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
- SCC-U Utility unit
- 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

<table>
<thead>
<tr>
<th>Operating data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample gas outlet temperature</td>
</tr>
<tr>
<td>Factory-set to +3 °C</td>
</tr>
<tr>
<td>Dew point stability</td>
</tr>
<tr>
<td>±0.3 °C per 10 °C temperature change, ±0.3 °C per 10 l/h change in flow rate</td>
</tr>
<tr>
<td>Refrigeration capacity</td>
</tr>
<tr>
<td>40 W at +10 to 50 °C</td>
</tr>
<tr>
<td>Warm-up time</td>
</tr>
<tr>
<td>Approx. 15 min</td>
</tr>
<tr>
<td>Pressure drop in heat exchanger</td>
</tr>
<tr>
<td>Approx. 1 hPa (1 mbar), approx. 4 to 8 hPa (4 to 8 mbar) for HE125</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dead volume in heat exchanger</th>
</tr>
</thead>
<tbody>
<tr>
<td>HE125</td>
</tr>
<tr>
<td>Glass</td>
</tr>
<tr>
<td>PVDF</td>
</tr>
<tr>
<td>Stainless steel</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gas tightness</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 × 10⁻⁶ hPa l/s</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Display and status signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature display</td>
</tr>
<tr>
<td>Digital display in °C</td>
</tr>
<tr>
<td>Status signal</td>
</tr>
<tr>
<td>&lt; 0 °C and &gt; 8 °C, 2 potential-free two-way switches, switching capacity 250 V AC, 2 A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
</tr>
<tr>
<td>Surface-mounting housing ½ 19 inch, 6 height units</td>
</tr>
<tr>
<td>Mounting</td>
</tr>
<tr>
<td>On the wall with mounting brackets supplied or in a 19-inch cabinet/rack</td>
</tr>
<tr>
<td>Housing material and color</td>
</tr>
<tr>
<td>Sheet steel; light gray (RAL 7035), basalt gray (RAL 7012)</td>
</tr>
<tr>
<td>Degree of protection of housing</td>
</tr>
<tr>
<td>IP20 to EN 60529</td>
</tr>
<tr>
<td>Dimensions</td>
</tr>
<tr>
<td>See page 5</td>
</tr>
<tr>
<td>Weight</td>
</tr>
<tr>
<td>Approx. 15.6 or 16.5 kg with 1 or 2 heat exchangers</td>
</tr>
<tr>
<td>Refrigerant</td>
</tr>
<tr>
<td>R 134a</td>
</tr>
</tbody>
</table>

Sample gas inlet conditions

<table>
<thead>
<tr>
<th>Sample gas pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat exchanger (HE) material</td>
</tr>
<tr>
<td>Glass</td>
</tr>
<tr>
<td>PVDF</td>
</tr>
<tr>
<td>Stainless steel</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sample gas flow rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 × 250 l/h (HE250) or 1 × 125 l/h (HE125) or 2 × 125 l/h, relating to sample gas pressure ( p_{\text{abs}} ) = 100 kPa (1 bar) and 25 °C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sample gas inlet temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. 140 °C</td>
</tr>
</tbody>
</table>

Sample gas inlet dew point

Max. 70 °C, max. 60 °C for HE250 at sample gas flow rate > 200 l/h
... 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>G¼ female thread</td>
<td>G¼ 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
- 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 SO$_2$ measuring ranges (< 1000 mg/m$^3$) 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 $p_{max} = 50$ 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: 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-D Е.АВ72.В.04753
SYSTEM COMPONENTS FOR SAMPLE GAS CONDITIONING | DS/SCC-EN REV. C

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**

![Diagram of 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>Description</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>Component</th>
<th>Catalog No. 23070-0-</th>
<th>0</th>
<th>0</th>
<th>0</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wall-mounted housing ⅝ 19 Inch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Preparation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>without</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with dosing unit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Heat exchanger</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glass</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PVDF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stainless steel</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Gas paths</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 gas path 250 l/h</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 gas path 125 l/h</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 gas paths 2 × 125 l/h</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Condensate drain</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>without</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 peristaltic pump</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 peristaltic pumps (2 × condensate)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 peristaltic pumps (1 × condensate, 1 × dosing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 peristaltic pumps (1 × condensate, 1 × precondensation)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Display</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature display and monitoring</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature display and monitoring and Pt 100</td>
<td></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>
</tr>
<tr>
<td>230 V, 50/60 Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>115 V, 50/60 Hz</td>
<td></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>
</tr>
<tr>
<td>without</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with CSA certification</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with ATEX certification, Zone 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with GOST certification</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></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 ¼ 19 inches, 6 height units)
- Service-friendly due to easy access to the modules

