System components for sample gas conditioning
Measurement made easy
System components for sample gas conditioning

Careful treatment of the sample gas ensures perfect measurement results in the gas analyzer

- In most cases, the sample gas taken from the process cannot be processed by the gas analyzer without further treatment. Excessive dust content, temperature and dew point as well as excessively high or low pressure and, last but not least, interfering components in the sample gas can impair the operability of the gas analyzer and falsify the measurement result.
- System components such as the sample gas cooler, pumps and filters ensure that regardless of the process and local conditions, the gas inlet conditions of the connected gas analyzers are met and perfect measurement results are obtained.

System components for sample gas conditioning

- SCC-C Sample gas cooler
- SCC-F Sample gas feed unit
- SCC-S Sample gas feed unit
- Diaphragm pump 4N
- SCC-K Converter
- Membrane filter
- CGKW Condensate monitor
- Acid filter
- Disposable filter
- Flow meters, flow monitors
- ER-144A/Ex Switching unit
- KFA Isolated switch amplifier
- Cylinder pressure reducers
- Multi-way test gas cock
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 version up to 1 MPa (10 bar)
- Temperature display
- Suitable for ambient temperatures up to 50 °C
- Compact surface-mounting housing (width ½ 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

<table>
<thead>
<tr>
<th>Sample gas pressure</th>
<th>Heat exchanger (HE) material</th>
<th>Sample gas pressure $p_{\text{max}}$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Glass</td>
<td>50 to 200 kPa (0.5 to 2.0 bar)</td>
</tr>
<tr>
<td></td>
<td>PVDF</td>
<td>50 to 250 kPa (0.5 to 2.5 bar)</td>
</tr>
<tr>
<td></td>
<td>Stainless steel</td>
<td>0.05 to 1 MPa (0.5 to 10 bar)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sample gas flow rate</th>
<th>$1 \times 250$ l/h (HE250)</th>
<th>$1 \times 125$ l/h (HE125)</th>
<th>$2 \times 125$ l/h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample gas inlet pressure $p_{\text{max}}$</td>
<td>100 kPa (1 bar)</td>
<td>75 kPa (0.75 bar)</td>
<td></td>
</tr>
</tbody>
</table>

| 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 to 50 °C
- Warm-up time
  Approx. 15 min
- Pressure drop in heat exchanger
  Approx. 1 hPa (1 mbar), approx. 4 to 8 hPa (4 to 8 mbar) for HE125

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

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

Display and status signal

- 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

Construction

- Design
  Surface-mounting housing ½ 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
  IP20 to EN 60529
- Dimensions
  See page 5
- Weight
  Approx. 15.6 or 16.5 kg with 1 or 2 heat exchangers
- Refrigerant
  R 134a
… SCC-C Sample gas cooler

Materials of gas-conducting parts
PVDF, PTFE, PP, glass, FPM, stainless steel (high pressure version)

Gas connections

<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 1)</td>
<td>Pipe nipple GL25</td>
</tr>
<tr>
<td>PVDF</td>
<td>6 mm tube</td>
<td>G¼ female thread</td>
</tr>
<tr>
<td>Stainless steel</td>
<td>G½ female thread</td>
<td>G¾ female thread</td>
</tr>
</tbody>
</table>

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

Safety
Testing to EN 61010-1

Protective class
I

Overvoltage category / degree of contamination
II / 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, Class B

Immunity to interference
Testing to EN 61000 Part 6-2, Industrial environment

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 to 150 Hz, 3 x 5 cycles

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

Ambient conditions

Ambient temperature
Operation: ±5 to 45 °C,
Storage and transport: -25 to +60 °C

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

Power supply

Input voltage
230 V AC or 115 V AC –15 to +15 %, 50 to 60 Hz

Power consumption
Max. 200 VA

Starting current
2.5 A at 230 V AC

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 $p_{\text{abs}} = 50$ to 150 kPa (0.5 to 1.5 bar), peristaltic tube service life approx. 5 months, power consumption 3.5 VA, weight approx. 0.6 kg

Certifications

IECEE CB Scheme – Safety
The SCC-C sample gas cooler is certified to the ‘IEC system for mutual recognition of test certificates for electrical equipment’. It complies with standard IEC 61010-1 (3rd Edition).
Certificate No. SI-4210

CSA – Safety
The SCC-C sample gas cooler is certified for use in general purpose environment, evidenced by full compliance with standards CAN/CSA-C22.2 No. 61010-1-12 und UL Std. No. 61010-1 (3rd Edition).
Certificate No. 70006295

ATEX – Explosion protection
Designation: Ex II 3G Ex nA nC IIC T4 Gc
Type examination certificate No. BVS 16 ATEX E 056 X

CSA – Explosion protection
The SCC-C sample gas cooler is certified to
- Class 2258 02 Process Control Equipment – For Hazardous Locations – Certified to Canadian Standards 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.
Certificate No. 1105720

GOST – Import and operation permission
Declaration of conformity No. ЕАЭС N RU Д-DE.AB72.В.04753
**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**

[Diagram showing electrical connections and components]
... 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 to 60 sec., recommended setting: cyclic duration factor 40 %, i.e. run time 5 minutes and off period 7.5 minutes

Degree of protection
Terminals IP20, housing IP50 to EN 60529

Weight
Approx. 0.125 kg

Power supply
12 to 240 V AC/DC, 40 to 440 Hz

Condensate collecting bottle

Volume
10 l

Material
LDPE/PVC

Connections
Sample gas: 1 connecting piece for hose with ID 4 to 5 mm
Condensate: 2 connecting pieces for hose with ID 12 to 13 mm
Condensate drain: SW 22

Weight
Approx. 1 kg

Level monitor

Switching voltage
30 V

Switching current
1 A

Switching power
30 VA

Connecting cable
2 × 0.25 mm², length 5 m

Ordering information

<table>
<thead>
<tr>
<th></th>
<th>Catalog No.</th>
</tr>
</thead>
<tbody>
<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>
## Ordering information

