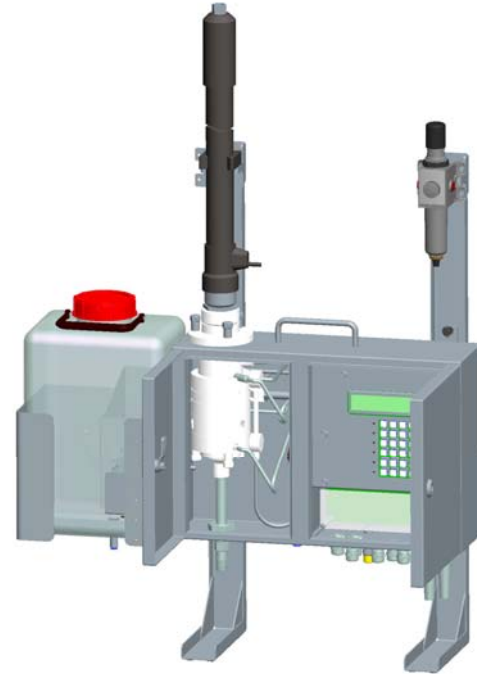


HYGROPHIL H 4230-10 process hygrometer

Continuous humidity measurement in industrial processes.

For very high demands in terms of being resistant to corrosion and dirt. Particularly suitable for cases where the air to be measured contains oil vapours, dust, water-soluble gases, solvents, acids and aggressive chemicals.

The device is certified by the German Technical Inspection Agency (TÜV) for the performance of flue gas measurements in accordance with the Federal German Pollution Control Act (BImSchV) (17th Implementing Ordinance).



In many processes, monitoring and controlling gas humidity is a must if you want to achieve a consistently high product quality, use energy efficiently and adhere to the regulations regarding emission limits. **HYGROPHIL H 4230** is a special measuring device that continuously measures the humidity levels during industrial processes.

Thanks to the carefully chosen materials and constant scavenging, the system is especially suitable for cases where the air to be measured contains oil or fat vapour, solvents, water-soluble gases or salts.

Examples:

Hot-air tunnels for cooking foodstuffs

Fertiliser dryers

Various chemical processes

It can even be used in cases where the air to be measured is highly contaminated with acids or other aggressive substances (such as sulphuric acid, hydrofluoric acid or nitrohydrochloric acid).

Examples:

Copper-nickel works

Large combustion plants

Combined heating and power stations

Waste incineration plants

In power stations, incineration plants, and other industrial facilities, the amount of water vapour can also be measured in non-purified flue gas immediately downstream of the filter. This allows you to detect not only pipe damage, but also hairline cracks in the heat exchanger.

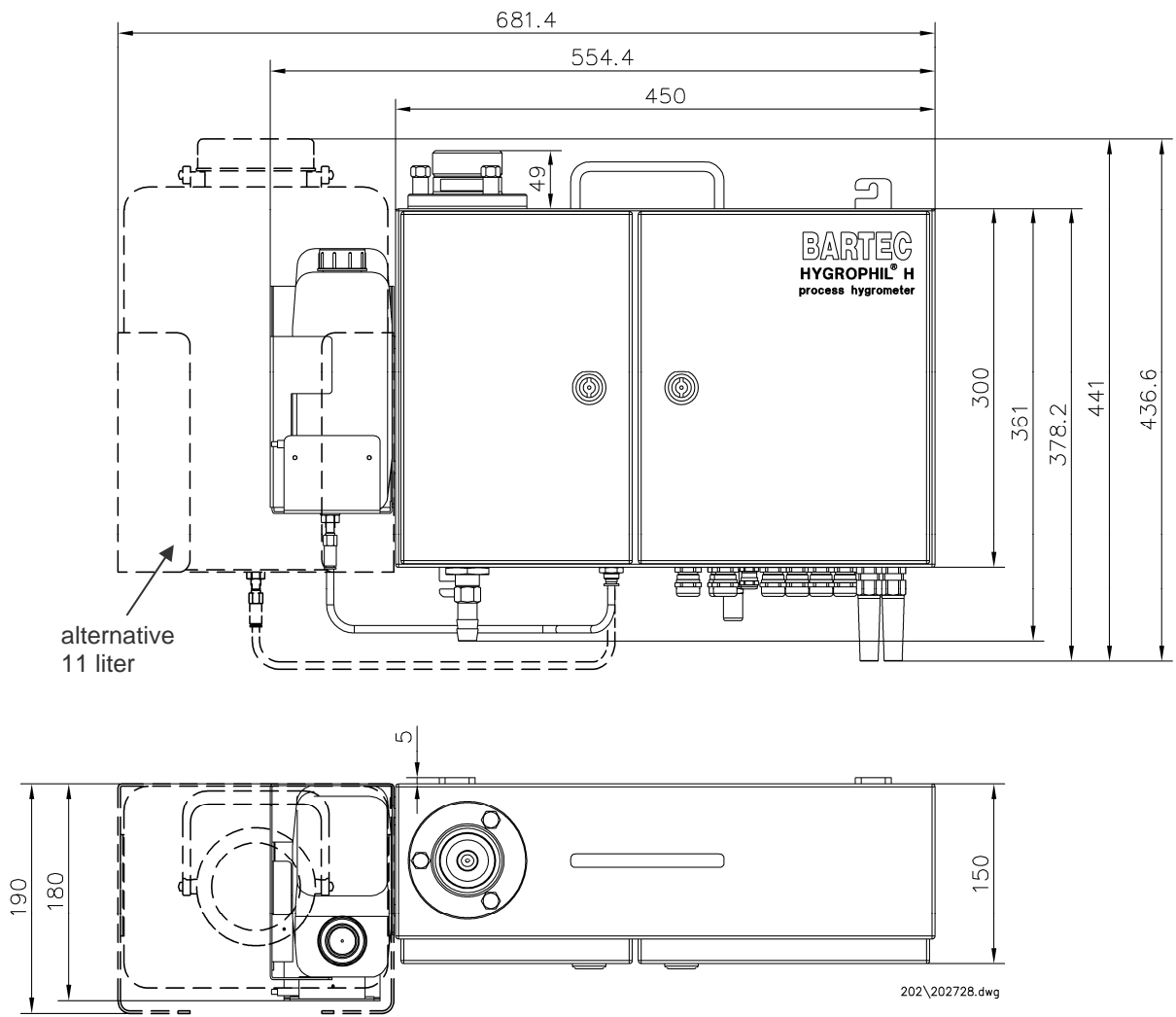
The portable design is particularly suitable for mobile application at the facilities of test centres and agencies for monitoring plants and at energy information centres.

Thanks to the standard method used, HYGROPHIL H is also suitable for use as a reference device.

