

# System Components and Accessories for Sample Gas Conditioning



SCC-C Sample Gas Cooler

SCC-F Sample Gas Feed Unit

SCC-E Sample Gas Feed Unit

Diaphragm Pump 4N

Diaphragm Pump 2

SCC-K NO<sub>2</sub>/NO Converter

CGO-9 Tubular Furnace

Reaction Element

Membrane Filter

CGKW Condensate Monitor

Acid Filter

Disposable Filter

Flow Meters, Flow Monitors

ER-144A/Ex Switching Unit

KFA Isolated Switch Amplifier

Stripper for Cooling Water and Waste Water

Multi-way Test Gas Cocks

Cylinder Pressure Reducers



# SCC-C Sample Gas Cooler

- Compressor sample gas cooler
- Constant outlet dew point
- 1 or 2 gas paths
- Heat exchanger made from glass, PVDF or stainless steel, exchangeable without tools
- Corrosion-resistant gas lines
- High pressure design up to 1 MPa (10 bar)
- Temperature display
- Suitable for ambient temperatures up to 50 °C
- Compact surface-mounting housing (width 1/2 19 inches, 6 height units)
- System solutions in connection with the SCC-F sample gas feed unit
- Suitable for use in measuring equipment conforming with 17th BImSchV (German Federal Immission Protection Law)
- Explosion-proof versions with ATEX and CSA certifications



## Sample gas inlet conditions

Sample gas pressure

Heat exchanger material	Sample gas pressure $p_{abs}$	
	without peristaltic pump	with peristaltic pump
Glass	50...200 kPa (0.5...2.0 bar)	50...150 kPa (0.5...1.5 bar)
PVDF	50...250 kPa (0.5...2.5 bar)	50...150 kPa (0.5...1.5 bar)
Stainless steel	0.05...1 MPa (0.5...10 bar)	50...150 kPa (0.5...1.5 bar)

Sample gas flow rate

1 x 250 l/h (HE250) or 1 x 125 l/h (HE125) or 2 x 125 l/h, with respect to the sample gas pressure  $p_{abs} = 100$  kPa (1 bar) and 25 °C

Sample gas inlet temperature

Max. 140 °C

Sample gas inlet dew point

Max. 70 °C,  
max. 60 °C for HE250 at sample gas flow rate > 200 l/h

## Operating data

Sample gas outlet temperature

Factory-set to +3 °C

Dew point stability

±0.3 °C per 10 °C temperature change,  
±0.3 °C per 10 l/h change in flow rate

Refrigeration capacity

40 W at +10...+50 °C

Warm-up time

Approx. 15 min

Pressure drop in heat exchanger

Approx. 1 hPa (1 mbar)

Approx. 4...8 hPa (4...8 mbar) for HE125

Dead volume in heat exchanger

Heat exchanger material	Dead volume in heat exchanger	
	HE125	HE250
Glass	40 ml	140 ml
PVDF	25 ml	100 ml
Stainless steel	30 ml	100 ml

Gas tightness

$5 \times 10^{-6}$  hPa l/s

Temperature display

Digital display in °C

Status signal

< 0 °C and > 8 °C, 2 potential-free two-way switches,  
switching capacity 250 VAC, 2 A

Refrigerant

R 134a

## Materials of gas-conducting parts

PVDF, PTFE, PP, glass, FPM, stainless steel (high pressure version)

## Power supply

Input voltage

230 VAC or 115 VAC -15...+10 %, 50...60 Hz

Power consumption

Max. 200 VA

Starting current

2.5 A at 230 VAC

# SCC-C Sample Gas Cooler

## Construction

### Design

Surface-mounting housing 1/2 19 inch, 6 height units

### Mounting

On the wall with mounting brackets supplied or in a 19-inch cabinet/rack

### Housing material and color

Sheet steel; light gray (RAL 7035), basalt gray (RAL 7012)

### Degree of protection of housing

IP 20 to EN 60529

### Dimensions

See dimensional drawing on page 5

### Weight

Approx. 15.6/ 16.5 kg with 1/2 heat exchangers

## Gas connections

### Heat exchanger

Heat exchanger material	Sample gas inlets & outlets	Condensate outlet
Glass	Screwed pipe or hose connection GL18 <sup>1)</sup>	Pipe nipple GL25
PVDF	6 mm tube	G 3/8 inch internal thread
Stainless steel	G 1/4 inch internal thread	G 3/8 inch internal thread

1) 2 GL coupling nuts per heat exchanger with insert 6 x 4 x 1 mm threads for a hose or pipe are supplied with the unit

### Peristaltic pump (option)

Condensate outlet PVDF, DN 4/6

## Electrical connections

### Power supply

Cable, 3 m long, permanently fixed

### Status signal

Cable, 3 m long, permanently fixed

## Electrical safety

Testing to EN 61010-1

### Protective class

I

### Overvoltage category / degree of contamination

III/2

### Protective separation

Electrical isolation of the 115 / 230 V AC power supply from the other current circuits by means of reinforced or double insulation. Functional extra-low voltages (PELV) on the low voltage side

## Electromagnetic compatibility

### Emitted interference

Testing to EN 61000 Part 6-3:2001

### Immunity to interference

Testing to EN 61000 Part 6-2:2005

## Mechanical capabilities

Testing to EN 60068-2-27 and EN 60068-2-6

### Transport

Shock: 30 g/18 ms/18 shocks

Vibration: 1 g/±0.15 mm/5...150 Hz, 3 x 5 cycles

### Operation

Vibration: 1 g/±0.07 mm/5...55 Hz, 3 x 2 cycles

## Ambient conditions

### Ambient temperature

Operation: +10...+50 °C,

Storage and transport: -25...+60 °C

### Relative humidity

≤ 75 % annual average, occasional and slight condensation permitted, ≤ 95 % on 30 days per year

## Options

### Metering device

In gas path 1 by means of a peristaltic pump installed in the SCC-C sample gas cooler or in the SCC-F sample gas feed unit, feed tank as accessory, for small SO<sub>2</sub> measuring ranges (< 1000 mg/m<sup>3</sup>) or to avoid acid aerosols

### Peristaltic pumps

1 or 2 peristaltic pumps for discharging condensate (flow rate approx. 300 ml/h, 5 rpm) and metering (flow rate approx. 15 ml/h),  
Pressure resistance p<sub>abs</sub> = 50...150 kPa (0.5...1.5 bar),  
Peristaltic tube service life approx. 5 months,  
Power consumption 3.5 VA,  
Weight approx. 0.6 kg

## Explosion-proof versions

### ATEX certification

The SCC-C sample gas cooler in the category 3G explosion-proof version is suitable for use in zone 2 hazardous areas.

Testing to EN 60079-15:2003

Designation:  II 3G Ex nAC [nL] IIC T4

Type examination certificate: KEMA 06 ATEX 0165X

### CSA certification

The SCC-C sample gas cooler is certified to

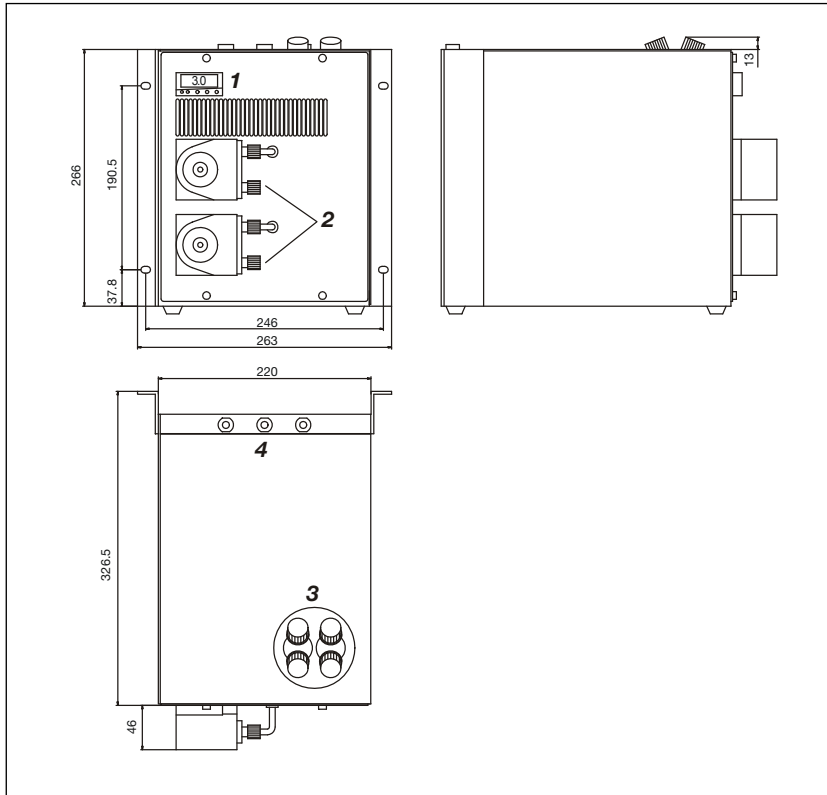
- Class 2258 02 Process Control Equipment – For Hazardous Locations and
- Class 2258 82 Process Control Equipment – For Hazardous Locations – Certified to U.S. Standards Class 1, Div. 2, Groups A, B, C and D, Temperature Code T4, Maximum Ambient Temperature +50 °C.

Approval includes testing per applicable Canadian (CSA) and US directives.

Certificate No. 1105720

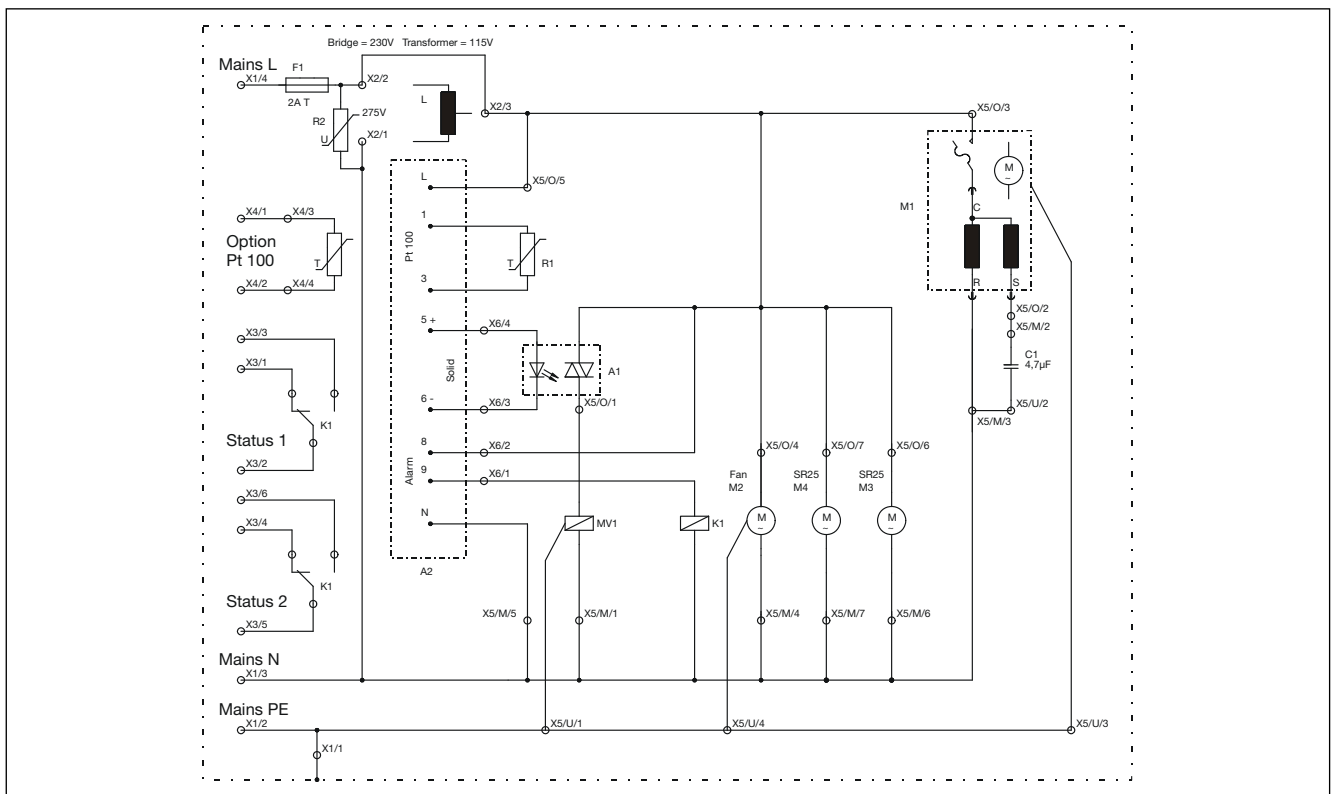
# SCC-C Sample Gas Cooler

Dimensional drawing (dimensions in mm)



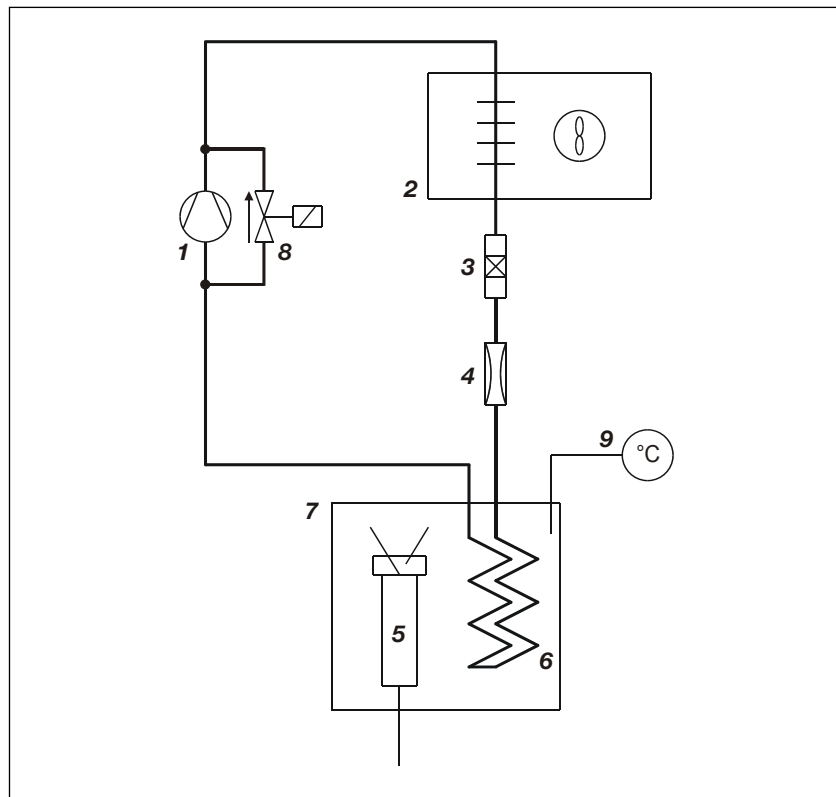
- 1 Temperature display
- 2 Condensate outlet (for option with peristaltic pumps)
- 3 Gas connections of heat exchangers
- 4 Conduits for the (permanently-connected) electrical connection lines

