



Perfect **S**ample **G**as ?



Product Catalogue **2021** !





Welcome!

Company

- ✓ Product overview
- ✓ Contact information



1

Gas Sampling Probes

- ✓ PSG Basic / PSG Plus / PSG Plus DSBP
- ✓ Sampling tubes / pre-filters / valves



2

Heated Sample Lines and Accessories

- ✓ PSG Extruded Basic / Plus / SR / SR Ex / Hybrid
- ✓ PSG Flex Basic / Plus / Plane / Ultra
- ✓ Temp. controller ST49 / DC-10 / PSG WB



3

Sample Gas Coolers

- ✓ BCR01 / 02 / 03 / 04 / 05 Ex / 06
- ✓ MAK10 / MAK10P / MAK6



4

Accessories and Options for Sample Gas Cooler

- ✓ Condensate removal / Peristaltic Pump
- ✓ Pre-separator / flowmeters / filters / Pump



5

Components for Sample Gas Preparation

- ✓ Particle Filter / Aerosol filter / Adsorption Filter
- ✓ liquid stop / condensate guard / NO₂/NO converters
- ✓ Diaphragm Pump / Ex Pump / Heated pump



6

Mobile Measurements

- ✓ Portable gas sampling probe / heated line
- ✓ Portable sample gas conditioning



7

Systems

- ✓ Mercury Sorbent Trap Probe and Accessories
- ✓ Application Questionnaire



8



PSG[®]
Perfect Sample Gas



Product Overview

Gas Analysis, Air-Dryer, Instrumentation and Heat Trace Solutions

Gas-Analysis	Air-Dryer , Instrumentation, Heating
<p>Gas Sampling Probes</p> <ul style="list-style-type: none"> PSG Basic PSG Plus 	 <p>Compressed Air Dryer</p>
<p>Analyser Lines</p> <ul style="list-style-type: none"> PSG extruded PSG flexible 	 <p>Tubes Tube Bundles Fittings</p>
<p>Sample Gas Conditioning</p> <ul style="list-style-type: none"> MAK 10 BCR 	 <p>Air Manifolds / Header / Instrument Air Distributor</p>
<p>Special Analysis</p> <ul style="list-style-type: none"> Mercury Measurement Monitoring Cooling Water System Integration 	 <p>Heat Tracing Solutions</p>



Production and logistics

DIN ISO 9001:2015: certified.

We are very proud of our long-standing certification. Through regular improvement procedures and training of all our employees, we achieve the best quality and in some respects, more than meet the requirements of the standards.

As is the case with in-house manufactured components and systems, we also have years of experience with outsourced products and vendors - we know how things work!

Processes

If there is a solution, we'll find it!

Complex applications and problems require individualised consultancy. Our experts will support you in this, and ensure a quick solution – thus ensuring your success.

Made in Germany – Delivered worldwide

Thanks to our AEO (Authorized Economic Operator) we can dispatch our goods world-wide, quickly and without any complications – after all, every minute counts!





Contact Information

Facts and Figures of AGT-PSG GmbH & Co. KG



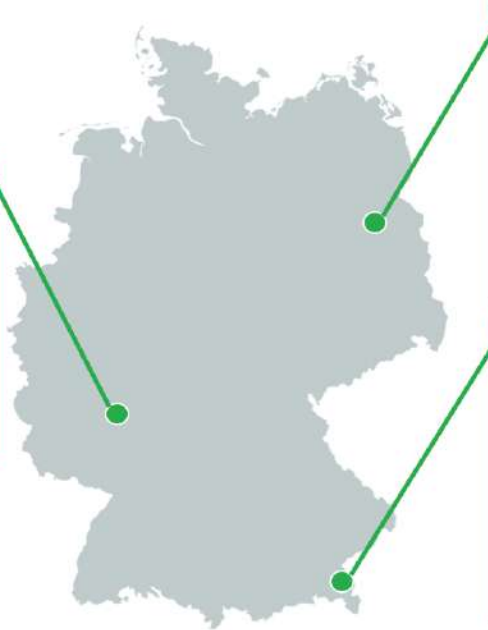
AGT-PSG Headquarter Frankfurt

- **Founded:** 1975 | 1963
- **Formerly:** PSG Petro Service | AGT Thermotechnik
- **Competences:** Gas Sample Probes
Heated Sample Lines
Analyser System Integration
Air Distributor
Heat Tracing Solutions
Sample Gas Coolers
Air Dryer
ATEX certified production
- **Employees:** 27




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Matchcode Gas Sampling Probes





Order Number

Matchcode	TO.	B.	u.	E1.	Gl.	R1.	S0.	P1.	H1.	T1.	I3.	U2.	m.	D1
ATEX class	T2	Ex T2												
	T3	Ex T3												
	TO	Non Ex												
Gas sampling probe type	B	PSG Basic												
	P	PSG Plus												
	F	PSG Basic w/o housing												
	O	PSG Plus w/o housing												
	G	Glass fiber housing												
	E	Glass fiber housing Ex												
Filter unit	b	Filter coated												
	u	Filter uncoated												
Gasket	E1	FKM												
	E2	FFKM												
Filter cartridge	Gl	Glass fiber 0,1 µm												
	SI	Silicone carbide 0,3 µm												
Backpurging	R0	w/o Backpurging												
	R1	Backpurging 1-stage												
	R2	Backpurging 2-stage												
	R3	Backpurging 1-stage + Coax												
	R4	Backpurging 2-stage + Coax												
Purgingtank	S0	w/o purgingtank												
	S1	2 Liter												
	S2	5 Liter												
Test gas connection	P0	w/o test gas connection												
	P1	PSG Basic w. test gas connection												
	P2	PSG Plus w. test gas connection												
Heating unit	H0	s/o heating unit												
	H1	Heating sleeve <250°C												
	H2	Heating sleeve + Thermostat												
	H4	Heating sleeve <90°C Ex selfreg.												
	H5	Ringheater <160°C												
Temperature monitoring/controlling	T0	w/o Thermostat												
	T1	PT100												
	T2	Thermostat												
	T3	Thermocouple Type J												
	T4	Thermocouple Type K												
Insulation	I0	w/o insulation												
	I1	PSG Basic housing insulated												
	I2	PSG Plus housing insulated												
	I3	Insulation sleeve PSG Basic												
	I4	Insulation sleeve PSG Plus												
	I5	Insulation sleeve + PSG Basic housing insulated												
Operating power	U1	110V AC												
	U2	230V AC												
Hookup measurements	m	Metric												
	z	Imperial												
Documentation	D1	Additional manual (1st included)												



Heated Gas Sampling Probe

PSG Basic

Application

The heated gas sampling probes **PSG Basic** are used for continuous extractive gas analysis. They enable continuously trouble-free representative sampling of hot, predominantly low or medium dust and water vapor loaded gases - high dust load with additional options. Typical applications are emission measurement, process monitoring, control and optimization.

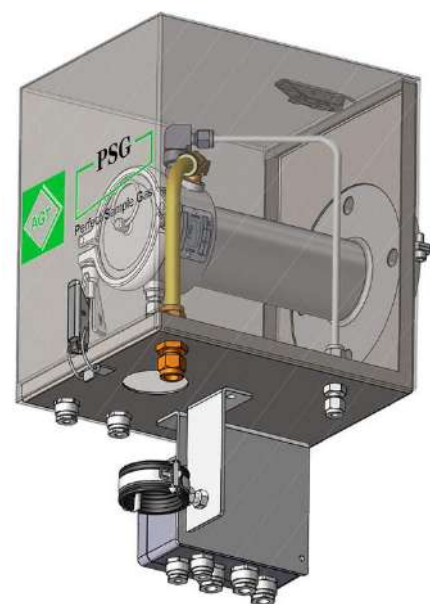
Technology

The intelligent design with optimum gas guidance enables the filtration of sample gas at the outer 212 cm² filtration surface (largest worldwide) as well as quick and easy filter change without tools and dismounting of the heated sample line. Easy maintenance of the **PSG Basic** is enabled due to its newly space-saving bracket design, which also can be used to lift a sticking filter housing lid. The holohedral tight high-performance ring heater in combination with the tight thick-walled glass fiber insulation jacket ensures a homogeneous heating of the complete **PSG Basic** up to 250 °C. The self-regulated version has a factory setting of 160 °C (standard) up to 180 °C. Regulated temperature enables up to 250 °C and is recommended especially in case of high (acid) dew point or to avoid salification (especially if sample gas includes low acidic / alkaline components as NH₃ leading to ammonium carbonate): Sophisticated **PSG Basic** design - long lifetime.

Functions

Extreme large filter surface & homogeneous heating ensures that dust will always be separated reliably in the **PSG Basic** without condensation of water vapor thus avoiding blocking of the filter. Due to large filters with 0.1 resp. 0.3 µm porosity the **PSG Basic** can be used for applications with up to 3 g/m³ dust and 10 g/m³ with pre-filter or single stage back purge. The 0.3 µm surface-coated SiC ceramic filter enables best thermal & chemical resistance also for tough applications. The standard calibration resp. test gas connection enables the use of the **PSG Basic** within emission monitoring systems acc. to EU Regulations 2000/76/EG & 2001/80/EG: TI Air (TA Luft), 13th & 17th BImSchV (large combustion plants, waste incineration). **PSG Basic** design allow small, medium or high dust contents.

- ✓ Extreme low maintenance due to the largest active filter surface on the market
- ✓ 4-fold less maintenance than any other filter: 100 mg/m³ dust =>2 years interval
- ✓ Controlled filter heating up to 250 °C or self-regulated heating: 160 °C to 180 °C
- ✓ Filter change without tools and sample line dismounting
- ✓ Corrosion resistant realized with stainless steel SS 1.4571 / Fitting SS 316
- ✓ Calibration & back purge connection
- ✓ Temperature alarm contact included
- ✓ Compact protective housing for outdoor installation under rough conditions
- ✓ Sampling of low and medium dust - high dust load with additional measures



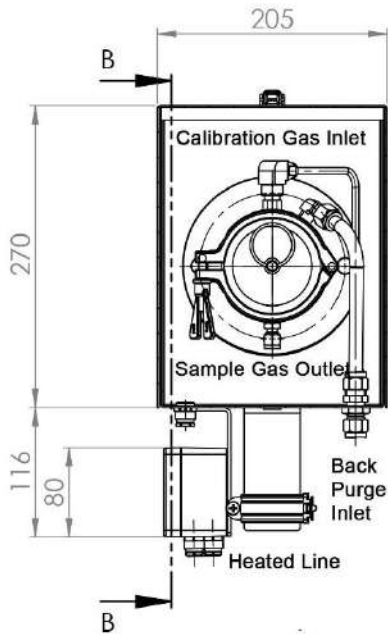


Technical Data PSG Basic

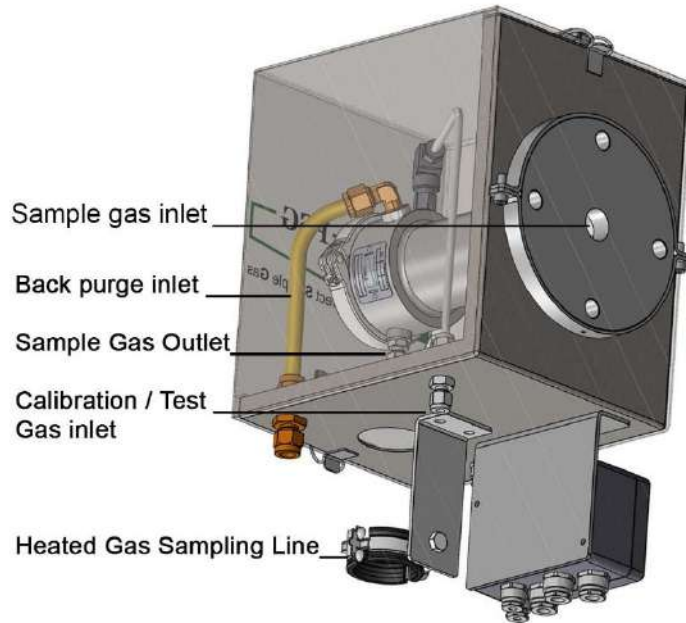
Process gas sampling Conditions	Pressure p_{abs} :	50...6000 hPa (mbar _(abs))		
	Sample Gas Temperature:	Up to 600 °C	Tube: SS 1.4571	
	Sample Gas Temperature:	Up to 900 °C	Standard Tube: SS 1.4893 High resistant Tube: Hastelloy C4	
	Sample Gas Temperature:	Up to 1300 °C	Tube: Kanthal APM	
	Ambient temperature	250 W heater: -30 ... 50 °C // 350 W heater: -50 ... 50 °C		
Low & medium Dust	Flow	30...500 l/h, referred to 1013 hPa and 0 °C		
	Pressure drop	Approx. 0.6 hPa at 100 l/h		
	Standard Basic with standard filter unit	Dust concentration: < 100 mg/m ³ < 1 g/m ³	Maintenance: Any 2 years Twice a year	
		< 3 g/m ³	Any 3 months	
High Dust Content	1-stage back purge or Pre-Filter PF	> 3 up to < 10 g/m ³	Option	
Connections	Sample gas	G1/4" f (DIN ISO 228/1)		
	Test gas (standard) / tubing (option)	G1/4" f (DIN ISO 228/1) / 6 mm Tube		
Filter Heating	Type Content	Heating sleeve incl. PT100	230/ 115 V _{AC} , 50...60 Hz 230/ 115 V _{AC} , 50...60 Hz	250 W 350 W
		Ring heater self-regulating	230/ 115 V _{AC} , 48...62 Hz	2 x 100 W
		Removable insulation jacket, heating sleeve only		
	Isolation	Additional insulation protective housing, heating sleeve only, for ambient temperature:		-30 ... +60 °C
	Temperature, self-regulating	Standard: 160 °C		Alarm: 140 °C
	Temperature, regulated	Up to 250 °C; acid dew point, salification to be evaluated		Alarm: 20 °C below setting
	Temperature control	PID-controller ST49 incl. solid state relays for DIN-rail-mounting With controller in connection box, heating sleeve only		Heating sleeve only
Filter Properties	Temperature sensor	PT100 (only heating sleeve)		
	Filter with Surface of 212 cm ²	Ceramic, silicon carbide (SiC) Glass fiber: if no acidic components to be measured	Standard Special	
	Porosity	SiC ceramic: 0.3 µm // Borosilicate Glass fiber: 0.1 µm		
	Tightness	10 ⁻⁴ hPa l/s		
	Dead volume	ca. 280 ml		
Protective Housing	Dimensions	50/20 x 135 mm		
	Dimensions	250 x 205 x 270 mm (L x B x T)		
	Material	Stainless steel SS 304		
	Ambient temperature	-20 °C ... +60 °C; Option: -30 °C ... +60 °C		Add. measures
	Weight	Approx. 14 kg		Complete probe
	For heating with thermostat control	With adapted connection box		
	Without protective housing	With adapted connection box		
Without protective housing, for heating with thermostat control	With adapted connection box			
Mounting	Protection class connection box	IP67 EN 60529		
	Flange	DN 65, PN 6, 4-hole, form B according to DIN 2527		
Materials in contact with sample gas	Installation angle	10° - 35° inclination to horizontal position		Recommended
	Housing, gas connections / flange	Stainless steel SS 1.4571 // Fitting: stainless steel SS 316		
	Gaskets	FPM as standard: FFKM as corrosion resistant version:	Up to 200 °C Up to 250 °C	
	Filter material	Silicon Carbide (SiC) Borosilicate Glass (fiber)	Standard Special	
	Pressure reduction valve at probe outlet	to prevent pressure peaks during back purge, 6 mm O.D. tube connection		Option



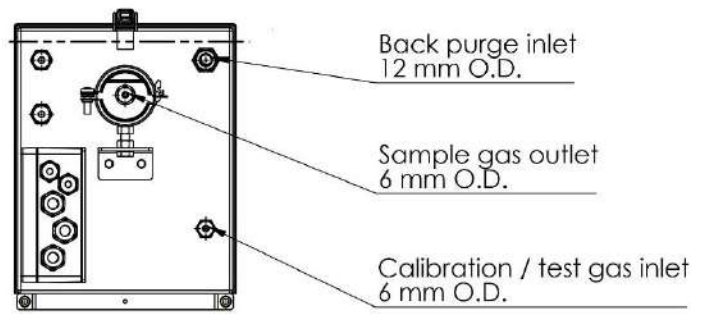
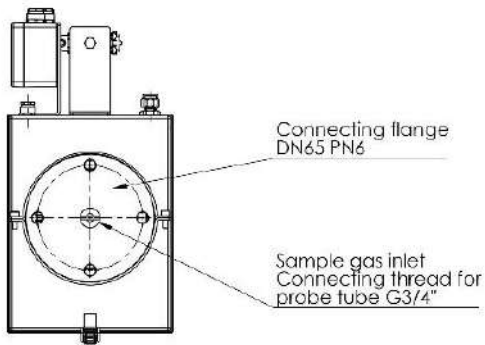
PSG Basic Filter



Calibration & Sample Gas flow through



PSG Basic with Back Purge and Cal Gas Inlet



Dimensions in mm



Options for PSG Basic, PSG Plus and Plus DSBP



Heating sleeve incl. PT100
Part No. 53500018



PID-controller ST49 & solid-state relays (25A) with heat sink for DIN-rail-mounting, heating sleeve only
Part No. 50078850



Removable insulation jacket
Part No. 80060544B
resp. 80060593P



Ring heater selfregulating
Part No. 53500019



Gas Sampling Tubes – see also: PDS PSG ST, Part No. 80060022 Length: 1000 mm // Extension: 100 mm



Assembly consisting of:
Part No. 80060526, 80060492 and 80060493



Length: 220 / 520 mm



Length: 1000 mm; Extension 100 mm

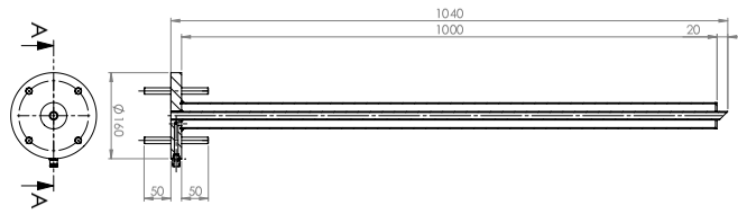
Gas Sampling Pre-Filter – see also: PDS PSG PF

Part No. 80060492 (for L = 220 mm)
resp. 80060572 (for L = 520 mm)

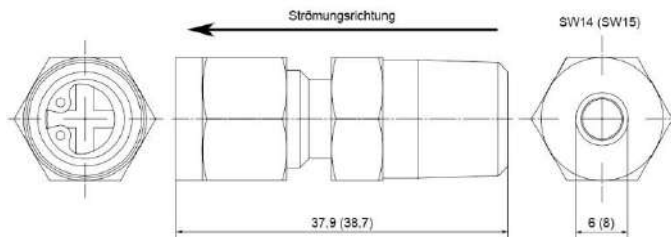
Part No. 80060526



Heated Gas Sampling Tube – see also: PDS PSG HT, Part No. 80060671



Pressure Reduction Valve – see also PDS PSG PR
Part No. 80060195 (Ø = 6 mm), resp. 80060675 (Ø = 8 mm)



Dimensions in mm



Heated Gas Sampling Probe PSG Plus

Application

The heated gas sampling probes series **PSG Plus** are used for continuous extractive gas analysis. They enable trouble-free representative sampling of hot predominantly dust and water vapour loaded gases. Typical applications are emission measurement, process monitoring and process optimisation.

Technology

The intelligent design with optimum gas guidance enables the filtration of sample gas at the outer filtration surface of 212cm² (largest on the market) as well as comfortable and quick filter change without tools and dismounting of the heated sample line. Extremely simple maintenance of the **PSG Plus** is enabled due to a sophisticated corkscrew mechanism, which allows opening without effort also at sticking filter housing lid. The holohedral tight high performance ring heater in combination with the tight thick-walled glass fibre insulation jacket ensures a homogeneous heating of the complete **PSG Plus** to 180°C.

Functions

Due to the largest filtration surface on the market in combination with the homogeneous heating dust will always be separated reliably in the **PSG Plus** without condensation of water vapour and therefore without blocking of the filter. For elevated dust concentrations of up to 40g/m³ resp. 280g/m³ the **PSG Plus** can be equipped with an ultimate effective single or dual stage back purging with tubing of 12mm outer diameter which is unique on the market. This way filter chamber (single stage) as well as filter are purged thoroughly. The standard calibration resp. test gas connection enables the use of the **PSG Plus** within emission measuring systems according to 13. and 17. BImSchV (EU-regulations 2000/76/EG and 2001/80/EG).

- ✓ Largest active filter surface on the market
- ✓ Corrosion resistant made of stainless steel SS316Ti
- ✓ Controlled or self-regulated heating to 180°C
- ✓ No cold spots
- ✓ Comfortable filter change without tools
- ✓ Single or dual stage back purging as option
- ✓ Test gas connection as standard
- ✓ Protective housing for outdoor installation
- ✓ Temperature alarm contact
- ✓ 8-hole flange for variable mounting
- ✓ Upgradeable as option



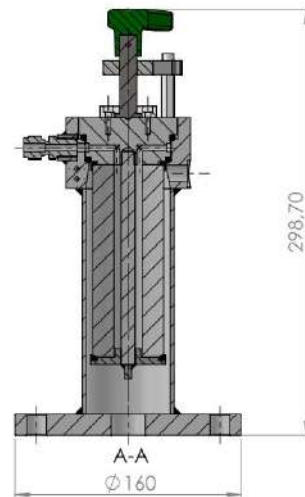
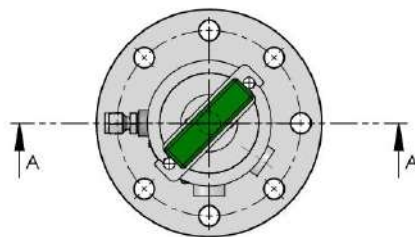
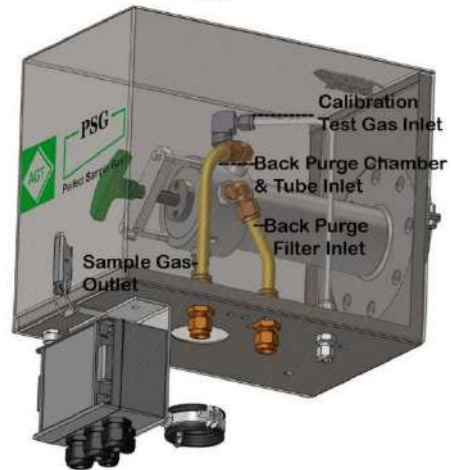
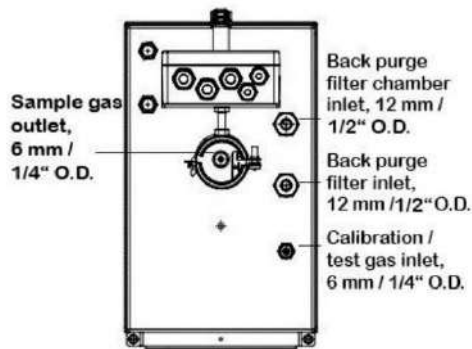
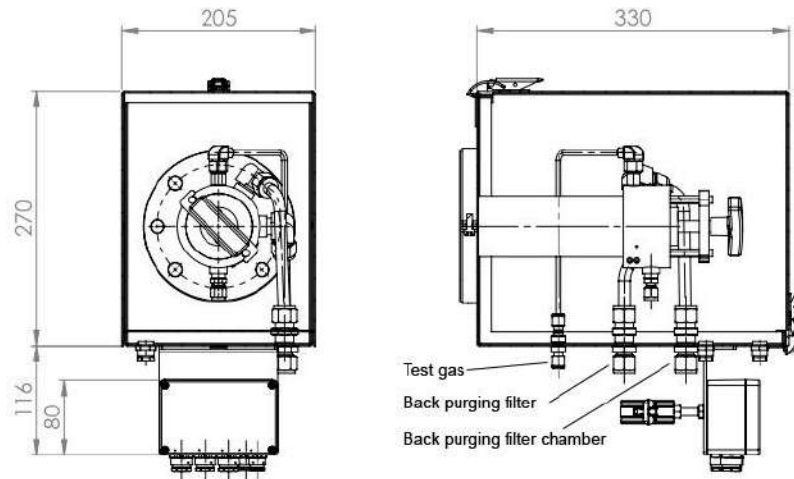


Technical Data

				Part No.
Process gas sampling conditions PSG Plus	Pressure		p _{abs} = 50...600 kPa	
	Temperature		max. 200 °C at probe inlet	
	Flow		30...1500 l/hr, referred to 100 kPa and 0 °C	
	Pressure drop		approx. 0,6 hPa at 100 l/hr	
	Max. dust content without and with back purging		3 g/m ³ / 40g/m ³ single stage / 280g/m ³ dual stage	
Connections	Sample gas		G1/4" f (DIN ISO 228/1)	
	Test gas (standard) / Tubing (option)		G1/4" f (DIN ISO 228/1) / 6mm tube	
	Back purge (standard)	Tubing (option)	2 x G3/8" f (DIN ISO 228/1)	Single stage 12mm tube Dual stage 12mm tube
Heating	Type	Heating sleeve incl. PT100	115V AC, 50...60 Hz, 250 W	53500017
			230V AC, 50...60 Hz, 250 W	53500018
		Ring heater self regulating	115V AC, 2x100W, 48...62 Hz,	53500016
			230V AC, 2x100W, 48...62 Hz,	53500019
	Isolation	Removable insulation jacket (only heating sleeve)		80060593
		Additional insulation protective housing (only heating sleeve) for ambient temperature -30°C		53500038
	Temperature		180 °C	
	Temperature alarm		approx. 150 °C	
	Temperature control	PID-controller ST49 incl. solid state relays for DIN-rail-mounting (only heating sleeve)		50078850
		Thermostat control with controller in connection box (only heating sleeve)		53500041
Temperature sensor		PT100 (only heating sleeve)		
Filter Properties PSG Plus	Filter		Surface filter, ceramic coated	
	Porosity		0,3 µm	
	Tightness		10 ⁻⁴ hPa l/s	
	Dead volume		ca. 280 ml	
	Dimensions		50/20 x 135 mm	
Protective Housing	Dimensions		330 x 205 x 270 mm (L x B x T)	
	Material		Stainless steel SS 304	
	Ambient temperature		-20°C ... +60°C	
	Weight		approx. 14 kg (complete probe)	
	For heating with thermostat control		With adapted connection box	
Mounting	Protection class connection box		IP67 EN 60529	
	Flange		DN 65, PN 6, 8-hole, form B according to DIN 2527	
	Installation angle		10°-35° inclination to horizontal position	
Materials in contact with sample gas	Housing, flange, gas connections		Stainless steel SS 316Ti	
	Gaskets	FPM		80060638
		FFKM instead of FPM for heating to 315°C or corrosion resistant version (with back purging)		80060953
Pre-configured examples	with protective housing, heating sleeve, PT100 and insulation jacket		53402001	
	with protective housing, heating sleeve, PT100, insulation jacket , test gas tubing and dual stage back purge tubing		53402002	
	with protective housing, heating sleeve, PT100, insulation jacket and temperature controller ST49		53402003	
	with protective housing, heating sleeve, PT100, insulation jacket , test gas tubing, dual stage back purge tubing and temperature controller ST49		53402004	
	with protective housing, heating sleeve, insulation jacket and thermostat controller		53402005	
with protective housing, heating sleeve, insulation jacket , test gas tubing, dual stage back purge tubing and thermostat controller		53402006		



Dimensions



Dimensions in mm



Options



Heating sleeve incl. PT100, Part No. 53500017 resp. 53500018



Removable insulation jacket, Part No. 80060593



Ring heater self regulating, Part No. 53500016 resp. 53500019



PID-controller ST49 and solid state relays (25A) with heat sink for DIN-rail-mounting (only heating sleeve), Part No. 50078850



Heated Gas Sampling Probe PSG Plus DSBP

Application

The heated gas sampling probes series **PSG Plus DSBP** are used for continuous extractive gas analysis. They enable trouble-free representative sampling of hot highly dust and water vapour loaded gases. Typical applications are e.g. process measurements in the cement industry.

Technology

The intelligent design with optimum gas guidance enables the filtration of sample gas at the outer filtration surface of 212cm² (largest on the market) as well as comfortable and quick filter change without tools and dismounting of the heated sample line. Extremely simple maintenance of the **PSG Plus DSBP** is enabled due to a sophisticated corkscrew mechanism, which allows opening without effort also at sticking filter housing lid. The holohedral tight high performance ring heater in combination with the tight thick-walled glass fibre insulation jacket ensures a homogeneous heating of the complete **PSG Plus DSBP** to 180°C. The dual stage back purge with 12x1mm tubing is controlled by optional mounted Coax solenoid valves with 10mm passage.

Functions

Due to the largest filtration surface on the market in combination with the homogeneous heating dust will always be separated reliably in the **PSG Plus DSBP** without condensation of water vapour and therefore without blocking of the filter. For elevated dust concentrations of up to 280g/m³ the **PSG Plus DSBP** is equipped with an ultimate effective double stage back purge with 10mm passage which is unique on the market. This way filter as well as filter chamber are purged thoroughly and dust is purged back almost completely into the process. The membrane coated ceramic filter with 0,3µm porosity is supporting additionally the great back purge effectivity.

- ✓ **Largest active filter surface on the market**
- ✓ **Dual stage back purging with 10mm passage**
- ✓ **Corrosion resistant made of stainless steel SS316Ti**
- ✓ **Controlled heating to 180°C**
- ✓ **No cold spots**
- ✓ **Comfortable filter change without tools**
- ✓ **Test gas connection as standard**
- ✓ **Protective housing for outdoor installation**
- ✓ **Temperature alarm contact**
- ✓ **8-hole flange for variable mounting**



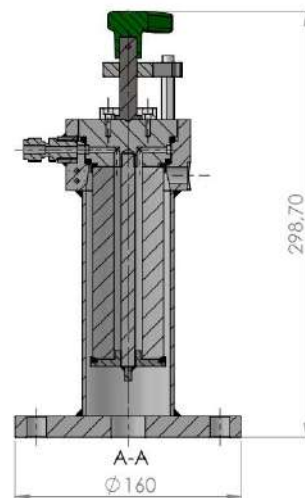
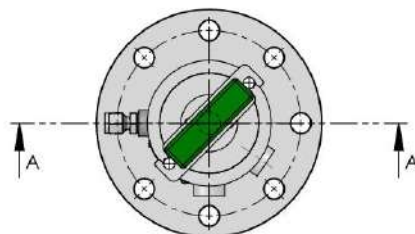
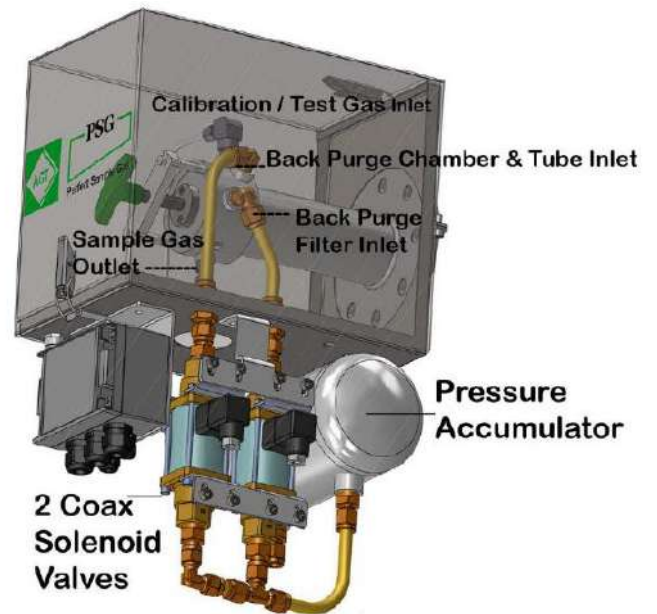
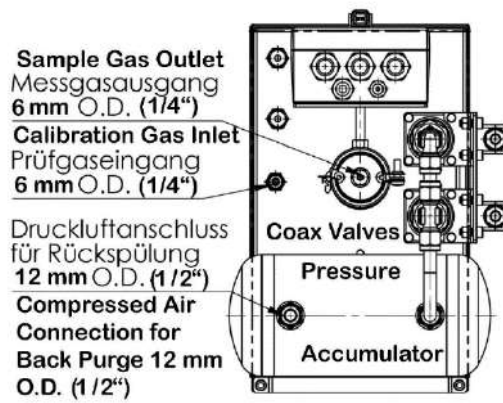


Technical Data

Process gas sampling conditions PSG Plus DSBP	Pressure	$p_{abs} = 50...600 \text{ kPa}$
	Temperature	max. 200 °C at probe inlet
	Flow	30...1500 l/hr, referred to 100 kPa and 0 °C
	Pressure drop	approx. 0,6 hPa at 100 l/hr
	Max. dust concentration	280g/m ³
Connections	Sample gas	G1/4" f (DIN ISO 228/1)
	Test gas / Tubing	G1/4" f (DIN ISO 228/1) / 6mm tube
	Back purge / Tubing	12x1mm tube
Heating	Type	Heating sleeve incl. PT100, 250W
	Isolation	Removable insulation jacket Additional insulation protective housing for ambient temperature -30°C as option
	Temperature	180 °C
	Temperature alarm	approx. 150 °C
	Temperature control	PID-controller ST49 incl. solid state relais for DIN-rail-mounting Thermostat control with controller in connection box
Filter Properties PSG Plus DSBP	Filter	Surface filter, ceramic coated
	Porosity	0,3 µm
	Tightness	10 ⁻⁴ hPa l/s
	Dead volume	ca. 280 ml
	Dimensions	50/20 x 135 mm
Protective Housing	Dimensions	330 x 205 x 270 mm (L x W x D)
	Material	Stainless steel SS 304
	Ambient temperature	-20°C ... +60°C
	Weight	approx. 14 kg (complete probe)
	Protection class connection box	IP67 EN 60529
Mounting	Flange	DN 65, PN 6, 8-hole, form B according to DIN 2527
	Installation angle	10°-35° inclination to horizontal position (recommended)
Materials in contact with sample gas	Housing, flange, gas connections	Stainless steel SS 316Ti
	Gaskets	FPM (FFKM as option) FFKM instead of FPM for heating to 315°C or corrosion resistant version (with back purging), Art. 80060638
Part Number	53402004	PSG Plus DSBP, 230V 50/60Hz, with PID-controller ST49 and solid state relais for DIN-rail mounting
	53402011	PSG Plus DSBP, 115V 50/60Hz, with PID-controller ST49 and solid state relais for DIN-rail mounting
	53402006	PSG Plus DSBP, 230V 50/60Hz, with thermostat controller in connection box
	53402012	PSG Plus DSBP, 115V 50/60Hz, with thermostat controller in connection box
	53500057	Extra charge for 2 Coax solenoid valves mounted at the probe and wired to connection box, voltage 24VDC
	53500038	Extra charge for additional insulation of protective housing for ambient temperatures -30°C
	80060195	Pressure reduction valve for sample gas outlet to prevent pressure peaks when back purging, 6mm tube connection
	53001192	Pressure accumulator 2L, material stainless steel, mounted at probe connected with 12mm tube at Coax valves, max. operating pressure 7bar, pressure air connection 12mm tube



Dimensions



Dimensions in mm



Product details



Removable insulation jacket



PSG Plus DSBP with protective housing



PID-controller ST49 and solid state relays (25A) with heat sink for DIN-rail-mounting



Coax solenoid valve for back purge control



PSG Plus DSBP with Coax valves and 2l pressure accumulator



Heated Gas Sampling Probe PSG Plus Ex 90



Application

The heated gas sampling probes series **PSG Plus Ex 90** are used for continuous extractive gas analysis. They enable trouble-free representative sampling of hot predominantly dust and water vapour loaded gases. Typical applications are monitoring and protection of explosion-endangered plant components.

Technology

The intelligent design with optimum gas guidance enables the filtration of sample gas at the outer filtration surface of 212cm² (largest on the market) as well as comfortable and quick filter change without tools and dismantling of the heated sample line. Extremely simple maintenance of the **PSG Plus Ex 90** is enabled due to a sophisticated corkscrew mechanism, which allows opening without effort also at sticking filter housing lid. The holohedral tight aluminium block heater in combination with the 3 self-regulating heating elements ensures a homogeneous heating of the complete **PSG Plus Ex 90** to 90°C.

Functions

Due to the largest filtration surface on the market in combination with the homogeneous heating dust will always be separated reliably in the **PSG Plus Ex 90** without condensation of water vapour and therefore without blocking of the filter. For elevated dust concentrations of up to 40g/m³ resp. 280g/m³ the **PSG Plus Ex 90** can be equipped with an ultimate effective single or dual stage back purging with tubing of 12mm outer diameter which is unique on the market. This way filter chamber (single stage) as well as filter are purged thoroughly. The standard calibration resp. test gas connection enables the use of the **PSG Plus Ex 90** within emission measuring systems according to 13. and 17. BImSchV (EU-regulations 2000/76/EG and 2001/80/EG).

- ✓ Mounting in Ex zone 1 and 2
- ✓ Largest active filter surface on the market
- ✓ Corrosion resistant made of stainless steel SS316Ti
- ✓ Self-regulated heating to 90°C
- ✓ No cold spots
- ✓ Comfortable filter change without tools
- ✓ Single or dual stage back purging as option
- ✓ Test gas connection as standard
- ✓ Protective housing for outdoor installation
- ✓ 8-hole flange for variable mounting
- ✓ Upgradeable as option



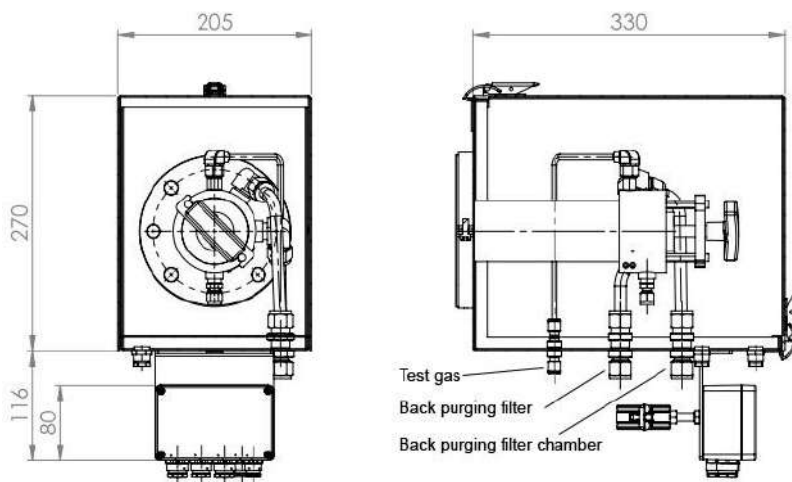


Technical Data

				Part No.
Process gas sampling conditions PSG Plus Ex 90	Pressure	p _{abs} = 50...600 kPa		80060528
	Temperature	max. 200 °C at probe inlet		
	Flow	30...1500 l/hr, referred to 100 kPa and 0 °C		
	Pressure drop	approx. 0,6 hPa at 100 l/hr		
	Max. dust content without and with back purging	3 g/m ³ / 40g/m ³ single stage / 280g/m ³ dual stage		
Connections	Sample gas	G1/4" f (DIN ISO 228/1)		53500062
	Test gas (standard) / Tubing (option)	G1/4" f (DIN ISO 228/1) / 6mm tube		
	Back purge (standard)	Tubing (option)	2 x G3/8" f (DIN ISO 228/1)	
Heating	Type	Block heater self-regulating	230VAC 50 Hz / 3 x 100W II 2G Ex d IIC T3 Gb	53500073
	Isolation	Additional insulation protective housing (only heating sleeve) for ambient temperature -30°C		53500038
	Temperature	90 °C		
	Temperature control	self-regulating		
Filter Properties PSG Plus	Filter	Surface filter, ceramic coated		80060528
	Porosity	0,3 µm		
	Tightness	10 ⁻⁴ hPa l/s		
	Dead volume	ca. 280 ml		
	Dimensions	50/20 x 135 mm		
Protective Housing	Dimensions	330 x 205 x 270 mm (L x B x T)		53500008
	Material	Stainless steel SS 304		
	Ambient temperature	-20°C ... +60°C		
	Weight	approx. 14 kg (complete probe)		
	Protection class connection box	IP67 EN 60529		
Mounting	Flange	DN 65, PN 6, 8-hole, form B according to DIN 2527		80060528
	Installation angle	10°-35° inclination to horizontal position		
Materials in contact with sample gas	Housing, flange, gas connections	Stainless steel SS 316Ti		
	Gaskets	FPM		

State 05 / 2019 | Subject to change

Dimensions



Dimensions in mm



Heated Gas Sampling Probe

PSG ATEX 150



Application

The heated gas sampling probes series **PSG ATEX 150** are used for continuous extractive gas analysis. They enable trouble-free representative sampling of hot predominantly dust and water vapour loaded gases. Typical applications are measurements and monitoring in explosive plant components.

Technology

The intelligent design with optimum gas guidance enables the filtration of sample gas at the outer filtration surface of 212cm², allowing service periods of up to 2 years (depending on the dust concentration). If it is necessary to change the filter, the arrowed corkscrew mechanism allows this to be done quickly and conveniently in just a few steps without tools and without disassembling the connected heated sample gas line.

The full-surface tight-fitting aluminium heating element with one self-regulating heating cartridge ensures homogeneous heating of the entire **PSG ATEX 150** to 150°C even at the lowest ambient temperatures.

Functions

Due to the largest filtration surface dust will always be separated reliably in the **PSG ATEX 150**. The heating concept prevents water vapour condensation in order to reliably prevent blocking of the filter. For elevated dust concentrations of up to 40g/m³ resp. 280g/m³ the **PSG ATEX 150** can be equipped with an ultimate effective single or dual stage back purging with tubing of 12mm outer diameter. In this way filter chamber (single stage) as well as filter element are back purged thoroughly and low-maintenance operation is ensured.

- ✓ For operation in Ex zone 1 and 2
- ✓ Temperature class: T3
- ✓ Self-limiting heating to 150° C in an environment down to -40° C (optionally also down to -60° C possible)
- ✓ No temperature limiter necessary
- ✓ IP65 protection class
- ✓ Largest active filter surface on the market
- ✓ No cold spots
- ✓ Comfortable filter change without tools
- ✓ Single or dual stage back purging as option
- ✓ 120VAC version (option)



Picture corresponds to PSG ATEX 180

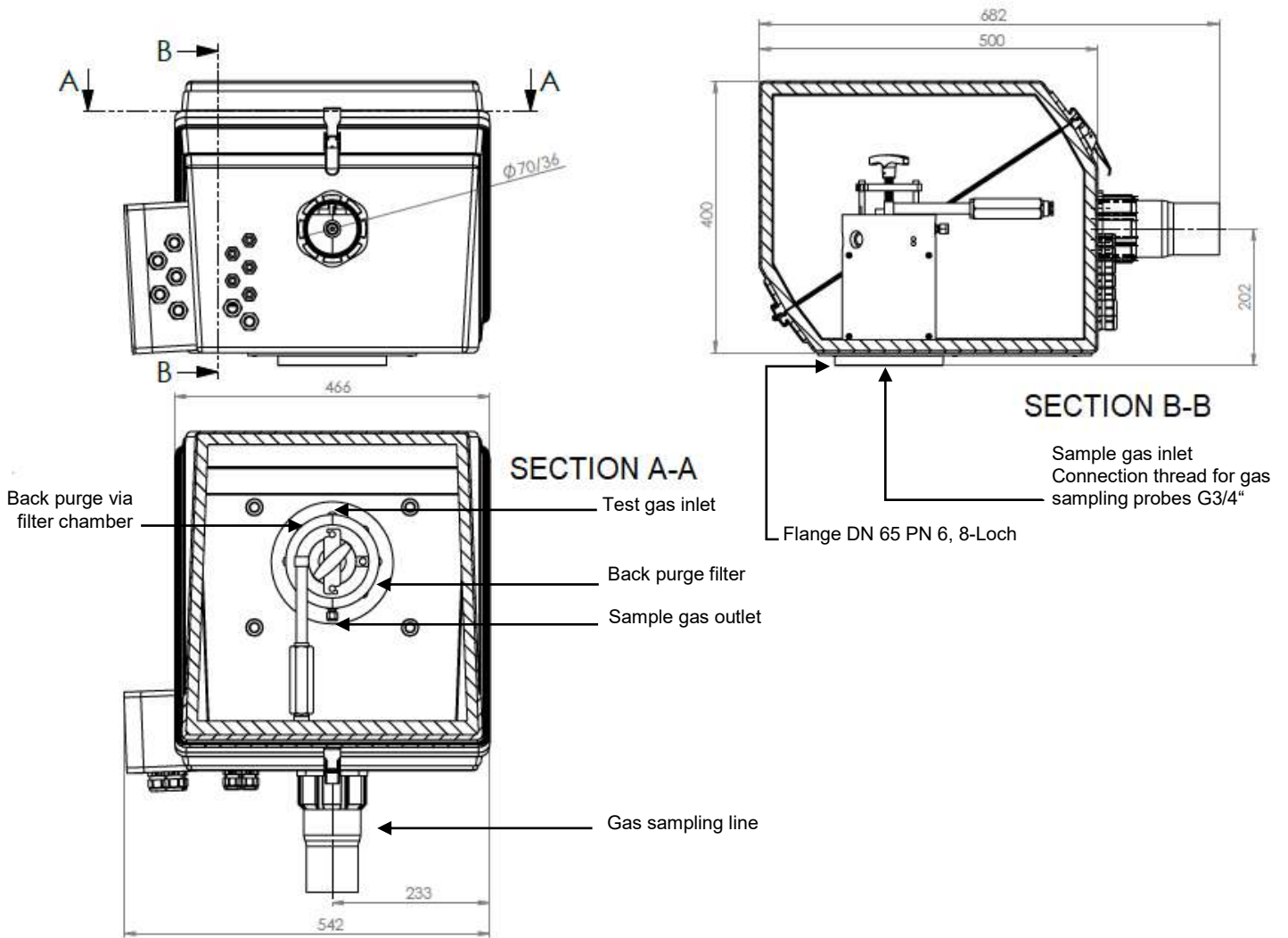


Technical Data

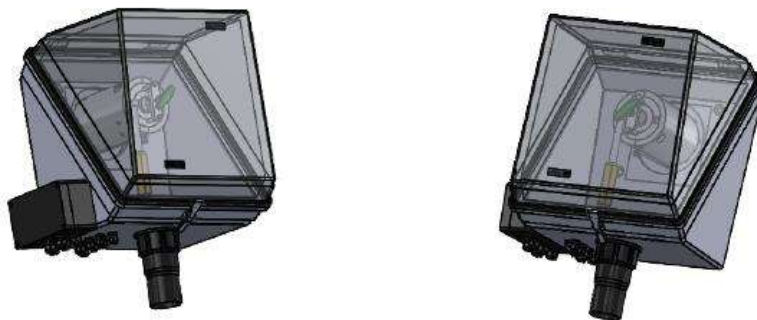
			ArtikelNr.
Process gas sampling conditions PSG ATEX 150	Pressure	p _{abs} = 50...600 kPa	
	Temperature	max. +200 °C at probe inlet	
	Flow	30...1500 l/h, referred to 100 kPa and 0 °C	
	Pressure drop	approx. 0,6 hPa at 100 l/hr	
	Max. dust content without and with back purging	3 g/m ³ w/o / 40g/m ³ single stage / 280 g/m ³ dual stage	
Connections	Sample gas	G1/4" f (DIN ISO 228/1)	
	Test gas (blanking valve as standard) / Tubing (option)	G1/4" f (DIN ISO 228/1) / 6mm tube	
	Back purge (blanking valve as standard)	Tubing (option)	2 x G3/8" f (DIN ISO 228/1) Single stage (Filter chamber) 12mm tube Dual stage 12mm tube
Heating	Type	Cartridge heater Self-limiting	240VAC 50 Hz / 1 x 265W II 2G Ex d IIC T3 IECEx 120V option on request
	Isolation	PU as housing insulation	30061093
	Temperature	Pyrogel insulation sleeve for heating element around filter unit (without back purte)	55500364
	Temperature control	150 °C at -40°C Ambient temperature (-60°C version with support heating option) Not necessary because it is self-limiting	
Filter Properties PSG Plus	Filter	Surface filter, ceramic coated	
	Porosity	0,3 µm	
	Tightness	10 ⁻⁴ hPa l/s	
	Dead volume	ca. 280 ml	
	Dimensions	50/20 x 135 mm	
Protective Housing	Dimensions	682 x 542 x 400 mm (L x B x T)	
	Material	GRP with reduced surface resistance according to DIN EN IEC 60079-0, less than 10 ⁹ Ohm	
	Ambient temperature	-40°C ... +50°C (-60°C with support heating possible)	
	Weight	approx.30 kg (Probe incl. protective housing)	
Mounting	Protection class terminal box and protective housing	IP65 EN 60529	
	Flange	DN 65, PN 6, 8-hole, Form B acc. to DIN 2527	
Materials in contact with sample gas	Installation angle	+ 10°bis +35° inclination to horizontal position	
	Flange, gas connections	Stainless steel SS 316Ti	
	Dichtungen	FPM	80060638
Low to medium dust loading	Extremely long maintenance	FFKM instead of FPM for process temperatures of up to 315°C or corrosion resistant version (with back purging)	80060953
		FFKM instead of FPM for process temperatures of up to 315°C or corrosion resistant version (without back purging)	
		Dust load:	Maintenance
	< 100 mg/m ³	Every 2 years	
	< 1 g/m ³	Twice a year	
	< 3 g/m ³	Every 3 months	



Dimensions



State 05 / 2021 | Subject to change



Dimensions in mm





Heated Gas Sampling Probe

PSG ATEX 180



Application

The heated gas sampling probes series **PSG ATEX 180** are used for continuous extractive gas analysis. They enable trouble-free representative sampling of hot predominantly dust and water vapour loaded gases. Typical applications are measurements and monitoring in explosive plant components.