<table>
<thead>
<tr>
<th>Catalog No. 23070-0-</th>
<th>0 0 0 0</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design</strong></td>
<td></td>
</tr>
<tr>
<td>Wall-mounted housing ½ 19 Inch</td>
<td>1</td>
</tr>
<tr>
<td><strong>Preparation</strong></td>
<td></td>
</tr>
<tr>
<td>without</td>
<td>0</td>
</tr>
<tr>
<td>with dosing unit</td>
<td>1</td>
</tr>
<tr>
<td><strong>Heat exchanger</strong></td>
<td></td>
</tr>
<tr>
<td>Glass</td>
<td>1</td>
</tr>
<tr>
<td>PVDF</td>
<td>2</td>
</tr>
<tr>
<td>Stainless steel</td>
<td>3</td>
</tr>
<tr>
<td><strong>Gas paths</strong></td>
<td></td>
</tr>
<tr>
<td>1 gas path 250 l/h</td>
<td>1</td>
</tr>
<tr>
<td>1 gas path 125 l/h</td>
<td>2</td>
</tr>
<tr>
<td>2 gas paths 2 × 125 l/h</td>
<td>3</td>
</tr>
<tr>
<td><strong>Condensate drain</strong></td>
<td></td>
</tr>
<tr>
<td>without</td>
<td>0</td>
</tr>
<tr>
<td>1 peristaltic pump</td>
<td>1</td>
</tr>
<tr>
<td>2 peristaltic pumps (2 × condensate)</td>
<td>2</td>
</tr>
<tr>
<td>2 peristaltic pumps (1 × condensate, 1 × dosing)</td>
<td>3</td>
</tr>
<tr>
<td>2 peristaltic pumps (1 × condensate, 1 × precondensation)</td>
<td>4</td>
</tr>
<tr>
<td><strong>Display</strong></td>
<td></td>
</tr>
<tr>
<td>Temperature display and monitoring</td>
<td>1</td>
</tr>
<tr>
<td>Temperature display and monitoring and Pt 100</td>
<td>2</td>
</tr>
<tr>
<td><strong>Power supply</strong></td>
<td></td>
</tr>
<tr>
<td>230 V, 50/60 Hz</td>
<td>1</td>
</tr>
<tr>
<td>115 V, 50/60 Hz</td>
<td>2</td>
</tr>
<tr>
<td><strong>Certification</strong></td>
<td></td>
</tr>
<tr>
<td>without</td>
<td>0</td>
</tr>
<tr>
<td>with CSA certification</td>
<td>1</td>
</tr>
<tr>
<td>with ATEX certification, Zone 2</td>
<td>2</td>
</tr>
<tr>
<td>with GOST certification</td>
<td>3</td>
</tr>
</tbody>
</table>
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 ½ 19 inches, 6 height units)
- Service-friendly due to easy access to the modules

Sample gas inlet conditions

Sample gas pressure
\( p_{\text{abs}} = 70 \text{ to } 105 \text{ kPa (0.7 to 1.05 bar)} \)

Sample gas flow rate
Gas paths 1 and 2 max. 100 l/h, bypass max. 200 l/h

Sample gas inlet temperature
+10 to 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
Rotameter 10 to 100 l/h with needle valve (metal-free)

Feed performance standard

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

Feed performance bypass

Status signals

Status signals
Flow rate and condensate monitors, one potential-free two-way switch each, switching capacity:
Version without I/O card: 250 V AC, 2 A per sample gas path,
version with I/O card option: 30 V, 1 A
Construction

Design
Surface-mounting housing ½ 19 inch, 6 height units

Mounting
On a mounting plate 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
IP20 to EN 60529

Dimensions
See page 10

Weight
Max. 15 kg

Material of gas-conducting parts
PVDF, PTFE, PVC, EPDM, FPM, PP-EPDM elastomer

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 max. 2.5 mm²

Status signals
Screw clamp terminals for stranded or solid wire max. 1.5 mm²

Safety
Testing to EN 61010-1

Protective class
I

Overvoltage category/degree of contamination
II/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
Tested to EN 61326-1

Emitted interference
Class B

Immunity to interference
Industrial environment

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 to 150 Hz, 3 x 5 cycles

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

Ambient conditions

Installation site
The SCC-F sample gas feed unit is only intended for installation indoors. The max. altitude of the installation site may not exceed 2000 m above sea level.

Ambient temperature
Operation: +5 to 45 °C,
Storage and transport: –25 to +60 °C

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

Power supply
Input voltage
230 V AC or 115 V AC, 50 Hz or 60 Hz

Power consumption during operation
Max. 185 VA

Options

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 up to three external solenoid valves for zero gas connection, 230 V, 50 Hz
– Digital inputs for monitoring condensate collecting bottles and reagent reservoirs

Certifications

IECEE CB Scheme – Safety
The SCC-F sample gas feed unit with I/O card option is certified to the ‘IEC system for mutual recognition of test certificates for electrical equipment’. It complies with standard IEC 61010–1 (3rd Edition). Certificate No. DE1–55251

CSA – Safety
The SCC-F sample gas feed unit with I/O card option is certified for use in general purpose environment, evidenced by full compliance with standards CAN/CSA-C22.2 No. 61010–1–12 and UL Std. No. 61010–1 (3rd Edition). Certificate No. 70010607

CSA – Explosion protection
The SCC-F sample gas feed unit is certified to
– Class 2258 02 Process Control Equipment – For Hazardous Locations – Certified to Canadian Standards and
– Class 2258 82 Process Control Equipment – For Hazardous Locations – Certified to U.S. Standards
for use in hazardous areas Class 1, Div. 2, Groups A, B, C and D, temperature code T4, maximum ambient temperature +50 °C. Certificate No. 1105720

GOST – Import and operation permission
Declaration of conformity No. ЕАЭС N RU Д–DE.AB72.B.04753
... SCC-F Sample gas feed unit

