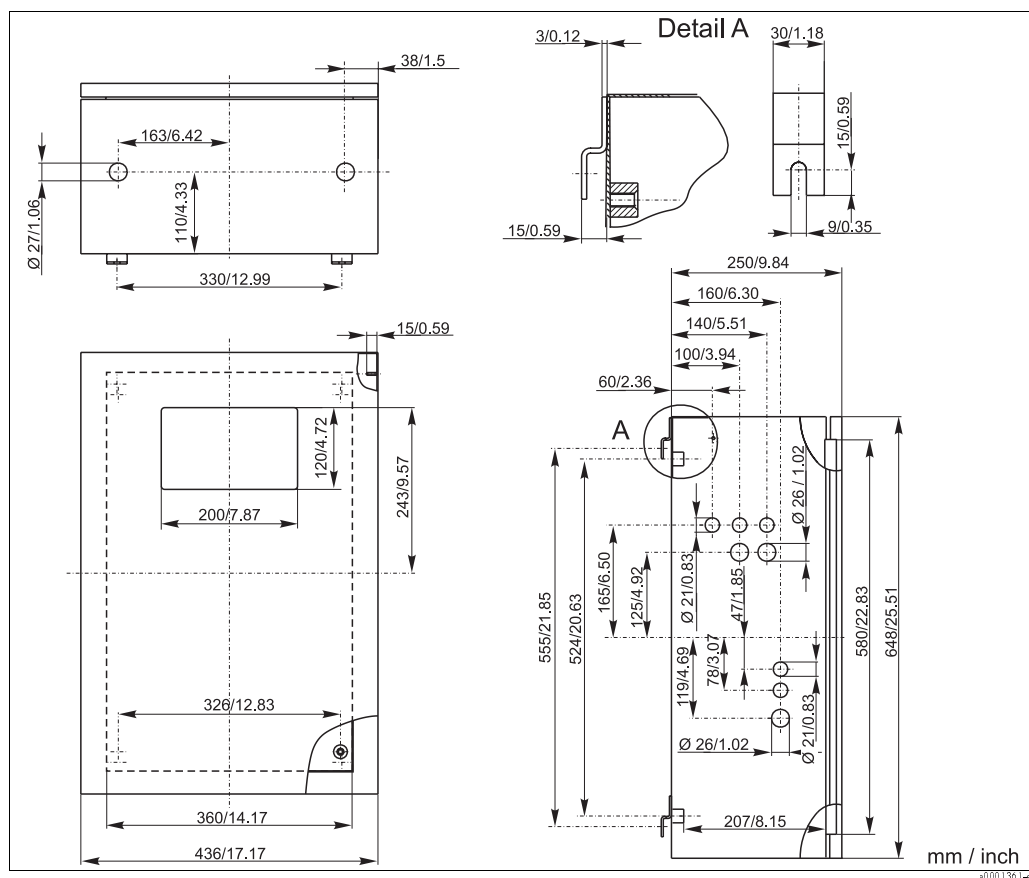
Ambient temperature	5 ... 40 °C (41 ... 104 °F) at temperatures > 30 °C (86 °F) the calibration interval has to be cut to max. 6 h
Humidity	below the condensation limit, installation in usual, clean rooms outdoor installation only possible with protective devices (customer supplied)
Ingress protection	IP 43

Process

Sample temperature	5 to 40 °C (41 to 104 °F)
Sample flow rate	min. 5 ml (0.0013 US.gal.) per min
Consistence of the sample	low solid content (< 50 ppm)
Sample inlet	pressureless