Technology

The intelligent design with optimum gas guidance enables the filtration of sample gas at the outer filtration surface of 212cm², allowing service periods of up to 2 years (depending on the dust concentration). If it is necessary to change the filter, the arrowed corkscrew mechanism allows this to be done quickly and conveniently in just a few steps without tools and without disassembling the connected heated sample gas line.

The full-surface tight-fitting aluminium heating element with the two self-regulating heating cartridges ensures homogeneous heating of the entire **PSG ATEX 180** to 180°C even at the lowest ambient temperatures.

Functions

Due to the largest filtration surface dust will always be separated reliably in the **PSG ATEX 180**. The heating concept prevents water vapour condensation in order to reliably prevent blocking of the filter. For elevated dust concentrations of up to 40g/m³ resp. 280g/m³ the **PSG ATEX 180** can be equipped with an ultimate effective single or dual stage back purging with tubing of 12mm outer diameter. In this way filter chamber (single stage) as well as filter element are back purged thoroughly and low-maintenance operation is ensured.

- ✓ For operation in Ex zone 1 and 2
- ✓ Temperature class: T3
- ✓ Self-limiting heating to 180° C in an environment down to -40° C (optionally also down to -60° C possible)
- ✓ No temperature limiter necessary
- ✓ IP65 protection class
- ✓ Largest active filter surface on the market
- ✓ No cold spots
- ✓ Comfortable filter change without tools
- ✓ Single or dual stage back purging as option
- ✓ 120VAC version (option)



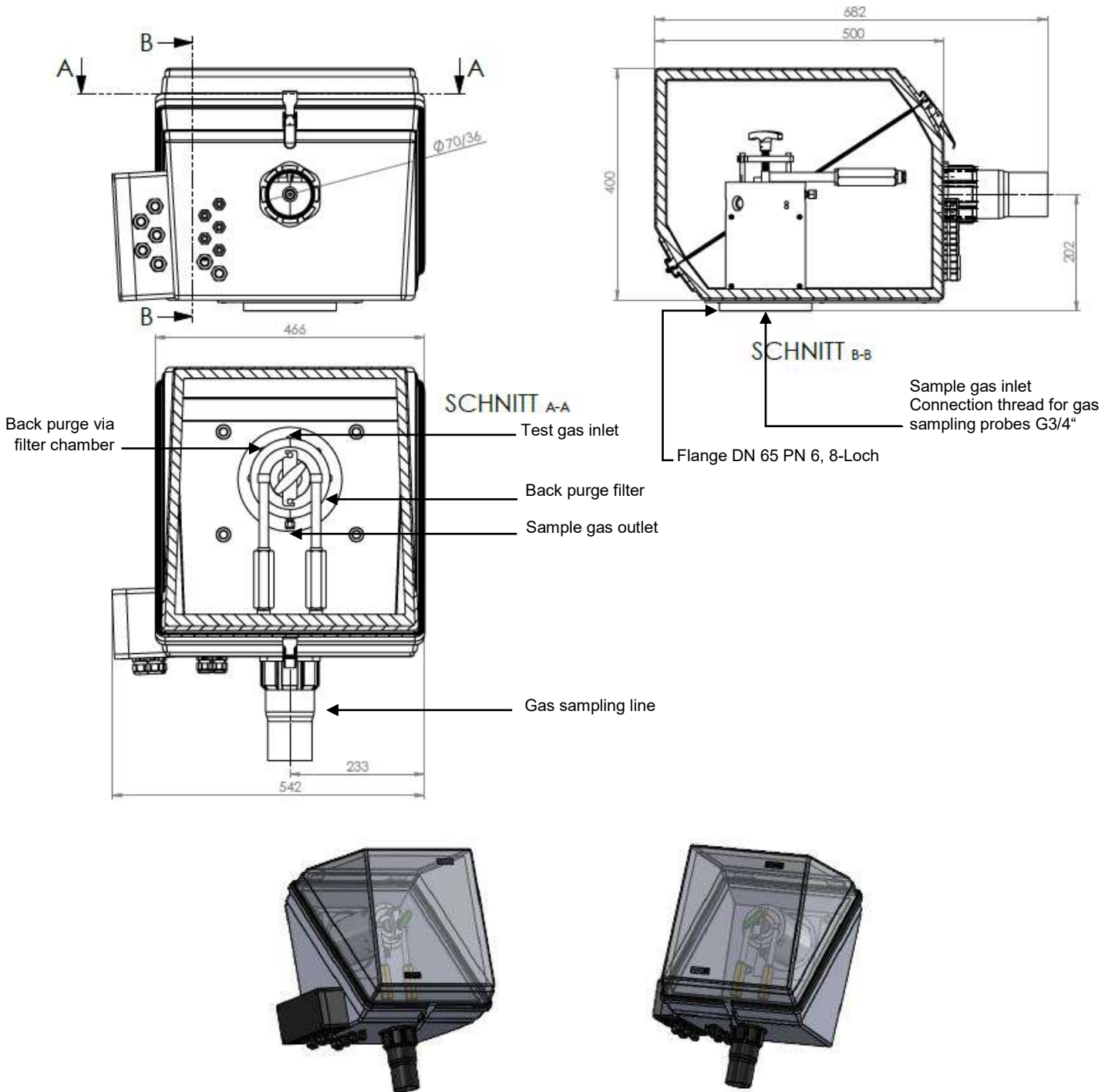


Technical Data

			ArtikelNr.	
Process gas sampling conditions PSG ATEX 180	Pressure	p _{abs} = 50...600 kPa		
	Temperature	max. +200 °C at probe inlet		
	Flow	30...1500 l/h, referred to 100 kPa and 0 °C		
	Pressure drop	approx. 0,6 hPa at 100 l/hr		
	Max. dust content without and with back purging	3 g/m ³ w/o / 40g/m ³ single stage / 280 g/m ³ dual stage		
Connections	Sample gas	G1/4" f (DIN ISO 228/1)		
	Test gas (blanking valve as standard) / Tubing (option)	G1/4" f (DIN ISO 228/1) / 6mm tube		
	Back purge (blanking valve as standard)	Tubing (option)	2 x G3/8" f (DIN ISO 228/1)	Single stage (Filter chamber) 12mm tube On request
				Dual stage 12mm tube On request
Heating	Type	Cartridge heaters Self-limiting	240VAC 50 Hz / 2 x 265W II 2G Ex d IIC T3 IEcEX 120V option on request	
	Isolation	PU as housing insulation	30061093	
	Temperature	Pyrogel insulation sleeve for heating element around filter unit (without back purte)	55500364	
	Temperature control	180 °C at -40°C Ambient temperature (-60°C version with support heating option) Not necessary because it is self-limiting		
Filter Properties PSG Plus	Filter	Surface filter, ceramic coated		
	Porosity	0,3 µm		
	Tightness	10 ⁻⁴ hPa l/s		
	Dead volume	ca. 280 ml		
	Dimensions	50/20 x 135 mm		
Protective Housing	Dimensions	682 x 542 x 400 mm (L x B x T)		
	Material	GRP with reduced surface resistance according to DIN EN IEC 60079-0, less than 10 ⁹ Ohm		
	Ambient temperature	-40°C ... +50°C (-60°C with support heating possible)		
	Weight	approx.30 kg (Probe incl. protective housing)		
	Protection class terminal box and protective housing	IP65 EN 60529		
Mounting	Flange	DN 65, PN 6, 8-hole, Form B acc. to DIN 2527		
	Installation angle	+ 10°bis +35° inclination to horizontal position		
Materials in contact with sample gas	Flange, gas connections	Stainless steel SS 316Ti		
	Dichtungen	FPM		
		FFKM instead of FPM for process temperatures of up to 315°C or corrosion resistant version (with back purging)	80060638	
	FFKM instead of FPM for process temperatures of up to 315°C or corrosion resistant version (without back purging)	80060953		
Low to medium dust loading	Extremely long maintenance	Dust load:	Maintenance	
		< 100 mg/m ³	Every 2 years	
		< 1 g/m ³	Twice a year	
		< 3 g/m ³	Every 3 months	



Dimensions



State 05 / 2021 | Subject to change

Dimensions in mm



PSG[®]
Perfect Sample Gas



Pressure Reduction Valve PSG PR

Application

The pressure reduction valve **PSG PR** is used for continuous extractive gas analysis. It serves for reduction of pressure in the sample gas outlet of gas sampling probes series **PSG Plus** while back purging. Typical applications are all processes with high dust concentrations where gas sampling for process monitoring or process optimization occurs.

Technology

The pressure reduction valve **PSG PR** is based on a stainless steel fitting for tube connection with 1/4"-RT male thread, suitable for the sample gas outlet of the gas sampling probe series **PSG Plus**. In the fitting a spring loaded corrosion resistant stainless steel shut off body is integrated. The used spring is also made of corrosion resistant stainless steel.

Functions

In case of back purging the gas sampling probe **PSG Plus** the pressure reduction valve **PSG PR** reduces the fed pressure impulse in the sample gas outlet. This way a damage of downstream devices like sample gas cooler, filter, flow meter and especially analyser is prevented. The valve is designed so that no complete shut off is happening to enable a pressure relief in the gas sampling probe at any time and to remove possibly depositing particles during back purge process. Additionally the heated sample gas line is connected without cold spots via temperature resistant valve **PSG PR**. The **PSG PR** is not suited to be used in combination with a pre-filter (e.g. PSG PF).

- ✓ Reliable reduction of pressure peaks in sample gas outlet of **PSG Plus** while back purging
- ✓ Safe protection of analyser and gas conditioning components against damage
- ✓ Increase of back purge efficiency
- ✓ Self-cleaning effect
- ✓ Corrosion resistant
- ✓ Temperature resistant
- ✓ Compact design
- ✓ Dual function with connection for heated sample line
- ✓ Dismountable for simple cleaning
- ✓ Quick and simple mounting

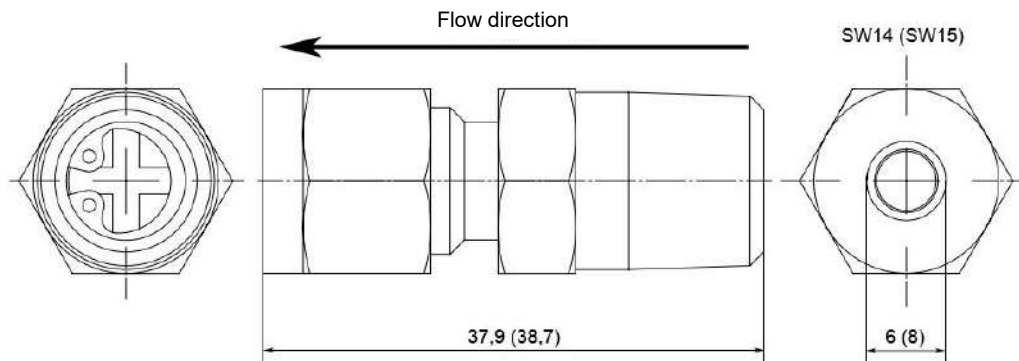




Technical Data

PSG PR			
Part No.		80060195	80060675
Max. pressure sample gas outlet PSG Plus	mbar	800	
Closing pressure at 180°C	bar abs.	> 1,8	
May. flow rate	NI/hr	1000	
Max. pressure	bar abs.	7	
Connections		6mm – ¼"RT m	8mm – ¼"RT m
Max. media temperature	°C	+320	
Materials of media wetted parts		SS316 / SS316Ti	
Ambient temperature	°C	-40...+320	
Design Data			
Length	mm	37,9	38,7
Weight	kg	ca. 0,04	
Mounting		threaded joint	

Dimensions



Dimensions in mm / values in () for 8mm tube connection



Gas Sampling Pre-Filter

PSG PF

Application

The gas sampling pre-filters series **PSG PF** are used in combination with gas sampling probes **PSG Basic** and **PSG Plus** for continuous extractive gas analysis. They serve for precisely representative sampling of sample gas with dust loads above 3g/m^3 . Typical applications are process monitoring and process optimization, e.g. in coal silos or cement plants.

Technology

The sinter metal filters series **PSG PF** cover a temperature range of up to 900°C . By choosing an appropriate extension tube the position of the pre-filter in the process can exactly be determined. At risk of abrasion (erosion of filter material by dust particles with high speed) and also for life time extension (deflection of dust particles) an appropriate deflector can be used. The pre-filter **PSG PF** have a G3/4"-male thread. All extension tubes have a R3/4"-male thread fitting to the female thread in the sample gas inlet of the gas sampling probes and a G3/4"-female thread for mounting of the pre-filter.

Functions

Due to filtration at the surface of the gas sampling pre-filters **PSG PF** with increasing operation time a steady growing dust layer (filter cake) is building up and acting as additional filtration layer. Moreover it prevents a deep infiltration of dust particles into the sinter metal filter and thus has a service life prolonging effect.

- ✓ Dust separation in the process
- ✓ For dust concentrations above 3g/m^3
- ✓ Large active surface
- ✓ Long lifetime
- ✓ Low differential pressure even at high flow rates
- ✓ Corrosion resistant stainless steel or Hastelloy sinter metal filter
- ✓ Temperature resistant up to 900°C
- ✓ Sample length selectable with extension tube
- ✓ Quick and simple mounting
- ✓ Service life prolongation and protection against abrasion by deflector





Technical Data

Pre-Filter PSG PF	Max. Temp. [°C]	Length L [mm]	Connection	Porosity [µm]	Ø D [mm]	Part No.
Stainless steel	550	220	G3/4"a	2	45	80060492
		520			50	80060572
Extension tube*						
Stainless steel	550	1000	R3/4"a – G3/4"i	-	26	80060526
		100				80060645
Deflector						
Stainless steel	550	220	clamping plate	-	-	80060493
		520				80060632

*Standard length and standard extension, any arbitrary intermediate length is possible by shortening. Please indicate desired length with order.

Dimensions



Dimensions in mm



Gas Sampling Tubes

PSG ST

Application

The gas sampling tubes series **PSG ST** are used in combination with gas sampling probes **PSG Basic** and **PSG Plus** for continuous extractive gas analysis. They serve for precisely representative sampling of sample gas with dust loads up to 3g/m^3 . Typical applications are emission measurement, process monitoring and process optimization.

Technology

The spectrum of possible gas sampling tubes covers a temperature range up to 1800°C . Due to the choice of various corrosion and temperature resistant materials the possibility for every application is given to find a fitting gas sampling tube as extension for the gas sampling probes **PSG Basic** and **PSG Plus**. All tubes have a R3/4"-male thread fitting to the female thread in the sample inlet of the gas sampling probe.

Functions

By choosing the tube length exhaust or process gas can be sampled precisely from the stack or industry process and fed to the dust filtration in the heated gas sampling probe.

- ✓ **Precise measuring gas sampling**
- ✓ **For dust concentrations up to 3g/m^3**
- ✓ **Solutions for nearly all applications**
- ✓ **Corrosion resistant**
- ✓ **Temperature resistant up to 1800°C**
- ✓ **Sampling length definable**
- ✓ **Various tube materials possible**
- ✓ **Simple mounting**





Technical Data

Tube Material	Max. Temp. [°C]	Length* L [mm]	Max. Length** [mm]	Ø D [mm]	Part No.
Stainless steel SS316Ti	600	1000	2500	27	80060022
Extension stainless steel SS316Ti		100			80060645
Hastelloy C4	900	1000	2500	25	08060438
Extension Hastelloy C4		100			80060646
Stainless steel 1.4893	900	1000	2500	27	80060388
Extension stainless steel 1.4893		100			80060647
Incoloy 800HT (1.4959)	1100	1000	2500	27	80060648
Extension Incoloy 800HT		100			80060649
Inconel 601 (2.4851)	1200	1000	2500	25	80060650
Extension Inconel 601		100			80060651
Alloy HR160	1200	1000	2000	27	80060652
Extension Alloy HR160		100			80060653
Kanthal APM	1300	1000	1500	27	80060660
Extension Kanthal APM		100			80060661
Aluminium oxide-ceramic	1800	1000	1500	24	80060662
Extension Aluminium oxide-ceramic		100			80060663

*Standard length and standard extension, every arbitrary intermediate length is also possible by shortening. Please specify with order.

**Self-supporting, increased lengths are also possible but have to be supported at the sampling place due to appropriate measures like e.g. traverses

Dimensions



Dimensions in mm



Heated Gas Sampling Tube

PSG HT

Application

The heated gas sampling tubes series **PSG HT** are used for continuous extractive gas analysis. They enable trouble-free representative sampling of hot predominantly dust and water vapour loaded gases. Typical applications are emission measurement, process monitoring and process optimization.

Technology

The intelligent design of the double jacket tube with homogeneous controlled heating to 180°C over the entire tube length enables a trouble free extraction of sample gas without condensate formation. The mounting flange with stud bolts on both sides (DN65PN6) enables a seamless adaption to the gas sampling probes **PSG Basic** und **PSG Plus** as well as to the process flange DN65PN6. For other process flange dimensions adapter flange connectors are available.

Functions

Due to homogeneous heating to 180°C, zones are bridged where temperature is possibly falling below the dew point resp. acid dew point of the sample gas on its way from sampling point to gas sampling probe. Thus condensate formation and therefore blocking and damaging of the tube as well as washing out of water soluble sample gas components like SO₂ is prevented. With optional G3/4"-internal thread at the tube end the heated gas sampling tube **PSG HT** can be extended with all unheated sampling tubes and pre-filters from the **AGT-PSG** product range.

- ✓ Homogeneous heating over entire tube length
- ✓ Corrosion resistant out of SS316Ti
- ✓ Controlled heated to 180°C
- ✓ No cold spots
- ✓ In arbitrary lengths up to 2m available
- ✓ Internal tube diameter 12-20mm available
- ✓ With thermocouple Fe-CuNi
- ✓ With cable for electrical connection via connection box of **PSG Basic** and **PSG Plus**
- ✓ Protection class IP68
- ✓ Low dead volume
- ✓ Tube end with G3/4" female thread as option for extension with optional unheated tube or pre-filter

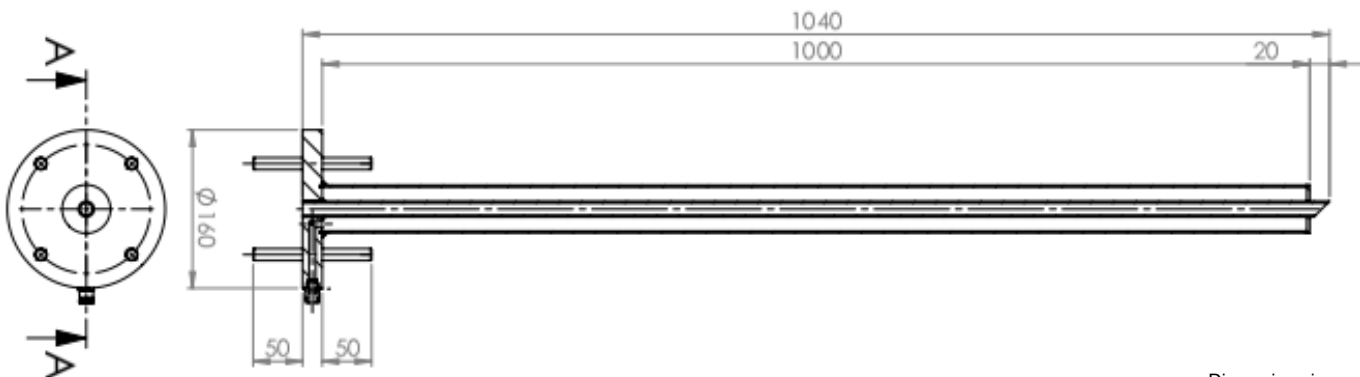




Technical Data

			Part No.	
Process gas sampling conditions PSG HT	Pressure	$p_{abs} = 50 \dots 600 \text{ kPa}$		
	Temperature	max. 250 °C		
	Flow	30...1500 l/h, referred to 100 kPa and 0 °C		
	Max. dust concentration	3 g/m ³		
Connections	Extension tube / pre-filter	G3/4" i (DIN ISO 228/1) optional	80060674	
Heating	Type	Fixed resistance heater	50078850	
	Temperature	180 °C		
	Temperature alarm	150 °C (adjusted at optional temperature controller)		
	Temperature control (optional)	PID-controller ST49 incl. solid state relay for DIN-rail-mounting 230V 50/60Hz		
		PID-controller ST49 incl. solid state relay for DIN-rail-mounting 115V 50/60Hz		
Temperature sensor	Fe-CuNi	50078851		
Design	Standard lengths (others on request)	0,5m	80060670	
		1m	80060671	
		1,5m	80060672	
		2,0m	80060673	
	Material	Stainless steel SS316Ti		
	Ambient temperature	-20°C ... +180°C		
	Weight	ca.9 kg (1m)		
	Diameter	external: 48,3mm, internal: 12mm (up to 20mm possible)		
Dead volume	113 ml/m (12mm internal diameter)			
Protection class	IP68 EN 60529			
Heat capacity	130 W/m			
Voltage	230VAC 50...60Hz (115V on request)			
Electrics	Electrical connection	3m cable (3 x 1,5mm ² and 2 x thermocouple)		
	Electrical standard	EN 61010, EN 60519-1		
	Flange	Stud bolts on both sides M12 x 40mm corresponding to DN65PN6 form B according to DIN 2527		
Mounting	Material	Flange gasket Klingersil DN65PN6, 4 x nut M12, 4 x spring washers and washers		
	Installation angle	10°-35° inclination to horizontal position (recommended)		
	Materials in contact with sample gas	Tube, flange, connections	Stainless steel SS316Ti	

Dimensions



Dimensions in mm



Heated Gas Sampling Tube

PSG HT Ex



Application

The heated gas sampling tubes series **PSG HT Ex** are used for continuous extractive gas analysis. They enable trouble-free representative sampling of hot predominantly dust and water vapour loaded gases in explosion-endangered areas. Typical applications are emission measurement, process monitoring and process optimization.

Technology

The intelligent design of the double jacket tube with homogeneous controlled heating up to 110°C over the entire tube length enables a trouble free extraction of sample gas without condensate formation. The mounting flange with stud bolts on both sides (DN65PN6) enables a seamless adaption to the gas sampling probes **PSG Basic** und **PSG Plus** as well as to the process flange DN65PN6. For other process flange dimensions adapter flange connectors are available.

Functions

Due to homogeneous heating up to 110°C, zones are bridged where temperature is possibly falling below the dew point resp. acid dew point of the sample gas on its way from sampling point to gas sampling probe. Thus condensate formation and therefore blocking and damaging of the tube as well as washing out of water soluble sample gas components like SO₂ is prevented. With optional G3/4"-internal thread at the tube end the heated gas sampling tube **PSG HT Ex** can be extended with all unheated sampling tubes and pre-filters from the **AGT-PSG** product range.

- ✓ Homogeneous heating over entire tube length
- ✓ For use in Ex-zone 1 and 2
- ✓ Corrosion resistant out of SS316Ti
- ✓ Self-regulated heating up to 110°C
- ✓ No cold spots
- ✓ In arbitrary lengths up to 2m available
- ✓ Protection class IP65
- ✓ Low dead volume
- ✓ Tube end with G3/4" female thread as option for extension with optional unheated tube or pre-filter

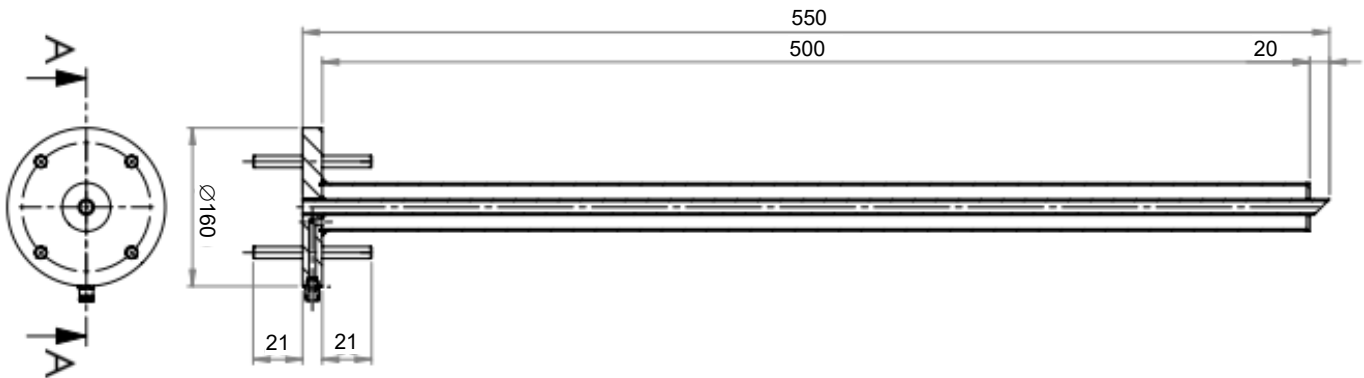




Technical Data

			Part No.
Process gas sampling conditions PSG HT	Pressure	$p_{abs} = 50 \dots 600 \text{ kPa}$	
	Temperature	max. 120 °C	
	Flow	30...1500 l/h, referred to 100 kPa and 0 °C	
	Max. dust concentration	3 g/m ³	
Connections	Extension tube / pre-filter	G3/4" i (DIN ISO 228/1) optional	80060674
Heating	Type	Self-regulating heating tape	
	Holding temperature	Up to 110 °C	
Design	Standard lengths (others on request)	0,5m	80060329
		1m	
		1,5m	
		2,0m	
	Material	Stainless steel SS316Ti	
	Ambient temperature	-20°C ... +120°C	
	Weight	ca. ? kg	
	Diameter	external: 76,1mm, internal: 22mm	
Dead volume	380 ml/m		
Protection class	IP65 EN 60529		
Heat capacity heating tape	100 W/m		
Electrics	Voltage	230VAC 50...60Hz (115V on request)	
	Electrical connection	terminals 3 x 4mm ² MXK4 and 1 x MSLKG5, cable gland 1xM25x1,5 and 1xM20x1,5	
	Electrical standard	EN 61010, EN 60519-1	
Mounting	Flange	Stud bolts on both sides M12 x 21mm corresponding to DN65PN6 form B according to DIN 2527	
	Material	Flange gasket Klingersil DN65PN6, 4 x nut M12, 4 x spring washers and washers	
	Installation angle	10°-35° inclination to horizontal position (recommended)	
Materials in contact with sample gas	Tube, flange, connections	Stainless steel SS316Ti	

Dimensions



Dimensions in mm



PID-Temperature Controller ST49

Application

The micro-processed controller **ST49** serves for temperature control of the gas sampling probes **PSG Basic** and **PSG Plus** as well as for the heated gas sampling tubes **PSG HT** and the heated sample lines **PSG Extruded Basic**, **PSG Extruded Plus**, **PSG Flex Basic** and **PSG Extruded Hybrid**. Also for heating sleeves and heated wall ducts the controller is applicable.

Technology

The controller **ST49** is a PID-controller that will be parameterized in different levels for the individual needs of the respective devices. The controller is available for 115VAC, 230VAC and 400V 3ph. The solid state relay is mounted on a heat sink and has 25A switching capacity for 115/230VAC and 50A for 400V 3ph. Controller and relay are suitable for DIN rail or wall mounting.

Functions

Beside resistance sensors and semiconductor thermocouples the multi-sensor input of the **ST49** can equally process 0...10V and/or 4...20mA. The PID and/or thermostat control can be activated by parameter setting. Different outputs are available, such as two relay contacts, a voltage output for the solid state relay and an analogue output. A temperature limiter function with alarm message is also available. Red LEDs indicate the status of the output relays. The set-points and parameters determining the process are adjusted by a 4-field foil keyboard.

- ✓ Parameterizable PID temperature controller with solid state relay
- ✓ Pre-parametered for AGT-PSG heated sample lines
- ✓ In various voltages 115VAC, 230VAC or 400V available
- ✓ Temperature-limiter function with alarm message and self-locking
- ✓ 3 LEDs for status display of the 3 outputs
- ✓ Multisensor-input
- ✓ DIN rail or wall mounting



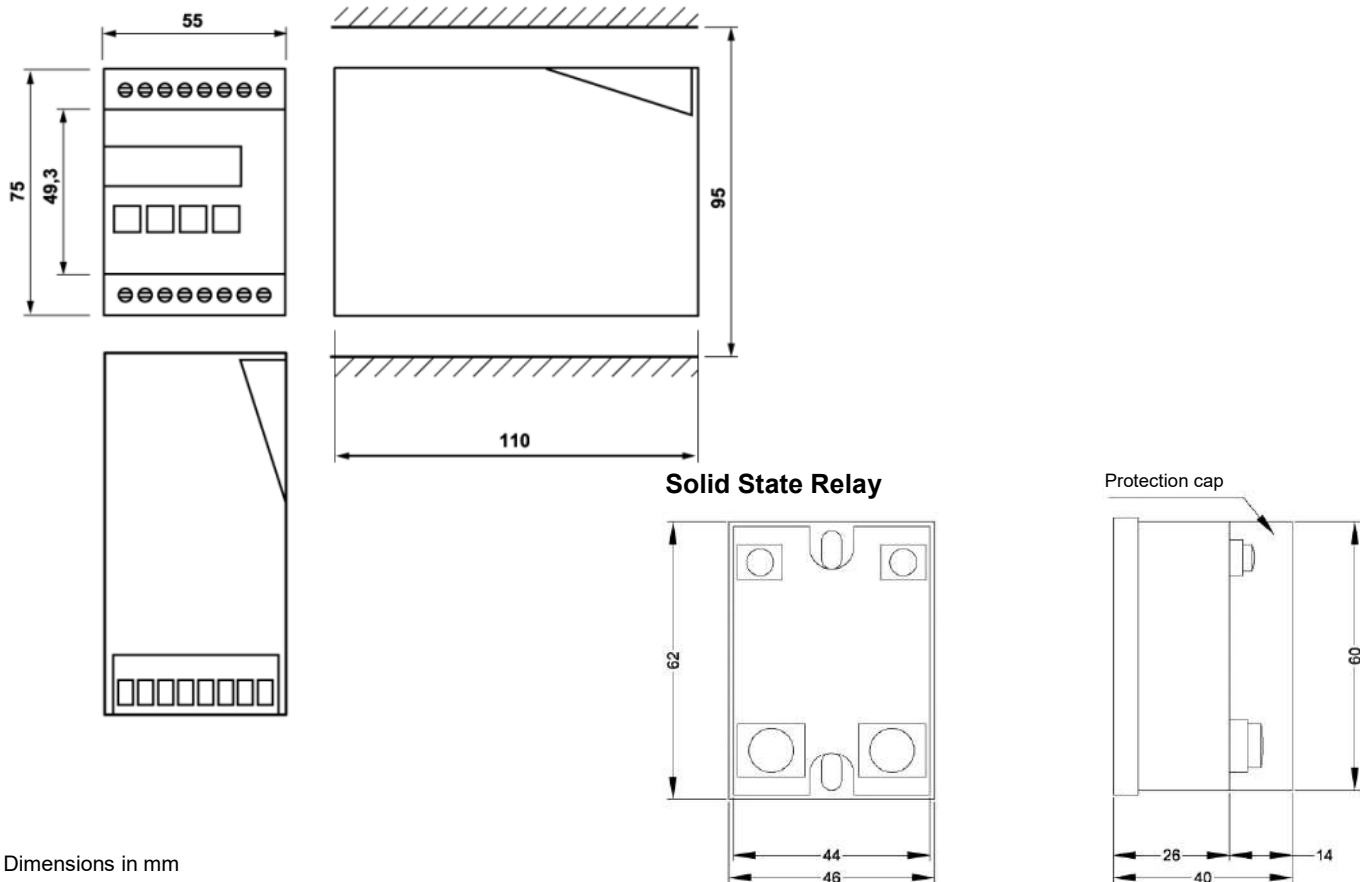


Technical Data

ST49				
Part no.		50078850	50078851	50078810
Execution		Temperature controller		
Ambient temperature	°C	0...+55°C		
Design data				
Dimensions	mm	75 x 55 x 110		
Weight	g	360		
Mounting		DIN rail EN 60715 TH35 or wall mounting		
Electrical data				
Temperature sensors		Pt100-2, Pt100-3, Pt1000-2, Pt1000-3, Type J, Type K, PTC		
Outputs		K1 (NO contact), K2 (NO contact), S3 voltage for SSR control		
Power supply	V	230VAC 50/60 Hz	115VAC 50/60Hz	230V/400V 3Ph
Housing / protection class		IP00 / II		
Number of contacts		2 NO contacts 8(1,5) A 250V~		
Max. continuous current	A	25	25	50
Display		3-digit LED-display and 3 LEDs		
Electr. connection		2 x 8-pole screw terminals max. 2,5mm ²		

Dimensions

Controller



Dimensions in mm

PID-Temperature Controller DC-10

Application

The micro-processed controller **DC-10** serves for temperature control of the heated sample lines **PSG Extruded Basic**, **PSG Extruded Plus**, **PSG Flex Basic** and **PSG Extruded Hybrid**. Also for heating sleeves and heated wall ducts the controller is applicable.

Technology

The controller **DC10** is a PID-controller that will be parameterized in different levels for the individual needs of the respective devices. The controller is applicable for voltages 110 - 230VAC 50..60Hz. The solid state relay is integrated in the housing, has 10A switching capacity and is zero-crossing switching for pulsed control of the load (pulse width modulation PWM).

Functions

The four digit display indicates permanently set and real value. The sensor input can equally process Pt100 and thermocouple type J and K. A temperature limiter function with alarm message and self-locking can be parameterized. An automatic self-optimizing function simplifies the parameterization. Three LEDs indicate the status and two alarms. The set-points and parameters are adjusted by a 4-field foil keyboard. For wall mounting a quick-change frame for quick and simple dismantling from the wall is included.

- ✓ “Plug and Play” PID temperature controller with integrated solid state relay
- ✓ Pre-parametered for AGT-PSG heated sample lines
- ✓ Self-optimizing function
- ✓ Voltage 110 - 230VAC 50..60Hz
- ✓ Temperature-limiter function with alarm message and self-locking
- ✓ 3 LEDs for status and alarm display
- ✓ Sensor-input for Pt100 and thermocouple type J and K (pre-adjusted)
- ✓ Wall mounting (quick-change frame) or table operation



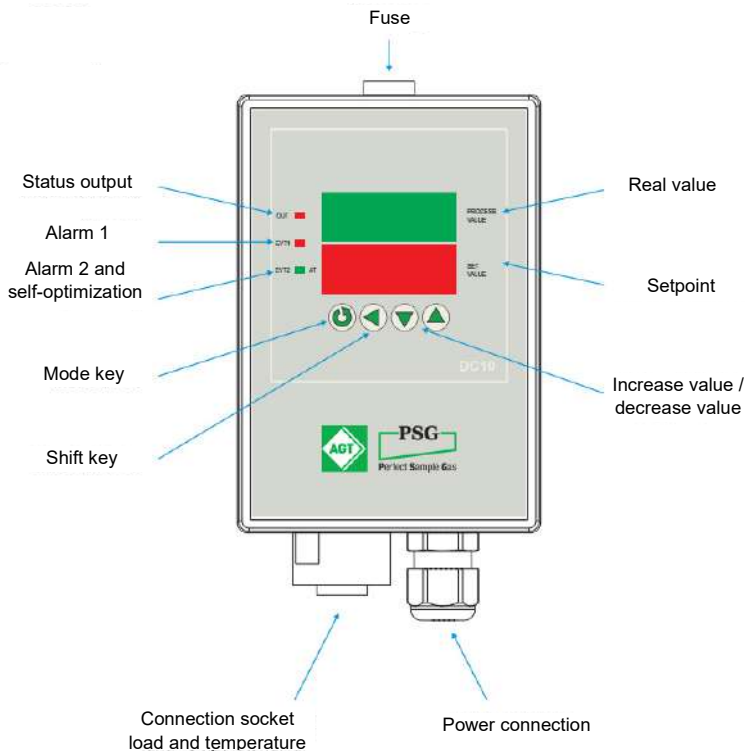


Technical Data

DC-10				
Part no.		50078822	50078821	50078820
Temperature sensor		Pt100	Thermocouple type J	Thermocouple type K
Ambient temperature	°C	0...+35°C		
Design data				
Dimensions	mm	130 x 90 x 70		
Weight	g	800		
Mounting		wall mounting with quick-change frame or table operation		
Elektrical data				
Temperature sensors		Pt100-2, Pt100-3, Type J, Type K		
Accuracy	%	±0,3 of measuring range		
Power supply	V	110 - 230VAC 50..60Hz		
Housing / protection class		Aluminium light grey / IP65		
Power consumption	VA	5 (without load)		
Max. continuous current	A	10		
Display		Two 4-digit LED-displays and 3 LEDs		
Electr. connection		3m power cable with Schuko-plug IP44		

Operation and connections

Wall mounting with quick-change frame





Programmable Back Purge Controller

PSG BPC

Application

The microprocessor controlled programmed back purge controller **PSG PBC** is used for continuous extractive gas analysis. It serves for the individual control of the optional back purge valves at the gas sampling probes series **PSG Plus**.

Technology

The back purge controller **PSG BPC** is a LOGO-controller of the company Siemens, completely wired and ready to connect built in an IP66 wall mounting housing. An individually parameterizable back purge program is already installed. The controller is available for 115 to 230VAC or 24V.

Functions

The back purge program can be arranged individually and can be adapted to the individual process conditions. The back purge time can be defined (e.g. every 4hr), the length of one back purge impulse can be chosen (e.g. 1s) and the total back purge time can be specified (e.g. 20s). The program contains also the possibility to control both solenoid valves in alternation due to the input of a delay time for the second valve (e.g. 1s). In the mentioned example every valve opens ten times for a back purge impulse of one second every four hours.

- ✓ Programmed logic controller for execution of individual back purge programs for gas sampling probes series PSG Plus
- ✓ Pre-parametered for back purging of AGT-PSG gas sampling probes
- ✓ In various voltages 115-230VAC or 24V available
- ✓ Completely pre-wired for power connection and COAX-valves
- ✓ IP66 protection housing
- ✓ Suitable for wall mounting

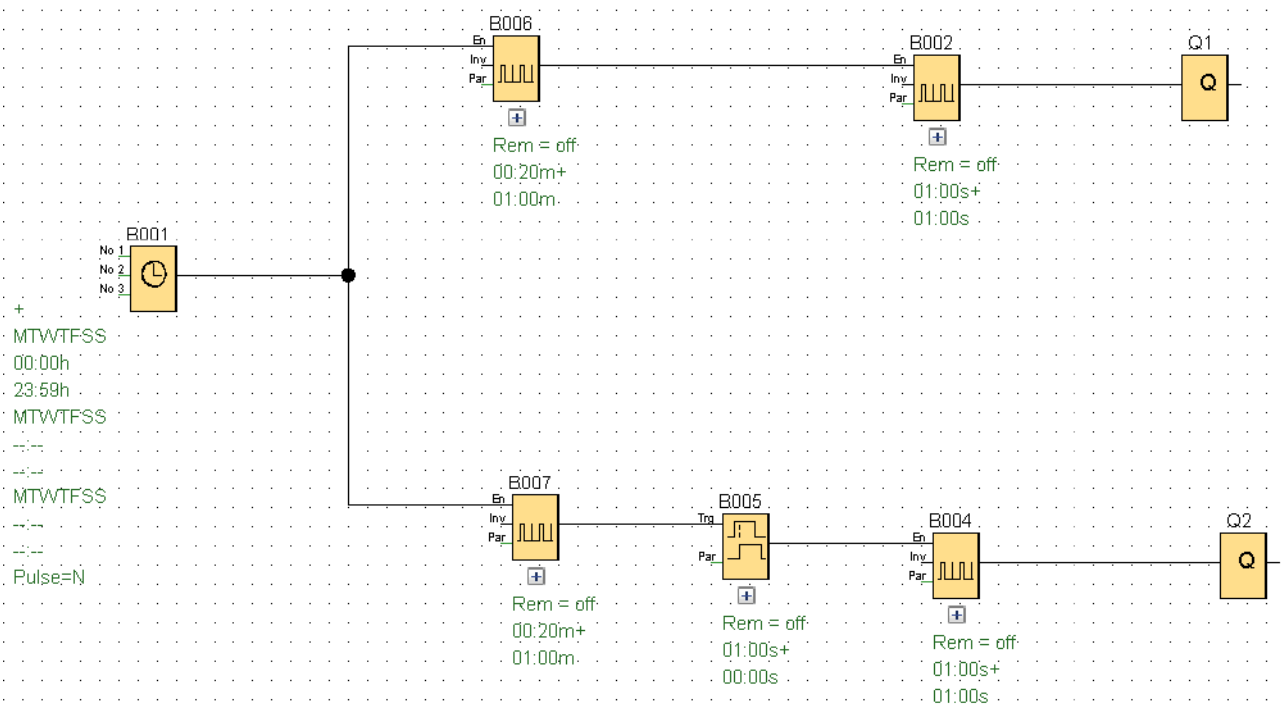




Technical Data

PSG BPC			
Part no.		80060682	
Execution		Temperature controller	
Ambient temperature	°C	0...+55°C	
Design data			
Dimensions	mm	75 x 55 x 110	
Weight	g	360	
Mounting		DIN rail EN 60715 TH35 or wall mounting	
Electrical data			
Cycle time	ms	<0,1 / function	
Outputs		2; relays	
Power supply	V	115...230VAC 50/60 Hz	24VDC
Housing / protection class		IP66	
Short circuit protection		external protection necessary	
Max. continuous current	A	3	0,3
Display		LCD display	
Electr. connection		screw terminals max. 2,5mm ²	

Back purge program



- B001: Start and end of program (e.g. the whole day from 00:00h to 23:59h)
- B006 and B007: Total duration of back purging and break time (e.g. 20s every minute)
- B005: Delay time for second back purge impulse (e.g. 1s)
- B002 and B004: Length of one back purge impulse (e.g. 1s)
- Q1 and Q2: COAX solenoid valves

All time parameters are easily adjustable at the control unit. Upon request a program sequence already can be adjusted ex works.