Pneumatic diagrams

Catalog No. 23212-0-11XXXX000000

Catalog No. 23212-0-12XXXX000000

Catalog No. 23212-0-13XXXX000000

Catalog No. 23212-0-14XXXX000000

Catalog No. 23212-0-15XXXX000000

Catalog No. 23212-0-16XXXX000000

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

Note: The illustration shows options. The scope and features of the ordered design may differ.
## Ordering information

<table>
<thead>
<tr>
<th>Design</th>
<th>Catalog No. 23212-0-</th>
<th>0</th>
<th>0</th>
<th>0</th>
<th>0</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wall-mounted housing ¼ 19 Inch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Gas paths</strong> (see pneumatic diagrams on page 10)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 gas path, 1 condensate monitor, 1 flow monitor, 1 diaphragm pump</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 separate gas paths, 2 condensate monitors, 2 flow monitors, 2 diaphragm pumps</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 gas path, 1 condensate monitor, 2 flow monitors, 1 diaphragm pump</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 gas path, 1 condensate monitor, 2 flow monitors, 1 diaphragm pump, 1 pressure controller</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 separate gas paths, 2 condensate monitors, 2 flow monitors, 1 diaphragm pump</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 separate gas paths, 2 condensate monitors, 1 flow monitor, 1 diaphragm pump</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Dosing</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>without</td>
<td></td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with dosing pump</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Electronic processing unit</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with 1 electronic processing unit</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with 2 electronic processing units</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with I/O interface board</td>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Power supply</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>230 V, 50/60 Hz</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>115 V, 50/60 Hz</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Certification</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>without</td>
<td></td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with CSA certification</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with GOST certification</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SCC-S Sample gas feed unit

- Process-proven modules
  - Diaphragm pump for feed-in of the gas
  - Membrane filter/condensate monitor
  - Flow monitor with needle valve
  - Ball valve/solenoid valves for feed-in of the test gas
  - Peltier cooler with condensate pump
- Ideal for use in simple processes (non-corrosive sample gas)
- Simple installation and connection
- Housing designed for 19-inch rack mounting and wall mounting (4 height units, IP20)
- Attractively priced system solution in combination with gas analyzers of the EasyLine series

Sample gas inlet conditions

Sample gas pressure
\[ p_{\text{abs}} = 70 \text{ to } 105 \text{ kPa} \] (0.7 to 1.05 bar)

Sample gas flow rate
Gas path: 7 to 70 l/h,
Bypass: 15 to 150 l/h (not in version with Peltier cooler)

Sample gas inlet temperature
+10 to 50 °C

Sample gas inlet dew point
Version with Peltier cooler: max. +50 °C (at max. +25 °C ambient temperature)
Version without Peltier cooler: 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.

Operating data

Warm-up time
Version with Peltier cooler: approx. 10 minutes
Version without Peltier cooler: ready for immediate use

Gas tightness
\[ 5 \times 10^{-8} \text{ hPa l/s} \]

Flow rate display and adjustment
Rotameter with needle valve (metal-free)

Outlet dew point (versions with Peltier cooler)
+3 °C

Condensate discharge (versions with Peltier cooler)
Peristaltic pump: feed performance approx. 300 ml/h at 5 rpm, pressure resistance \( p_{\text{abs}} = 50 \) to 150 kPa (0.5 to 1.5 bar), peristaltic tube material TPE, peristaltic tube service life approx. 5 months, power consumption 3.5 VA, weight approx. 0.6 kg

Display and status signals

Temperature control and display (versions with Peltier cooler)
Temperature controller with digital display of the cooler temperature in °C; set point factory-set at +3 °C, can be altered on site.

Status signals
Collective status signal of the condensate, flow and cooler monitoring: potential-free changeover contact, contact load 24 V DC/AC, 1 A. Status display of the condensate monitoring: Red LED on the front panel

Applications: Peltier cooler for combustion gases

Application 1
SO\(_2\) 0 to 75 mg/m\(^3\), NO 0 to 100 mg/m\(^3\), measurement with Uras26

<table>
<thead>
<tr>
<th>Sample gas inlet dew point at the cooler inlet</th>
<th>Ambient temperature</th>
<th>Flow rate 30 l/h</th>
<th>60 l/h</th>
<th>90 l/h</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 °C</td>
<td>+10 °C</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>+20 °C</td>
<td>X</td>
<td>X</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>+30 °C</td>
<td>X</td>
<td>X</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>+40 °C</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>50 °C</td>
<td>+10 °C</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>+20 °C</td>
<td>X</td>
<td>X</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>+30 °C</td>
<td>X</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>+40 °C</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

X: permitted, –: not permitted

Application 2
SO\(_2\) 0 to 400 mg/m\(^3\), NO 0 to 100 mg/m\(^3\), measurement with Uras26 (also for CO, CO\(_2\), and O\(_2\))

<table>
<thead>
<tr>
<th>Sample gas inlet dew point at the cooler inlet</th>
<th>Ambient temperature</th>
<th>Flow rate 30 l/h</th>
<th>60 l/h</th>
<th>90 l/h</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 °C</td>
<td>+10 °C</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>+20 °C</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>+30 °C</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>+40 °C</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>50 °C</td>
<td>+10 °C</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>+20 °C</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>+30 °C</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>+40 °C</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
Construction

Design
19-inch housing (4 height units) for rack and wall mounting

Mounting
Rack mounting on mounting rails, wall mounting with pre-assembled mounting brackets on the housing. The gas and electrical connections are located on the back of the housing for rack mounting and on the top of the housing for wall mounting. They can be altered on site. Comply with the distances from the wall during installation: left and right-hand side panels at least 35 mm, back panel at least 25 mm. A distance of at least 1 height unit from devices which develop heat is required for the version with Peltier cooler. Max. inclination of the instrument 5°.