Sample gas inlet conditions
The SCC-F sample gas feed unit is designed for continuous dosed feeding of sample gas.
The SCC-F sample gas feed unit must not be used:
- for feeding mixtures of gas/air or oxygen that are capable of ignition during normal service.
- for feeding flammable gas, which can ignition-capable mixture, or
- in a potentially explosive atmosphere or hazardous areas.

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

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 ¼ 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 × 4 × 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 × 5 cycles

**Operation**
Vibration: 1 g / ±0.07 mm / 5 to 55 Hz, 3 × 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**

**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 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.АВ72.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>Gas paths (see pneumatic diagrams on page 10)</th>
<th>Dosing</th>
<th>Electronic processing unit</th>
<th>Power supply</th>
<th>Certification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wall-mounted housing ⅛ 19 Inch</td>
<td>1 gas path, 1 condensate monitor, 1 flow monitor, 1 diaphragm pump</td>
<td>without</td>
<td>with 1 electronic processing unit</td>
<td>230 V 50/60 Hz</td>
<td>without</td>
</tr>
<tr>
<td></td>
<td>2 separate gas paths, 2 condensate monitors, 2 flow monitors, 2 diaphragm pumps</td>
<td></td>
<td>with 2 electronic processing units</td>
<td>115 V 50/60 Hz</td>
<td>with CSA certification</td>
</tr>
<tr>
<td></td>
<td>1 gas path, 1 condensate monitor, 2 flow monitors, 1 diaphragm pump</td>
<td></td>
<td>with 2 electronic processing units</td>
<td>230 V 50/60 Hz</td>
<td>with GOST certification</td>
</tr>
<tr>
<td></td>
<td>1 gas path, 1 condensate monitor, 2 flow monitors, 1 diaphragm pump, 1 pressure controller</td>
<td></td>
<td>with I/O interface board</td>
<td>115 V 50/60 Hz</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
\( 5 \times 10^{-6} \text{ hPa l/s} \)

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 \( p_{\text{abs}} = 50 \text{ to } 150 \text{ kPa} \) (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

Feed performance of the diaphragm pump

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

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>Flow rate 60 l/h</th>
<th>Flow rate 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>X</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>Flow rate 60 l/h</th>
<th>Flow rate 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

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 $p_{\text{abs}} = 50$ 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

**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>Component</th>
<th>Catalog No. 23236-0-0</th>
<th>0</th>
<th>0</th>
<th>0</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19-inch housing for rack mounting, 4 height units, IP20</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19-inch housing for wall mounting, 4 height units, IP20</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Gas path</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Membrane filter, pump and flow monitor with needle valve (Version 1)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condensate monitor, pump and flow monitor with needle valve (Versions 2, 4, 6 to 10)</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></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>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Internal test gas infeed</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>without (Versions 6, 10)</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One 3-way test gas cock (Versions 1, 2, 3, 7)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One 3/2-way solenoid valve (Versions 4, 5, 8)</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One 3/2-way solenoid valve and two 2/2-way solenoid valves (Version 9)</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Electrical power stage (24 V DC, 30 VA) for external test gas infeed</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>without (Versions 1 to 9)</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>For up to three external solenoid valves (Version 10)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cooler and condensate pump</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>without (Versions 1 to 5)</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with Peltier cooler and condensate pump (Versions 6 to 10)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Condensate pump for external cooler</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>without (Versions 1 to 5)</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with additional condensate pump (Versions 6 to 10)</td>
<td>1</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>
</tr>
<tr>
<td>230 V, 50 Hz</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>115 V, 60 Hz</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ex-certification</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></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
\( p_{\text{abs}} = 70 \) to 105 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

<table>
<thead>
<tr>
<th>Inlet pressure (hPa)</th>
<th>Flow rate (l/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>250</td>
<td>250</td>
</tr>
</tbody>
</table>

