A gas analysis system usually consists of two groups of devices:

- The gas analyzer measures the concentrations of the sample gas components and converts them into an electrical signal.
- Supplementary devices sample the sample gas from the process, condition it and feed it in the gas analysis system.

In most cases, the sample gas sampled from the process cannot be processed by the gas analyzer without further conditioning. Too high a dust content, temperature and dew point as well as too high or too low pressure, and not least interference components in the sample gas can impair the operational capability of the gas analyzer and falsify the measuring result.

Supplementary devices such as the sampling probe, the sample gas line, the sample gas cooler and pumps and filters ensure that the sample gas inlet conditions of the connected gas analyzers are satisfied and faultless measuring results are obtained independently of the process sequence and the local conditions.

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</table>
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 (Federal Immission Protection Law)

Sample gas inlet conditions

<table>
<thead>
<tr>
<th>Sample gas pressure</th>
<th>p_{abs} without peristaltic pump</th>
<th>p_{abs} with peristaltic pump</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glass</td>
<td>50…200 kPa (0.5…2.0 bar)</td>
<td>50…150 kPa (0.5…1.5 bar)</td>
</tr>
<tr>
<td>PVDF</td>
<td>50…250 kPa (0.5…2.5 bar)</td>
<td>50…150 kPa (0.5…1.5 bar)</td>
</tr>
<tr>
<td>Stainless steel</td>
<td>0.05…1 MPa (0.5…10 bar)</td>
<td>50…150 kPa (0.5…1.5 bar)</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Heat exchanger material</th>
<th>Dead volume in heat exchanger</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HE125</td>
</tr>
<tr>
<td>Glass</td>
<td>40 ml</td>
</tr>
<tr>
<td>PVDF</td>
<td>25 ml</td>
</tr>
<tr>
<td>Stainless steel</td>
<td>30 ml</td>
</tr>
</tbody>
</table>

Gas tightness
5 x 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 V AC, 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 V AC or 115 V AC ±15…+10 %, 50…60 Hz

Power consumption
max. 200 VA

Starting current
2.5 A at 230 V AC
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*

<table>
<thead>
<tr>
<th>Heat exchanger material</th>
<th>Sample gas inlets &amp; outlets</th>
<th>Condensate outlet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glass</td>
<td>Screwed pipe or hose connection GL18</td>
<td>Pipe nipple GL25</td>
</tr>
<tr>
<td>PVDF</td>
<td>6 mm tube</td>
<td>G 3/8 inch internal thread</td>
</tr>
<tr>
<td>Stainless steel</td>
<td>G 1/4 inch internal thread</td>
<td>G 3/8 inch internal thread</td>
</tr>
</tbody>
</table>

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**

*Radio interference suppression*
Class B to EN 55011

*Interference immunity*
Testing to EN 50082-2

**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 SO₂ measuring ranges (< 1000 mg/m³) 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_{abs} = 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

**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

Accessories for condensate disposal

Time relay
Run time and off period settings
0.6…6.0 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 mm², 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

<table>
<thead>
<tr>
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<tr>
<td>Timer relay</td>
<td>90805-4-0741607</td>
</tr>
<tr>
<td>Reagent and condensate bottle</td>
<td>23234-5-8328972</td>
</tr>
<tr>
<td>Level monitor condensate</td>
<td>23005-4-0741239</td>
</tr>
<tr>
<td>Level monitor reagent</td>
<td>90805-5-8308994</td>
</tr>
<tr>
<td>Condensate trap, filter surface 20 cm²</td>
<td>23065-5-8018512</td>
</tr>
</tbody>
</table>
### SCC-C Sample Gas Cooler

#### Ordering information

<table>
<thead>
<tr>
<th>Catalog No. 23070-0-</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>0</th>
<th>0</th>
<th>0</th>
<th>0</th>
</tr>
</thead>
</table>

**Design**

- Wall-mounted housing 1/2-19 Inch
  - 1

**Preparation**

- without
  - 0
- with dosing unit
  - 1

**Heat exchanger**

- Glass
  - 1
- PVDF
  - 2
- Stainless steel
  - 3

**Gas paths**

- 1 gas path 250 l/h
  - 1
- 1 gas path 125 l/h
  - 2
- 2 gas paths 2 x 125 l/h
  - 3

**Condensate drain**

- without
  - 0
- 1 peristaltic pump
  - 1
- 2 peristaltic pumps (2 x condensate)
  - 2
- 2 peristaltic pumps (1 x condensate, 1 x dosing)
  - 3
- 2 peristaltic pumps (1 x condensate, 1 x precondensation)
  - 4