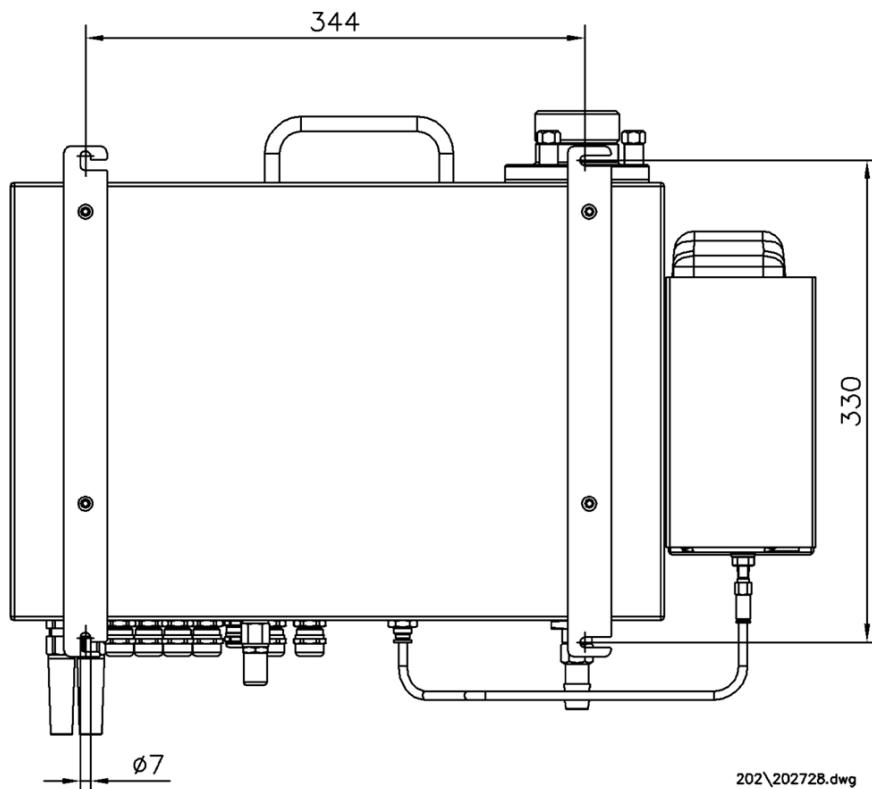
- **Measurement range:**
20...100 °C DT
- **Primary measurement variables:**
TT, HT, SP, aux. temperature
- **Calculated measurement variables:**
DT, MH, SH, vol.%, VP, h, DVP
- **Secondary standard method in accordance with DIN 50012**
- **1 additional temperature measuring circuit for PT100**
- **Current outputs 2x 0/4...20 mA electrically isolated**
- **Profibus DP field bus**
- **Certified by the TÜV for use in accordance with the Federal German Pollution Control Act (BImSchV) (13th and 17th Implementing Ordinances)**

Technical data					
Humidity measurement					
Measurement principle	Psychrometric gas humidity measurement in line with the impact jet method				
Transducer	PT 100/ 4-conductor in accordance with DIN IEC 751				
Computational accuracy	≤ 0.01%				
Computing time	Approx. 2s				
Settling time	t ₉₀ = 90s (for sudden change in SH from 10 to 190 g/kg)				
Air/gas throughput	Max. 17,5 NI/min				
Water intake	Max. 25 ml/h (tube pump)				
Water reserve	2l (enough for approx. 3 days) or 11l				
Compressed air intake	2...5 bar (max. air consumption 2000NI/h)				
Measured variable inputs					
Measured variable		Measurement range	Resolution	Accuracy	Type
Dry temperature	TT	0...140 °C	0.1 °C	≤ 0.5% of the measurement range	Primary
Wet temperature	HT	0...140 °C			
Temperature	T1	0...200 °C			
Absolute pressure	SP	500...1500 hPa	1 hPa	≤ 1%	Calculated
Dew-point temperature	DT	20...100 °C	0.1 °C		
Volumetric content H ₂ O	Vol.%	2...100 %	0.1 %		
Absolute humidity	MH	15...1000 g/kg	1 g/kg		
Specific humidity	SH	15...1000 g/kg	1 g/kg		
Enthalpy	h	35...1000 kJ/kg	1 kJ/kg		
Current vapour pressure	VP	10...1000 hPa	1 hPa		
Saturation deficit	DVP	0...1000 hPa	1 hPa		
Outputs					
Signal output					
Analogue output	2 electrically isolated output channels, can be assigned to each of the measurement ranges, spread, error behaviour programmable				
Output signal	0...20 mA or 4...20 mA (programmable), linear				
Permissible load	≤ 500 Ω				
Accuracy	≤ 0.2% of the associated measured value				
Inputs					
External water detector	24 V d.c., NPN				
T1 _{extern}	PT 100/ 4-conductor in accordance with DIN IEC 751				
Data interface					
Field bus interface	Profibus				
Electrical data					
Auxiliary power	Measuring unit: 90...264 V a.c., 47...63 Hz, approx. 30 VA Heating hose: 230 V or 115 V a.c.; approx. 100 VA/m				
Relays					
Warn relay	Display of warnings	Load: 1 A/24 V d.c., at least 10 mA			
ERROR-relay	Display of failures	Load: 1 A/24 V d.c., at least 10 mA			
Ambient conditions					
Permitted working temperature	+5...+50°C, with enclosure 4230-119 for explosion protected area 22: - 30 °C ... + 50 °C				
Permitted storage temperature	-20...+70°C (without water)				
Climate category	KWF in accordance with DIN 40040				
Reference conditions	23°C ±2°C / 230V ± 2%				
Mechanical data					
Enclosure	Stainless steel enclosure; protection rating IP64 in accordance with DIN 40050				
Dimensions	450×410×150 mm (without mount)				
Assembly drill holes	347x330 mm, 4×Ø7x13mm (M6)				
Weight	Approx. 12.5 kg				
Connections					
Electrical connection	Screw terminals 0.5-1.5 mm ² ; cable feed via M 16x1.5 cable gland				
Compressed air supply	Plug nipple NW 7				
Gas sampling hose connection	Special connection				