PSG Heated Sample Lines





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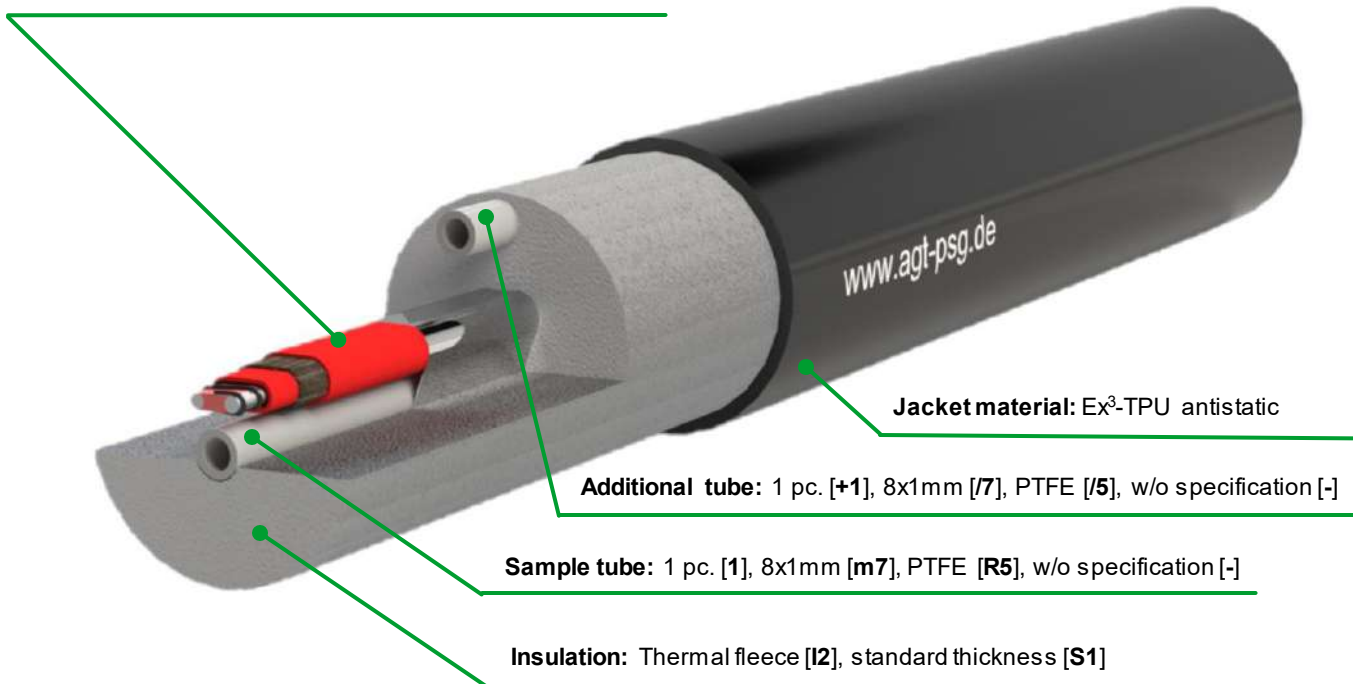


Order codes lines

Matchcode	T3.	A.	1	+1.	M7	/7.	R5	/5.	-	-	I2.	S1.	M27.	U4.	H10	L38
ATEX class → Page 5																
Bundle type → Page 5																
Number of sample tubes → Page 6																
Number of additional tubes → Page 6																
Size of sample tubes → Page 6																
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General: Analysis bundle [A], ATEX class T3 [T3]

Heating cable: 12XTV [H10], 38W/m [L38], 230V AC [U4]





Ex class and bundle type

ATEX class

ATEX class	Code
Ex T1	T1
Ex T2	T2
Ex T3	T3
Ex T4	T4
Ex T5	T5
Ex T6	T6
Non-Ex	-

Bundle type

Bundle type	Code
Analysis bundle	A
Industry bundle	I
Pipe bundle	R



Line configuration

Number of sample tubes

Number of sample tubes	Code
1	1
2	2
...	...
13	13

Number of additional tubes

Number of additional tubes	Code
1	+1
2	+2
...	...
13	+13

Size of sample tube in mm

Size of sample tube in mm	Code
10x1 mm	m1
12x1 mm	m2
3x0,5 mm	m3
6x1 mm rpl.	m4
6x1 mm	m5
8x1 mm rpl.	m6
8x1 mm	m7
14x2 mm	m8
10x1 mm rpl.	m9
12x2 mm	m10
12x1,5 mm	m11
10x2mm	m12
4x1 mm	m13
18x1,5 mm	m14
10x1,5 mm	m15
14x1 mm	m16
16x1 mm	m17
7x1 mm rpl	m18
30x1 mm	m20
16x1,2 mm	m22
25x2,5mm	m23
37x6mm	m25
10x1,2mm	m26

Size of sample tube in inch

Size of sample tube in inch	Code
1/2x0,035"	z1
1/4x0,035"	z2
1/4x0,049"	z3
1/8x0,025"	z4
1/8x0,035"	z5
3/8x0,049"	z6
3/8x0,035"	z7
1/4x0,035"	z8
1/4x0,040"	z9
3/8x0,040"	z10
3/4x0,062"	z11
1/2x0,065"	z12
1/2x0,049"	z13
3/4x0,049"	z14
1"x0,085"	z15
1 1/4x0,125"	z16
1/8x0,020"	z17
1/2x0,04"	z18
1/4x0,04"	z19
1/16x0,04"	z20
1/8"x0,035"	z21
1/4"x0,065"	z22
1/4x0,032"	z23
3/8"x0,0625"	z24

Size of additional tube in mm

Size of additional tube in mm	Code
10x1 mm	/1
12x1 mm	/2
3x0,5 mm	/3
6x1 mm rpl.	/4
6x1 mm	/5
8x1 mm rpl.	/6
8x1 mm	/7
12x2+ 6x1 mm	/8
8x1 mm	/9
2x6x1 mm + 1x4x0,5mm	/11
2x8x1 mm + 2x10x1mm	/12

Size of additional tube in inch

Size of additional tube in inch	Code
1/2x0,035"	/1
1/4x0,035"	/2
1/4x0,049"	/3
1/8x0,025"	/4
1/8x0,035"	/5
3/8x0,049"	/6
3/8x0,035"	/7
3/8x0,04"	/8
1/2x0,065"	/9
1/4x0,0625"	/10
1/4x0,047"	/13



Material of sample tube

Material of sample tube	Code
1.4301	R1
1.4404	R2
1.4571	R3
PFA	R4
PTFE	R5
1.4435	R6
PVDF	R7
317L	R8
316L	R9
PE-LD	R10
Hastelloy	R11
Monel	R12
316L Duplex	R13
CU-DHP	R14
304L	R15
Inconel 625 NACE	R16
316L/1.4435	R17
PFA conductive	R18
1.4439	R19
316	R20
Rubber	R21

Material of additional tube

Material of additional tube	Code
1.4301	/1
1.4404	/2
1.4571	/3
PFA	/4
PTFE	/5
1.4435	/6
PVDF	/7
317L	/8
316L	/9
PE-LD	/10
316	/11
CU-DHP	/12
304	/13

State 05 / 2021 | Subject to change

Specification of sample tube

Specification	Code
electropolish	A1
welded	A2
conductive surface	A3
seamless	A4
Oil/greaseless	A5
SilcoNert2000	A6
sulfinized	A7
VA plated	A8
+ wire mesh	A9
Copper braided as PE	A10
Seamless/Dursan	A11

Specification of additional tube

Specification	Code
elektropolish	/1
welded	/2
conductive surface	/3
seamless	/4
Oil/greaseless	/5
SilcoNert2000	/6
sulfinized	/7
Va plated	/8
+ wire mesh	/9
Dursan coated	/10



Insulation and jacket material


Insulation type

Insulation type	Code
Glass fleece	I1
Thermal fleece	I2
Silicone foam tube	I3
Glass fibre	I4
Silicone foam tube + Thermal fleece	I6
Silicone foam tube + Glass fleece	I7
Aerogel	I9


Insulation thickness

Insulation thickness	Code
Standard = 10mm	S1
1,2-fold	S2
1,4- fold	S3
1,4/0,6	S4
1,6- fold	S5
1,8- fold	S6
2,5- fold	S7
2- fold	S8
3- fold	S9
2,2- fold	S10
0,4/Std.	S11
1,6/0,6	S12
Std./06	S13
Std./08	S14
0,2/Std.	S15
1,2/0,8	S16
1,6/06	S17
1,5- fold	S18
0,8- fold	S19
0,6/0,6	S20
1,9- fold	S21
0,4- fold	S22
04/06	S23
06/04	S24


Jacket material

Jacket material	Code	Picture
PVC	M1	
PU	M2	
TPU	M18	
PP	M19	
Ex ² -PVC+PE	M16	
Ex ² -TPU+PE	M17	
Ex ³ -TPU antistatic	M27	
Silicone Foam Tube	M24	


Jacket material

Jacket material	Code	Picture
PA6-corrugated	M3	
PA12-corrugated	M4	
Corrugated metal	M6	
Corrugated metal double	M7	
Corrugated metal + glass fibre	M8	
Corrugated metal + PVC	M9	
Corrugated metal + PU	M10	
Corrugated metal + PA	M11	
PA-corrugated + reduced surface resistance	M15	

Jacket material

Jacket material	Code	Picture
Metal braid stainless steel	M20	
Metal braid galvanised	M13	
Glass fiber mesh	M12	
Glass fiber	M14	


Jacket material

Jacket material	Code	Picture
PA-braiding	M5	
PE-LD	M21	
Tex.glas/Silikonb.	M22	
PA-mesh EXCP/V0	M23	




Heating cables and operating voltage

Self-regulating heating cables BTV

Heating cable	Code	Picture
3BTV (9 W/m at 10 °C)	H1	 <p>Self-regulating heating cables for pipeline antifreeze and process temperature maintenance up to 65 °C</p>
5BTV (16 W/m at 10 °C)	H2	
8BTV (25 W/m at 10 °C)	H3	
10BTV (29 W/m at 10 °C)	H4	


Self-regulating heating cables QTV

Heating cable	Code	Picture
10QTVR (38 W/m at 10 °C)	H5	 <p>Self-regulating heating cables for pipeline antifreeze and process temperature maintenance up to 110 °C</p>
15QTVR (51 W/m at 10 °C)	H6	
20QTVR (64 W/m at 10 °C)	H7	


Self-regulating heating cables XTV

Heating cable	Code	Picture
4XTV (12 W/m at 10 °C)	H8	 <p>Heating cables for pipeline antifreeze and process temperature maintenance up to 121 °C</p>
8XTV (25 W/m at 10 °C)	H9	
12XTV (38 W/m at 10 °C)	H10	
15XTV (47 W/m at 10 °C)	H11	
20XTV (63 W/m at 10 °C)	H12	

Self-regulating heating cables KTV

Heating cable	Code	Picture
5KTV (16 W/m at 10 °C)	H13	 <p>Heating cables maintain temperatures up to 150 °C (operating temperature up to 250 °C max)</p>
8KTV (25 W/m at 10 °C)	H14	
15KTV (47 W/m at 10 °C)	H15	
20KTV (65 W/m at 10 °C)	H16	

Performance heating cables VPL

Heating cable	Code	Picture
5VPL (15 W/m)	H27	 <p>Performance limited cables for process temperature maintenance up to 230 °C</p>
10VPL (30 W/m)	H23	
15VPL (45 W/m)	H18	
20VPL2 (61 W/m)	H19	



Parallel heating cables with constant performance FHT

Heating cable	Code	Picture
10FHT2 (10 W/m)	H32	 <p>Parallel heating cables with constant performance for process temperature maintenance up to 230 °C</p>
20FHT2 (20 W/m)	H33	
30FHT2 (30 W/m)	H26	
40FHT2 (40 W/m)	H29	

Fixed resistance heater

Heating cable	Code	Picture
Fixed resistance	H20	 <p>non shortenable heating cables with temperature maintenance up to 260 °C (temperature control needed)</p>
Fixed resistance + glass fibre	H21	
Fixed resistance + mineral	H22	

Parallel heating cables

Heating cable	Code	Picture
CPD	H17	 <p>Parallel heating cables with constant performance for process temperature maintenance up to 230 °C</p>
PSG CPD Basic	H25	



Operating voltage

Operating voltage	Code
None	U0
24V DC	U1
24V AC	U2
120V AC	U3
230V AC	U4
200/120V 3~	U5
400/230V 3~	U6
115/115V 2~	U7

Power output heating cable

Power output	Code
9 W/m	L9
12 W/m	L12
16 W/m	L16
25 W/m	L25
38 W/m	L38
47 W/m	L47
60 W/m	L60
63 W/m	L63
80 W/m	L80
90 W/m	L90
100 W/m	L00
110 W/m	L01
120 W/m	L120
140 W/m	L140
160 W/m	L160

Codes end caps

Matchcode	LA.	M6.	40x50.	PK.	-	K1.	A1.	-
Cap position → Page 14								
Cap material → Page 14								
Cap dimensions → Page 14								
Packaging → Page 14								
Temperature sensor connection → Page 15								
Supply cable gauge → Page 15								
Supply cable connection type → Page 15								
Tube connection type → Page 15								

Supply Cable: no Temperature sensor [-], 3x1,50 mm² [K1], led out backwards [A1]

Tube: no connection [-]



Cap: Analyser side [LA], Silicone [M6], 40x50 mm [40x50], PSG prefabricated [PK]



End caps

Cap position

Cap position	Analyzer side	Probe side	Midfeed
Code	LA	LP	LM

Cap material

Material	Code
Hard cap	M3
POM	M4
PTFE	M5
Silicone	M6
Ex-PTFE	M7
Metal cap	M8
Aluminium cap	M9

Cap material – shrinking caps

Material	Code
Shrinking cap 1 finger	AK1
Shrinking cap 2 finger	AK2
Shrinking cap 3 finger	AK3
Shrinking cap 4 finger	AK4
Shrinking cap 5 finger	AK5
Shrinking cap 6 finger	AK6
Shrinking cap 7 finger	AK7

Cap dimensions

Dimensions	
40x50	mm
40x75	mm
40x90	mm
40x150	mm
42x80	mm
43x110	mm
45x50	mm
45x70	mm
45x75	mm
45x110	mm
45x150	mm
46x90	mm

Cap dimensions

Dimensions	
50x70	mm
54x50	mm
54x70	mm
54x130	mm
57x50	mm
57x70	mm
60x50	mm
60x70	mm
65x70	mm
70x70	mm
70x150	mm
80x70	mm

Packaging

Packaging	Customer packaged	PSG prefabricated
Code	BK	PK



Connections

Temperature sensor connection

Connection	Temperature sensor	None
Code	TFA	

Supply cable

Cable gauge	Code
w/o supplycable	K0
3x1,50mm ²	K1
3x2,50mm ²	K2
4x1,50mm ²	K3
4x2,50mm ²	K4
5x1,50mm ²	K5
5x2,50mm ²	K6

Supply cable/Heating cable

Connection type	Code
Led out backwards	A1
Led out frontwise	A2
Recessed outlet	A3

Tube connection type

Connection type	Code
Male thread G1/8"	G1/8
Male thread R1/8"	R1/8
Pipe nipple AD = 1/2"	AD1/2
Pipe nipple AD = 1/4"	AD1/4
Pipe nipple AD = 3/8"	AD3/8

Tube connection type

Connection type	Code
Pipe nipple AD = 6,0mm	AD6
Pipe nipple AD = 8,0mm	AD8
Pipe nipple AD = 10,0mm	AD10
Pipe nipple AD = 12,0mm	AD12
Quick Connector	QC



PSG[®]
Perfect Sample Gas



Controlled Heated Shortenable Sample Lines

PSG Extruded Basic

Application

The controlled heated sample lines series **PSG Extruded Basic** are used for continuous extractive gas analysis. They serve primarily for the transport of the humid sample gas stream from the sample point to the analyser house. The holding temperature of the line thereby has to be above water vapour resp. acid dew point of the sample gas. In this way uncontrolled condensation of water vapour on the way to the analyser and therefore washing out of gas components in condensate is prevented. Also failure of the measurement by a freezing line at ambient temperatures below 0°C is avoided.

Technology

The robust lines with thick-walled extruded flame resistant and extremely weather resistant TPU, PE or PVC outer jacket are equipped with parallel heating cable. Insulation is done with a thermal or glass fibre fleece. Up to 12 PTFE, PFA, stainless steel or special alloy tubes as internal line and also interchangeable internal tubes are available.

Functions

The lines are available up to 300m at a stretch e.g. on cable drum and then can be adapted on-site and shortened every 0,5m. Furthermore they are available ready for operation ex works. Control of the lines to max. 200°C is done by an external temperature controller (e.g. PSG ST49 or PSG DC10) via the integrated PT100.

- ✓ Operation with external temperature controller
- ✓ PSG Basic parallel heating cable
- ✓ Max. 200°C control temperature
- ✓ Up to 300m at a stretch
- ✓ Every 0,5m shortenable for assembly on-site (video tutorial on YouTube) or ready-made ex works
- ✓ Robust design with thick-walled extruded, flame resistant, extremely weather resistant PVC, PE or TPU outer jacket
- ✓ Internal tube made of PTFE, PFA, stainless steel or special alloy
- ✓ Up to 12 internal lines as option
- ✓ Interchangeable internal lines as option





Technical data and order numbers

Construction data		
Max. operating temperature	°C	200
Heat insulation / weight	kg/m	thermal or glass fibre fleece / 1
Insulation thickness	mm	10
Heating cable type		parallel heating cable PSG Basic
Outer jacket		2mm PVC, PE or TPU extruded
Outer diameter	mm	42 with one internal line, 43 with 2x6mm, 45 with 2x8mm
Min. bending radius	mm	8 - 10 x outer diameter
Ambient temperature	°C	-20 to +65
Max. operating pressure abs. PTFE line	bar	DN4/6: 5,6 / DN6/8: 4,5
Max. operating pressure abs. SS316L line	bar	400
Protection class		IP64 (EN60529)
Max. length heating circuit	m	60
Electrical data		
Power	W/m	60
Electrical connection		3m silicone connection cable**, open ends (included in assembly)
Power supply		230V 50/60Hz or optional 120V 50/60Hz
Order numbers for 1m line 230V 50/60Hz		
1 x PTFE internal tube 6mm	1m	54003267
1 x PTFE internal tube 8mm	1m	54003084
1 x PTFE internal tube 6mm interchangeable	1m	54003139
2 x PTFE internal tube 6mm	1m	54003305
2 x PTFE internal tube 8mm	1m	50030601
1 x Stainless steel internal tube 6mm	1m	54003377
1 x Stainless steel internal tube 8mm	1m	54003378
Order numbers for assembly ex works		
Silicone cap ending		50084005
Silicone cap with electr. connection		50085004
PTFE cap ending		50085003
PTFE cap with electr. connection		50085002
Order numbers for assembly on-site		
Silicone cap ending		50084007
Silicone cap with electr. connection		50050470
PTFE cap ending		50084003
PTFE cap with electr. connection		50084002

* to lead frontal or backwards through the cap

Assembly



PTFE cap



Silicone cap

Temperature controller



PSG ST49 with 25A SSR 230V 50/60Hz
Part. No. 50078850



PSG DC10
Part. No. 50078820

Options

- Up to 12 internal lines made of PTFE and/or PFA and/or stainless steel 316L and/or special alloys with dimensions DN4/6, DN6/8, DN8/10, DN10/12 or inch
- Interchangeable internal line
- Power supply 115V 50/60Hz
- Cable gland M63 x 1,5 (clamping range 36-48mm), PA, for cabinet wall mounting, IP68, mounted or separately



Controlled Heated Shortenable Sample Lines

PSG Extruded Plus

Application

The controlled heated sample lines series **PSG Extruded Plus** are used for continuous extractive gas analysis. They serve primarily for the transport of the humid sample gas stream from the sample point to the analyser house. The holding temperature of the line thereby has to be above water vapour resp. acid dew point of the sample gas. In this way uncontrolled condensation of water vapour on the way to the analyser and therefore washing out of gas components in condensate is prevented. Also failure of the measurement by a freezing line at ambient temperatures below 0°C is avoided.

Technology

The robust lines with thick-walled extruded flame resistant and extremely weather resistant TPU, PE or PVC outer jacket are equipped with high quality PSG-Plus parallel heating cable. Insulation is done with a thermal or glass fibre fleece. Up to 12 PTFE, PFA, stainless steel or special alloy tubes as internal line and also interchangeable internal tubes are available.

Functions

The lines are available up to 300m at a stretch e.g. on cable drum and then can be adapted on-site and shortened every 0,6m. Furthermore they are available ready for operation ex works. Control of the lines to max. 200°C is done by an external temperature controller (e.g. PSG ST49 or PSG DC10) via the integrated PT100.

- ✓ Operation with external temperature controller
- ✓ PSG-Plus parallel heating cable
- ✓ Max. 200°C control temperature
- ✓ Up to 300m at a stretch
- ✓ Every 0,6m shortenable for assembly on-site (video tutorial on YouTube) or ready-made ex works
- ✓ Robust design with thick-walled extruded, flame resistant, extremely weather resistant PVC, PE or TPU outer jacket
- ✓ Internal tube made of PTFE, PFA, stainless steel or special alloy
- ✓ Up to 12 internal lines as option
- ✓ Interchangeable internal lines as option





Technical data and order numbers

Construction data		
Max. operating temperature	°C	200
Heat insulation / weight	kg/m	thermal or glass fibre fleece / 1
Insulation thickness	mm	10
Heating cable type		parallel heating cable PSG-Plus
Outer jacket		2mm PVC, PE or TPU extruded
Outer diameter	mm	42 with one internal line, 43 with 2x6mm, 45 with 2x8mm
Min. bending radius	mm	8 - 10 x outer diameter
Ambient temperature	°C	-20 to +65
Max. operating pressure abs. PTFE line	bar	DN4/6: 5,6 / DN6/8: 4,5
Max. operating pressure abs. SS316L line	bar	400
Protection class		IP64 (EN60529)
Max. length heating circuit	m	73
Electrical data		
Power	W/m	60
Electrical connection		3m silicone connection cable*, open ends (included in assembly)
Power supply		230V 50/60Hz or optional 120V 50/60Hz
Order numbers for 1m line 230V 50/60Hz		
1 x PTFE internal tube 6mm	1m	50030300
1 x PTFE internal tube 8mm	1m	50030400
1 x PTFE internal tube 6mm interchangeable	1m	50040100
2 x PTFE internal tube 6mm	1m	50030500
2 x PTFE internal tube 8mm	1m	50030600
1 x Stainless steel internal tube 6mm	1m	50030100
1 x Stainless steel internal tube 8mm	1m	50030200
Order numbers for assembly ex works		
Silicone cap ending		50084005
Silicone cap with electr. connection		50085004
PTFE cap ending		50085003
PTFE cap with electr. connection		50085002
Order numbers for assembly on-site		
Silicone cap ending		50084007
Silicone cap with electr. connection		50050470
PTFE cap ending		50084003
PTFE cap with electr. connection		50084002

* to lead frontal or backwards through the cap

Assembly



PTFE cap



Silicone cap

Temperature controller



PSG ST49 with 25A SSR 230V 50/60Hz
Part. No. 50078850



PSG DC10
Part. No. 50078820

Options

- Up to 12 internal lines made of PTFE and/or PFA and/or stainless steel 316L and/or special alloys with dimensions DN4/6, DN6/8, DN8/10, DN10/12 or inch
- Interchangeable internal line
- Power supply 115V 50/60Hz
- Cable gland M63 x 1,5 (clamping range 36-48mm), PA, for cabinet wall mounting, IP68, mounted or separately



Self-Regulating Heated Sample Lines

PSG Extruded SR

Application

The self-regulating heated sample lines series **PSG Extruded SR** are used for continuous extractive gas analysis. They serve primarily for the transport of the humid sample gas stream from the sample point to the analyser house. The holding temperature of the line thereby has to be above water vapour resp. acid dew point of the sample gas. In this way uncontrolled condensation of water vapour on the way to the analyser and therefore washing out of gas components in condensate is prevented. Also failure of the measurement by a freezing line at ambient temperatures below 0°C is avoided.

Technology

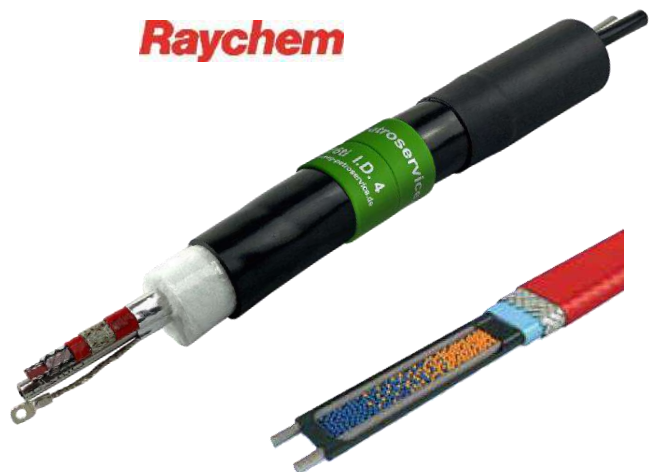
The robust lines with thick-walled extruded flame resistant and extremely weather resistant TPU, PE or PVC outer jacket are equipped with high quality self-regulating Raychem® heating cable. Insulation is done with a thermal or glass fibre fleece. Depending on the used heating cable holding temperatures of up to 150°C at -20°C ambient temperature can be reached. Solutions down to -52°C are also possible. As standard holding temperatures of 30°C, 100°C and 120°C are offered. Up to 12 PTFE, PFA, stainless steel or special alloy tubes as internal line and also interchangeable internal tubes are available.

Functions

Because of the self-regulating heating cable for operation an additional temperature controller is not necessary. The heating cable consists of two parallel arranged supply conductors connected with an electrically conductive polymer plastic. During operation conductivity of the plastic is decreasing with increasing temperature due to molecular expansion until the heating cable specific maximum temperature is reached. When the heating cable temperature now drops the process reverses.

- ✓ No temperature controller necessary
- ✓ Raychem® heating cables
- ✓ 30 / 100 / 120 / 150°C holding temperature at -20°C ambient temperature
- ✓ Up to 300m at a stretch
- ✓ Arbitrary cut to length for assembly on-site (video tutorial on YouTube) or ready-made ex works
- ✓ Robust design with thick-walled extruded, flame resistant, extremely weather resistant PVC, PE or TPU outer jacket
- ✓ Internal tube made of PTFE, PFA, stainless steel or special alloy
- ✓ Up to 12 internal lines as option
- ✓ Interchangeable internal lines as option

Raychem





Technical data and order numbers

Construction data				
Holding temperature*	°C	30	100	120
Heat insulation / weight	kg/m	thermal or glass fibre fleece / 1		
Insulation thickness	mm	10	10	14
Heating cable type		5BTV	12XTV	15XTV
Outer jacket		2mm PVC, PE or TPU extruded		
Outer diameter	mm	40		44
Min. bending radius	mm	8 - 10 x outer diameter		
Ambient temperature	°C	-20 to +65		
Max. operating pressure abs. PTFE line	bar	DN4/6:10 / DN6/8: 7,8	DN4/6: 8 / DN6/8: 6	DN4/6: 6 / DN6/8: 4,7
Max. operating pressure abs. SS316L line	bar	400		
Protection class		IP64 (EN60529)		
Max. heating circuit (32A fuse protection)	m	160	135	105
Electrical data				
Max. power (t _a = +10°C)	W/m	16	38	47
Electrical connection		3m silicone connection cable**, open ends (included in assembly)		
Power supply		230V 50/60Hz or optional 120V 50/60Hz		
Order numbers for 1m line 230V 50/60Hz				
1 x PTFE internal tube 6mm	1m	50010300	50011200	54002571
1 x Stainless steel internal tube 6mm	1m	50010100	50021000	54001828
1 x PTFE internal tube 8mm	1m	50010400	50011300	54003686
1 x Stainless steel internal tube 8mm	1m	50010200	50021100	54004547
Order numbers for assembly ex works				
Silicone cap ending			50084005	
Silicone cap with electr. connection			50085004	
PTFE cap ending			50085003	
PTFE cap with electr. connection			50085002	
Hard cap ending		50084011		-
Hard cap electr. connection		50084010		-
POM cap ending		50085001		-
POM cap with electr. connection		50085000		-
Order numbers for assembly on-site				
Silicone cap ending			50084007	
Silicone cap with electr. connection			50050470	
PTFE cap ending			50084003	
PTFE cap with electr. connection			50084002	
Hard cap ending		50084009		-
Hard cap electr. connection		50084008		-
POM cap ending		50084001		-
POM cap with electr. connection		50084000		-

* 150°C on request ** to lead frontal or backwards through the cap

Assembly



PTFE or POM cap



Silicone cap



Hard cap

Options

- Up to 12 internal lines made of PTFE and/or PFA and/or stainless steel 316L and/or special alloys with dimensions DN4/6, DN6/8, DN8/10, DN10/12 or inch.
- Interchangeable internal line / Power supply 115V 50/60Hz
- Cable gland M63 x 1,5 (clamping range 36-48mm), PA, for cabinet wall mounting, IP68, mounted or separately



Controlled Heated Shortenable Sample Lines

PSG Extruded Hybrid

Gefördert durch:



aufgrund eines Beschlusses
des Deutschen Bundestages

Application

The controlled heated sample lines series **PSG Extruded Hybrid** are used for continuous extractive gas analysis. They serve primarily for transport of the humid sample gas stream from sample point to analyser house. The holding temperature of the line thereby has to be above water vapour resp. acid dew point of the sample gas. In this way uncontrolled condensation of water vapour on the way to the analyser and therefore washing out of gas components in condensate is prevented. Additionally all electrical and pneumatic lines for operation of a heated gas sampling probe can be integrated. These are back purge and test gas lines enabling pre-heated gas feeding thus preventing cooling down resp. condensation in the probe as well as electrical supply and temperature sensor lines. This way the complete installation work for all lines is eliminated and the probe can be operated and controlled directly from the analyser house.

Technology

The robust lines with thick-walled extruded flame resistant and extremely weather resistant TPU, PE or PVC outer jacket are equipped with high quality PSG-Plus parallel heating cable. Insulation is done with a thermal or glass fibre fleece. PTFE, PFA, stainless steel or special alloy tubes as internal line and also interchangeable internal tubes are available.

Functions

The lines are available up to 300m at a stretch e.g. on cable drum and then can be adapted on-site and shortened every 0,6m. Furthermore they are available ready for operation ex works. Control of the lines to max. 200°C is done by an external temperature controller (e.g. PSG ST49 or PSG DC10) via the integrated temperature sensor to max. 200°C.

- ✓ Internal tube made of PTFE, PFA, stainless steel or special alloy
- ✓ Internal PTFE tube DN10/12 for pre-heated back purge gas and DN4/6 for pre-heated test gas
- ✓ Looped through lines for gas sampling probe operation and back purge control from analyser house without additional installation effort
- ✓ Operation with external temperature controller
- ✓ PSG-Plus high quality parallel heating cable
- ✓ Max. 200°C control temperature
- ✓ Up to 300m at a stretch
- ✓ Every 0,6m shortenable for assembly on-site (video tutorial on [YouTube](#)) or ready-made ex works
- ✓ Robust design with thick-walled extruded, flame resistant, extremely weather resistant PVC, PE or TPU outer jacket
- ✓ Interchangeable sample line as option





Technical data and order numbers

Construction data		
Max. operating temperature	°C	200 (230V) resp. 160°C (115V)
Heat insulation / weight	kg/m	thermal or glass fibre fleece / 1,5
Insulation thickness	mm	20
Heating cable type		parallel heating cable PSG-Plus
Outer jacket		2mm PVC, PE or TPU extruded
Outer diameter	mm	60 with full equipment
Min. bending radius	mm	8 - 10 x outer diameter
Ambient temperature	°C	-20 to +65
Max. operating pressure abs. PTFE line	bar	DN4/6: 5,6 / DN6/8: 4,5 at 180°C
Max. operating pressure abs. SS316L line	bar	400
Protection class		IP64 (EN60529)
Max. length heating circuit	m	60
Electrical data		
Power	W/m	60
Electrical connection (included in assembly)		3m silicone connection cable, open ends
Power supply		230V 50/60Hz or optional 120V 50/60Hz
Order numbers for 1m line 230V 50/60Hz		
Hybrid Basic: 1 x PTFE internal tube 6mm, power and temperature sensor line	1m	54003629
Hybrid Plus: like Hybrid Basic incl. back purge line DN10/12	1m	54003630
Hybrid Extra: like Hybrid Plus incl. test gas line DN4/6	1m	54003049
Hybrid All: like Hybrid Extra incl. connection line for 1 or 2 back purge valves	1m	54003631
Order numbers for assembly ex works		
Shrink cap ending		50085077
Shrink cap with electr. connection		50085078
Order numbers for assembly on-site		
Shrink cap ending		50085075
Shrink cap with electr. connection		50085076
Order numbers for integrated temperature sensor		
PT100, position 350mm from electr. connection, supply cable led out on the face, L = 3,0 m		50061200
Thermoelement type K, position 350mm from electr. connection, supply cable led out on the face, L = 3,0 m		50061151
Thermoelement type J, position 350mm from electr. connection, supply cable led out on the face, L = 3,0 m		50061152

Assembly



Polyolefin shrink cap

Temperature controller



PSG ST49 with 25A SSR
Part. No. 50078850, 230V 50/60Hz
Part. No. 50078851, 115V 50/60Hz



PSG DC10 with 10A for thermocouple type J and K, 110V-230VAC 50...60Hz
Part. No. 50078820

Options

- Interchangeable internal line up to 30m line length
- Power supply 115V 50/60Hz
- Cable gland M80 x 2 (clamping range 56-63mm), brass, for cabinet wall mounting, IP68, mounted or separately



Controlled Heated Flexible Sample Lines

PSG Flex Basic

Application

The controlled heated flexible sample lines series **PSG Flex Basic** are used for continuous extractive gas analysis. They serve primarily for the transport of the humid sample gas stream from the sample point to the analyser house. The holding temperature of the line thereby has to be above water vapour resp. acid dew point of the sample gas. In this way uncontrolled condensation of water vapour on the way to the analyser and therefore washing out of gas components in condensate is prevented. Also failure of the measurement by a freezing line at ambient temperatures below 0°C is avoided.

Technology

The flexible lines are equipped with outer jacket corrugated tube made of PA12. The ultraflexible versions get an outer jacket made of PA12 braid. For heating a fixed resistor heating cable is used. Insulation is done with silicone foam hose. Up to 6 internal lines made of PTFE or PFA are possible. Interchangeable PTFE or PFA are also available.

Functions

The lines are delivered completely assembled and ready for operation ex works. The control of the lines is done with an external temperature controller (e.g. PSG ST49 or PSG DC10) via integrated PT100 to max. 200°C.

- ✓ Robust design with flexible corrugated hose outer jacket made of PA12
- ✓ Ultraflexible versions with PA12 braid outer jacket
- ✓ Operation with external temperature controller
- ✓ Fixed resistor heating cable
- ✓ Max. 200°C control temperature
- ✓ Ready for operation assembled ex works
- ✓ Internal lines made of PTFE or PFA
- ✓ Up to 6 internal lines as option
- ✓ Interchangeable internal lines as option





Technical data and order numbers

Construction data		
Max. operating temperature	°C	200
Heat insulation / weight	kg/m	silicone foam hose / 0,8
Insulation thickness	mm	10
Heating cable type		Fixed resistor heating cable
Outer jacket		PA12 corrugated hose or braid
Outer diameter	mm	43 with one internal line
Min. bending radius	mm	8 - 10 x outer diameter
Ambient temperature	°C	-20 to +65
Max. operating pressure abs. PTFE line	bar	DN4/6: 5,6 / DN6/8: 4,5
Protection class		IP64 (EN60529)
Max. heating circuit length	m	60
Electrical data		
Power	W/m	90
Electrical connection		3m silicone connection cable*, open ends (included in assembly)
Power supply		230V 50/60Hz or optional 120V 50/60Hz
Order numbers for 1m line with PA12 corrugated hose, 230V 50/60Hz		
1 x PTFE internal tube 6mm	1m	54002196
1 x PTFE internal tube 8mm	1m	54000323
1 x PTFE internal tube 10mm	1m	54000462
1 x PTFE internal tube 12mm	1m	54000013
Order numbers for assembly ex works		
Silicone cap ending		50084005
Silicone cap with electr. connection		50085004
PTFE cap ending		50085003
PTFE cap with electr. connection		50085002

* to lead frontal or backwards through the cap

Assembly



PTFE cap



Silicone cap

Temperature controller



PSG ST49 with 25A SSR 230V 50/60Hz
Part No. 50078850



PSG DC10
Part No. 50078820

Options

- Flexible lines with PA12 corrugated hose outer jacket
- Ultraflexible lines with outer jacket made of PA12 braid
- Up to 6 internal lines made of PTFE or PFA
DN4/6, DN6/8, DN8/10, DN10/12 or inch
- Interchangeable internal lines
- Power supply 115V 50/60Hz
- Cable gland M63 x 1,5 (clamping range 36-48mm), PA, for cabinet wall mounting, IP68, mounted or separately



Controlled Heated Flexible Sample Lines

PSG Flex Plus

Application

The controlled heated flexible sample lines series **PSG Flex Plus** are used for continuous extractive gas analysis. They serve primarily for the transport of the humid sample gas stream from the sample point to the analyser house. The holding temperature of the line thereby has to be above water vapour resp. acid dew point of the sample gas. In this way uncontrolled condensation of water vapour on the way to the analyser and therefore washing out of gas components in condensate is prevented. Also failure of the measurement by a freezing line at ambient temperatures below 0°C is avoided.

Technology

The flexible lines are equipped with outer jacket corrugated tube made of metal. For heating a fixed resistor heating cable is used. Insulation is done with glass fibre and thermos fleece. Internal lines made of PTFE or PFA are possible. Pressure resistance is achieved by a metal braid jacket of the internal tube.

Functions

The lines are delivered completely assembled and ready for operation ex works. The control of the lines is done with an external temperature controller (e.g. PSG ST49 or PSG DC10) via integrated PT100 to max. 200°C.

- ✓ Robust design with flexible corrugated tube outer jacket made of metal with extruded PVC protection coating
- ✓ Pressure resistant internal tube with metal braid jacket
- ✓ Operation with external temperature controller
- ✓ Fixed resistor heating cable
- ✓ Max. 200°C control temperature
- ✓ Ready for operation assembled ex works
- ✓ Internal lines made of PTFE or PFA





Technical data and order numbers

Construction data		
Max. operating temperature	°C	200
Heat insulation / weight	kg/m	glass fibre and thermo fleece / 1
Insulation thickness	mm	10
Heating cable type		fixed resistor heating cable
Outer jacket		metal corrugated tube with extruded PVC protection coating
Outer diameter	mm	42 with one internal line
Min. bending radius	mm	8 - 10 x outer diameter
Ambient temperature	°C	-20 to +65
Max. operating pressure abs. PTFE line	bar	20
Protection class		IP64 (EN60529)
Max. heating circuit length	m	60
Electrical data		
Power	W/m	90
Electrical connection		3m silicone connection cable*, open ends (included in assembly)
Power supply		230V 50/60Hz or optional 120V 50/60Hz
Order numbers for 1m line with metal corrugated tube with extruded PVC protection coating, 230V 50/60Hz		
1 x PTFE internal line 6mm	1m	54003239
1 x PTFE internal line 8mm	1m	54003126
Order numbers for assembly ex works		
Silicone cap with stainless steel tube socket ending (probe side)		50085049
Silicone cap with stainless steel tube socket electr. connection		50085057
PT100 placed 350mm from ending, 3m cable		50061200

Assembly



Silicone cap with stainless steel tube socket

Temperature controller



PSG ST49 mit 25A SSR 230V 50/60Hz
Part No. 50078850



PSG DC10
Part No. 50078820

Options

- Internal lines made of PTFE or PFA with dimensions DN4/6 or DN6/8
- Power supply 115V 50/60Hz
- Cable gland M63 x 1,5 (clamping range 36-48mm), PA, for cabinet wall mounting, IP68, mounted or separately



Controlled Heated Shortenable Sample Lines

PSG Extruded Plus Flex

Application

The controlled heated sample lines series **PSG Extruded Plus Flex** are used for continuous extractive gas analysis. They serve primarily for the transport of the humid sample gas stream from the sample point to the analyser house. The holding temperature of the line thereby has to be above water vapour resp. acid dew point of the sample gas. In this way uncontrolled condensation of water vapour on the way to the analyser and therefore washing out of gas components in condensate is prevented. Also failure of the measurement by a freezing line at ambient temperatures below 0°C is avoided.

Technology

The robust lines with plastic spring wire and thick-walled extruded flame resistant and extremely weather resistant TPU, PE or PVC outer jacket are equipped with high quality PSG-Plus parallel heating cable. Insulation is done with a thermal or glass fibre fleece. Up to 12 PTFE, PFA, stainless steel or special alloy tubes as internal line and also interchangeable internal tubes are available.

Functions

The lines are available up to 300m at a stretch e.g. on cable drum and then can be adapted on-site and shortened every 0,6m. Furthermore they are available ready for operation ex works. Control of the lines to max. 200°C is done by an external temperature controller (e.g. PSG ST49 or PSG DC10) via the integrated PT100.

- ✓ Very small bending radius ($\approx 200\text{mm}$)
- ✓ Operation with external temperature controller
- ✓ PSG-Plus parallel heating cable
- ✓ Max. 200°C control temperature
- ✓ Up to 300m at a stretch
- ✓ Every 0,6m shortenable for assembly on-site (video tutorial on YouTube) or ready-made ex works
- ✓ Robust design with thick-walled extruded, flame resistant, extremely weather resistant PVC, PE or TPU outer jacket
- ✓ Internal tube made of PTFE, PFA, stainless steel or special alloy
- ✓ Up to 12 internal lines as option
- ✓ Interchangeable internal lines as option





Technical data and order numbers

Construction data		
Max. operating temperature	°C	200
Heat insulation / weight	kg/m	thermal or glass fibre fleece / 1
Insulation thickness	mm	10
Heating cable type		parallel heating cable PSG-Plus
Outer jacket		2mm PVC, PE or TPU extruded
Outer diameter	mm	42 with one internal line, 43 with 2x6mm, 45 with 2x8mm
Min. bending radius	mm	5 x outer diameter
Ambient temperature	°C	-20 to +65
Max. operating pressure abs. PTFE line	bar	DN4/6: 5,6 / DN6/8: 4,5
Max. operating pressure abs. SS316L line	bar	400
Protection class		IP64 (EN60529)
Max. length heating circuit	m	60
Electrical data		
Power	W/m	60
Electrical connection		3m silicone connection cable*, open ends (included in assembly)
Power supply		230V 50/60Hz or optional 120V 50/60Hz
Order numbers for 1m line 230V 50/60Hz		
1 x PTFE internal tube 6mm	1m	50010700
1 x PTFE internal tube 8mm	1m	50010710
1 x PTFE internal tube 6mm interchangeable	1m	50010720
2 x PTFE internal tube 6mm	1m	50010730
2 x PTFE internal tube 8mm	1m	50010740
1 x Stainless steel internal tube 6mm	1m	50010750
1 x Stainless steel internal tube 8mm	1m	50010760
Order numbers for assembly ex works		
Silicone cap ending		50084005
Silicone cap with electr. connection		50085004
PTFE cap ending		50085003
PTFE cap with electr. connection		50085002
Order numbers for assembly on-site		
Silicone cap ending		50084007
Silicone cap with electr. connection		50050470
PTFE cap ending		50084003
PTFE cap with electr. connection		50084002

* to lead frontal or backwards through the cap

Assembly



PTFE cap



Silicone cap

Temperature controller



PSG ST49 with 25A SSR 230V 50/60Hz
Part. No. 50078850



PSG DC10
Part. No. 50078820

Options

- Up to 12 internal lines made of PTFE and/or PFA and/or stainless steel 316L and/or special alloys with dimensions DN4/6, DN6/8, DN8/10, DN10/12 or inch
- Interchangeable internal line
- Power supply 115V 50/60Hz
- Cable gland M63 x 1,5 (clamping range 36-48mm), PA, for cabinet wall mounting, IP68, mounted or separately



Self-Regulating Heated Sample Lines

PSG Extruded SR Flex

Application

The self-regulating heated sample lines series **PSG Extruded SR Flex** are used for continuous extractive gas analysis. They serve primarily for the transport of the humid sample gas stream from the sample point to the analyser house. The holding temperature of the line thereby has to be above water vapour resp. acid dew point of the sample gas. In this way uncontrolled condensation of water vapour on the way to the analyser and therefore washing out of gas components in condensate is prevented. Also failure of the measurement by a freezing line at ambient temperatures below 0°C is avoided.

Technology

The robust lines with plastic spring wire and thick-walled extruded flame resistant and extremely weather resistant TPU, PE or PVC outer jacket are equipped with high quality self-regulating Raychem® heating cable. Insulation is done with a thermal or glass fibre fleece. Depending on the used heating cable holding temperatures of up to 150°C at -20°C ambient temperature can be reached. Solutions down to -52°C are also possible. As standard holding temperatures of 30°C, 100°C and 120°C are offered. Up to 12 PTFE, PFA, stainless steel or special alloy tubes as internal line and also interchangeable internal tubes are available.

Functions

Because of the self-regulating heating cable for operation an additional temperature controller is not necessary. The heating cable consists of two parallel arranged supply conductors connected with an electrically conductive polymer plastic. During operation conductivity of the plastic is decreasing with increasing temperature due to molecular expansion until the heating cable specific maximum temperature is reached. When the heating cable temperature now drops the process reverses.