**Display**

- Temperature display and monitoring
  - 1
- Temperature display and monitoring and Pt 100
  - 2

**Power supply**

- 230 V, 50/60 Hz
  - 1
- 115 V, 50/60 Hz
  - 2

**Certification**

- without
  - 0
- with CSA certification
  - 1

Catalog No. 23070-0-00


**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**

\[ p_{abs} = 70\ldots105 \text{ kPa (0.7...1.05 bar)} \]

**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 cm³ (plus dead volume of heat exchanger)

**Gas tightness**

\[ 5 \times 10^{-6} \text{ hPa l/s} \]

**Flow rate display and adjustment**

Rotometer 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 VAC, 2 A

### Feed performance standard

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

### Feed performance bypass

-1000 -500 0 500 1000 1500 2000 2500

Pressure / hPa

-400 hPa
-300 hPa
0 hPa
-100 hPa-200 hPa

Flow / l/h

250
200
150
100
50

Flow rate / l/h

Pressure / hPa
SCC-F Sample Gas Feed Unit

**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 ± 2 Hz
- 115 V (100…135 V) AC, 50 Hz or 60 Hz ± 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 mm²
Status signals
- Screw clamp terminals for stranded or solid wire with max. 1.5 mm²

**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**
Radio interference suppression
Class B to EN 55011
Interference immunity
Testing to EN 50082-2

**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,
- ≤ 90 % on 30 days/year

**Options**
Metering unit
- By means of peristaltic pump, flow rate 15 ml/h,
- feed tank as accessory
for small SO₂ measuring ranges (< 1000 mg/m³) 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

<table>
<thead>
<tr>
<th>Design</th>
<th>Wall-mounted housing 1/2-19 Inch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas paths</td>
<td>1 gas path, 1 condensate monitor, 1 flow monitor, 1 diaphragm pump</td>
</tr>
<tr>
<td></td>
<td>2 separate gas paths, 2 condensate monitors, 2 flow monitors, 2 diaphragm pumps</td>
</tr>
<tr>
<td></td>
<td>1 gas path, 1 condensate monitor, 2 flow monitors, 1 diaphragm pump</td>
</tr>
<tr>
<td></td>
<td>1 gas path, 1 condensate monitor, 2 flow monitors, 1 diaphragm pump, 1 pressure controller</td>
</tr>
<tr>
<td></td>
<td>2 separate gas paths, 2 condensate monitors, 2 flow monitors, 1 diaphragm pump</td>
</tr>
<tr>
<td></td>
<td>2 separate gas paths, 2 condensate monitors, 1 flow monitor, 1 diaphragm pump</td>
</tr>
<tr>
<td>Dosing</td>
<td>without</td>
</tr>
<tr>
<td></td>
<td>with dosing pump</td>
</tr>
<tr>
<td>Electronic processing unit</td>
<td>1 electronic processing unit</td>
</tr>
<tr>
<td></td>
<td>2 electronic processing units</td>
</tr>
<tr>
<td></td>
<td>I/O interface board</td>
</tr>
<tr>
<td>Power supply</td>
<td>230 V, 50/60 Hz</td>
</tr>
<tr>
<td></td>
<td>115 V, 50/60 Hz</td>
</tr>
<tr>
<td>Certification</td>
<td>without</td>
</tr>
<tr>
<td></td>
<td>with CSA certification</td>
</tr>
</tbody>
</table>

Catalog No. 23212-0-
SCC-F Sample Gas Feed Unit

Pneumatic diagrams

Catalog number 23212-0-11XXXX000000

Catalog number 23212-0-12XXXX000000

Catalog number 23212-0-13XXXX000000

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 und 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
\[ p_{\text{abs}} = 70 \ldots 105 \text{ kPa (0.7...1.05 bar)} \]

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 x 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

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**
Radio interference suppression
Class B to EN 55011

Interference immunity
Testing to EN 50082-2

**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**

Catalog number 23235-0-1100000000

Catalog number 23235-0-1200000000

Catalog number 23235-0-1300000000

Catalog number 23235-0-1210000000

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)**

1. Sample gas inlet
2. Test gas inlet
3. Sample gas outlet
4. Power supply and status signal cables
5. Flow rate monitor with needle valve
6. Peristaltic pump
7. Condensate monitor
8. LED indicator condensate alarm red
9. Pump switch
10. Temperature controller for cooler
11. 3-way cock sample gas/test gas
12. Condensate outlet
13. 4 x M5 threaded holes in ground plate
14. Bypass outlet (only in version with bypass 15–150 l/h 23235-0-130X00000000)

