

# HYGROPHIL-F, Moisture Analyzer, Type 5673-10, -11, -12, -13 series A

- **Moisture Measurement in gases and liquids**
- **Combined moisture and temperature sensor**
- **Multiple channel analyzer, max. 3 sensors can be connected**
- **Measurement at high pressure up to 200 bar (pressure dew point)**
- **Sensor can be placed in (Cl. I / Div. 1)**
- **Low-maintenance and long-term stable**



## Description

The sensor Type L166x, consists of a robust multi-layer of optically high refractive and low refractive layers connected with 2 glass fibre cables. Due to a special thermal coating technology, pores with the diameter of a water molecule are generated.

Due to the equilibrium, water is deposited in the layer and consequently changes the refraction index of the light rays (air: 1.00/water 1.33).

In the layer system this results in a shift of the wave length in proportion to the humidity prevalent in the medium. This shift is recorded by the evaluation unit and assigned to a dew point.

HYGROPHIL-F 5673 is temperature-compensated (integrated Pt100) and pressure-compensated in order to increase the measuring precision.

## Application

HYGROPHIL-F 5673 works with a combination sensor which by means of a fibre optical method measures the moisture content and by means of a PT100 measures the temperature in the medium. The very robust construction of the sensor and the measurement procedure itself offer several decisive advantages.

Among the advantages of this measurement principle which is protected by patents are the following:

- High measurement safety including accuracy, reproducibility and low hysteresis
- Long-term stability of the sensor (no drift !!!)
- Measurement directly in the pressure pipe is possible (pressure dew point!)
- Sensor can be placed in hazardous locations (Class I / Div. 1)
- Simple installation and integration (Swagelok, Parker, ...)

HYGROPHIL-F 5673 was particularly designed for the natural gas industry. In the meantime it is used for moisture measurement in a diversity of gases and liquids.

The sensor L166x is extremely robust and resistant to almost all mediums because of the high-quality materials.

## Features

- **Readings:**  
DT: **-80 ... +20 °C**  
mg/m<sup>3</sup>: **0.5 ... 10000**  
(customized calibration possible, e.g. 1 ... 10 ppm)
- **Up to 3 sensors can be connected**
- **Values that can be displayed:**  
DT, FP, PPMV/PPMW, Vol %, VP, MC, TT, SP
- **Calculation of water content according to DIN EN ISO 18453**
- **Graphical display**
- **Data logger**
- **Max. length of optical fibre cable: 800 m**
- **Ethernet**
- **Modbus**
- **RS 232**
- **Profibus**
- **USB**
- **3 x 0/4-20 mA**

# Technical data Hygrophil-F, type 5673-xx series A, evaluation unit

## Device-specific data

Range of indication (no measuring range)	Reading	Range start	Range end
	Vol% [%]	0	100
	PPM [ppm]	0	25000
	DT [°C, °F, K]	-100	+100
	FP [°C, °F, K]	-100	+100
	MC [mg/m3 or lb/MMscF]	0	30000
	VP [hPa]	0	250
	TT [°C, °F, K]	-50	100
	SP [bar, PSI,...]	0	250
	WL [nm]	780	830

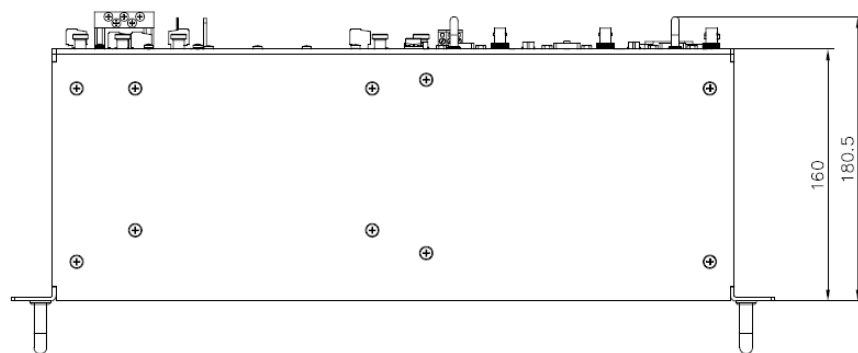
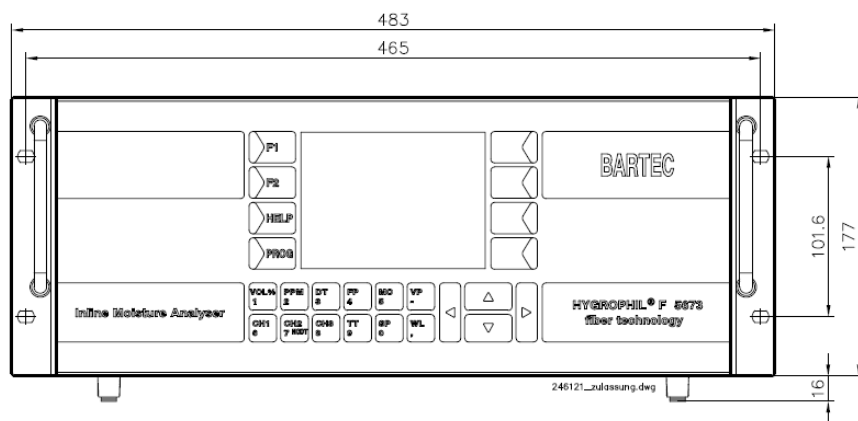
Display: Graphic display 320 x 240 dots