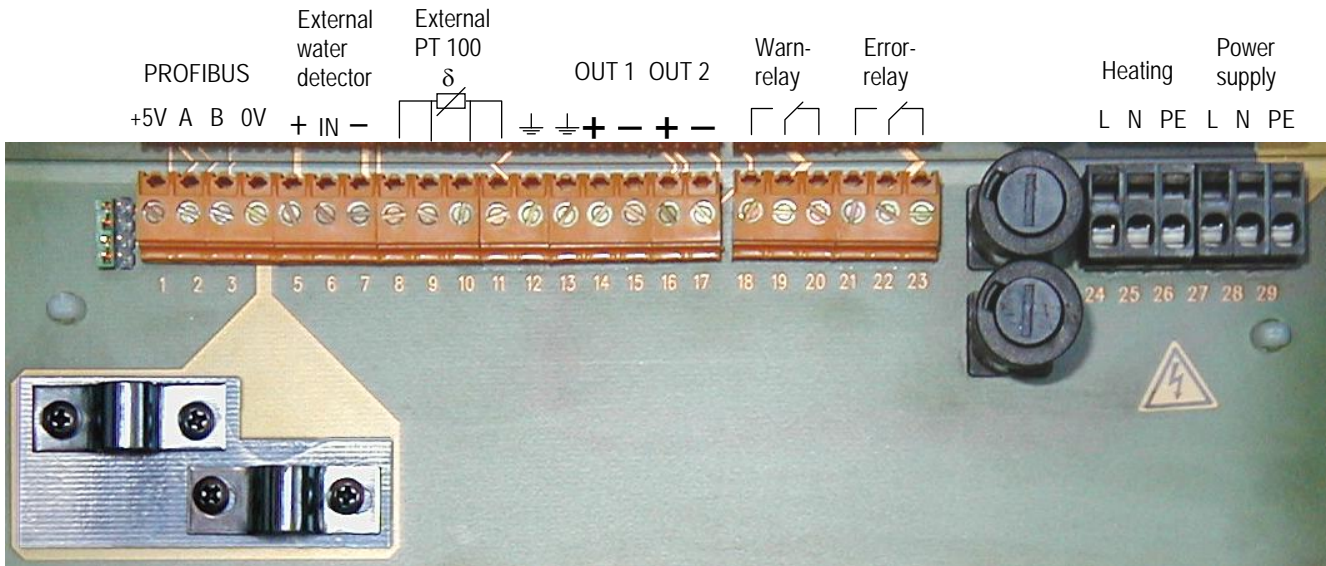
Dimensions



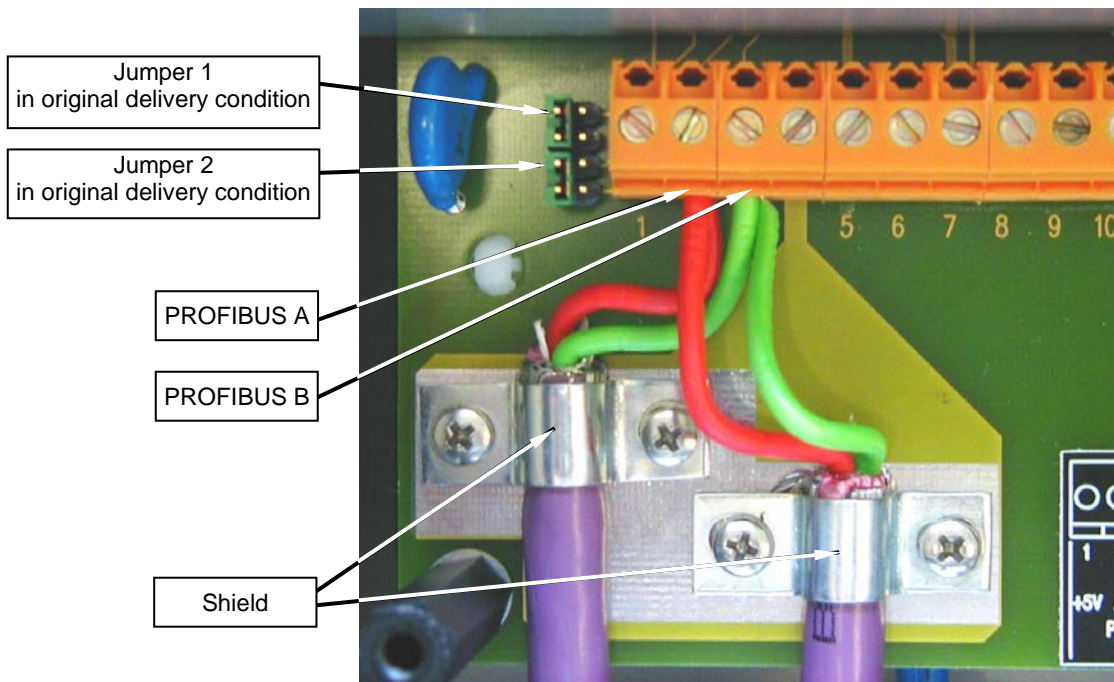
Assembly drill holes



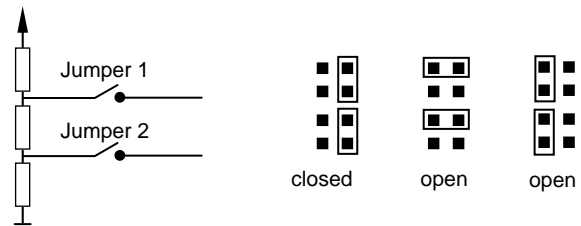
Assignment of terminals



The Profibus cable is connected to terminals 2 (Profibus A) and 3 (Profibus B).



If the device is the last user on the Profibus, the two jumpers must be closed.



Details when ordering

Basic equipment

HYGROPHIL H Type 4230-10

Corrosion-proof, 115/230 V a.c.

Scope of delivery: HYGROPHIL-H in accordance with order number; 1 litre of surfactant

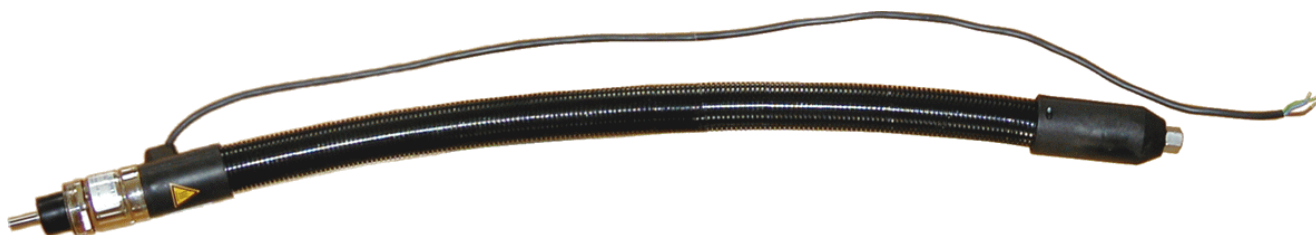
Order number: 202728

Accessories

Gas sampling hose, Type 4230-100

Flexible, water-resistant gas sampling hose for feeding measurement gas without condensate (max. input temperature 200 °C); Including 1 mount per metre; Operating voltage: 230 V a.c. or 115 V a.c.

Connection type: Universal conical nipple G3/8" DKR DIN3863



Length	Order number (230 V)	Order number (115 V)	
1,0 m	202729		
1,3 m	289818		
2,0 m	216375		
3,0 m	202727		
4,0 m	216376		
5,0 m	216377		
6,0 m	290074		
7,0 m	232553		306255
8,0 m	365576		302536 292338
10,0 m	294604		
12,0 m	233793		
16,0 m	281348	(60 W/m)	
Gas sampling hose (Hastelloy)			
2,0 m	292910	(100 W/m)	
12,0 m	371852	(100 W/m)	

Gas sampling hose Ex Type 4230-114

Flexible, water-resistant gas sampling hose for feeding measurement gas without condensate (max. input temperature 120 °C); Including 1 mount per metre

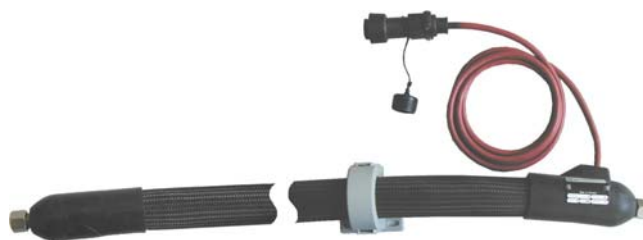
Operating voltage: 230 V a.c. or 115 V a.c.; Connection type: Universal conical nipple G3/8" DKR DIN3863



Length	Order number (230 V)	Order number (115 V)
4,0 m	321356	Order numbers for 115 V version on request
6,0 m	321357	
10,0 m	279259	
12,0 m	241974	
15,0 m	300500	

Gas sampling hose, Type 4200-06

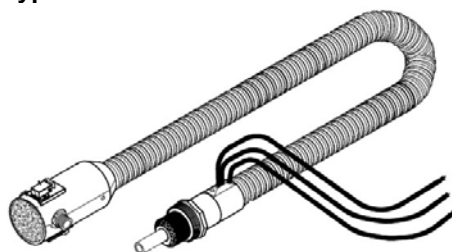
Connection type:
 Universal conical nipple
 G 3/8" DKR DIN3863
 PT 100



Length	Order number (230 V)
13,0 m	U7521113420006
15,0 m	U7521115420006
19,0 m	202222
20,0 m	U7521120420006
23,0 m	U7521123420006
24,0 m	320764
26,0 m	220718

Temperature Controller TRM/20, 0-200°C

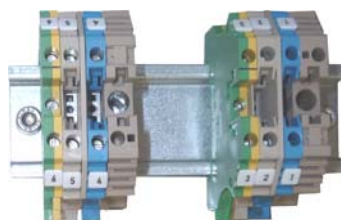
Order number: 314300

Measurement gas tube with switch, Type 4230-112

Length 2,5m Order number: 283058
 (230 V)