1) only in version with Peltier cooler and condensate pump 23235-0-121X00000000

**Ordering information**

<table>
<thead>
<tr>
<th>Design</th>
<th>Catalog No. 23235-0-00000000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wall-mounted housing 1/2-19 inch</td>
<td>1</td>
</tr>
<tr>
<td>with 3-way cock, diaphragm filter, pump and flow monitor with needle valve</td>
<td>1 0</td>
</tr>
<tr>
<td>with 3-way cock, condensate monitor, pump and flow monitor with needle valve</td>
<td>2</td>
</tr>
<tr>
<td>with 3-way cock, condensate monitor, pump, flow monitor 7–70 l/h, Bypass 15–150 l/h</td>
<td>3 0</td>
</tr>
</tbody>
</table>

**Cooler and condensate pump**

| without | 0 |
| with Peltier cooler and condensate pump | 2 1 |

**Power supply**

| 230 V, 50 Hz | 1 |
| 115 V, 60 Hz | 2 |

**Accessories**

<table>
<thead>
<tr>
<th>Catalog No. 23009-4-0730702</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carry handle</td>
</tr>
</tbody>
</table>

14  System Components and Accessories for Sample Gas Conditioning 10/23-5.20 EN December 2007
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
\[ p_{\text{abs}} = 70 \ldots 105 \text{ kPa (0.7 \ldots 1.5 bar)} \]

Flow rate
max. 250 l/h at atmospheric pressure

Inlet temperature
+5 \ldots +50 ^\circ \text{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 / ±0.15 mm / 5…150 Hz; 3 x 5 cycles
Operation
  Vibration: 2 g / ±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
  ≤ 90 % annual average, condensation permitted
Climatic class
  3K4 to EN 60721-3-3

Ordering information

<table>
<thead>
<tr>
<th>Catalog No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>23134-5-8018545</td>
<td>Diaphragm Pump 4N, IP 20; 230V, 50/60 Hz</td>
</tr>
<tr>
<td>23134-5-8018546</td>
<td>Diaphragm Pump 4N, IP 20; 115V, 50/60 Hz</td>
</tr>
<tr>
<td>23134-5-8018547</td>
<td>Diaphragm Pump 4N, IP 54; 230V, 50/60 Hz</td>
</tr>
<tr>
<td>23134-5-8018548</td>
<td>Diaphragm Pump 4N, IP 54; 115V, 50/60 Hz</td>
</tr>
</tbody>
</table>

Dimensional drawing (dimensions in mm)
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.

<table>
<thead>
<tr>
<th>Delivery</th>
<th>max. 300 l/h at atmospheric pressure, under other pressure conditions: see delivery diagram.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The diaphragm is moved by an electric magnet. The rate of flow can be changed by using a magnetic shunt.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time-related behavior</th>
<th>Flow rate</th>
<th>Dead time</th>
<th>Time constant</th>
<th>Pressure drop</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 l/h</td>
<td>0.9 s</td>
<td>1.1 s</td>
<td></td>
<td>0.4 hPa</td>
</tr>
<tr>
<td>60 l/h</td>
<td>0.7 s</td>
<td>1.0 s</td>
<td></td>
<td>1.1 hPa</td>
</tr>
<tr>
<td>90 l/h</td>
<td>0.6 s</td>
<td>0.9 s</td>
<td></td>
<td>1.8 hPa</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th></th>
<th>Catalog No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diaphragm Pump 2, 220 V, 50 Hz</td>
<td>23121-5-5861212</td>
</tr>
</tbody>
</table>

Dimensional drawing (dimensions in mm)

Sample gas connections
Gate valve for regulating the feed quantity
SCC-K NO$_2$/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**

<table>
<thead>
<tr>
<th>Sample gas flow rate</th>
<th>max. 150 l/h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature range</td>
<td>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</td>
</tr>
<tr>
<td>Effectivity</td>
<td>≥ 95 % with new catalyst</td>
</tr>
<tr>
<td>Sample gas pressure p$_{\text{max}}$</td>
<td>≤ 200 kPa (2 bar)</td>
</tr>
<tr>
<td>Pressure drop</td>
<td>≤ 0.01 kPa (10 mbar) at 90 l/h</td>
</tr>
<tr>
<td>Warm-up time</td>
<td>approx. 30 min</td>
</tr>
<tr>
<td>90% time T$_{90}$</td>
<td>≤ 10 s at 60 l/h</td>
</tr>
<tr>
<td>Status signal for temperature deviation</td>
<td>1 NO potential-free contact, capacity 24 V DC, 1 A</td>
</tr>
</tbody>
</table>