Keyboard: Touch-screen with red background illumination

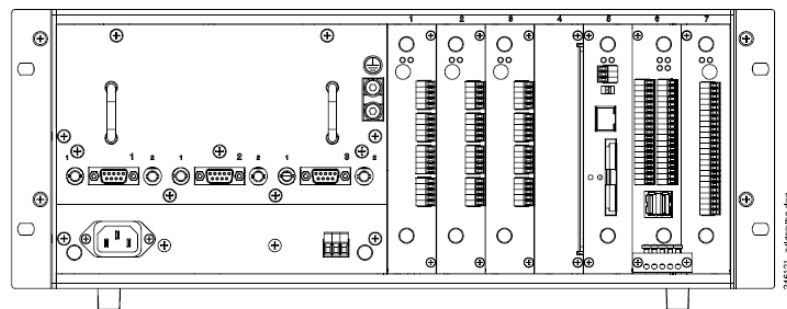
Dimensions of evaluation unit: 19" rack-version / desktop version, dimensions in mm

Type: 5673-10, Order no.: 284492

Type: 5673-12, Order no.: 246119



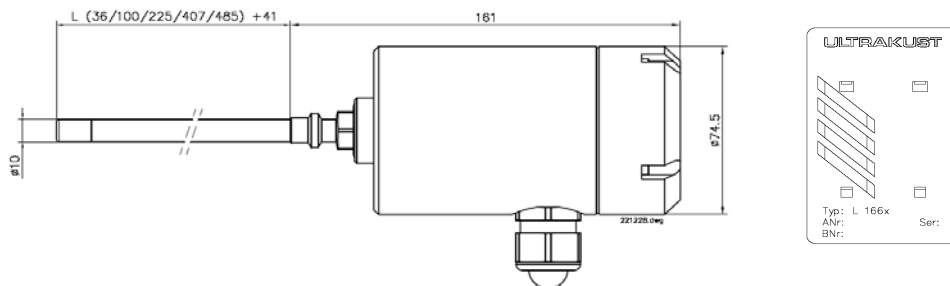
back view



Channel I/O 2 and 3 as option

<b>Electrical data</b>	
Auxiliary energy	DC 10 - 36 V max. 60 W (Si 6.3 A T) AC 100 - 240 V max. 110 VA (Si 3.15 A MT)
Auxiliary quantities	Temperature (TT) at the measurement spot is measured by means of a Pt100 sensor integrated in the humidity probe or entered manually as a constant factor. Pressure (SP) is measured via a 4 - 20 mA signal from an external pressure transmitter or entered manually as a constant factor. CO <sub>2</sub> content (0 - 100 %) is measured by an external sensor via a 4 - 20 mA signal or entered manually as a constant factor.
Measurement channels	1, 2 or 3
Measurement rate	Max. 3 measurements / minute per channel
Inputs per measurement channel	Light conductor connection for optical humidity probe 9-pole D-SUB plug for characteristic curve of sensor Clamp connection for Pt100 measurement from L166x Clamp connection for signal from a pressure transmitter, 4 - 20 mA (active or passive) Clamp connection for signal 4 - 20 mA (CO <sub>2</sub> content) All inputs Ex ia, galvanically separated
Analog output per measurement channel	Clamp connection 0/4 - 20 mA, galvanically separated, Ex ia Source or sink, Resolution 0.0003 mA Burden < 600 Ω, Precision 0.03 mA Temperature drift < 0.001 mA/°C
3 analog outputs interface board COM	Clamp connection 0/4 - 20 mA, galvanically separated Source; Resolution 0.0003 mA Burden < 800 Ω, Precision ± 0.15 % (0.03 mA) Temperature drift < 0.001 mA/°C
Control outputs	8 relay changeover contact, 30 V/1 A Connection via plug-in terminals 2 switching outputs per channel (ERROR and LIMIT)
Interfaces	Ethernet, RS 232, RS 485, Modbus, Profibus, USB
<b>Ambient conditions</b>	
Operating temperature	0 ... +50 °C
Storage temperature	-20 ... +60 °C
Climatic classification	IWI in accordance with DIN 40040
Approvals	ATEX, CSA, GOST
<b>Mechanical data</b>	
Weight	Approx. 8,5 kg
Dimensions	Width x height x depth 483 x 192 x 212 mm
Casing	Applicable for 19" installation and as desktop device
<b>Technical data of the moisture sensor, type L166x</b>	
<b>Device-specific data</b>	
Integrated Pt100	DIN IEC 751, four-wire
Calibrated Range	-80 ... +20 °C DT
Accuracy	+/- 1 K
<b>Ambient conditions</b>	
Operating temperature	-30 ... +60 °C
Storage temperature	-30 ... +60 °C
Maximally admissible working pressure	100 bar, 200 bar against test certificate
Protection type	IP 65 (in installed state)
Approvals	ATEX, CSA, CRN, GOST
<b>Mechanical data</b>	
Material	Shaft: 1.4571 Sensor head: POM