## Circuit and connection diagram



# SCC-C Sample Gas Cooler

## Refrigerant circuit



- 1 Refrigerant compressor
- 2 Refrigerant condenser
- 3 Refrigerant dryer
- 4 Capillary tube
- 5 Heat exchanger
- 6 Evaporator
- 7 Cooling block with temperature sensor
- 8 Valve
- 9 Temperature controller

## Accessories for condensate disposal

### Time relay

Run time and off period settings

0.6...60 sec., recommended setting: cyclic duration factor 40 %, i.e. run time 5 minutes and off period 7.5 minutes

Degree of protection

Terminals IP 20, housing IP 50 to EN 60529

Weight

approx. 0.125 kg

Power supply

12...240 V AC/DC, 40...440 Hz

### Level monitor

Switching voltage

30 V

Switching current

1 A

Switching power

30 VA

Connecting cable

2 x 0.25 mm<sup>2</sup>, length 5 m

### Condensate collecting bottle

Volume

10 l

Material

LDPE/PVC

Connections

Sample gas: 1 connecting piece for hose with ID 4–5 mm

Condensate: 2 connecting pieces for hose with ID 12–13 mm

Condensate drain: SW 22

Weight

approx. 1 kg

### Ordering information

	Catalog No.
Timer relay	90805-4-0741607
Reagent and condensate bottle	23234-5-8328972
Level monitor condensate	23005-4-0741239
Level monitor reagent	90805-5-8308994
Condensate trap, filter surface 20 cm <sup>2</sup>	23065-5-8018512



# SCC-F Sample Gas Feed Unit

- Complete sample gas conditioning in connection with the SCC-C sample gas cooler
- 2 independent gas paths
- Corrosion resistant, metal-free gas lines
- Compact surface-mounting housing (width 1/2 19 inches, 6 height units)
- Service-friendly due to easy access to the modules



## Sample gas inlet conditions

Sample gas pressure

$$p_{\text{abs}} = 70 \dots 105 \text{ kPa (0.7} \dots 1.05 \text{ bar)}$$

Sample gas flow rate

Gas paths 1 and 2 max. 100 l/h

Bypass max. 200 l/h

Sample gas inlet temperature

+10...+50 °C

Sample gas inlet dew point

The dew point of the sample gas must be at least 5 °C lower than the lowest ambient temperature in the whole sample gas path. Otherwise a sample gas cooler or a condensate trap is required.

## Operating data

Warm-up time

approx. 10 minutes (plus warm-up time of sample gas cooler)

Dead volume

approx. 10 cm<sup>3</sup> (plus dead volume of heat exchanger)

Gas tightness

$5 \times 10^{-6}$  hPa l/s

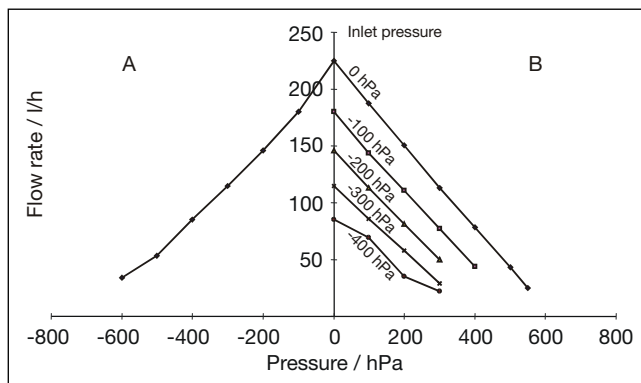
Flow rate display and adjustment

Rotameter 10...100 l/h with needle valve (metal-free)

Status signals

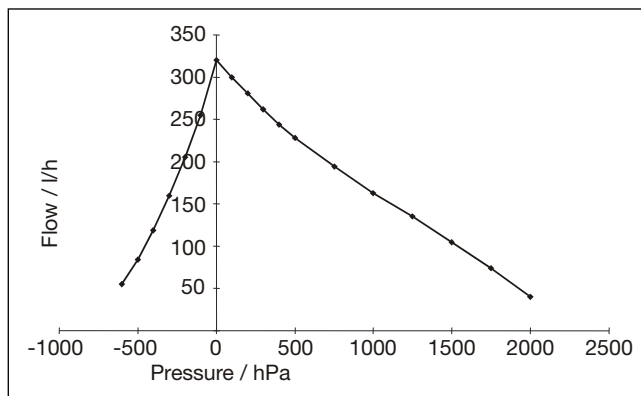
Flow rate and condensate monitors: 2 potential-free two-way switches, switching capacity 250 V AC, 2 A

## Feed performance standard



A Inlet: negative pressure, outlet: atmospheric pressure  
B Inlet: acc. to chart, outlet: gauge pressure

## Feed performance bypass



# SCC-F Sample Gas Feed Unit

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## Material of gas-conducting parts

PVDF, PTFE, PVC, EPDM, FPM, PP-EPDM elastomer

## Power supply

Input voltage

230 V (207...250 V) AC, 50 Hz or 60 Hz  $\pm$  2 Hz  
115 V (100...135 V) AC, 50 Hz or 60 Hz  $\pm$  2 Hz

Power consumption during operation

Diaphragm pump approx. 50 VA,  
metering pump approx. 3.5 VA

## Construction

Design

Surface-mounting housing 1/2 19 inch, 6 height units

Mounting

On the wall with the mounting brackets supplied or  
in a 19 inch cabinet/rack

Housing material and color

Sheet steel; light gray (RAL 7035), basalt gray (RAL 7012)

Degree of protection of housing

IP 20 to EN 60529

Dimensions

See dimensional drawing on page 10

## Gas connections

PVDF coupling for tube of 6 x 4 x 1 mm

## Electrical connections

Power supply

Screw clamp terminals for stranded or solid wire with  
max. 1.5 mm<sup>2</sup>

Status signals

Screw clamp terminals for stranded or solid wire with  
max. 1.5 mm<sup>2</sup>

## Electrical safety

Testing to EN 61010-1

Protective class

I

Overvoltage category / degree of contamination

III / 2

Protective separation

Electrical isolation of the 115 / 230 V AC power supply from  
the other current circuits by means of reinforced or double  
insulation. Functional extra-low voltages (PELV) on the low  
voltage side

## Electromagnetic compatibility

Emitted interference

Testing to EN 61000 Part 6-3:2001

Immunity to interference

Testing to EN 61000 Part 6-2:2005

## Mechanical capabilities

Testing to EN 60068-2-27 and EN 60068-2-6

Transport

Shock: 30 g / 18 ms / 18 shocks

Vibration: 1 g /  $\pm$  0.15 mm / 5...150 Hz, 3 x 5 cycles

Operation

Vibration: 1 g /  $\pm$  0.07 mm / 5...55 Hz, 3 x 2 cycles

## Ambient conditions

Ambient temperature

Operation: +10...+50 °C,

Storage and transport: -25...+60 °C

Relative humidity

$\leq$  75 % annual average, occasional and slight condensation  
permitted,  $\leq$  90 % on 30 days/year

## Options

Metering unit

By means of peristaltic pump, flow rate 15 ml/h,  
feed tank as accessory  
for small SO<sub>2</sub> measuring ranges (< 1000 mg/m<sup>3</sup>) or  
to avoid acid aerosols

I/O card

To connect the SCC-F sample gas feed unit and the SCC-C  
sample gas cooler to the AO2000 Series continuous gas  
analyzers via the system bus

- Display and monitoring of the cooler temperature
- Monitoring and processing of status signals of the SCC-F  
sample gas feed unit (condensate, flow rate)
- Control of an external solenoid valve for zero gas  
connection, 230 V, 50 Hz
- Digital inputs for monitoring condensate collecting bottles  
and reagent reservoirs

## CSA certification

The SCC-F sample gas feed unit is certified to

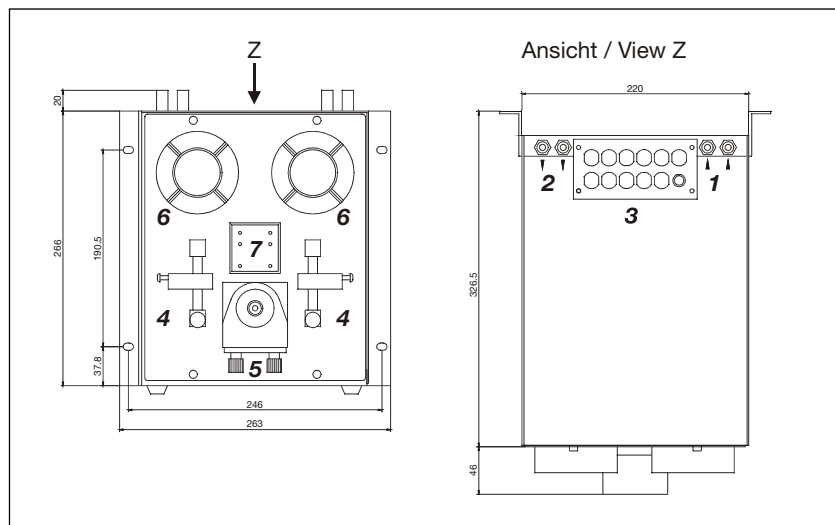
- Class 2258 02 Process Control Equipment - For Hazardous  
Locations and
- Class 2258 82 Process Control Equipment - For Hazardous  
Locations - Certified to U.S. Standards  
Class 1, Div. 2, Groups A, B, C and D, Temperature Code T4,  
Maximum Ambient Temperature +50 °C.

Approval includes testing per applicable Canadian (CSA) and  
US directives.

Certificate No. 1105720

# SCC-F Sample Gas Feed Unit

Dimensional drawing (dimensions in mm)



- 1 Sample gas inlet
- 2 Sample gas outlet
- 3 Electrical connections
- 4 Flow rate monitor with needle valve
- 5 Metering pump
- 6 Condensate monitor
- 7 LED display and reset button of switching amplifiers

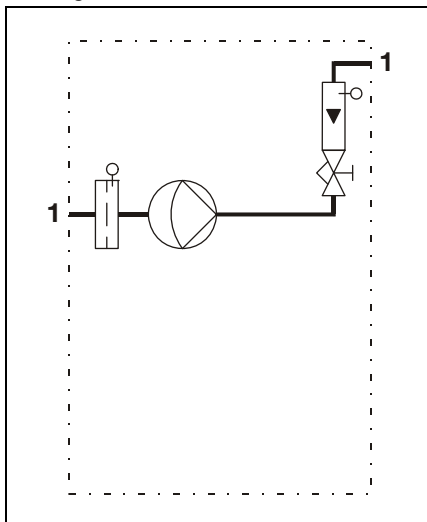
## Ordering information

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							0	0	0	0	0
	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
<b>Design</b>											
Wall-mounted housing 1/2-19 Inch	1										
<b>Gas paths</b>											
1 gas path, 1 condensate monitor, 1 flow monitor, 1 diaphragm pump	1										
2 separate gas paths, 2 condensate monitors, 2 flow monitors, 2 diaphragm pumps	2										
1 gas path, 1 condensate monitor, 2 flow monitors, 1 diaphragm pump	3										
1 gas path, 1 condens. monitor, 2 flow monitors, 1 diaphr. pump, 1 pressure controller	4										
2 separate gas paths, 2 condensate monitors, 2 flow monitors, 1 diaphragm pump	5										
2 separate gas paths, 2 condensate monitors, 1 flow monitor, 1 diaphragm pump	6										
<b>Dosing</b>											
without	0										
with dosing pump	1										
<b>Electronic processing unit</b>											
with 1 electronic processing unit	1										
with 2 electronic processing units	2										
with I/O interface board	3										
<b>Power supply</b>											
230 V, 50/60 Hz	1										
115 V, 50/60 Hz	2										
<b>Certification</b>											
without	0										
with CSA certification	1										
	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
	Catalog No. 23212-0-										
							0	0	0	0	0

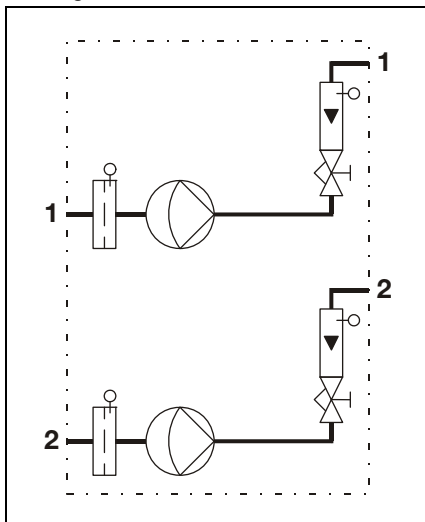
# SCC-F Sample Gas Feed Unit

## Pneumatic diagrams

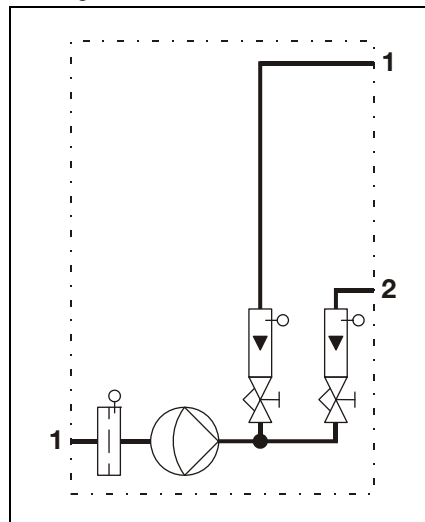
Catalog number 23212-0-11XXXX000000



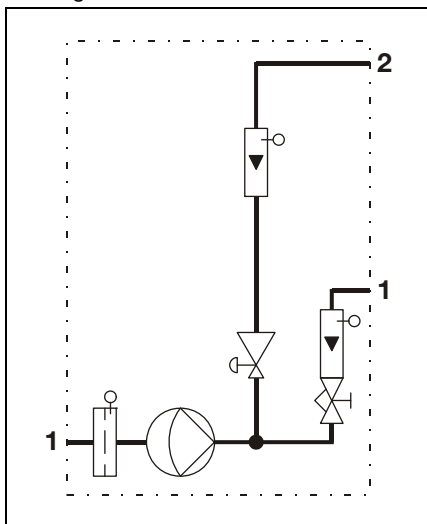
Catalog number 23212-0-12XXXX000000



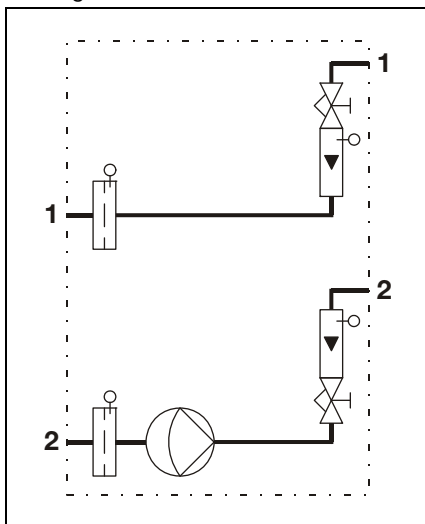
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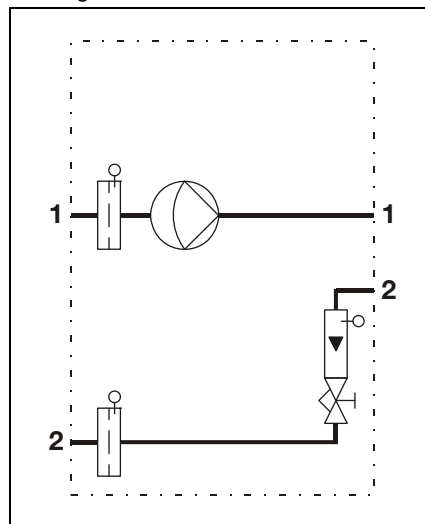
Catalog number 23212-0-14XXXX000000