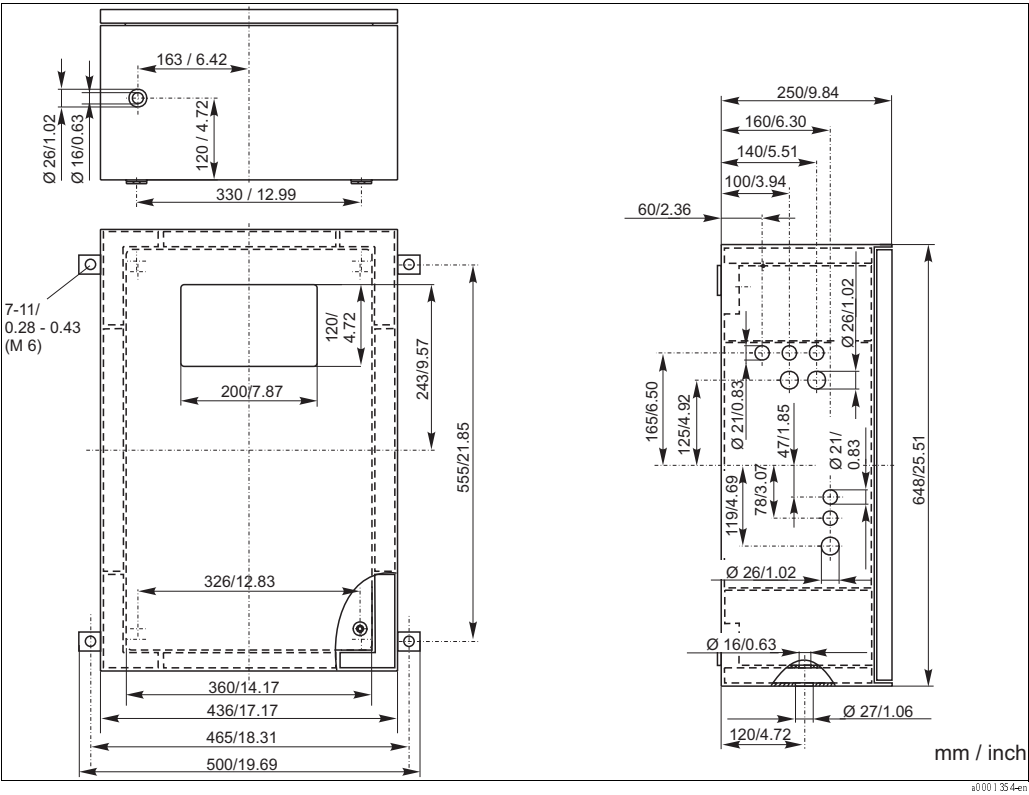
Mechanical construction

Design, dimensions	Analyser, stainless steel, AM-A/B/C/D
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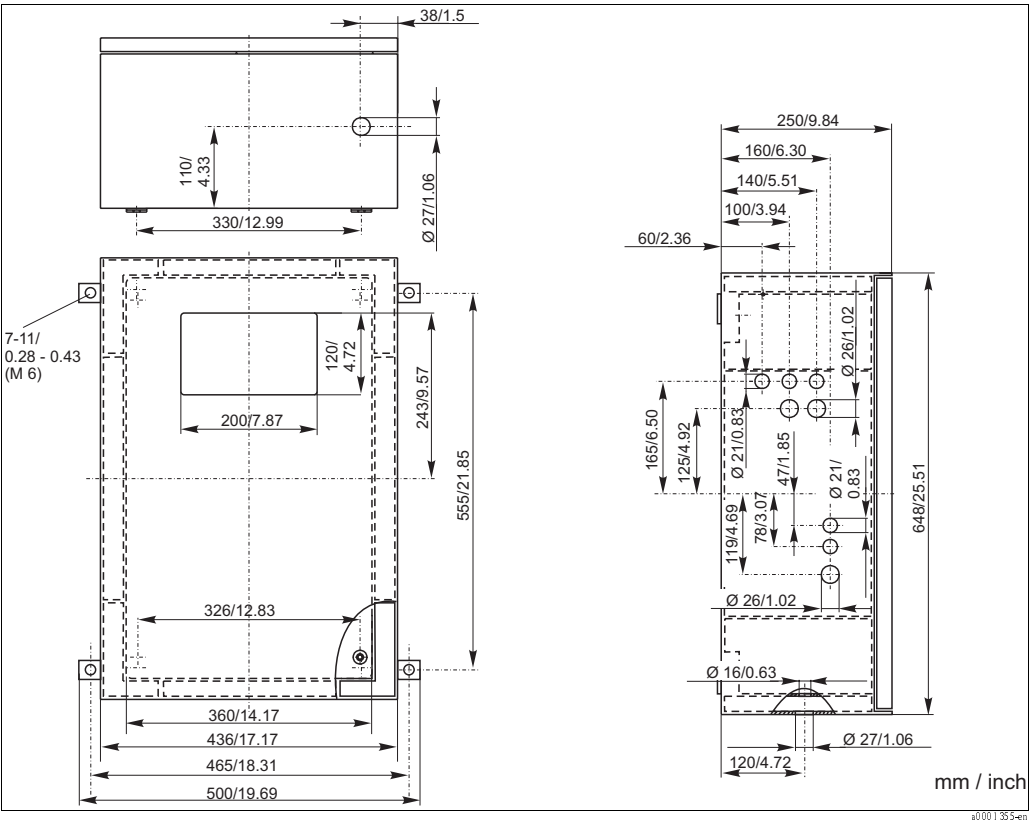
Stainless steel version