Dimensions of probe (in mm)



Ordering details

Designation	Type	Specification	Order no.
<b>Evaluation unit</b>			
	5673-10	100 - 240 VAC Class I/Div. 2 1 channel pre-installed	284492
	5673-11	100 - 240 VAC Class I/Div. 1 in Ex-d box 5673-111 1 channel pre-installed	242057
	5673-12	10 - 36 VDC Class I/Div. 2 1 channel pre-installed	246119
	5673-13	10 - 36 VDC Class I/Div. 1 in Ex-d box 5673-111 1 channel pre-installed	242056
	5673-114	Channel extension	287836
	5673-107	Wall mount / mounting plate	246120

Moisture sensor with integrated Pt100 sensor

Shaft diameter 10 mm, 100 bar, 200 bar against test certificate, calibrated from - 80°...+ 20 °C DT (standard)

	L 1661	Immersion depth 36 mm	287782
		Immersion depth 100 mm	281278
		Immersion depth 225 mm	302470
		Immersion depth 225 mm RT (for retraction tool)	302471
	L 1661 Li	For use in liquid applications	
		Immersion depth 36 mm	353632
		Immersion depth 100 mm	353633
	Protection cap	Immersion depth 225 mm	353634
		Teflon filter 10 µm	304746
		Special calibration in natural gas (with DAP test certificate, calibrated from -20° C, -10° C, 0° C DT, at 41 bara )	232340
		Special calibration for hexane (measurement range freely selectable)	232165
		Special calibration in several gases and fluids (measurement range selectable)	239022

Fibre-optic cable, suitable for field installation

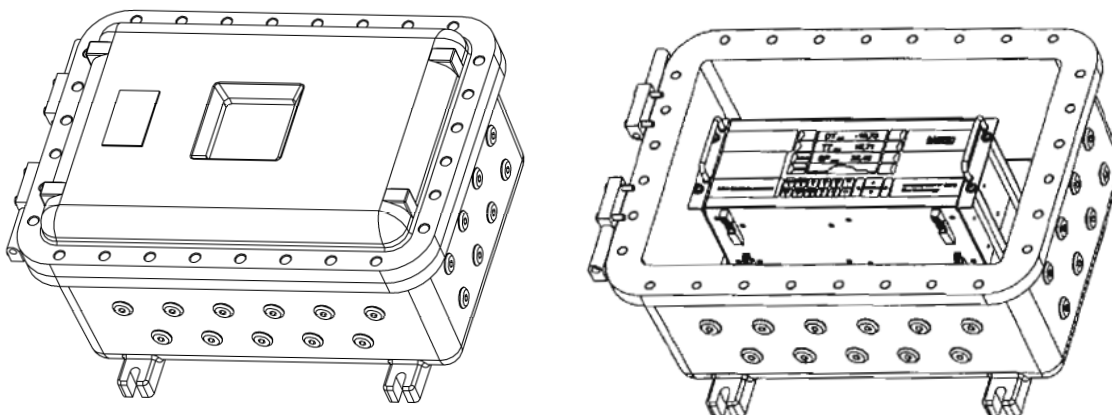
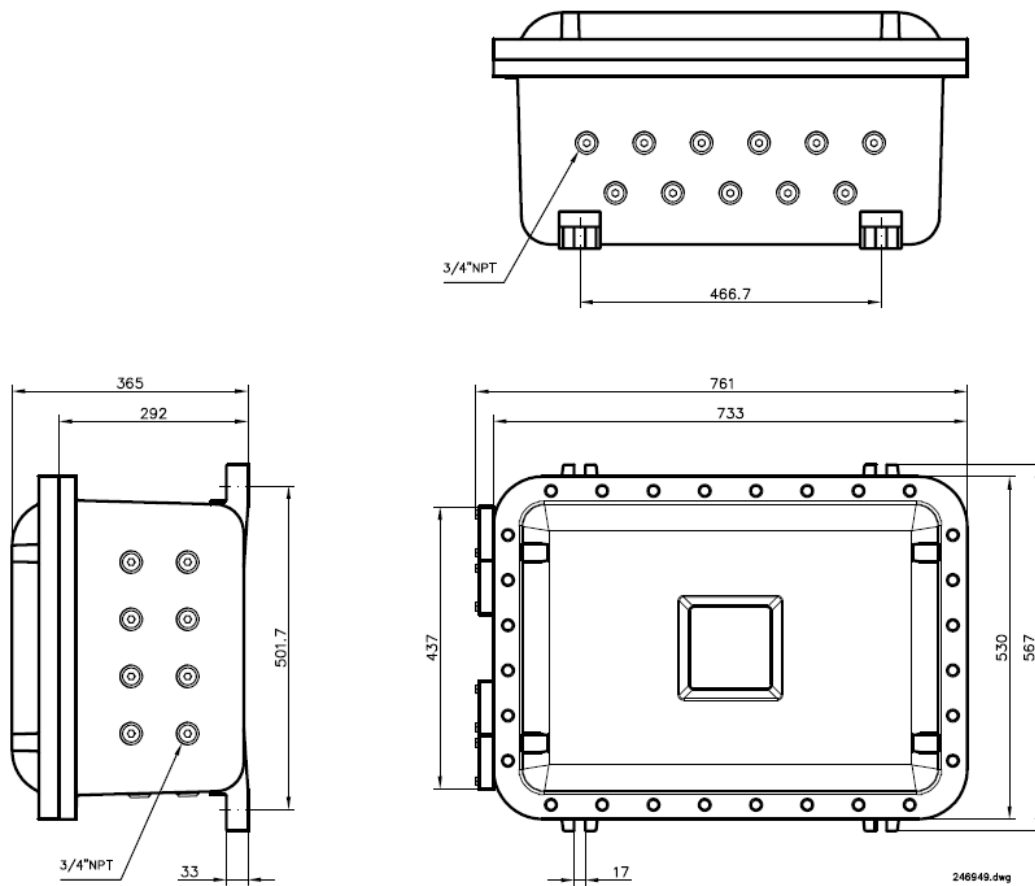
Including ST plugs