Housing material and color
Sheet steel, galvanized, basalt gray (RAL 7012), front panel light gray (RAL 7035)

Degree of protection of housing
IP20 to EN 60529

Dimensions
See page 16

Weight
Approx. 17 kg

Material of gas-conducting parts
Glass, glass fiber, EPDM, ETFE, FPM, PP, PPH, PVC, PVDF, TPE

Gas connections

Sample gas inlet
PVDF angled screw fitting for tube 6 × 4 × 1 mm

Test gas inlets
PPH coupling for tube 6 × 4 × 1 mm

Gas outlets
PPH coupling for tube 6 × 4 × 1 mm

Electrical connections

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

Status signal (standard) and external solenoid valves (option)
8-pin plug receptacle (see connection diagram, mating plug supplied)

Connection diagram

1. Status signal of the cooler,
2. flow and condensate monitoring:
3. potential-free changeover contact, contact load 24 V DC/AC, 1 A
4. Activation of solenoid valve Sample/Test gas
5. Activation of solenoid valve Test gas 1
6. Activation of solenoid valve Test gas 2
7. Internal power supply 0 V
8. Internal power supply +24 V DC

The connection diagram shows the internal wiring of the sample gas feed unit.
The integrated power supply can also be used for the supply of external solenoid valves: Terminal 7 = 0 V, terminal 8 = +24 V, maximum capacity 30 VA at 24 V DC.

Safety

Testing to EN 61010-1

Protective class
I

Overvoltage category/degree of contamination
II/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

Tested to EN 61326-1

Emitted interference
Class B

Immunity to interference
Industrial environment
... SCC-S Sample gas feed unit

**Ambient conditions**

**Ambient temperature**
Operation: +10 to 40 °C,
Storage and transport: −25 to +60 °C

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

**Power supply**

**Input voltage**
230 V AC ± 10 %, 50 Hz or 115 V AC ± 10 %, 60 Hz

**Power consumption during operation**
230 V AC, 50 Hz, max. 300 VA

**Protection of the instrument**
Fine-wire fuse, 3.15 A, slow-blow

**Options**

**Internal power supply/power stage**
For the activation of max. 3 internal or external solenoid valves, operating voltage 24 V DC, capacity max. 30 VA, 3 A fine-wire fuse

**Solenoid valves for internal test gas infeed**
3/2-way solenoid valve: 1 ea., for switching over sample gas/test gas, valve type is pivoted armature valve, material PVDF and FPM, power supply 24 V DC, activation via a digital output of the gas analyzer or a PLC.
2/2-way solenoid valve: max. 2 ea., for test gas infeed, valve type is rocker valve with separating diaphragm, material PPH and FPM, power supply 24 V DC, activation via a digital output of the gas analyzer or a PLC.

**Condensate discharge for external cooler**
Peristaltic pump: flow rate approx. 300 ml/h at 5 rpm, pressure resistance $p_{abs} = 50$ to 150 kPa (0.5 to 1.5 bar), peristaltic tube material TPE, peristaltic tube service life approx. 5 months, power consumption 3.5 VA, weight approx. 0.6 kg

**Certifications**

**IECEE CB Scheme – Safety**
The SCC-S sample gas feed unit is certified to the 'IEC system for mutual recognition of test certificates for electrical equipment'. It complies with standard IEC 61010-1 (3rd Edition).
Certificate No. SI-6537

**CSA – Safety**
The SCC-S sample gas feed unit is certified for use in general purpose environment, evidenced by full compliance with standards CAN/CSA-C22.2 No. 61010-1-04 und UL Std. No. 61010-1 (2nd Edition).
Certificate No. 2504652

---

**Pneumatic diagrams**

**Version 1**
 Catalog No. 23236-0-X11000XX0000

**Version 2**
 Catalog No. 23236-0-X21000XX0000

**Version 3**
 Catalog No. 23236-0-X31000XX0000

**Version 4**
 Catalog No. 23236-0-X22000XX0000
1 Sample gas inlet
2 Test gas inlet
3 Gas outlet
4 Bypass outlet
5 Sample gas inlet for external infeed
6 Test gas inlet for external infeed
7 Condensate inlet from the external cooler
8 Condensate outlet

Not supplied:
A External cooler
B External multi-way cock
C External solenoid valves

Option:
D Additional condensate pump for external cooler
... SCC-S Sample gas feed unit

**Dimensions (in mm)**

1. Sample gas inlet
2. Sample gas outlet, bypass outlet and test gas inlets via ball valve or solenoid valve
3. Power supply connection and electrical connection for status signal, solenoid valve control and 24 V DC
4. Ball valve for infeed of test gas
5. Flow monitor with needle valve (option: second flow monitor for bypass)
6. Peristaltic pump (option: second peristaltic pump for external cooler)
7. Membrane filter or condensate monitor
8. LED indicator for condensate alarm, red
9. Pump switch
10. Temperature controller for cooler

Note: The illustration shows options. The scope and features of the ordered design may differ.
## Ordering information

<table>
<thead>
<tr>
<th></th>
<th>Catalog No. 23236-0-</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design</strong></td>
<td></td>
</tr>
<tr>
<td>19-inch housing for rack mounting, 4 height units, IP20</td>
<td>1</td>
</tr>
<tr>
<td>19-inch housing for wall mounting, 4 height units, IP20</td>
<td>2</td>
</tr>
<tr>
<td><strong>Gas path</strong></td>
<td></td>
</tr>
<tr>
<td>Membrane filter, pump and flow monitor with needle valve (Version 1)</td>
<td>1</td>
</tr>
<tr>
<td>Condensate monitor, pump and flow monitor with needle valve (Versions 2, 4, 6 to 10)</td>
<td>2</td>
</tr>
<tr>
<td>Condensate monitor, pump and flow monitor 7 to 70 l/h, bypass 15 to 150 l/h (Versions 3, 5)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Internal test gas infeed</strong></td>
<td></td>
</tr>
<tr>
<td>without (Versions 6, 10)</td>
<td>0</td>
</tr>
<tr>
<td>One 3-way test gas cock (Versions 1, 2, 3, 7)</td>
<td>1</td>
</tr>
<tr>
<td>One 3/2-way solenoid valve (Versions 4, 5, 8)</td>
<td>2</td>
</tr>
<tr>
<td>One 3/2-way solenoid valve and two 2/2-way solenoid valves (Version 9)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Electrical power stage (24 V DC, 30 VA) for external test gas infeed</strong></td>
<td>0</td>
</tr>
<tr>
<td>without (Versions 1 to 9)</td>
<td></td>
</tr>
<tr>
<td>For up to three external solenoid valves (Version 10)</td>
<td>1</td>
</tr>
<tr>
<td><strong>Cooler and condensate pump</strong></td>
<td></td>
</tr>
<tr>
<td>without (Versions 1 to 5)</td>
<td>0</td>
</tr>
<tr>
<td>with Peltier cooler and condensate pump (Versions 6 to 10)</td>
<td>1</td>
</tr>
<tr>
<td><strong>Condensate pump for external cooler</strong></td>
<td></td>
</tr>
<tr>
<td>without (Versions 1 to 5)</td>
<td>0</td>
</tr>
<tr>
<td>with additional condensate pump (Versions 6 to 10)</td>
<td>1</td>
</tr>
<tr>
<td><strong>Power supply</strong></td>
<td></td>
</tr>
<tr>
<td>230 V, 50 Hz</td>
<td>1</td>
</tr>
<tr>
<td>115 V, 60 Hz</td>
<td>2</td>
</tr>
<tr>
<td><strong>Ex-certification</strong></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>1</td>
</tr>
</tbody>
</table>
Diaphragm pump 4N