**Materials of gas-conducting parts**

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

**Power supply**

<table>
<thead>
<tr>
<th>Input voltage</th>
<th>230 V AC or 115 V AC –15…+10 %, 48…62 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power consumption</td>
<td>230 V AC: 350 VA; 115 V AC: max. 170 VA</td>
</tr>
</tbody>
</table>

**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$^\circledR$ 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 NO₂/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
Radio interference immunity
Class B to EN 55011

Interference immunity
Testing to EN 50082-2

Ambient conditions
Ambient temperature
Operation: +10…+50 °C,
Storage and transport: –25…+65 °C

Relative humidity
≤ 75 % annual mean, occasional and slight condensation permitted

CSA certification
The SCC-K NO₂/NO converter is certified to
– Class 2258 01 Process Control Equipment and
– Class 2258 81 Process Control Equipment – Certified to U.S. Standards

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

Certificate No. 1105720

Service life of catalyst
The service life of the catalyst depends on its operating temperature as well as the flow rate and the NO₂ and O₂ content of the sample gas. It is > 6 months for 320 °C, 30 l/h, 10 ppm NO₂ and 5 Vol.-% O₂.

Ordering information

| Converter SCC-K, cock PVDF, 230 VAC | 23093-4-0801974 |
| Converter SCC-K, 2 solen. valves, 230 VAC | 23093-4-0801975 |
| Converter SCC-K, heated, 1 s.v., 230 VAC | 23093-4-0801976 |
| Converter SCC-K, cock PVDF, 115 VAC | 23093-4-0801977 |
| Converter SCC-K, 2 solen. valves, 115 VAC | 23093-4-0801978 |
| Converter SCC-K, heated, 1 s.v., 115 VAC | 23093-4-0801979 |

Accessories

| Wall mounting bracket | 23009-4-0801980 |
| Carbon catalyst set | 23009-4-0801981 |
SCC-K NO$_2$/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**

Netzfilter
mains suppression filter

Statussignal NO
Status signal NO

Converter

Bypass

Bei Steuerung nur intern
Brücke X2/1 nach X2/6
Internal controlled only
link X2/1 to X2/6

External internal

X1 F1/2 3,15A
Netz
Power supply

Frontplatte
front panel

M1
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
$p_{abs} \leq 120$ kPa (1.2 bar)

Operating data

<table>
<thead>
<tr>
<th></th>
<th>30 l/h</th>
<th>60 l/h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dead time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Without filling</td>
<td>1.5 s</td>
<td>0.5 s</td>
</tr>
<tr>
<td>With filling</td>
<td>2 s</td>
<td>0.7 s</td>
</tr>
<tr>
<td>90% time</td>
<td>2 s</td>
<td>0.75 s</td>
</tr>
<tr>
<td>Pressure drop</td>
<td>1.5 hPa</td>
<td>3.6 hPa</td>
</tr>
<tr>
<td>Without filling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>With filling</td>
<td>2 hPa</td>
<td>0.7 hPa</td>
</tr>
<tr>
<td>4.5 hPa</td>
<td>2.5 hPa</td>
<td></td>
</tr>
<tr>
<td>6 hPa</td>
<td>12 hPa</td>
<td></td>
</tr>
</tbody>
</table>

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)

Ordering information

<table>
<thead>
<tr>
<th></th>
<th>Catalog No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CGO-9 with reaction tube,</td>
<td>23092-4-0806560</td>
</tr>
<tr>
<td>with thermocouple</td>
<td></td>
</tr>
<tr>
<td>CGO-9 with reaction tube,</td>
<td>23092-4-0856545</td>
</tr>
<tr>
<td>with catalyst LF 316, with</td>
<td></td>
</tr>
<tr>
<td>thermocouple</td>
<td></td>
</tr>
<tr>
<td>Accessories</td>
<td></td>
</tr>
<tr>
<td>CGO-9 reaction tube, quartz</td>
<td>23005-4-0806559</td>
</tr>
<tr>
<td>CGO-9 reaction tube, stainless</td>
<td>23004-4-0856544</td>
</tr>
<tr>
<td>steel with catalyst LF 316</td>
<td></td>
</tr>
<tr>
<td>CGO-9 stainless steel catalyst</td>
<td>23004-4-0801715</td>
</tr>
<tr>
<td>LF 316</td>
<td></td>
</tr>
</tbody>
</table>
### CGO-9 Tubular Furnace