	1631	Length 5 m	U01120051631
		Length 10 m	U01120101631
		Length 20 m	U01120201631
		Length 50 m	U01120501631
		Length 100 m	U01121001631
		Special lengths in steps of 5 m, up to 100 m Special lengths in steps of 10 m, from a length of 100 m, max. length 800 m	U0112xxx1631 (xxx = length in m)

Ordering details			
Designation	Type	Specification	Order no.
<b>Pt100 cable, suitable for field installation</b>			
4-wire, shielded		Can be delivered in any length	232128
<b>Combined fibre-optic cable</b>			
Including ST plugs; 2 optical fibres + 6 Cu lines for Pt100 and for pressure sensor; Shielded, protected and flame-retardant in accordance with IEC 332-3A, Suitable for field application, temperature range from -20°C...+70°C			
	1631-112	Length 2 m	242445
		Length 5 m	247283
		Length 10 m	245449
		Length 20 m	240821
		Length 100 m	239954
		Special lengths in steps of 5 m, up to 100 m Special lengths in steps of 10 m, from a length of 100 m (Max. length 800 m)	
<b>Combined fibre-optic cable with extended temperature range</b>			
Including ST plugs; 2 optical fibres + 6 Cu lines for Pt100 and for pressure sensor; Shielded, protected and flame-retardant in accordance with IEC 332-3A, Suitable for field application, temperature range from -55°C...70°C			
	1631-113	Special lengths in steps of 5 m, up to 100 m Special lengths in steps of 10 m, from a length of 100 m (Max. length 800 m)	xxxxxx
<b>Accessories</b>			
Stainless steel casing IP 65 (three-part)	5673-112		283933
Gas-/liquid separator	5672-129		287907
Sample Taker (Swagelok -T)	5672-111	For analysis line with 6 mm	221715
	5672-112	For analysis line with 10 mm	221717
Retraction Tool WA 3HD- US/EU 225	ZM-WA-010- 025-EST	PBCompac flange PN 250 Material: stainless steel	246703
Blind plug	ZM-BB-007-015- EST	For sensor retraction tool Material: stainless steel	246711
CF welding socket	ZM-CF-037-025- EST	For Retraction Tool Material: stainless steel	246706
alternatively			
CF welding socket	ZM-CF-037-025- ST	For Retraction Tool Material: steel	246707
CF-welding socket	ZM-CF-073-025- EST	For Retraction Tool Assembly of small diameter pipe (DN50, DN65 und DN80) Material: stainless steel	344861
alternatively:			
CF-welding socket	ZM-CF-073-025- ST	For Retraction Tool Assembly of small diameter pipe (DN50, DN65 und DN80) Material: steel	344860
Compac blind flange	ZM-CF-357-025- EST	For Retraction Tool Material: stainless steel	246708
alternatively			
Compac blind flange	ZM-CF-357-025- ST	For Retraction Tool Material: steel	246720
Assembling Set	ZM-WZ-003	1x hook wrench 4x screws for PBCompac PN200 1x set of O-rings for retraction tool	246721
Sample conditioning (SCS) system for natural gas applications	5985-13	316 SS / up to 170 bar / ATEX, CSA pressure reduction heated opt. self-standing support frame, 316SS opt. roof, 316SS	247595 279426 274206
Moisture generator	DPG-59	Approx. 20ppm / 50ppm / 100ppm	239611

