

ABB MEASUREMENT & ANALYTICS | DATA SHEET

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 | • 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 cock |
| • CGKW Condensate monitor | |

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

Sample gas pressure

Heat exchanger (HE) material	Sample gas pressure p_{abs}	
	w/o peristaltic pump	with peristaltic pump
Glass	50 to 200 kPa (0.5 to 2.0 bar)	50 to 150 kPa (0.5 to 1.5 bar)
PVDF	50 to 250 kPa (0.5 to 2.5 bar)	50 to 150 kPa (0.5 to 1.5 bar)
Stainless steel	0.05 to 1 MPa (0.5 to 10 bar)	50 to 150 kPa (0.5 to 1.5 bar)

Sample gas flow rate

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

Sample gas inlet temperature

Max. 140 °C

Sample gas inlet dew point

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

Operating data

Sample gas outlet temperature

Factory-set to +3 °C

Dew point stability

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

Refrigeration capacity

40 W at +10 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

Dead volume in heat exchanger

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

Gas tightness

5×10^{-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

Heat exchanger

Heat exchanger material	Sample gas inlets & outlets	Condensate outlet
Glass	Screwed pipe or hose connection GL18 ¹⁾	Pipe nipple GL25
PVDF	6 mm tube	G $\frac{3}{8}$ female thread
Stainless steel	G $\frac{3}{4}$ female thread	G $\frac{3}{8}$ female thread

1) 2 GL coupling nuts per heat exchanger with insert 6 × 4 × 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 × 5 cycles

Operation

Vibration: 1 g / ± 0.07 mm / 5 to 55 Hz, 3 × 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_{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

The SCC-C sample gas cooler in the category 3G explosion-proof version is suitable for use in zone 2 hazardous areas. Testing to EN 60079-0:2012 + A11:2013 and EN 60079-15:2010. 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

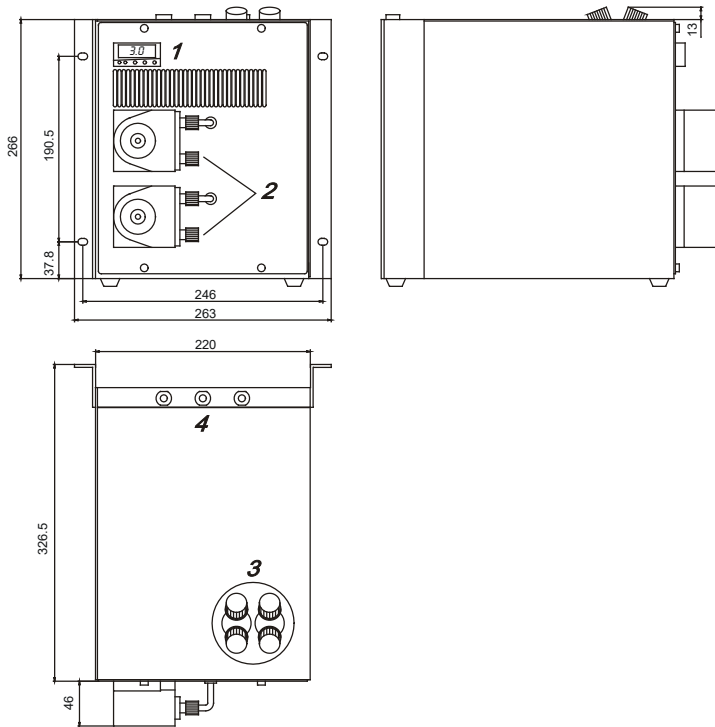
- Class 2258 02 Process Control Equipment – For Hazardous Locations – Certified to Canadian Standards and
- Class 2258 82 Process Control Equipment – For Hazardous Locations – Certified to U.S. Standards

Class 1, Div. 2, Groups A, B, C and D, Temperature code T4, maximum ambient temperature +50 °C.