A Inlet: negative pressure, outlet: atmospheric pressure
B 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

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\( \frac{1}{4} \) 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>Dimensions</th>
<th>Ordering information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z-14185</td>
<td><strong>Catalog No.</strong></td>
</tr>
<tr>
<td>148</td>
<td>23134-5-8018545</td>
</tr>
<tr>
<td>160</td>
<td>23134-5-8018546</td>
</tr>
<tr>
<td>120</td>
<td>23134-5-8018547</td>
</tr>
<tr>
<td>10</td>
<td>23134-5-8018548</td>
</tr>
</tbody>
</table>

Z-14185

Gas connections

Electrical connections

**Ordering information**

<table>
<thead>
<tr>
<th>Product Description</th>
<th>Catalog No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diaphragm pump 4N, IP20; 230V, 50/60 Hz</td>
<td>23134-5-8018545</td>
</tr>
<tr>
<td>Diaphragm pump 4N, IP20; 115V, 50/60 Hz</td>
<td>23134-5-8018546</td>
</tr>
<tr>
<td>Diaphragm pump 4N, IP54; 230V, 50/60 Hz</td>
<td>23134-5-8018547</td>
</tr>
<tr>
<td>Diaphragm pump 4N, IP54; 115V, 50/60 Hz</td>
<td>23134-5-8018548</td>
</tr>
</tbody>
</table>
**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**
  - T₉₀ ≤ 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**
  - T₉₀ ≤ 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: PTFE, 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
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. ЕАЭС N RU Д-ДЕ.АВ72.Б.04753

Ordering information
<table>
<thead>
<tr>
<th>Converter SCC-K, cock PVDF, 240 V AC</th>
<th>Catalog No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Converter SCC-K, 2 solenoid valves, 240 V AC</td>
<td>23093-4-0801974</td>
</tr>
<tr>
<td>Converter SCC-K, heated, 1 solenoid valve, 240 V AC</td>
<td>23093-4-0801976</td>
</tr>
<tr>
<td>Converter SCC-K, cock PVDF, 120 V AC</td>
<td>23093-4-0801977</td>
</tr>
<tr>
<td>Converter SCC-K, 2 solenoid valves, 120 V AC</td>
<td>23093-4-0801978</td>
</tr>
<tr>
<td>Converter SCC-K, heated, 1 solenoid valve, 120 V AC</td>
<td>23093-4-0801979</td>
</tr>
<tr>
<td>Converter SCC-K, quartz-glass reaction tube, 240 V AC</td>
<td>23093-4-3KXG801000U0100</td>
</tr>
<tr>
<td>Converter SCC-K, quartz-glass reaction tube, 120 V AC</td>
<td>23093-4-3KXG801001U0100</td>
</tr>
</tbody>
</table>

Accessories
| Wall mounting bracket | 23009-4-0801980 |
| Carbon catalyst set | 23009-4-0801981 |
... SCC-K Converter

Pneumatic diagrams

NO\textsubscript{2}/NO converter, standard version with 4-way ball valve

NO\textsubscript{2}/NO converter, option with heated sample gas inlet

NO\textsubscript{2}/NO converter, option with two solenoid valves

Thermal converter with quartz-glass reaction tube
**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 (only in NO₂/NO converter)
4. Sample gas outlet G¼ female thread
5. Sample gas inlet G¼ female thread

---

**Circuit and connection diagram**
SCC-U Utility unit

- Power supply and control unit for use in small extractive gas analyzer systems
- Power distribution for gas analyzers, gas sampling devices, heated sample probe filter units, heated sample gas lines
- Temperature controllers for heated sample gas line and heated sample probe filter (optional)
- Solenoid valves for control of automatic calibration with test gases (optional)

Power distribution

Single-phase power supply output for:

- ABB Continuous gas analyzers
- SCC Gas sampling devices
- SCC-K NO2/NO converter
- PFE2 or PFE3 Heated filter unit
- TBL01-S Heated sample gas line
- CGWB13 Heated sample gas line

Calibration control

Solenoid valves for switching up to three test gases according to following configurations (see 'Pneumatic diagrams' on page 26):

- Calibration with calibration cells: 1 solenoid valve for switching ambient air
- Calibration with test gas feeding at sample gas cooler: 3 + 1 solenoid valves for switching up to three test gases
- Calibration with test gases feeding at gas sampling probe: 3 + 1 solenoid valves for switching up to three test gases and ambient air

Sample gas inlet conditions

The sample gas must be non-corrosive, non-flammable and non-toxic. The utility unit has one gas path.