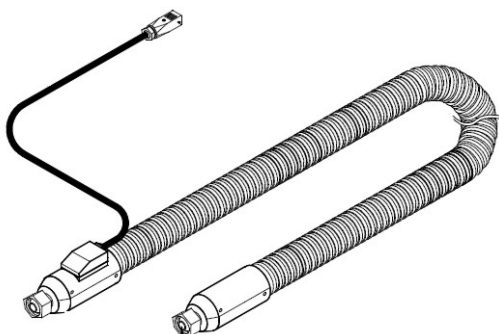
Terminal strip Type 4230-134

for connecting the gas sampling hose with switching valve



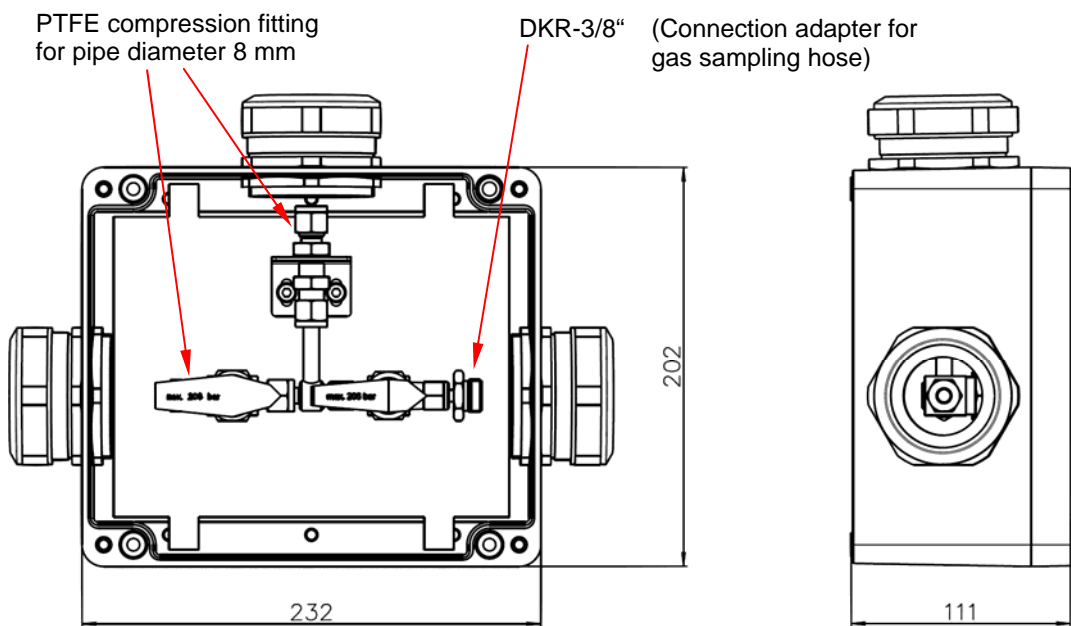
Order number: 368952

Gas sampling hose self-regulating, Type 4230-128



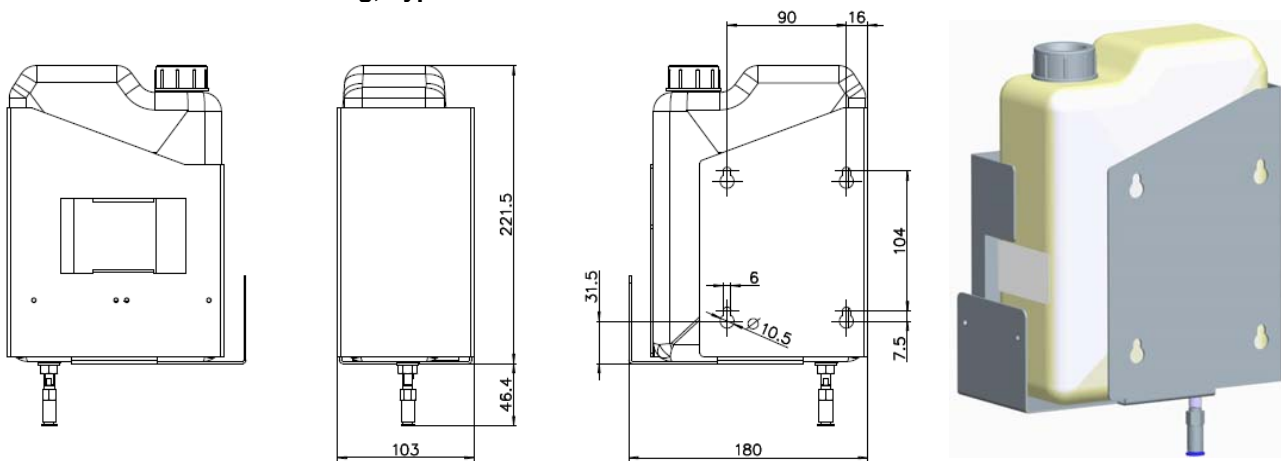
Length	Order number (230 V)
4,0 m	367556
8,0 m	348425

Heated Box, 230VAC, with manual valves, Type 4230-135



Order number: 376237

Water container 2l with holding, Type 4230-123



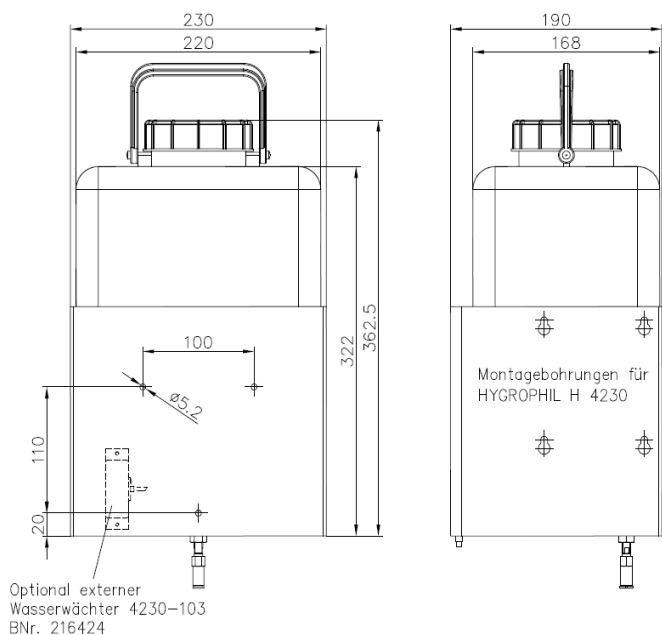
Order number: 304510

Water container, Type 4230-300



Order number: 202156

Water container 11l, Type 4230-102



Order number: 216420

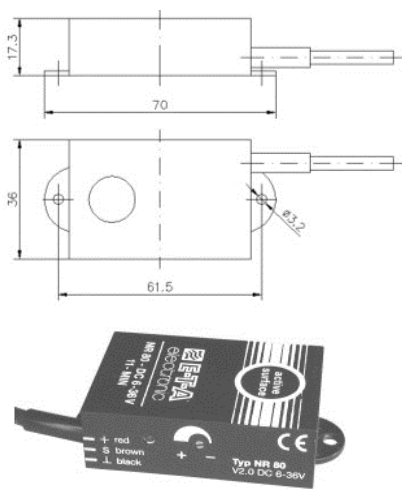
Water container 11l without holding, Type 4230-133