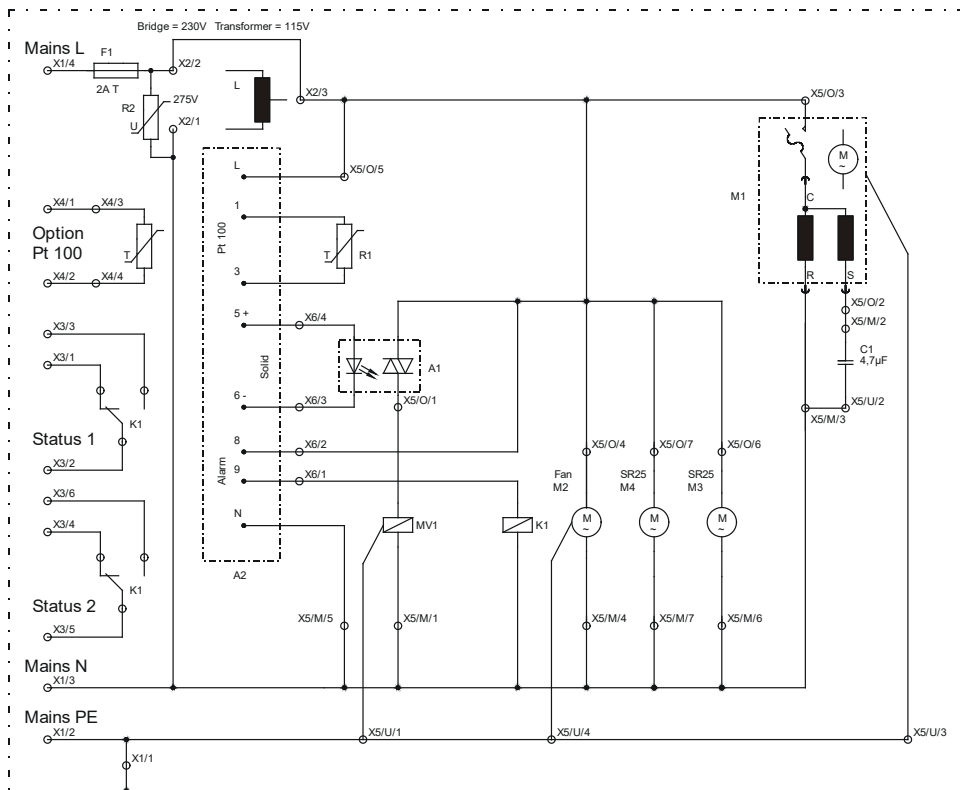
Certificate No. 1105720

GOST – Import and operation permission

Declaration of conformity No. EAЭC N RU Д-DE.AB72.B.04753

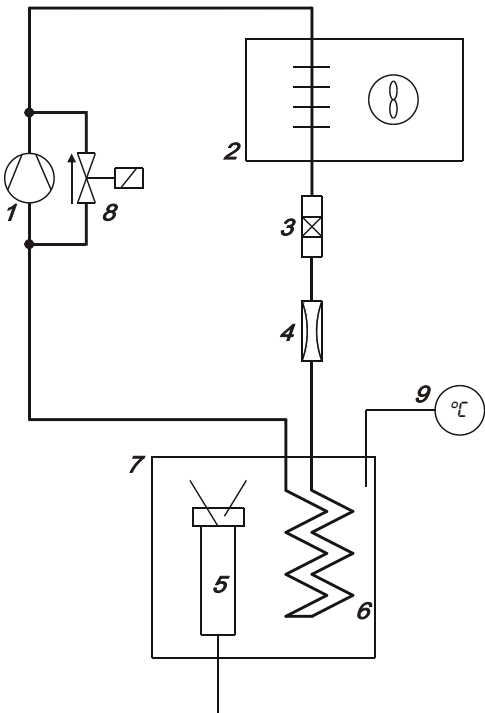
Dimensions (in mm)

- 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

... 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

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

Ordering information

Catalog No. 23070-0-										0	0	0	0
Design													
Wall-mounted housing ½ 19 Inch										1			
Preparation													
without										0			
with dosing unit										1			
Heat exchanger													
Glass										1			
PVDF										2			
Stainless steel										3			
Gas paths													
1 gas path 250 l/h										1			
1 gas path 125 l/h										2			
2 gas paths 2 × 125 l/h										3			
Condensate drain													
without										0			
1 peristaltic pump										1			
2 peristaltic pumps (2 × condensate)										2			
2 peristaltic pumps (1 × condensate, 1 × dosing)										3			
2 peristaltic pumps (1 × condensate, 1 × precondensation)										4			
Display													
Temperature display and monitoring										1			
Temperature display and monitoring and Pt 100										2			
Power supply													
230 V, 50/60 Hz										1			
115 V, 50/60 Hz										2			
Certification													
without										0			
with CSA certification										1			
with ATEX certification, Zone 2										2			
with GOST certification										3			

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

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)

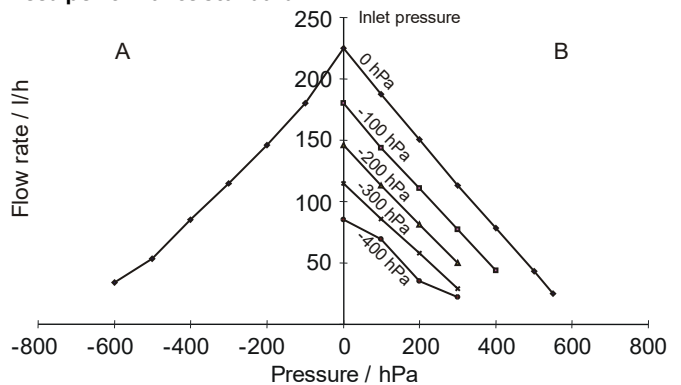
Gas tightness

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

Flow rate display and adjustment

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

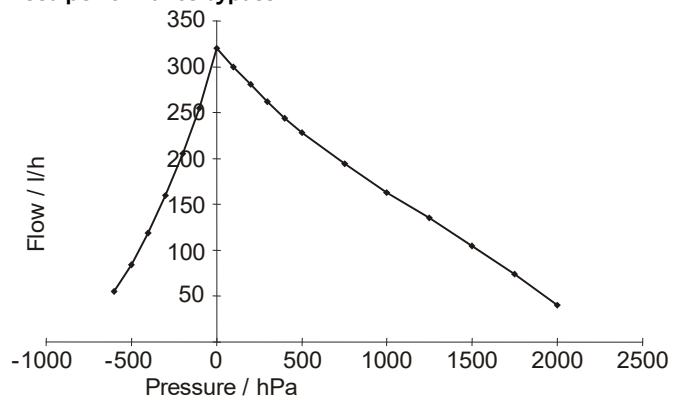
Feed performance standard



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 × 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