Sample gas pressure

$P_{\text{abs}} = 70$ to 105 kPa (0.7 to 1.05 bar)

Test gas pressure

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

Sample gas flow rate

70 l/h with SCC-S
100 l/h with SCC-C and SCC-F

Sample gas inlet temperature

10 to 50 °C

Note

The relevant data in the gas analyzer data sheets must be considered as well for the sample handling components.

Power supply

Input voltage

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

Note

The unit is prepared to support both voltage ranges. Take care to have the connected components in the correct voltage range available, when carrying out the engineering.

Power consumption

230 V AC 50 Hz: max. 3500 VA, max. 16 A.
115 V AC 60 Hz: max. 1750 VA, max. 16 A.

Internal fuse protection: 10 A (sample gas line), 6 A (filter unit), 10A (internal 24 V supply, external devices).

External fuse protection by customer: 16 A.
Display and status signals
Temperature control and display (optional)
Temperature controllers with digital display for heated filter unit PFE2 or PFE3 and heated sample gas line TBL01-S

Note
The temperature controllers are pre-configured for PFE2 or PFE3 and TBL01-S. In case the CGWB13 or third party devices are used the configuration needs to be adapted to the settings of the components which comes to application. The settings of the temperature controllers can be modified by following the instructions of the operator manual, in case the adaption to other heaters is required. Take care of the maximum power consumption and the correct operation when carrying out the engineering.

Status signals
- Status signal transmission between the analyzer and the SCC-U via terminal block -X32.
- Failure messages via the connected analyzer

1) Signal wiring needs to meet the hard wired linkage of signals inside the SCC-U.

Construction
Design
19-inch housing (3 height units)

Mounting
Rack mounting on mounting rails. The gas and electrical connections are located on the rear side of the housing. Consider the distances from the wall during installation: Left- and right-hand side panels at least 35 mm, rear panel at least 200 mm. A distance of at least 1 height unit from devices which develop heat is required.

Housing material and color
Aluminum, front panel light gray (RAL 7035)

Degree of protection of housing
IP20 to EN 60529

Dimensions
See page 27 and the Technical drawings SCC-U on page 41

Weight
Approx. 15 kg

Materials of gas-conducting parts
PVDF, PTFE, PA, EPDM, ETFE, FPM, PP, PPH, PVC, TPE

Gas connections
Sample gas inlet
1 PVDF coupling for tube 6 x 4 x 1 mm

Test gas inlet
3 PVDF couplings for tube 6 x 4 x 1 mm

Gas outlet
2 PVDF couplings for tube 6 x 4 x 1 mm

Electrical connections
See also the Wiring diagram on page 45.

Power supply input
Male connectors (socket plug) for non-heating apparatus.

Power supply output
Female connectors (socket plugs) for non-heating apparatus for:
- 4 socket plugs are available
- ABB Continuous gas analyzers
- SCC Gas sampling devices
- 1 socket plug 2) (-X20) fix assigned for:
  Heated sample probe filter unit PFE2 or PFE3
- 1 socket plug 2) (-X21) fix assigned for:
  Heated sample gas line

2) The power supply output is available only if the unit is configured with temperature controllers.

Note
For the maximum power consumption please refer for the chapter power supply and the wiring diagrams which are part of the drawing package.

Cables
- Cables with mating plugs, length 2 m, to connect the external devices are supplied per order.
  Type: H05VV-F 3 x 1mm², CE, VDE, 300V
- Mating plugs are supplied only for TBL01-S and PFE2/PFE3.

Digital input and output signals
15 pin Sub-D female connector (-X32). Cable with length 2 m, for connection to the gas analyzer is supplied.
... SCC-U Utility unit

Safety
Tested to EN 61010-1:2010

Protective class
I

Overvoltage category/degree of contamination
II/2

Electromagnetic compatibility
Tested to EN 61326-1:2013

Emitted interference
Class B

Immunity to interference
Industrial environment

Ambient conditions

Ambient temperature
Operation: 10 to 40 °C, storage and transport: −25 to 60 °C

Relative humidity
≤ 75 % annual average

Installation location
Installation in general purpose environment only

Certifications

IECEE CB Scheme – Safety
The SCC-U utility 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).