#### Examples of applications

<table>
<thead>
<tr>
<th>Application</th>
<th>Furnace temperature</th>
<th>Temperature controller</th>
<th>Reagent</th>
<th>Sample gas throughput</th>
<th>Mounting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxidation of sulfur compounds</td>
<td>800 °C</td>
<td>no</td>
<td>none</td>
<td>60 l/h</td>
<td>arbitrary</td>
</tr>
<tr>
<td>Combustion of organic chlorine compounds</td>
<td>800 °C</td>
<td>yes</td>
<td>none</td>
<td>60 l/h</td>
<td>arbitrary</td>
</tr>
<tr>
<td>Conversion of H₂ to HCl using Cl₂, where Cl₂ concentration ≥ H₂ concentration</td>
<td>800 °C</td>
<td>yes</td>
<td>none</td>
<td>60 l/h</td>
<td>arbitrary</td>
</tr>
<tr>
<td>NO₂/NO conversion in the exhaust air of nitric acid or pickling plants</td>
<td>750 °C</td>
<td>yes</td>
<td>Stainless steel catalyst LF 316</td>
<td>60 l/h</td>
<td>vertical</td>
</tr>
<tr>
<td>Combustion of NH₃ in air</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combustion of organic nitrogen compounds, such as emissions from animal keeping or carcass incineration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Application range: 100…3000 ppm NO₂</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: The stainless steel catalyst is not suitable for SO₂-containing combustion gases.
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 (H₂) with chlorine (Cl₂) 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
  \( p_{\text{abs}} = 80 \ldots 150 \text{ kPa (0.8} \ldots 1.5 \text{ bar) } \)

Dead volume of the reaction tube
  approx. 250 cm³

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

Ordering information

<table>
<thead>
<tr>
<th></th>
<th>Catalog No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reaction element with UV lamp</td>
<td>23095-5-5854124</td>
</tr>
</tbody>
</table>
Membrane Filter

Application
Membrane filters are used in gas conditioning systems of analyzer equipment for fine filtering of dust particles ≥ 1 µm, 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 ≥ 1 µm

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 cm²

Dead volume
approx. 15 cm³

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

<table>
<thead>
<tr>
<th>Catalog No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>23145-5-8018438</td>
<td>Membrane filter, PVC</td>
</tr>
<tr>
<td>23147-5-8018439</td>
<td>Membrane filter, stainless steel</td>
</tr>
<tr>
<td>23158-5-8018440</td>
<td>Condensate monitor, PVC</td>
</tr>
<tr>
<td>23157-5-8018039</td>
<td>Condensate monitor, stainless steel</td>
</tr>
</tbody>
</table>

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 $p_{\text{abs}}$
PVC: max. 150 kPa (1.5 bar), stainless steel: max. 200 kPa (2 bar)
Gas temperature
max. 55 °C
Retention rate
100 % for particles $\geq 1 \mu m$
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 cm²
Dead volume
approx. 15 cm³
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 stain. 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 positive pressure. Condensate barrier by 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 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 SO₃ content in the sample gas is greater than 1 mg/m³ or the SO₂ content is greater than 1000 mg/m³ – 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
\( p_{\text{abs}} = 50\ldots200 \text{kPa (0.5\ldots2 bar)} \)
Sample gas temperature
max. 150 °C
Sample gas dew point
max. 70 °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…+50 °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 replacement instructions

Dimensional drawing (dimensions in mm)

Ordering information

<table>
<thead>
<tr>
<th>Catalog No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acid filter</td>
</tr>
</tbody>
</table>
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
- $+5\ldots+50 \degree\text{C}$
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$^3$
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
- $+5\ldots+50 \degree\text{C}$
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

Ordering information

<table>
<thead>
<tr>
<th>Catalog No.</th>
<th>Disposable filter</th>
</tr>
</thead>
<tbody>
<tr>
<td>23044-5-8018418</td>
<td></td>
</tr>
</tbody>
</table>