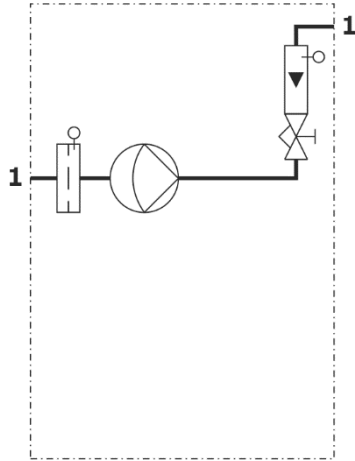
GOST – Import and operation permission

Declaration of conformity No. EAЭC N RU Д-DE.AB72.B.04753

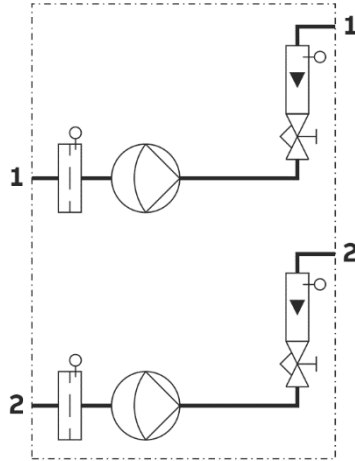
... SCC-F Sample gas feed unit

Pneumatic diagrams

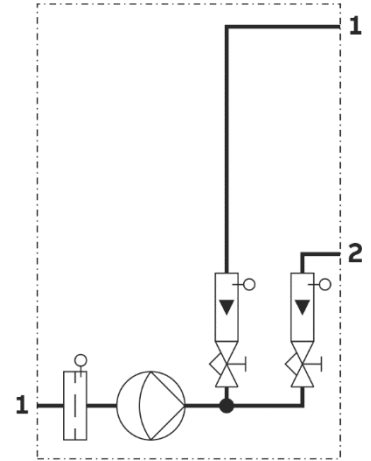
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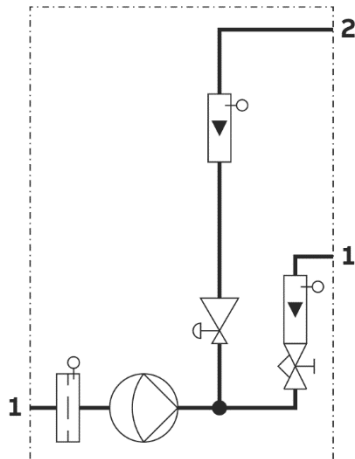
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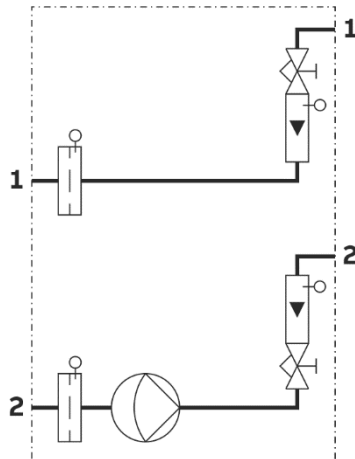
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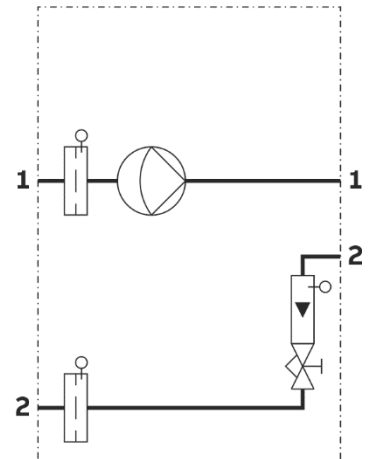
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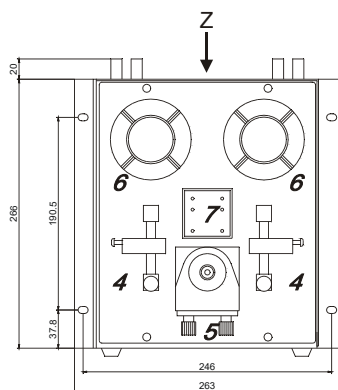
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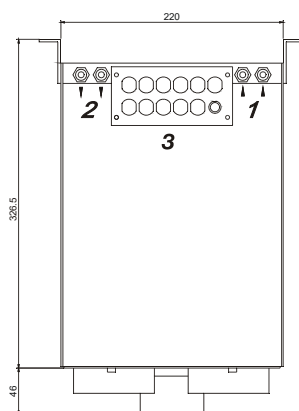
Catalog No. 23212-0-16XXXX000000



Dimensions (in mm)



Ansicht / View Z



- 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.

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

$p_{abs} = 70$ to 105 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

5×10^{-6} hPa l/s

Flow rate display and adjustment

Rotameter with needle valve (metal-free)

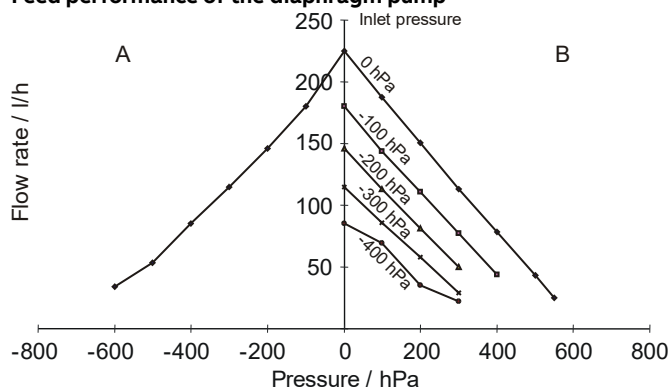
Outlet dew point (versions with Peltier cooler)

+3 °C

Condensate discharge (versions with Peltier cooler)

Peristaltic pump: feed performance approx. 300 ml/h at 5 rpm, pressure resistance $p_{abs} = 50$ 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

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

SO₂ 0 to 75 mg/m³, NO 0 to 100 mg/m³, measurement with Uras26

Sample gas inlet dew point at the cooler inlet	Ambient temperature	Flow rate		
		30 l/h	60 l/h	90 l/h
30 °C	+10 °C	X	X	X
	+20 °C	X	X	–
	+30 °C	X	X	–
	+40 °C	–	–	–
50 °C	+10 °C	X	X	X
	+20 °C	X	X	–
	+30 °C	X	–	–
	+40 °C	–	–	–

X: permitted, –: not permitted

Application 2

SO₂ 0 to 400 mg/m³, NO 0 to 100 mg/m³, measurement with Uras26 (also for CO, CO₂ and O₂)

Sample gas inlet dew point at the cooler inlet	Ambient temperature	Flow rate		
		30 l/h	60 l/h	90 l/h
30 °C	+10 °C	X	X	X
	+20 °C	X	X	X
	+30 °C	X	X	X
	+40 °C	X	X	X
50 °C	+10 °C	X	X	X
	+20 °C	X	X	X
	+30 °C	X	X	X
	+40 °C	X	X	X