CSA – Safety
The SCC-U utility 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 (3rd Edition).

Pneumatic diagrams

See also the Piping diagram on page 44.

Catalog No. 23940-0-1100011X000
Version with 1 solenoid valve for switching ambient air for calibration using calibration cells

Catalog No. 23940-0-1100012X000
Version with 3 + 1 solenoid valves for switching up to three test gases for calibration with test gas feeding at sample gas cooler

Catalog No. 23940-0-1100013X000
Version with 3 + 1 solenoid valves for switching up to three test gases and ambient air for calibration with test gas feeding at gas sampling probe
Dimensions (in mm [in])

483 (19.02)

462 (18.09)
432 (17.00)
420 (16.54)

133 (5.24)

4.5 (0.18)

420 (16.54)

432.5 (17.03)
**SCC-U Utility unit**

**Front panel**

1. Heated filter unit temperature controller (optional)
2. Heated sample gas line temperature controller (optional)
3. Main switch
4. Heated filter unit circuit breaker (6 A)
5. Heated sample gas line residual current breaker with overcurrent protection (10 A / 0.03 A)
6. Heated sample gas line circuit breaker, 10 A
7. External power sockets and 24 VDC power supply circuit breaker (10 A)

**Rear panel**

**RUBBER CONNECTORS**
- X20 POWER OUT FILTER UNIT
- X21 POWER OUT SAMPLE GAS LINE
- X22 POWER OUT ANALYZER EASY LINE OR AC2000
- X23 POWER OUT SAMPLE GAS COOLER OR SAMPLE GAS FEED UNIT
- X24 POWER OUT NO-CONVERTER OR OTHER SAMPLE HANDLING DEVICE
- X25 POWER OUT SPARE
- X26 POWER SUPPLY INLET

**-X30 Pt100 TERMINAL (SCREW TERMINALS)**
1. Pt100 FILTER UNIT/WHITE
2. Pt100 FILTER UNIT/RED
3. Pt100 FILTER UNIT/WHITE
4. Pt100 SAMPLE GAS LINE/WHITE
5. Pt100 SAMPLE GAS LINE/RED
6. Pt100 SAMPLE GAS LINE/RED

1) EARTHING SCREW

**-X32 STATUS SIGNALS (D-SUB 15-PIN)**
- TO ANALYZER 1ST DI/DD MODULE D3:3
- TO ANALYZER 1ST DI/DD MODULE D3:4
- FROM NO-CONVERTER D-SUB 9-PIN 5
- TO ANALYZER 1ST DI/DD MODULE D4:1
- TO ANALYZER 1ST DI/DD MODULE D4:3
- FROM SAMPLE GAS COOLER + SAMPLE GAS FEED UNIT X3:3
- TO ANALYZER 1ST DI/DD MODULE D4:13
- TO ANALYZER 1ST DI/DD MODULE D4:15
- ANALYZER 2ND DI/DD MODULE D3:16
- ANALYZER 2ND DI/DD MODULE D3:14
- ANALYZER 2ND DI/DD MODULE D2:2
- ANALYZER 2ND DI/DD MODULE D2:19
- ANALYZER 2ND DI/DD MODULE D2:22
- ANALYZER 2ND DI/DD MODULE D2:20
- SAMPLE GAS COOLER/ SAMPLE GAS FEED UNIT X3:2 AND NO CONVERTER D-SUB 9-PIN 9

- FAILURE FILTER UNIT/ SAMPLE GAS LINE
- FAILURE CONVERTER
- FAILURE GAS COOLER/ CONVERTER
- SWITCHING SAMPLE GAS VALVE
- SWITCHING TEST GAS VALVE 3
- SWITCHING TEST GAS VALVE 2
- SWITCHING TEST GAS VALVE 1
- FAILURE GAS COOLER/ CONVERTER AND CONVERTER
Ordering information

<table>
<thead>
<tr>
<th>Catalog No. 23940-0-</th>
<th>0 0 0 0 0 0 0 0</th>
</tr>
</thead>
</table>

**Design**
19-inch housing for rack mounting, 3 height units, IP20

**Power supply**
Power supply 115 V AC and 230 V AC

**Solenoid valves**
- Solenoid valve for calibration with calibration cells and ambient air
- Solenoid valves for calibration with test gases at the sample gas cooler
- Solenoid valves for calibration with test gases at the sampling probe

**Temperature controllers**
- Without
- With 2 temperature controllers for heated filter unit and heated sample gas line

Engineering information

The following engineering information shall be taken into consideration when designing a small extractive gas analyzer system with the SCC-U utility unit.