## Accessories

Ex-d housing 5673-111 ATEX, dimensions in mm

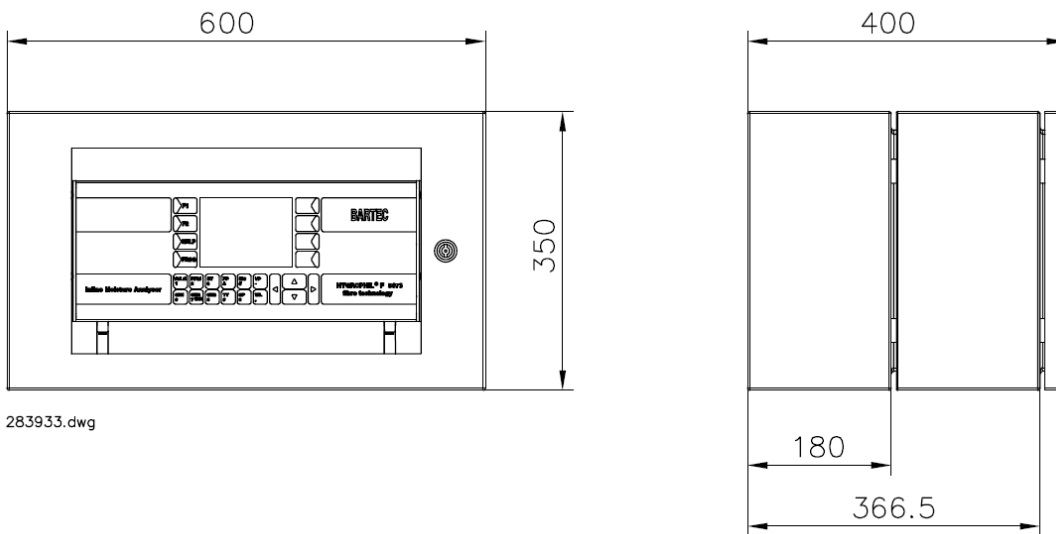


3D - view with installed HYGROPHIL F 5673

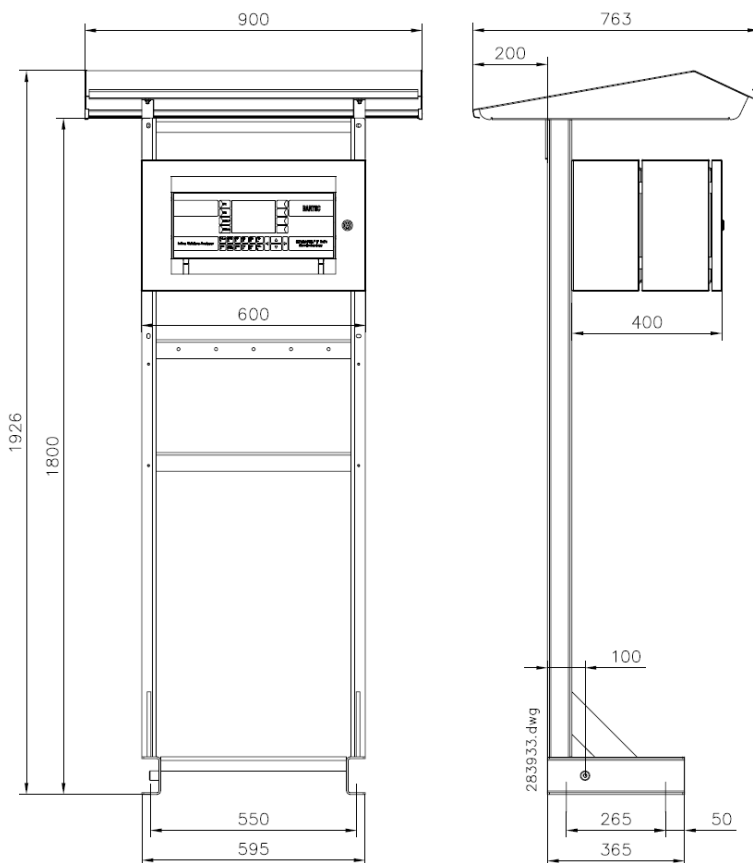
## Accessories

### Stainless steel casing IP65 - three-part, dimensions in mm

Type: 5673-112 Order no.: 283933