- Feed in of the sample gas
- Compact unit with degree of protection of housing IP20 or IP54

Operating data

Inlet pressure

\[ p_{\text{abs}} = 70 \text{ to } 105 \text{ kPa (0.7 to 1.5 bar)} \]

Flow rate

Max. 250 l/h at atmospheric pressure

Inlet temperature

+5 to 50 °C

Inlet dew point

Below room temperature

Tightness

Pressure drop 0.1 hPa/min

Feed performance

![Graph showing flow rate vs. pressure]

- Inlet: negative pressure, outlet: atmospheric pressure
- Inlet: according diagram, outlet: positive pressure

Construction

Design

Surface-mounting case for wall attachment, motor axis horizontal

Housing material and color

Plastic, RAL 7035

Degree of protection of housing

IP20 or IP54 to EN 60529

Class of protection

I

Dimensions

See page 19

Weight

Approx. 1.8 kg

Materials of gas-conducting parts

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

Gas connections

G\(\frac{3}{4}\) female thread for male fittings, nozzles for hose inside diameter 4 mm are supplied with the unit.

Electrical connections

Terminals via cable connection M20

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 to 150 Hz, 3 × 5 cycles

Operation

Vibration: 2 g / ± 0.07 mm / 4 to 7 Hz, 3 × 2 cycles

Ambient conditions

Ambient temperature

Operation: IP54 +5 to 40 °C, IP20 +5 to 50 °C
Storage and transport: −25 to +65 °C

Relative humidity

≤ 90 % annual average, condensation permitted

Climatic class

3K4 to EN 60721-3-3

Power supply

AC voltage

230 V ± 10 %, 50 Hz or 60 Hz
115 V ± 10 %, 50 Hz or 60 Hz

Power consumption

Approx. 50 VA
**Dimensions (in mm)**

<table>
<thead>
<tr>
<th>Component</th>
<th>Dimension 1</th>
<th>Dimension 2</th>
<th>Dimension 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diaphragm pump 4N, IP20; 230V, 50/60 Hz</td>
<td>32</td>
<td>95</td>
<td>140</td>
</tr>
<tr>
<td>Diaphragm pump 4N, IP20; 115V, 50/60 Hz</td>
<td>32</td>
<td>95</td>
<td>140</td>
</tr>
<tr>
<td>Diaphragm pump 4N, IP54; 230V, 50/60 Hz</td>
<td>32</td>
<td>95</td>
<td>140</td>
</tr>
<tr>
<td>Diaphragm pump 4N, IP54; 115V, 50/60 Hz</td>
<td>32</td>
<td>95</td>
<td>140</td>
</tr>
</tbody>
</table>

**Ordering information**

<table>
<thead>
<tr>
<th>Component</th>
<th>Catalog No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diaphragm pump 4N, IP20; 230V, 50/60 Hz</td>
<td>23134-S-8018545</td>
</tr>
<tr>
<td>Diaphragm pump 4N, IP20; 115V, 50/60 Hz</td>
<td>23134-S-8018546</td>
</tr>
<tr>
<td>Diaphragm pump 4N, IP54; 230V, 50/60 Hz</td>
<td>23134-S-8018547</td>
</tr>
<tr>
<td>Diaphragm pump 4N, IP54; 115V, 50/60 Hz</td>
<td>23134-S-8018548</td>
</tr>
</tbody>
</table>

1. Gas connections
2. Electrical connections
SCC-K Converter

NO₂/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
- Application: Reduction of NO₂ to NO in emission monitoring

Thermal converter with quartz-glass reaction tube
- Thermal converter for operation temperatures up to 680°C
- No consumable parts
- PVDF fittings
- Applications:
  - Conversion of certain carbon, sulfur and halogen compounds into measurable components
  - Removal of interfering components from the sample gas without the other gas components being affected

Operating data of NO₂/NO converter

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

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.

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

Operating data of thermal converter

Sample gas flow rate
Normally 60 l/h, max. 120 l/h

Sample gas inlet temperature
Max. 80 °C (dew point dry)

Temperature range
Max. 680 °C at 120 l/h sample gas flow rate

Effectivity
≥ 99 %

Sample gas pressure
p_{abs} ≤ 120 kPa (1.2 bar)

Pressure drop
≤ 0.5 kPa (5 mbar)

Warm-up time
Approx. 60 min

90%-time
T_{90} ≤ 10 s at 60 l/h

Applications of thermal converter

Pulp and paper industry

Chlorine plants
Conversion of H₂ to HCl using Cl₂. Analyzer: Caldos25 (flowing reference gas). Operating temperature: 450 °C or 500 °C. Sample gas flow rate: 60 l/h or 120 l/h.