- ✓ Very small bending radius (≈ 200mm)
- ✓ No temperature controller necessary
- ✓ Raychem® heating cables
- ✓ 30 / 100 / 120 / 150°C holding temperature at -20°C ambient temperature
- ✓ Up to 300m at a stretch
- ✓ Arbitrary cut to length for assembly on-site (video tutorial on YouTube) or ready-made ex works
- ✓ Robust design with thick-walled extruded, flame resistant, extremely weather resistant PVC, PE or TPU outer jacket
- ✓ Internal tube made of PTFE, PFA, stainless steel or special alloy
- ✓ Up to 12 internal lines as option
- ✓ Interchangeable internal lines as option





Technical data and order numbers

Construction data				
Holding temperature*	°C	30	100	120
Heat insulation / weight	kg/m	thermal or glass fibre fleece / 1		
Insulation thickness	mm	10	10	14
Heating cable type		5BTV	12XTV	15XTV
Outer jacket		2mm PVC, PE or TPU extruded		
Outer diameter	mm	40		44
Min. bending radius	mm	5 x outer diameter		
Ambient temperature	°C	-20 to +65		
Max. operating pressure abs. PTFE line	bar	DN4/6:10 / DN6/8: 7,8	DN4/6: 8 / DN6/8: 6	DN4/6: 6 / DN6/8: 4,7
Max. operating pressure abs. SS316L line	bar	400		
Protection class		IP64 (EN60529)		
Max. heating circuit (32A fuse protection)	m	160	135	105
Electrical data				
Max. power (t _a = +10°C)	W/m	16	38	47
Electrical connection		3m silicone connection cable**, open ends (included in assembly)		
Power supply		230V 50/60Hz or optional 120V 50/60Hz		
Order numbers for 1m line 230V 50/60Hz				
1 x PTFE internal tube 6mm	1m	50010500	50010540	50010580
1 x Stainless steel internal tube 6mm	1m	50010510	50010550	50010590
1 x PTFE internal tube 8mm	1m	50010520	50010560	50010600
1 x Stainless steel internal tube 8mm	1m	50010530	50010570	50010610
Order numbers for assembly ex works				
Silicone cap ending			50084005	
Silicone cap with electr. connection			50085004	
PTFE cap ending			50085003	
PTFE cap with electr. connection			50085002	
Hard cap ending		50084011		-
Hard cap electr. connection		50084010		-
POM cap ending		50085001		-
POM cap with electr. connection		50085000		-
Order numbers for assembly on-site				
Silicone cap ending			50084007	
Silicone cap with electr. connection			50050470	
PTFE cap ending			50084003	
PTFE cap with electr. connection			50084002	
Hard cap ending		50084009		-
Hard cap electr. connection		50084008		-
POM cap ending		50084001		-
POM cap with electr. connection		50084000		-

* 150°C on request ** to lead frontal or backwards through the cap

Assembly



PTFE or POM cap



Silicone cap



Hard cap

Options

- Up to 12 internal lines made of PTFE and/or PFA and/or stainless steel 316L and/or special alloys with dimensions DN4/6, DN6/8, DN8/10, DN10/12 or inch
- Interchangeable internal line / Power supply 115V 50/60Hz
- Cable gland M63 x 1,5 (clamping range 36-48mm), PA, for cabinet wall mounting, IP68, mounted or separately



Self Regulating Heated Sample Lines

PSG Ex Extruded



Application

The self-regulating heated sample lines series **PSG Ex Extruded** are used for continuous extractive gas analysis. They serve primarily for the transport of the humid sample gas stream from the sample point to the analyser house. The holding temperature of the line thereby has to be above water vapour resp. acid dew point of the sample gas. In this way uncontrolled condensation of water vapour on the way to the analyser and therefore washing out of gas components in condensate is prevented. Also failure of the measurement by a freezing line at ambient temperatures below 0°C is avoided.

Technology

The robust lines with thick-walled extruded flame resistant and extremely weather resistant TPU, PE or PVC outer jacket are equipped with high quality self-regulating Raychem® heating cable for ATEX areas. Insulation is done with a thermal or glass fibre fleece. Depending on the used heating cable holding temperatures of up to 150°C (on request) at - 20°C ambient temperature can be reached. Solutions down to - 52°C are also possible. As standard holding temperatures of 30°C, 100°C and 120°C are offered. Up to 12 PTFE, PFA, stainless steel or special alloy tubes as internal line and also interchangeable internal tubes are available.

Functions

Because of the self-regulating heating cable for operation an additional temperature controller is not necessary. The heating cable consists of two parallel arranged supply conductors connected with an electrically conductive polymer plastic. During operation conductivity of the plastic is decreasing with increasing temperature due to molecular expansion until the heating cable specific maximum temperature is reached. When the heating cable temperature now drops the process reverses.

- ✓ For use in Ex-zone 1 and 2
- ✓ No temperature controller necessary
- ✓ Raychem® heating cables for ATEX
- ✓ 30 / 100 / 120°C holding temperature at - 20°C ambient temperature
- ✓ Up to 300m at a stretch
- ✓ Arbitrary cut to length for assembly on-site (video tutorial on [YouTube](#)) or ready-made ex works
- ✓ Robust design with thick-walled extruded, flame resistant, extremely weather resistant PVC, PE or TPU outer jacket
- ✓ Internal tube made of PTFE, PFA, stainless steel or special alloy
- ✓ Up to 12 internal lines as option
- ✓ Interchangeable internal lines as option

Raychem





Technical data and order numbers

Construction data				
Holding temperature*	°C	30	100	120
Heat insulation / weight	kg/m	Thermal or glass fibre fleece / 1		
Insulation thickness	mm	10	10	14
Heating cable type		5BTV	12XTV	15XTV
Outer jacket		2mm PVC, PE oder TPU extruded		
Outer diameter	mm	40		44
Min. bending radius	mm	8 - 10 x outer diameter		
Ambient temperature	°C	-20 to +65		
Max. operating pressure abs. PTFE line	bar	DN4/6:10 / DN6/8: 7,8	DN4/6: 8 / DN6/8: 6	DN4/6: 6 / DN6/8: 4,7
Max. operating pressure abs. SS316L line	bar	400		
Protection class		IP64 (EN60529)		
Ex-protection heating cable		 Ex e IIC T6 Gb Ex tD A21 IP66 T80°C II 2G Ex e II T6 II 2D Ex tD A21 IP66 T80°C	 Ex e IIC T3 Gb Ex tD A21 IP66 T200°C II 2G Ex e II T3 II 2D Ex tD A21 IP66 T200°C	
Temperature class		T6	T3	T3
Protection against electrostatic chargings		none (see Ex ² or Ex ³ if required)		
Max. heating circuit (32A fuse protection)	m	160	135	105
Electrical data				
Max. Power (t _a = +10°C)	W/m	16	38	47
Electrical connection		with 0,5m protruded heating cable		
Power supply		230V 50/60Hz or optional 120V 50/60Hz		
Order numbers for 1m line 230V 50/60Hz				
1 x PTFE internal tube 6mm	1m	50020300	50021200	54003136
1 x Stainless steel internal tube 6mm	1m	50020100	50021000	54004048
1 x PTFE internal tube 8mm	1m	50020400	50021300	54003751
1 x Stainless steel internal tube 8mm	1m	50020200	54004504	54004738
Order number for assembly ex works				
PTFE-Ex-cap ending		50085565		50085566
PTFE-Ex-cap with electr. connection		50085550		50085551
Order number for assembly on-site				
PTFE-Ex- cap ending		50085665		50085666
PTFE-Ex- cap with electr. connection		50085650		50085651

* 150°C on request

Assembly



PTFE-Ex-Cap

Options

- Up to 12 internal PTFE and/or PFA and/or stainless steel and/or special alloy tubes with dimensions DN4/6, DN6/8, DN8/10, DN10/12 or inch
- Interchangeable internal lines
- Power supply 115V 50/60Hz
- Cable gland M63 x 1,5 (clamping range 36-48mm), PA, for cabinet wall mounting, IP68, mounted or separately



Self Regulating Heated Sample Lines

PSG Ex² Extruded SR



Application

The self regulating heated sample lines series **PSG Ex² Extruded SR** are used for continuous extractive gas analysis. They serve primarily for the transport of the humid sample gas stream from the sample point to the analyser house. The holding temperature of the line thereby has to be above water vapour resp. acid dew point of the sample gas. In this way uncontrolled condensation of water vapour on the way to the analyser and therefore washing out of gas components in condensate is prevented. Also failure of the measurement by a freezing line at ambient temperatures below 0°C is avoided.

Technology

The robust lines with thick-walled extruded flame resistant and extremely weather resistant TPU or PVC outer jacket are equipped with high quality self-regulating Raychem® heating cable. Insulation is done with a thermal or glass fibre fleece. For prevention of electrostatic charging the **patented Ex²-technology** is used. Depending on the used heating cable holding temperatures of up to 150°C at -20°C ambient temperature can be reached. Solutions down to -52°C are also possible. Up to 12 PTFE, PFA, stainless steel or special alloy tubes as internal line and also interchangeable internal tubes are available.

Functions

Because of the self-regulating heating cable for operation an additional temperature controller is not necessary. The heating cable consists of two parallel arranged supply conductors connected with an electrically conductive polymer plastic. During operation conductivity of the plastic is decreasing with increasing temperature due to molecular expansion until the heating cable specific maximum temperature is reached. When the heating cable temperature now drops the process reverses.

- ✓ For use in Ex-zone 1 and 2
- ✓ Patented Ex²-technology for prevention of electrostatic charging
- ✓ No temperature controller necessary
- ✓ Raychem® heating cables
- ✓ 30 / 100 / 120 / 150°C holding temperature at -20°C ambient temperature
- ✓ Up to 300m at a stretch
- ✓ Arbitrary cut to length for assembly on-site (video tutorial on YouTube) or ready-made ex works
- ✓ Robust design with thick-walled extruded, flame resistant, extremely weather resistant PVC, PE or TPU outer jacket
- ✓ Internal tube made of PTFE, PFA, stainless steel or special alloy
- ✓ Up to 12 internal lines as option
- ✓ Interchangeable internal lines as option

Raychem





Technical data and order numbers

Construction data				
Holding temperature*	°C	30	100	120
Heat insulation / weight	kg/m	thermal- or glass fibre fleece / 1,1		
Insulation thickness	mm	10	10	14
Heating cable type		5BTV	12XTV	15XTV
Outer jacket		2mm PVC, PE or TPU extruded		
Outer diameter	mm	40		44
Min. bending radius	mm	8 - 10 x outer diameter		
Ambient temperature	°C	-20 to +65		
Max. operating pressure abs. PTFE line	bar	DN4/6:10 / DN6/8: 7,8	DN4/6: 8 / DN6/8: 6	DN4/6: 6 / DN6/8: 4,7
Max. operating pressure abs. SS316L line	bar	400		
Protection class		IP64 (EN60529)		
Ex-protection heating cable		Ex e IIC T6 Gb Ex tD A21 IP66 T80°C ⊕ II 2G Ex e II T6 ⊕ II 2D Ex tD A21 IP66 T80°C	Ex e IIC T3 Gb Ex tD A21 IP66 T200°C ⊕ II 2G Ex e II T3 ⊕ II 2D Ex tD A21 IP66 T200°C	
Temperature class		T6	T3	T3
Protection against electrostatic		patented Ex ² -technology		
Max. heating circuit (32A fuse protection)	m	160	135	105
Electrical data				
Max. Power (t _a = +10°C)	W/m	16	38	47
Electrical connection		with 0,5m protruded heating cable		
Power supply		230V 50/60Hz or optional 120V 50/60Hz		
Order numbers for 1m line 230V 50/60Hz				
1 x PTFE internal tube 6mm	1m	54002978	54002983	54002576
1 x Stainless steel internal tube 6mm	1m	54002979	54002447	54002981
1 x PTFE internal tube 8mm	1m	54002708	54002984	54004545
1 x Stainless steel internal tube 8mm	1m	54002980	54002982	54004546
Order number for assembly ex works				
PTFE-Ex-cap ending			50085503	
PTFE-Ex-cap with electr. connection			50085502	
Order number for assembly on-site				
PTFE-Ex- cap ending			50084503	
PTFE-Ex- cap with electr. connection			50084502	

* 150°C on request

Assembly



PTFE-Ex-cap

Patented Ex²-technology



Integrated aluminium layer for reliable discharging of static charge at the outer jacket



... because safety comes first!

Options

- Up to 12 internal PTFE and/or PFA and/or stainless steel and/or special alloy tubes with dimensions DN4/6, DN6/8, DN8/10, DN10/12 or inch
- Interchangeable internal lines
- Power supply 115V 50/60Hz
- Cable gland M63 x 1,5 (clamping range 36-48mm), PA, for cabinet wall mounting, IP68, mounted or separately



Self-Regulating Heated Sample Lines

PSG Ex³ Extruded



Application

The self-regulating heated sample lines series **PSG Extruded Ex³** are used for continuous extractive gas analysis. They serve primarily for the transport of the humid sample gas stream from the sample point to the analyser house. The holding temperature of the line thereby has to be above water vapour resp. acid dew point of the sample gas. In this way uncontrolled condensation of water vapour on the way to the analyser and therefore washing out of gas components in condensate is prevented. Also failure of the measurement by a freezing line at ambient temperatures below 0°C is avoided.

Technology

The robust lines with thick-walled extruded flame resistant and extremely weather resistant TPU outer jacket are equipped with high quality self-regulating Raychem® heating cable. Insulation is done with a thermal or glass fibre fleece. For prevention of electrostatic chargings the **patented Ex³-technology** is used. Depending on the used heating cable holding temperatures of up to 150°C at -20°C ambient temperature can be reached. Solutions down to -52°C are also possible. Up to 12 PTFE, PFA, stainless steel or special alloy tubes as internal line and also interchangeable internal tubes are available.

Functions

Because of the self-regulating heating cable for operation an additional temperature controller is not necessary. The heating cable consists of two parallel arranged supply conductors connected with an electrically conductive polymer plastic. During operation conductivity of the plastic is decreasing with increasing temperature due to molecular expansion until the heating cable specific maximum temperature is reached. When the heating cable temperature now drops the process reverses.

- ✓ For use in Ex-zone 1 and 2
- ✓ Patented Ex³-technology with conductive outer jacket without electrostatic chargings
- ✓ No temperature controller necessary
- ✓ Raychem® heating cables
- ✓ 30 / 100 / 120 / 150°C holding temperature at -20°C ambient temperature
- ✓ Up to 300m at a stretch
- ✓ Arbitrary cut to length for assembly on-site (video tutorial on YouTube) or ready-made ex works
- ✓ Robust design with thick-walled extruded, flame resistant, extremely weather resistant TPU outer jacket
- ✓ Internal tube made of PTFE, PFA, stainless steel or special alloy
- ✓ Up to 12 internal lines as option
- ✓ Interchangeable internal lines as option





Technical data and order numbers

Construction data				
Holding temperature*	°C	30	100	120
Heat insulation / weight	kg/m	thermal- or glass fibre fleece / 1,1		
Insulation thickness	mm	10	10	14
Heating cable type		5BTV	12XTV	15XTV
Outer jacket		2mm TPU extruded		
Outer diameter	mm	40		44
Min. bending radius	mm	8 - 10 x outer diameter		
Ambient temperature	°C	-20 to +65		
Max. operating pressure abs. PTFE line	bar	DN4/6:10 / DN6/8: 7,8	DN4/6: 8 / DN6/8: 6	DN4/6: 6 / DN6/8: 4,7
Max. operating pressure abs. SS316L line	bar	400		
Protection class		IP64 (EN60529)		
Ex-protection heating cable		Ex e IIC T6 Gb Ex tD A21 IP66 T80°C ⚠ II 2G Ex e IIC T6 ⚠ II 2D Ex tD A21 IP66 T80°C	Ex e IIC T3 Gb Ex tD A21 IP66 T200°C ⚠ II 2G Ex e IIC T3 ⚠ II 2D Ex tD A21 IP66 T200°C	
Temperature class		T6	T3	T3
Protection against electrostatic chargings		patented Ex ³ -technology		
Max. heating circuit (32A fuse protection)	m	160	135	105
Electrical data				
Max. Power (t _a = +10°C)	W/m	16	38	47
Electrical connection		with 0,5m protruded heating cable		
Power supply		230V 50/60Hz or optional 120V 50/60Hz		
Order numbers for 1m line 230V 50/60Hz				
1 x PTFE internal tube 6mm	1m	54004537	54004353	54004541
1 x Stainless steel internal tube 6mm	1m	54004538	54004533	54004542
1 x PTFE internal tube 8mm	1m	54004539	54004534	54004543
1 x Stainless steel internal tube 8mm	1m	54004540	54004535	54004544
Order number for assembly ex works				
PTFE-Ex-cap ending			50085503	
PTFE-Ex-cap with electr. connection			50085502	
Order number for assembly on-site				
PTFE-Ex- cap ending			50084503	
PTFE-Ex- cap with electr. connection			50084502	

* 150°C on request

Assembly



PTFE-Ex-cap

Patented Ex³-technology



Conductive outer jacket prevents static chargings

Options

- Up to 12 internal PTFE and/or PFA and/or stainless steel and/or special alloy tubes with dimensions DN4/6, DN6/8, DN8/10, DN10/12 or inch
- Interchangeable internal lines
- Power supply 115V 50/60Hz
- Cable gland M63 x 1,5 (clamping range 36-48mm), PA, for cabinet wall mounting, IP68, mounted or separately



Controlled Heated Shortenable Sample Lines

PSG 150 Ex Extruded



Application

The controlled heated sample lines series **PSG 150 Ex Extruded** are used for continuous extractive gas analysis. They serve primarily for the transport of the humid sample gas stream from the sample point to the analyser house. The holding temperature of the line thereby has to be above water vapour resp. acid dew point of the sample gas. In this way uncontrolled condensation of water vapour on the way to the analyser and therefore washing out of gas components in condensate is prevented. Also failure of the measurement by a freezing line at ambient temperatures below 0°C is avoided.

Technology

The robust lines with thick-walled extruded flame resistant and extremely weather resistant TPU or PVC outer jacket are equipped with high quality Raychem® heating cable. Insulation is done with a thermal or glass fiber fleece. Holding temperatures of up to 150°C at -20°C ambient temperature can be reached. Solutions down to -52°C are also possible. Up to 12 PTFE, PFA, stainless steel or special alloy tubes as internal line and also interchangeable internal tubes are available.

Functions




Delivery lengths of up to 300m at a stretch are possible on cable drum and then can be adapted on-site and shortened every 1.5m. Furthermore they are available ready for operation ex works. Control of the lines to max. 150°C is done by an external temperature controller and limiter via the integrated PT100.

- ✓ For use in Ex-zone 1 and 2
- ✓ Temperature controller necessary
- ✓ Raychem® heating cables
- ✓ Max. 150°C holding temp. at -20°C ambient temperature
- ✓ Up to 300m at a stretch
- ✓ Every 1.5m shortenable for assembly on-site (video tutorial on [YouTube](#)) or ready-made ex works
- ✓ Robust design with thick-walled extruded, flame resistant, extremely weather resistant PVC or TPU outer jacket
- ✓ Internal tube made of PTFE, PFA, stainless steel or special alloy
- ✓ Up to 12 internal lines as option
- ✓ Interchangeable internal lines as option





Technical data and order numbers

Construction data		
Max. operating temp. (heating cable)	°C	260
Max. holding temperature	°C	150
Heat insulation / weight	kg/m	thermal- or glass fibre fleece / 1,1
Insulation thickness	mm	10
Heating cable type		Raychem [®] 40FHT2-CT
Outer jacket		2mm PVC or TPU extruded
Outer diameter	mm	42 with one internal line, 43 with 2x6mm, 45 with 2x8mm
Min. bending radius	mm	8 - 10 x outer diameter
Ambient temperature	°C	-20 to +65
Max. operating pressure abs. PTFE line	bar	DN4/6: 5,8 / DN6/8: 4,6 at 150°C
Max. operating pressure abs. SS316L line	bar	400
Protection class		IP64 (EN60529)
Ex-protection heating cable		⚠ II 2GD Ex e II T* (See Schedule) Ex tD A21 IP66 Ex e II T* (See Schedule) Ex tD A21 IP66
Temperature class*		T3...T1
Max. length heating circuit	m	85
Electrical data		
Max. Power (t _a = +10°C)	W/m	40
Electrical connection		Heating cable overhang with M25 for ATEX terminal box
Power supply		230 Vac
Order numbers for 1m line 230V 50/60Hz		
1 x PTFE internal tube 6mm	1m	54004455
2 x PTFE internal tube 6mm	1m	54003306
Temperature controller and limiter		
with SSR FRBL1 		50071110
NGC-20-CL-E 		80001102
Order number for assembly ex works		
PTFE-Ex-cap ending		50085503
PTFE-Ex-cap with electr. connection		50085502
Order number for assembly on-site		
PTFE-Ex- cap ending		50084503
PTFE-Ex- cap with electr. connection		50084502

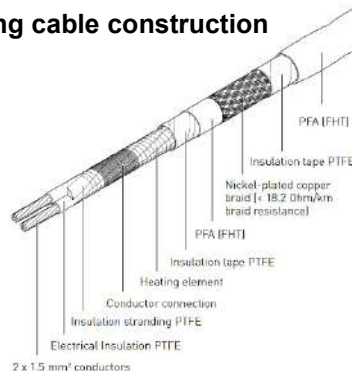
* By design. Temperature classification (T-rating) has to be established by using the principles of stabilised design or the use of a temperature limiting device.

Assembly



PTFE-Ex-cap

FHT Heating cable construction



Options

- Up to 12 internal PTFE and/or PFA and/or stainless steel and/or special alloy tubes with dimensions DN4/6, DN6/8, DN8/10, DN10/12 or inch
- Interchangeable internal lines
- Cable gland M63 x 1,5 (clamping range 36-48mm), PA, for cabinet wall mounting, IP68, mounted or separately



Accessories for Heated Sample Lines

PSG Extruded and PSG Flex



Application

The controlled heated sample lines series **PSG Extruded** and **PSG Flex** are used for continuous extractive gas analysis. They serve primarily for the transport of the humid sample gas stream from the sample point to the analyser house. The holding temperature of the line thereby has to be above water vapour resp. acid dew point of the sample gas. In this way uncontrolled condensation of water vapour on the way to the analyser and therefore washing out of gas components in condensate is prevented. Also failure of the measurement by a freezing line at ambient temperatures below 0°C is avoided.

Technology

The lines series **PSG Extruded** with extruded outer jacket are all shortenable and will be assembled ex works or by the customer himself on site with optional assembly sets. Lines series **PSG Flex** are always delivered completely assembled ex works with optional selectable assembly sets. Due to use of connection boxes very long line lengths can be realised.

Functions

For completion and mounting of heated lines **PSG Extruded** and **PSG Flex** various assembly sets, cable glands, electrical connection boxes and connection or distribution boxes are available. With various cable glands the heated lines can be inserted dust and water tight into analysis cabinets and houses. Inside of the connection boxes the heating cable will be lead out of the lines and used to heat the connector.

- ✓ Termination sets for assembly ex works or on site
- ✓ Cable glands and heat shrinkable sleeves for cabinet insertion
- ✓ Terminal boxes for electrical connection
- ✓ Connection and distribution boxes





Termination set

Mounting set for tube bundles and analyser lines on site.

The termination set for the tube/line end consists of:

- Cap (PTFE, POM, Silicone, hard plastic)
- Heat shrinkable sleeve
- Silicone

In addition for the electrical supply the termination set will include:

- Silicone cable 3x1,5 mm² or 3x2,5 mm², length 3 m
- Equipment for electrical connection



End seal kit for hazardous area

Heat shrinkable end seal kit for self-regulating heating elements in hazardous areas.

The tracing for tube bundles and analyser lines with self-regulating heating elements must be terminated with an end seal kit, which has the same certification as the tube/line itself.

Certification according to ATEX: ⚠ II 2 G EEx e T6



Connection kit for hazardous area

Heat shrinkable connection kit for self-regulating heating elements in hazardous areas.

The tracing for tube bundles and analyser lines with self-regulating heating elements must exit the line and be connected to power supply with an explosion proof termination box.

The heating elements must be connected to a termination box, which has the same certification as the tube/line itself.

The heating connections entrance to the termination box must be a M25 x 1,5mm cable gland with a special heater cable sealing.

Certification according to ATEX: ⚠ II 2 G EEx e



Termination box for hazardous area

For tube bundles and analyser lines with self-regulating heating elements, complete prefabrication on mounting plate.

Material	Glass fibre reinforced Polyester
Dimensions	110 x 55 x 75mm
Terminals	3 x 0,2...4mm ²
Cable glands	1 x M25x1,5 (heating cable) u. 1 x M20x1,5 (power)
Ambient temperature	-20°C...+40°C
ATEX marking	⚠ II 2 G EEx e II T6



Coupling or distribution boxes

For coupling of tube bundles and heated sample lines. The lines are inserted at the front via cable glands and connected with a tube fitting. Via integrated terminal block also the heating circuits can be coupled electrically.

Material	Glass fibre reinforced Polyester
Dimensions	300 x 150 x 130mm
Terminals	3 x 0,2...4mm ²
Cable glands	2 x M63x1,5
Ambient temperature	-50°C...+150°C



Cable glands and heat shrinkable sleeve

Cable glands and heat shrinkable sleeves required for insertion of tube bundles and analyser lines into analyser cabinets, sample conditioning cabinets, transmitter boxes or other housings.

Material	Polyamide		Polyamide / Polyolefin
	Thread	M63 x 1,5	PG42
Clamping range	37...44mm	36...45mm	36...70mm / 19...51mm
Protection type	IP68		
Ambient temperature	-20°C...+80°C		-55°C...+90°C
Shrinking temperature	min. 121°C		





Heated Wall Bushings

PSG WB

Application

The heated wall bushings series **PSG WB** are used in gas analysis for connection of heated sample lines with an installation route leading through walls like e.g. brickworks. A typical application is also leading heated sample lines out of climatic chambers in the automotive industry.

Technology

The heated wall bushings series **PSG WB** with stainless steel jacket made of SS316Ti are designed for installation in brickworks. They are available in various versions. Besides standard dimensions customised solutions are possible. Individualisation in relation to length (in dependance on brickworks) temperature and control can be considered. Swagelok-fittings are used for connection of sample lines as standard. Other connections are also possible. Length of the supply line and type of connection plug are also manufactured on customer request. One side has e.g. a screw lid and both sides stainless steel fittings for connection of the sample lines. Internally an insulated stainless steel tube with heating cable is heated to the desired temperature.

Functions

Due to the homogeneous heating to max. 250°C zones are bridged where temperature could fall below the dew point resp. acid dew point on its way through the brickworks. Thus condensate formation and therefore clogging as well as washing out of water soluble sample gas components like e.g. SO₂ is prevented.

- ✓ Individual production
- ✓ Homogeneous heating of complete tube length
- ✓ Corrosion resistant made of stainless steel SS316Ti
- ✓ Heatable up to 250°C
- ✓ Controlled or non-regulated operation possible
- ✓ No cold spots
- ✓ Surface temperature <60°C
- ✓ In any length available
- ✓ Various lines with different dimensions in one bushing possible





Technical Data

PSG WB				
Part no.		54002520	54002523	54002738
Holding temperature	°C	200		90
Design data				
Dimensions	mm	see design example or upon request		
Connections		8mm Rohr	DN100 5mm / Norma Grip	6mm + 8mm Rohr
Mounting		installation in brickwork		
Materials		SS316TI / SS316L		
Electrical data				
Temperature sensor		NiC-Ni		PT100
Temperature alarm		without		
Voltage	V	230VAC 50/60 Hz or 115VAC 50/60Hz		
Power consumption	W	50	400	60
Heating type		Fixed resistor		
Electr. connection		3m cable with plug Amphenol 6 + PE; Cannon Military or upon request		

Design examples

Part No. 54002520	
1	Wall mounting tube 2"
2	Nut 2"
3	Bulkhead fitting
4	Media tube
5	Cable gland
6	Silicone cap
7	Cylindrical screw

Part No. 54002738	
1	Wall mounting tube 2"
2	Nut 2"
3	Bulkhead fitting
4	Media tube
5	Cable gland
6	Silicone cap
7	Cylindrical screw

Part No. 54002523	
1	NORMA Grip E
2	Wall mounting tube
3	Cable gland
4	Flange DN100

Example-dimensions in mm



Compact Gas Conditioning MAK10



Application

The compact gas conditioning systems series **MAK10** are used for continuous extractive gas analysis. They serve primarily for exact constant lowering of the sample gas dew point and thus for drying of the humid sample gas flow. In this way water vapour cross sensitivities and volumetric errors are minimized and damages of the sensible analyzer are avoided. With optional components like condensate pumps, pre-separators, filters, liquid sensors, flow meters and sample gas pumps devices of series **MAK10** can be upgraded to complete compact quick and simple integrable conditioning systems. The flexible modular design guarantees an optimum adaption to every measuring task.

Technology

The precise proportional temperature control in combination with the long-lasting hot-gas bypass system and the innovative corrosion resistant heat exchangers achieves low extremely constant dew points. Also load fluctuations and high thermal stress is compensated reliably. The hydrophobic corrosion resistant PTFE coating and the very short retention time in the heat exchanger ensure a lowest possible gas dissolution rate.

Functions

An electronic system controls dew point and cooling air temperature. Potential free alarm contacts allow remote monitoring of the device. The operating parameters are stored in a log book for diagnosis. An operation hours counter controls the service intervals. Available housing versions are wall mounting housing, 19"-rack housing and mobile versions with carrying handles.

- ✓ High performance compressor cooler
- ✓ Long lasting hot-gas bypass system without switching the compressor
- ✓ Corrosion resistant PTFE / PVDF heat exchanger
- ✓ Very compact design
- ✓ Digital display for temperature, alarms, logbook, operating hours counter and service interval indication
- ✓ Modular upgradeable and application dependently configurable
- ✓ 1 - 4 gas paths
- ✓ Integrable filters, flow meters, flow alarms, liquid sensors, gas pumps, pre-separators und acid dosing
- ✓ Wall mounting, 19"-rack, or mobile housing





Technical Data

Model							
Type		MAK10-1	MAK10-2	MAK10-3	MAK10-4	MAK10-1 PS1	MAK10-2 PS2
Part number		MAK10-1101-4-00-F	MAK10-2202-4-00-F	MAK10-3303-5-00-F	MAK10-4404-5-00-F	MAK10-1112-4-00-F	MAK10-2224-5-00-F
Number of gas paths		1	2	3	4	1	2
Number of condensate pumps		1	2	3	4	2	4
Number of pre-separators		0	0	0	0	1	2
Docking Station		-	-	yes	yes	-	yes
Material of gas paths							
Cooling transmission / storage		aluminium tube / copper rod					
Cooling surface		PTFE coating					
Housing / sealings		PVDF / FPM					
Operating data							
Gas flow $V_n^{1)}$ at 65°C dp	l/hr	1 x 125	2 x 125	3 x 125	4 x 125	1 x 150	2 x 150
Gas flow $V_n^{1)}$ at 55°C dp	l/hr	1 x 175	2 x 175	3 x 175	4 x 175	1 x 200	2 x 200
Gas inlet temperature	°C	max. 140					
Ambient temperature	°C	+5 to +45					
Operating pressure	bar	0,2 to 2,2					
Outlet dew point ¹⁾	°C	3,0 ± 0,3 at constant conditions					
Dead space per gas path	ml	26					
Ready for start up	min	< 5	< 10	< 15	< 15	< 5	< 10
Cooling capacity	KJ/hr	792					
Design data							
Dimensions (W x H x D)	mm	310 x 266 x 321		449 x 266 x 321		310 x 266 x 321 / 449 x 266 x 321	
Weight without options	kg	16,0	18,0	20,8	23,0	17,0	20,0
Housing		wall mounting (19"- rack and mobile optional) / RAL 7035					
Connections		gas: PVDF DN 4/6 / condensate: PVDF DN 4/6					
Electrical data							
Mains connection		plug					
Digital display		temperature (outlet dew point resp. ambient), operating status, alarm and alarm storage, service control, operating hours, condensate pump control					
Alarm set-points	°C	< +2.0 / > +10.0					
Protection rate		IP 20 EN 60529 / EN 61010					
Conformity		CE /cMETus					
Power supply		230V 50/60Hz or 115V 50/60Hz					
Power consumption	W	170 - 195		235 - 270		170 - 195	

¹⁾ at 25°C ambient temperature
dp = inlet dew point

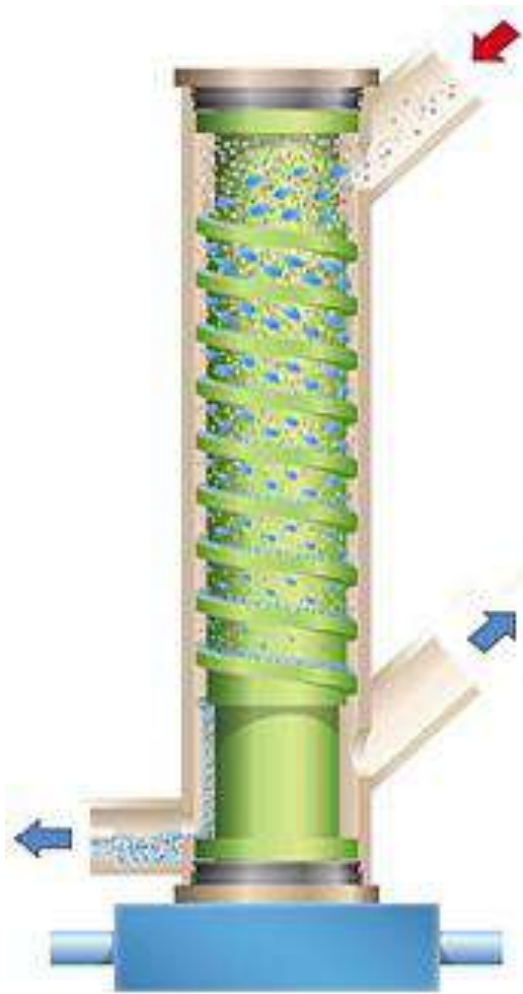
Options

- Condensate pump
- PTFE or glass fibre depth filter, length 70mm or 90mm
- Sample gas pump N86 IP00 or IP20
- Flow meter for max. 150 or 250 or 500 l/h
- Flow meter with light barrier and electronic
- Liquid sensor internal or external incl. electronic
- Pre-separator incl. condensate pump
- Acid dosing incl. condensate pump
- Docking Station
- 19"-rack
- Carrying handles
- Voltage 115V 50/60H

Due to the large number of options a big variety of individual configurations of the MAK10 is possible. Basically devices with 3-4 heat exchangers, 3-4 condensate pumps, 1-2 sample gas pumps, 2 filters and 2 flow meters need additionally always the docking station. Thereby the housing width changes from 310mm to 449mm. For your individual configuration of a MAK10 please contact our sales team in Erkelenz.



MAK10 Heat-Exchanger System



More efficiency, no energy losses, even at high ambient temperatures

- ✓ Coldness transfer through copper and aluminium
- ✓ Best thermal conductance values 300/204 W/m²K
- ✓ Coldness transferred from the inside outwards
- ✓ Extremely compact design
- ✓ Optimal shielding from the environment

High and constant dryness rate even at extreme load changes

- ✓ PTFE-coated, hydrophobic surface
- ✓ Immediate formation of large condensate droplets
- ✓ Spiral performing stream goes downwards
- ✓ Consistent use of gravity
- ✓ Discharge of condensate at the lowest point
- ✓ Inner copper rod as cold storage

Exceptionally low gas dissolution rates enable accurate analysis

- ✓ Very low dead volume
- ✓ Extremely short retention time of the gas in the system
- ✓ Small heat-exchanger surface
- ✓ Rapid saturation of the surface
- ✓ Reduced response-time of gas to condensate
- ✓ Minimized contact surface of sample gas and condensate
- ✓ On three sides evacuated condensate spiral stream
- ✓ Coating reduces electrostatics

Reliability and sustainability reduce time and efforts for maintenance

- ✓ Exchangeable heat-exchangers
- ✓ Optimum chemical resistance
- ✓ No abrasive wear-out
- ✓ Self-cleaning effects, no contamination
- ✓ Maintenance-free system
- ✓ Proven and safe technology
- ✓ Monitored quality
- ✓ More than 10.000 systems in successful operation



MAK10 Model Examples

MAK10-2

- ✓ 2 heat exchangers PTFE / PVDF
- ✓ 2 gas paths (2 x 175 l/h)
- ✓ 2 condensate pumps
- ✓ 1 MAK-alarm contact



MAK10-2 mobile version

- ✓ 2 heat exchanger PTFE / PVDF
- ✓ 1 gas path (1 x 175 l/h)
- ✓ 2 condensate pumps
- ✓ 1 depth filter
- ✓ 1 liquid sensor and electronic
- ✓ 1 flow meter
- ✓ 1 MAK- / 1 sensor alarm contact



MAK10-2 PS2

- ✓ 2 heat exchangers PTFE / PVDF
- ✓ 2 gas paths (2 x 200 l/h)
- ✓ 2 pre-separators
- ✓ 4 condensate pumps
- ✓ 2 depth filters
- ✓ 2 liquid sensors and electronics
- ✓ 1 MAK- / 2 sensor alarm contacts



MAK10-2 19"-rack version

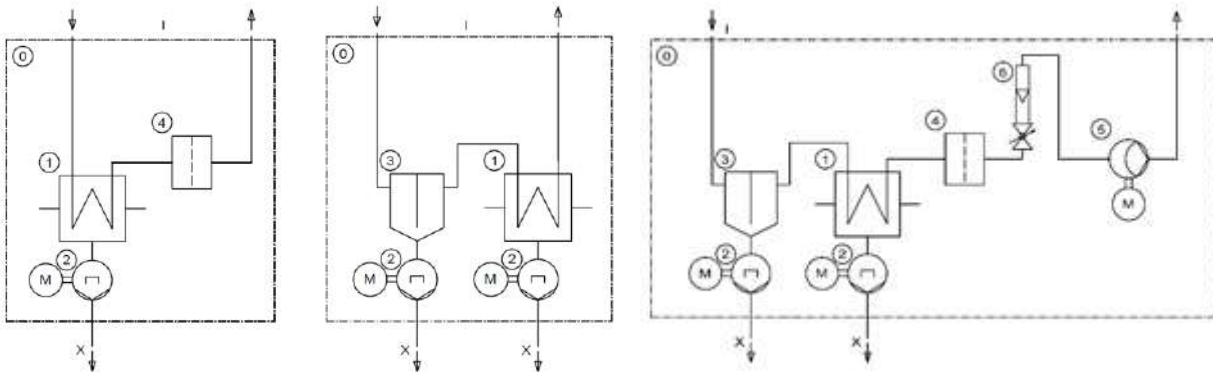
- ✓ 2 heat exchangers PTFE / PVDF
- ✓ 1 gas path (1 x 175 l/h)
- ✓ 2 condensate pumps
- ✓ 1 depth filter
- ✓ 1 liquid sensor and electronic
- ✓ 1 flow meter
- ✓ 1 MAK- / 1 sensor alarm contact



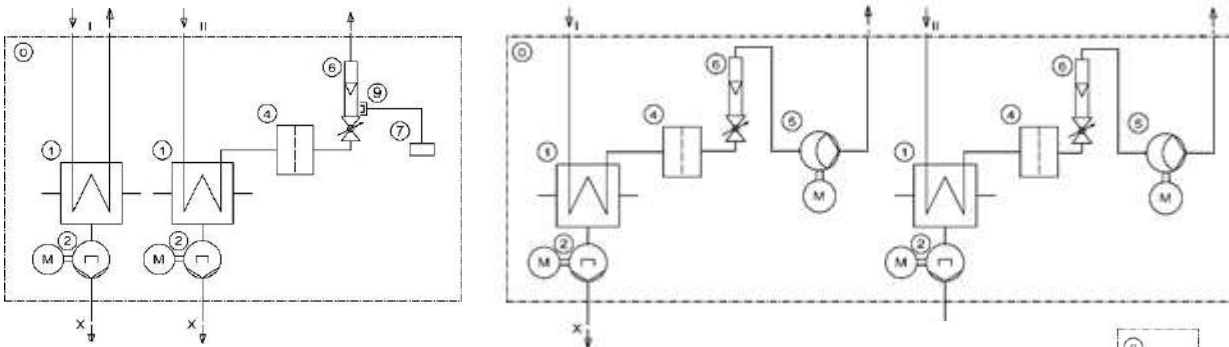


Configuration examples

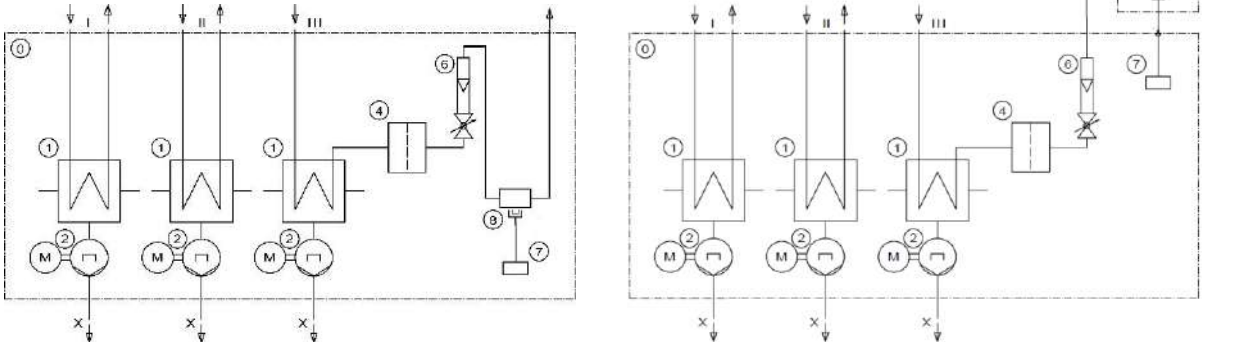
MAK10-1



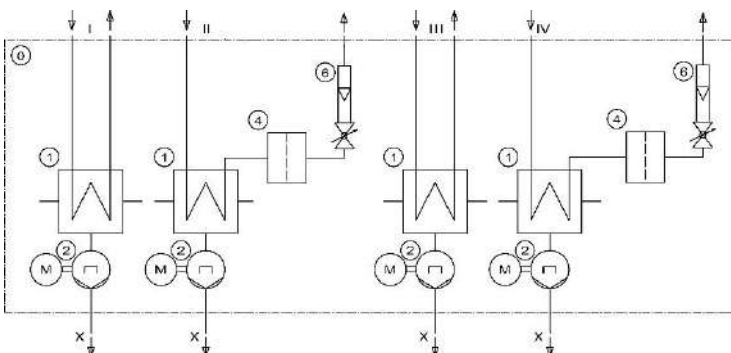
MAK10-2



MAK10-3



MAK10-4



- ① Heat exchanger
- ② Condensate pump
- ③ Condensate pre-separator
- ④ Depth filter
- ⑤ Sample gas pump
- ⑥ Flow meter
- ⑦ Electronic
- ⑧ Liquid sensor
- ⑨ Light barrier



Integrated components / options

Condensate pump

- ✓ Reliable continuous condensate removal
- ✓ Low rotation speed, long lasting pump tube



Condensate pre-separator

- ✓ Separation of free condensate and solid particles
- ✓ Sample gas pre-cooling for inlet dew points >65°C



PTFE or glass fibre depth filter

- ✓ Reliable filtration of solid particles
- ✓ Quick and simple filter change



Flow meter

- ✓ Exact dosing, with fine adjustment needle valve
- ✓ Optional with light barrier



Liquid sensor

- ✓ Protects against condensate break through
- ✓ Reliable detection of smallest amounts of liquid



Electronic

- ✓ Control / alarm for liquid sensors / light barriers
- ✓ Potential free switch contact

Sample gas pump

- ✓ Pure pumping of sample gases
- ✓ Perfect integration in the sample gas cooler





Compact Gas Conditioning MAK10 Mobile



Application

The compact gas conditioning systems series **MAK10 Mobile** are used for continuous extractive gas analysis at different locations. They serve primarily for exact constant lowering of the sample gas dew point and thus for drying of the humid sample gas flow. In this way water vapour cross sensitivities and volumetric errors are minimized and damages of the sensible analyzer are avoided. With optional components like condensate pumps, pre-separators, filters, liquid sensors, flow meters and sample gas pumps devices of series **MAK10 Mobile** can be upgraded to complete compact quick and simple integrable conditioning systems.

Technology

The precise proportional temperature control in combination with the long-lasting hot-gas bypass system and the innovative corrosion resistant heat exchangers achieves low extremely constant dew points. Also load fluctuations and high thermal stress is compensated reliably. The hydrophobic corrosion resistant PTFE coating and the very short retention time in the heat exchanger ensure a lowest possible gas dissolution rate.

Functions

An electronic system controls dew point and cooling air temperature. Potential free alarm contacts allow remote monitoring of the device. The operating parameters are stored in a log book for diagnosis. An operation hours counter controls the service intervals.