283933.dwg



#### Optional:

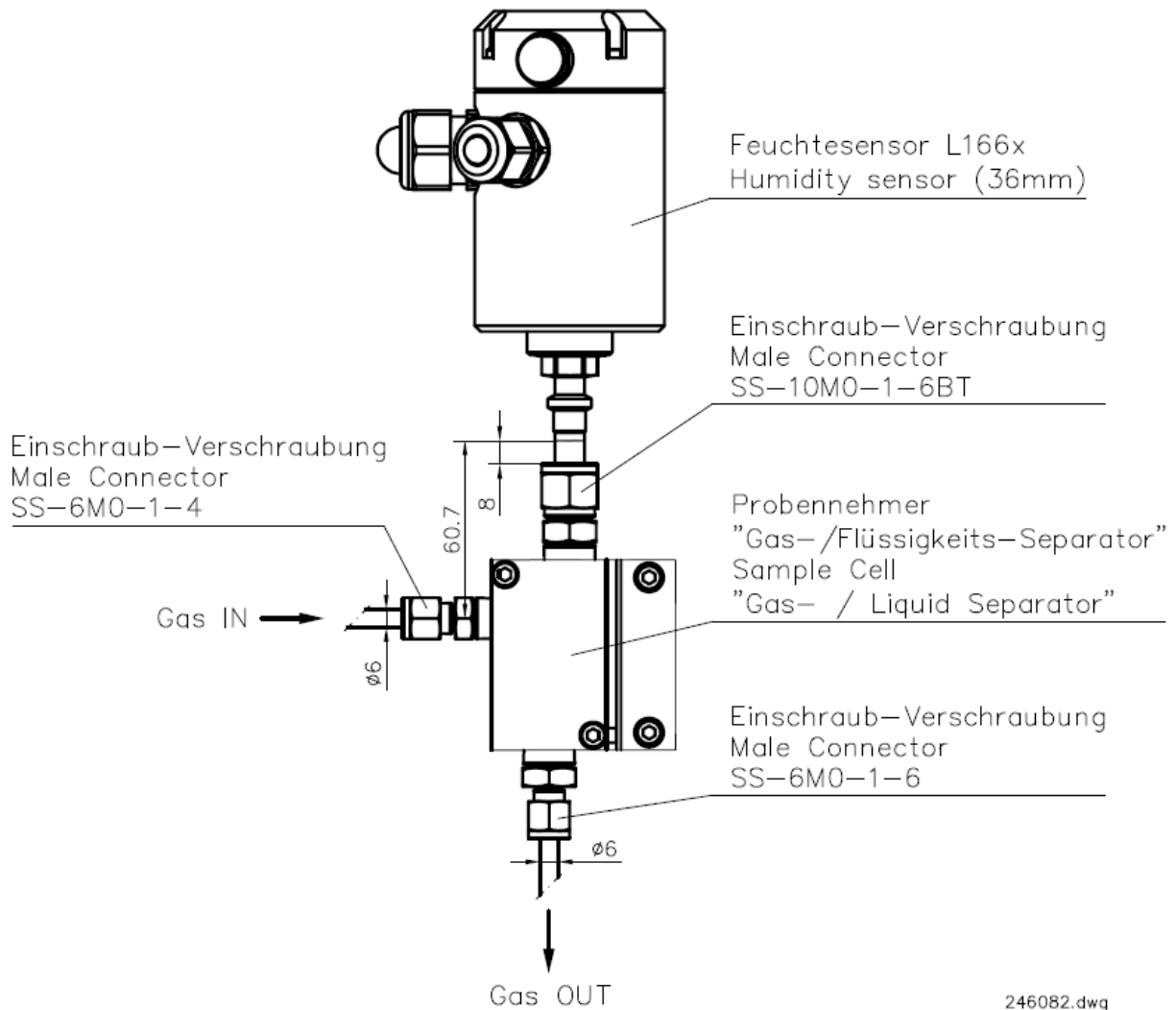
- Self-standing support frame, stainless steel, Order No.: 246019
- Self-standing support frame, zinc plated, Order No.: 279427
- Roof, stainless steel Order No.: 274206