Chlorinated hydrocarbons (CHC), PVC plants

Status signal

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

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
IP20 to EN 60529

Dimensions
See page 23

Weight
Approx. 8 to 9 kg
Materials of gas-conducting parts

NO₂/NO converter: Stainless steel 1.4571 (SAE 316Ti), PVDF, PTFE, FPM, PFA.
Thermal converter: PVDF, PFA, quartz glass.

Gas connections

Sample gas inlet and outlet unheated
G¼ female thread (PVDF in thermal converter)

Heated sample gas inlet (optional in NO₂/NO converter)
Swagelok® screwed connection for pipes with 6 mm inner 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

Safety

Testing to EN 61010-1

Protective class
I

Overvoltage category / degree of contamination
II / 2

Protective separation
Electrical isolation of the 120/240 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

Tested to EN 61326-1

Emitted interference
Class B

Immunity to interference
Industrial environment

Ambient conditions

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

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

Power supply

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

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

Certifications

IECEE CB Scheme – Safety
The SCC-K converter is certified to the ‘IEC system for mutual recognition of test certificates for electrical equipment’. It complies with standard IEC 61010-1 (3rd Edition) and IEC 61010-2-010 (3rd Edition).
Certificate No. SI-6661

CSA – Safety
The SCC-K NO₂/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 Std. No 61010-1 (2nd Edition).
Certificate No. 2298365

GOST – Import and operation permission
Declaration of conformity No. EAЭС N RU Д-DЭ.АВ72.B.04753

Ordering information

<table>
<thead>
<tr>
<th>Catalog No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>23093-4-0801974</td>
<td>Converter SCC-K, cock PVDF, 240 V AC</td>
</tr>
<tr>
<td>23093-4-0801975</td>
<td>Converter SCC-K, 2 solenoid valves, 240 V AC</td>
</tr>
<tr>
<td>23093-4-0801976</td>
<td>Converter SCC-K, heated, 1 solenoid valve, 240 V AC</td>
</tr>
<tr>
<td>23093-4-0801977</td>
<td>Converter SCC-K, cock PVDF, 120 V AC</td>
</tr>
<tr>
<td>23093-4-0801978</td>
<td>Converter SCC-K, 2 solenoid valves, 120 V AC</td>
</tr>
<tr>
<td>23093-4-0801979</td>
<td>Converter SCC-K, heated, 1 solenoid valve, 120 V AC</td>
</tr>
<tr>
<td>23093-4-3KKG801000U0100</td>
<td>Converter SCC-K, quartz-glass reaction tube, 240 V AC</td>
</tr>
<tr>
<td>23093-4-3KKG801001U0100</td>
<td>Converter SCC-K, quartz-glass reaction tube, 120 V AC</td>
</tr>
<tr>
<td>23009-4-0801980</td>
<td>Wall mounting bracket</td>
</tr>
<tr>
<td>23093-4-0801981</td>
<td>Carbon catalyst set</td>
</tr>
</tbody>
</table>
... SCC-K Converter

Pneumatic diagrams

**NO₂/NO converter, 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

**NO₂/NO converter, 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

**NO₂/NO converter, option with two solenoid valves**

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

**Thermal converter with quartz-glass reaction tube**

1. Power supply
2. Status signal
4. Sample gas outlet
5. Sample gas inlet
E1. Heated reaction tube
Dimensions (in mm)

- Power supply input X1
- Status signal output X2
- Heated sample gas inlet 6 mm
- Sample gas outlet G¼ female thread
- Sample gas inlet G¼ female thread

Circuit and connection diagram

[Diagram showing connections and components]
Membrane filter

Application

The membrane filter is 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
Max. 300 l/h (air)

Gas pressure
PVC: p_{abs} max. 150 kPa (1.5 bar), stainless steel: p_{abs} 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 to 250 l/h (air)

Materials of gas-conducting parts
Case: PVC or stainless steel 1.4571 (SAE 316Ti), gas connections: PTFE, round cord rings: FPM, filter membrane: glass fiber

Filter surface
Approx. 24 cm²

Dead volume
Approx. 15 cm³

Weight
PVC: approx. 0.6 kg, stainless steel: approx. 1.4 kg

Mounting
Panel and wall mounting (with mounting bracket)

Gas connections
G¼ female thread or nozzles for hose internal diameter 4 mm

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

Ordering information

<table>
<thead>
<tr>
<th>Membrane filter</th>
<th>Catalog No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Membrane filter, PVC</td>
<td>23145-S-8018438</td>
</tr>
<tr>
<td>Membrane filter, stainless steel</td>
<td>23147-S-8018439</td>
</tr>
</tbody>
</table>

Condensate monitor (see page 25)

<table>
<thead>
<tr>
<th>Condensate monitor, PVC</th>
<th>Catalog No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>23158-S-8018440</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Condensate monitor, stainless steel</th>
<th>Catalog No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>23157-S-8018039</td>
</tr>
</tbody>
</table>
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 30).

Technical data

Flow rate
Max. 300 l/h (air)

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

Gas temperature
Max. 55 °C

Retention rate
100 % for particles ≥ 1 μm

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

Materials of gas-conducting parts
Case: PVC or stainless steel 1.4571 (SAE 316Ti), gas connections: PTFE, electrodes: stainless steel 1.4305 (SAE 303), 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 24)

Weight
PVC: approx. 0.7 kg, stainless steel: approx. 1.5 kg

Mounting
Panel and wall mounting (with mounting bracket)

Gas connections
G¼ female thread 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 30)

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 24

Explosion protection (only with stainless steel case)
The condensate monitor is a device without voltage source. 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
2 Condensate monitor
3 Solenoid valve
4 Switching unit
5 Pilot lamp
6 Flow meter
7 Analyzer
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 SO$_3$ content in the sample gas is greater than 1 mg/m$^3$ or the SO$_2$ content is greater than 1000 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
Max. 250 l/h (air)

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

Sample gas temperature
Max. 150 °C

Sample gas dew point
Max. 70 °C

Retention rate
99.99 % for particles ≥ 0.1 μm

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. 0.6 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 to 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