**Arrangement of the devices in a rack or cabinet (examples)**

<table>
<thead>
<tr>
<th>SCC-K NO₂/NO converter</th>
<th>SCC-U Utility unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCC-U Utility unit</td>
<td>EL3020 Gas analyzer</td>
</tr>
<tr>
<td>EL3020 Gas analyzer</td>
<td>SCC-S Sample gas feed unit</td>
</tr>
<tr>
<td>SCC-S Sample gas feed unit</td>
<td></td>
</tr>
</tbody>
</table>

When installing the devices into a rack or cabinet, provide a distance of at least 1 height unit between the devices.

An SCC-K NO₂/NO converter must always be installed as the topmost device.

An SCC-F sample gas feed unit and an SCC-C sample gas cooler can be installed side-by-side instead of the SCC-S sample gas feed unit.

**Engineering hint**
Take care of sufficient heat dissipation of your system. Avoid heat buildups inside the cabinet.

Laying the sample gas line
Lay the heated sample gas line inclined downwards. Avoid water pockets when laying the sample gas line.

**Ambient temperature**
Consider the ambient temperature at the installation location of the analyzer system. A fan with inlet and outlet filter is required in any case. Installation of a cooling unit may be necessary depending on the prevailing ambient temperature. Avoid radiated heat and harsh conditions (e.g. dust).
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
\( \frac{1}{8} \text{ NPT} \) 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>Test gas cock stainless steel for wall mounting</th>
<th>Catalog No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>23177-5-8308581</td>
</tr>
</tbody>
</table>
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: $p_{\text{abs}}$ max. 150 kPa (1.5 bar), stainless steel: $p_{\text{abs}}$ 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>23145-5-8018438</td>
</tr>
<tr>
<td>Membrane filter, stainless steel</td>
<td>23147-5-8018439</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Condensate monitor</th>
<th>Catalog No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condensate monitor, PVC</td>
<td>23158-5-8018440</td>
</tr>
<tr>
<td>Condensate monitor, stainless steel</td>
<td>23157-5-8018039</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 37).

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 $\geq 1 \mu m$
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 cm$^2$
Dead volume
Approx. 15 cm$^3$
Dimensions
As for membrane filter (see page 31)
Weight
PVC: approx. 0.7 kg, stainless steel: approx. 1.5 kg
Mounting
Panel and wall mounting (with mounting bracket)
Gas connections
G$\frac{1}{4}$ 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 37)
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 31

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 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) The sample gas path to the analyzer is blocked in the de-energized condition.
**Acid filter**

**Application and description**

The acid filter is used in the gas conditioning system. Its purpose is to collect the sulfuric acid aerosols entrapped in the sample gas. The acid filter may always be required where the $\text{SO}_3$ content in the sample gas is greater than 1 mg/m$^3$ or the $\text{SO}_2$ 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**
  $p_{\text{abs}} = 50$ 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 $\geq 0.1 \mu\text{m}$

- **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

- **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**

| Acid filter | Catalog No. | 23045-5-8018419 |
Disposable filter

Application and description
The disposable filter is used in the gas conditioning system. It is mounted in the sample gas line upstream of the gas analyzer. The disposable filter consists of a micro fiber filter pipe which is welded into a plastic case.