Catalog number 23212-0-15XXXX000000



Catalog number 23212-0-16XXXX000000



# SCC-E Sample Gas Feed Unit

- Process-proven modules
- Ideal for processes with non-corrosive gases
- Integrated Peltier cooler and peristaltic pump (option)
- Simple installation and connection
- Portable housing for rack and wall mounting (1/2 19 inch, 4 height units)
- Attractively priced system solution with EL1020 gas analyzer



## Sample gas inlet conditions

Sample gas pressure

$$p_{\text{abs}} = 70 \dots 105 \text{ kPa (0.7} \dots 1.05 \text{ bar)}$$

Sample gas flow rate

7...70 l/h

Sample gas inlet temperature

+10...+50 °C

Sample gas inlet dew point (Peltier cooler)

max. 50 °C

## Operating data

Outlet dew point (Peltier cooler)

+3 °C

Warm-up time

approx. 10 minutes with Peltier cooler

Gas tightness

$5 \times 10^{-6}$  hPa l/s

Flow rate display and adjustment

Rotameter 10...100 l/h with needle valve (metal-free)

Status signals

Cooler, flow and condensate monitoring: 1 potential-free two-way switch, switching capacity 250 V AC, 2 A

## Material of gas-conducting parts

PPH, EPDM, FPM, PP-EPDM elastomer, glass

## Power supply

Input voltage

230 V AC, 50 Hz or 115 V AC, 60 Hz

Power consumption during operation

230 V AC, 50 Hz: 1.05 A, 240 VA

## Construction

Design

Surface-mounting housing 1/2 19 inch, 4 height units

Mounting

On the wall or in a 19 inch cabinet/rack with the mounting brackets supplied

Housing material and color

Sheet steel; light gray (RAL 7035), basalt gray (RAL 7012)

Degree of protection of housing

IP 20 to EN 60529

Dimensions

see dimensional drawing on page 14

Weight

approx. 11.2 kg

## Gas connections

PPH couplings for tube 6 x 4 x 1 mm

## Electrical connections

Power supply

Cable, length 1.5 m, permanently fixed

Status signal

Cable, length 1.5 m, permanently fixed

# SCC-E Sample Gas Feed Unit

## Electrical safety

Testing to EN 61010-1

Protective class

I

Overtoltage category/degree of contamination  
III/2

Protective separation

Electrical isolation of the 115 / 230 V AC power supply from the other current circuits by means of reinforced or double insulation. Functional extra-low voltages (PELV) on the low voltage side

## Electromagnetic compatibility

Emitted interference

Testing to EN 61000 Part 6-3:2001

Immunity to interference

Testing to EN 61000 Part 6-2:2005

## Mechanical capabilities

Testing to EN 60068-2-27 and EN 60068-2-6

Transport

Shock: 30 g / 18 ms / 18 shocks

Vibration: 1 g / ±0.15 mm / 5...150 Hz, 3 x 5 cycles

Operation

Vibration: 1 g / ±0.07 mm / 5...55 Hz, 3 x 2 cycles

## Ambient conditions

Ambient temperature

Operation: +10...+45 °C,

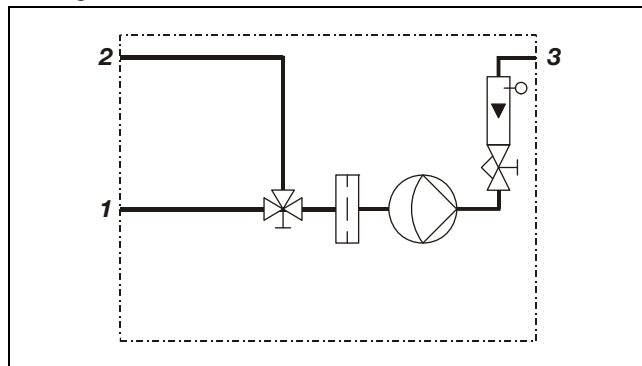
Storage and transport: -25...+60 °C

Relative humidity

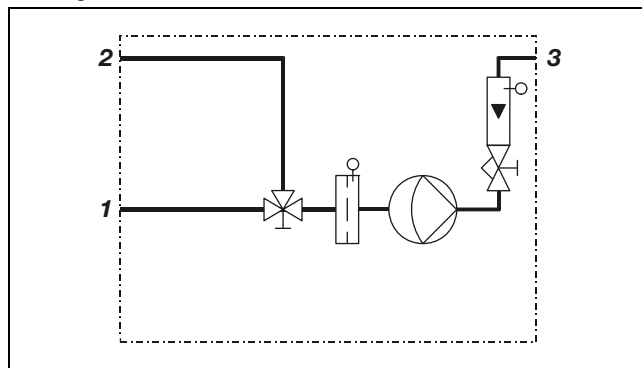
≤ 75 % annual average, occasional and slight condensation permitted, ≤ 90 % on 30 days/year

## Pneumatic diagrams

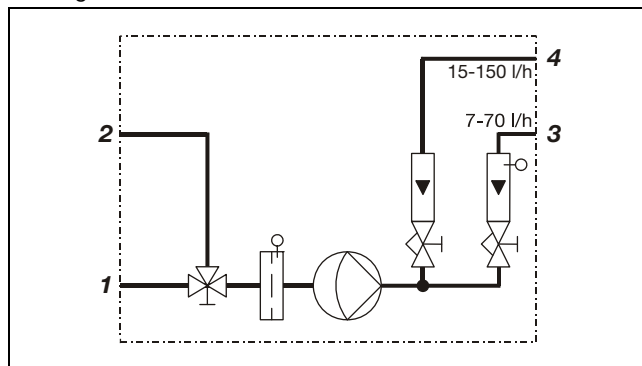
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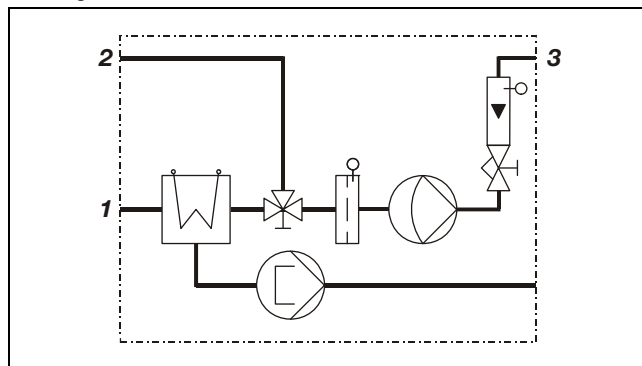
Catalog number 23235-0-120X00000000



Catalog number 23235-0-130X00000000



Catalog number 23235-0-121X00000000



1 Sample gas inlet

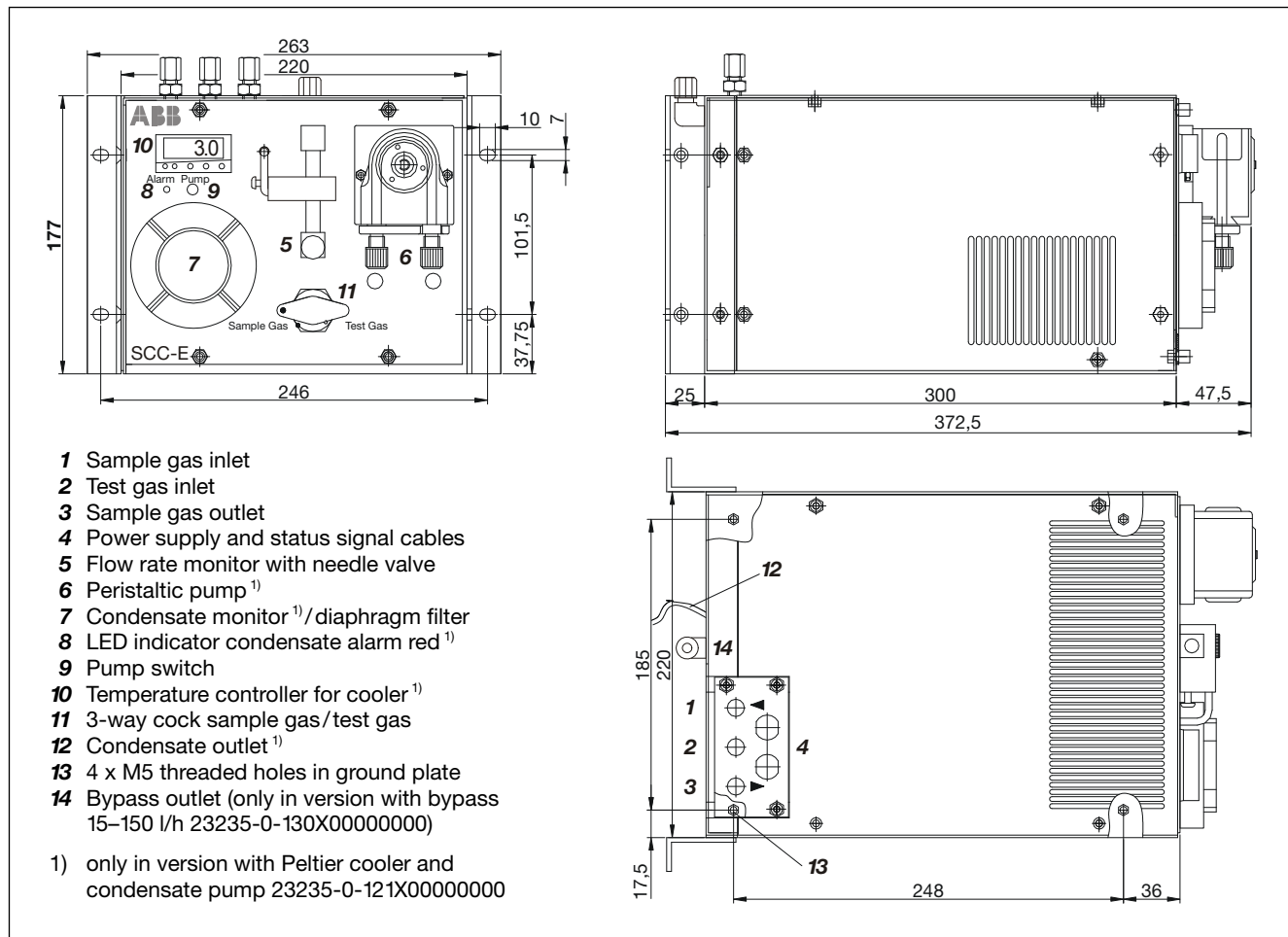
2 Test gas inlet

3 Gas outlet

4 Bypass outlet

# SCC-E Sample Gas Feed Unit

Dimensional drawing (dimensions in mm)



## Ordering information

	Catalog No. 23235-0-									
				0	0	0	0	0	0	0
<b>Design</b>	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Wall-mounted housing 1/2-19 inch	1									
with 3-way cock, diaphragm filter, pump and flow monitor with needle valve	1	0								
with 3-way cock, condensate monitor, pump and flow monitor with needle valve	2									
with 3-way cock, condensate monitor, pump, flow monitor 7–70 l/h, Bypass 15–150 l/h	3	0								
<b>Cooler and condensate pump</b>										
without		0								
with Peltier cooler and condensate pump	2	1								
<b>Power supply</b>										
230 V, 50 Hz				1						
115 V, 60 Hz				2						
	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
	Catalog No. 23235-0-									
				0	0	0	0	0	0	0
<b>Accessories</b>										
Carry handle	Catalog No. 23009-4-0730702									

# Diaphragm Pump 4N

- Feed in of the sample gas
- Compact unit with degree of protection of housing IP 20 or IP 54



## Operating data

Inlet pressure

$$p_{\text{abs}} = 70 \dots 105 \text{ kPa (0.7 \dots 1.5 bar)}$$

Flow rate

max. 250 l/h at atmospheric pressure

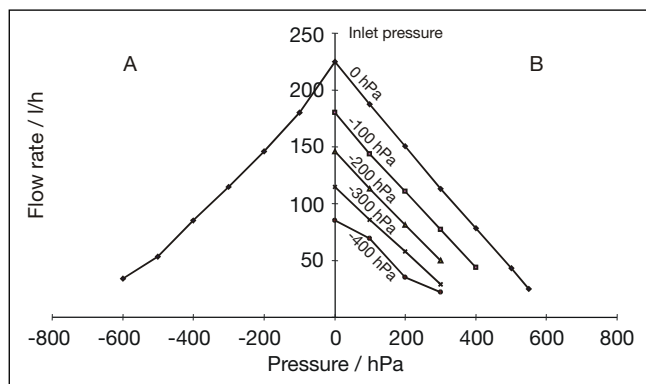
Inlet temperature

+5...+50 °C

Inlet dew point

below room temperature

Feed performance



A Inlet: negative pressure, outlet: atmospheric pressure

B Inlet: according diagram, outlet: negative pressure

Tightness

Pressure drop 0.1 hPa/min

## Materials of gas-conducting parts

Valve plate, diaphragm: EPDM (ethylene-propylene);  
pump body: PP (polypropylene); hose: FPM;  
nozzles: ETFE (ethylene-tetrafluorethylene)

## Power supply

AC voltage

230 V  $\pm$  10 %, 50 Hz or 60 Hz

115 V  $\pm$  10 %, 50 Hz or 60 Hz

Power consumption

approx. 50 VA

## Construction

Design

Surface-mounting case for wall attachment, motor axis horizontal

Housing material and color

Plastic, RAL 7035

Degree of protection of housing

IP 20 or IP 54 to EN 60529

Class of protection

I

Dimensions

see dimensional drawing on page 16

Weight

approx. 1.8 kg

## Gas connections

G 1/4 female thread (DIN ISO 228/1) for male fittings, nozzles for hose inside diameter 4 mm are supplied with the unit.