Dimensions (in mm)

Ordering information

<table>
<thead>
<tr>
<th>Acid filter</th>
<th>Catalog No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>23045-5-8018419</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
Max. 250 l/h (air)

Gas pressure
$P_{\text{abs}} \leq 200 \text{ kPa (2 bar)}$

Sample gas temperature
+5 to 50 °C

Retention rate
99.99 % for particles ≥ 0.1 µm

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 cm³

Weight
Approx. 0.1 kg

Mounting
Mounting orientation preferably vertical

Gas connections
Two pipe nipples, outside diameter 6.3 mm

Ambient temperature
+5 to 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

Dimensions (in mm)

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø 26.5</td>
<td>40.5</td>
</tr>
<tr>
<td>Ø 3</td>
<td>40.5</td>
</tr>
</tbody>
</table>

Ordering information

<table>
<thead>
<tr>
<th>Product</th>
<th>Catalog No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disposable filter</td>
<td>23044-5-8018418</td>
</tr>
</tbody>
</table>
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 to 70 l/h**

**Measuring range**
7 to 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: 49 l/h
- Carbon dioxide CO₂: 55 l/h
- Carbon monoxide CO: 60 l/h
- Oxygen O₂: 54 l/h
- Methane CH₄: 86 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 1.4401 (SAE 316)
- Float catcher: PTFE
- Fitting: Stainless steel 1.4571 (SAE 316Ti)
- Needle valve: Stainless steel 1.4571 (SAE 316Ti)
- Seals: FPM
- Nozzles: PTFE

**Weight**
Approx. 0.5 kg

**Mounting**
Panel or wall mounting by means of mounting bracket

**Gas connections**
¼ NPT female thread or sleeve for hose 4 mm inner diameter

**Scope of delivery**
Flow meter, mounting bracket, 2 nozzles

**Flow monitor 1.6 to 16 l/h, 7 to 70 l/h**

**Measuring range**
1.6 to 16 l/h or 7 to 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 to 70 l/h

**Weight**
Approx. 0.8 kg

**Mounting**
Panel or wall mounting by means of mounting bracket

**Gas connections**
¼ NPT female thread or sleeve for hose 4 mm inner diameter

**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 M16

**Scope of delivery**
Flow monitor, mounting bracket, 2 nozzles, O-ring

**Flow monitor for chlorine 7 to 70 l/h**

**Measuring range**
7 to 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, set to 20 l/h
- Case: PVDF
- Seals: FFKM

**Weight**
Approx. 0.5 kg

**Mounting**
Panel or wall mounting by means of mounting bracket

**Gas connections**
¼ 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 M16

**Scope of delivery**
Flow monitor, mounting bracket, 2 nozzles, O-ring
### Dimensions (in mm)

**Flow meter**
- Flow meter
- Flow monitor

![Diagram of system components](diagram.png)

1. Gas inlet
2. Gas outlet

**Flow monitor**
- Flow monitor
- Flow monitor

### Ordering information

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalog No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow meter 7 to 70 l/h</td>
<td>23151-S-8018474</td>
</tr>
<tr>
<td>Flow monitor 1.6 to 16 l/h</td>
<td>23155-S-8018476</td>
</tr>
<tr>
<td>Flow monitor 7 to 70 l/h</td>
<td>23155-S-8018475</td>
</tr>
<tr>
<td>Flow monitor for chlorine 7 to 70 l/h</td>
<td>23155-S-8018477</td>
</tr>
</tbody>
</table>
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 25). 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' 'ib'
No-load voltage \( U_0 \) \( \leq 13.1 \) V \( \leq 13.1 \) V
Short-circuit current \( I_0 \) \( \leq 5 \) mA \( \leq 5 \) mA
Power \( P_0 \) \( \leq 65 \) mW \( \leq 65 \) mW
Permissible external capacitance \( C_0 \) \( \leq 0.97 \) µF \( \leq 6 \) µF
Permissible external inductance \( L_0 \) \( \leq 0.9 \) H \( \leq 1 \) H

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

Indication
One LED each for line breakage and condensate penetration

Construction
Surface-mounting case

Degree of protection
Housing IP40, terminals IP20 to EN 60529

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 to +60 °C

Power supply
230 V AC or 115 V AC ±10 %, 48 to 62 Hz, ≤ 1 VA

EC type examination certificate
TÜV 00 ATEX 1604

Designation
\( \mathbb{E} \) II (I) G [Ex ia Ga] IIC

Installation location
Outside the hazardous area

Dimensions (in mm)

Electrical connections
Relays are shown in the unpowered state.

Ordering information

<table>
<thead>
<tr>
<th>Catalog No.</th>
<th>Switching unit ER-144A/Ex, 230 V AC</th>
<th>Switching unit ER-144A/Ex, 115 V AC</th>
</tr>
</thead>
<tbody>
<tr>
<td>23371-4-0730637</td>
<td></td>
<td>23371-4-0730638</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 28). 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)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>$U_0 \leq 10.6 \text{ V}$, $I_0 \leq 1.91 \text{ mA}$, $P_0 \leq 51 \text{ mW}$</td>
<td></td>
</tr>
</tbody>
</table>

Permissible connection values

<table>
<thead>
<tr>
<th>Explosion group</th>
<th>IIA</th>
<th>IIB</th>
<th>IIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>External capacitance</td>
<td>72 µF</td>
<td>16.2 µF</td>
<td>2.32 µF</td>
</tr>
<tr>
<td>External inductance</td>
<td>780 mH</td>
<td>390 mH</td>
<td>97 mH</td>
</tr>
</tbody>
</table>