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

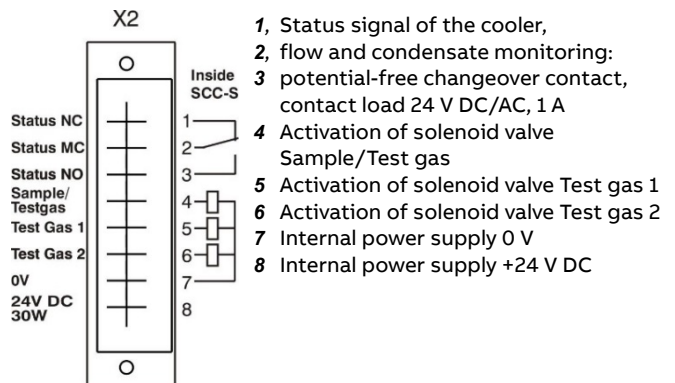
Power supply

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 $p_{abs} = 50$ 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

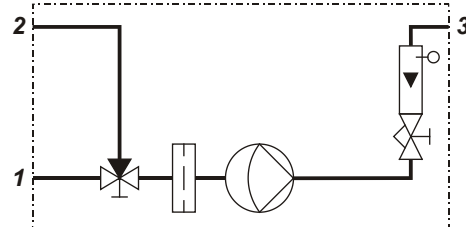
CSA – Safety

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).

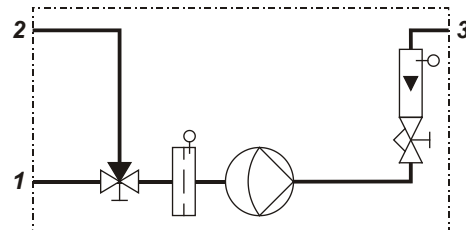
Certificate No. 2504652

Pneumatic diagrams

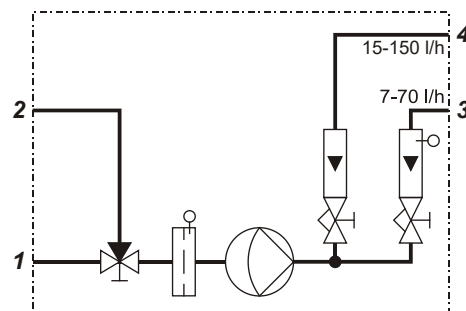
Version 1 Catalog No. 23236-0-X11000XX0000



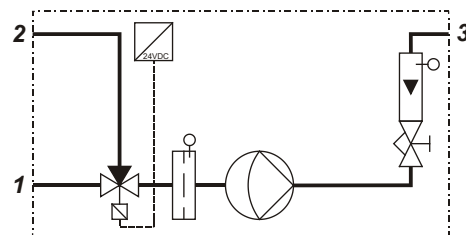
Version 2 Catalog No. 23236-0-X21000XX0000

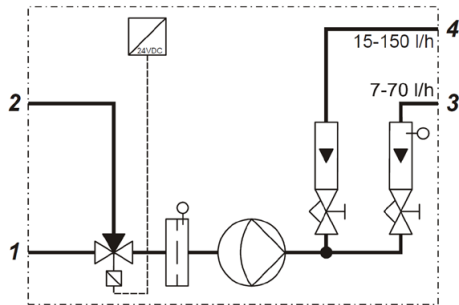
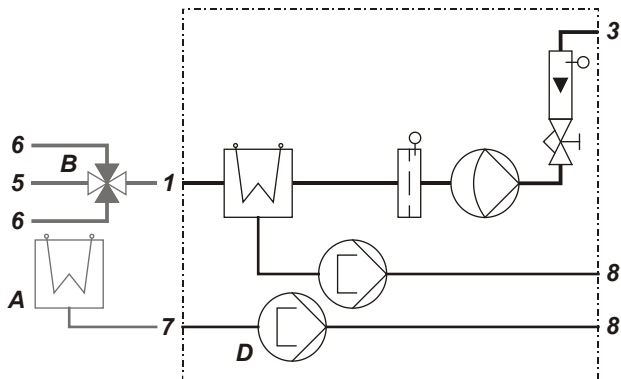
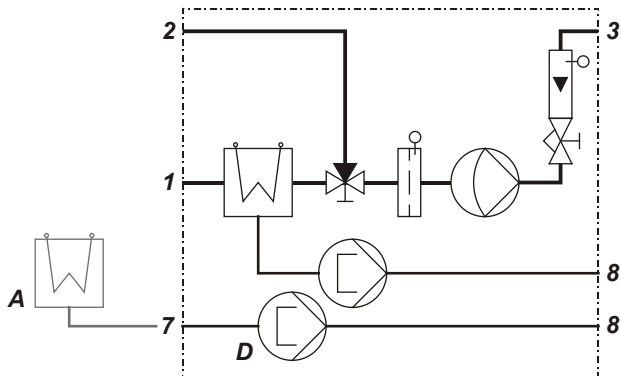
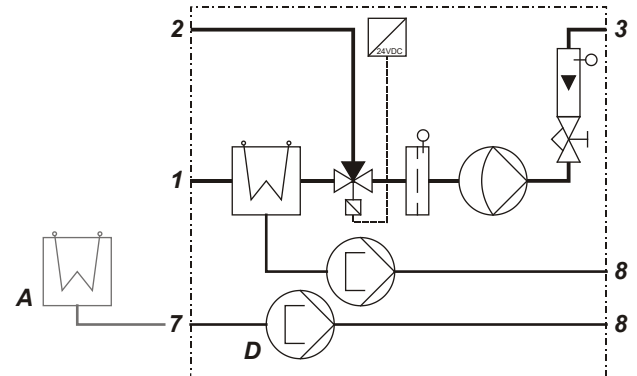
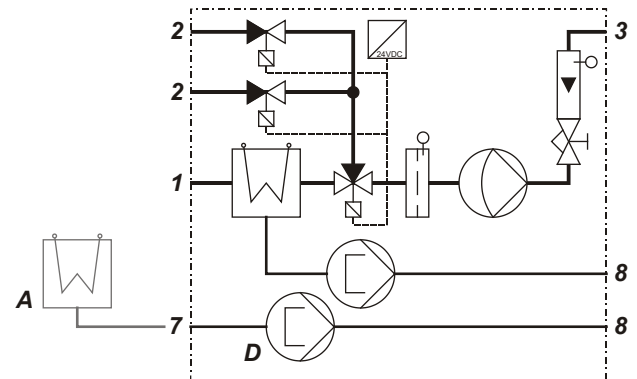
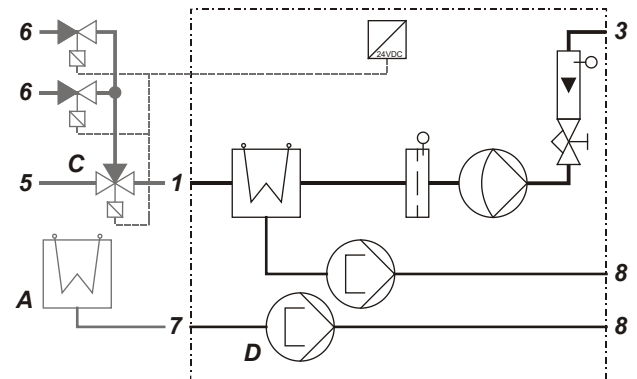