# Diaphragm Pump 4N

## Electrical connections

Terminals via cable connection PG 13.5

## Mechanical capabilities

Testing to DIN EN 60068-2-27 and DIN EN 60068-2-6

Transport

Shock: 30 g/18 ms/18 shocks

Vibration: 2 g/ $\pm 0.15$  mm/5...150 Hz, 3 x 5 cycles

Operation

Vibration: 2 g/ $\pm 0.07$  mm/4...7 Hz, 3 x 2 cycles

## Ambient conditions

Ambient temperature

Operation: IP 54 +5...+40 °C, IP 20 +5...+50 °C

Storage and transport: -25...+65 °C

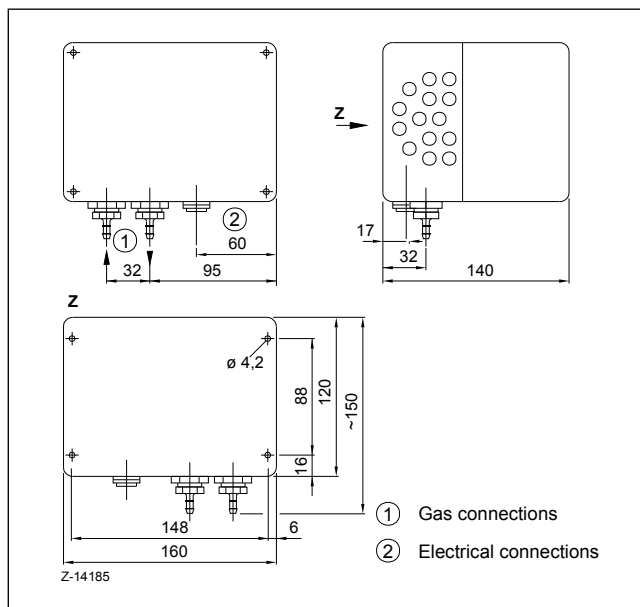
Relative humidity

$\leq 90$  % annual average, condensation permitted

Climatic class

3K4 to EN 60721-3-3

## Dimensional drawing (dimensions in mm)



## Ordering information

### Catalog No.

Diaphragm Pump 4N, IP 20; 230V, 50/60 Hz **23134-5-8018545**

Diaphragm Pump 4N, IP 20; 115V, 50/60 Hz **23134-5-8018546**

Diaphragm Pump 4N, IP 54; 230V, 50/60 Hz **23134-5-8018547**

Diaphragm Pump 4N, IP 54; 115V, 50/60 Hz **23134-5-8018548**

# Diaphragm Pump 2

- Extremely robust version thanks to cast metal cladding
- Very reliable operationally and easy to maintain thanks to the simple method of operation
- Delivery adjustable using magnetic shunt

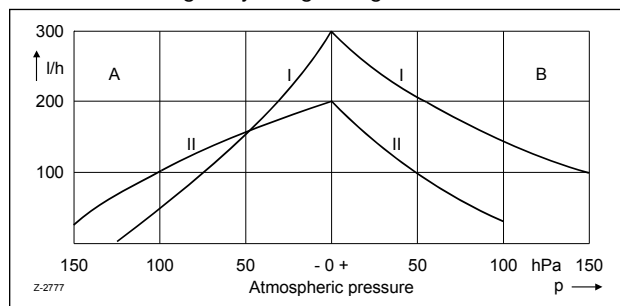


## Operating data

### Delivery

max. 300 l/h at atmospheric pressure, under other pressure conditions: see delivery diagram.

The diaphragm is moved by an electric magnet. The rate of flow can be changed by using a magnetic shunt.



I Diaphragm pump 2

II Diaphragm pump 2-Ex (not available)

A Inlet: negative pressure, outlet: atmospheric pressure

B Inlet: atmospheric pressure, outlet: negative pressure

### Time-related behavior

Flow rate	Dead time	Time constant	Pressure drop
30 l/h	0.9 s	1.1 s	0.4 hPa
60 l/h	0.7 s	1.0 s	1.1 hPa
90 l/h	0.6 s	0.9 s	1.8 hPa

## Materials of gas-conducting parts

Diaphragm: EPDM; valves: FPM; pump body: PVDF; hose: PVC; nozzles: PTFE

## Power supply

### Power supply

220 V AC, 50 Hz

### Power consumption

max. 13 VA, depending on adjustment of the delivery

## Construction

### Design

Surface-mounting case for wall attachment

### Housing material

Cap and lower part in light alloy casting

### Degree of protection of housing

IP 54 to EN 60529

### Weight

approx. 3 kg

## Gas connections

G 1/4 female thread (DIN ISO 228/1) for male fittings, nozzles for hose inside diameters 4 mm are supplied with the unit

## Electrical connections

Terminals via cable connection PG 11

## Ambient conditions

### Ambient temperature

Operation: +5...+45 °C, storage and transport: -25...+65 °C

### Relative humidity

≤ 90% annual average, condensation permitted

### Climatic class

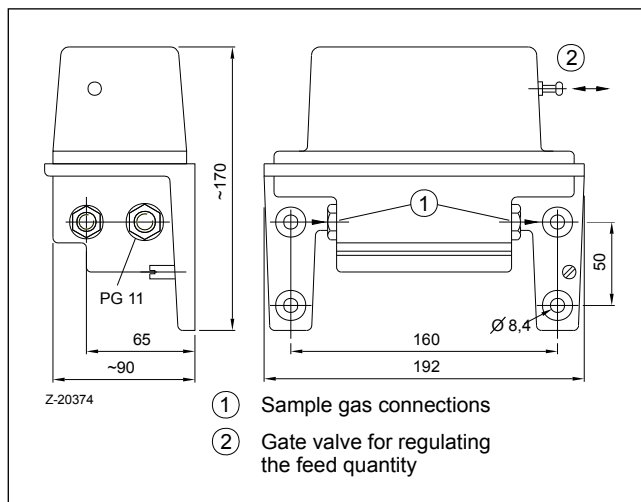
3K4 to EN 60721-3-3

# Diaphragm Pump 2

## Ordering information

	Catalog No.
Diaphragm Pump 2, 220 V, 50 Hz	23121-5-5861212

## Dimensional drawing (dimensions in mm)



# SCC-K NO<sub>2</sub>/NO Converter

- Catalytic converter based on carbon-molybdenum
- High catalyst service life
- Catalyst cartridge can be changed without tools
- Option: Version with heated sample gas inlet



## Operating data

Sample gas flow rate  
Max. 150 l/h

Temperature range  
Depending on sample gas flow rate:  
30 l/h: 320 °C; 60 l/h: 320 °C; 90 l/h: 340 °C, 150 l/h: 360 °C

Effectivity  
≥ 95 % with new catalyst

Sample gas pressure  $p_{abs}$   
≤ 200 kPa (2 bar)

Pressure drop  
≤ 2 kPa (20 mbar) at 90 l/h

Warm-up time  
Approx. 30 min

90% time  $T_{90}$   
≤ 10 s at 60 l/h

Status signal for temperature deviation  
1 NO potential-free contact,  
capacity 24 V DC, 1 A

## Materials of gas-conducting parts

Stainless steel W-No. 1.4571, PVDF, PTFE, FPM

## Power supply

Input voltage  
240 V AC, -15/+10 %, 48...62 Hz or  
120 V AC, -10/+10 %, 48...62 Hz

Power consumption  
240 V AC: 575 VA; 120 V AC: max. 560 VA

## Construction

Design  
19 inch slide-in housing, 3 height units

Mounting  
In 19 inch cabinet/rack or with mounting brackets  
(accessories) on the wall, distance above min. 1 height unit

Housing material and color  
Sheet steel; light gray (RAL 7035), basalt gray (RAL 7012)

Degree of protection of housing  
IP 20 to EN 60529

Dimensions  
See dimensional drawing on page 21

Weight  
approx. 8...9 kg

## Gas connections

Sample gas inlet and outlet unheated  
G 1/4 female thread to DIN ISO 228/1

Heated sample gas inlet  
Swagelok® screwed connection for pipes with 6 mm outer  
diameter

## Electrical connections

Power supply  
Connector for non-heating apparatus, cable with grounding  
plug, length 2 m

Status signal  
9 pin Sub-D female connector with counter-plug

# SCC-K NO<sub>2</sub>/NO Converter

---

## Electrical safety

Testing to EN 61010-1

Protective class

I

Overvoltage category / degree of contamination  
III / 2

Protective separation

Electrical isolation of the 115 / 230 V AC power supply from the other current circuits by means of reinforced or double insulation. Functional extra-low voltages (PELV) on the low voltage side

## Electromagnetic compatibility

Emitted interference

Testing to EN 61000 Part 6-3:2001

Immunity to interference

Testing to EN 61000 Part 6-2:2005

## Ambient conditions

Ambient temperature

Operation: +10...+50 °C,

Storage and transport: -25...+65 °C

Relative humidity

≤ 75 % annual mean, occasional and slight condensation permitted

## Service life of catalyst

The service life of the catalyst depends on its operating temperature as well as the flow rate and the NO<sub>2</sub> and O<sub>2</sub> content of the sample gas. It is > 6 months for 320 °C, 30 l/h, 10 ppm NO<sub>2</sub> and 5 Vol.-% O<sub>2</sub>.

## CSA certification

The SCC-K NO<sub>2</sub>/NO converter is certified for use in general purpose environment, evidenced by full compliance with standards CAN/CSA-C22.2 No. 61010-1-04 and UL 61010-1 (2<sup>nd</sup> Edition).

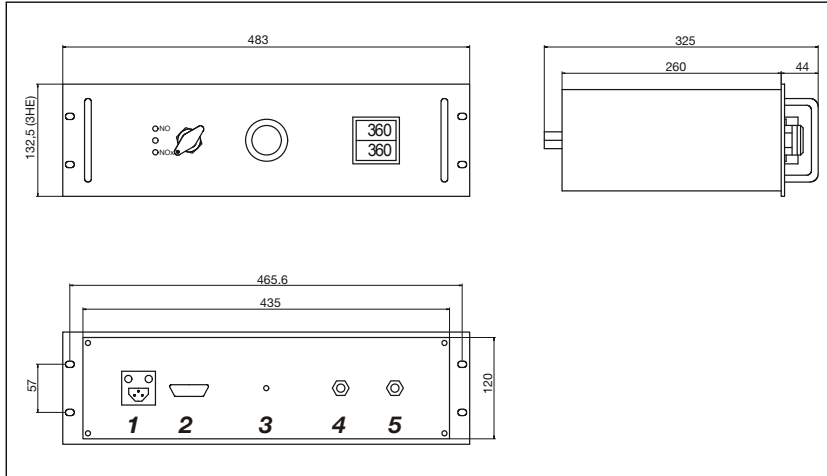
Certificate No. 2298365

## Ordering information

	<b>Catalog No.</b>
Converter SCC-K, cock PVDF, 230 VAC	<b>23093-4-0801974</b>
Converter SCC-K, 2 solen. valves, 230 VAC	<b>23093-4-0801975</b>
Converter SCC-K, heated, 1 s.v., 230 VAC	<b>23093-4-0801976</b>
Converter SCC-K, cock PVDF, 115 VAC	<b>23093-4-0801977</b>
Converter SCC-K, 2 solen. valves, 115 VAC	<b>23093-4-0801978</b>
Converter SCC-K, heated, 1 s.v., 115 VAC	<b>23093-4-0801979</b>
<b>Accessories</b>	
Wall mounting bracket	<b>23009-4-0801980</b>
Carbon catalyst set	<b>23009-4-0801981</b>

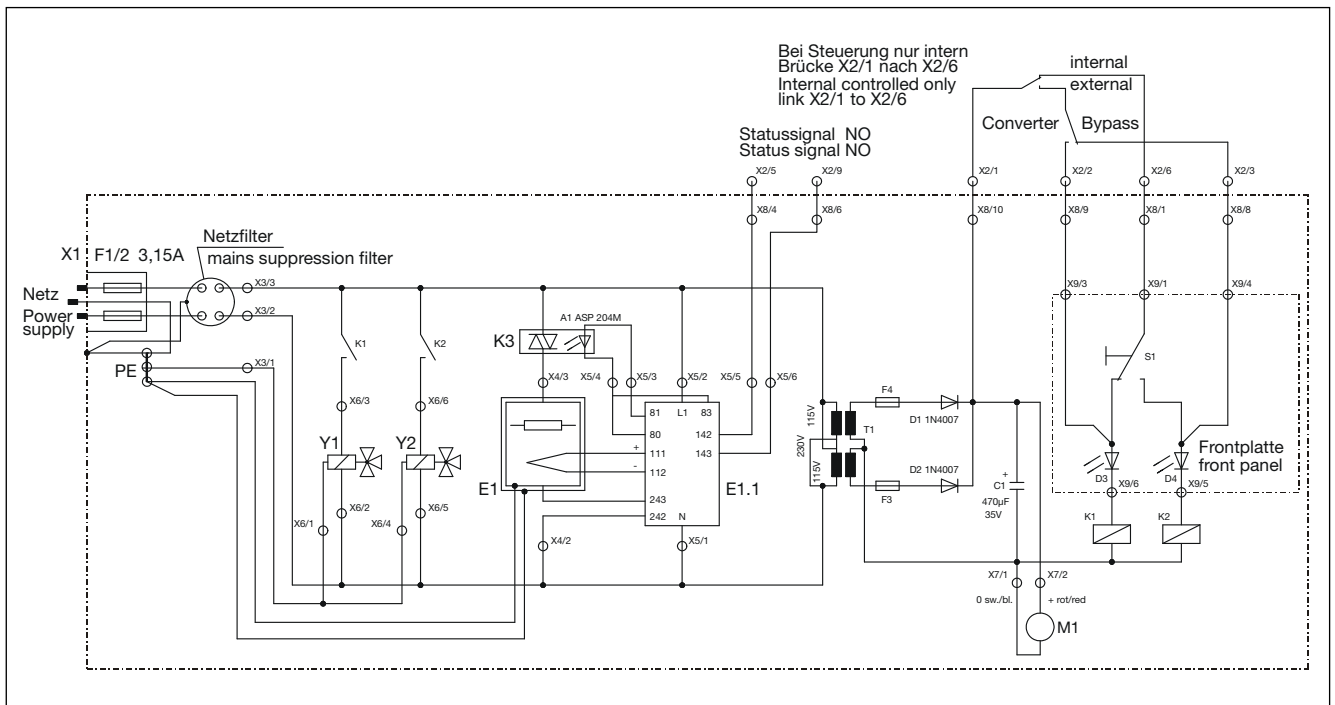
# SCC-K NO<sub>2</sub>/NO Converter

## Dimensional drawing (Dimensions in mm)



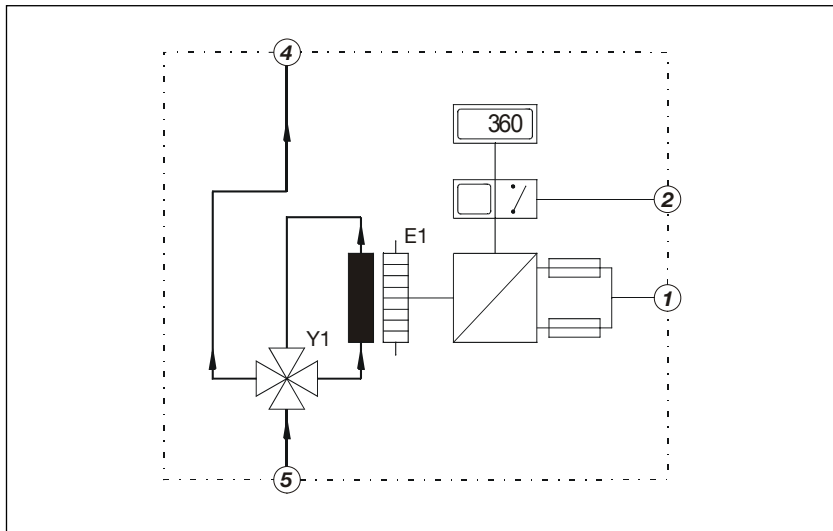
- 1 Power supply input X1
- 2 Status signal output X2 (9-pin Sub-D female connector)
- 3 Heated sample gas inlet 6 mm
- 4 Sample gas outlet G1/4 inch
- 5 Sample gas inlet G1/4 inch