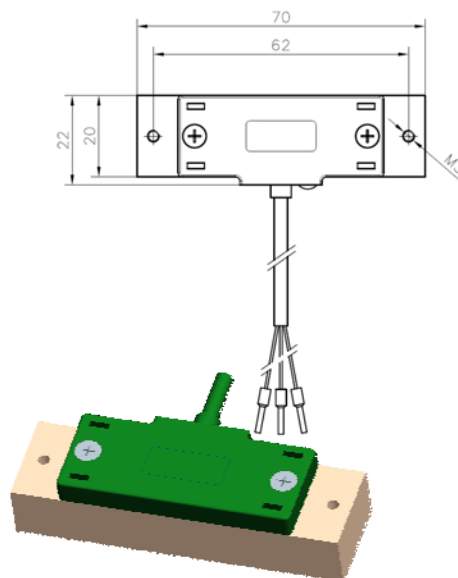
Order number: 367964

Water sensor external, Type 4230-103
 For monitoring the fill level in the water storage tank

Old construction type



New construction type



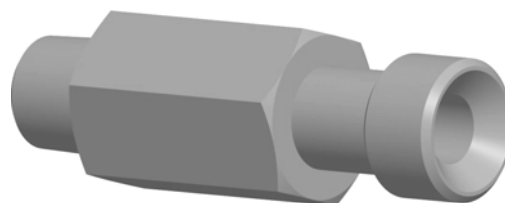
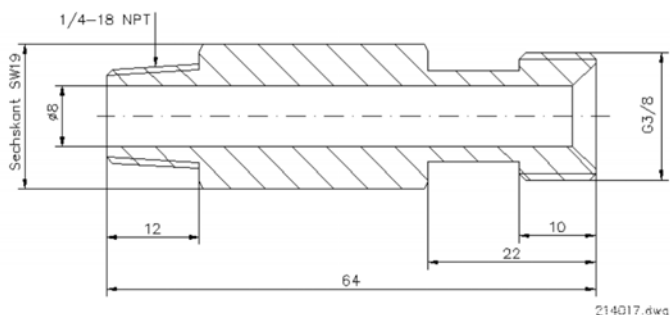
Order number: 216424

Adapter for gas sampling hose stainless steel 1.4301

Type 4230-00-044
 (DKR-3/8" to NPT-1/4")

Adapter for gas sampling hose Hastelloy

Type 4230-00-068
 (DKR-3/8" to NPT-1/4")



Order number: 214017

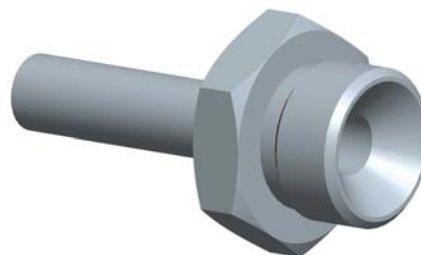
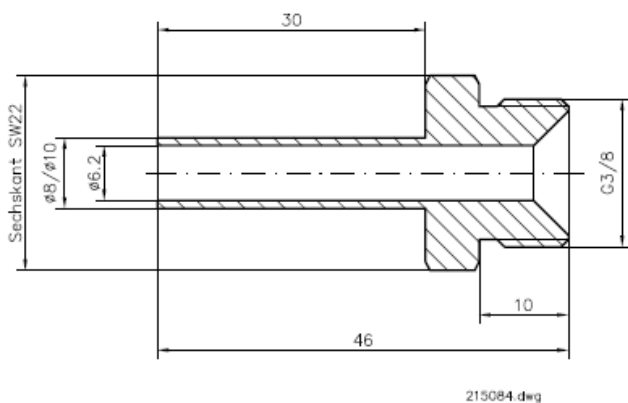
292981

Adapter for gas sampling hose stainless steel 1.4301

Type 4230-00-046
 (DKR-3/8 to 8 mm Swagelok®)

Type 4230-00-061
 (DKR-3/8" to 10 mm Swagelok®)

Type 4230-0087
 (DKR-3/8" to 6 mm Swagelok®)



Order number:
 215084

246326

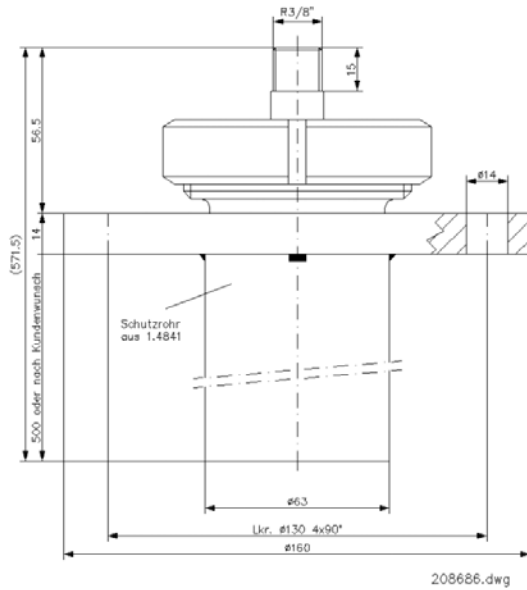
376319

Adapter 6HMK4SS Straight connector
(DKR-3/8", stainless steel)



Order number: 320763

Standard filter, Type 4220-100 including filter cartridge 150-µm CrNi Steel 1.4404