Version 3 Catalog No. 23236-0-X31000XX0000



Version 4 Catalog No. 23236-0-X22000XX0000



Version 5 Catalog No. 23236-0-X32000XX0000**Version 6** Catalog No. 23236-0-X2001XXX0000**Version 7** Catalog No. 23236-0-X2101XXX0000**Version 8** Catalog No. 23236-0-X2201XXX0000**Version 9** Catalog No. 23236-0-X2301XXX0000**Version 10** Catalog No. 23236-0-X2011XXX0000

- 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:

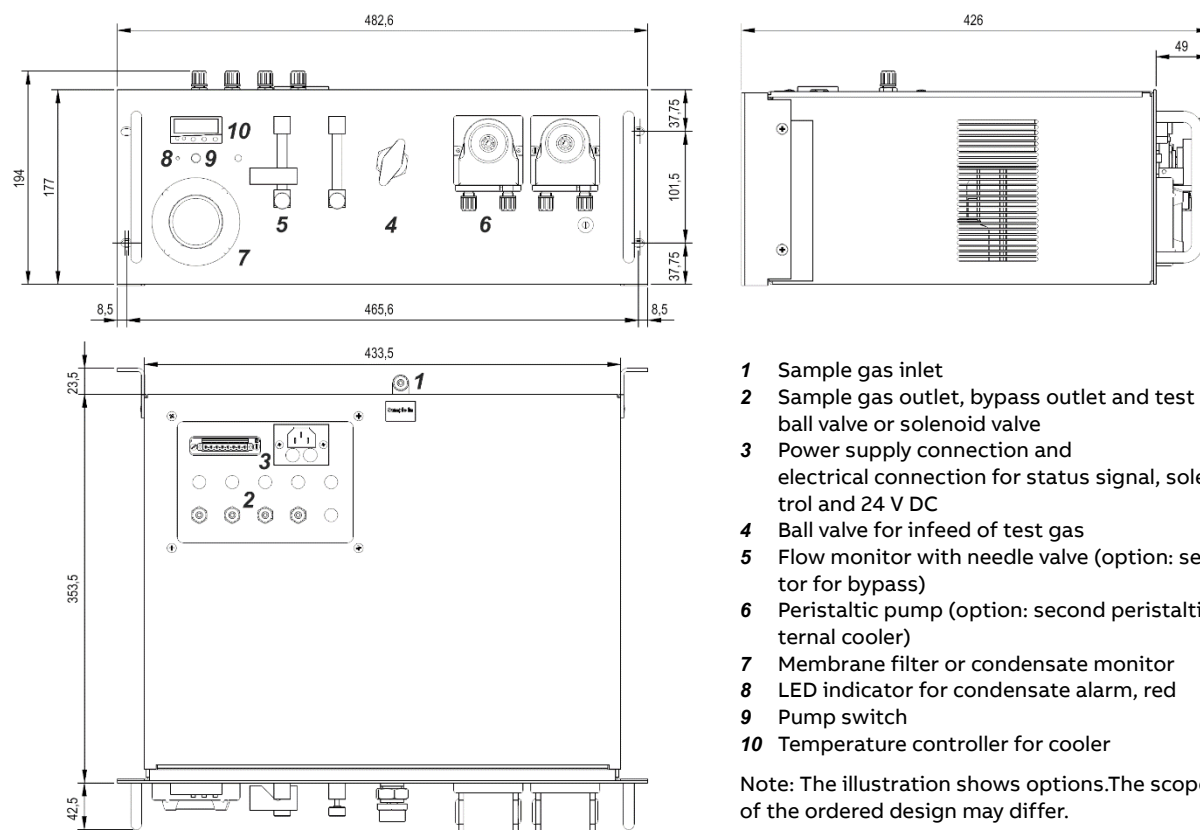
- A External cooler
- B External multi-way cock
- C External solenoid valves

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.