Weight: 32,5 kg

## Accessories

### Gas-/Liquid Separator, dimensions in mm

Type: 5672-129 Order no.: 287907



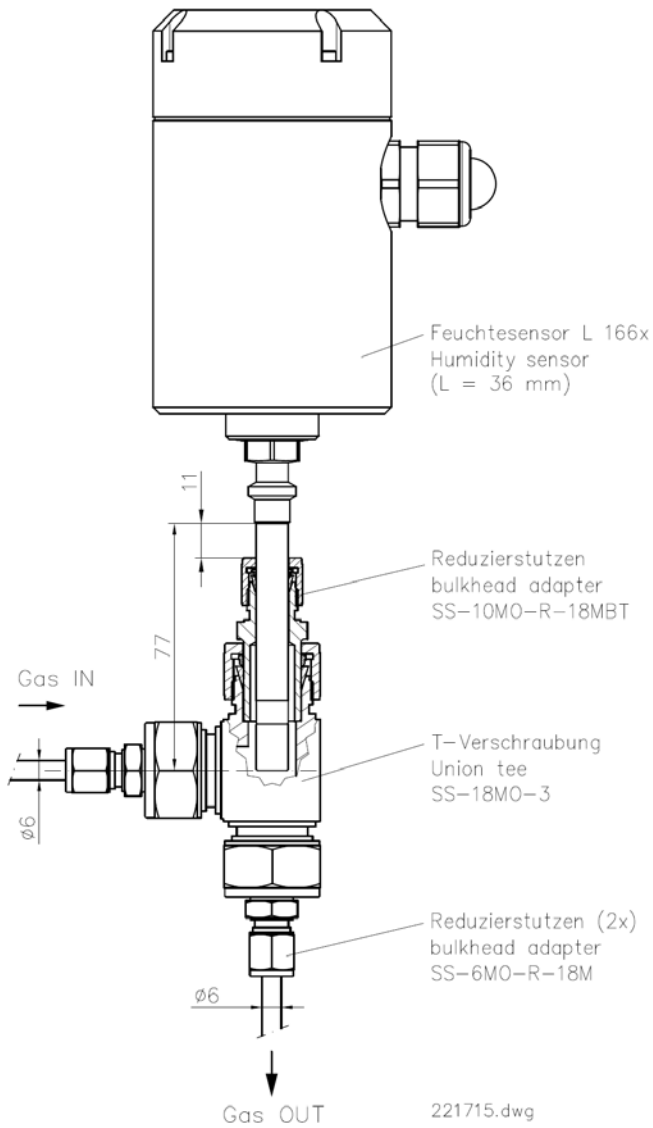
246082.dwg



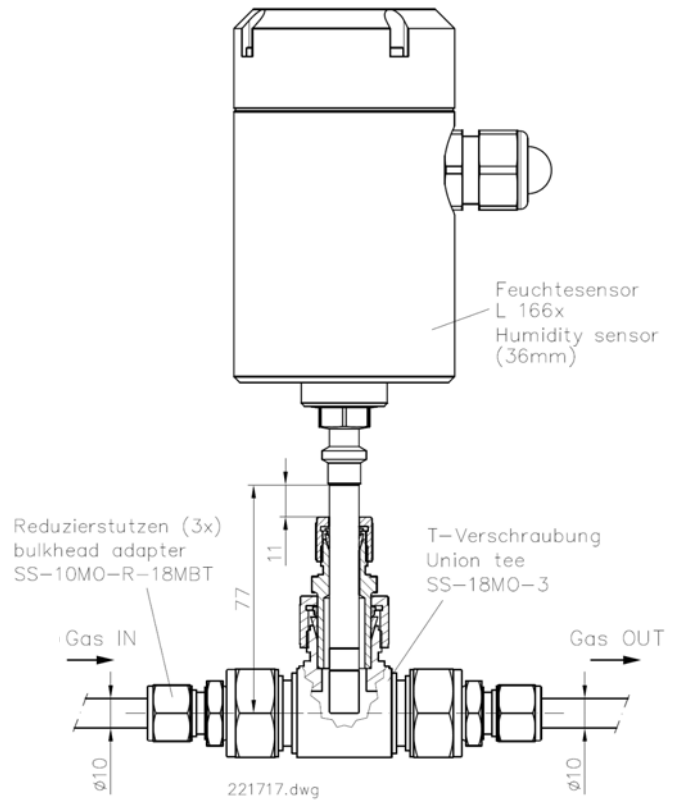
**Accessories**

**Flow through cell (union-T), dimensions in mm**

Type: 5672-111 (6 mm) Order no.: 221715



Type: 5672-112 (10 mm) Order no.: 221717



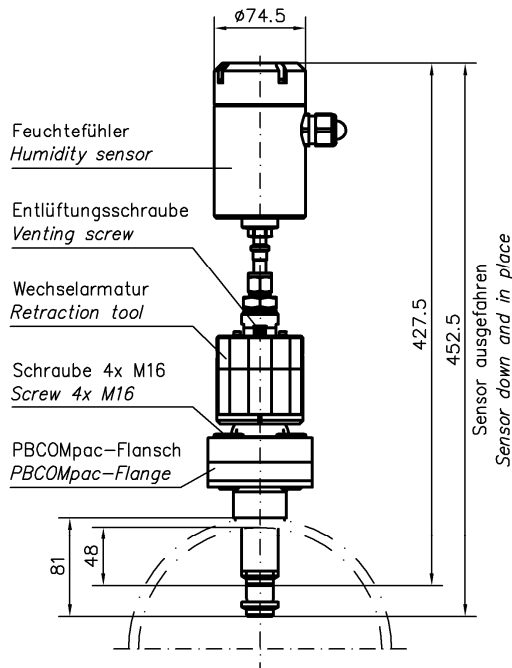
**Accessories**

**Retraction tool, dimensions in mm**

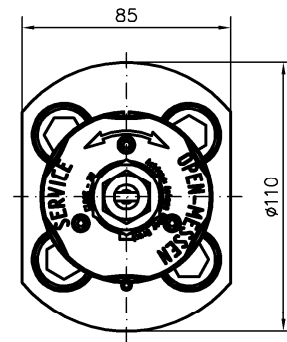
Type: ZM-WA-025-040

Order no.: 246703

Notice incident flow direction



Draufsicht  
*Top view*  
 M 2:1

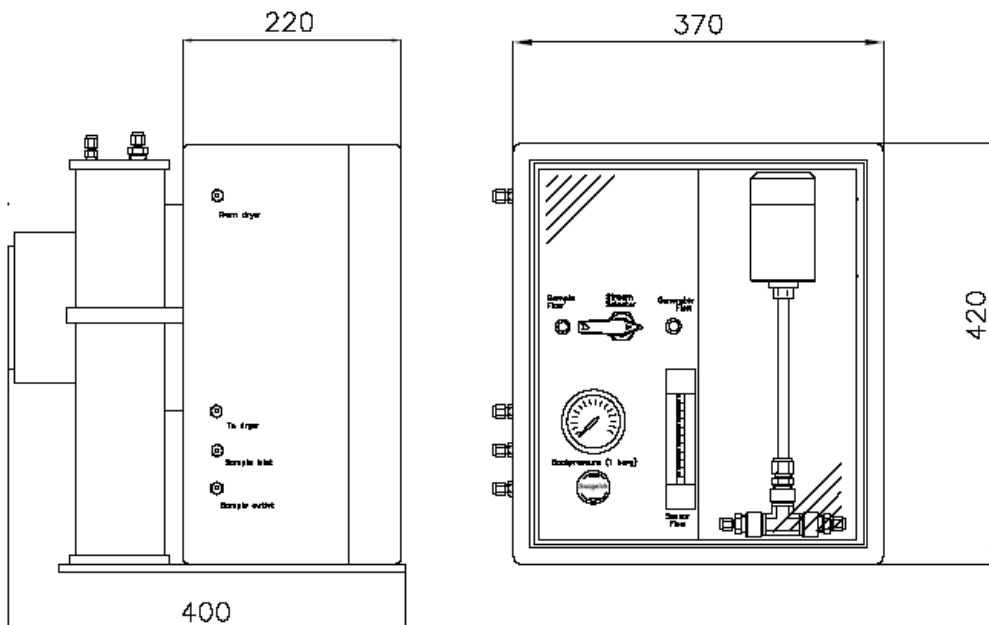


Ptc\sonderp.\sensorwech.dwg