- ✓ High performance compressor cooler
- ✓ For mobile applications
- ✓ Long lasting hot-gas bypass system without switching the compressor
- ✓ Corrosion resistant PTFE / PVDF heat exchanger
- ✓ Very compact design
- ✓ Digital display for temperature, alarms, logbook, operating hours counter and service interval indication
- ✓ Modular upgradeable
- ✓ 1 - 2 gas paths
- ✓ Integrable filters, flow meters, flow alarms, liquid sensors, gas pumps, pre-separators und acid dosing





Technical Data

Model			
Type		MAK10-1	MAK10-2
Part number		MAK10-1101-8-00-F	MAK10-2202-8-00-F
Number of gas paths		1	2
Number of condensate pumps		1	2
Number of pre-separators		0	
Docking Station		-	
Material of gas paths			
Cooling transmission / storage		aluminium tube / copper rod	
Cooling surface		PTFE coating	
Housing / sealings		PVDF / FPM	
Operating data			
Gas flow $V_n^{(1)}$ at 65°C dp	l/hr	1 x 125	2 x 125
Gas flow $V_n^{(1)}$ at 55°C dp	l/hr	1 x 175	2 x 175
Gas inlet temperature	°C	max. 140	
Ambient temperature	°C	+5 to +45	
Operating pressure	bar	0,2 to 2,2	
Outlet dew point ¹⁾	°C	3,0 ± 0,3 at constant conditions	
Dead space per gas path	ml	26	
Ready for start up	min	< 5	< 10
Cooling capacity	KJ/hr	792	
Design data			
Dimensions (W x H x D)	mm	310 x 266 x 321	
Weight without options	kg	16,0	18,0
Housing		wall mounting (19" - rack and mobile optional) / RAL 7035	
Connections		gas: PVDF DN 4/6 / condensate: PVDF DN 4/6	
Electrical data			
Mains connection		plug	
Digital display		temperature (outlet dew point resp. ambient), operating status, alarm and alarm storage, service control, operating hours, condensate pump control	
Alarm set-points	°C	< +2.0 / > +10.0	
Protection rate		IP 20 EN 60529 / EN 61010	
Conformity		CE /cMETus	
Power supply		230V 50/60Hz or 115V 50/60Hz	
Power consumption	W	170 - 195	

¹⁾ at 25°C ambient temperature
dp = inlet dew point

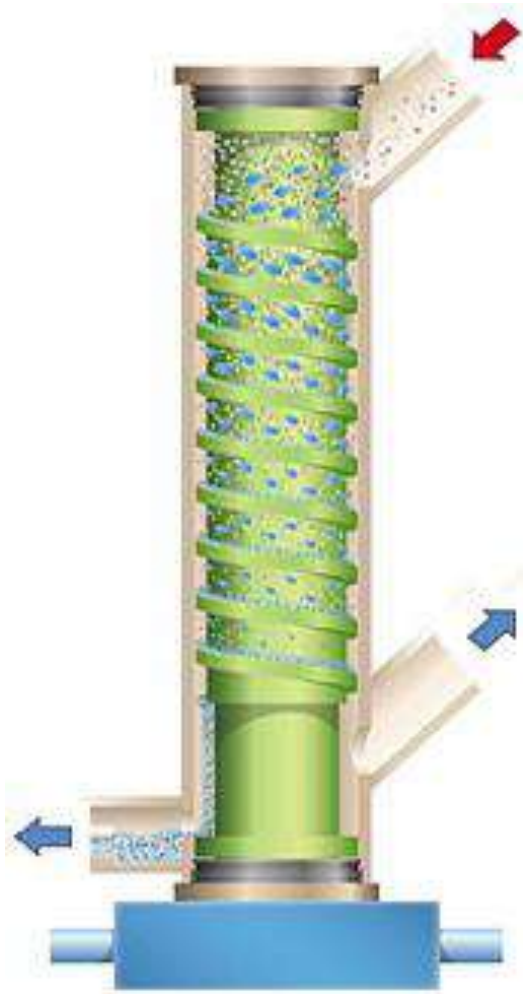
Options

- Condensate pump
- PTFE or glass fibre depth filter, length 70mm or 90mm
- Sample gas pump N86 IP00 or IP20
- Flow meter for max. 150 or 250 or 500 l/h
- Flow meter with light barrier and electronic
- Liquid sensor internal or external incl. electronic
- Pre-separator incl. condensate pump
- Acid dosing incl. condensate pump
- Docking Station
- Voltage 115V 50/60Hz

Due to the large number of options a big variety of individual configurations of the MAK10 is possible. Basically devices with 3-4 condensate pumps, 1-2 sample gas pumps, 2 filters and 2 flow meters need additionally always the docking station. Thereby the housing width changes from 310mm to 449mm. For your individual configuration of a MAK10 please contact our sales team.



MAK10 Heat-Exchanger System



More efficiency, no energy losses, even at high ambient temperatures

- ✓ Coldness transfer through copper and aluminium
- ✓ Best thermal conductance values 300/204 W/m²K
- ✓ Coldness transferred from the inside outwards
- ✓ Extremely compact design
- ✓ Optimal shielding from the environment

High and constant dryness rate even at extreme load changes

- ✓ PTFE-coated, hydrophobic surface
- ✓ Immediate formation of large condensate droplets
- ✓ Spiral performing stream goes downwards
- ✓ Consistent use of gravity
- ✓ Discharge of condensate at the lowest point
- ✓ Inner copper rod as cold storage

Exceptionally low gas dissolution rates enable accurate analysis

- ✓ Very low dead volume
- ✓ Extremely short retention time of the gas in the system
- ✓ Small heat-exchanger surface
- ✓ Rapid saturation of the surface
- ✓ Reduced response-time of gas to condensate
- ✓ Minimized contact surface of sample gas and condensate
- ✓ On three sides evacuated condensate spiral stream
- ✓ Coating reduces electrostatics

Reliability and sustainability reduce time and efforts for maintenance

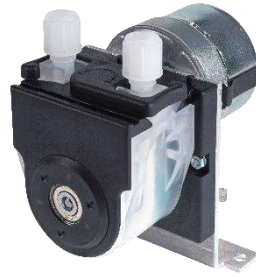
- ✓ Exchangeable heat-exchangers
- ✓ Optimum chemical resistance
- ✓ No abrasive wear-out
- ✓ Self-cleaning effects, no contamination
- ✓ Maintenance-free system
- ✓ Proven and safe technology
- ✓ Monitored quality
- ✓ More than 10.000 systems in successful operation



Integrated components / options

Condensate pump

- ✓ Reliable continuous condensate removal
- ✓ Low rotation speed, long lasting pump tube



Condensate pre-separator

- ✓ Separation of free condensate and solid particles
- ✓ Sample gas pre-cooling for inlet dew points >65°C



PTFE or glass fibre depth filter

- ✓ Reliable filtration of solid particles
- ✓ Quick and simple filter change



Flow meter

- ✓ Exact dosing, with fine adjustment needle valve
- ✓ Optional with light barrier



Liquid sensor

- ✓ Protects against condensate break through
- ✓ Reliable detection of smallest amounts of liquid



Electronic

- ✓ Control / alarm for liquid sensors / light barriers
- ✓ Potential free switch contact

Sample gas pump

- ✓ Pure pumping of sample gases
- ✓ Perfect integration in the sample gas cooler





Compact sample gas conditioning MAK20

Application

The compact sample gas treatment systems of the MAK 20 series are used for drying sample gases to exclude condensation in the analyzers. Stable dew points of less than 3°C can be guaranteed even with highly fluctuating volume flows with different humidity contents. Volumetric errors or errors caused by H₂O cross sensitivity of analysis methods are thus largely eliminated. The MAK 20 series is also characterized by an optimized JET heat exchanger system in that the leaching of water-soluble gases such as SO₂ is reduced to a minimum, which leads to a significant improvement in the analysis results.

Technology

The precise proportional temperature control in combination with the long-lasting hot gas bypass system and the innovative corrosion-resistant heat exchangers achieves low, extremely constant dew points. Load fluctuations and high thermal loads are also reliably compensated. The hydrophobic surface and the very short residence time of the gas in the heat exchanger ensure the lowest possible gas solubility rates.

Functions

An electronic system monitors dew point and cooling air temperature. Potential-free alarm contacts enable remote monitoring of the device. The operating parameters are stored in a logbook for diagnostics. An operating hour counter monitors the service intervals.

- ✓ Optimized jet stream heat exchanger principle
- ✓ Lowest leaching of measurement gases
- ✓ Powerful compressor cooler with 792 KJ / h cooling capacity
- ✓ The heat exchanger can be changed without opening the housing
- ✓ Gas flow 1 x 150 l / h, 2 x 150 l / h or 1 x 250 l / h (by connecting the heat exchangers in series)
- ✓ Long-lasting hot gas bypass system without switching the compressor
- ✓ Corrosion-resistant PVDF heat exchangers
- ✓ compact design
- ✓ digital display for temperature, alarms, logbook, operating hour counter and service interval display
- ✓ Potential-free contacts for operational monitoring, alarm and moisture breakthrough
- ✓ JET heat exchanger in BCR sample gas cooler also available for ATEX Zone II





Model							
Type		MAK20-1	MAK20-2	MAK20-3	MAK20-4	MAK20-1 PS	MAK20-2 PS
Article		MAK20-1101-4-00-F	MAK20-1202-4-00-F	MAK20-2303-5-00-F	MAK20-2404-5-00-F	MAK20-1112-5-00-F	MAK20-1224-5-00-F
Number of gas paths		1	2 (1)*	3	4 (2)*	1	2
Number of condensate pumps		1	2	3	4	2	4
Number of pre-separators		0	0	0	0	1	2
Docking Station		-	-	yes	yes	yes	yes
Material of the gas path							
Refrigeration Transfer / Memory		Aluminum insert / copper pipe					
Cooling surface		PVDF					
Enclosures / Seals		PVDF / Viton					
Operating							
gas flow rate Vn1) at 60°C Tp	l/h	1 x 150	2 x 150 or 1 x 250*	3 x 150	4 x 150 or 2 x 250*	1 x 150	2 x 150 or 1 x 250*
Gas temperature at the entrance	°C	max. 140					
Ambient temperature	°C	+5 to +50					
Pressure	bar	0,2 to 2,2					
Gas dew point at the outlet1)	°C	3,0 ± 0,3 under constant conditions					
Dead volume per gas path	ml	27					
Operational readiness	min	< 5	< 10	< 15	< 15	< 5	< 10
Cooling	KJ/h	792					
Design data							
Dimensions (W x H x D)	mm	310 x 266 x 321			449 x 266x 321		
Weight without options	kg	19	19,5	21,8	22,3	20,3	20,8
Housing		Wall montage / RAL 9003					
Connections		Gas: PVDF DN 4/6 / Condensate : PVDF DN 4/6					
Electrical data							
Power supply		Power cord					
Digital display		Temperature (output dew point or environment), operating status, alarm and alarm memory, service monitoring, operating hours, condensate pump control					
Alarm limits	°C	< +2.0 / > +10.0					
Enclosure protection type		IP 20 EN 60529 / EN 61010					
Conformity		CE /cMETus					
Power supply		230V 50/60Hz or 115V 50/60Hz					
Power consumption	W	190 - 220		200 - 220		210 - 230	

Technical data

¹⁾ at 25°C ambient temperature

^{*)} by connecting two heat exchangers in row, a higher gas flow is made possible

Tp = input dew point

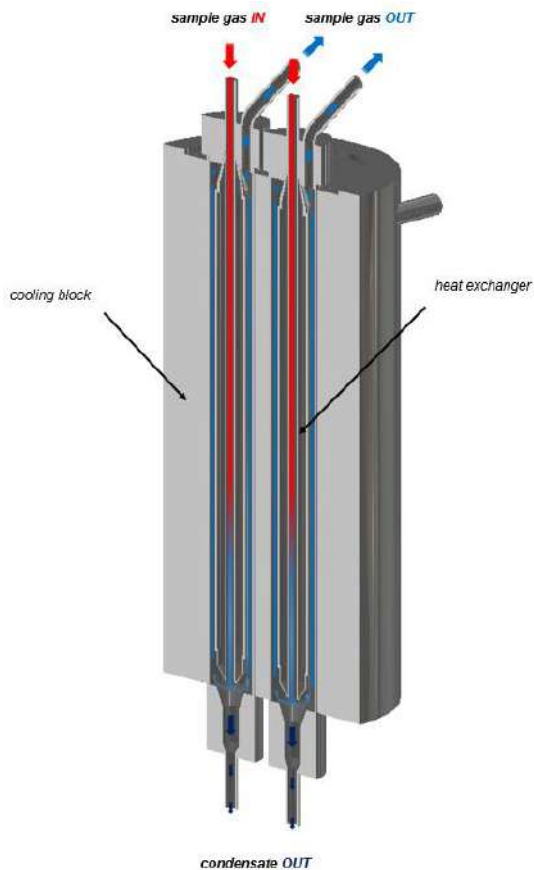
Options

- Condensate pump
- Glass fibre or PTFE-filter, length 70 mm
- Sample gas pump N86 IP00
- Flow meter for max. 150 or 250 l/h
- Flow meter with light barrier and evaluator electronics
- Humidity sensor internally or externally incl. evaluating electronics
- Pre-separator incl. condensate pump (only with docking station)
- Acid dosing incl. condensate pump
- Docking Station
- Voltage 115V 50/60Hz

Due to the large number of options, a variety of individual configurations of the MAK20 are possible. Basically, devices with 3-4 heat exchangers, 3-4 condensate pumps, 1-2 sample gas pumps, 2 filters and 2 flow meters, 1-2 pre-separators always require the docking station. This changes the device width from 310mm to 449mm. For a specific configuration of a MAK20, please contact our sales team in Erkelenz.



MAK20 Heat Exchanger – System



More efficiency, no energy losses, even at high ambient temperatures

- ✓ Refrigeration transmission by copper and aluminium
- ✓ Proven jet-stream operating principle
- ✓ Compact design
- ✓ Optimal shielding against the environment

High and constant drying rate even in extreme load fluctuation

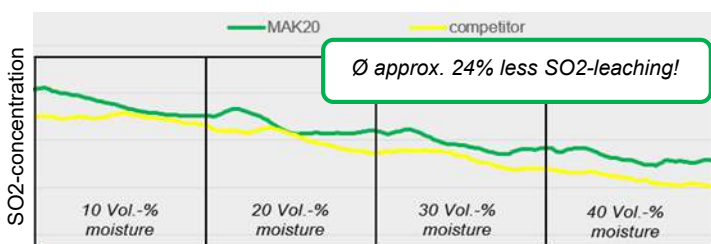
- ✓ Hydrophobic surface
- ✓ Consistent use of gravity
- ✓ Immediate dissipation of the condensate from the gas stream

Exceptionally low gas solubility rates enable accurate analysis

- ✓ Very low dead volume
- ✓ Extremely short residence time of the gas in the system
- ✓ Reduced reaction time of the gas to the condensate

Reliability and long-term stability reduce maintenance and costs

- ✓ Alternating heat exchanger
- ✓ Very good chemical resistance
- ✓ No abrasive wear
- ✓ Self-cleaning effect, no contamination
- ✓ Maintenance-free system
- ✓ Proven and safe technology
- ✓ Monitored quality



moisture content of the measuring gas



MAK20 Model examples

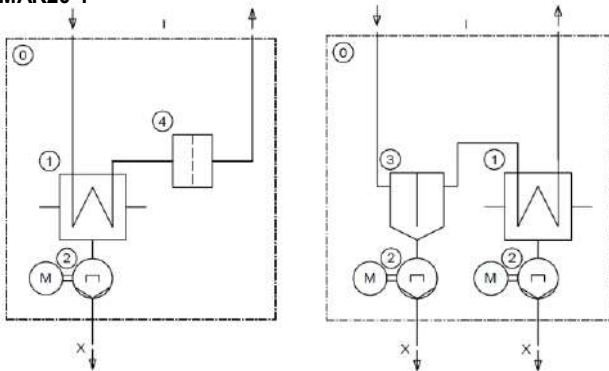
MAK20-2

- ✓ 2 heat exchanger PVDF
- ✓ 2 gas paths (2 x 150 l/h or 1 x 250 l/h)
- ✓ 2 condensate pumps
- ✓ 1 MAK- alarm contact

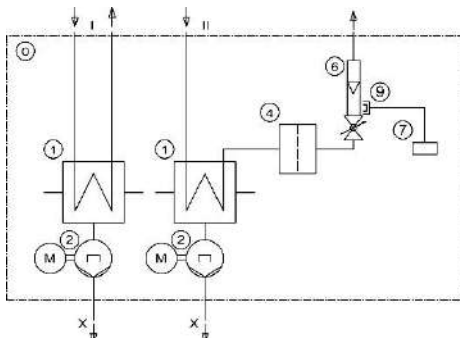


Configuration examples

MAK20-1



MAK20-2



- ① Heat exchanger
- ② Condensate pump
- ③ condensate pre-separator
- ④ Depth filter
- ⑤ gas pump
- ⑥ Flow meter
- ⑦ quality electronics
- ⑧ humidity monitors
- ⑨ light barrier flow monitoring



Integrated Components / Options

Condensate pump

- ✓ Reliable continuous condensate disposal
- ✓ Low speed, long-lasting pump hose



Condensate pre-separator

- ✓ Deposition of free condensate and solids
- ✓ Measuring gas pre-cooling for input dew points >65°C



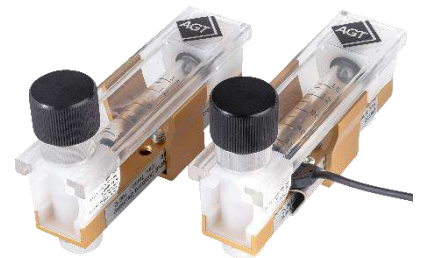
Teflon Depth Filter

- ✓ Reliable solid particle filtration
- ✓ Easy and fast filter element change



Flow meter

- ✓ optional with light barrier
- ✓ Precise dosing, with needle fine regulating valve



Humidity guards

- ✓ Protects against condensate breakthrough
- ✓ Safe detection of even the smallest amounts of liquid



Evaluator electronics

- ✓ Control / Alarm for humidity sensors / light barrier
- ✓ Potential-free switching contact



Sample gas pump

- ✓ Unadulterated conveying of measuring gases
- ✓ Perfect integration into the cooler





PSG[®]
Perfect Sample Gas



Compact Gas Conditioning MAK10-Peltier

Application

The compact gas conditioning systems series **MAK10-Peltier** are used for continuous extractive gas analysis. They serve primarily for exact constant lowering of the sample gas dew point and thus for drying of the humid sample gas flow. In this way water vapour cross sensitivities and volumetric errors are minimized and damages of the sensible analyzer are avoided. With optional components like condensate pumps, pre-separators, filters, liquid sensors, flow meters and sample gas pumps devices of series **MAK10-Peltier** can be upgraded to complete compact quick and simple integrable conditioning systems. The flexible modular design guarantees an optimum adaption to every measuring task.

Technology

The precise temperature control with pulse width modulation in combination with the innovative corrosion resistant heat exchangers achieves low extremely constant dew points. Also load fluctuations and high thermal stress is compensated reliably. The hydrophobic corrosion resistant PTFE coating and the very short retention time in the heat exchanger ensure a lowest possible gas dissolution rate.

Functions

An electronic system controls dew point and cooling air temperature. Potential free alarm contacts allow remote monitoring of the device. Operating parameters are stored for diagnosis in a log. An operation hours counter controls the service intervals. Available housing versions are wall mounting housing, 19"-rack housing and very light-weight mobile versions with carrying handles. The mobile version with optional aluminium housing is especially light-weight.

- ✓ High performance peltier-cooler with two long lasting peltier-elements
- ✓ Precise outlet dew point even at significant load variations
- ✓ Corrosion resistant PTFE / PVDF heat exchanger
- ✓ Very compact design
- ✓ Digital display for temperature, alarms, logbook, operating hours counter and service interval indication
- ✓ Modular upgradeable and application dependently configurable
- ✓ 1 - 2 gas paths
- ✓ Integrable filters, flow meters, flow alarms, liquid sensors, gas pumps, pre-separators und acid dosing
- ✓ Wall mounting, 19"-rack, or mobile housing





Technical Data

Model					
Type		MAK10P-1	MAK10P-1 PS1	MAK10P-2	MAK10P-2 PS1
Part number		MAK10P-1101-4-00-F	MAK10P-1112-4-00-F	MAK10P-2502-4-00-F	MAK10P-2513-5-00-F
Number of gas paths		1		2	
Number of condensate pumps		1		2	3
Number of pre-separators		0	1	0	1
Docking Station		-	-	-	ja
Material of gas paths					
Cooling transmission / storage		aluminium-tube / block		aluminium- block	
Cooling surface		PTFE-coating		PVDF	
Housing / sealings		PVDF / FPM		PVDF	
Operating data					
Gas flow $V_n^{1)}$ at 65°C dp	l/hr	1 x 110	1 x 125	2 x 70	2 x 85
Gas flow $V_n^{1)}$ at 55°C dp	l/hr	1 x 150	1 x 170	2 x 90	2 x 110
Gas inlet temperature	°C	max. 140			
Ambient temperature	°C	+5 to +45			
Operating pressure	bar	0,2 to 2,2			
Outlet dew point ¹⁾	°C	3,0 ± 0,3 at constant conditions			
Dead space per gas path	ml	26		55	
Ready for start up	min	< 15			
Cooling capacity	KJ/hr	peltier-elements with modulating power supply: 2 x 124			
Design data					
Dimensions (W x H x D)	mm	310 x 266 x 321			449 x 266 x 321
Weight without options	kg	9,5	10,0	12,0	14,0
Housing		wall mounting (19"- rack and mobile optional) / RAL 7035			
Connections		gas: PVDF DN 4/6 / condensate: PVDF DN 4/6			
Electrical data					
Mains connection		plug			
Digital display		temperature (outlet dew point resp. ambient), operating status, alarm and alarm storage, service control, operating hours, condensate pump control			
Alarm set-points	°C	< +2.0 / > +10.0			
Protection rate		IP 20 EN 60529 / EN 61010			
Conformity		CE			
Power supply		230V 50/60Hz or 115V 50/60Hz			
Power consumption	W	170 - 180			

¹⁾ at 25°C ambient temperature
dp = inlet dew point

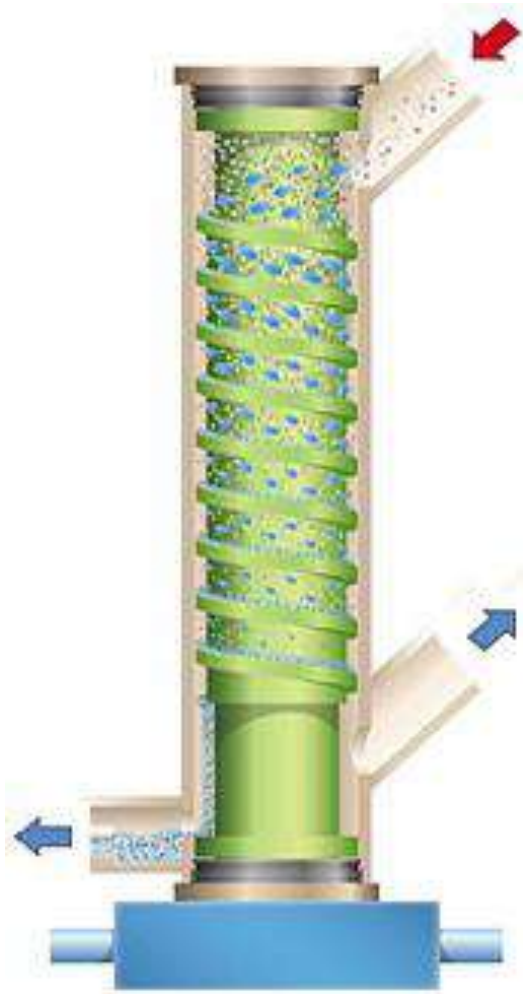
Options

- Condensate pump
- PTFE or glass fibre depth filter, length 70mm or 90mm
- Sample gas pump N86 IP00 or IP20
- Flow meter for max. 150 or 250 or 500 l/h
- Flow meter with light barrier and electronic
- Liquid sensor internal or external incl. electronic
- Pre-separator incl. condensate pump
- Acid dosing incl. condensate pump
- Docking Station
- 19"-rack
- Portable housing
- Voltage 115V 50/60H

Due to the large number of options a big variety of individual configurations of the MAK10P is possible. Basically devices with 3-4 condensate pumps, 1-2 sample gas pumps, 2 filters and 2 flow meters need additionally always the docking station. Thereby the housing width changes from 310mm to 449mm. For your individual configuration of a MAK10P please contact our sales team in Erkelenz.



MAK10 Heat-Exchanger System



More efficiency, no energy losses, even at high ambient temperatures

- ✓ Coldness transfer through aluminium
- ✓ Good thermal conductance 204 W/m²K
- ✓ Double sided cold transfer with 2 peltier elements
- ✓ Extremely compact design
- ✓ Optimal shielding from the environment

High and constant dryness rate even at extreme load variations

- ✓ PTFE-coated, hydrophobic surface
- ✓ Immediate formation of large condensate droplets
- ✓ Spiral performing condensate stream goes downwards
- ✓ Consistent use of gravity
- ✓ Discharge of condensate at the lowest point
- ✓ Copper core and block as cold storage

Exceptionally low gas dissolution rates enable accurate analysis

- ✓ Very low dead volume
- ✓ Extremely short retention time of the gas in the system
- ✓ Small heat-exchanger surface
- ✓ Rapid saturation of the surface
- ✓ Reduced response-time of gas to condensate
- ✓ Minimized contact surface of sample gas and condensate
- ✓ On three sides evacuated condensate spiral stream
- ✓ Coating reduces electrostatics

Reliability and sustainability reduce time and efforts for maintenance

- ✓ Exchangeable heat-exchangers
- ✓ Optimum chemical resistance
- ✓ No abrasive wear-out
- ✓ Self-cleaning effects, no contamination
- ✓ Maintenance-free system
- ✓ Proven and safe technology
- ✓ Monitored quality
- ✓ More than 10.000 systems in successful operation



MAK10-Peltier Model Examples

MAK10P-1

- ✓ 1 heat exchanger PTFE / PVDF
- ✓ 1 gas path (1 x 150 l/hr)
- ✓ 1 condensate pump
- ✓ 1 MAK-alarm contact



MAK10P-1 with pre-separator

- ✓ 1 heat exchanger PTFE / PVDF
- ✓ 1 gas path (1 x 170 l/h)
- ✓ 1 pre-separator
- ✓ 2 condensate pumps
- ✓ 1 depth filter
- ✓ 1 flow meter
- ✓ 1 sample gas pump
- ✓ 1 MAK alarm contact



MAK10P-2 with docking station

- ✓ 1 heat exchanger dual PVDF
- ✓ 2 gas paths (2 x 90 l/h)
- ✓ 2 condensate pumps
- ✓ 2 depth filters
- ✓ 2 liquid sensors with electronic
- ✓ 1 MAK- / 2 sensor alarm contacts



MAK10P-2 19"-rack version

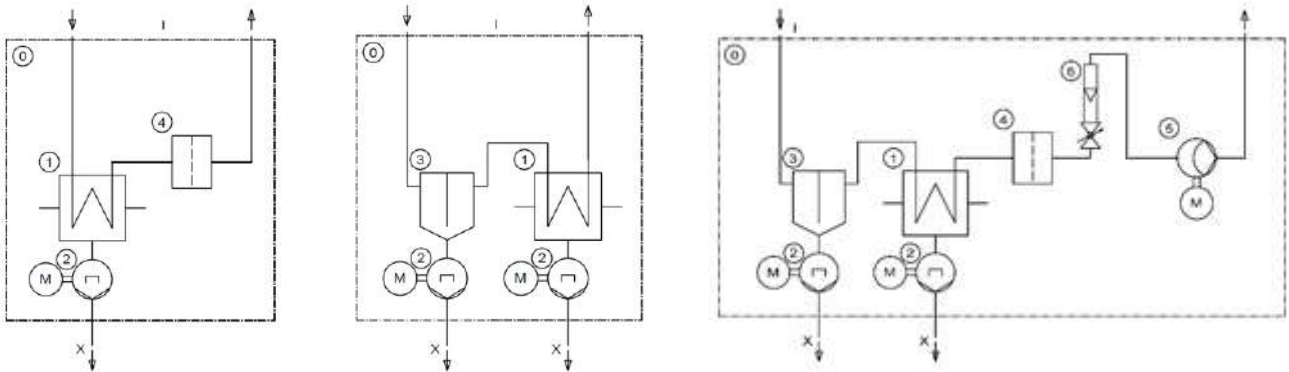
- ✓ 2 heat exchangers PTFE / PVDF
- ✓ 2 gas paths (2 x 150 l/h)
- ✓ 2 condensate pumps
- ✓ 1 depth filter
- ✓ 1 liquid sensor and electronic
- ✓ 1 flow meter
- ✓ 1 MAK- / 1 sensor alarm contact



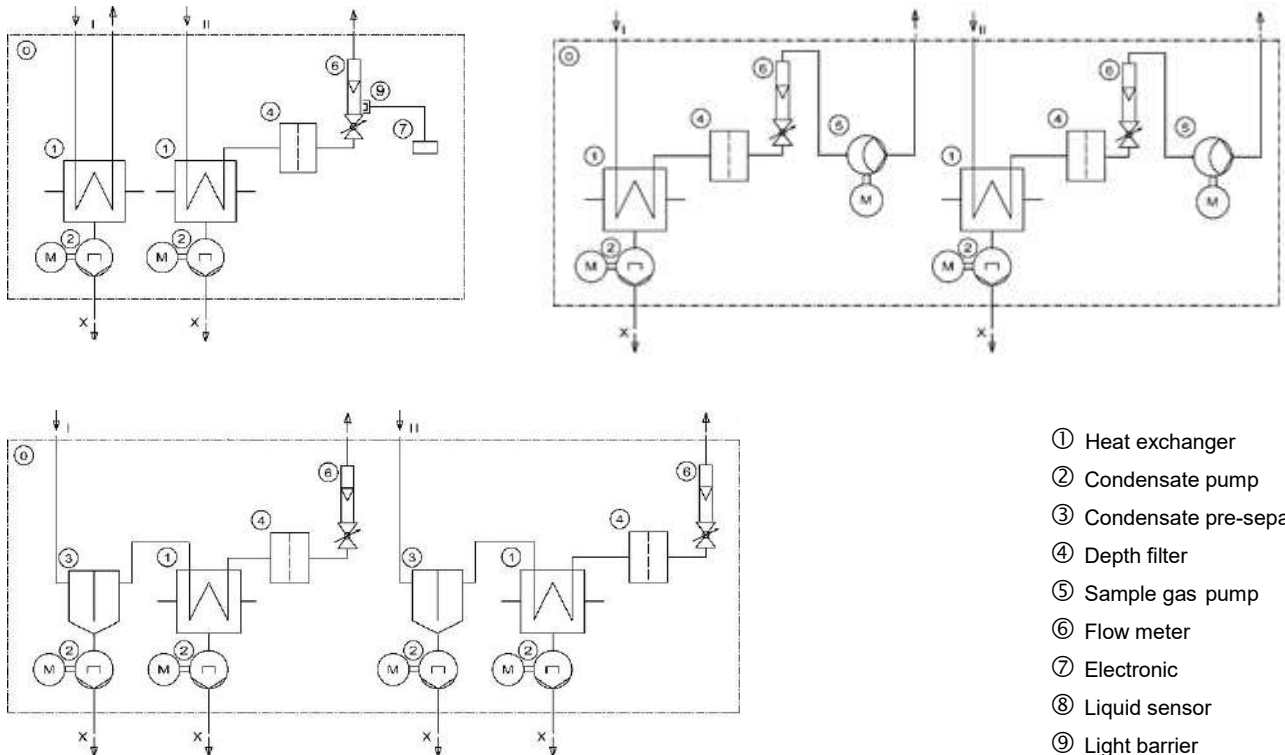


Configuration examples

MAK10P-1



MAK10P-2





Integrated components / options

Condensate pump

- ✓ Reliable continuous condensate removal
- ✓ Low rotation speed, long lasting pump tube



Condensate pre-separator

- ✓ Separation of free condensate and solid particles
- ✓ Sample gas pre-cooling for inlet dew points >65°C



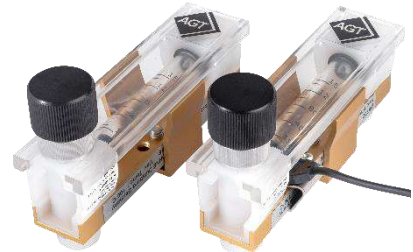
PTFE or glass fibre depth filter

- ✓ Reliable filtration of solid particles
- ✓ Quick and simple filter change



Flow meter

- ✓ Exact dosing, with fine adjustment needle valve
- ✓ Optional with light barrier



Liquid sensor

- ✓ Protects against condensate break through
- ✓ Reliable detection of smallest amounts of liquid



Electronic

- ✓ Control / alarm for liquid sensors / light barriers
- ✓ Potential free switch contact

Sample gas pump

- ✓ Pure pumping of sample gases
- ✓ Perfect integration in the sample gas cooler





Mobile Thermoelectric Sample Gas Cooler MAK10-Nomad

Application

The mobile sample gas coolers series **MAK10-Nomad** are used for extractive gas analysis and can be integrated with the **MET-Nomad** to complete a mercury backup monitoring system. They serve primarily for exact constant lowering of the sample gas dew point and thus for drying of the humid sample gas flow. In this way water vapour cross sensitivities and volumetric errors are minimized and damages of the sensible analyzers are avoided. With optional HVAC system the **MAK10-Nomad** is suitable also for extreme conditions.

Technology

The precise temperature control with pulse width modulation in combination with the innovative corrosion resistant heat exchangers achieves low extremely constant dew points. Also load fluctuations and high thermal stress is compensated reliably.

Functions

An electronic display unit for performance feedback controls dew point and cooling air temperature. Potential free alarm contacts allow remote monitoring of the device. Operating parameters are stored for diagnosis in a log. An operation hours counter controls the service intervals.

- ✓ High performance thermoelectric cooler with two long lasting peltier-elements
- ✓ Precise outlet dew point even at significant load variations
- ✓ Corrosion resistant dual path PVDF heat exchanger
- ✓ Very compact design
- ✓ Digital display for temperature, alarms, logbook, operating hours counter and service interval indication
- ✓ Integrated with the MET-Nomad
- ✓ Same footprint as the MET-Nomad
- ✓ Out-of-range temperature alarm
- ✓ Integrated peristaltic pumps
- ✓ Optional HVAC system





Technical Data

Model		
Type		MAK10-Nomad
Part number		MAK10-Nomad-2502-4-00-F
Number of gas paths		2
Number of condensate pumps		2
Material of gas paths		
Cooling transmission / storage		aluminium-block
Cooling surface		PVDF
Housing / sealings		PVDF
Operating data		
Max. gas flow per gas path	l/hr	180
Gas inlet temperature	°C	max. 140
Ambient temperature	°C	+5 to +40
Operating pressure	bar	0,2 to 2,2
Outlet dew point ¹⁾	°C	3,0 ± 0,3 at constant conditions
Dead space per gas path	ml	55
Ready for start up	min	< 15
Cooling capacity	KJ/hr	peltier-elements with modulating power supply: 2 x 124
Design data		
Dimensions (W x H x D)	mm	460 x 480 x 180
Weight without options	kg	approx. 15
Housing		portable hard plastic case
Connections		gas: PVDF DN 4/6 / condensate: PVDF DN 4/6
Electrical data		
Mains connection		plug
Digital display		temperature (outlet dew point resp. ambient), operating status, alarm and alarm storage, service control, operating hours, condensate pump control
Alarm set-points	°C	< +2.0 / > +10.0
Power supply		230V 50/60Hz or 115V 50/60Hz
Power consumption	W	170 - 180

¹⁾ at 25°C ambient temperature

Options

- HAVAC system



Sample Gas Compressor Cooler

MAK 6

Application

The high performance and low maintenance compressor coolers series **MAK 6** are used for continuous extractive gas analysis. They serve primarily for exact constant lowering of the sample gas dew point and thus for drying of the humid sample gas flow. In this way water vapour cross sensitivities and volumetric errors are minimized and damages of the sensible analyzer are avoided. The MAK 6 series are long-standing proven and robust refrigerated coolers rolled-out in 1995 and still available within the scope of our special plant manufactory.

Technology

The precise proportional temperature control in combination with the long-lasting hot-gas bypass system and the innovative corrosion resistant heat exchangers achieves low extremely constant dew points. Also load fluctuations and high thermal stress is compensated reliably. The two mono or dual heat exchangers with one or two gas paths each are built in a solid aluminium cylinder which guarantees an optimal energy exchange between sample gas and cooling medium. In addition, the aluminum cylinder is an effective cold storage that supports the compensation of unfavorable operating conditions. The **MAK 6** is equipped with exchangeable heat exchangers which allows an easy replacement without dismantling the device.

Functions

The cooling system is filled with FCKW-free refrigerant R134a. As heat-exchanger materials PVDF, glass or stainless-steel are available. The sample gas cooler is equipped with a digital display for temperature monitoring and with a potential-free alarm contact. Two brackets allow a quick and easy wall mounting of the device.

- ✓ High performance compressor cooler
- ✓ 1 – 4 gas paths
- ✓ High performance heat exchangers
- ✓ Long-lasting hot-gas bypass system without switching the compressor
- ✓ Corrosion resistant easy to change PTFE / PVDF, stainless steel or glass heat exchanger
- ✓ Tendency or digital display for temperature and alarm
- ✓ Alarm contact
- ✓ Wall mounting housing





Technical data

MAK6						
Type		MAK 6 Mini	MAK 6-1	MAK 6-2	MAK 6-3	MAK6-4
Gas paths		1	1	2	3	4
Heat exchanger		1 x Mono	1 x Mono	2 x Mono	3 x Mono	2 x Dual
Heat exchanger material		PVDF				
Gas flow V _n ¹⁾	l/hr	1 x 100	1 x 250	2 x 250	3 x 250	4 x 100
Gas inlet temperature	°C	140				
Operating pressure max.	bar	2,5				
Heat exchanger material		Stainless steel SS316Ti				
Gas flow V _n ¹⁾	l/hr	1 x 110	1 x 500	2 x 500	3 x 500	4 x 200
Gas inlet temperature	°C	180				
Operating pressure max.	bar	100				
Heat exchanger material		Glass				
Gas flow V _n ¹⁾	l/hr	1 x 110	1 x 300	2 x 300	3 x 300	-
Gas inlet temperature	°C	180				
Operating pressure max.	bar	2,0				
Ambient temperature	°C	+5 to +45				
Gas outlet dew point ¹⁾	°C	3,0 ± 0,5				
Dead volume per gas path	ml	137			70	
Ready for start up	min	10				
Design data						
Dimensions (W x H x D)	mm	247x298x272	290x366x355		290x422x341	290x366x355
Weight	kg	13,0	19,0	21,0	25,0	21,0
Housing		w all mounting / RAL 7035				
Gas / condensate connections		DN 4/6 / condensate outlet at bottom D12				
Electrical data						
Power supply		230V 50/60 Hz or 115V 50/60Hz				
Temperature display		tendency display or optional digital display				
Alarm set-points	°C	< +2.0 / > +10.0				
Protection rate		IP 20 EN 60529 / EN 61010				
Power consumption	W	120 - 140	280 - 315	280 - 315	300 - 335	280 - 315
Alarm contact		potential free				

¹⁾ at inlet dew point 65°C and 25°C ambient temperature

MAK 6 Mini





Sample Gas Compressor Cooler BCR01

Application

The compact high performance and low maintenance compressor coolers series **BCR01** are used for continuous extractive gas analysis. They serve primarily for exact constant lowering of the sample gas dew point and thus for drying of the humid sample gas flow. In this way water vapour cross sensitivities and volumetric errors are minimized and damages of the sensible analyzer are avoided. With optional integrated peristaltic pump for condensate removal complete devices series **BCR01** are quick and simple integrable in sample gas conditioning systems.

Technology

The precise proportional temperature control in combination with the long-lasting hot-gas bypass system and the innovative corrosion resistant heat exchangers achieves low extremely constant dew points. Also load fluctuations and high thermal stress is compensated reliably. The heat exchanger is built in a solid aluminium cylinder which guarantees an optimal energy exchange between sample gas and cooling medium. In addition, the aluminum cylinder is an effective cold storage that supports the compensation of unfavorable operating conditions. The **BCR01** is equipped with an exchangeable heat exchanger which allows an easy replacement without dismantling the device.

Functions

The cooling system is filled with FCKW-free refrigerant R134a. As heat-exchanger materials PVDF, glass or stainless-steel are available. The sample gas cooler is equipped with a digital display for temperature monitoring and with a potential-free alarm contact. Two brackets allow a quick and easy wall mounting of the device. Even mobile versions of the **BCR01** with handle are available.

- ✓ High performance compressor cooler
- ✓ 1 gas path
- ✓ High performance heat exchanger
- ✓ Long-lasting hot-gas bypass system without switching the compressor
- ✓ Corrosion resistant easy to change PTFE / PVDF, stainless steel or glass heat exchanger
- ✓ Very compact design
- ✓ Digital display for temperature and alarm
- ✓ Alarm contact
- ✓ Integrated condensate pump optionally
- ✓ Wall mounting or portable housing





Sample Gas Compressor Cooler BCR02

Application

The compact high performance and low maintenance compressor coolers series **BCR02** are used for continuous extractive gas analysis. They serve primarily for exact constant lowering of the sample gas dew point and thus for drying of the humid sample gas flow. In this way water vapour cross sensitivities and volumetric errors are minimized and damages of the sensible analyzer are avoided. With optional integrated peristaltic pumps for condensate removal complete devices series **BCR02** are quick and simple integrable in sample gas conditioning systems.

Technology

The precise proportional temperature control in combination with the long-lasting hot-gas bypass system and the innovative corrosion resistant heat exchangers achieves low extremely constant dew points. Also load fluctuations and high thermal stress is compensated reliably. The mono or dual heat exchanger with one or two gas paths is built in a solid aluminium cylinder which guarantees an optimal energy exchange between sample gas and cooling medium. In addition, the aluminum cylinder is an effective cold storage that supports the compensation of unfavorable operating conditions. The **BCR02** is equipped with an exchangeable heat exchanger which allows an easy replacement without dismantling the device.

Functions

The cooling system is filled with FCKW-free refrigerant R134a. As heat-exchanger materials PVDF, glass or stainless-steel are available. The sample gas cooler is equipped with a digital display for temperature monitoring and with a potential-free alarm contact. Two brackets allow a quick and easy wall mounting of the device. Even mobile versions of the **BCR02** with handle are available.

- ✓ High performance compressor cooler
- ✓ 1 - 2 gas paths
- ✓ High performance heat exchanger
- ✓ Long-lasting hot-gas bypass system without switching the compressor
- ✓ Corrosion resistant easy to change PTFE / PVDF, stainless steel or glass heat exchanger
- ✓ Compact design
- ✓ Digital display for temperature and alarm
- ✓ Alarm contact
- ✓ Integrated condensate pumps optionally
- ✓ Wall mounting or portable housing





Technical data

BCR02						
Gas paths		1			2	
Heat exchanger		Mono			Dual	
Heat exchanger material		PVDF	Glass	SS316	PVDF	SS316
Gas flow V _n ¹⁾	l/hr	180	200	350	2 x 90	2 x 150
Gas inlet dew point	°C	65	65	80	65	80
Gas inlet temperature max.	°C	140	160	180	140	180
Ambient temperature	°C	+5 to +45				
Operating pressure with condensate pump	bar	0,2 – 2,2	0,2 – 2,0		0,2 – 2,2	
Operating pressure without condensate pump	bar	2,5	2,0	100,0	2,5	2,5
Gas outlet dew point	°C	3,0 ± 0,5				
Dead volume per gas path	ml	67	98	67	2 x 55	
Ready for start up	min	5				
Cooling capacity	KJ/hr	774				
Design data						
Dimensions (B x H x T) [mm]	mm	230 x 300 x 355				
Weight without options	kg	18,5			19,0	
Housing		wall mounting (rear or side panel) / mobile (with handle) / RAL 7035				
Gas / condensate connections		DN 4/6 / without integrated peristaltic pump condensate outlet at bottom D12				
Electrical data						
Power supply		230V 50/60 Hz or 115V 50/60Hz				
Temperature display		digital				
Alarm set-points	°C	< +2.0 / > +10.0				
Protection rate		IP 20 EN 60529 / EN 61010				
Power consumption	W	190 at 230VAC – start-up current 6,3A				
Alarm contact		250V AC / 1,5A / 375VA				

¹⁾ at standard conditions, dew point 65°C inlet temperature, 10-25°C ambient temperature

Order numbers

Gas paths	Mono			1																	
	Dual			2																	
Heat exchanger material	PVDF																				
	SS316																				
	Glass																				
Integrated condensate pumps	without		2																		
	with one		1																		
	with two		1																		
Housing	wall mounting																			1	
	portable																			4	
Power supply	230V 50/60Hz																				F
	115V 50/60Hz																				B
Order number	BCR02 –																				



BCR02 portable, with on/off switch and fuse on front plate

Order example : **BCR02-2120-1-00-F** → Sample gas compressor cooler **BCR02** with mono heat exchanger made of SS316, without integrated condensate pump, condensate connection at bottom D12, in wall mounting housing and with power supply 230V 50/60Hz



Sample Gas Compressor Cooler BCR03

Application

The high performance and low maintenance compressor coolers series **BCR03** are used for continuous extractive gas analysis. They serve primarily for exact constant lowering of the sample gas dew point and thus for drying of the humid sample gas flow. In this way water vapour cross sensitivities and volumetric errors are minimized and damages of the sensible analyzer are avoided. With optional integrated peristaltic pumps for condensate removal complete devices series **BCR03** are quick and simple integrable in sample gas conditioning systems.

Technology

The precise proportional temperature control in combination with the long-lasting hot-gas bypass system and the innovative corrosion resistant heat exchangers achieves low extremely constant dew points. Also load fluctuations and high thermal stress is compensated reliably. The two mono or dual heat exchangers with one or two gas paths each are built in a solid aluminium cylinder which guarantees an optimal energy exchange between sample gas and cooling medium. In addition, the aluminum cylinder is an effective cold storage that supports the compensation of unfavorable operating conditions. The **BCR03** is equipped with exchangeable heat exchangers which allows an easy replacement without dismantling the device.

Functions

The cooling system is filled with FCKW-free refrigerant R134a. As heat-exchanger materials PVDF, glass or stainless-steel are available. The sample gas cooler is equipped with a digital display for temperature monitoring and with a potential-free alarm contact. Two brackets allow a quick and easy wall mounting of the device.