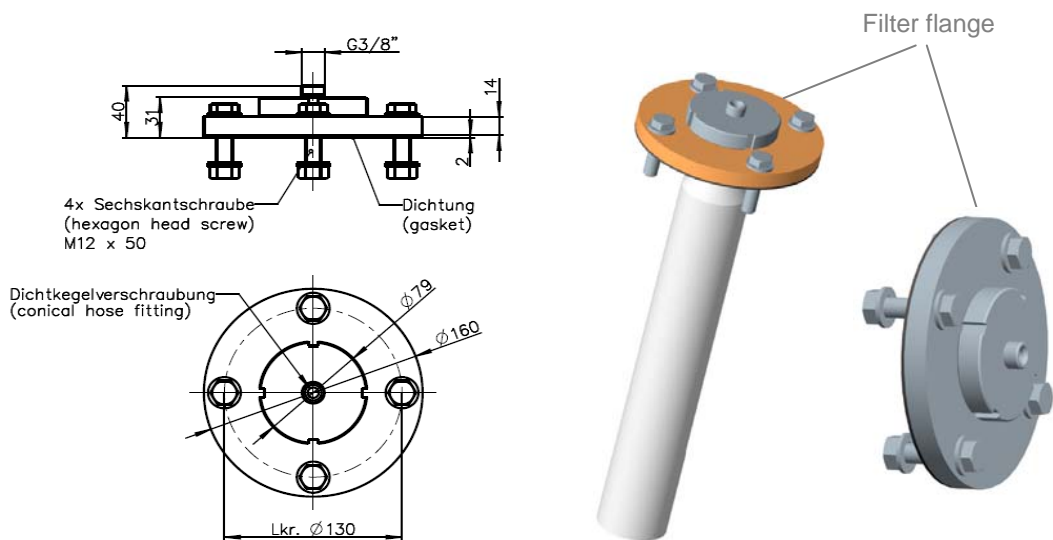
Order number: 208686

Spare filter for standard filter Type 4220-106
150 µm, Cr-Ni steel 1.4404



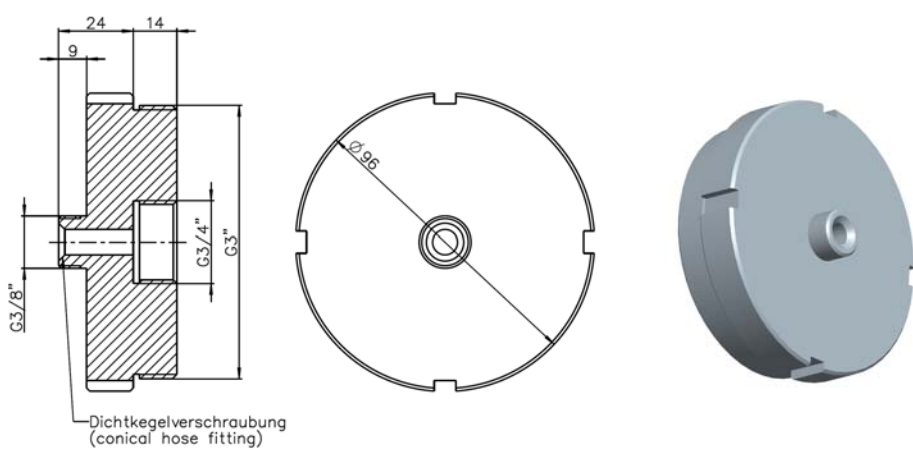
Order number: U 116006

Filter flange , Type 4230-125 DN65/PN6



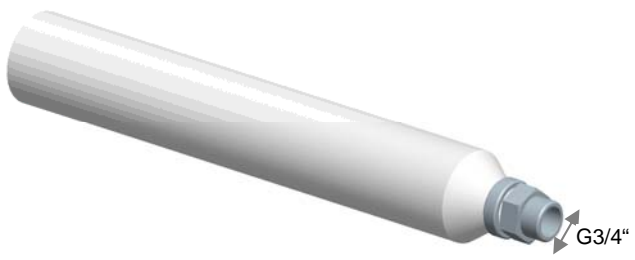
Order number: 296346

Heating hose adapter for filter G3" Type 4230-00-089



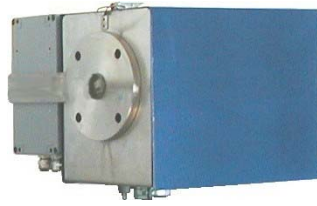
Order number: 387933

Filter



	Order number	
	Filter	Replacement hose
V20-6; 500 °C max.; 520 x 60 mm	319545	
V20-T; 200 °C max.; 400 x 40 mm	302189	234660
Sampling filter type 4230-131; 150 °C max.; 700 x 40 mm	365641	365652

Gas sampling sensor



Type	Order number (230 V)	Order number (115 V)
SP 2000-HF-GF 150	214334	292337
SP 2000HF/HC (Hastelloy)	292899	

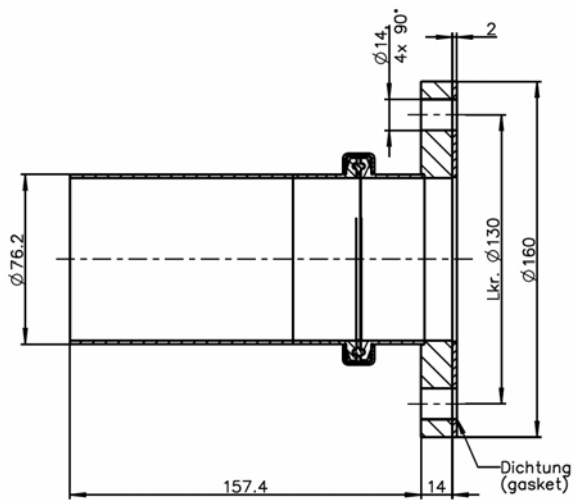
Glass fibre filter Type GF 150

for Gas sampling sensor Type SP 2000
0,1 µm



Order number: 220232

Flange DN65PN6 incl. clamp connection Type 4230-130



Order number: 365640

Sampling pipe for Gas sampling sensor



Type	Length	for gas sampling sensor type	Order number
SP 2000 /SS	1 m	SP 2000 / SP 2200	214333
	2 m		372218
SP 2000/HC	1 m	SP 2000HF/HC (Hastelloy)	292898

**Sampling sensor, 230V, 0 - 180 °C, flushable
Type SP2200-HF//BB**

- Accessories:
- Hexagon screws M 12x60
 - Fitting washers and nuts
 - Gasket Ø 160/68 mm
 - Instructions



Order number: 279032

**Sampling sensor, 230V, with magnetic valve terminal
Type SP2200-HF/C//BB**



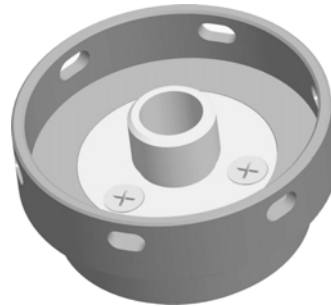
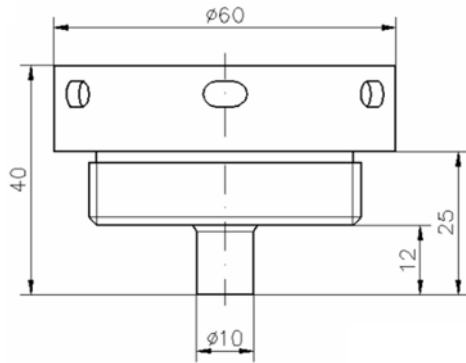
Order number: 365577

**Sampling sensor, 230V, 0 - 180 °C
Type SP2200-HF/C//BB/F**



Order number: 372217

Adapter for gas sampling hose 4220 to 4230, Type 4230-101



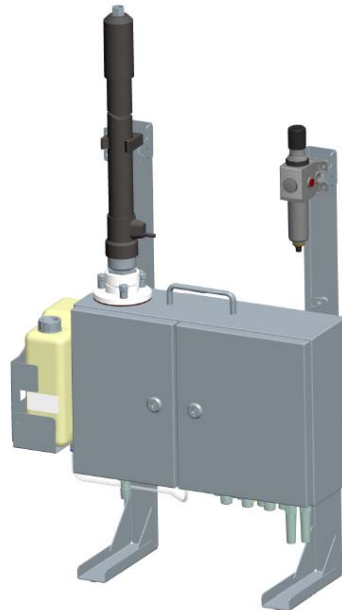
Order number: 216421

Nut for gas sampling hose, Type 4230-00-042



Order number: 202388

Stand holder, type 4220-35

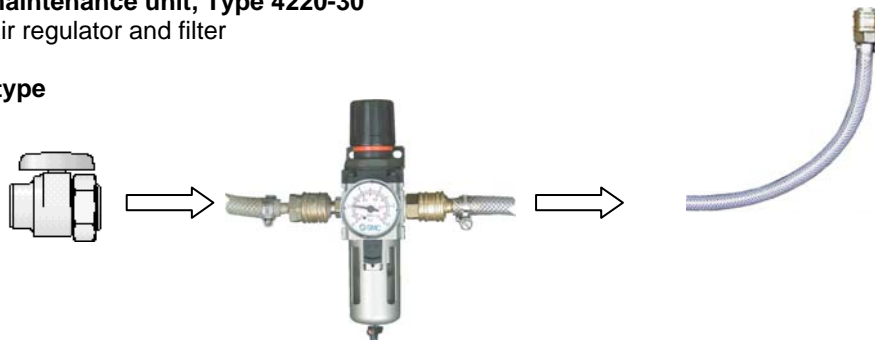


Order number: U 3401422035

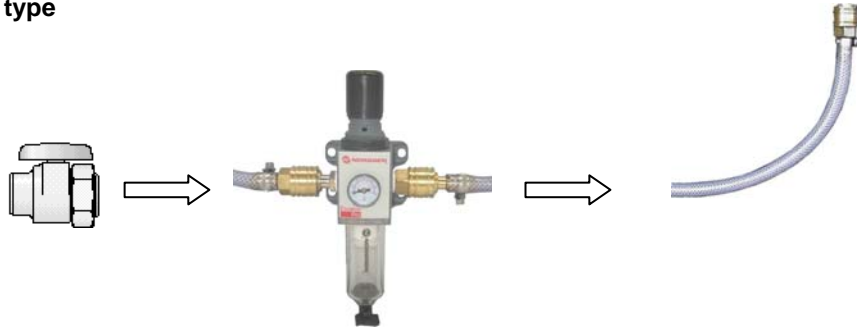
Compressed air maintenance unit, Type 4220-30