**Moisture generator (optionally portable or stationary), dimensions in mm**

Type: DPG-59

Order no.: 239611

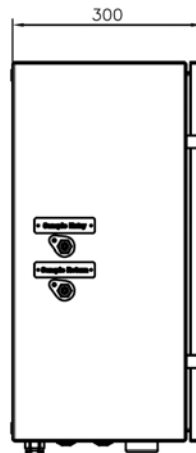
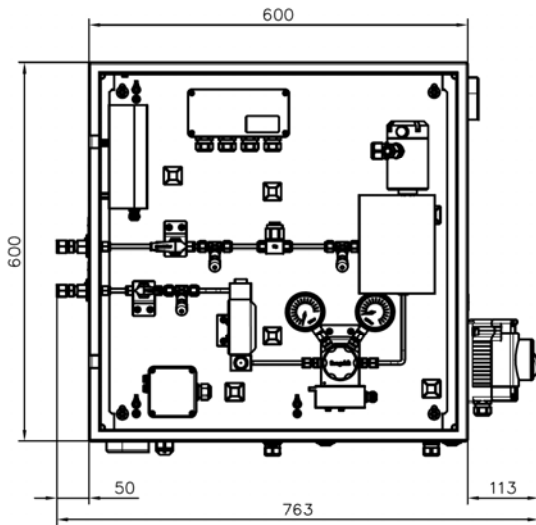


**Accessories**

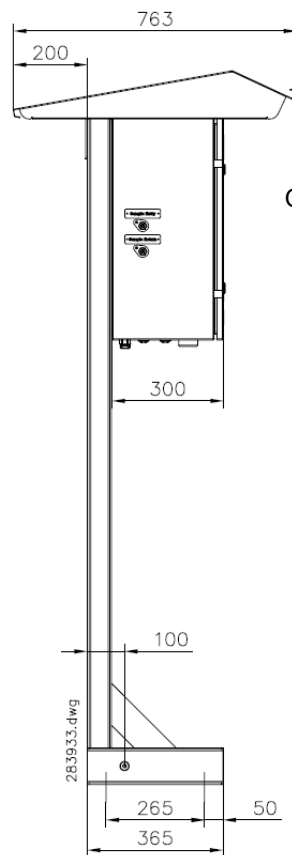
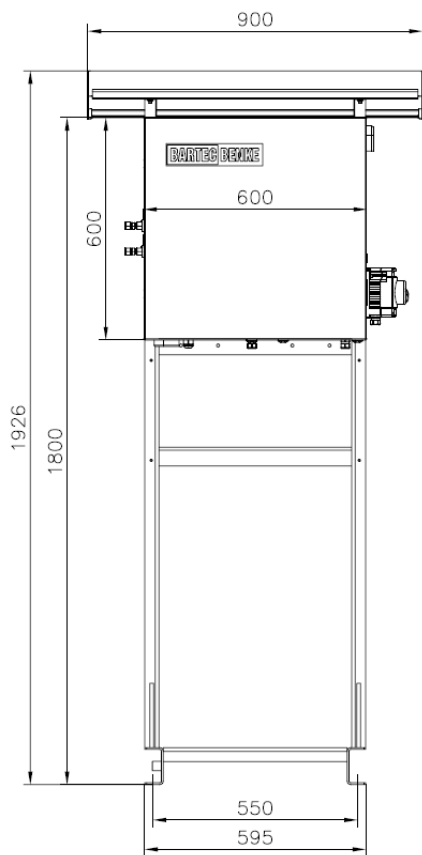
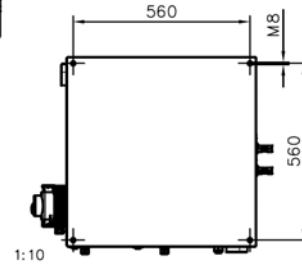
**Sample and Conditioning System (SCS) for natural gas applications, dimensions in mm**

Type: 5985-13

Order no.: 247595



back view:  
pattern of drilling



**Optional:**

- Self-standing support frame, stainless steel, Order No.: 246019
- Self-standing support frame, zinc plated, Order No.: 279427
- Roof, stainless steel Order No.: 274206

M 1:10