Analysér, GFR version, AM-A/B/C



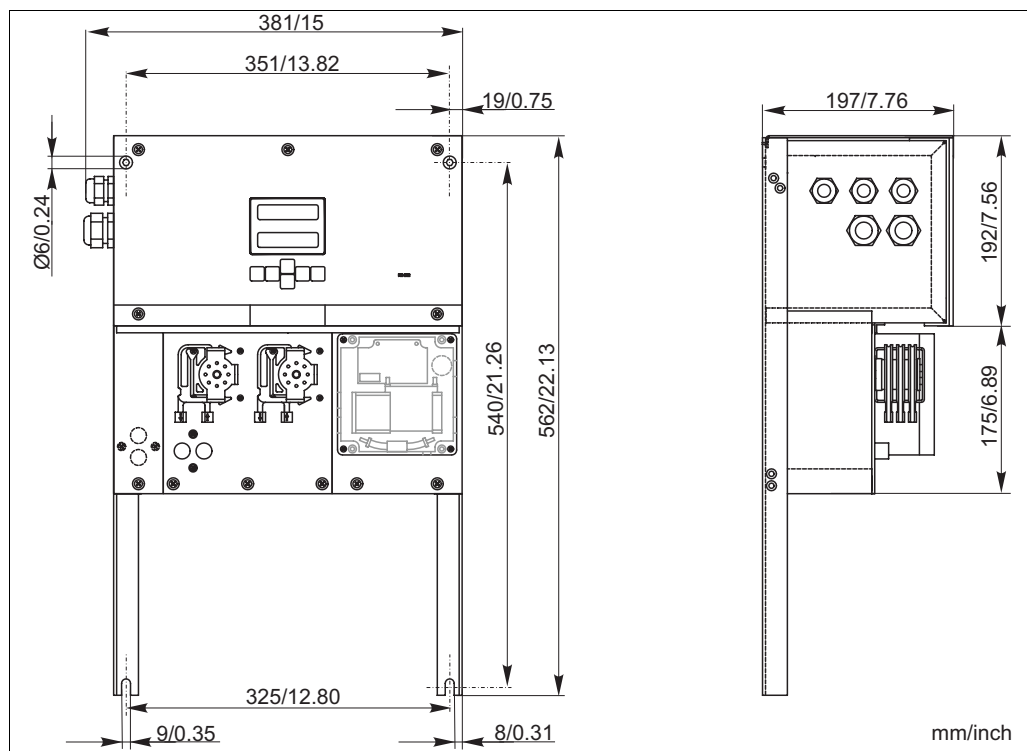
GFR version

Analysér, GFR version, AM-D



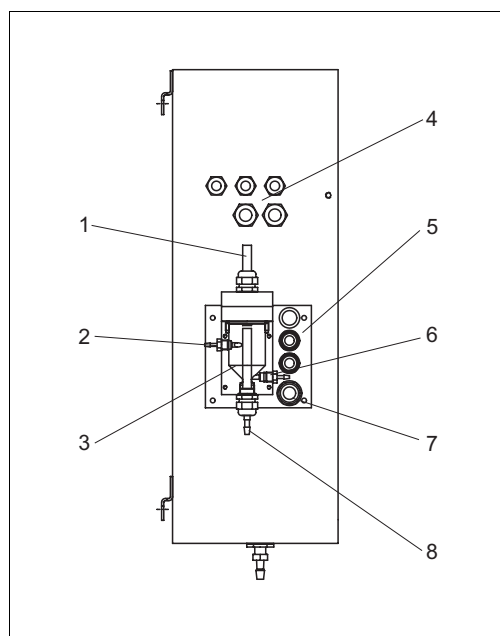
GFR version

Analyser, open version, AM-A/B/C/D



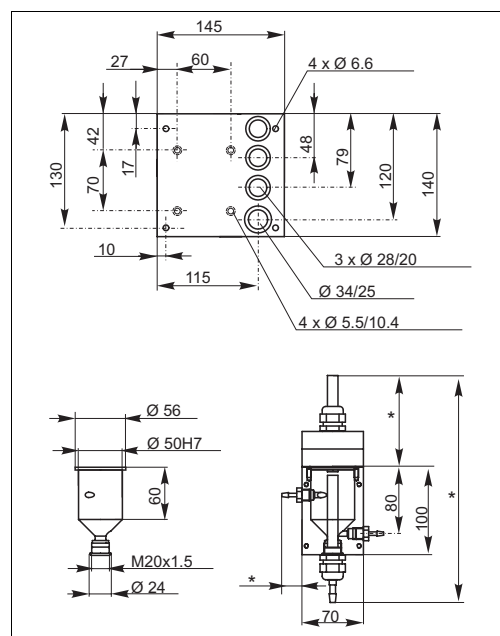
Open version (without housing)

Collecting vessel



Collecting vessel at analyser (optional)

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



Collecting vessel dimensions

- * variable, freely adjustable dimensions
- 6 Sampling for analyser
 - 7 analyser outlet
 - 8 Sample overflow

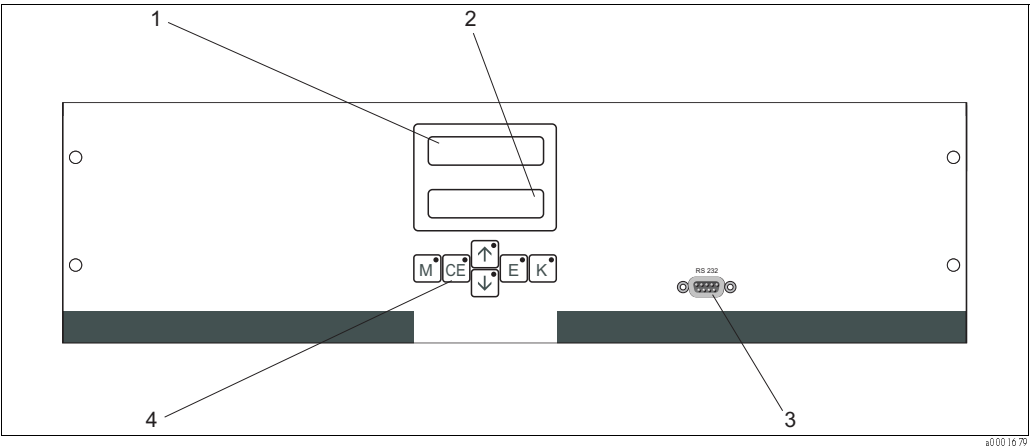
Weight

GFR housing	approx. 28 kg (61.7 lb)
Stainless steel housing	approx. 33 kg (72.8 lb)
Without housing	approx. 23 kg (50.6 lb)

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
<hr/>		
Sample line connection	One channel version	
	<i>Collecting vessel</i> (at analyser, with or without level measurement)	
	Connection	hose ID 3.2 mm (0.13")
	<i>Customer collecting vessel</i>	
	Connection	hose ID 1.6 mm (0.06")
	Max. distance from collecting vessel to analyser	1 m (3.28 ft)
	Max. height difference from collecting vessel to analyser	0.5 m (1.64 ft)
	Two channel version	
	<ul style="list-style-type: none">■ 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 analyser.	
	<hr/>	
Sample outlet AM-A/B/C	Connection	Hose ID 6.4 mm (0.25") – 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 (0.005 US.gal.)
	<hr/>	
Sample outlet AM-D	Connection	Hose ID 16 mm (0.63") – 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
	<hr/>	

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

Ordering information

Product structure

Measuring range										
A	0.02 ... 5 mg/l NH ₄ -N									
B	0.2 ... 15 mg/l NH ₄ -N									
C	0.2 ... 100 mg/l NH ₄ -N									
D	1 ... 500 µg/l NH ₄ -N									
Y	Special version acc. to customer's specification									
Sample transfer										
1	From one measuring point (one-channel version)									
2	From two measuring points (two-channel version)									
Power supply										
0	230 V AC / 50 Hz									
1	115 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	Without									
2	GFK housing									
3	Stainless steel 1.4301 (AISI 304)									
Communication										
A	0/4 ... 20 mA, RS 232									
Additional equipment										
1	Quality certificate									
2	Quality certificate + set of inactive reagents									
3	Quality certificate + three sets of inactive reagents									
CA71AM -										complete order code

Scope of delivery



Note!