- ✓ High performance compressor cooler
- ✓ 1 - 4 gas paths
- ✓ High performance heat exchangers
- ✓ Long-lasting hot-gas bypass system without switching the compressor
- ✓ Corrosion resistant easy to change PTFE / PVDF, stainless steel or glass heat exchanger
- ✓ Digital display for temperature and alarm
- ✓ Alarm contact
- ✓ Integrated condensate pumps optionally
- ✓ Wall mounting housing





Technical data

BCR03									
Gas paths		1			2			4	
Heat exchanger		1 x Mono			2 x Mono			2 x Dual	
Heat exchanger material		PVDF	Glas	SS316	PVDF	Glas	SS316	PVDF	SS316
Gas flow V _n ¹⁾	l/hr	250	300	500	2 x 250	2 x 300	2 x 400	4 x 125	4 x 150
Gas inlet dew point	°C	65	70	80	65	70	80	65	80
Gas inlet temperature max.	°C	140	160	180	140	160	180	140	180
Ambient temperature	°C	+5 to +45							
Operating pressure with condensate pump	bar	0,2 – 2,2	0,2 – 2,0	0,2-2,2		0,2-2,0		0,2 – 2,2	
Operating pressure without condensate pump	bar	2,5	2,0	100,0	2,5	2,0	100,0	2,5	100,0
Gas outlet dew point ¹⁾	°C	3,0 ± 0,5							
Dead volume per gas path	ml	67	98	67	2 x 67	2 x 98	2 x 67	4 x 55	
Ready for start up	min	10							
Cooling capacity	KJ/hr	1080							
Design data									
Dimensions (B x H x T)	mm	450 x 300 x 300							
Weight without options	kg	21,0				23,0			
Housing		Wall mounting (rear side) / RAL 7035							
Gas / condensate connections		DN 4/6 / without integrated peristaltic pump condensate connection at bottom D12							
Electrical data									
Power supply		230V 50/60 Hz or 115V 50/60Hz							
Temperature display		digital							
Alarm set-points	°C	< +2.0 / > +10.0							
Protection rate		IP 20 EN 60529 / EN 61010							
Power consumption	W	220 at 230VAC – start-up current 6,3A							
Alarm contact		250V AC / 1,5A / 375VA							

¹⁾ at inlet dew point 65°C and 25°C ambient temperature

Order numbers

Number of heat exchangers		1																	
		2																	
Gas paths	1 x Mono			1															
	2 x Mono			2															
	2 x Dual			4															
Heat exchanger material	PVDF				1														
	SS316				2														
	Glass (only Mono)				3														
Integrated condensate pumps	without																		0
	with one																		1
	with two																		2
	with four																		4
Housing	wall mounting																		1
Power supply	230V 50/60Hz																		F
	115V 50/60Hz																		B
Order number	BCR03 –																		

Order example : **BCR03-2424-1-00-B** → Sample gas compressor cooler **BCR03** with 2 dual heat exchangers made of SS316, with 4 integrated condensate pumps, in wall mounting housing and with power supply 115V 50/60Hz



Sample Gas Compressor Cooler BCR04

Application

The high performance and low maintenance compressor coolers series **BCR04** are used for continuous extractive gas analysis. They serve primarily for exact constant lowering of the sample gas dew point and thus for drying of the humid sample gas flow. In this way water vapour cross sensitivities and volumetric errors are minimized and damages of the sensible analyzer are avoided. With optional integrated peristaltic pumps for condensate removal complete devices series **BCR04** are quick and simple integrable in sample gas conditioning systems.

Technology

The precise proportional temperature control in combination with the long-lasting hot-gas bypass system and the innovative corrosion resistant heat exchangers achieves low extremely constant dew points. Also load fluctuations and high thermal stress is compensated reliably. The two mono or dual heat exchangers with one or two gas paths each are built in a solid aluminium cylinder which guarantees an optimal energy exchange between sample gas and cooling medium. In addition, the aluminum cylinder is an effective cold storage that supports the compensation of unfavorable operating conditions. The **BCR04** is equipped with exchangeable heat exchangers which allows an easy replacement without dismantling the device.

Functions

The cooling system is filled with FCKW-free refrigerant R134a. As heat-exchanger materials PVDF, glass or stainless-steel are available. The sample gas cooler is equipped with a digital display for temperature monitoring and with a potential-free alarm contact. Two brackets allow a quick and easy wall mounting of the device.

- ✓ High performance compressor cooler
- ✓ 1 - 8 gas paths
- ✓ High performance heat exchangers
- ✓ Long-lasting hot-gas bypass system without switching the compressor
- ✓ Corrosion resistant easy to change PTFE / PVDF, stainless steel or glass heat exchanger
- ✓ Digital display for temperature and alarm
- ✓ Alarm contact
- ✓ Integrated condensate pumps optionally
- ✓ Wall mounting housing





Technical data

BCR04						
Gas paths		4			8	
Heat exchanger		1-4 x Mono			1-4 x Dual	
Heat exchanger material		PVDF	Glass	SS316	PVDF	SS316
Gas flow V _n ¹⁾	l/hr	4 x 250	4 x 300	4 x 500	8 x 125	8 x 150
Gas inlet dew point	°C	65	65	80	65	80
Gas inlet temperature max.	°C	140	160	180	140	180
Ambient temperature	°C	+5 to +45				
Operating pressure with condensate	bar	0,2 – 2,2	0,2 – 2,0		0,2 - 2,2	
Operating pressure without condensate	bar	2,5	2,0	100,0	2,5	100,0
Gas outlet dew point ¹⁾	°C	3,0 ± 0,5				
Dead volume per gas path	ml	67	98	67	55	55
Ready for start up	min	10				
Cooling capacity	KJ/hr	1728				
Design data						
Dimensions (B x H x T)	mm	450 x 300 x 430				
Weight without options	kg	39			42	
Housing		Wall mounting / RAL 7035				
Gas / condensate connections		DN 4/6 / without integrated peristaltic pump condensate connection at bottom D12				
Electrical data						
Power supply		230V 50/60 Hz or 115V 50/60Hz				
Temperature display		digital				
Alarm set-points	°C	< +2.0 / > +10.0				
Protection rate		IP 20 EN 60529 / EN 61010				
Power consumption	W	350 at 230VAC – start up current 6,3A				
Alarm contact		250V AC / 1,5A / 375VA				

¹⁾ at inlet dew point 65°C and 25°C ambient temperature

Order numbers

Number of heat exchangers		4																		
Gas paths	4 x Mono			4																
	4 x Dual			8																
Heat exchanger material	PVDF					1														
	SS316					2														
	Glass (only Mono)					3														
Integrated condensate pumps	without																		0	
	with four																		4	
	with eight																		8	
Housing	wall mounting																		1	
Power supply	230V 50/60Hz																			F
	115V 50/60Hz																			B
Order number	BCR04 –	4																		

Order example : **BCR04-4828-1-00-B** → Sample gas compressor cooler **BCR04** with 4 dual heat exchangers made of SS316, with 8 integrated condensate pumps, in wall mounting housing and with power supply 115V 50/60Hz



Portable or Stationary Gas Conditioning BCR06

Application

The high performance and low maintenance compressor coolers series **BCR06** are used for continuous extractive gas analysis. They serve primarily for exact constant lowering of the sample gas dew point and thus for drying of the humid sample gas flow. In this way water vapour cross sensitivities and volumetric errors are minimized and damages of the sensible analyzer are avoided. With optional integrated components like condensate pump, filter, flow meter, liquid sensor and sample gas pump powerful portable and stationary complete systems can be configured.

Technology

The precise proportional temperature control in combination with the long-lasting hot-gas bypass system and the innovative corrosion resistant heat exchangers achieves low extremely constant dew points. Also load fluctuations and high thermal stress is compensated reliably. The mono heat exchanger with one gas path is built in a solid aluminium cylinder which guarantees an optimal energy exchange between sample gas and cooling medium. In addition, the aluminium cylinder is an effective cold storage that supports the compensation of unfavorable operating conditions. The **BCR06** is equipped with exchangeable heat exchangers which allows an easy replacement without dismantling the device.

Functions

The cooling system is filled with FCKW-free refrigerant R134a. As heat-exchanger materials PVDF, glass or stainless-steel are available. The sample gas cooler is equipped with a digital display for temperature monitoring and with a potential-free alarm contact. Two brackets allow a quick and easy wall mounting of the device. Even mobile versions of the **BCR06** with handle are available.

- ✓ High performance compressor cooler
- ✓ Portable or wall mounting housing
- ✓ High performance heat exchangers
- ✓ Long-lasting hot-gas bypass system without switching the compressor
- ✓ Corrosion resistant easy to change PTFE / PVDF, stainless steel or glass heat exchanger
- ✓ Digital display for temperature and alarm
- ✓ Alarm contact
- ✓ Integrable filter, flow meter, liquid sensor and sample gas pump



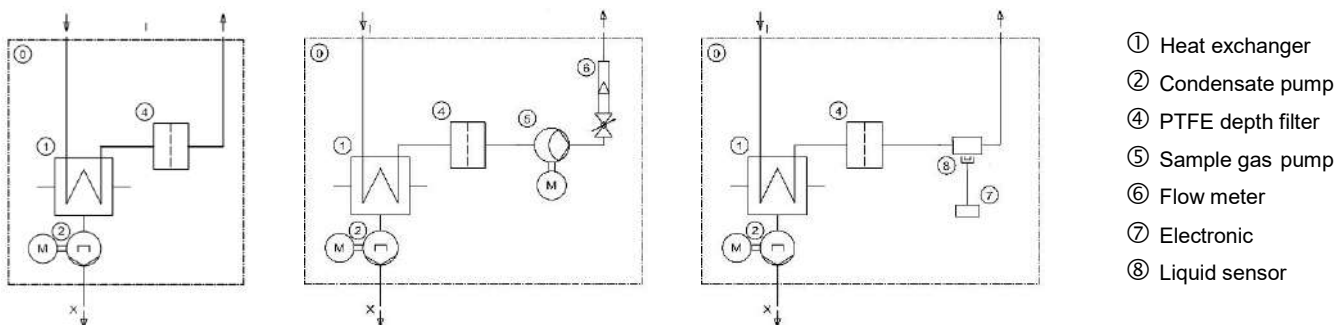


Technical Data

BCR06				
Gas paths			1	
Heat exchanger			Mono	
Heat exchanger material		PVDF	Glas	SS316
Gas flow $V_n^{1)}$	l/h	180	200	350
Gas inlet dew point	°C	70	65	80
Gas inlet temperature max.	°C	140	160	180
Ambient temperature	°C	+5 bis +45		
Operating pressure with condensate	bar	0,2 – 2,2	0,2 – 2,0	0,2 – 2,2
Operating pressure without	bar	2,5	2,0	100,0
Gas outlet dew point ¹⁾	°C	3,0 ± 0,5		
Dead volume per gas path	ml	67	98	67
Ready for start up	min	5		
Cooling capacity	KJ/hr	774		
Design data				
Dimensions (B x H x T) [mm]	mm	230 x 300 x 430		
Weight without options	kg	18,5		
Housing		wall mounting (rear or side panel) / mobile (with handle) / RAL 7035		
Gas / condensate connections		DN 4/6 / without integrated peristaltic pump condensate outlet at bottom D12		
Electrical data				
Power supply		230V 50/60 Hz or 115V 50/60Hz		
Temperature display		digital		
Alarm set-points	°C	< +2.0 / > +10.0		
Protection rate		IP 20 EN 60529 / EN 61010		
Power consumption	W	190 at 230VAC – start up current 6,3A		
Alarm contact		250V AC / 1,5A / 375VA		

¹⁾ at inlet dew point 65°C and 25°C ambient temperature

Configuration examples



Integrable components



Condensate pump



PTFE depth filter



Flow meter



Liquid sensor



Electronic



Sample gas pump



Sample Gas Compressor Cooler BCR02 Ex



Application

The compact high performance and low maintenance compressor coolers series **BCR02 Ex** are used for continuous extractive gas analysis. They serve primarily for exact constant lowering of the sample gas dew point and thus for drying of the humid sample gas flow. In this way water vapour cross sensitivities and volumetric errors are minimized and damages of the sensible analyzer are avoided. With optional integrated peristaltic pumps for condensate removal complete devices series **BCR02 Ex** are quick and simple integrable in sample gas conditioning systems. The coolers are specifically designed for operation in ATEX zone 2. ATEX-certification: II 3G Ex nA nC T4 Gc.

Technology

The precise proportional temperature control in combination with the long-lasting hot-gas bypass system and the innovative corrosion resistant heat exchangers achieves low extremely constant dew points. Also load fluctuations and high thermal stress is compensated reliably. The mono or dual heat exchanger with one or two gas paths is built in a solid aluminium cylinder which guarantees an optimal energy exchange between sample gas and cooling medium. In addition, the aluminum cylinder is an effective cold storage that supports the compensation of unfavorable operating conditions. The **BCR02 Ex** is equipped with an exchangeable heat exchanger which allows an easy replacement without dismantling the device.

Functions

The cooling system is filled with CFC-free refrigerant R134a. As heat-exchanger materials PVDF, glass or stainless-steel are available. The sample gas cooler is equipped with a digital display for temperature monitoring and with a potential-free alarm contact. Two brackets allow a quick and easy wall mounting of the device.

- ✓ High performance compressor cooler
- ✓ For Atex-zone 2
- ✓ II 3G Ex nA nC T4 Gc
- ✓ 1 - 2 gas paths
- ✓ High performance heat exchanger
- ✓ Long-lasting hot-gas bypass system without switching the compressor
- ✓ Corrosion resistant easy to change PTFE / PVDF, stainless steel or glass heat exchanger
- ✓ Digital display for temperature and alarm
- ✓ Alarm contact
- ✓ Integrated condensate pumps optionally
- ✓ Wall mounting housing





Technical data

BCR02 Ex						
Gas paths		1			2	
Heat exchanger		Mono			Dual	
Heat exchanger material		PVDF	Glass	SS316	PVDF	SS316
Gas flow $V_n^{1)}$	l/hr	180	200	350	2 x 90	2 x 150
Gas inlet dew point	°C	65	65	80	65	80
Gas inlet temperature max.	°C	140	160	180	140	180
Ambient temperature	°C	+5 to +45				
Operating pressure with condensate pump	bar	0,2 – 2,2	0,2 – 2,0		0,2 – 2,2	
Operating pressure without condensate pump	bar	2,5	2,0	100,0	2,5	2,5
Gas outlet dew point	°C	3,0 ± 0,5				
Dead volume per gas path	ml	67	98	67	2 x 55	
Ready for start up	min	5				
Cooling capacity	KJ/hr	774				
Design data						
Dimensions (B x H x T) [mm]	mm	230 x 300 x 355				
Weight without options	kg	19,5			20,0	
Housing		wall mounting (rear panel) / RAL 9003				
Gas / condensate connections		DN 4/6 / without integrated peristaltic pump condensate outlet at bottom D12				
Electrical data						
Power supply		230V 50/60 Hz or 115V 50/60Hz				
Certification		II 3G Ex nA nC T4 Gc, for ATEX zone 2				
Temperature display		digital				
Alarm set-points	°C	< +2.0 / > +10.0				
Protection rate		IP 20 EN 60529 / EN 61010				
Power consumption	W	190 at 230VAC – start-up current 6,3A				
Alarm contact		250V AC / 1,5A / 375VA				

¹⁾ at standard conditions, dew point 65°C inlet temperature, 10-25°C ambient temperature

Order numbers

Gas paths	Mono		1																	
	Dual		2																	
Heat exchanger material	PVDF			1																
	SS316			2																
	Glass			3																
Integrated condensate pumps	without	2				0														
	with one	1				1														
	with two	1				2														
Housing	wall mounting									1										
Power supply	230V 50/60Hz																			F
	115V 50/60Hz																			B
Order number	BCR02Ex –																			


Order example : **BCR02Ex-2120-1-00-F** → Sample gas compressor cooler **BCR02 Ex** with mono heat exchanger made of SS316, without integrated condensate pump, condensate connection at bottom D12, in wall mounting housing and with power supply 230V 50/60Hz



Sample Gas Compressor Cooler BCR03 Ex



Application


The high performance and low maintenance compressor coolers series **BCR03 Ex** are used for continuous extractive gas analysis. They serve primarily for exact constant lowering of the sample gas dew point and thus for drying of the humid sample gas flow. In this way water vapour cross sensitivities and volumetric errors are minimized and damages of the sensible analyzer are avoided. With optional integrated peristaltic pumps for condensate removal complete devices series **BCR03 Ex** are quick and simple integrable in sample gas conditioning systems. The coolers are specifically designed for operation in ATEX zone 2. ATEX-certification:  II 3G Ex nA nC T4 Gc.

Technology

The precise proportional temperature control in combination with the long-lasting hot-gas bypass system and the innovative corrosion resistant heat exchangers achieves low extremely constant dew points. Also load fluctuations and high thermal stress is compensated reliably. The two mono or dual heat exchangers with one or two gas paths each are built in a solid aluminium cylinder which guarantees an optimal energy exchange between sample gas and cooling medium. In addition, the aluminum cylinder is an effective cold storage that supports the compensation of unfavorable operating conditions. The **BCR03 Ex** is equipped with exchangeable heat exchangers which allows an easy replacement without dismantling the device.

Functions

The cooling system is filled with CFC-free refrigerant R134a. As heat-exchanger materials PVDF, glass or stainless-steel are available. The sample gas cooler is equipped with a digital display for temperature monitoring and with a potential-free alarm contact. Two brackets allow a quick and easy wall mounting of the device.

- ✓ High performance compressor cooler
- ✓ For Atex-zone 2
- ✓  II 3G Ex nA nC T4 Gc
- ✓ 1 - 4 gas paths
- ✓ High performance heat exchangers
- ✓ Long-lasting hot-gas bypass system without switching the compressor
- ✓ Corrosion resistant easy to change PTFE / PVDF, stainless steel or glass heat exchanger
- ✓ Digital display for temperature and alarm
- ✓ Alarm contact
- ✓ Integrated condensate pumps optionally
- ✓ Wall mounting housing





Technical data

BCR03 Ex									
Gas paths		1			2			4	
Heat exchanger		1 x Mono			2 x Mono			2 x Dual	
Heat exchanger material		PVDF	Glas	SS316	PVDF	Glas	SS316	PVDF	SS316
Gas flow V _n ¹⁾	l/hr	250	300	500	2 x 250	2 x 300	2 x 400	4 x 125	4 x 150
Gas inlet dew point	°C	65	70	80	65	70	80	65	80
Gas inlet temperature max.	°C	140	160	180	140	160	180	140	180
Ambient temperature	°C	+5 to +45							
Operating pressure with condensate pump	bar	0,2 – 2,2	0,2 – 2,0	0,2-2,2		0,2-2,0		0,2 – 2,2	
Operating pressure without condensate pump	bar	2,5	2,0	100,0	2,5	2,0	100,0	2,5	100,0
Gas outlet dew point ¹⁾	°C	3,0 ± 0,5							
Dead volume per gas path	ml	67	98	67	2 x 67	2 x 98	2 x 67	4 x 55	
Ready for start up	min	10							
Cooling capacity	KJ/hr	1080							
Design data									
Dimensions (B x H x T)	mm	450 x 300 x 300							
Weight without options	kg	22,0				24,0			
Housing		Wall mounting (rear side) / RAL 7035							
Gas / condensate connections		DN 4/6 / without integrated peristaltic pump condensate connection at bottom D12							
Electrical data									
Power supply		230V 50/60 Hz or 115V 50/60Hz							
Certification		⚠ II 3G Ex nA nC T4 Gc, for ATEX zone 2							
Temperature display		digital							
Alarm set-points	°C	< +2.0 / > +10.0							
Protection rate		IP 20 EN 60529 / EN 61010							
Power consumption	W	220 at 230VAC – start-up current 6,3A							
Alarm contact		250V AC / 1,5A / 375VA							

¹⁾ at inlet dew point 65°C and 25°C ambient temperature

Order numbers

Number of heat exchangers		2																	
Gas paths	2 x Mono																		
	2 x Dual																		
Heat exchanger material	PVDF																		
	SS316																		
	Glass (only Mono)																		
Integrated condensate pumps	without																		
	with two																		
	with four																		
Housing	wall mounting																		
Power supply	230V 50/60Hz																		F
	115V 50/60Hz																		B
Order number	BCR03Ex –	2																	


Order example : **BCR03Ex-2424-1-00-B** → Sample gas compressor cooler **BCR03 Ex** with 2 dual heat exchangers made of SS316, with 4 integrated condensate pumps, in wall mounting housing and with power supply 115V 50/60Hz



Sample Gas Compressor Cooler BCR05 Ex



Application


The high performance and low maintenance compressor coolers series **BCR05 Ex** are used for continuous extractive gas analysis. They serve primarily for exact constant lowering of the sample gas dew point and thus for drying of the humid sample gas flow. In this way water vapour cross sensitivities and volumetric errors are minimized and damages of the sensible analyzer are avoided. Compressor coolers series **BCR05 Ex** are specifically designed for operation in ATEX zones 1 and 2. ATEX-certification:  II 2G Ex pxb de [ia] IIC T4 Gb.

Technology

The precise proportional temperature control in combination with the long-lasting hot-gas bypass system and the innovative corrosion resistant heat exchangers achieves low extremely constant dew points. Also load fluctuations and high thermal stress are compensated reliably. The two mono or dual heat exchangers with one or two gas paths each are built in a solid aluminium cylinder which guarantees an optimal energy exchange between sample gas and cooling medium. In addition, the aluminum cylinder is an effective cold storage that supports the compensation of unfavorable operating conditions. The **BCR05 Ex** is equipped with exchangeable heat exchangers which allows an easy replacement without dismantling the device.

Functions

The cooling system is filled with CFC-free refrigerant R134a. As heat-exchanger materials PVDF, glass or stainless-steel are available. The sample gas cooler is equipped with an analog indication for temperature monitoring and with a potential-free alarm contact. A pre-mounted stable console with vibration dampers for easy and safe wall mounting is available as option.

- ✓ High performance compressor cooler
- ✓ For Atex-zone 1 and 2
- ✓  II 2G Ex pxb de [ia] IIC T4 Gb
- ✓ 1 - 4 gas paths
- ✓ High performance heat exchangers
- ✓ Long-lasting hot-gas bypass system without switching the compressor
- ✓ Corrosion resistant easy to change PTFE / PVDF, stainless steel or glass heat exchanger
- ✓ Analog temperature indication
- ✓ Alarm contact
- ✓ Easy wall mounting due to optional stable pre-mounted console





Technical Data

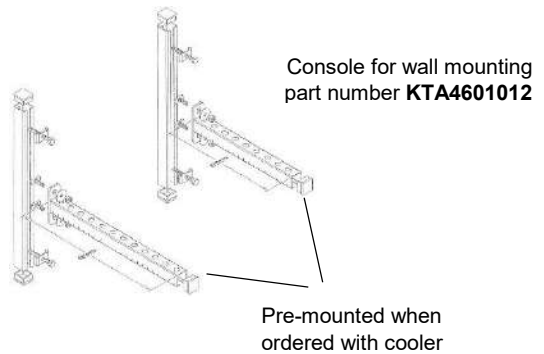
BCR05 Ex									
Gas paths		1			2			4	
Heat exchanger		1 x Mono			2 x Mono			2 x Dual	
Heat exchanger material		PVDF	Glas	SS316	PVDF	Glas	SS316	PVDF	SS316
Gas flow V _n ¹⁾	l/hr	250	300	400	2 x 250	2 x 300	2 x 350	4 x 125	4 x 150
Gas inlet dew point	°C	65	70	80	65	70	80	65	80
Gas inlet temperature max.	°C	130							
Ambient temperature ²⁾	°C	+15 to +45							
Operating pressure with condensate pump	bar	for connection of condensate pumps / containers observe manufacturer specifications							
Operating pressure without cond. pump	bar	2,5	2,0	100,0	2,5	2,0	100,0	2,5	100,0
Gas outlet dew point ¹⁾	°C	3,0 ± 0,5							
Dead volume per gas path	ml	67	98	67	2 x 67	2 x 98	2 x 67	4 x 55	
Ready for start up	min	10							
Cooling capacity	KJ/hr	1080							
Design data									
Dimensions (B x H x T) [mm]	mm	440 x 350 x 470							
Weight without options	kg	38,5			40,5				
Housing		wall mounting (with console part no. KTA4601012) / RAL 7035							
Gas / condensate connections		DN4/6 / tube 12mm o.d. without thread							
Electrical data									
Power supply		230V 50/60 Hz or 115V 50/60Hz							
Certification		Ex II 2G Ex pxb de [ia] IIC T4 Gb, for ATEX zone 1 and 2							
Temperature display		analog with insulated alarm contact							
Alarm set-points	°C	< +2.0 / > +10.0							
Protection rate		IP 20 EN 60529 / EN 61010							
Power consumption	W	220 at 230VAC – start-up current 6,3A							
Alarm contact		250V AC 50Hz / 40VA							

¹⁾ at inlet dew point 65°C and 25°C ambient temperature

²⁾ for ambient temperatures below 15°C the factory setting of the cooler is changed. Please indicate ambient temperature with order.

Order number

Number of heat exchangers		1																	
		2																	
Gas paths	1 x Mono			1															
	2 x Mono			2															
	1 x Dual			2															
	2 x Dual			4															
Heat exchanger material	PVDF			1															
	SS316			2															
	Glass (only Mono)			3															
Integrated condensate pumps	without					0													
	with console																		
Housing	without console																		1
	with console																		2
Power supply	230V 50/60Hz																		F
	115V 50/60Hz																		B
Order number	BCR05 –					0	-												



Order example : **BCR05-2420-1-00-F** → Sample gas compressor cooler **BCR05 Ex** with 2 dual heat exchangers made of SS316, in wall mounting housing with pre-mounted console and with power supply 230V 50/60Hz



Peristaltic Pump

SR25[®]

Application

The peristaltic pump **SR25[®]** is designed specifically for analysis technology applications for metering fluid media. Key applications include:

- reliable continuous condensate drainage
- metered addition of acids and alkalis

Technology

The peristaltic pump **SR25[®]** is self-suctioning and designed for continuous operation. It consists of three compact parts:

- synchronous motor
- gearing unit with return stop
- pump

The low speed, the two PVDF hose contact pulleys and the Novoprene hose guarantee a good mechanical and chemical resistance with a long service life. A change of pump hoses is simplified by using especially designed hose sets. The tube connectors allow the application of different tube types. Due to the combination of different gear units and hose sets the **SR25[®]** provides a wide range of performance and applications.

Funktionen

Due to its excellent properties the **SR25[®]** is integrated as condensate pump and acid/alkalis dosage pump in sample gas coolers and conditioning systems. The pump is available as built-in component, but also on bracket for separate mounting. It can operate in any installed position.

- ✓ Self-suctioning
- ✓ Synchronous motor
- ✓ Return stop
- ✓ High chemical resistance
- ✓ Wide range of performance and applications
- ✓ Very compact design
- ✓ Low speed
- ✓ Long-lasting pump hose



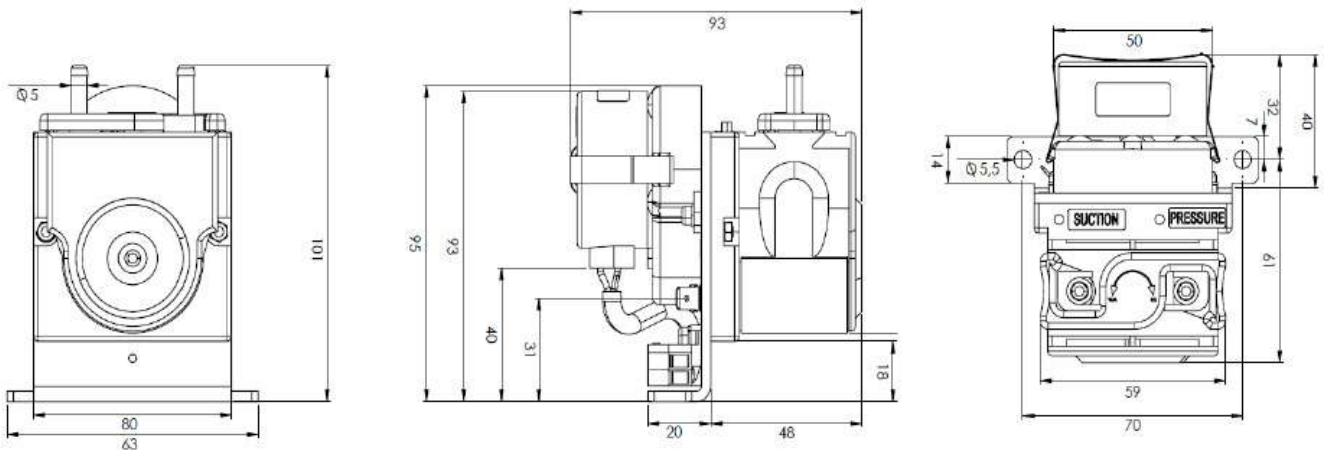


Technical Data

SR25 [®]							
Order Number		6406019	6406004	6406008*	6406002	6406082	6406081
Speed	rpm	1		5		10	
Pump hose diameter	mm	1,6 x 1,6	3,2 x 1,6	3,2 x 1,6	3,2 x 1,6	4,1 x 1,6	4,1 x 1,6
Pump capacity	ml/min	0,2	0,7	3,5	3,5	5,0	10,0
Anschluss		grommet		hose fitting DN4/6			
Suction maximum	bar abs.	0,2					
Pressure maximum	bar abs.	2,2					
Media temperature maximum	°C	60					
Material of media conducting parts		PVDF, Novoprene					
Ambient temperature	°C	0...+60					
Duty cycle	%	100					
Design data							
Dimensions	mm	130 x 110 x 80					
Weight	kg	0,4					
Mounting		incorporation					
Electrical data							
Power supply		230V 50/60Hz or 115V 50/60Hz					
Power consumption	W	4,0					
Protection rate	IP	10					
Electrical standard		IP10 / EN60529					
Electrical connection		terminals 1,5mm ²					

* Built-in version partially assembled, incl. hose set N3,2x1,6mm (w/o bracket), only intended as a spare part for MAK 10 and BCR devices.

Dimensions



Dimensions in mm



Pre-Separator PS

Application

The pre-separator **PS** is designed specifically for gas analysis technology to relief sample gas coolers at high inlet temperatures up to 160°C and high water vapour inlet dew points above 65°C.

Technology

The pre-separator **PS** is made of corrosion resistant glass and equipped with PVDF hose fittings and a wall mounting bracket.

It is designed so that the wash out ratio of water soluble gas components is minimized and a safe condensate separation for flow rates up to 500NI/hr is guaranteed.

For condensate removal the condensate pump SR25 is used.

Functions

The performance of the sample gas cooler is affected favorably by the pre-separator **PS**. The sample gas is pre-cooled in the pre-separator by ambient air. Reaching the dew point, water vapor condenses along the dew point line as a result of cooling. Condensate is separated from the sample gas, is collected in the separator and then continuously drained by the connected condensate pump SR25.

- ✓ Separation of condensate
- ✓ Pre-cooling to ambient temperature for water vapour inlet dew points >65°C
- ✓ Improved performance of sample gas cooler
- ✓ Suitable for high temperatures
- ✓ Condensate removal with peristaltic pump SR25
- ✓ PVDF-hose fittings and mounting bracket
- ✓ Corrosion resistant made of glass
- ✓ Low wash out ratio

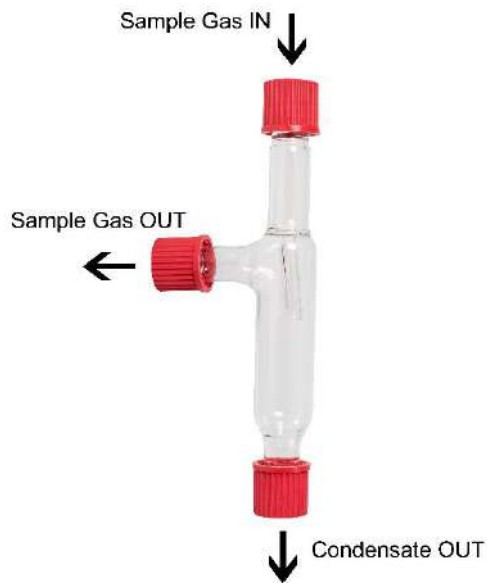




Technical Data

PS		
Part number		8480101
Scope of delivery		glass pre-separator with 3 PVDF hose connectors DN4/6 and mounting bracket, 2m Viton hose, 1 x SR25 peristaltic pump
Gas flow max.	NI/hr	500
Pressure max.	bar abs.	2,5
Connections		PVDF-hose-fittings DN4/6
Medium temperature max.	°C	160
Media wetted parts		glass, PVDF
Ambient temperature	°C	0...+60
Design data		
Dimensions	mm	180 x 85 x 55
Weight	kg	0,2
Mounting		wall mounting

Connections



Condensate removal



Condensate pump **SR25** with pump capacity 3,4ml/min (see also separate data sheet)



Condensate Sensor MS

Application

The condensate sensor **MS** is used for continuous extractive gas analytics. It is usually integrated downstream the sample gas cooler and serves for detection of humidity and condensate break through within a gas analysis system.

Technology

The condensate sensor is mounted in a flow chamber made of corrosion resistant PVDF and has two densely packed long-lasting corrosion resistant Platinum contacts, electrically conductive connected already due to minimal condensate quantities. Via connected optional electronic control **EC72.01** then a signal is transmitted. The PVDF sample gas connections for hose DN4/6 are located directly at the flow chamber.

Functions

The condensate sensor **MS** reliably detects a condensate break through downstream the sample gas cooler and therefore gives an indication of an overload or defect of cooler or condensate separator. Additionally the downstream analyser is protected against breaking through condensate by e.g. switching off the sample gas pump in case of alarm via the connected electronic control **EC72.01**. This way costly downtime and high repair costs of the analyser are avoided.

- ✓ **Reliable protection of the analyser against condensate break through**
- ✓ **Safe detection of condensate**
- ✓ **Long-lasting Platinum electrodes**
- ✓ **Simple mounting and integration**
- ✓ **High chemical resistance**
- ✓ **Line break monitoring of the sensor with electronic control EC72.01**

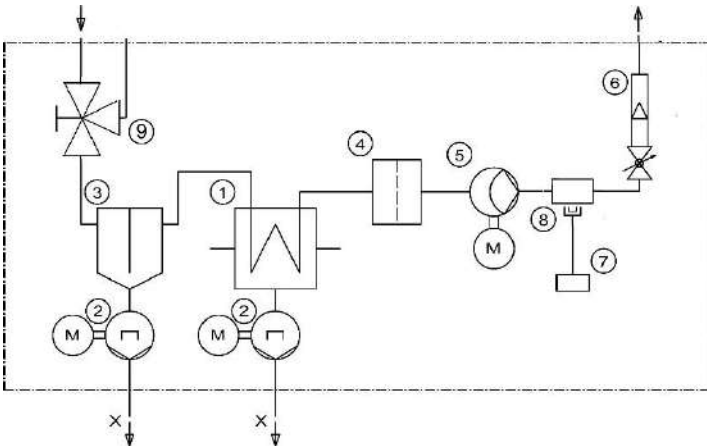




Technical Data

MS		
Part No.		8440225
Sample gas connections		DN4/6
Ambient temperature	°C	-20...+60
Max. media temperature	°C	100
Materials media wetted parts		glass, PVDF, Platinum, FPM
Max. operating pressure	bar	2,5
Max. flow rate V _n	l/h	500
Design data		
Dimensions	mm	125 x 55 x 40
Weight	kg	0,1
Mounting		wall mounting
Electrical data		
Electrode material		Platinum
Cable length	m	1,25

Application example



- ① Heat exchanger
- ② Condensate pump
- ③ Condensate pre-separator (Option)
- ④ PTFE depth filter
- ⑤ Sample gas pump
- ⑥ Flow meter
- ⑦ Electronic control
- ⑧ **Condensate sensor MS**
- ⑨ Test gas valve

Electronic control



Electronic control EC72.01, part no. 5201047 (24VDC, see also separate data sheet)



Variable-Area Flowmeter

FM

Application

The corrosion resistant compact variable-area flowmeters series **FM** are used for continuous extractive gas analytics. They are usually integrated downstream the sample gas cooler and serve e.g. for adjustment of the sample gas flow rate for analyser and bypass within a gas analysis system.

Technology

The highly corrosion resistant compact variable-area flowmeters series **FM** with their measuring tube made of borosilicate glass are equipped with a precise and very robust stainless steel needle valve. Due to the special design the valve has an almost linear control characteristic. The flowmeters can be equipped with a sensor light barrier which transmits a signal in case of missing flow via connected optional electronic control **EC72.01**. Due to the G1/8" f-thread the sample gas connections can be determined variably by means of an appropriate screw fitting.

Functions

The flow is clearly visible in the measuring glass of the flowmeter and the current flow rate can be read easily from the scale directly at the top of the float. The linear control characteristic of the fine adjustment valve enables monitoring and dosing of extremely low flow quantities.

- ✓ **Exact linear flow rate adjustment with precise fine adjustment valve**
- ✓ **High chemical resistance**
- ✓ **Very compact design**
- ✓ **Easy mounting and integration in front panels or on mounting plates with optional mounting set**
- ✓ **With sensor light barrier for flow alarm as option**
- ✓ **Line breakage monitoring of flow alarm sensor with electronic control EC72.01**



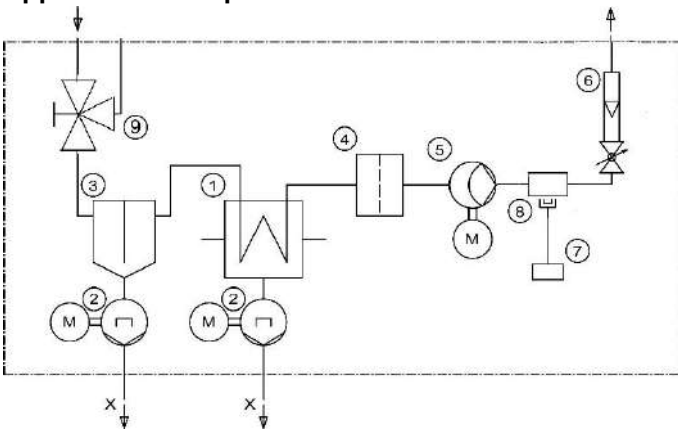


Technical Data

FM		FM140	FM150	FM250	FM500
Part no.		6507009	6507005(-	6507008(-KIT)*	6507010(-KIT)*
Mounting position		45° (gas cooler)	vertical		
Measuring range V _n	l/h air / 1,2 bar(a)	14-140	15-150	25-250	50-500
Sample gas connections		G1/8"i (DN4/6 in optional mounting set)			
Max. media temperature	°C	100			
Materials media wetted parts		glass, PVDF, PEEK, FKM			
Max. pressure	bar	4			
Calibration		air at 20°C and 1,2 bar abs.			
Design data					
Dimensions	mm	94 x 25 x 35			
Weight	kg	0,1			
Mounting		front panel or optional wall mounting with mounting set			
Options					
Sensor light barrier		integrated in flowmeter, part no. 5702010			
Part numbers electronic control EC72.01 for light barrier		5201047 24VDC 5201048 230VAC 50/60Hz 5201049 115VAC 50/60Hz			

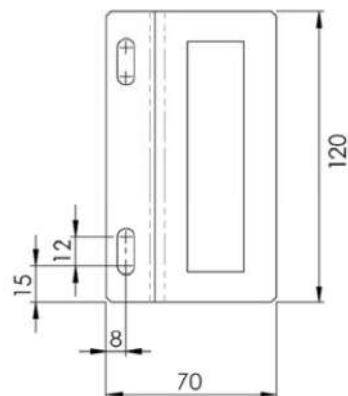
*Part numbers with -KIT contain additionally mounting set with mounting bracket and 2 x PVDF-screw fitting G1/8" a - DN4/6

Application example



- ① Heat exchanger
- ② Condensate pump
- ③ Condensate pre-separator (Option)
- ④ PTFE depth filter
- ⑤ Sample gas pump
- ⑥ **Flow meter FM**
- ⑦ Electronic control
- ⑧ Condensate sensor
- ⑨ Test gas valve

Mounting bracket and electronic control



Electronic control EC72.01
(see also separate data sheet)



Electronic Control EC 72.01

Application

The electronic control **EC 72.01** is used for supply and signal processing of liquid sensor MS and light barrier at flow meter FM.

Technology

The electronic control is equipped with a potential-free directional contact. The switch-point of the electronic control unit can be adjusted with a potentiometer. The electronic control **EC 72.01** is available for 24VDC, 115VAC and 230VAC.

Function

The electronic control **EC 72.01** is intended for DIN-rail mounting. The switch-contact is used for alarm signalling or for switching off the sample gas pump or for switching a shut off valve.

- ✓ Feed / alerting liquid sensor
- ✓ Feed / alerting light barrier at flow meter
- ✓ Potential-free switch-contact for alerting, switching off the sample gas pump or switching a shut off valve
- ✓ Adjustable switch-point
- ✓ LED for operation / alarm notification

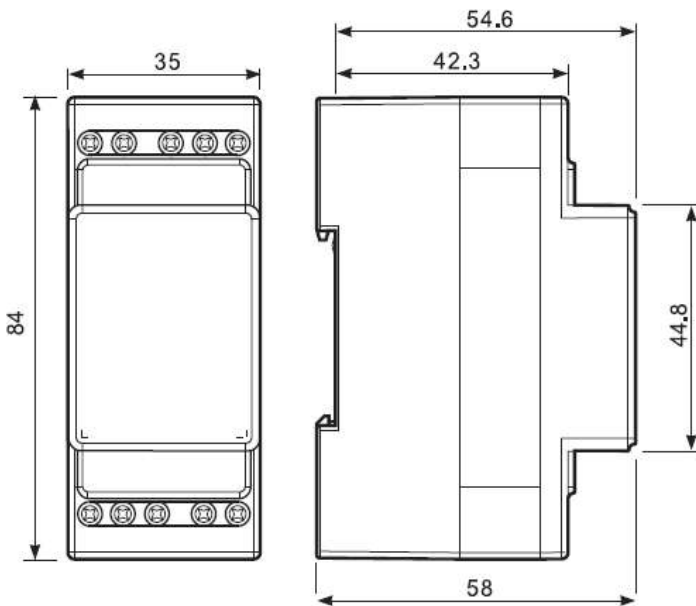




Technical Data

EC 72.01				
Part No.		5201047	5201048	5201049
Execution			Level monitoring relay	
Ambient temperature			-20...+60°C	
Design data				
Dimensions	mm	85 x 55 x 35		
Weight	kg	0,1		
Mounting		DIN-rail EN 60715 TH35		
Electrical data				
Responsivity	KΩ	5 - 150		
Pre-adjustment		function type FS 0,5s release delay, responsivity 70KΩ		
Operating voltage	V	24V DC	230V AC 50/60Hz	115V AC 50/60Hz
Protection rate		IP20		
Amount of contacts		1 changeover contact		
Max. continuous current / max. starting current	A	16 / 30		
Nominal voltage / max. switching voltage	V AC	250 / 400		

Dimensions



Dimensions in mm



Diaphragm Sample Gas Pump N86 KT21E

Application

The diaphragm sample gas pump **N86 KT21E** is used for continuous extractive gas analytics. It mainly serves for unadulterated sucking and pumping of sample gas from sample point to the analyser house resp. analyser. Typical applications are emission measurements e.g. in power plants or waste incinerations and process measurements e.g. in chemical, petro-chemical, steel-, glass- or cement-industry.

Technology

The **N86 KT21E** is a reliable diaphragm pump with especially compact dimensions that guarantees an optimum integration in systems and devices. It has a highly gas tight pump head whose components have been developed especially for pumping of aggressive and corrosive gases. Special valves ensure a high tolerance to vapour and condensate. The patented diaphragm was optimised using the finite-element-method. The results are an extremely long lifetime of the diaphragm and a high pneumatic performance of the pump. The pump is operating absolutely oil-free and ensures therefore an unadulterated pumping, evacuating and compressing of gases. The pump can operate in any position.

Functions

Core of the **N86 KT21E** is the elastic diaphragm which is moved up and down in its center by an eccentric. In this way gas is pumped through self-opening and-closing valves. Due to the compact design and excellent features **AGT-PSG** integrates the **N86 KT21E** also in their sample gas coolers and conditioning systems. Because of the low weight the pump is also excellently suitable for integration in mobile devices.

- ✓ Unadulterated pumping of sample gas
- ✓ Corrosion resistant sample gas wetted components
- ✓ Start up against vacuum pressure
- ✓ Tension optimised long-lasting PTFE-diaphragm
- ✓ Maintenance free operation
- ✓ Compact dimensions
- ✓ Low weight
- ✓ Simple mounting and integration
- ✓ Operation in any position
- ✓ Completely ready for mounting also

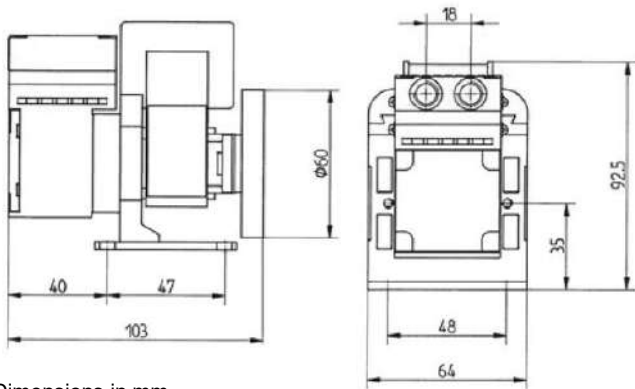




Technical Data

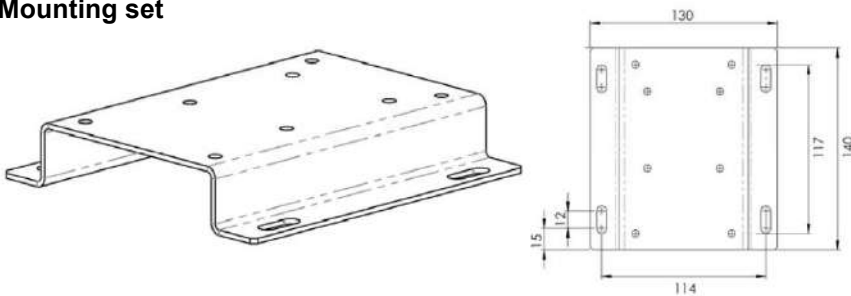
N86 KT21E					
Part No.		6407043	6407044	6407043-KIT	6407044-KIT
Mounting set (1x mounting plate / 4x vibration dampers / 2x PVDF-fittings DN4/6)		no	no	yes	yes
Pump capacity pressureless	l/min	5,5			
End vacuum	mbar	190			
Pump start	mbar	> 700 mbar abs.			
Max. operating excess pressure	bar ü	2,5			
Ambient temperature Umgebungstemperatur	°C	+5...+40			
Media temperature	°C	+5...+40			
Design data					
Dimensions (W x H x D)	mm	64 x 93 x 103		130 x 145 x 140	
Weight	kg	1,1		1,3	
Media wetted materials		PTFE (membrane), FFPM (valves), PPS (pump head)			
Connections		2 x G 1/8"i DIN ISO 228/1		DN 4/6 PVDF	
Electrical data					
Operating voltage ± 10%	V	230V AC 50Hz	115V AC 60Hz	230V AC 50Hz	115V AC 60Hz
Protection rate		IP00 EN 60529			
Electrical connection		2 x 0,5 mm ² single wires, length 900 mm			
Start up current	A	0,65	1,1	0,65	1,1
Power consumption	W	60	55	60	55

Dimensions



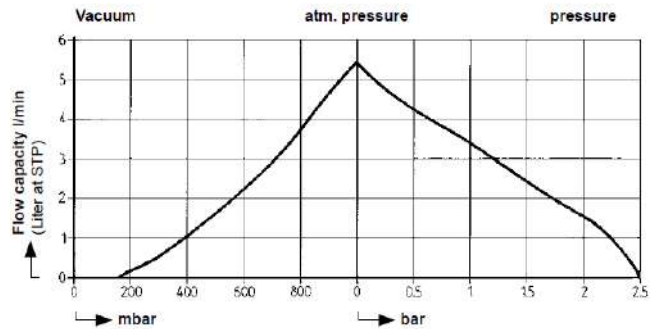
Dimensions in mm

Mounting set



The pump with mounting set is delivered with a mounting plate, two PVDF-fittings G1/8"i – DN4/6 and four vibration dampers with screws.