Diaphragm pump 4N



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

Operating data

Inlet pressure

$p_{abs} = 70$ to 105 kPa (0.7 to 1.5 bar)

Flow rate

Max. 250 l/h at atmospheric pressure

Inlet temperature

+5 to 50 °C

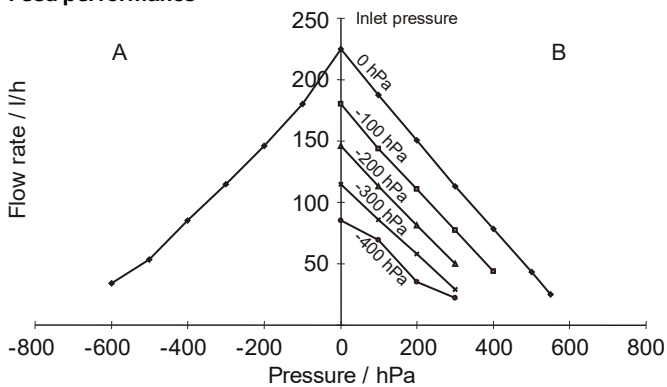
Inlet dew point

Below room temperature

Tightness

Pressure drop 0.1 hPa/min

Feed performance



- A** Inlet: negative pressure, outlet: atmospheric pressure
B Inlet: according to 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 $\frac{1}{4}$ 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 \times 5 cycles

Operation

Vibration: 2 g / ± 0.07 mm / 4 to 7 Hz, 3 \times 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

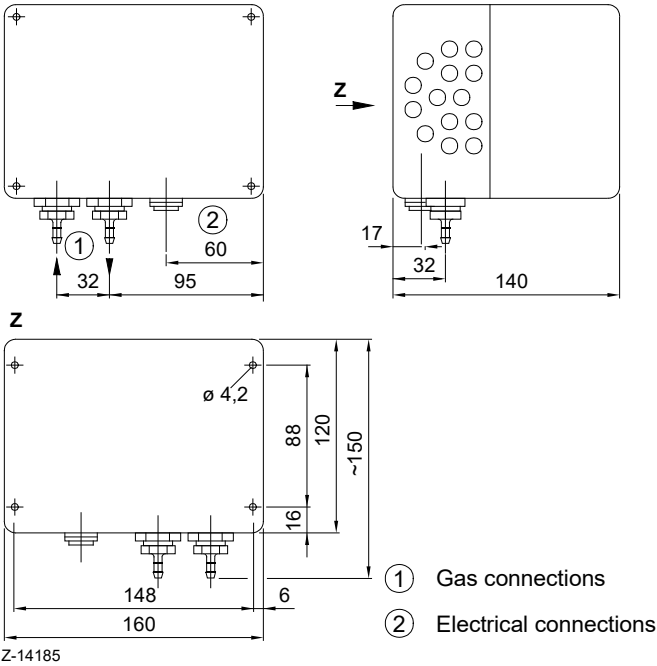
230 V ± 10 %, 50 Hz or 60 Hz

115 V ± 10 %, 50 Hz or 60 Hz

Power consumption

Approx. 50 VA

Dimensions (in mm)



Ordering information

	Catalog No.
Diaphragm pump 4N, IP20; 230V, 50/60 Hz	23134-5-8018545
Diaphragm pump 4N, IP20; 115V, 50/60 Hz	23134-5-8018546
Diaphragm pump 4N, IP54; 230V, 50/60 Hz	23134-5-8018547
Diaphragm pump 4N, IP54; 115V, 50/60 Hz	23134-5-8018548

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

TRS measurement, oxidation of sulfur-organic and non-organic compounds. Analyzer: Uras26. Operating temperature: 650 °C. Sample gas flow rate: 60 l/h.

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

Oxidation of chlorine components. Analyzer: upon request, measurement of HCl. Operating temperature: 650 °C. Sample gas flow rate: 60 l/h.

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

G $\frac{3}{4}$ 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. EAЭC N RU Д-DE.AB72.B.04753

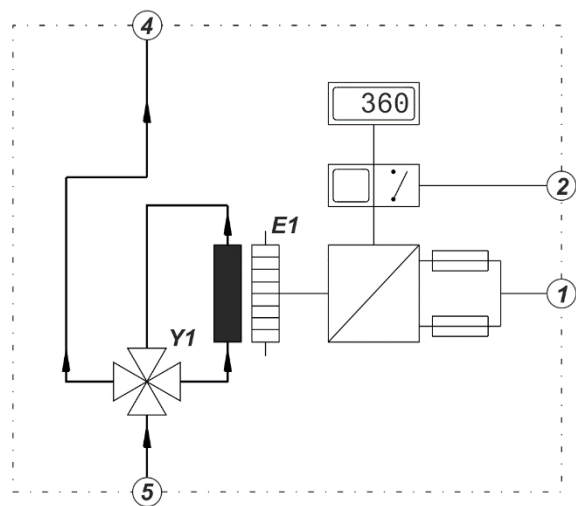
Ordering information

	Catalog No.
Converter SCC-K, cock PVDF, 240 V AC	23093-4-0801974
Converter SCC-K, 2 solenoid valves, 240 V AC	23093-4-0801975
Converter SCC-K, heated, 1 solenoid valve, 240 V AC	23093-4-0801976
Converter SCC-K, cock PVDF, 120 V AC	23093-4-0801977
Converter SCC-K, 2 solenoid valves, 120 V AC	23093-4-0801978
Converter SCC-K, heated, 1 solenoid valve, 120 V AC	23093-4-0801979
Converter SCC-K, quartz-glass reaction tube, 240 V AC	23093-4-3KXG801000U0100
Converter SCC-K, quartz-glass reaction tube, 120 V AC	23093-4-3KXG801001U0100
Accessories	
Wall mounting bracket	23009-4-0801980
Carbon catalyst set	23009-4-0801981