## Circuit and connection diagram



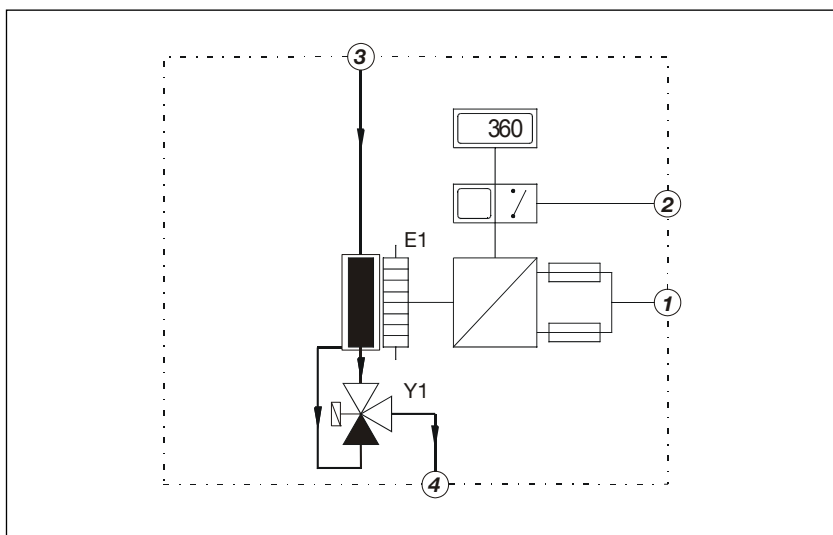
# SCC-K NO<sub>2</sub>/NO Converter

## Pneumatic layouts



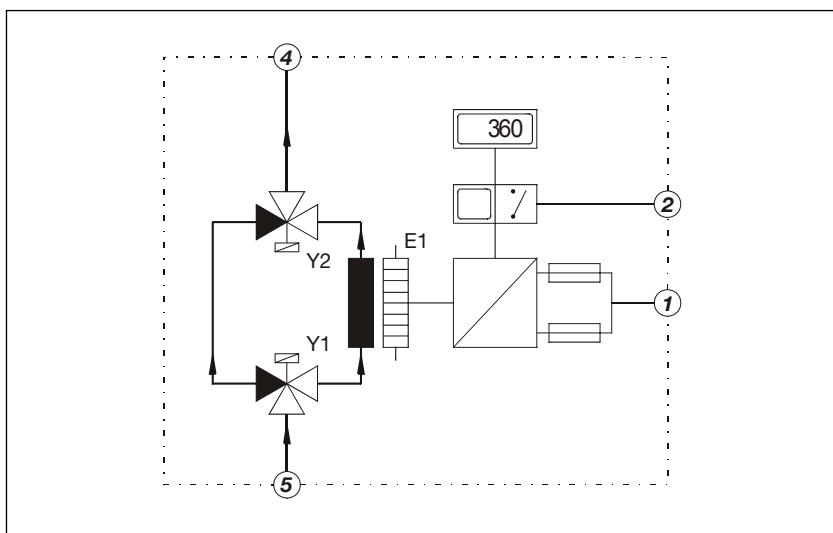
Standard version with 4-way ball valve

- 1 Power supply
- 2 Status signal
- 4 Sample gas outlet
- 5 Sample gas inlet
- E1 Tube furnace
- Y1 4-way ball valve



Option with heated sample gas inlet

- 1 Power supply
- 2 Status signal
- 3 Heated sample gas inlet
- 4 Sample gas outlet
- E1 Tube furnace
- Y1 3/2-way solenoid valve



Option with two solenoid valves

- 1 Power supply
- 2 Status signal
- 4 Sample gas outlet
- 5 Sample gas inlet
- E1 Tube furnace
- Y1 3/2-way solenoid valve
- Y2 3/2-way solenoid valve

# CGO-9 Tubular Furnace

## Application and description

The tubular furnace is used to convert a non-measurable gas component into a measurable compound which can be measured by a gas analyzer. This is for example necessary with certain carbon, sulfur and halogen (such as chlorine) compounds. The conversion is performed in a reaction tube which is filled with a catalyst and heated by the tubular furnace. A further application of the tubular furnace is to remove interfering components without the other gas components being affected.

## Technical data

Sample gas pressure  
 $p_{\text{abs}} \leq 120 \text{ kPa (1.2 bar)}$

### Operating data

	Dead time in s at		90% time in s at		Pressure drop in hPa/mbar at	
	30 l/h	60 l/h	30 l/h	60 l/h	30 l/h	60 l/h
Without filling	1.5	0.5	2	0.75	1.5	3.6
With filling	2	0.7	4.5	2.5	6	12

### Reaction tube

Material quartz, volume 20 ml, filling volume 8 ml

### Thermocouple

Chromel-Alumel (corresponds to NiCr-Ni)

### Furnace temperature

max. 800 °C

The intermediate temperatures are set using an external on/off controller.

### Heat-up time

approx. 120 min.

### Power supply

AC voltage 220 V +10...-12 %, 48...62 Hz  
 Power consumption 150 W

### Case material

Steel sheet

### Degree of protection of housing

IP 50 to EN 60529

A protective cap (accessory) is required if the tubular furnace is not protected against touching by design measures such as installation in a cabinet or a case.

### Weight

approx. 1.0 kg

### Mounting

Wall fastening

### Sample gas connection

Glass tube 5 mm outside diameter for hose with 4 mm inside diameter

### Electrical connections

Terminals via cable gland PG 9

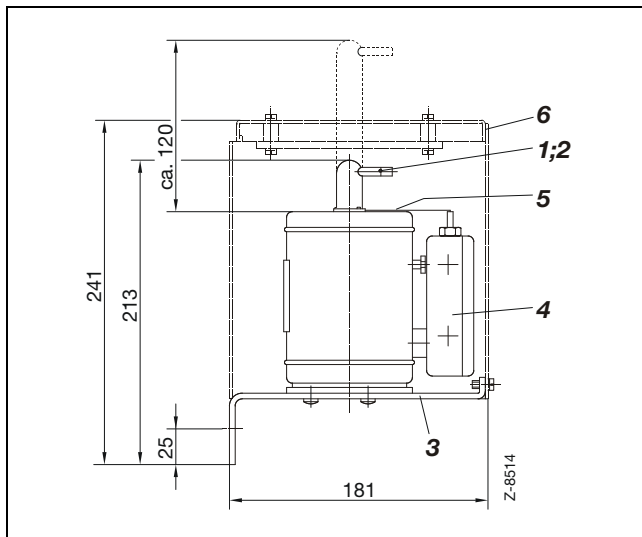
### Ambient temperature

Operation: +5...+50 °C,

Storage and transport: -25...+65 °C



## Dimensional drawing (dimensions in mm)



- 1 Gas inlet
- 2 Gas outlet (offset by 60°)
- 3 Mounting bracket or strap
- 4 Terminal box
- 5 Thermocouple
- 6 Protective cap

## Ordering information

	Catalog No.
CGO-9 with reaction tube, with thermocouple	23092-4-0806560
CGO-9 with reaction tube, with catalyst LF 316, with thermocouple	23092-4-0856545
<b>Accessories</b>	
CGO-9 reaction tube, quartz	23005-4-0806559
CGO-9 reaction tube, stainless steel with catalyst LF 316	23004-4-0856544
CGO-9 stainless steel catalyst LF 316	23004-4-0801715

## CGO-9 Tubular Furnace

### Examples of applications

Application	Furnace temperature	Temperature controller	Reagent	Sample gas throughput	Mounting
Oxidation of sulfur compounds	800 °C	no	none	60 l/h	arbitrary
Combustion of organic chlorine compounds	800 °C	yes	none	60 l/h	arbitrary
Conversion of H <sub>2</sub> to HCl using Cl <sub>2</sub> , where Cl <sub>2</sub> concentration ≥ H <sub>2</sub> concentration (O <sub>2</sub> concentration > 4 Vol.-%, otherwise use reaction element, see page 25)	800 °C	yes	none	60 l/h	arbitrary
NO <sub>2</sub> /NO conversion in the exhaust air of nitric acid or pickling plants Combustion of NH <sub>3</sub> in air Combustion of organic nitrogen compounds, such as emissions from animal keeping or carcass incineration Application range: 100...3000 ppm NO <sub>2</sub>	750 °C	yes	Stainless steel catalyst LF 316 Service life: change catalyst every 6 months as a preventative measure. The stainless steel catalyst is not suitable for SO <sub>2</sub> -containing combustion gases	60 l/h	vertical

# Reaction Element

## Application and description

The reaction element with UV lamp is used for gases which react chemically under the influence of UV light. A typical application is the conversion of hydrogen ( $H_2$ ) with chlorine ( $Cl_2$ ) into hydrochloric acid (HCl). For chlorine concentrations of less than 85 Vol.-%, however, the tubular furnace CGO-9 should be used in principle.

The sample gas is irradiated in a quartz reaction vessel by a UV lamp. The lamp is mounted in the centre of the reaction vessel so that the UV light radiates to all sides. This device is housed in a plastic case. The formation of ozone outside the reaction vessel is prevented by purging the case with nitrogen or instrument air.

## Technical data

Sample gas pressure

$$p_{\text{abs}} = 80 \dots 150 \text{ kPa (0.8 \dots 1.5 bar)}$$

Dead volume of the reaction tube

approx.  $250 \text{ cm}^3$

Service life of the UV lamp

approx. 5 months

Power supply

230 VAC, 50 Hz

Power consumption 0.5 A during start-up, 0.35 A in continuous operation

Case material

Glass-fiber-reinforced polyester

Weight

2 kg

Degree of protection of housing

IP54 to EN 60529

Materials of gas-conducting parts

FPM, quartz

Electrical connection

Terminals via PG 11 cable gland

Gas connection

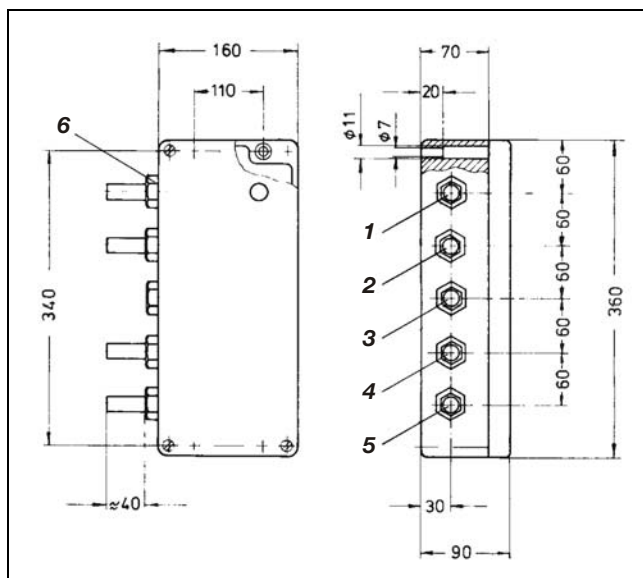
Glass tube with 7 mm outer  $\varnothing$  for tube with 6 mm inner  $\varnothing$  and 9 mm outer  $\varnothing$

Case purging

approx. 10 l/h nitrogen or instrument air



## Dimensional drawing (dimensions in mm)



- |                     |                    |
|---------------------|--------------------|
| 1 Purge gas outlet  | 4 Sample gas inlet |
| 2 Sample gas outlet | 5 Purge gas inlet  |
| 3 Power supply      | 6 Cable gland      |

## Ordering information

	Catalog No.
Reaction element with UV lamp	23095-5-5854124

# Membrane Filter

## Application

Membrane filters are used in gas conditioning systems of analyzer equipment for fine filtering of dust particles  $\geq 1 \mu\text{m}$ , in order to protect the analysis instruments from contamination in the event of disturbances in the sample gas conditioning chain.