Performance





Depth Filter

TF70 / TF90

Application

The depth filters series **TF** are used for continuous extractive gas analytics. They are usually integrated downstream the sample gas cooler and serve for fine dust separation from the sample gas to protect the analyser from damage.

Technology

The depth filters series **TF** are designed particularly corrosion resistant and easy to maintain. Filter cartridge in PTFE or glass fibre, filter body and holder are made of PVDF, lid is made of glass and sealing is made of FKM. The PTFE filter element has a porosity of 0,1µm a large filter surface of 67cm² resp. 86cm² and an especially low pressure drop of only a few mbar. Regarding design special attention was also paid to an extra low dead volume for fast response time. Due to the G1/8" f-thread the sample gas connections can be determined variably by means of an appropriate screw fitting.

Functions

Due to the PTFE depth filters series **TF** fine dust particles up to a grain size of 0,1µm are separated reliably. The glass lid allows quick and easy to assess the degree of contamination of the filter element. The easy-to-loosen PVDF knurled nut enables opening with quick and easy change of the filter element.

- ✓ **Reliable protection of the analyser against fine dust**
- ✓ **Safe separation of dust particles up to 0,1µm**
- ✓ **Durable corrosion resistant inert filter element**
- ✓ **Quick and easy change of filter element**
- ✓ **Two filter sizes available**
- ✓ **Easy mounting and integration**
- ✓ **High chemical resistance**
- ✓ **Low dead volume for fast response time**
- ✓ **Optical control of degree of contamination**
- ✓ **Front panel and wall mounting (with optional mounting bracket)**

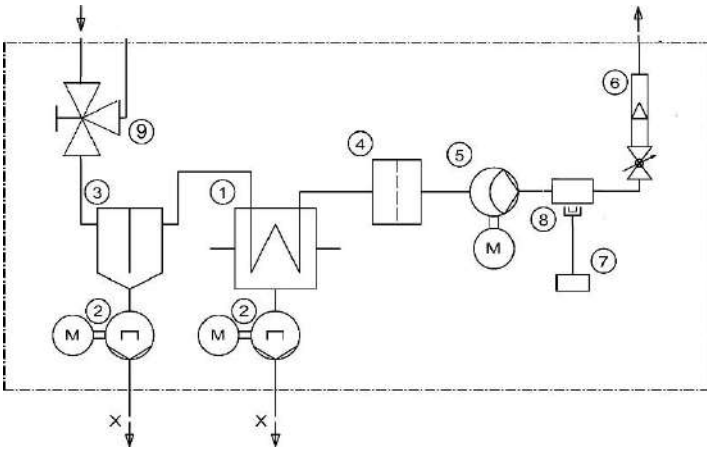




Technical Data

TF		TF70	TF90
Part no.		6400084	6400087
Filter cartridge	mm	70 (Glass fibre)	90 (Teflon)
Sample gas connections		G1/8"i	
Ambient temperature	°C	-20...+80	
Max. medium temperature	°C	120	
Materials media wetted parts		glass, PVDF, FPM, PTFE (filter element)	
Max. operating pressure	bar	6	
Max. flow rate V_n	l/hr	500 with filter element / 1000 without filter element	
Dead volume	ml	25	35
differential pressure	mbar	approx. 10 at 200l/h and a clean filter element	
Design data			
Dimensions	mm	40 x 40 x 105	40 x 40 x 135
Weight	kg	0,2	0,3
Mounting		Front panel resp. wall mounting with optional mounting bracket	
Options			
Straight connector DN4/6		G1/8"a – DN4/6 PVDF part no. 6353979	

Application example



- ① Heat exchanger
- ② Condensate pump
- ③ Condensate pre-separator (Option)
- ④ **Glass fibre / PTFE depth filter TF**
- ⑤ Sample gas pump
- ⑥ Flow meter
- ⑦ Electronic control
- ⑧ Condensate sensor
- ⑨ Test gas valve



Aerosol Filter

AF and AF-LS

Application

The aerosol filters series **AF** are used for continuous extractive gas analytics. They are usually installed directly upstream the analyser and serve for fine liquid particle (aerosol) separation from the sample gas to protect the analyser from damage. Typical applications for the filters series **AF** are burning processes with high content of sulfur in the burning material like brown coal and heavy oil.

Technology

The aerosol filters series **AF** are designed particularly corrosion resistant and easy to maintain. Filter head and holder are made of PVDF, body is made of glass and sealing is made of FKM. The glass fibre filter element has 2 layers with different porosity and an especially low pressure drop of only a few mbar. Regarding design special attention was also paid to an extra low dead volume for fast response time. Due to the G1/4"-f-thread the sample gas connections can be determined variably by means of an appropriate screw fitting. Version **AF-LS** additionally has a liquid stop with semipermeable membrane integrated in the filter outlet.

Functions

With the 2-layer glass fibre filter element 99,9999% of fine liquid particles up to a size of 0,1µm are separated reliably. The filtration happens from inside the filter element to the outside via the inner layer with higher porosity than the outer layer. This way the very fine liquid particles can combine to bigger liquid drops on the way through the filter element and will drop down to the bottom due to gravity. The glass body allows quick and easy to assess the condition of the filter element.

- ✓ **Reliable protection of the analyser against aerosols**
- ✓ **Safe separation of 99,9999% liquid particles up to 0,1µm**
- ✓ **Durable corrosion resistant materials: PVDF, Duran-glass, FKM, glass fibre, PTFE**
- ✓ **Integrated liquid stop for AF-LS**
- ✓ **Quick and easy change of filter element**
- ✓ **Easy mounting and integration**
- ✓ **Low dead volume for fast response time**
- ✓ **Optical control of filter element condition**
- ✓ **Wall mounting**

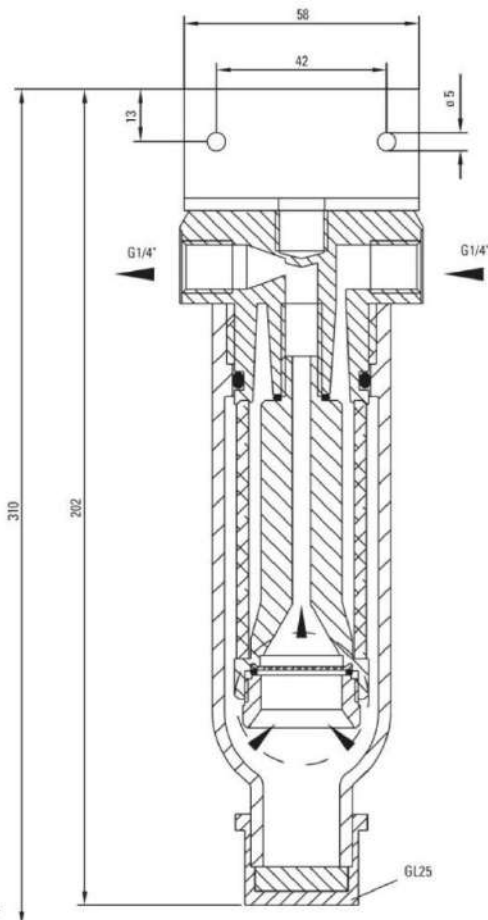




Technical Data

		AF	AF-LS
Part No.		30000981	30000991
With integrated liquid stop		no	yes
Sample gas / condensate connections		G1/4" f / GL25 blind cap	
Ambient temperature	°C	0...+60	
Max. Gas temperature	°C	+80	
Separation rate	%	99,9999	
Max. medium temperature	°C	+120	
Materials media wetted parts		glass fibre, glass, PVDF, FKM, PTFE	
Max. operating pressure	bar abs.	0,2 – 2 Δp max. 1 bar	0,3 – 3 Δp max. 0,5 bar
Max. flow rate V_n	l/hr	300	200
Dead volume	ml	65	
Max. liquid volume	ml	20	
Design data			
Dimensions	mm	58 x 202	
Weight	kg	0,3	
Mounting		wall mounting with mounting bracket	
Options			
Straight connector DN4/6		G1/4" m – DN4/6 PVDF	

Dimensions in mm



* Constructional size



Adsorption Filter

ADF

Application

The adsorption filters series **ADF** are used for continuous extractive gas analytics. They are usually installed downstream the sample gas cooler and serve for removal of interfering gas components due to adsorption. Upstream the sample gas cooler the filter is also suitable for pre-separation of condensing liquids. Typical applications for the filters series **ADF** are process gases whose gas matrix allows to remove gas components selectively without influence on the measurement.

Technology

The adsorption filters series **ADF** are designed particularly corrosion resistant and easy to maintain. The filter head is made of PVDF, body is made of glass and sealing is made of FKM. The glass frit in the lower part of the glass body prevents leakage of the solid filling material. Regarding design special attention was also paid to an extra low dead volume and at the same time a high filling degree for fast response time. Due to the G1/4" f-thread the sample gas connections can be determined variably by means of an appropriate screw fitting.

Functions

With appropriate filling material interfering sample gas components will be adsorbed. Here the precise choice of the correct adsorption material is important to remove selectively only these components that should not be measured. The gas inlet is at the bottom of the filter glass (GL25-12). With glass ball filling condensing liquids and / or solids can be removed. The sample gas outlet then is located at the filter head. The glass body allows quick and easy to assess the condition of the adsorption material.

- ✓ Filling with various adsorption materials
- ✓ Filling with glass balls for large reaction surface
- ✓ Durable corrosion resistant materials: PVDF, Duran-glass, FKM
- ✓ Quick and easy change of filling
- ✓ Easy mounting and integration
- ✓ Low dead volume for fast response time
- ✓ Optical control of adsorption material
- ✓ Wall mounting



Technical Data

ADF Filter		
Filling material		solid adsorption material
Sample gas inlet / outlet		2 x G1/4" f or GL25-12 / 1 x G1/4" f
Ambient temperature	°C	-20...+80
Max. gas temperature	°C	+80
Materials media wetted parts		PVDF (head), PTFE (cartridge), Duran® glass (body, frit) FPM (head seals), PTFE/Silicone (GL-connection seals)
Max. operating pressure at 20°C	bar abs.	5
Max. flow rate V _n	l/hr	500
Dead volume	ml	65 (for 75mm-cartridge) / 190 (for 150mm-cartridge)
Filter surface	cm ²	70 (for 75mm-cartridge) / 140 (for 150mm-cartridge)
Design data		
Mounting		wall mounting with mounting bracket
Options		
Straight connector DN4/6		G1/4" m – DN4/6 PVDF
GL adapter GL25-DN4/6		GL25 – DN4/6 PVDF

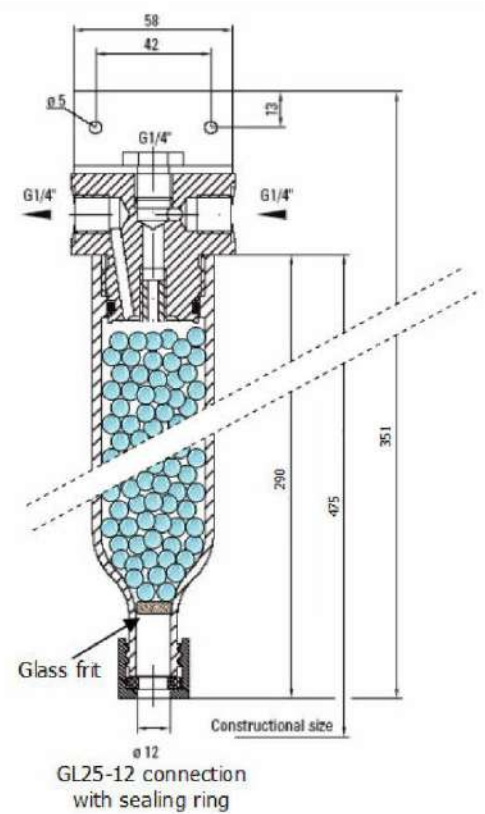
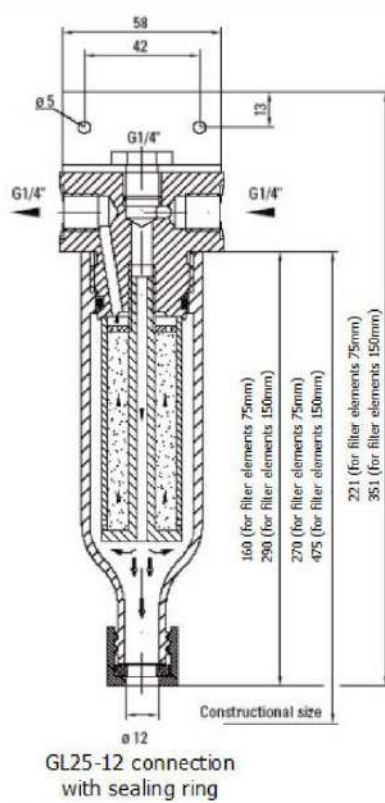
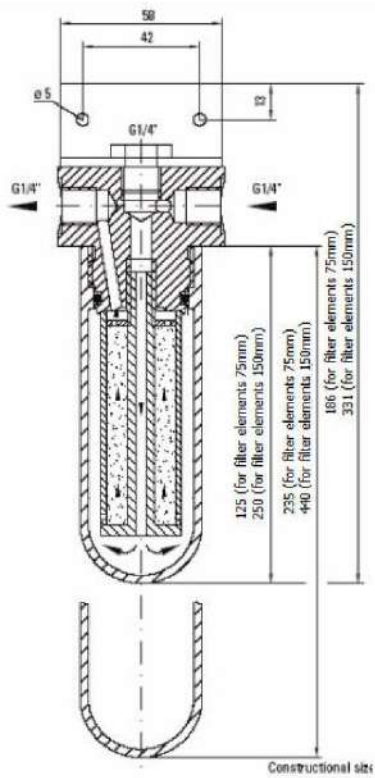
Order numbers for ADF filters	Part No.
with bottom frit to fill with adsorption materials or glass balls. Filter body length: 120mm Materials: PVDF (head), Viton® (o-ring), Duran® glass (body, frit) Connection: GL25-8 (gas inlet), G 1/4" f (gas outlet) Incl. bracket for wall-mounting, material: aluminium	30008677
with bottom frit to fill with adsorption materials or glass balls. Filter body length: 240mm Materials: PVDF (head), Viton® (o-ring), Duran® glass (body, frit) Connection: GL25-8 (gas inlet), G 1/4" f (gas outlet) Incl. bracket for wall-mounting, material: aluminium	30008678
with (empty) filter cartridge, cartridge length: 75mm, filter body length: 120mm Materials: PVDF (head), PTFE (cartridge), Viton® (o-ring), Duran® glass (body) Connection: G 1/4" f (gas inlet, gas outlet) Incl. bracket for wall-mounting, material: aluminium	30008711
with (empty) filter cartridge, cartridge length: 150mm, filter body length: 240mm Materials: PVDF (head), PTFE (cartridge), Viton® (o-ring), Duran® glass (body) Connection: G 1/4" f (gas inlet, gas outlet). Incl. bracket for wall-mounting, material: aluminium	30008712
Order numbers for consumables	Part No.
Adsorption material Active-coal, quantity: 1kg	30008687
Adsorption material Purafil II, quantity: 1kg	30008689
Adsorption material Silicagel, quantity: 1000ml	30008688
Adsorption material Bronze granulate	30008694
Volume displacer/surface extension glass balls, diameter: 10mm, quantity: 1kg	30008695

Adsorption material

Adsorption material	Components to be interrupted	Cross sensitive against
Active charcoal	Vapour of solvents or essential oil	SO ₂ , CO ₂ , Cl ₂ , NH ₃
Silica-gel	Water vapour	SO ₂ , NH ₃ , HCl, CO ₂ , C _n H _m
Purafil II	SO ₂ , SO ₃ , NH ₃ , CS ₂ , H ₂ S	C ₂ H ₂ , C ₂ H ₄ , CH ₄ O
Calcium hydroxide	CO ₂	SO ₂ , Cl ₂ , H ₂ O
Eisenberger Masse	Aerosols	HF
Sodium-calcium	CO ₂	SO ₂ , Cl ₂ , H ₂ O



Dimensions



Dimensions in mm



PSG[®]
Perfect Sample Gas



Solid Particle Filter SPF

Application

The solid particle filters series **SPF** are used for continuous extractive gas analytics. They are usually installed upstream the analyser and serve for fine solid particle separation from the sample gas to protect the analyser from damage. Typical applications for the filters series **SPF** are all kinds of emission monitoring and process gas measurements.

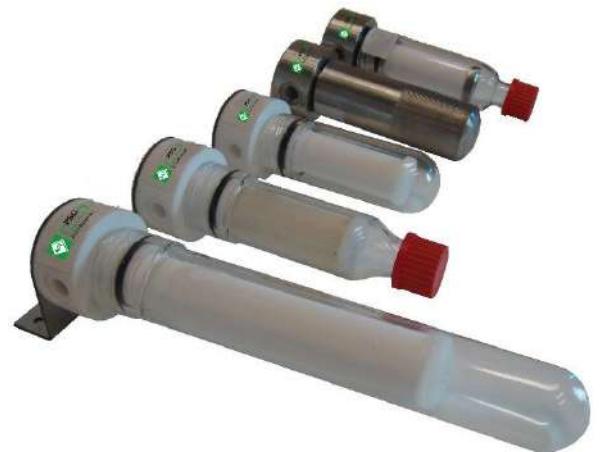
Technology

The solid particle filters series **SPF** are designed particularly corrosion resistant and easy to maintain. Filter head and holder can be made of PVDF, PTFE or stainless steel. The filter body is made of glass or stainless steel and the sealing is made of FKM. Filter elements made of PTFE, glass fibre, ceramic or stainless steel can be mounted. Regarding design special attention was also paid to an extra low dead volume for fast response time and a low pressure drop. Due to the G1/4" f-thread the sample gas connections can be determined variably by means of an appropriate screw fitting. With optional GL25-connection the liquid sensor MS can be integrated in the filter.

Functions

With the different filter elements with porosities between 0,1µm and 2µm even finest solid particles will be separated reliably. The filtration happens from the outside to the inside of the filter element and thus uses the larger outer filter surface. The gas flow enables also the reliable separation of possibly arriving liquids in the bottom of the filter body. With integrated liquid sensor at this point unwanted occurring liquid can be detected and signaled directly. Using a filter body made of glass a quick and simple assessment of the condition of the filter element is possible.

- ✓ **Reliable protection of the analyser against solid particles**
- ✓ **Safe separation of solid particles up to 0,1µm**
- ✓ **Different durable corrosion resistant materials to combine: PVDF, PTFE, stainless steel, Duran-glass, FKM, ceramic, glass fibre**
- ✓ **Quick and easy change of filter element**
- ✓ **Easy mounting and integration**
- ✓ **Low dead volume for fast response time**
- ✓ **Optical control of filter element condition**
- ✓ **Wall mounting**





Technical Data

		SPF
Materials		Filter head and –holder : PVDF, PTFE, SS316L Filter body : Duran glass, SS316L Filter element : PTFE, ceramic, glass fibre, stainless steel Sealing : FKM, PTFE / Silicone (GL25-connection)
Sample gas / condensate connections		3 x G1/4"i / GL25-12
Ambient and gas temperature	°C	PVDF : -20...+80 / PTFE -20...+100 / 1.4404 : -20...+180°C
Length filter element	mm	75
Active filter surface	cm ²	70
Max. operating pressure at +20°C	bar abs.	5 (glass filter body without GL25) 2 (glass filter body with GL25-connection) 50 and 20 at +180°C (stainless steel body)
Max. volume flow V _n	l/h	500
Dead volume	cm ³	65
Design data		
Dimensions with 75mm filter element	mm	60 x 180 / 60 x 215 (with GL25)
Weight with 75mm filter element	kg	approx. 0,4 (1,5 completely stainless steel)
Mounting		wall mounting with mounting bracket
Options		
Straight connector DN4/6		G1/4"m – DN4/6 PVDF
Liquid sensor		type MS (see separate data sheet also)

Order Numbers

With connection GL25 for condensate outlet or liquid alarm sensor	Part No.
Filter body: Duran glass. Filter element: PTFE 2µm, 75mm. Connections: G1/4"f (gas in, gas out), GL25	30008681
Filter body: Duran glass. Filter element: glass-fiber 0.1µm, 75mm. Connections: G1/4"f (gas in, gas out), GL25	30008682
Filter body: SS316. Filter element: PTFE 2µm, 75mm. Connections: G1/4"f (gas in, gas out), GL25	30008685
Filter body: SS316. Filter element: glass-fiber 0.1µm, 75mm. Connections: G1/4"f (gas in, gas out),GL25	30008686

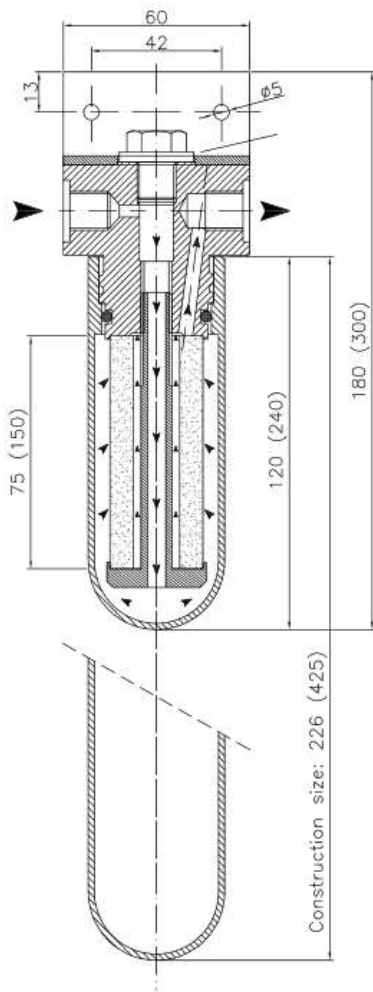
Order Numbers

Without connection GL25	Part No.
Filter body: Duran glass. Filter element: PTFE 2µm, 75mm. Connections: G1/4"f (gas inlet, gas outlet),	30008679
Filter body: Duran glass. Filter element: glass-fiber 0.1µm, 75mm. Connections: G1/4"f (gas inlet, gas outlet)	30008680
Filter body: SS316. Filter element: PTFE 2µm, 75mm. Connections: G1/4"f (gas inlet, gas outlet)	30008683
Filter body: SS316. Filter element: glass-fiber 0.1µm, 75mm. Connections: G1/4"f (gas inlet, gas outlet)	30008684

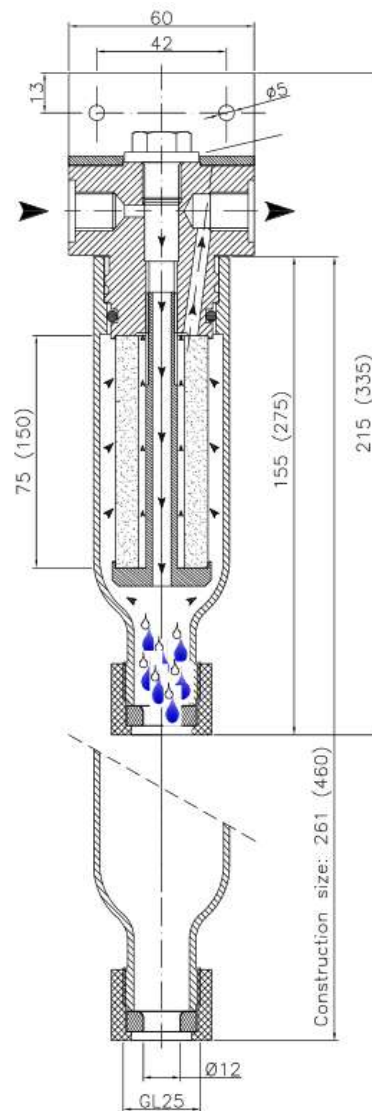


Dimensions

Filter unit without drain,
for filter element 75mm (150mm)



Filter unit with drain,
for filter element 75mm (150mm)



Dimensions in mm



PSG[®]
Perfect Sample Gas



Liquid Stop LS

Application

The liquid stops series **LS** are used for continuous extractive gas analytics. They are usually integrated directly upstream the gas analyser and serve for blocking liquids coming with the sample gas to protect the analyser from damage.

Technology

The liquid stops series **LS** are disposable filters that have to be exchanged after moistening. The filter body is made of PP and the membrane is made of PTFE. The membrane has a porosity of $0,2\mu\text{m}$ and an especially low pressure drop of only a few mbar. Regarding design special attention was also paid to an extra low dead volume for fast response time. Due to the NPT $1/8''$ -thread the sample gas connections can be determined variably by means of an appropriate screw fitting.

Functions

Due to the semipermeable PTFE membrane liquid drops and even fine liquid particles down to a size of $0,2\mu\text{m}$ are separated reliably and sample gas can pass the filter without falsification. In case of completely wetted membrane no further gas flow is possible. The easy-to-loosen optional PVDF fittings enable a quick and easy exchange of the device in case of liquid blocking.

- ✓ **Reliable protection of the analyser against intrusion of liquids**
- ✓ **Safe separation of liquid particles down to $0,2\mu\text{m}$**
- ✓ **Durable corrosion resistant inert semipermeable membrane**
- ✓ **Quick and easy installation**
- ✓ **High chemical resistance**
- ✓ **Low dead volume for fast response time**
- ✓ **Low differential pressure**

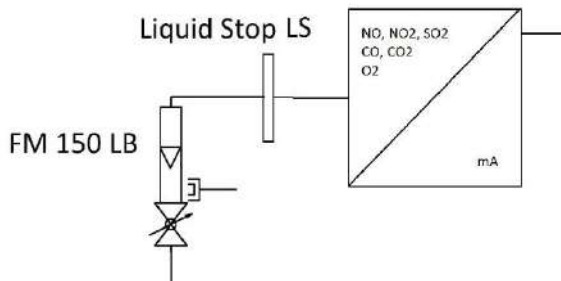




Technical Data

		LS
Part no.		92300618
Sample gas connections		NPT1/8"m
Ambient temperature	°C	0...+80
Max. medium temperature	°C	120
Materials media wetted parts		PP, PTFE
Max. operating pressure	bar	3
Max. flow rate V_n at $\Delta p=0,1$ bar	NI/hr	300
Differential pressure	mbar	10 at 100NI/hr and 30 at 300NI/hr
Dead volume	ml	3
Filter surface	cm ²	20
Design data		
Dimensions (\varnothing x L)	mm	64 x 115 (with PVDF fittings)
Mounting	kg	within sample gas line
Options		
Straight connector DN4/6		NPT1/8"f – DN4/6 PVDF part no. 92300619 (2 necessary)

Application example





Condensate Guard

CG1 / CG2

Application

The condensate guards CG1 and CG2 are used for continuous extractive gas analytics. They are usually integrated downstream the sample gas cooler and serve for detection of humidity and condensate break through within a gas analysis system.

Technology

CG1 and CG2 are complete units ready for operation (plug and play) in a compact and robust IP66 housing. They are equipped with liquid sensor(s) and electronic(s) as well as with power supply and alarm contact cable. The sensors are mounted in a flow chamber made of corrosion resistant PVDF and have two closely positioned long-lasting corrosion resistant platinum contacts, electrically conductive connected already due to minimal condensate quantities. Via the connected electronic a signal then is transmitted to the outside. The PVDF sample gas connections for hose DN4/6 are located at the outside of the housing.

Functions

The one- resp. two-way condensate guards CG1 and CG2 reliably detect a condensate break through downstream the sample gas cooler and therefore give an indication of an overload or defect of cooler or condensate separator. Additionally the downstream analyser is protected against breaking through condensate by e.g. switching off the sample gas pump in case of alarm via the integrated electronic. This way costly downtime and high repair costs of the analyser are avoided.

- ✓ **Reliable protection of the analyser against condensate break through**
- ✓ **Safe detection of condensate**
- ✓ **Completely ready for mounting (Plug and Play)**
- ✓ **Simple mounting and integration**
- ✓ **High chemical resistance**
- ✓ **Monitoring of one or two gas paths**
- ✓ **Voltage 24V DC, 115V AC or 230V AC**
- ✓ **Line break monitoring of the sensor**

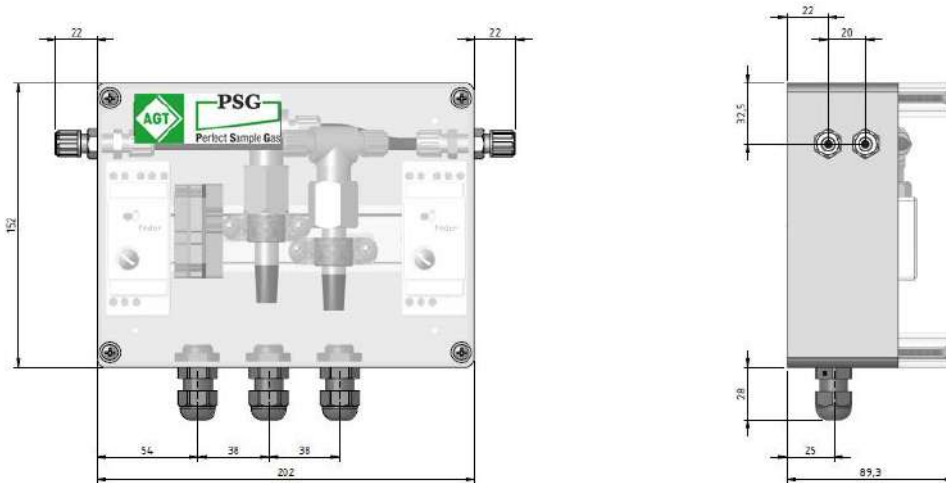




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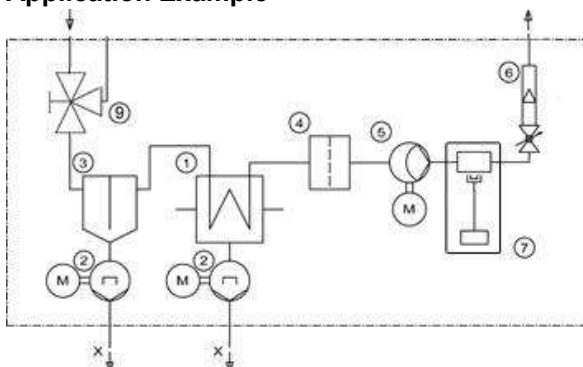
CG1 / CG2							
Part no.		92100022	92100025	92100023	92100026	92100021	92100024
Gas paths		1	2	1	2	1	2
Ambient temperature	°C	-20...+60					
Max. media temperature	°C	100					
Media wetted materials		glass, PVDF, platinum, FPM					
Max. operating pressure	bar	2,5					
Max. flow rate V _n	l/hr	500					
Design data							
Dimensions (W x H x D)	mm	202 x 152 x 90					
Weight	kg	0,9	1,1	0,9	1,1	0,9	1,1
Mounting		wall mounting					
Electrical data							
Voltage	V	230/240V AC 50/60Hz		115V AC 50/60Hz		24V DC	
Protection rate		IP66					
No. of contacts (changeover)		1	2	1	2	1	2
Max. continuous current / max. starting	A	16 / 30					
Nominal voltage / max. switching voltage	V AC	250 / 400					
Responsivity	kΩ	5 - 150					

Dimensions



Dimensions in mm

Application Example



- ① Heat exchanger
- ② Condensate pump
- ③ Condensate pre-separator
- ④ PTFE depth filter
- ⑤ Sample gas pump
- ⑥ Flow meter
- ⑦ **Condensate Guard CG1**
- ⑨ Test gas valve



Diaphragm Sample Gas Pump N86 KT18

Application

The diaphragm sample gas pump **N86 KT18** is used for continuous extractive gas analytics. It mainly serves for unadulterated sucking and pumping of sample gas from sample point to the analyser house resp. analyser. Typical applications are emission measurements e.g. in power plants or waste incinerations and process measurements e.g. in chemical, petro-chemical, steel-, glass- or cement-industry.

Technology

The **N86 KT18** is a reliable diaphragm pump with IP20-housing, that guarantees an optimum integration in systems and devices. It has a highly gas tight pump head whose components have been developed especially for pumping of aggressive and corrosive gases. Special valves ensure a high tolerance to vapour and condensate. The patented diaphragm was optimised using the finite-element-method. The results are an extremely long lifetime of the diaphragm and a high pneumatic performance of the pump. The pump is operating absolutely oil-free and ensures therefore an unadulterated pumping, evacuating and compressing of gases. The pump can operate in any position.

Functions

Core of the **N86 KT18** is the elastic diaphragm which is moved up and down in its center by an eccentric. In this way gas is pumped through self-opening and-closing valves. Due to the compact design and excellent features **AGT-PSG** integrates the **N86 KT18** also in their sample gas coolers and conditioning systems.

- ✓ Unadulterated pumping of sample gas
- ✓ Corrosion resistant sample gas wetted components
- ✓ Start up also against vacuum pressure
- ✓ Tension optimised long-lasting PTFE-diaphragm
- ✓ Maintenance free operation
- ✓ Compact IP20-housing with On/Off-switch
- ✓ Low weight
- ✓ Simple mounting and integration
- ✓ Operation in any position
- ✓ Completely ready for mounting also

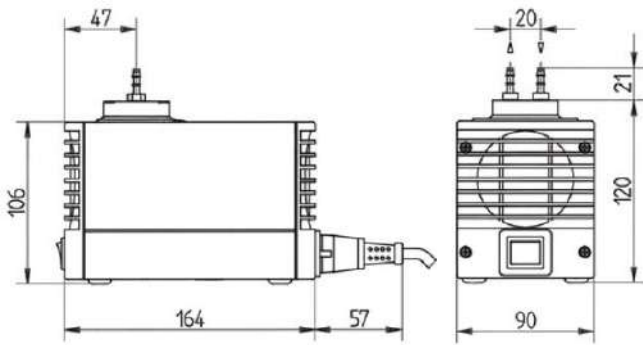




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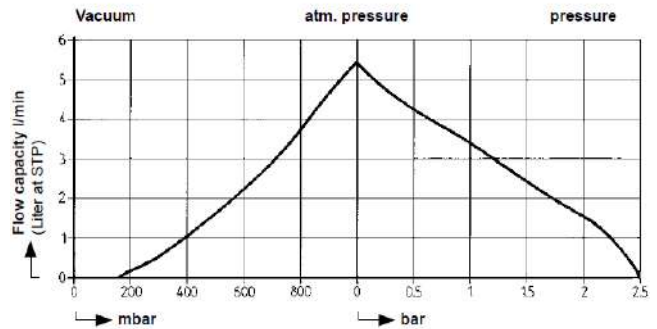
N86 KT18					
Part No.		6407053	6407054	6407053-KIT	6407054-KIT
Mounting set (1x mounting plate / 4x vibration dampers / 2x PVDF-fittings DN4/6)		no	no	yes	yes
Pump capacity pressureless	l/min	5,5			
End vacuum	mbar	190			
Pump start	mbar	> 700 mbar abs.			
Max. operating excess pressure	bar ü	2,5			
Ambient temperature Umgebungstemperatur	°C	+5...+40			
Media temperature	°C	+5...+40			
Design data					
Dimensions (W x H x D)	mm	90 x 120 x 164		130 x 145 x 164	
Weight	kg	1,9		2,1	
Media wetted materials		PTFE (membrane), FFPM (valves), PPS (pump head)			
Connections		2 x G 1/8"i DIN ISO 228/1		DN 4/6 PVDF	
Electrical data					
Operating voltage ± 10%	V	230V AC 50Hz	115V AC 60Hz	230V AC 50Hz	115V AC 60Hz
Protection rate		IP00 EN 60529			
Electrical connection		2 x 0,5 mm ² single wires, length 900 mm			
Start up current	A	0,65	1,1	0,65	1,1
Power consumption	W	60	55	60	55

Dimensions

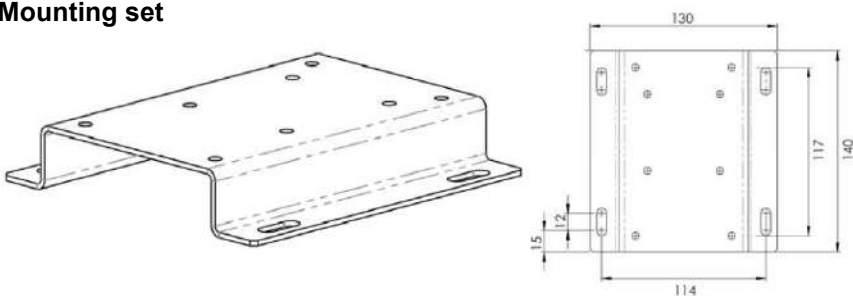


Dimensions in mm

Performance



Mounting set



The pump with mounting set is delivered with a mounting plate, two PVDF-fittings G1/8"i – DN4/6 and four vibration dampers with screws.





Heated Diaphragm Sample Gas Pump

N012ST.26E

Application

The diaphragm sample gas pump **N012ST.26E** is used for continuous extractive “hot gas” analytics. It mainly serves for unadulterated sucking and pumping of highly aggressive and corrosive sample gas above the dew point from sample point to the analyser house resp. analyser. Typical applications are emission measurements e.g. in waste incinerations and process measurements e.g. in chemical, petro-chemical, steel-, glass- or cement-industry.

Technology

The **N012ST.26E** is a reliable diaphragm pump with compact dimensions that guarantees an optimum integration in systems. It has a highly gas tight stainless steel pump head whose components have been developed especially for pumping of aggressive and corrosive gases. Special valves made of PTFE ensure a high tolerance to vapour and condensate as well as the PTFE-coated diaphragm. The results are an extremely long lifetime of the diaphragm and a high pneumatic performance of the pump. The pump is operating absolutely oil-free and ensures therefore an unadulterated pumping, evacuating and compressing of gases. The pump is ready for mounting and can operate in any position.

Functions

Core of the **N012ST.26E** is the elastic diaphragm which is moved up and down in its center by an eccentric. In this way gas is pumped through self-opening and-closing valves. Due to the IP54 housing of the motor it is protected perfectly against spray water, dust and dirt. The desired temperature can be adjusted at the electronic controller with display. External control of the pump via PC is possible with special software and RS232 interface.

- ✓ Heated to max. 240°C
- ✓ Electronic temperature controller
- ✓ Unadulterated pumping of sample gas
- ✓ Especially corrosion resistant sample gas wetted components made of PTFE and stainless steel
- ✓ Pump capacity 10,5 NI/hr without pressure
- ✓ Simple to remove insulation
- ✓ Long lifetime
- ✓ Maintenance free operation
- ✓ Simple mounting and integration
- ✓ RS232 interface and PC-software

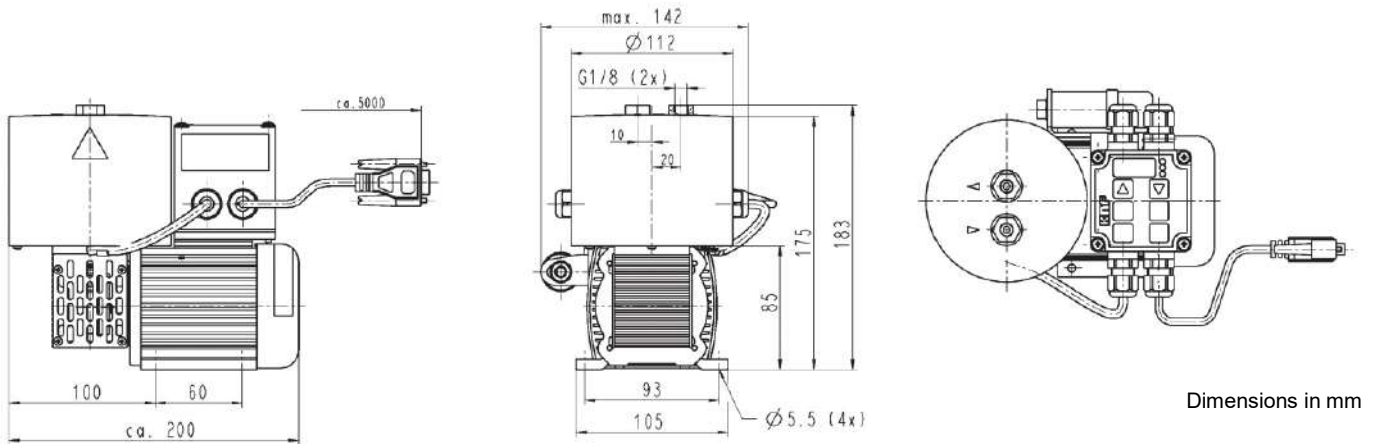




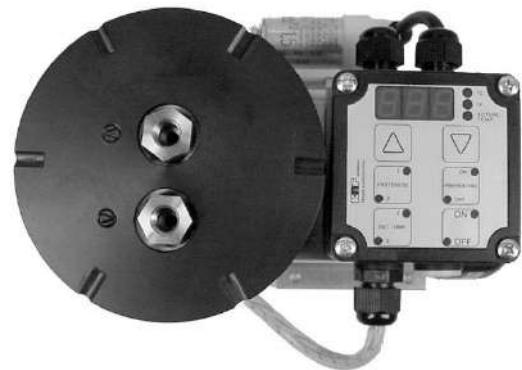
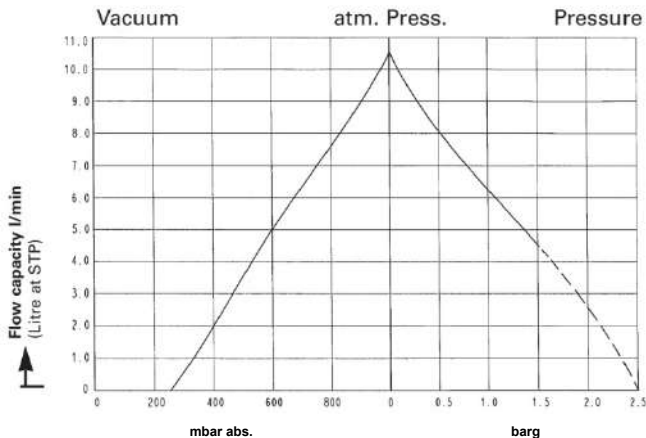
Technical Data

N012ST.26E			
Part No.			30000092
Pump capacity pressureless	l/min		10,5
End vacuum	mbar		240
Max. operating excess pressure	bar ü		1,5
Ambient temperature	°C		+5...+40
Heating temperature	°C		240
Design data			
Dimensions (W x H x D)	mm		142 x 183 x 200
Weight	kg		4,2
Media wetted materials			PTFE (membrane), PTFE (valves), Stainless Steel (pump head)
Connections			2 x G 1/8"i DIN ISO 228/1
Electrical data			
Operating voltage ± 10%	V		230V AC 50Hz
Protection class motor / heating			IP54 / IP20 (EN 60529)
Electrical connection			connection box
Operating current motor / heating	A		0,4 / 0,6
Power motor / heating	W		80 / 140
Interface			RS232

Dimensions



Performance diagram



N012ST.26E with electronic controller



Diaphragm Sample Gas Pump N87 TTE

Application

The diaphragm sample gas pump **N87 TTE** is used for continuous extractive gas analytics. It mainly serves for unadulterated sucking and pumping of highly aggressive and corrosive sample gas from sample point to the analyser house resp. analyser. Typical applications are emission measurements e.g. in waste incinerations and process measurements e.g. in chemical, petro-chemical, steel-, glass- or cement-industry.

Technology

The **N87 TTE** is a reliable diaphragm pump with compact dimensions that guarantee an optimum integration in systems and devices. It has a highly gas tight PVDF-pump head whose components have been developed especially for pumping of aggressive and corrosive gases. Special valves made of FFPM ensure a high tolerance to vapour and condensate. The patented PTFE-coated diaphragm was optimised using the finite-element-method. The results are an extremely long lifetime of the diaphragm and a high pneumatic performance of the pump. The pump is operating absolutely oil-free and ensures therefore an unadulterated pumping, evacuating and compressing of gases. The pump is ready for mounting and can operate in any position.

Functions

Core of the **N87 TTE** is the elastic diaphragm which is moved up and down in its center by an eccentric. In this way gas is pumped through self-opening and-closing valves. Due to the IP54 housing the pump is protected perfectly against spray water, dust and dirt.