... SCC-K Converter

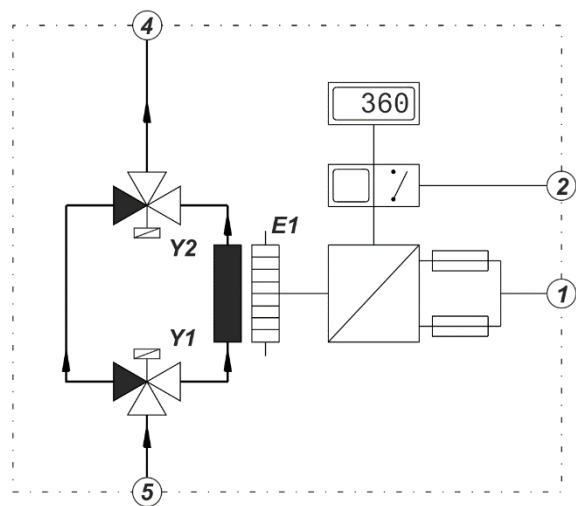
Pneumatic diagrams

NO₂/NO converter, standard version with 4-way ball valve



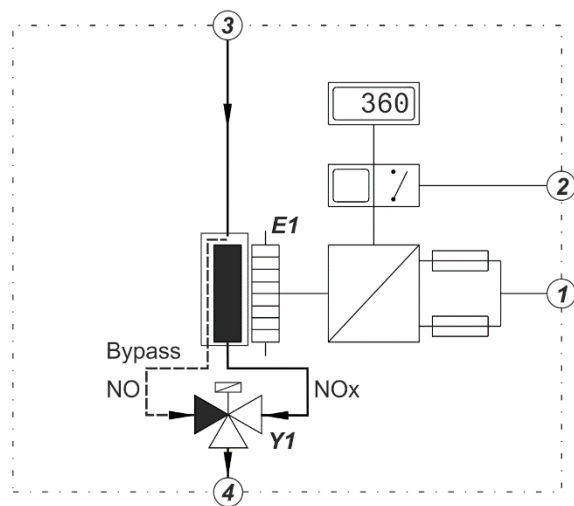
- 1 Power supply
- 2 Status signal
- 4 Sample gas outlet
- 5 Sample gas inlet
- E1 Tube furnace
- Y1 4-way ball valve

NO₂/NO converter, option with two solenoid valves



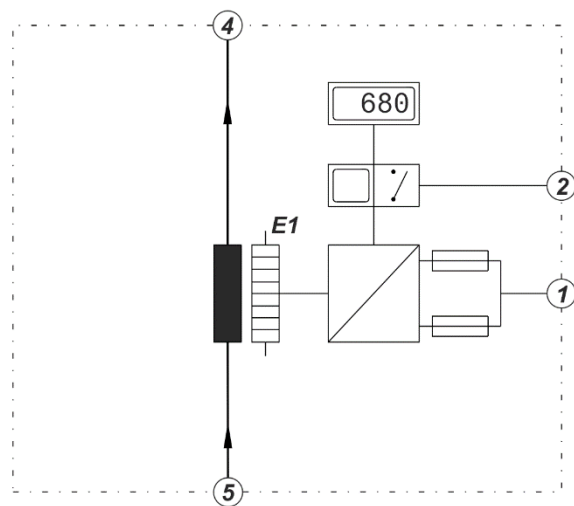
- 1 Power supply
- 2 Status signal
- 4 Sample gas outlet
- 5 Sample gas inlet
- E1 Tube furnace
- Y1 3/2-way solenoid valve
- Y2 3/2-way solenoid valve

NO₂/NO converter, option with heated sample gas inlet

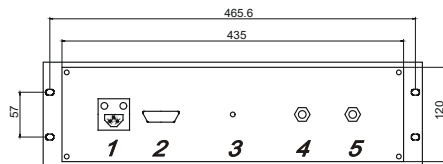
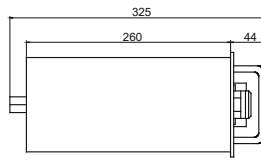
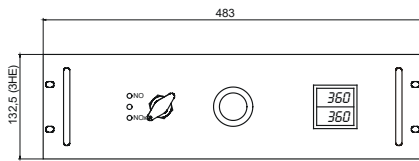


- 1 Power supply
- 2 Status signal
- 3 Heated sample gas inlet
- 4 Sample gas outlet
- E1 Tube furnace
- Y1 3/2-way solenoid valve

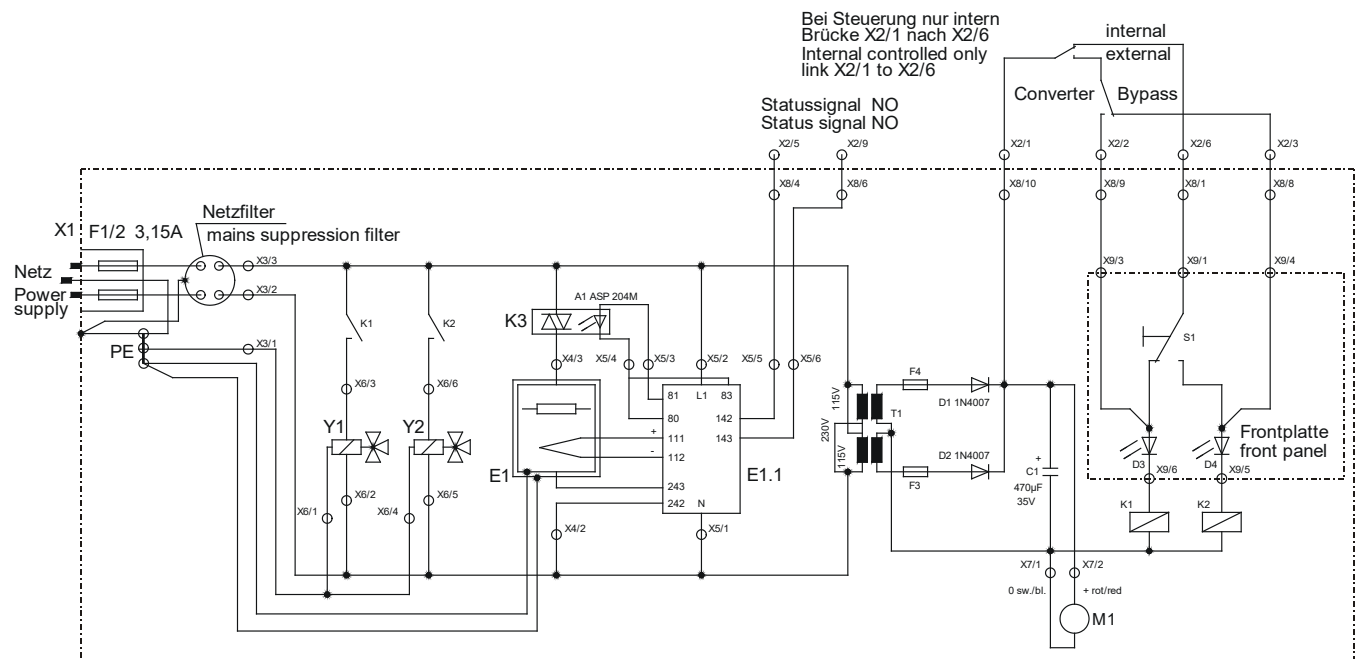
Thermal converter with quartz-glass reaction tube