Dimensional drawing (dimensions in mm)
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 (SO₂) 48 l/h
  - Carbon dioxide (CO₂) 51 l/h
  - Argon (Ar) 54 l/h
  - Air 59 l/h
  - Oxygen (O₂) 63 l/h
  - Carbon monoxide (CO) 68 l/h
  - Methane (CH₄) 98 l/h
  - Hydrogen (H₂) 156 l/h
  - Helium (He) 213 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

**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**

<table>
<thead>
<tr>
<th></th>
<th>Catalog No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow meter 7…70 l/h</td>
<td>23151-5-8018474</td>
</tr>
<tr>
<td>Flow monitor 1.6…16 l/h</td>
<td>23155-5-8018476</td>
</tr>
<tr>
<td>Flow monitor 7…70 l/h</td>
<td>23155-5-8018475</td>
</tr>
<tr>
<td>Flow monitor for chlorine 7…70 l/h</td>
<td>23155-5-8018477</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Input</th>
<th>“ia”</th>
<th>“ib”</th>
</tr>
</thead>
<tbody>
<tr>
<td>No-load voltage U₀</td>
<td>≤ 13.1 V</td>
<td>≤ 13.1 V</td>
</tr>
<tr>
<td>Short-circuit current I₀</td>
<td>≤ 5 mA</td>
<td>≤ 5 mA</td>
</tr>
<tr>
<td>Power P₀</td>
<td>≤ 65 mW</td>
<td>≤ 65 mW</td>
</tr>
<tr>
<td>Permissible external capacitance C₀</td>
<td>≤ 0.97 µF</td>
<td>≤ 6 µF</td>
</tr>
<tr>
<td>Permissible external inductance L₀</td>
<td>≤ 0.9 H</td>
<td>≤ 1 H</td>
</tr>
</tbody>
</table>

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

Indication
One LED each for line breakage and condensate penetration

Power supply
230 V AC or 115 V AC ±10 %, 48…62 Hz, ≤ 1 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…+60 °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

<table>
<thead>
<tr>
<th>Catalog No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>23371-4-0730637</td>
<td>Switching unit ER-144A/Ex, 230 V AC</td>
</tr>
<tr>
<td>23371-4-0730638</td>
<td>Switching unit ER-144A/Ex, 115 V AC</td>
</tr>
</tbody>
</table>
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 µF
- 16.2 µF
- 2.32 µF
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
\(-20...+60 \, ^\circ\text{C}\)

EC type examination certificate
PTB 00 ATEX 2081

Designation
\( \text{II (1) G D [EEx ia] llC} \)

Installation location
Outside the hazardous area

Electrical connections

Ordering information

<table>
<thead>
<tr>
<th>Catalog No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>23372-5-8328644</td>
<td>KFA6-SR2-Ex1.W, 1 channel, 230 V AC</td>
</tr>
<tr>
<td>23372-5-8328645</td>
<td>KFA6-SR2-Ex2.W, 2 channels, 230 V AC</td>
</tr>
<tr>
<td>23372-5-8328851</td>
<td>KFA5-SR2-Ex1.W, 1 channel, 115 V AC</td>
</tr>
<tr>
<td>23372-5-0730651</td>
<td>KFA5-SR2-Ex2.W, 2 channels, 115 V AC</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalog No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stripper IP 65, unheated</td>
<td>23841-5-4560001</td>
</tr>
<tr>
<td>Stripper IP 65, heated, 230 VAC</td>
<td>23841-5-0768362</td>
</tr>
<tr>
<td>Stripper IP 65, heated, 120 VAC</td>
<td>23841-5-0768361</td>
</tr>
</tbody>
</table>
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
\[ p_{\text{abs}} = 50 \ldots 200 \text{ kPa (0.5} \ldots 2 \text{ bar)} \]
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…+80 °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
\[ p_{\text{abs}} = 17.6 \text{ MPa (176 bar)} \]
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…+65 °C

Ordering information

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalog No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test gas cock PVDF</td>
<td>23177-4-0839859</td>
</tr>
<tr>
<td>Test gas cock stainless steel for wall mount</td>
<td>23177-5-8308581</td>
</tr>
</tbody>
</table>
## 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

<table>
<thead>
<tr>
<th>Catalog No.</th>
<th>2-stage for nitrogen</th>
<th>2-stage for non-corrosive test gases</th>
<th>2-stage for corrosive test gases</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>23422-5-8018376</td>
<td>23422-5-8018377</td>
<td>23422-5-8018378</td>
</tr>
</tbody>
</table>

### Technical data

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

### Technical data

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

### Dimensional drawings

[Image of dimensional drawings]
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