Output relays

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

Construction

Surface-mounting case

Degree of protection of housing

IP20 to EN 60529

Weight

Approx. 0.15 kg

Mounting

On standard rail 35 mm to EN 60715:2001

Ambient temperature

$-20 \text{ to } +60 \text{ °C}$

Power supply

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

EC type examination certificate

PTB 00 ATEX 2081

Designation

II (I)G [Ex ia Ga] IIC,
II (I)D [Ex ia Da] IIIIC

Installation location

Outside the hazardous area
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>
<th>1-stage for nitrogen, brass</th>
</tr>
</thead>
<tbody>
<tr>
<td>23422-5-8018376</td>
<td>23422-5-8018377</td>
<td>23422-5-8018378</td>
<td>23422-4-0730654</td>
<td></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>Gas type</td>
<td>Nitrogen</td>
<td>Non-corrosive test gases</td>
<td>Corrosive test gases</td>
</tr>
<tr>
<td>Construction</td>
<td>2-stage, brass, with minimum contact</td>
<td>2-stage, stainless steel, with min. contact</td>
<td></td>
</tr>
<tr>
<td>Inlet pressure</td>
<td>Max. 21 MPa (210 bar)</td>
<td>Max. 21 MPa (210 bar)</td>
<td></td>
</tr>
<tr>
<td>Outlet pressure (adjustable)</td>
<td>10 to 150 kPa (0.1 to 1.5 bar)</td>
<td>10 to 150 kPa (0.1 to 1.5 bar)</td>
<td></td>
</tr>
<tr>
<td>Safety valve set to</td>
<td>Approx. 1.6 MPa (16 bar)</td>
<td>Approx. 1.6 MPa (16 bar)</td>
<td></td>
</tr>
<tr>
<td>Relief valve set to</td>
<td>Approx. 200 kPa (2 bar)</td>
<td>Approx. 200 kPa (2 bar)</td>
<td></td>
</tr>
<tr>
<td>Pressure gauge indication inlet pressure</td>
<td>0 to 25 MPa (0 to 250 bar)</td>
<td>0 to 25 MPa (0 to 250 bar)</td>
<td></td>
</tr>
<tr>
<td>Pressure gauge indication outlet pressure</td>
<td>−100 to +300 kPa (−1 to +3 bar)</td>
<td>−100 to +300 kPa (−1 to +3 bar)</td>
<td></td>
</tr>
<tr>
<td>Flow rate</td>
<td>25 to 500 l/h</td>
<td>25 to 500 l/h</td>
<td></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>
</tr>
<tr>
<td>Status signal</td>
<td>Reed contact 100 V, 0.5 A</td>
<td>Reed contact 100 V, 0.5 A</td>
<td></td>
</tr>
<tr>
<td>Membrane material</td>
<td>Stainless steel</td>
<td>Stainless steel</td>
<td></td>
</tr>
<tr>
<td>Seal material</td>
<td>ETFE, PVDF, EPDM</td>
<td>ETFE, PVDF, EPDM</td>
<td></td>
</tr>
<tr>
<td>Case material</td>
<td>Brass chromium plated</td>
<td>Stainless steel 1.4401 (SAE 316)</td>
<td></td>
</tr>
<tr>
<td>Dimensions (W × H × D)</td>
<td>Approx. 160 × 185 × 167 mm</td>
<td>Approx. 160 × 185 × 167 mm</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>Approx. 2.1 kg</td>
<td>Approx. 2.1 kg</td>
<td></td>
</tr>
<tr>
<td>Connection to cylinder (thread to DIN 477)</td>
<td>Hexagon</td>
<td>Hexagon</td>
<td></td>
</tr>
<tr>
<td>Gas outlet connection</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>Safety valve connection</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>Relief valve connection</td>
<td>¼ NPT male thread</td>
<td>¼ NPT male thread</td>
<td></td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>−5 to +75 °C</td>
<td>−5 to +75 °C</td>
<td></td>
</tr>
<tr>
<td>Scope of delivery</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>
</tbody>
</table>

Dimensions (in mm)
<table>
<thead>
<tr>
<th>Catalog No.</th>
<th>23422-4-0730654</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas type</td>
<td>Nitrogen</td>
</tr>
<tr>
<td>Construction</td>
<td>1-stage, brass</td>
</tr>
<tr>
<td>Inlet pressure</td>
<td>21 MPa (210 bar)</td>
</tr>
<tr>
<td>Control range</td>
<td>0 to 250 kPa (2.5 bar)</td>
</tr>
<tr>
<td>Pressure gauge</td>
<td>31.5 MPa (315 bar)</td>
</tr>
<tr>
<td>Outlet pressure gauge indication range</td>
<td>0 to 400 kPa (0 to 4 bar)</td>
</tr>
<tr>
<td>Body material</td>
<td>Brass</td>
</tr>
<tr>
<td>Membrane material</td>
<td>NBR</td>
</tr>
<tr>
<td>Case seal material</td>
<td>NBR</td>
</tr>
<tr>
<td>Filter</td>
<td>100 μm</td>
</tr>
<tr>
<td>Bottle connection</td>
<td>DIN 477, No. 10</td>
</tr>
<tr>
<td>Safety relief valve</td>
<td>1</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>−5 to +75 °C</td>
</tr>
<tr>
<td>Weight</td>
<td>2.1 kg</td>
</tr>
</tbody>
</table>

Dimensions (in mm)
Multi-way test gas cock

Technical data

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

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

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 kg

Mounting
Wall mounting (with accessories) or panel mounting

Gas connections
\( \frac{1}{8} \) NPT and screw fitting for pipes with 6 mm outer diameter

Ambient temperature
+10 to 65 °C

Dimensions (in mm)

Ordering information

<table>
<thead>
<tr>
<th>Catalog No.</th>
<th>Test gas cock stainless steel for wall mounting</th>
</tr>
</thead>
<tbody>
<tr>
<td>23177-5-8308581</td>
<td></td>
</tr>
</tbody>
</table>
We reserve the right to make technical changes or modify the contents of this document without prior notice. With regard to purchase orders, the agreed particulars shall prevail. ABB does not accept any responsibility whatsoever for potential errors or possible lack of information in this document. We reserve all rights in this document and in the subject matter and illustrations contained therein. Any reproduction, disclosure to third parties or utilization of its contents – in whole or in parts – is forbidden without prior written consent of ABB.