Technical data

Flow rate
Max. 250 l/h (air)

Gas pressure
$p_{\text{abs}} \leq 200$ 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)

Ordering information

<table>
<thead>
<tr>
<th>Disposable filter</th>
<th>Catalog No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>23044-5-8018418</td>
<td></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 \( \text{SO}_2 \) 49 l/h
- Carbon dioxide \( \text{CO}_2 \) 55 l/h
- Carbon monoxide \( \text{CO} \) 60 l/h
- Oxygen \( \text{O}_2 \) 54 l/h
- Methane \( \text{CH}_4 \) 86 l/h

Flow rate adjustment
With integral needle valve

Materials of gas-conducting parts
- Measuring tube: Borosilicate glass
- Float: Stainless steel 1.4401 (SAE 316)
- 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
1/4 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
1/4 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
- Fitting: Stainless steel 1.4571 (SAE 316Ti)
- Needle valve: Stainless steel 1.4571 (SAE 316Ti)
- 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 M16

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


... Flow meters, flow monitors

**Dimensions (in mm)**

<table>
<thead>
<tr>
<th>Component</th>
<th>Flow meter</th>
<th>Flow monitor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gas inlet</td>
<td>Gas inlet</td>
</tr>
<tr>
<td>2</td>
<td>Gas outlet</td>
<td>Gas outlet</td>
</tr>
</tbody>
</table>

**Ordering information**

<table>
<thead>
<tr>
<th>Product Description</th>
<th>Catalog No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow meter 7 to 70 l/h</td>
<td>23151-5-8018474</td>
</tr>
<tr>
<td>Flow monitor 1.6 to 16 l/h</td>
<td>23155-5-8018476</td>
</tr>
<tr>
<td>Flow monitor 7 to 70 l/h</td>
<td>23155-5-8018475</td>
</tr>
<tr>
<td>Flow monitor for chlorine 7 to 70 l/h</td>
<td>23155-5-8018477</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 32). 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 $U_0$</td>
<td>$\leq 13.1$ V</td>
<td>$\leq 13.1$ V</td>
</tr>
<tr>
<td>Short-circuit current $I_0$</td>
<td>$\leq 5$ mA</td>
<td>$\leq 5$ mA</td>
</tr>
<tr>
<td>Power $P_0$</td>
<td>$\leq 65$ mW</td>
<td>$\leq 65$ mW</td>
</tr>
<tr>
<td>Permissible external capacitance $C_0$</td>
<td>$\leq 0.97$ µF</td>
<td>$\leq 6$ µF</td>
</tr>
<tr>
<td>Permissible external inductance $L_0$</td>
<td>$\leq 0.9$ H</td>
<td>$\leq 1$ 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

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

Ex II (1) G [Ex ia Ga] IIC

Installation location

Outside the hazardous area

Electrical connections

Relays are shown in the unpowered state.

Ordering information

<table>
<thead>
<tr>
<th>Catalog No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching unit ER-144A/Ex, 230 V AC</td>
</tr>
<tr>
<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 35). 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)
\[ U_0 \leq 10.6 \text{ V}, \quad I_0 \leq 19.1 \text{ mA}, \quad P_0 \leq 51 \text{ mW} \]

Permissible connection values
- Explosion group: IIA, IIB, IIC
- External capacitance: 72 \( \mu \)F, 16.2 \( \mu \)F, 2.32 \( \mu \)F
- External inductance: 780 mH, 390 mH, 97 mH

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

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 to +60 °C

Power supply
207 to 253 V AC or 103.5 to 126 V AC, 45 to 65 Hz, \( \leq 1 \) VA

EC type examination certificate
PTB 00 ATEX 2081

Designation
II (1)G [Ex ia Ga] IIC,
II (1)D [Ex ia Da] IIIC

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>
</tr>
</thead>
<tbody>
<tr>
<td>23422-5-8018376</td>
<td>23422-5-8018377</td>
<td>23422-5-8018378</td>
<td>23422-4-0730654</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>
<tr>
<td>Dimensions (in mm)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
... Cylinder pressure reducers

<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>
<tr>
<td>Dimensions (in mm)</td>
<td></td>
</tr>
</tbody>
</table>
Appendix

Technical drawings SCC-U
... Appendix

... Technical drawings SCC-U
CALIBRATION WITH TEST GASES AT SAMPLE GAS PROBE
... Appendix

... Technical drawings SCC-U
Notes
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
• Acid filter
• SCC-F Sample gas feed unit
• Disposable filter
• SCC-S Sample gas feed unit
• Flow meters, flow monitors
• Diaphragm pump 4N
• ER-144A/Ex Switching unit
• SCC-K Converter
• KFA Isolated switch amplifier
• SCC-U Utility unit
• Cylinder pressure reducers
• Membrane filter
• Multi-way test gas coc
• CGKW Condensate monitor