With compressed air regulator and filter

Old construction type

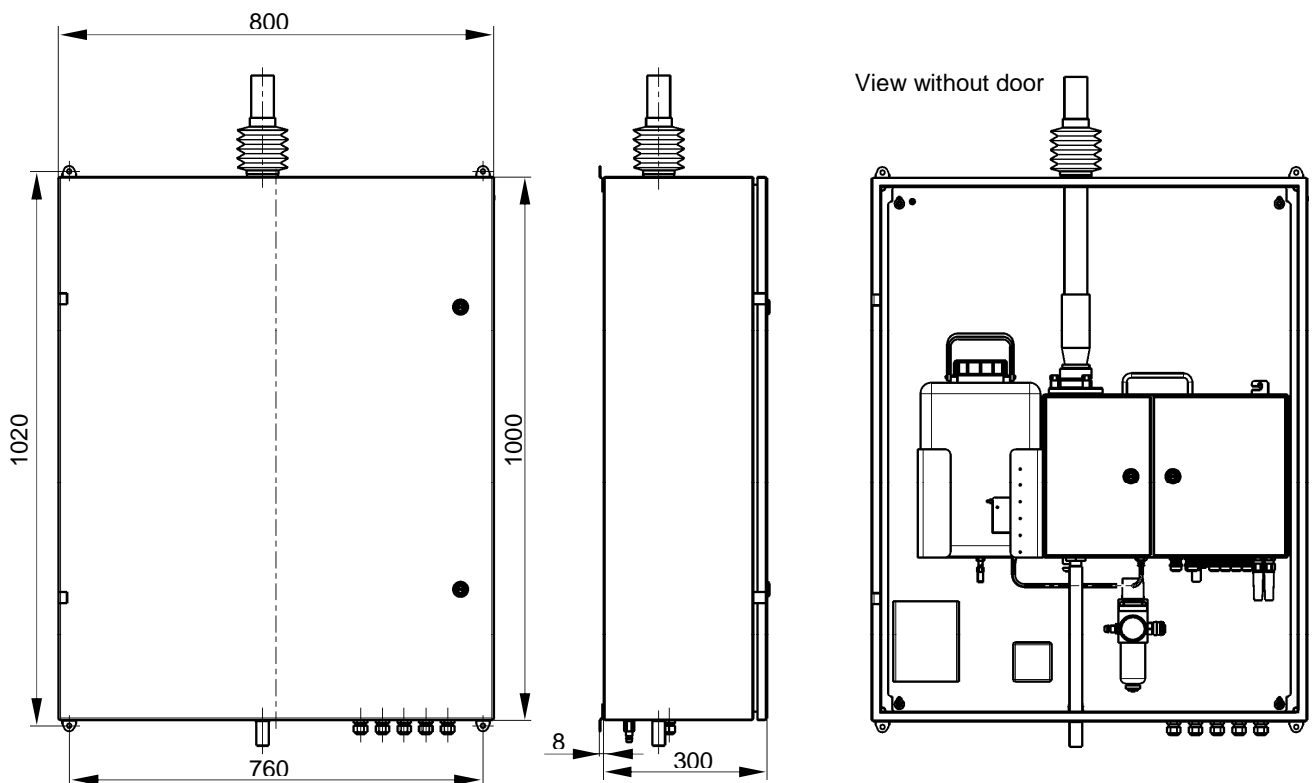


New construction type



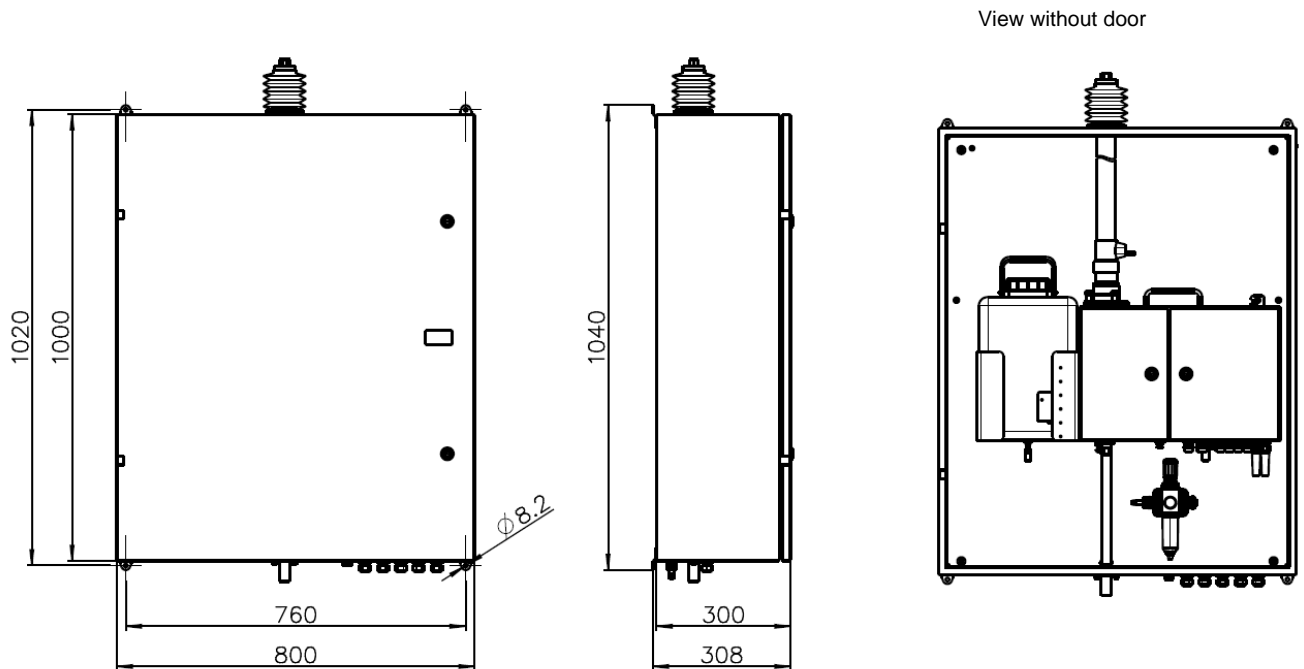
Order number: U3401422030

Enclosure Type 4230-119 (Ex Zone 22)