Please, order reagents separately with analyser 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.

AM-A/B/C

The scope of delivery comprises:

- an analyser 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")
- a C-flex hose, length 2.5 m (8.2 ft), ID 6.4 mm (0.25")
- a C-flex hose, length 2.5 m (8.2 ft), ID 3.2 mm (0.12")
- two hose fittings of each size:
 - 1.6 mm x 1.6 mm (0.06" x 0.06")
 - 1.6 mm x 3.2 mm (0.06" x 0.12")
 - 6.4 mm x 3.2 mm (0.25" x 0.12")
- two T-hose fittings of each size:
 - 1.6 mm x 1.6 mm x 1.6 mm (0.06" x 0.06" x 0.06")
 - 3.2 mm x 3.2 mm x 3.2 mm (0.12" x 0.12" x 0.12")
- an interference suppressor for the current output
- 4 edge covers
- a quality certificate
- Operating Instructions (English).

AM-D

The scope of delivery comprises:

- an analyser 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")
- a Grifflex hose, length 2.0 m (6.56 ft), ID 19 mm (0.75")
- a C-flex hose, length 2.5 m (8.2 ft), ID 3.2 mm (0.12")
- two hose fittings of each size:
 - 1.6 mm x 1.6 mm (0.06" x 0.06")
 - 1.6 mm x 3.2 mm (0.06" x 0.12")
- two T-hose fittings of each size:
 - 1.6 mm x 1.6 mm x 1.6 mm (0.06" x 0.06" x 0.06")
 - 3.2 mm x 3.2 mm x 3.2 mm (0.12" x 0.12" x 0.12")
- an interference suppressor for the current output
- a screwed socket for the outlet pipe
- 4 edge covers
- a quality certificate
- Operating Instructions (English).

Certificates and approvals

CE approval

Declaration of conformity

The product meets the legal requirements of the harmonised 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.

Accessories

Reagents and standard solutions

- ☐ Reagent set active, 1 l reagent AM1+AM2 each; order no. CAY140-V10AAE
- ☐ Reagent set inactive, for 1 reagent AM1+AM2 each; order no. CAY140-V10AAH
- ☐ Cleaning agent, 1l; order no. CAY141-V10AAE
- ☐ Standard solution 100 µg/l NH₄ - N; order no.CAY142-V10C01AAE
- ☐ Standard solution 500 µg/l NH₄ - N; order no.CAY142-V10C02AAE
- ☐ Standard solution 5 mg/l NH₄ - N; order no.CAY142-V10C05AAE
- ☐ Standard solution 10 mg/l NH₄ - N; order no.CAY142-V10C10AAE
- ☐ Standard solution 15 mg/l NH₄ - N; order no.CAY142-V10C15AAE
- ☐ Standard solution 20 mg/l NH₄ - N; order no.CAY142-V10C20AAE
- ☐ Standard solution 30 mg/l NH₄ - N; order no.CAY142-V10C30AAE
- ☐ Standard solution 50 mg/l NH₄ - N; order no.CAY142-V10C50AAE

Cleaner for hoses

- ☐ Cleaning agent, alkaline, 100 ml; order no. CAY746-V01AAE
- ☐ Cleaning agent, acidic, 100 ml; 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

AM-A/B/C

- ☐ Maintenance kit CAV 740:
 - 2 sets pump hoses yellow/blue
 - 1 set hose connectors per hose set
 order no. CAV 740-2A

AM-D

- ☐ 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 (order no. 51508729)
- ☐ Technical Information Stamoclean CAT411, TI 349C/07/en (order no. 51508785)
- ☐ Technical Information Stamoclean CAT221, TI 384C/07/en (order no. 51515899)

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