## Technical data

Flow rate (air)  
max. 300 l/h

Gas pressure  $p_{\text{abs}}$   
PVC: max. 150 kPa (1.5 bar),  
stainless steel: max. 200 kPa (2 bar)

Gas temperature  
PVC: max. 55 °C, stainless steel: max. 100 °C

Retention rate  
100 % for particles  $\geq 1 \mu\text{m}$

Pressure drop  
2.5 to 20 hPa (mbar) at a flow rate of 30...250 l/h (air)

Materials of gas-conducting parts  
Case: PVC or stainless steel (Mat. No. 1.4571),  
gas connections: PTFE, round cord rings: FPM,  
filter membrane: glass fiber

Filter surface  
approx. 24 cm<sup>2</sup>

Dead volume  
approx. 15 cm<sup>3</sup>

Weight  
PVC: approx. 0.59 kg, stainless steel: approx. 1.4 kg

Mounting  
Panel and wall mounting (with mounting bracket)

Gas connections  
G 1/4 (DIN ISO 228/1) or nozzles for hose internal diameter  
4 mm

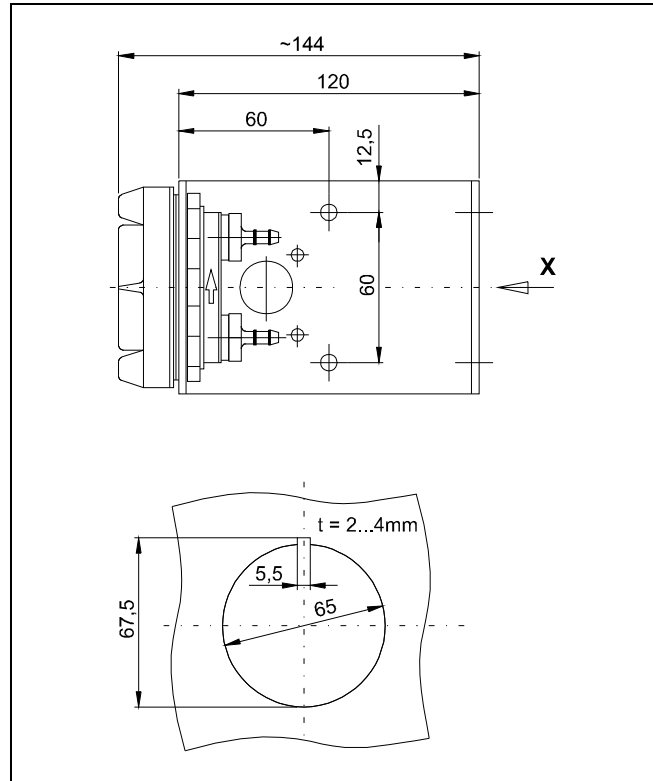
Scope of delivery  
Membrane filter, mounting bracket, 2 nozzles, 2 round cord  
rings, 50 filter membranes

## Ordering information

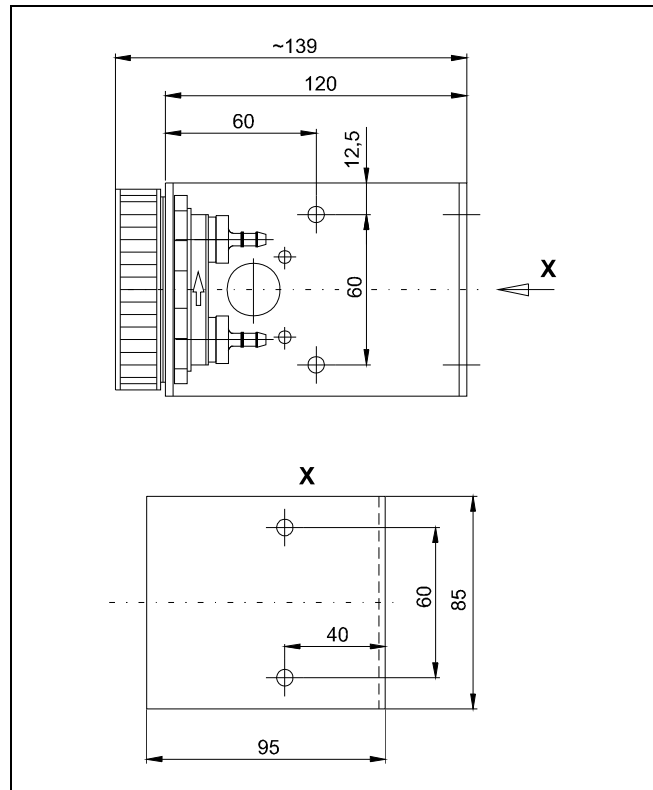
	Catalog No.
<b>Membrane filter</b>	
Membrane filter, PVC	23145-5-8018438
Membrane filter, stainless steel	23147-5-8018439
<b>Condensate monitor</b> (see page 27)	
Condensate monitor, PVC	23158-5-8018440
Condensate monitor, stainless steel	23157-5-8018039

## Dimensional drawings (dimensions in mm)

### Membrane filter, PVC version



### Membrane filter, stainless steel version



# CGKW Condensate Monitor

## Application

The condensate monitor CGKW is used to indicate moisture (condensate) or any other electrically-conducting liquid which penetrates into the sample gas line to the gas analyzer. At the same time, the condensate monitor is a membrane filter and it therefore satisfies the double function of fine filtering the sample gas as well as of signaling moisture. The filter membrane holds back the penetrated concentrate for a short while. An independent condensate barrier (see application examples) can be constructed with the condensate monitor as sensor element and the switching unit ER-144A/Ex (see page 32).

## Technical data

Flow rate (air)  
max. 300 l/h

Gas pressure  $p_{abs}$   
PVC: max. 150 kPa (1.5 bar),  
stainless steel: max. 200 kPa (2 bar)

Gas temperature  
max. 55 °C

Retention rate  
100 % for particles  $\geq 1 \mu\text{m}$

Pressure drop  
2.5 to 20 hPa (mbar) at a flow rate of 30...250 l/h (air)

Materials of gas-conducting parts  
Case: PVC or stainless steel (Mat. No. 1.4571), gas connections: PTFE, electrodes: stainless steel (Mat. No. 1.4305), round cord rings: FPM, filter membrane: glass fiber

Filter surface  
approx. 24 cm<sup>2</sup>

Dead volume  
approx. 15 cm<sup>3</sup>

Dimensions  
as for membrane filter (see page 26)

Weight  
PVC: approx. 0.71 kg, stainless steel: approx. 1.5 kg

Mounting  
Panel and wall mounting (with mounting bracket)

Gas connections  
G 1/4 (DIN ISO 228/1) or nozzles for hose inside diameter 4 mm

Electrical connections  
Two-core cable, approx. 1 m, for connecting to the switching unit ER-144A/Ex (see page 32)

Mounting orientation  
Safety nose at top, electrode below

Scope of delivery  
Condensate monitor, mounting bracket, 2 nozzles, 2 round cord rings, 25 filter membranes, operating manual

Ordering information  
see page 26

## Explosion protection (only with stainl. steel case)

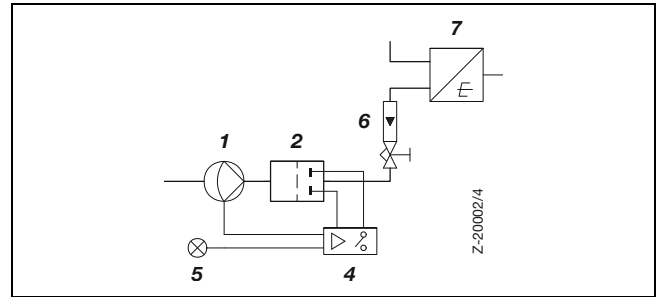
The condensate monitor is a device without voltage source (VDE 0165/2.91 Section 6.1.3.1.3). If the condensate monitor is

being operated in the intrinsically-safe control circuit of the switching unit ER-144A/Ex, the apparatus is permitted in hazardous areas of Zones 1 and 2 up to a gas and ambient temperature of 55 °C without restriction of the explosion groups and temperature classes.

## Application examples

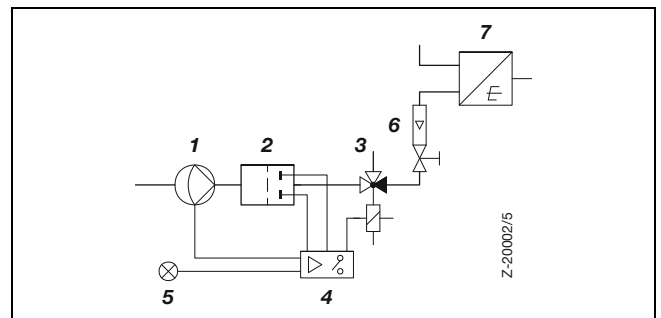
### The process gas is present at zero pressure or with negative pressure

Sample gas feeding by pump. Condensate barrier by switching off the pump. Condensate monitor and analyzer must be arranged above the sample gas conditioning chain.



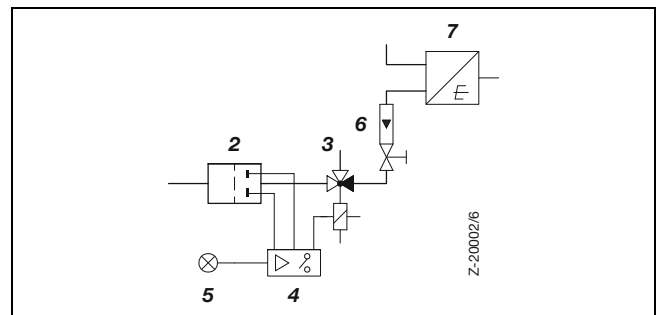
### The process gas is present at zero pressure or with weak positive pressure

Sample gas feeding by pump. Condensate barrier by switching off the pump and switching over a 3/2-way solenoid valve. Condensate monitor and analyzer can be arranged as you wish.



### The process gas is present with positive pressure

Sample gas feeding by positive pressure. Condensate barrier by switching over a 3/2-way solenoid valve. Condensate monitor and analyzer can be arranged as you wish.



- |                                |                  |            |
|--------------------------------|------------------|------------|
| 1 Membrane pump                | 4 Switching unit | 7 Analyzer |
| 2 Condensate monitor           | 5 Pilot lamp     |            |
| 3 Solenoid valve <sup>1)</sup> | 6 Flow meter     |            |

1) The sample gas path to the analyzer is blocked in the de-energized condition

# Acid Filter

## Application and description

The acid filter is used in the gas conditioning system. Its purpose is to collect the sulfuric acid aerosols entrapped in the sample gas. The acid filter may always be required where the  $\text{SO}_3$  content in the sample gas is greater than  $1 \text{ mg/m}^3$  or the  $\text{SO}_2$  content is greater than  $1000 \text{ mg/m}^3$  – for example in flue gas from heavy-oil or hard coal firings.

The filter element is made up of borosilicate fibers. An influencing and “hang-up” of the measuring component in the sample gas is not detectable with this material.

## Technical data

Flow rate (air)  
max. 250 l/h

Gas pressure  
 $p_{\text{abs}} = 50 \dots 200 \text{ kPa}$  (0.5...2 bar)

Sample gas temperature  
max.  $150 \text{ }^\circ\text{C}$

Sample gas dew point  
max.  $70 \text{ }^\circ\text{C}$

Retention rate  
99.99 % for particles  $\geq 0.1 \mu\text{m}$

Pressure drop  
10 hPa at 250 l/h, 50 hPa at 250 l/h

Dead time  
approx. 20 s

Materials of gas-conducting parts  
Connection cap: PVDF; vessel: glass;  
filter element: borosilicate glass micro fiber

Dead volume  
approx. 130 ml

Dimensions  
see dimensional drawing

Weight  
approx. 0.57 kg

Mounting  
Wall mounting with mounting bracket, mounting orientation  
vertical

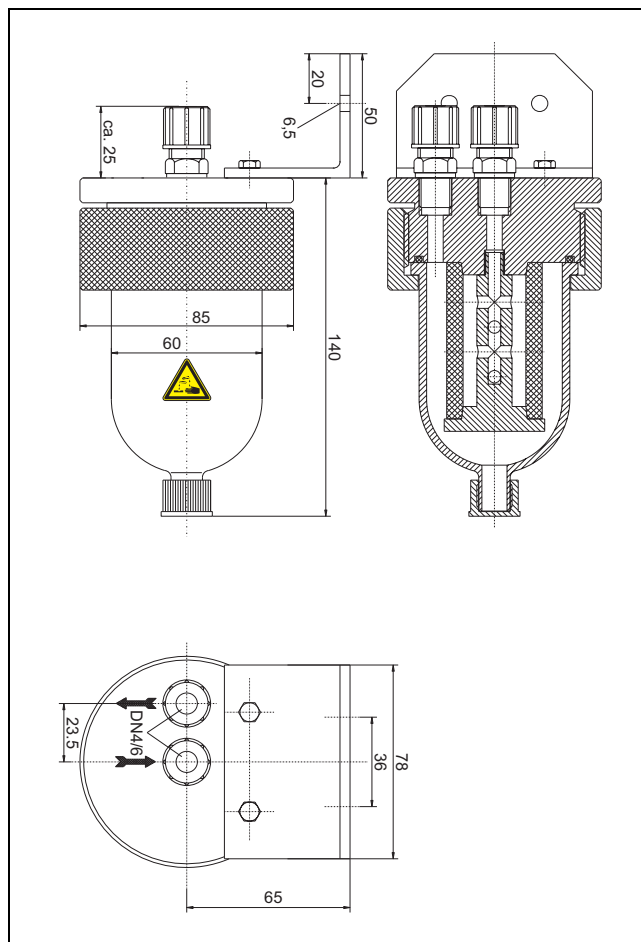
Gas connections  
Male fitting (PVDF) for 4/6/1 mm, drainage connection GL14  
with terminal fitting 4/6/1 mm (PVDF)

Ambient temperature  
 $+5 \dots +50 \text{ }^\circ\text{C}$

Service life  
Change element if there is contamination and perceptibly  
higher pressure drop

Scope of delivery  
Filter vessel with filter element, two male fittings, drainage  
connection GL14, mounting bracket, mounting and replace-  
ment instructions

## Dimensional drawing (dimensions in mm)



## Ordering information

	Catalog No.
Acid filter	23045-5-8018419

# Disposable Filter

## Application and description

The disposable filter is used in the gas conditioning system. It is mounted in the sample gas line upstream of the gas analyzer.

The disposable filter consists of a micro fiber filter pipe which is welded into a plastic case.