- ✓ Unadulterated pumping of sample gas
- ✓ Especially corrosion resistant sample gas wetted components made of PTFE, PVDF and FFPM
- ✓ Pump capacity 5,5 resp. 7,5l/min without pressure
- ✓ Tension optimised long-lasting PTFE-diaphragm
- ✓ Long lifetime
- ✓ Maintenance free operation
- ✓ IP54 housing
- ✓ Simple mounting and integration
- ✓ Operation in any position

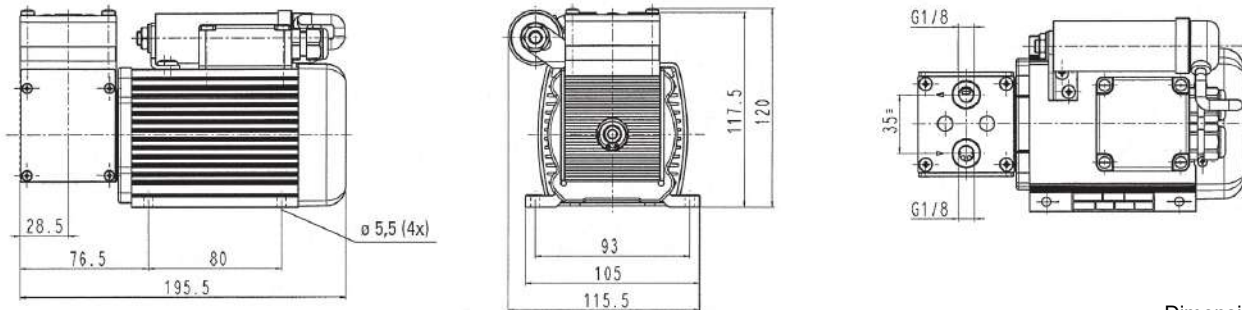




Technical Data

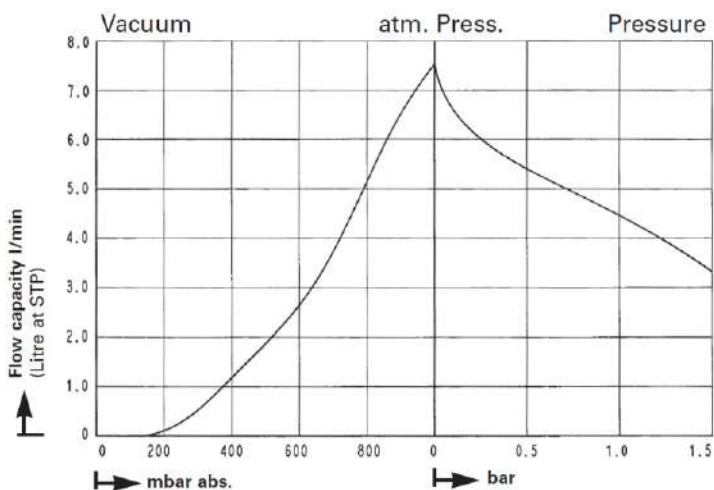
N87 TTE			
Part No.		92100003	92100610
Pump capacity pressureless	l/min	5,5	7,5
End vacuum	mbar	200	
Pump start	mbar abs	500	atmospheric pressure
Max. operating excess pressure	bar ü	1,5	
Ambient temperature	°C	+5...+40	
Media temperature	°C	+5...+40	
Design data			
Dimensions (W x H x D)	mm	196 x 120 x 116	
Weight	kg	3,1	3,3
Media wetted materials		PTFE (membrane), FFPM (valves), PVDF (pump head)	
Connections		2 x G 1/8" DIN ISO 228/1	
Electrical data			
Operating voltage ± 10%	V	230V AC 50Hz	115V AC 60Hz
Protection rate		IP54 EN 60529	
Electrical connection		connection box	
Operating current	A	0,5	0,7
Power	W	70	
Overload protection		thermo switch	

Dimensions



Dimensions in mm

Performance diagram





Diaphragm Sample Gas Pump N87 TTE Ex



Application

The diaphragm sample gas pump **N87 TTE Ex** is used for continuous extractive gas analytics in explosion zones. It mainly serves for unadulterated sucking and pumping of highly aggressive and corrosive sample gas from sample point to the analyser house resp. analyser. Typical applications are emission measurements e.g. in waste incinerations and process measurements e.g. in chemical, petro-chemical, steel-, glass- or cement-industry.

Technology

The **N87 TTE Ex** is a reliable diaphragm pump with compact dimensions that guarantees an optimum integration in systems and devices. It has a highly gas tight PVDF-pump head whose components have been developed especially for pumping of aggressive and corrosive gases. Special valves made of FFPM ensure a high tolerance to vapour and condensate. The patented PTFE-coated diaphragm was optimised using the finite-element-method. The results are an extremely long lifetime of the diaphragm and a high pneumatic performance of the pump. The pump is operating absolutely oil-free and ensures therefore an unadulterated pumping, evacuating and compressing of gases. The pump is ready for mounting and can operate in any position.

Functions

Core of the **N87 Ex TTE** is the elastic diaphragm which is moved up and down in its center by an eccentric. In this way gas is pumped through self-opening and-closing valves. Due to the IP66 housing the pump is protected perfectly against spray water, dust and dirt.

- ✓ **Applicable in Ex-zone 1 and 2**
- ✓ **Unadulterated pumping of sample gas**
- ✓ **Especially corrosion resistant sample gas wetted components made of PTFE, PVDF and FFPM**
- ✓ **Pump capacity 7,5l/min without pressure**
- ✓ **Tension optimised long-lasting PTFE-diaphragm**
- ✓ **Long lifetime**
- ✓ **Maintenance free operation**
- ✓ **IP66 housing**
- ✓ **Simple mounting and integration**
- ✓ **Operation in any position**

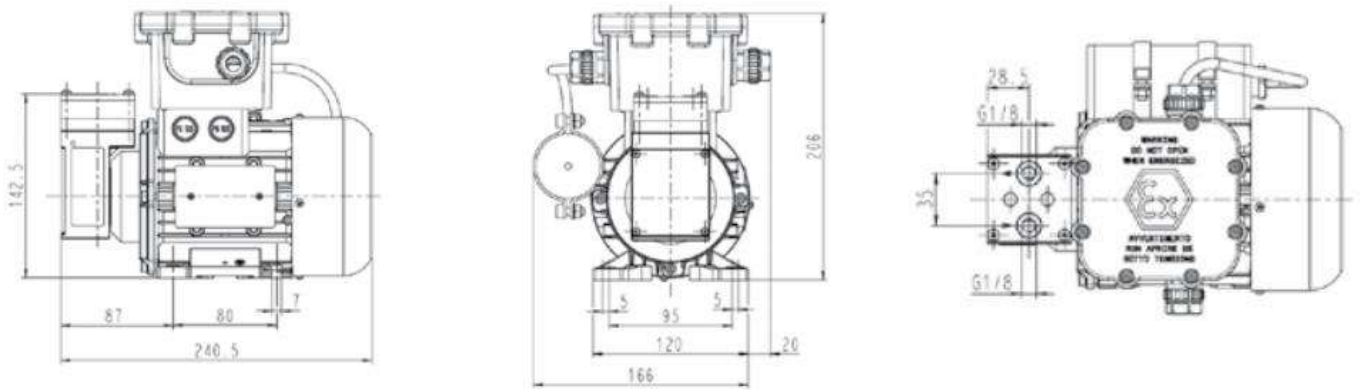




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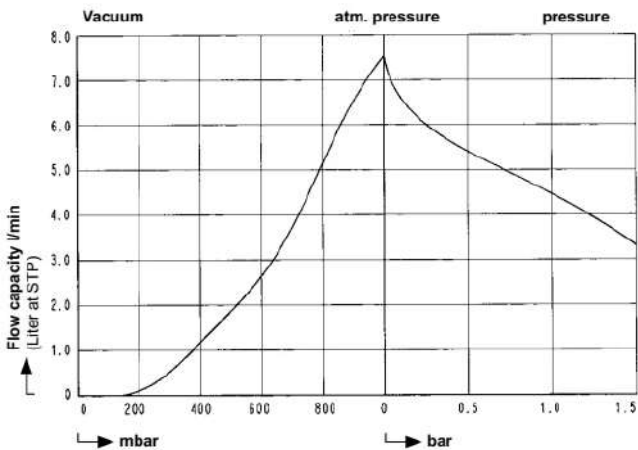
N87 TTE Ex			
Part No.		92100004	92100800
Pump capacity pressureless	l/min	7,5	
End vacuum	mbar	140	
Max. operating excess pressure	bar ü	1,5	
Ambient temperature	°C	+5...+40	
Media temperature	°C	+5...+40	
Design data			
Dimensions (W x H x D)	mm	186 x 206 x 240	
Weight	kg	7,0	
Media wetted materials		PTFE (membrane), FFPM (valves), PVDF (pump head)	
Connections		2 x G 1/8" DIN ISO 228/1	
Electrical data			
Operating voltage ± 10%	V	230V AC 50/60Hz	115V AC 50/60Hz
Protection rate		IP66 EN 60529	
Ex protection		Pump parts: II 2G c IIB + H2 T4 X	Motor: II 2G Ex db IIC T4
Electrical connection		connection box	
Operating current 50/60 Hz	A	0,96/0,72	1,92/1,40
Power 50/60Hz	W	166/158	162/155

Dimensions



Dimensions in mm

Performance diagram





NO₂/NO Sample Gas Converters

PSG NC / PSG NCB / PSG NCS

Application

The NO₂/NO sample gas converters series **PSG NC** are used for continuous extractive gas analysis. They serve primarily for conversion of NO₂ to NO for determination of NO_x as a sum of NO and NO₂. This enables the use of an NO-analyzer for measurement of the total nitrogen oxide concentration in burning processes like e.g. power plants or waste incinerations.

Technology

The centerpiece of **PSG NC** and **PSG NCB** is an oven within the easy to change molybdenum filled catalyst cartridge. The precise electronic temperature control to only 225°C in combination with the long-lasting catalyst cartridge achieves high conversion ratios even at high flow rates. Unique on the market is the catalyst reaction without any CO emission! The **PSG NCB** converter is additionally equipped with a 3/2-way solenoid valve downstream the catalyst cartridge to offer a bypass for test and calibration reasons.

Functions

Almost the total NO₂ amount of the sample gas is converted to NO with help of the molybdenum catalyst at an operating temperature of only 225°C. The low operating temperature prevents unwanted side-reactions. The change of the catalyst cartridge can be done very quick and simple via a thermally decoupled handle within short time. The bypass valve of the **PSG NCB** can be activated on the front panel to check e.g. the status of the catalyst cartridge with NO₂ test gas or for calibration via converter without influence of the catalyst.

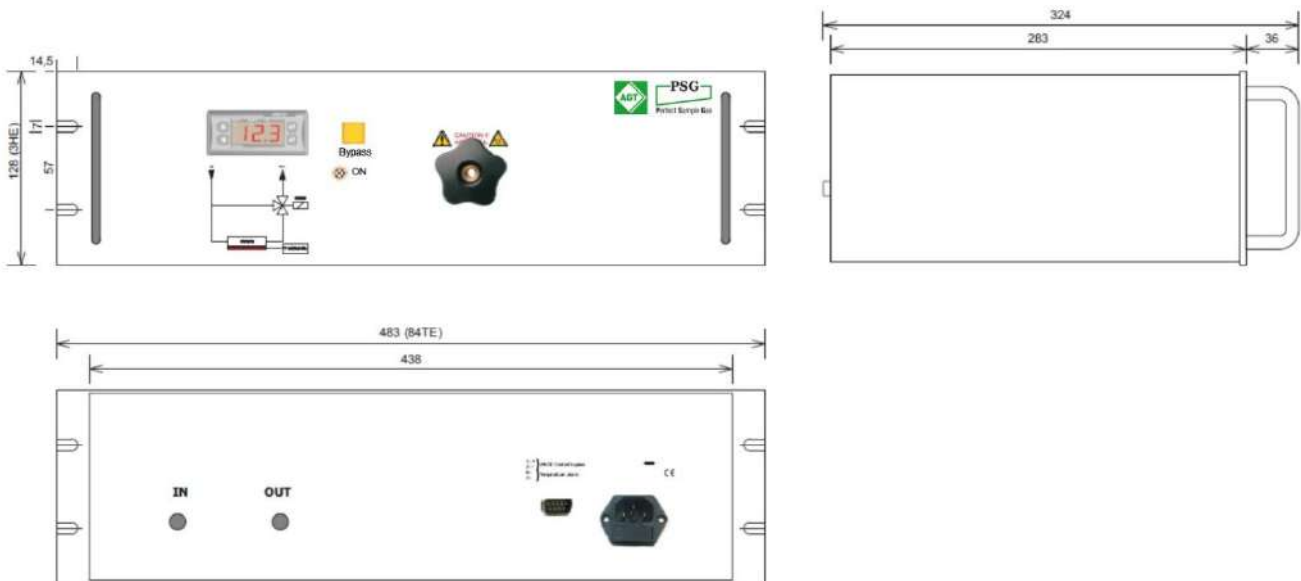
- ✓ High conversion efficiency
- ✓ Long cartridge lifetime even at high flow rates
- ✓ No CO emission
- ✓ Low operating temperature of 225°C
- ✓ Simple change of catalyst cartridge without any tools
- ✓ Bypass solenoid valve



Technical data

PSG NC / NCB / NCS				
Model		PSG NC	PSG NCB	PSG NCS
Part number		30000886	30000887	30000888
Bypass valve		no	yes	no
Operating temperature	°C	225 for standard molybdenum filling (600 for optional metal filling)		
Max. temperature	°C	600		
Gas flow rate V_n	l/hr	standard 60 (max. 90)		
Operating pressure	bar abs.	max. 2		
Gas inlet temperature	°C	max. 250		
Sample gas connections		¼" NPT f		
Conversion ratio	%	> 96 (new cartridge)		
Lifetime converter cartridge		approx. 6 month (depending on flow rate and NO ₂ concentration)		
Relative air humidity	%	< 80		
Ambient temperature	°C	+5 to +50		
Materials of gas wetted parts		stainless steel SS316, PTFE, FKM		
Design data				
Dimensions (W x H x D)	mm	483 x 128 x 283		100 x 176 x 300
Weight	kg	approx. 5		
Housing / colour		19"-rack / RAL 9003		wall mounting / steel grey
Electrical data				
Power supply		230V 50 Hz (others on request)		
Temperature display		digital		
Alarm set-points	°C	± 10.0		
Protection rate		IP 20 EN 60529 / EN 61010		
Power consumption	W	approx.. 450		
Alarm contact		freely programmable 1NO/1NC, rating: 250V, 5A AC		

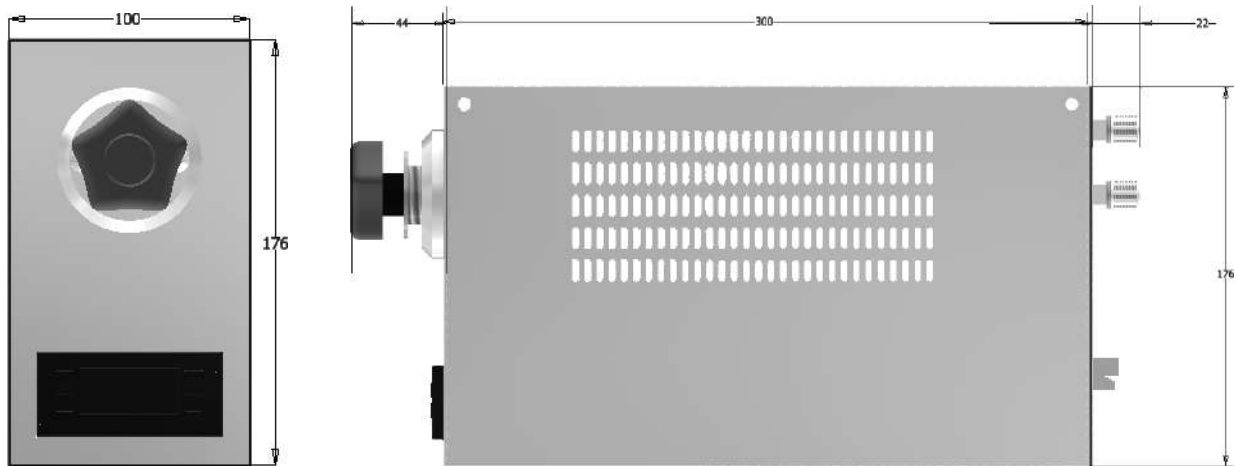
PSG NC / NCB Dimensions



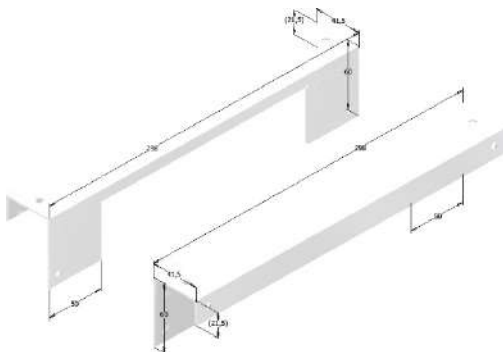
Dimensions in mm



PSG NCS Dimensions



Mounting brackets (can be mounted in 4 different positions)



Dimensions in mm



PSG[®]
Perfect Sample Gas



Portable Heated Gas Sampling Probe PSG Mobile

Application

The portable heated gas sampling probes series **PSG Mobile** are used for continuous extractive gas analysis. They enable trouble-free representative sampling of hot predominantly dust and water vapour loaded gases at changing locations. Typical applications are emission measurement, process monitoring and process optimization as well as inspection of permanently installed measurements.

Technology

The intelligent design with optimum gas guidance enables the filtration of sample gas at the outer filtration surface of 141cm² (largest on the market for portable probes) as well as comfortable and quick filter change without tools and dismounting of the heated sample line. Extremely simple maintenance of the **PSG Mobile** is enabled due to unscrewing the complete filter unit at the external rotary knob. The well insulated self-regulating high performance heating elements always ensures a homogeneous heating of the complete **PSG Mobile** to 180°C.

Functions

Due to the largest filtration surface on the market in combination with the homogeneous heating, dust will always be separated reliably in the **PSG Mobile** without condensation of water vapour and therefore without blocking of the filter. Due to the large ceramic filter with 2µm porosity the **PSG Mobile** is applicable for dust concentrations of up to 1g/m³. For elevated dust concentrations of up to 10g/m³ the **PSG Mobile** has a back purge port as standard. A stainless steel filter cartridge filled with glass wool is available for applications with soot and tar (e.g. diesel fuel exhaust gas). The standard calibration resp. test gas connection enables the use of the **PSG Mobile** within emission measuring systems according to 13. and 17. BImSchV (EU-regulations 2000/76/EG and 2001/80/EG).

- ✓ Largest active filter surface on the market
- ✓ Corrosion resistant made of stainless steel SS316
- ✓ Very compact and light weight design
- ✓ Self-regulated heating to 180°C
- ✓ No cold spots
- ✓ Very quick and simple filter change without any tools
- ✓ Test gas / back purge connection as standard
- ✓ Low temperature alarm contact
- ✓ Excess temperature safety switch-off
- ✓ Extremely robust transport case
- ✓ Different sampling tube materials and length adaptable





Technical Data

PSG Mobile			
Model		PSG Mobile	PSG MP
Part number		53402201	53402202
With transport case and spare filter		nein	ja
Operating temperature	°C	180	
Operating pressure	bar abs.	0,5 - 4	
Ready for operation	min	15 - 30	
Filter porosity / material / surface	µm / cm ²	2 / 141 / ceramic (others on request)	
Dust concentration	g/m ³	1 (10 w ith back purge)	
Calibration gas / back purge connection		¼" NPT f	
Sample gas connection		¼" NPT f	
Connection sample gas inlet		G 3/8" f	
Mounting		Mounting eye w ith 2m metal chain or G 3/4" m for flange mounting	
Max. gas temperature	°C	Depending on sampling tube resp. 200 at sample gas inlet	
Ambient temperature	°C	-20 to +80	
Material gas w etted parts		Stainless steel SS316, ceramic, FKM	
Design data			
Dimensions (W x H x D)	mm	330 x 125 x 220	
Weight	kg	ca. 2,5	
Housing / color		sheet steel painted / RAL 9003	
Protection class		IP40	
Electrical data			
Voltage	VAC	230 50 Hz (115 60Hz optional)	
Electrical connection		7-pin plug connection w ith 4m cable and device plug	
Power consumption	W	approx. 450	
Voltage indication		by red LED	
Ready-to-operate display		by green LED	
Safety switch-off		at excess temperature	

Additional Options

Option	Part number
Voltage 115V/60Hz instead of 230V 50Hz	53500100
Glass w ool cartridge incl. filling instead of ceramic filter	53500101
Check valve in calibration gas / back purge connection, 0,7 bar cracking pressure	53500102
Mounting flange DN65 PN6 w ith bushing G 3/4"i for permanent probe mounting	53500103
Sampling tube SS316, G 3/8"m, length 1m, 10mm Øo., max. 600°C	53500104
Sampling tube SS316, G 3/8"m, length 1,5m, 10mm Øo., max. 550°C	53500105
Sampling tube SS316, G 3/8"m, length 2m, 10mm Øo., max. 500°C	53500106
Sampling tube Kanthal, G 3/8"a, length 1m, max. 1400°C	53500107
Sampling tube Kanthal, G 3/8"a, length 1,5m, max. 1400°C	53500108
Sampling tube Kanthal, G 3/8"a, length 2m, max. 1400°C	53500109
Heated stainless steel sampling tube PSG HTM , G 3/8"m and G 3/8"f, length 1m, heated to 180°C, max. process temperature 580°C, 230VAC500W	53500110
Heated stainless steel sampling tube PSG HTM , G 3/8"m and G 3/8"f, length 2m, heated to 180°C, max. process temperature 580°C, 230VAC500W	53500111



PSG HTM



Sampling tube
SS316 or Kanthal



Glass w ool cartridge

PSG MP



Controlled Heated Flexible Sample Lines

PSG Flex Plane

Application

The controlled heated sample lines series **PSG Flex Plane** are used for continuous extractive gas analysis and are suitable especially for movable resp. mobile applications. They serve primarily for the transport of the humid sample gas stream from the sample point to the analysis system. The holding temperature of the line thereby has to be above water vapour resp. acid dew point of the sample gas. In this way uncontrolled condensation of water vapour on the way to the analyser and therefore washing out of gas components in condensate is prevented. Also failure of the measurement by a freezing line at ambient temperatures below 0°C is avoided.

Technology

The extremely flexible lines **PSG Flex Plane** are equipped with outer silicone jacket. For heating a fixed resistor heating cable is used. Insulation is done with glass fibre fleece and silicone foam hose. Internal lines made of PTFE or PFA are possible. Pressure resistance is achieved by a metal braid jacket of the internal tube.

Functions

The lines are delivered completely assembled and ready for operation ex works. The control of the lines **PSG Flex Plane** is done with an external temperature controller (e.g. **ST49** or **DC-10**) via integrated PT100 to max. 200°C. With optional quick connectors and looped through power supply the heated line can be connected quick and simple with e.g. the mobile gas sampling probe **PSG Mobile** and the mobile gas conditioning system **MAK Mobile**. This way all three components are supplied with only the electrical connection of the gas conditioning **MAK Mobile**.

- ✓ Design with very flexible silicone outer jacket
- ✓ Pressure resistant internal tube with metal braid jacket
- ✓ Ideal for mobile applications
- ✓ Perfectly combinable with PSG Mobile and MAK Mobile
- ✓ Operation with external temperature controller
- ✓ Fixed resistor heating cable
- ✓ Max. 200°C control temperature
- ✓ Ready for operation assembled ex works
- ✓ Internal lines made of PTFE or PFA





Technical data and order numbers

Construction data		
Max. operating temperature	°C	200
Heat insulation / weight	kg/m	glass fibre fleece and silicone foam hose / 1
Insulation thickness	mm	14
Heating cable type		fixed resistor heating cable
Outer jacket		silicone
Outer diameter	mm	44
Min. bending radius	mm	5 x outer diameter
Ambient temperature	°C	-20 to +65
Max. operating pressure abs. PTFE line	bar	20
Protection class		IP64 (EN60529)
Max. heating circuit length	m	60
Electrical data		
Power	W/m	90
Electrical connection		3m silicone connection cable, open ends or 0,3m with 7-pole plug
Power supply		230V 50/60Hz or optional 120V 50/60Hz
Order numbers for 1m line with silicone jacket, 230V 50/60Hz		
1 x PTFE internal line 6mm	1m	54004157
1 x PTFE internal line 8mm	1m	54004158
1 x PTFE internal line 6mm*	1m	54004088
Order numbers for assembly ex works		
Silicone cap with stainless steel tube socket ending (probe side)		50085049
Silicone cap with stainless steel tube socket electr. connection		50085057
Silicone cap with quick connector (probe side)		50085096
Silicone cap with quick connector and electr. connection		50085097
Silicone cap with quick connector (probe side)**		50085093
Silicone cap with quick connector (analyzer side)**		50085094
Loop-through power supply with 7-pin connector at both ends		50085098
PT100 placed 350mm from ending, 3m cable		50061200

*Including 230VAC power cable for self-regulating mobile probe heating

**Including supply connection and temp.sensor connection

Assembly



Silicone cap with stainless steel tube socket



Silicone cap with quick connector

Temperature controllers



PSG ST49 with 25A SSR 230V 50/60Hz
Part No. 50078850



PSG DC10
Part No. 50078820

Options

- Silicone foam ring with Velcro fastener for thermal insulation of the measuring gas connection on the PSG Mobile
- Internal lines made of PTFE or PFA with dimensions DN4/6 or DN6/8
- Power supply 115V 50/60Hz
- Cable gland M63 x 1,5 (clamping range 36-48mm), PA, for cabinet wall mounting, IP68, mounted or separately



Portable Sample Gas Conditioning System

MAK Mobile

Application

The compact powerful and low maintenance sample gas conditioning system **MAK Mobile** is used for continuous extractive gas analysis at changing locations. It serves primarily for exact constant lowering of the sample gas dew point and thus for drying of the humid sample gas flow. In this way water vapour cross sensitivities and volumetric errors are minimized and damages of the sensible analyzer are avoided. Integrated filter, condensate pump and sample gas pump ensure residual dust and condensate removal as well as supply of the analyser with sample gas.

Technology

The precise microprocessor controlled temperature regulation of the Peltier cooler within the **MAK Mobile** in combination with the innovative corrosion resistant PFA-coated heat exchangers achieves a low highly constant dew point. The hydrophobic corrosion resistant PFA-coating and the very short retention time of the sample gas in the heat exchanger ensure lowest possible gas dissolution ratios.

Functions

All components of the **MAK Mobile** are integrated in an extremely robust transport case which can be operated in closed condition and therefore weather protected. The heated line is inserted lateral in the case and directly connected at the temperature resistant robust stainless steel connector and the 7-pole plug. At the integrated temperature controllers dew point temperature and temperature of the heated line can be adjusted quick and simple. Through the inspection window in the case lid temperature controller and up to three flow meters are readable at any time. With optional integrable components like flow meters, liquid alarm sensor, acid dosage and temperature controller for the heated line the portable sample gas conditioning system **MAK Mobile** can be equipped as needed.

- ✓ Powerful Peltier cooler for max. 250NI/hr
- ✓ Constant adjustable outlet dew point
- ✓ Integrated condensate pump, sample gas pump and PTFE fine filter
- ✓ Corrosion resistant heat exchanger with PFA-coating
- ✓ Compact design, low weight
- ✓ Extremely robust transport case
- ✓ Fast operational readiness < 10 min.
- ✓ Up to 3 flowmeter, a temperature controller, acid dosage and liquid alarm integrable as option
- ✓ Tubing in PTFE and PVDF
- ✓ Quick and simple maintenance





Technical Data

MAKMobile		
Model		MAK Mobile
Part number		92100640
Max. gas flow $V_n^{1)}$	l/hr	250
Outlet dew point	°C	adjustable +1 to +15 / factory setting +4 / alarm limits ± 4
Dew point stability	°C	$\pm 0,1$
Max. operating pressure	bar	3
Max. sample gas temperature	°C	190
Ambient temperature	°C	+5 to +45
Storage temperature	°C	-25 to +65
Operational readiness	min	< 10
Filter porosity	μm	2
Connection sample gas inlet	mm	stainless steel fitting DN4/6
Connection sample gas outlet (max. 3)	mm	PVDF-fitting DN4/6
Materials of gas wetted parts		PFA, PTFE, PVDF, glass, PPS, FFPM, SS316
Design data		
Dimensions (W x H x D)	mm	468 x 355 x 193
Weight	kg	approx. 12
Housing / colour		heavy duty ABS-case / grey
Electrical data		
Voltage	VAC	230 50 Hz (115 60Hz optional)
Total cooling capacity	kJ/hr	max. 245 (2 Peltier-elements)
Power consumption	W	100
Electrical connection		1,5m cable with device plug
Electrical connection heated line (option)		7-pole socket
Max. switching capacity f. heated line (Option)	A	10
Electrical case protection	A	2 (standard) resp. 10 for option temperature controller for heated line
Alarm contact		switching off sample gas pump at excess / low temperature and liquid alarm
Electrical equipment standard		EN61010

¹⁾ in consideration of the total cooling capacity at 25°C ambient temperature

Additional Options

Option	Part number
Voltage 115V/60Hz instead of 230V 50Hz	92100645
Integrated flow meter with needle valve FM60, 6-60N/h	92100646
Integrated flow meter with needle valve FM150, 15-150N/hr	92100647
Integrated flow meter with needle valve FM250, 25-250N/hr	92100648
Integrated flow meter with needle valve FM500, 50-500N/hr	92100649
Liquid alarm with sensor integrated in the filter to switch off sample pump at liquid	92100650
Integrated from outside visible temperature regulator for heated line with 7-pole connection for max. 10A switching capacity	92100651
Additional sample gas outlet without flow meter	92100652
Sample gas outlet made of SS316 instead of PVDF	92100653
Acid dosage upstream heat exchanger inlet with integrated SR25 for minimization of wash out effects	92100644





Mercury Sorbent Trap Probe

Application

The sampling probe is the single most important hardware element in sorbent trap mercury monitoring systems. The probe has to hold up to constant and direct flue gas exposure while keeping the sorbent traps properly positioned and maintaining temperatures at appropriate levels.

Technology

The well-designed probe guarantees a quick and easy trap exchange without the use of any tools. With this tool-free system, users can install and remove traps in seconds without breakage. In addition, this probe provides for field serviceability by allowing the removal of the outer probe jacket. This is the only mercury probe on the market that with this feature.

Functions

The 1,50 m probe weighs less than 16 kg. It is easily maneuvered by a single operator. Our probes incorporate several unique design features that ensure ease of use, fast trap exchanges and minimal maintenance.

In combination with the MET-Nomad, it is possible to determine mercury concentrations in flue gases of less than

3.

- ✓ **Corrosion resistant. Made of stainless steel SS316 or C-276 Hastelloy**
- ✓ **No cold spots**
- ✓ **Quick and easy exchange of the sorbent traps without tools**
- ✓ **Integrated multi-zone heated Sample Line**
- ✓ **High reliability**
- ✓ **Easily maneuvered by a single operator**
- ✓ **Made in Germany**



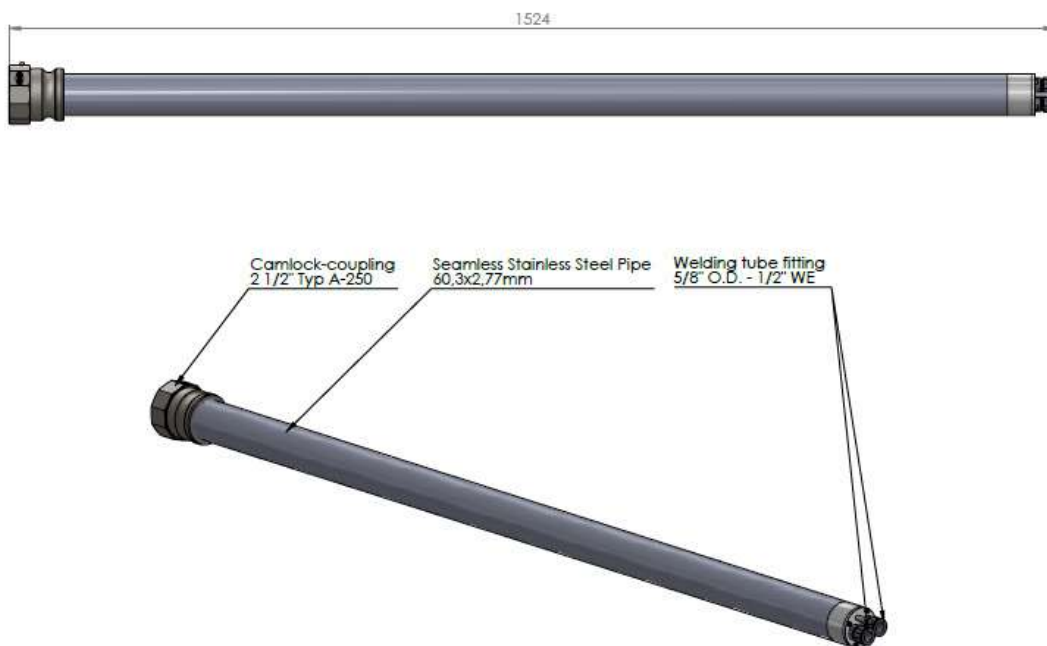


Technical Data

			Part No.
Mercury sampling Probe conditions	Pressure	p _{abs} = 2 ... 15 inch hg / 7 hPA ... 48 hPA	
	Temperature	max. 200 °C	
	Flow	50...5000 scc/min	
	Max. dust content	20 mg/m ³	
Connections	Sample gas	2 x G1/4" f (DIN ISO 228/1) / 6 mm tube	
	Thermocouple	3 x Thermocouple connectors in miniature design	
Heating	Type	Flexible heating cable	115V AC, 200 W 230V AC, 200 W
	Isolation	thermal or glass fibre fleece	
	Temperature	150 °C	
	Temperature sensor	Thermocouple K-type Insulated NiCr-Ni, Outer Jacket Inconel 600	
Probe Properties	Dimension	1524 x 60,3 x 60,3 mm (L x B x T)	
	Material	Stainless steel SS 316 / C-276 Hastelloy	
	Ambient temperature	+50°C ... +120°C	
	Weight	approx. 30 kg (complete probe)	
Mounting	Flange	2 1/2"	
Materials in contact with sample gas	Housing, flange, gas connections	Stainless steel SS 316Ti or C-276 Hastelloy	

Dimensions

1,5 m Probe



Dimensions in mm



Mercury Calibration Kit

MET-CalKit

Application

The MET-Cal-Kit is all you need to ensure that your monitoring system (MET-Nomad) is sampling accurately and keeps you compliant with QA/QC requirements. All packaged in a rugged Pelican case for secure storage and transportation

- ✓ Online calibration audits in minutes with the intuitive METRIC software
- ✓ Quick and easy temperature audits with reference thermocouples and digital pyrometer

Functions

With the METRIC Software it is possible to do online audits within minutes. Temperature audits can be done quickly with reference thermocouples and digital pyrometer. All audit components are NIST- traceable and have CE and RoHS Certifications.





Construction data		
Ambient temperature	°C	+5 to +40
Ready for start up	min	20
Flow Ranges	ccm	50 to 5000
Accuracy Volumetric		±1.0%
Accuracy Standardized		±0.75%
Temperature & Pressure Sensor Accuracy		In the flow stream Pressure: ±3.5 mmHg (typical), ±7.0 mm (max) Temperature: ±0.8 °C (typical), ±1.3 °C (max)
Display		Backlit graphical LCD
Design data		
Dimensions (W x H x D)	mm	140 x 150 x 75
Weight	kg	0,89
Electrical data		
AC Adapter/Charger		12 DC, >250 ma, 2.5 mm, center positive
Battery		6V rechargeable, sealed lead-acid, 6-8 hours typical operation

Components:

- Mesa Labs BIOS Definer flow calibrator
- 1/8" NIST-traceable reference thermocouple for stack thermocouple audit
- 3/8" NIST-traceable reference thermocouple for trap thermocouple audit
- Digital pyrometer for use with the reference thermocouples

- Self-regulated heating blanket to facilitate thermocouple audits
- Ancillary components, such as fittings, tubing, etc. to facilitate use of the major components listed above



Portable Mercury Sorbent Trap Monitoring System PSG MET Basic

Application

Built with the same attention to detail as the other products of the MET™ Line of Products, this sampler is ideal for short-term tests of critical processes in harsh environments. The ease of setup and configuration of this highly portable system allows any team to start testing quickly and at a moment's notice. Although primarily designed for Hg testing using sorbent traps, this system also accommodates traps for HCl, HBr, Se, As, and other target compounds.

The PSG MET Basic with its accompanying MET-Probe is ideal for the following applications:

- EPA Method 30B (Relative Accuracy Test Audit testing)
- Engineering Studies and Diagnostic Testing
- Mercury Speciation Studies
- Control Technology Performance Optimization Testing
- Continuous Emissions Monitoring System Verification Testing and Spot Checks

Technology

The portable, robust yet lightweight design of the PSG MET Basic allows for frequent use in harsh environments without degradation of performance. With its proven mass flow meter technology, it can precisely measure sample flow and volume during a sample run and automatically control the sample flow to a configured setpoint. The PSG MET Basic has two sample flow paths. Each sample flow path accommodates a sample flow range of 0 – 2 l/min (liters per minute). The system features all digital readouts and one oxygen sensor per flow path to indicate potential system leakage. System operation control is achieved via several dials and buttons, providing for intuitive operation.

Combined with the proven MET-Probes, the sampler achieves a precise temperature control for probes and heated sample lines guaranteeing an optimum test performance.

Features

- ✓ Designed and built for frequent use in harsh environments
- ✓ Easy setup and configuration
- ✓ PID control for trap and heated sample line heating
- ✓ Based on mass flow meter technology that automatically corrects sample volume for pressure and temperature
- ✓ Digital temperature and pressure readouts
- ✓ Oxygen sensor for each flow path
- ✓ Compatible with all MET-Probes





Specifications

Construction data		
Gas paths		2
Sample Flow Rate	l/min	0 – 2 (Standard), other ranges available upon request.
Ambient temperature	°C	0 to +43
Ready for startup	min	10
Design data		
Sampler Dimensions (W x H x D)	cm	50.8 x 40.6 x 17.8
Sample Weight	kg	8.62
Carrying Case		Hard plastic
Electrical data		
Power supply	V	230V 50/60 Hz or 115V 50/60Hz
Current	A	10

Recommended Accessories and Consumables



Vacuum-safe impinger set (polycarbonate) for moisture and acid gas removal



Acid gas and moisture scrubbing adsorbent mixture (5 lb container)



NIST-traceable volumetric flow meter for system calibration



6-inch sorbent trap shield (Stainless Steel or Hastelloy)



MET-Probe (Stainless Steel and Hastelloy), heated or air-cooled



Flange with Camlock adapter



Mercury Sorbent Trap Monitoring System

PSG MET Plus

Application

The same high-accuracy flow technology and automation software used in the proven MET™-80 monitoring systems from one of the big players in the US market, CleanAir Engineering, is now available in the compact and portable MET Plus at AGT-PSG. This fully automated system makes Mercury RATA, LEE, and diagnostic testing easy.

Technology

The robust design of the MET Plus allows for frequent use in harsh environments while ensuring reliability. While originally designed for mercury testing, it can also be used for other sorbent trap test methods including for speciated mercury testing. The MET-Nomad has two sample flow paths. Each sample flow path accommodates a wide sample flow range of 50 – 5.000 dscm/min (dry standard cubic centimeter per minute).

Functions

This system is completely stand-alone, automating sampling, calibrations and leak checks. The automation is achieved via a robust programmable automation controller that also provides for data back up onto a flash drive. The user interacts with the MET Plus via an intuitive software interface, the “METRIC”. METRIC™ can be installed on an accompanying tablet and is continuously updated by CleanAir Engineering to reflect the latest operator experiences. The MET Plus controller is backed by a Mini UPS to avoid data loss during a sudden power outage.

Features

- ✓ Designed and built for frequent use in harsh environments
- ✓ Stand Alone – completely automated
- ✓ Can be used for any sorbent trap test - not limited to mercury testing
- ✓ Easy to use - Intuitive Software
- ✓ Mini UPS keeps data safe during power loss
- ✓ DAHS Connectivity via Modbus TCP or analog signals
- ✓ 46 x 48 x 18 cm – small footprint for tight test locations





Specifications

Construction data		
Gas paths		2
Gas flow	l/hr	12 - 120
Ambient temperature	°C	+5 to +40
Ready for start up	min	20
Design data		
Dimensions (W x H x D)	cm	46 x 48 x 18
Weight	kg	30
Housing		Hard plastic
Electrical data		
Power supply		230V 50/60 Hz or 115V 50/60Hz

Recommended Accessories and Consumables



Vacuum-safe impinger set (polycarbonate) for moisture and acid gas removal



Acid gas and moisture scrubbing adsorbent mixture (5 lb container)



NIST-traceable volumetric flow meter for system calibration



6-inch sorbent trap shield (Stainless Steel or Hastelloy)



MET-Probe (Stainless Steel and Hastelloy), heated or air-cooled



Flange with Camlock adapter



Application Questionnaire

Contact	Name			
	Company			
	Division			
	Street			
	Post Code			
	City			
	Phone / Mobile			
	Fax			
Process description				
Government regulations	<input type="checkbox"/> Monitoring <input type="checkbox"/> Process control <input type="checkbox"/> Process measurement <input type="checkbox"/> 13.BImSchV <input type="checkbox"/> 17.BImSchV			
Hazardous area application	Sampling location (connection piece)	Transport way	Installation location analysis cabinet	
	Zone Temperature class T	Zone Temperature class T.....	Zone Temperature class T.....	
Sample gas line	<input type="checkbox"/> unheated <input type="checkbox"/> heated to°C lengthm Ambient temperature°C to°C			
Location analysis cabinet	<input type="checkbox"/> sheltered <input type="checkbox"/> outdoor <input type="checkbox"/> analysis house <input type="checkbox"/> corrosive ambient Ambient temperatureC° to°C			



Application Questionnaire

Process data			
Process conditions	Min.	Normal	Max.
Temperature at sampling point [°C]			
Pressure at sampling point [bar abs.]			
Water vapour content [g/m ³] or water vapour dew point [°C]			
Acid dew point [°C]			
Dust concentration [mg/m ³]			
Further contaminants [mg/m ³]			
Grain size / grain size distribution [µm / %]			

Sample gas composition	Component	Measuring component	Min.	Normal	Max.	Temperature	Dew point



Application Questionnaire

Design data for sampling point(s)	
Gas sampling probe, sampling tube length(s) from flange :	
Mounting flange : DN PN / ANSI lbs /	
Mounting position of gas sampling probe : <input type="checkbox"/> horizontal <input type="checkbox"/> vertical <input type="checkbox"/> sketch	
Heating of sample line : <input type="checkbox"/> electr. heating <input type="checkbox"/> steam heating min. temperature°C	
Dimension of sample line : <input type="checkbox"/> DN4/6mm <input type="checkbox"/> DN6/8mm <input type="checkbox"/>	
Available sample quantity [NI/hr]	
Required T ₉₀ time [s] :	
Electrical auxiliary energy : <input type="checkbox"/> 230V 50Hz <input type="checkbox"/> 115V 60Hz <input type="checkbox"/>V.....Hz	
Instrument air oil/water free :bar steam :bar cooling water :°C	
Output signal : <input type="checkbox"/> 0-20mA <input type="checkbox"/> 4-20mA <input type="checkbox"/>mV <input type="checkbox"/> potential-free <input type="checkbox"/> Ex (i)	
Further processing of the output signal at the site as :	
<input type="checkbox"/> Indication <input type="checkbox"/> Registration <input type="checkbox"/> Controller connection <input type="checkbox"/> Computer connection	
Limit signalling :	
<input type="checkbox"/> acoustic <input type="checkbox"/> optical <input type="checkbox"/> limit exceeding <input type="checkbox"/> low limit deviation	
<input type="checkbox"/> Sample gas is in operating composition an explosive gas composition	
<input type="checkbox"/> Sample gas is an explosive gas composition in combination with air	
<input type="checkbox"/> Ignition protection type for explosion protected analysis system :	
<input type="checkbox"/> Protective gas purging is sufficient	
<input type="checkbox"/> System parts like display, plotter, switching devices can be installed in ex-free area	
Which :	
<input type="checkbox"/> Distance between site of analysis facility and ex-free zone (m) :	
<input type="checkbox"/> Lacquering RAL 7032 <input type="checkbox"/> Special lacquering, colour :	



Application Questionnaire

Design data for sampling point(s)
Design of analysis system : <input type="checkbox"/> single devices <input type="checkbox"/> mounting plate <input type="checkbox"/> FRP-cabinet <input type="checkbox"/> steel-cabinet <input type="checkbox"/> cabinet in special construction <input type="checkbox"/> cabinet with window <input type="checkbox"/> installation with several systems <input type="checkbox"/> cabinet with base 100 / 200mm <input type="checkbox"/> mobile version <input type="checkbox"/> other
Max. dimensions [mm] :(B) x(H) x(T)
Installation site : <input type="checkbox"/> outside <input type="checkbox"/> in closed rooms <input type="checkbox"/> on ground floor <input type="checkbox"/> on floor <input type="checkbox"/> for transport accessible via stairs / lift <input type="checkbox"/> weight or dimension limitation (kg/mm) :
Insertion sample line into cabinet : <input type="checkbox"/> any <input type="checkbox"/> above <input type="checkbox"/> left <input type="checkbox"/> right <input type="checkbox"/> back
Cable insertion into cabinet : <input type="checkbox"/> any <input type="checkbox"/> above <input type="checkbox"/> left <input type="checkbox"/> right <input type="checkbox"/> back
Fitting dimensions of sample line : <input type="checkbox"/> 6mm <input type="checkbox"/> 8mm <input type="checkbox"/> 10mm <input type="checkbox"/> 12mm <input type="checkbox"/>Inchl External fittings type
Fittings and tube/hose-material : <input type="checkbox"/> SS316Ti <input type="checkbox"/> PVDF <input type="checkbox"/> PTFE <input type="checkbox"/> FPM External fittings type
Heating (type) :
Ventilation (type) :
Air-conditioning (type) :
Lighting (type) :
Connection box (type) :
<input type="checkbox"/> Voltage from grid L1, N PE <input type="checkbox"/> L1, L2 (two-pole protection) <input type="checkbox"/> Protection transformer internal <input type="checkbox"/> external <input type="checkbox"/>
Special circuit regulations :
Special factory specifications of the operator :



Application Questionnaire

Design data for sampling point(s)	
Special make request for auxiliary equipment :	
<input type="checkbox"/> Design-, tubing- and wiring plans before production start for approval	
Documentation scope : number of copies number of manuals	
Language : <input type="checkbox"/> German <input type="checkbox"/> Englisch <input type="checkbox"/>	
<input type="checkbox"/> Factory acceptance desired <input type="checkbox"/> start up desired <input type="checkbox"/> on-site mounting	
<input type="checkbox"/> Several measuring points are connected, pieces	
Sample point switching of sample gas	
<input type="checkbox"/> automatically with solenoid valves <input type="checkbox"/> manually with manual valves	



PSG[®]
Perfect Sample Gas

Application Questionnaire

System sketch and information about particular details

Location, date :

Signature customer :

Signature AGT-PSG employee :

AGT-PSG GmbH & Co.KG

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