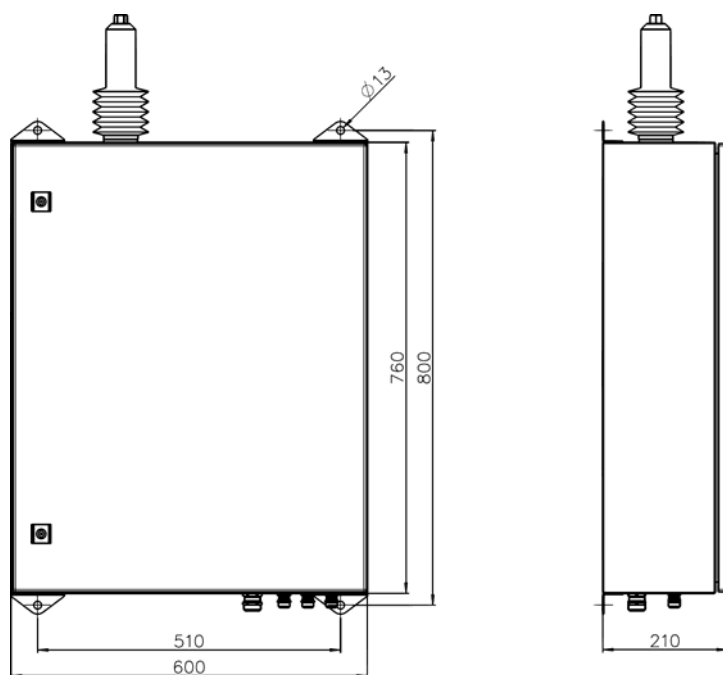
Order number: 295991

Enclosure Type 4230-127 without heating (Ex Zone 22)



Order number: 321358

Enclosure with heating hose-passage Type 4230-129



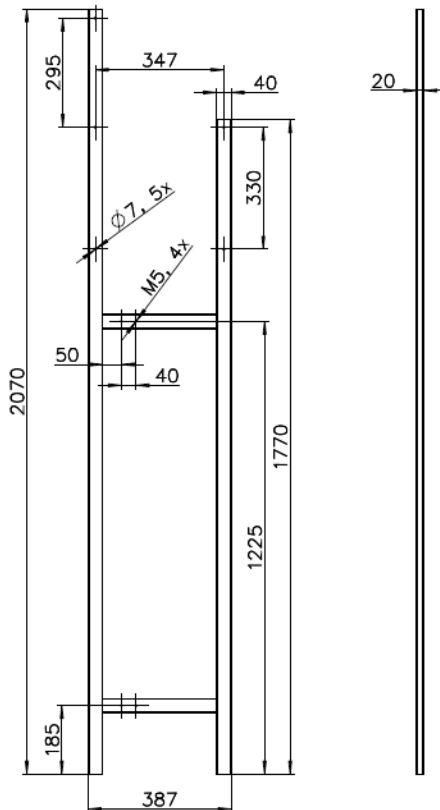
Order number: 352826

Flange carrying Type 4230-126



Order number: 312707

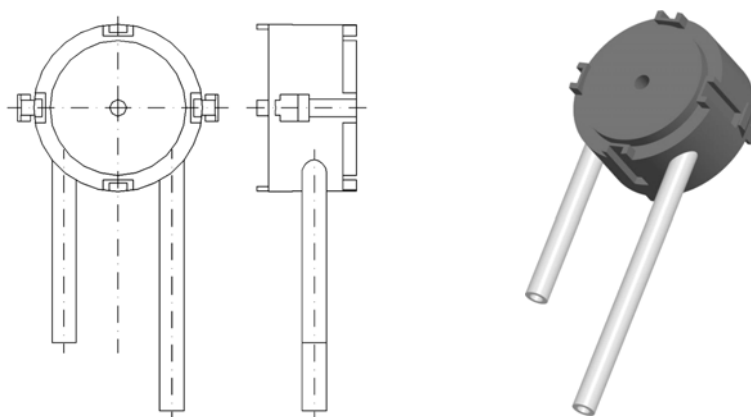
Assembly stand Type 4230-120



Order number: 300545

Spare parts

Tube pump cartridge, Type 4230-104



Order number: 216422

Measuring chamber with ejector, Type 4230-301

Without probes



Order number: 202383

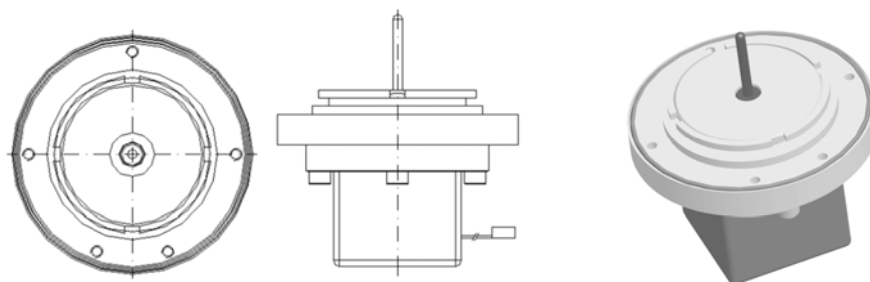
Water sensor, Type 4230-302

For monitoring the fill level in the measuring cell



Order number: 202823

Pump motor, Type 4230-303



Order number: 202409

Probe TT, Type 4230-304



Order number: 202411

Probe HAT, Type 4230-305



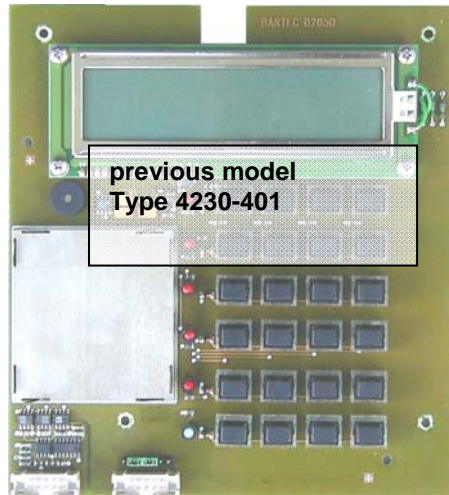
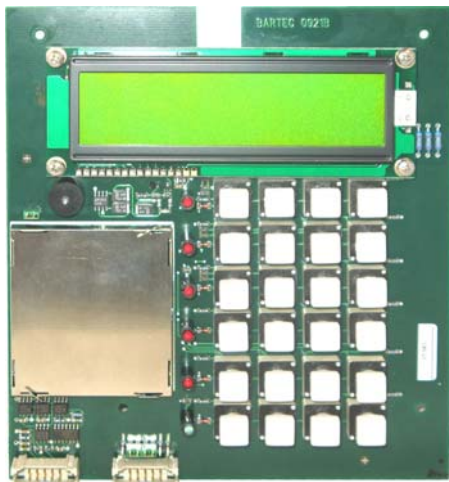
Order number: 202410

Proportional valve, Type 4230-308



Order number: 202781

Display- / Profibus board, Type 4230-122



Order number: 301656

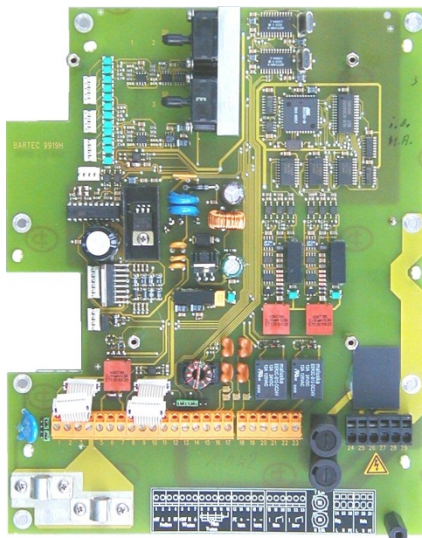
Cover Plate with Keyboard Foil, Type 4230-121

The cover Plate is used in combination with the Display/PROFIBUS board type 4230-122. When replacing the display/PROFIBUS board type 4230-401 (installed in devices with A-N^o. up to 1001 0456) by the display/PROFIBUS board type 4230-122 you must also replace the cover Plate.



Order number: 301657

Electronics board with power supply unit, Type 4230-400



Order number: 202412

Tensid

1l, PE-Bottle

Order number: U04014220201



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