## Technical data

Flow rate (air)

max. 250 l/h

Gas pressure

$p_{\text{abs}} \leq 200 \text{ kPa (2 bar)}$

Sample gas temperature

+5...+50 °C

Retention rate

99.99 % for particles  $\geq 0.1 \mu\text{m}$

Pressure drop

approx. 2 hPa at 60 l/h

Dead time

approx. 3 s at 60 l/h

Materials of gas-conducting parts

Case: PA,

Filter element: borosilicate glass micro fiber

Case volume

11.5 cm<sup>3</sup>

Dimensions

Height 80 mm, diameter 28 mm

Weight

approx. 0.1 kg

Mounting

Mounting orientation preferably vertical

Gas connections

Two pipe nipples, outside diameter 6.3 mm

Ambient temperature

+5...+50 °C

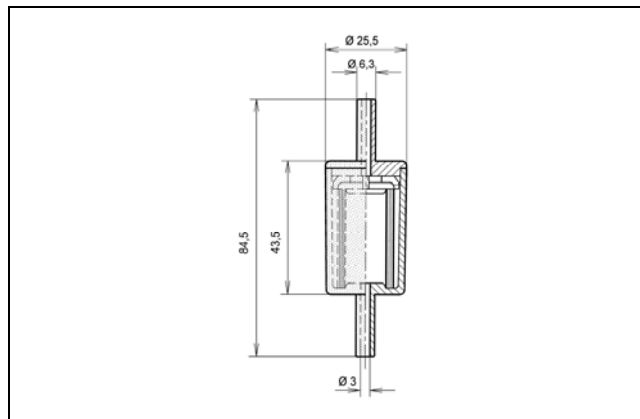
Service life

Change filter if there is condensate accumulation (acid), and in any case every 6 months

Scope of delivery

Disposable filter, mounting and replacement instructions

## Dimensional drawing (dimensions in mm)



## Ordering information

	Catalog No.
Disposable filter	23044-5-8018418

# Flow Meters, Flow Monitors

- Flow measurement using float-type flow meters
- Replaceable measuring tube
- Integral needle valve
- Flow monitor with inductive contact



## Flow meter 7...70 l/h

### Measuring range

7...70 l/h nitrogen at 20 °C and 1013 hPa (mbar)

The following flow rates are obtained with other gases under the same conditions at the 60 l/h mark (approximate values):

Sulfur dioxide	SO <sub>2</sub>	49 l/h
Carbon dioxide	CO <sub>2</sub>	55 l/h
Argon	Ar	49 l/h
Air		59 l/h
Oxygen	O <sub>2</sub>	54 l/h
Carbon monoxide	CO	60 l/h
Methane	CH <sub>4</sub>	86 l/h
Hydrogen	H <sub>2</sub>	159 l/h
Helium	He	77 l/h

### Measuring deviation

±5 % of the full-scale value

### Gas inlet conditions

Pressure max. 10 MPa (10 bar), temperature 100 °C

### Flow rate adjustment

with integral needle valve

### Materials of gas-conducting parts

Measuring tube	borosilicate glass
Float	stainless steel Mat. No. 1.4401
Float catcher	PTFE
Fitting	stainless steel Mat. No. 1.4571
Needle valve	stainless steel Mat. No. 1.4571
Seals	FPM
Nozzles	PTFE

### Weight

approx. 0.5 kg

### Mounting

Panel or wall mounting by means of mounting bracket

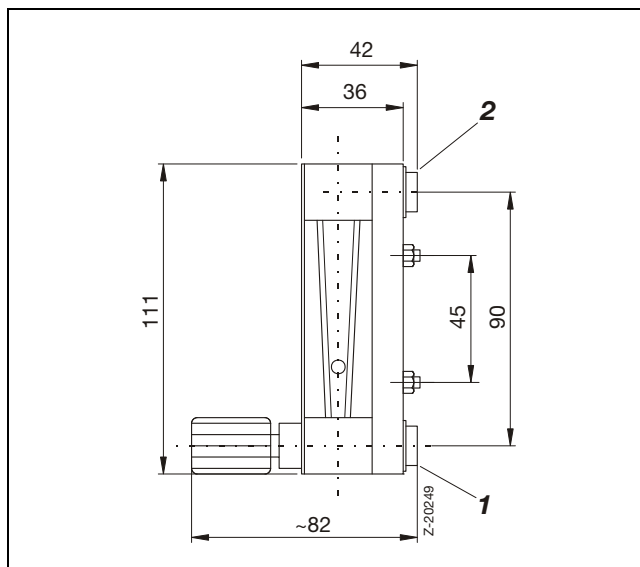
### Gas connections

1/4 NPT female thread or sleeve for hose 4 mm ID

### Scope of delivery

Flow meter, mounting bracket, 2 nozzles

## Dimensional drawing (dimensions in mm)



- 1** Gas inlet
- 2** Gas outlet

# Flow Meters, Flow Monitors

## Flow monitor 1.6...16 l/h, 7...70 l/h

### Measuring range

1.6...16 l/h or 7...70 l/h nitrogen at 20 °C and 1013 hPa (mbar)

### Measuring deviation

±5 % of the full-scale value

### Flow rate adjustment

with integral needle valve

### Materials of gas-conducting parts

as with flow meter 7...70 l/h

### Weight

approx. 0.8 kg

### Mounting

as with flow meter 7...70 l/h

### Gas connections

as with flow meter 7...70 l/h

### Signaling

with inductive contact RC 10-14-NO  
Float catcher set to 5 l/h or 20 l/h

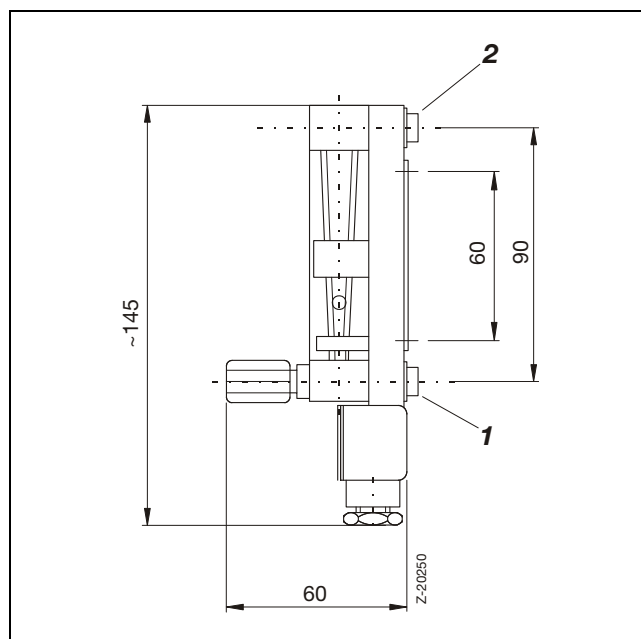
### Electrical connections

Terminal boxes with EMC filter and cable gland PG 11

### Scope of delivery

Flow monitor, mounting bracket, 2 nozzles, O-ring

## Dimensional drawing (dimensions in mm)



1 Gas inlet

2 Gas outlet

## Flow monitor for chlorine 7...70 l/h

### Measuring range

7...70 l/h chlorine at 20 °C and 1013 hPa (mbar)

### Measuring deviation

±5 % of the full-scale value

### Gas inlet conditions

Pressure max. 4 MPa (4 bar), temperature 100 °C

### Flow rate adjustment

with integral needle valve PEEK

### Materials of gas-conducting parts

Measuring tube	borosilicate glass
Float	PEEK with lining
Float catcher	PTFE
Case	PVDF
Seals	FFKM

### Weight

approx. 0.5 kg

### Mounting

Panel or wall mounting by means of mounting bracket

### Gas connections

1/4 NPT female thread

### Signaling

with inductive contact RC 10-14-NO  
Float catcher set to 20 l/h

### Electrical connections

Terminal boxes with EMC filter and cable gland PG 11

### Scope of delivery

Flow monitor, mounting bracket, 2 nozzles, O-ring

## Ordering information

	Catalog No.
Flow meter 7...70 l/h	23151-5-8018474
Flow monitor 1.6...16 l/h	23155-5-8018476
Flow monitor 7...70 l/h	23155-5-8018475
Flow monitor for chlorine 7...70 l/h	23155-5-8018477

# ER-144A/Ex Switching Unit

## Application and description

The switching unit ER-144A/Ex acts as switching amplifier for the condensate monitor CGKW (see page 27). The intrinsically-safe circuit of the switching unit ER-144A/Ex enables the condensate monitor also to be installed in hazardous areas.

The ER-144A/Ex switching unit operates in closed-circuit operation. The alarm positions of the output contacts correspond to those of the device in a non-voltage state or exceeding the adjustable measurement current value (electric conductance) or disconnection of the sensor lead. In the “Ready” status, the output contacts have changed over to the corresponding counter-position (internal relay picked-up).

A 100-kΩ resistor (1 % /0.25 W) must be installed at the sensor in order to monitor the signal line between the sensor and the electrode relay. Without the resistor, the switching unit will change to the “Line break” position.

## Technical data

Input	“ia”	“jb”
No-load voltage $U_0$	$\leq 13.1\text{ V}$	$\leq 13.1\text{ V}$
Short-circuit current $I_0$	$\leq 5\text{ mA}$	$\leq 5\text{ mA}$
Power $P_0$	$\leq 65\text{ mW}$	$\leq 65\text{ mW}$
Permissible external capacitance $C_0$	$\leq 0.97\text{ }\mu\text{F}$	$\leq 6\text{ }\mu\text{F}$
Permissible external inductance $L_0$	$\leq 0.9\text{ H}$	$\leq 1\text{ H}$

Output  
2 potential-free changeover contacts, max. 250 VAC, 5 A

Indication  
One LED each for line breakage and condensate penetration

Power supply  
230 VAC or 115 VAC  $\pm 10\%$ , 48...62 Hz,  $\leq 1\text{ VA}$

Construction  
Surface-mounting case

Degree of protection  
Housing IP 40, terminals IP 20 to EN 60529

Electrical safety  
Protection class II,  
Over-voltage category III,  
Degree of pollution 2

Weight  
approx. 0.2 kg

Mounting  
Snap fastening on standard rail 35 mm (EN 50022)

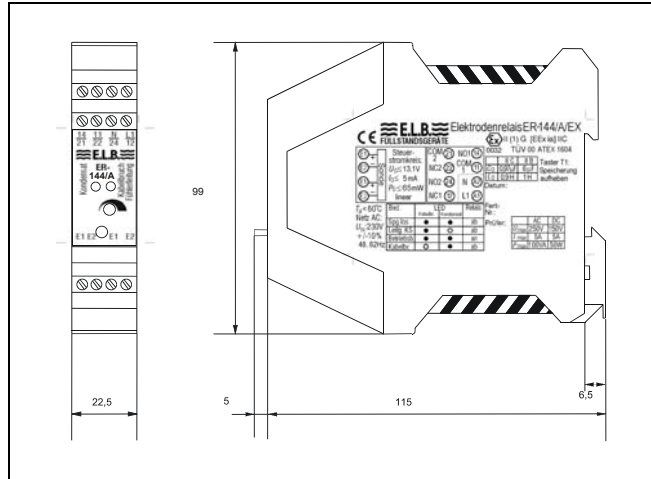
Ambient temperature  
 $-25\dots+60\text{ }^\circ\text{C}$

EC type examination certificate  
TÜV 00 ATEX 1604

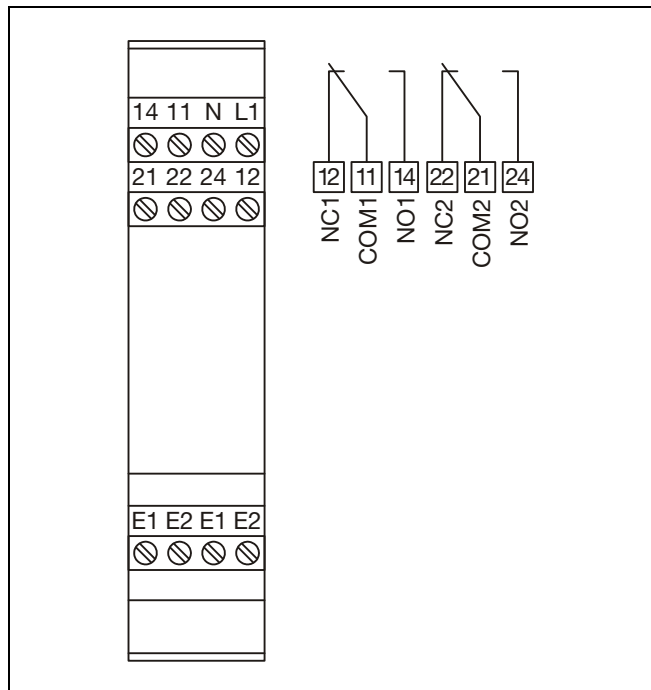
Designation  
 II (1) G [EEx ia] IIC

Installation location  
Outside the hazardous area

## Dimensional drawing (dimensions in mm)



## Electrical connections



Relays are shown in the unpowered state.

## Ordering information

	Catalog No.
Switching unit ER-144A/Ex, 230 V AC	23371-4-0730637
Switching unit ER-144A/Ex, 115 V AC	23371-4-0730638

# KFA Isolated Switch Amplifier

## Application and description

The KFA isolated switch amplifier is used as switch amplifier for the flow monitor (see page 30).

The control circuit is monitored for line breakage and short circuit. External faults are indicated by a red flashing LED.

## Technical data

Input (intrinsically safe)

$$U_0 \leq 10.6 \text{ V}$$

$$I_0 \leq 19.1 \text{ mA}$$

$$P_0 \leq 51 \text{ mW}$$

Permissible connection values

Explosion group	IIA	IIB	IIC
External capacitance	72 $\mu\text{F}$	16.2 $\mu\text{F}$	2.32 $\mu\text{F}$
External inductance	780 mH	390 mH	97 mH

Output relays

Potential-free changeover contacts, max. 253 V AC, 2 A;  
 $\cos \varphi > 0.7$ ; switching frequency < 10 Hz

Power supply

207...253 V AC or 103.5...126 V AC, 45...65 Hz,  $\leq 1 \text{ VA}$

Construction

Surface-mounting case

Degree of protection of housing

IP 30 to EN 60529

Weight

approx. 150 g

Mounting

Panel or wall mounting with screw fastening (EN 50022/3) or  
 snap fastening on standard rail 35 mm (EN 50022)

Ambient temperature

-20...+60 °C

EC type examination certificate

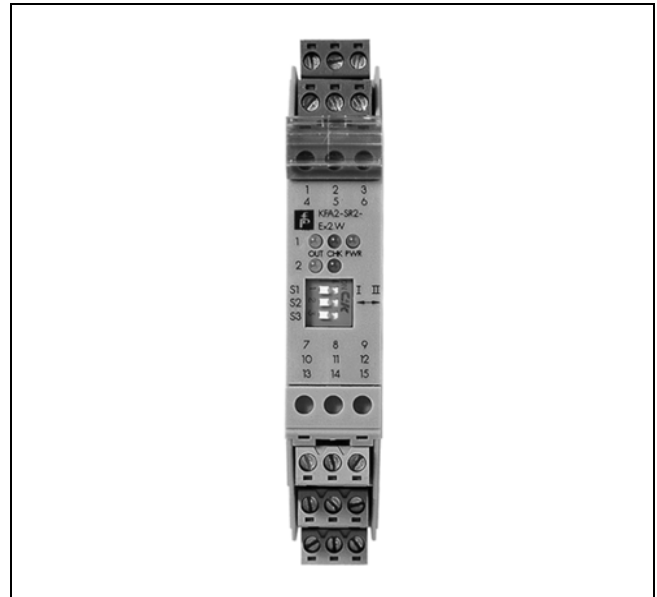
PTB 00 ATEX 2081

Designation

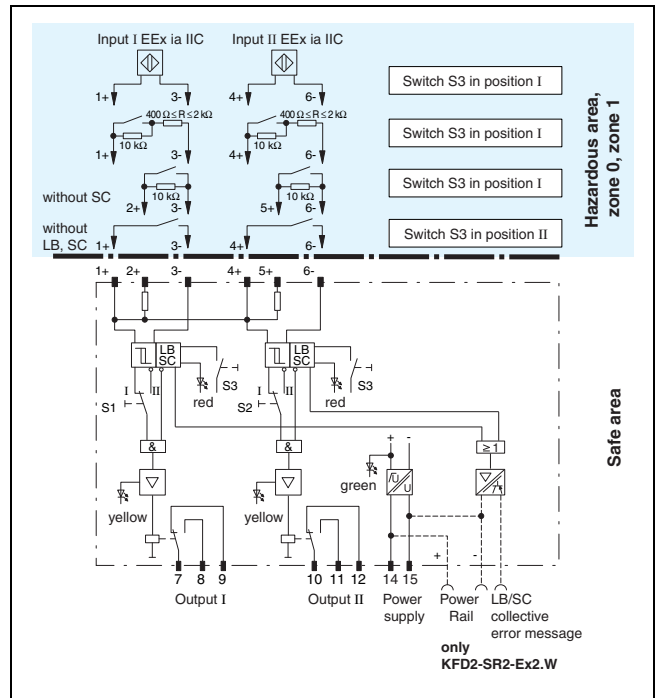
$\text{Ex}$  II (1) G D [EEx ia] IIC

Installation location

Outside the hazardous area



## Electrical connections



## Ordering information

	Catalog No.
KFA6-SR2-Ex1.W, 1 channel, 230 V AC	23372-5-8328644
KFA6-SR2-Ex2.W, 2 channels, 230 V AC	23372-5-8328645
KFA5-SR2-Ex1.W, 1 channel, 115 V AC	23372-5-8328851
KFA5-SR2-Ex2.W, 2 channels, 115 V AC	23372-5-0730651

# Stripper for Cooling Water and Waste Water

## Application and description

The stripper enables traces of organic solvents or pollution in waste water or cooling water to be monitored continuously.

The stripper is used in combination with a flame-ionization detector (FID). The device operates on the flow principle. 100...300 l/h of the water to be analyzed are sent through a glass body in the center of which is located a glass frit which is continuously purged with the instrument air. Hydrocarbons change into the gas phase and are driven out of the medium by the air bubbles. The air stream is then analyzed with an FID.

The stripper unit is operated on the bypass principle without a pump. The cross-sections of the entire unit are designed in such a way that clogging is prevented to a greater or lesser extent. A threefold safeguard against flooding and water breakthrough to the FID is achieved by an overflow and an emergency overflow as well as a check valve. The feed can be shut off by means of a gate valve. To obtain long-term measurement stability, the strip air is fed via flow regulators.



## Technical data

### Instrument air

100...700 kPa (1...7 bar), consumption approx. 100 l/h

### Minimum pressure difference

10 kPa (0.1 bar)

### Medium temperature

+10...+50 °C

### Flow rate sample water

100...300 l/h

### Heat-up time

< 7 s with 3 m feed line between stripper and FID

### Materials of gas-conducting parts

Rigid PVC, glass

### Power supply

230 VAC, 50/60 Hz or 120 VAC, 60 Hz

### Case material

G.R.P.

### Degree of protection of housing

IP 65 to EN 60529

### Dimensions

1000 x 460 x 340 mm (H x W x D)

### Weight

24 kg

## Connections

### Connection, test water:

1 inch thread connection

### Connection, sample water:

DN 25 using DIN 4-hole flange with flat seal

### Discharge, sample water:

Discharge point DN 50 via DIN 4-hole flange with flat seal

## Contacts

Potential-free contact for flow monitoring of the sample water

## Ambient temperature

+10...+50 °C

## Ordering information

	Catalog No.
Stripper IP 65, unheated	23841-5-4560001
Stripper IP 65, heated, 230 VAC	23841-5-0768362
Stripper IP 65, heated, 120 VAC	23841-5-0768361

# Multi-way Test Gas Cocks

## Multi-way test gas cock, PVDF version

Flow rate  
approx. 1000 l/h at 100 hPa pressure difference and 20 °C

Gas pressure  
 $p_{abs} = 50 \dots 200 \text{ kPa (0.5 \dots 2 bar)}$

Leakage rate  
 $\leq 5 \times 10^{-3} \text{ hPa l/s}$

Materials of gas-conducting parts  
PVDF, PTFE, FPM

Weight  
approx. 0.7 kg

Mounting  
Wall or panel mounting

Gas connections  
G1/4 (DIN ISO 228/1)

Ambient temperature  
 $+5 \dots +80 \text{ °C}$



## Multi-way test gas cock, stainless steel version

Flow rate  
approx. 1000 l/h at 50 hPa pressure difference and 20 °C

Gas pressure  
 $p_{abs} = 17.6 \text{ MPa (176 bar)}$

Leakage rate  
 $\leq 5 \times 10^{-3} \text{ hPa l/s}$

Materials of gas-conducting parts  
PTFE, stainless steel SS 316, suitable for pure oxygen

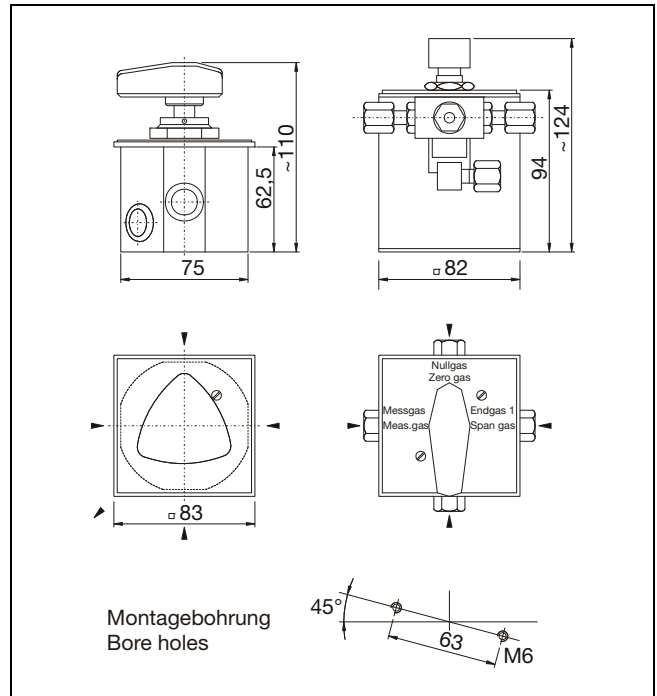
Weight  
approx. 0.8 or 0.45 kg

Mounting  
Wall mounting (with accessories) or panel mounting

Gas connections  
1/8-NPT and screw fitting for 6 mm OD pipes

Ambient temperature  
 $+10 \dots +65 \text{ °C}$

## Dimensional drawing (dimensions in mm)



## Ordering information

	Catalog No.
Test gas cock PVDF	23177-4-0839859
Test gas cock stainless steel for wall mount.	23177-5-8308581

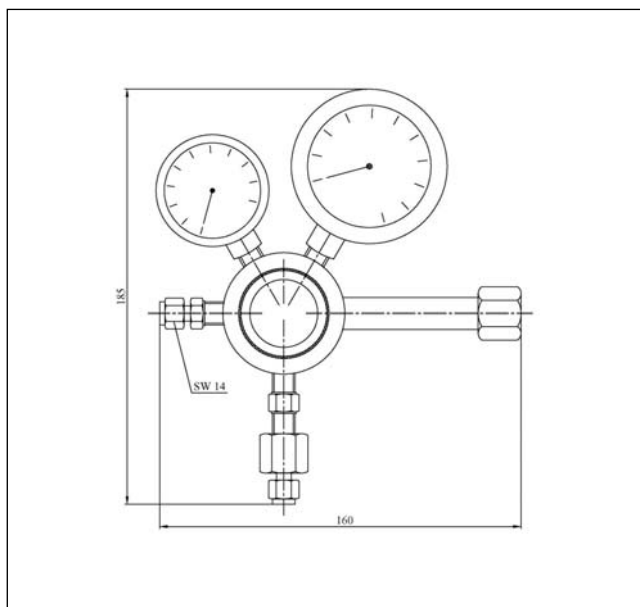
# Cylinder Pressure Reducers

## Application and description

Cylinder pressure reducers are used to reduce the filling pressure in pure gas and test gas cylinders to the required operating pressure. Material compatibility must be observed in respect of the test gas (see technical data). Two-stage cylinder pressure reducers are employed where very constant pressure and flow are required at low operating pressure – for example where the subsequent gas paths are switched over using solenoid valves. Pressure reducers with minimum contact at the high-pressure gauge give an indication when the cylinder pressure has dropped to such a level that it is necessary to replace the gas cylinder.

## Ordering information

	Catalog No.
2-stage for nitrogen	<b>23422-5-8018376</b>
2-stage for non-corrosive test gases	<b>23422-5-8018377</b>
2-stage for corrosive test gases	<b>23422-5-8018378</b>
1-stage for nitrogen, brass	<b>23422-4-0730654</b>
1-stage for non-corrosive test gases, brass	<b>23422-4-0730655</b>
2-stage for hydrogen, brass	<b>23422-4-0730652</b>
2-stage for hydrogen, stainless steel	<b>23422-4-0730653</b>



## Technical data

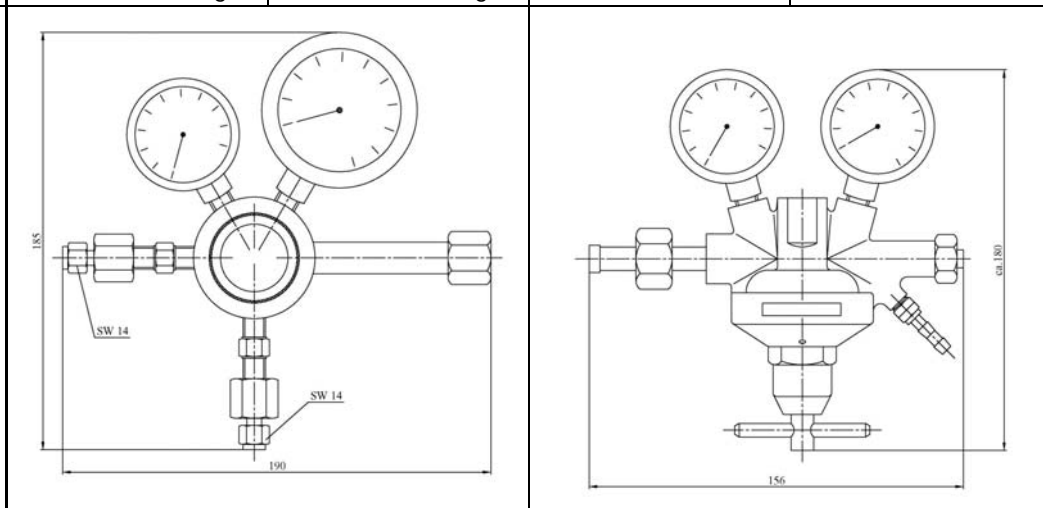
Catalog No.	23422-5-8018376	23422-5-8018377	23422-5-8018378
Gas type	Nitrogen	Non-corr. test gases	Corrosive test gases
Construction	2-stage, brass, with minimum contact		2-stage, stainless steel, with min. contact
Inlet pressure	max. 21 MPa (210 bar)		max. 21 MPa (210 bar)
Outlet pressure (adjustable)	10...150 kPa (0.1...1.5 bar)		10...150 kPa (0.1...1.5 bar)
Safety valve set to	approx. 1.6 MPa (16 bar)		approx. 1.6 MPa (16 bar)
Relief valve set to	approx. 200 kPa (2 bar)		approx. 200 kPa (2 bar)
Pressure gauge indication			
Inlet pressure	0...25 MPa (0...250 bar)		0...25 MPa (0...250 bar)
Outlet pressure	-100...+300 kPa (-1...+3 bar)		-100...+300 kPa (-1...+3 bar)
Flow rate	25...500 l/h		25...500 l/h
Control action	Back pressure increase with falling cylinder pressure down to 3 bar equals zero		Back pressure increase with falling cylinder pressure down to 3 bar equals zero
Status signal	Reed contact 100 V, 0.5 A		Reed contact 100 V, 0.5 A
Materials of gas-conducting parts			
Membranes	Stainless steel		Stainless steel
Seal	ETFE, PVDF, EPDM		ETFE, PVDF, EPDM
Case	Brass chromium plated		Stainless steel 1.4401
Dimensions (W x H x D)	approx. 160 x 185 x 167 mm		approx. 160 x 185 x 167 mm
Weight	approx. 2.1 kg		approx. 2.1 kg
Connections			
Connection to cylinder (thread to DIN 477)	Hexagon		Hexagon
Gas outlet	Clamping ring screw fitting Swagelok® for pipe with 6 mm outside diameter		Clamping ring screw fitting Swagelok® for pipe with 6 mm outside diameter
Safety valve	Clamping ring screw fitting Swagelok® for pipe with 6 mm outside diameter		Clamping ring screw fitting Swagelok® for pipe with 6 mm outside diameter
Relief valve	1/4-NPT male thread		1/4-NPT male thread
Ambient temperature	-5...+75 °C		-5...+75 °C
Scope of delivery	Pressure reducer, pressure gauge, safety valve and clamping ring screw fitting attached; replacement seals, manual		Pressure reducer, pressure gauge, safety valve and clamping ring screw fitting attached; replacement seals, manual
Dimensional drawing	see above		see above

# Cylinder Pressure Reducers

## Technical data

Catalog No.	23422-4-0730652	23422-4-0730653	23422-4-0730654	23422-4-0730655
Gas type	Hydrogen	Hydrogen	Nitrogen	Non-corrosive test gas
Construction	2-stage, brass	2-stage, stainless steel	1-stage, brass	1-stage, brass
Inlet pressure	21 MPa (210 bar)	21 MPa (210 bar)	21 MPa (210 bar)	21 MPa (210 bar)
Control range	0...350 kPa (3.5 bar)	0...350 kPa (3.5 bar)	0...250 kPa (2.5 bar)	0...250 kPa (2.5 bar)
Control action	Back pressure increase with falling cylinder pressure down to 3 bar equals zero	Back pressure increase with falling cylinder pressure down to 3 bar equals zero	–	–
Pressure gauge	–	–	31.5 MPa (315 bar)	31.5 MPa (315 bar)
Reed contact pressure gauge	25 MPa (250 bar)	25 MPa (250 bar)	–	–
Contact	falling opening	falling opening	–	–
Outlet pressure gauge indication range	–100...+500 kPa (–1...+5 bar)	–100...+500 kPa (–1...+5 bar)	0...+400 kPa (0...+4 bar)	0...+400 kPa (0...+4 bar)
Materials of gas-conducting parts				
Body	Brass	Stainless steel 1.4404	Brass	Brass
Membrane	Stainless steel	Stainless steel	NBR	NBR
Case seal	NBR	EPDM	NBR	NBR
Seat	PVDF/PTFE	PVDF/PTFE	–	–
Filter	50 µm	50 µm	100 µm	100 µm
Connection cable	3 m	3 m	–	–
Bottle connection	DIN 477, No. 1	DIN 477, No. 1	DIN 477, No. 10	DIN 477, No. 14
Safety relief valve	2	2	1	1
Ambient temperature	–5...+75 °C	–5...+75 °C	–5...+75 °C	–5...+75 °C
Weight	2.1 kg	2.1 kg	2.1 kg	2.1 kg
Special features	Outlet with throttle approx. 40 l/h and 6 mm screwed fitting	Outlet with throttle approx. 40 l/h and 6 mm screwed fitting		

## Dimensional drawings



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10/23-5.20 EN Rev. 11.02.2011