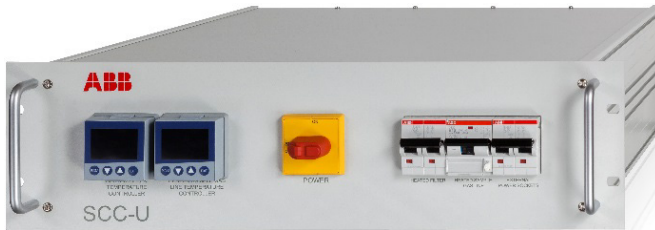
- 1 Power supply
- 2 Status signal
- 4 Sample gas outlet
- 5 Sample gas inlet
- E1 Heated reaction tube

Dimensions (in mm)

- 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 G¹/₄ female thread
- 5 Sample gas inlet G¹/₄ 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

Note

EL3000 Analyzers to be configured via APC with the second Digital I/O board for valve control according to the wiring diagrams. For valve activation and the implementation of alarms ECT software is required. Take care of the correct operation when carrying out the engineering.

AO2000 Analyzers to be configured via APC with the necessary Digital I/O's in according to the wiring diagrams. For valve activation and the implementation of alarms FB-programming is required. Take care of the correct operation when carrying out the engineering.

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

$p_{abs} = 70$ to 105 kPa (0.7 to 1.05 bar)

Test gas pressure

$p_{abs} \leq 200$ 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 $\pm 10\%$, 50 Hz or 115 V AC $\pm 10\%$, 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 analyzer¹⁾

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 plug²⁾ (-X20) fix assigned for:
Heated sample probe filter unit PFE2 or PFE3
- 1 socket plug²⁾ (-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

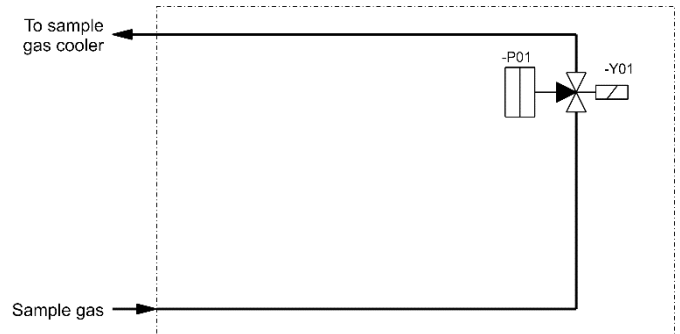
The SCC-U utility unit is certified for use in general purpose environment, evidenced by full compliance with standards CAN/CSA-C22.2 No. 61010-1-04 und UL Std. No. 61010-1 (3rd Edition).

Pneumatic diagrams

See also the **Piping diagram** on page 44.

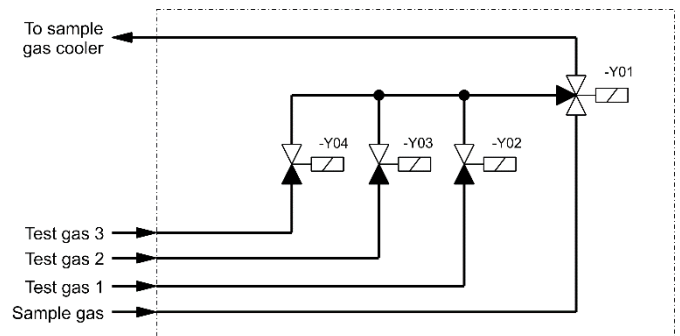
Catalog No. 23940-0-1100011X000

Version with 1 solenoid valve for switching ambient air for calibration using calibration cells



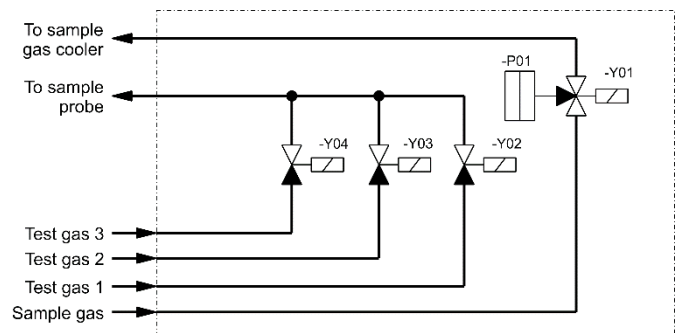
Catalog No. 23940-0-1100012X000

Version with 3 + 1 solenoid valves for switching up to three test gases for calibration with test gas feeding at sample gas cooler

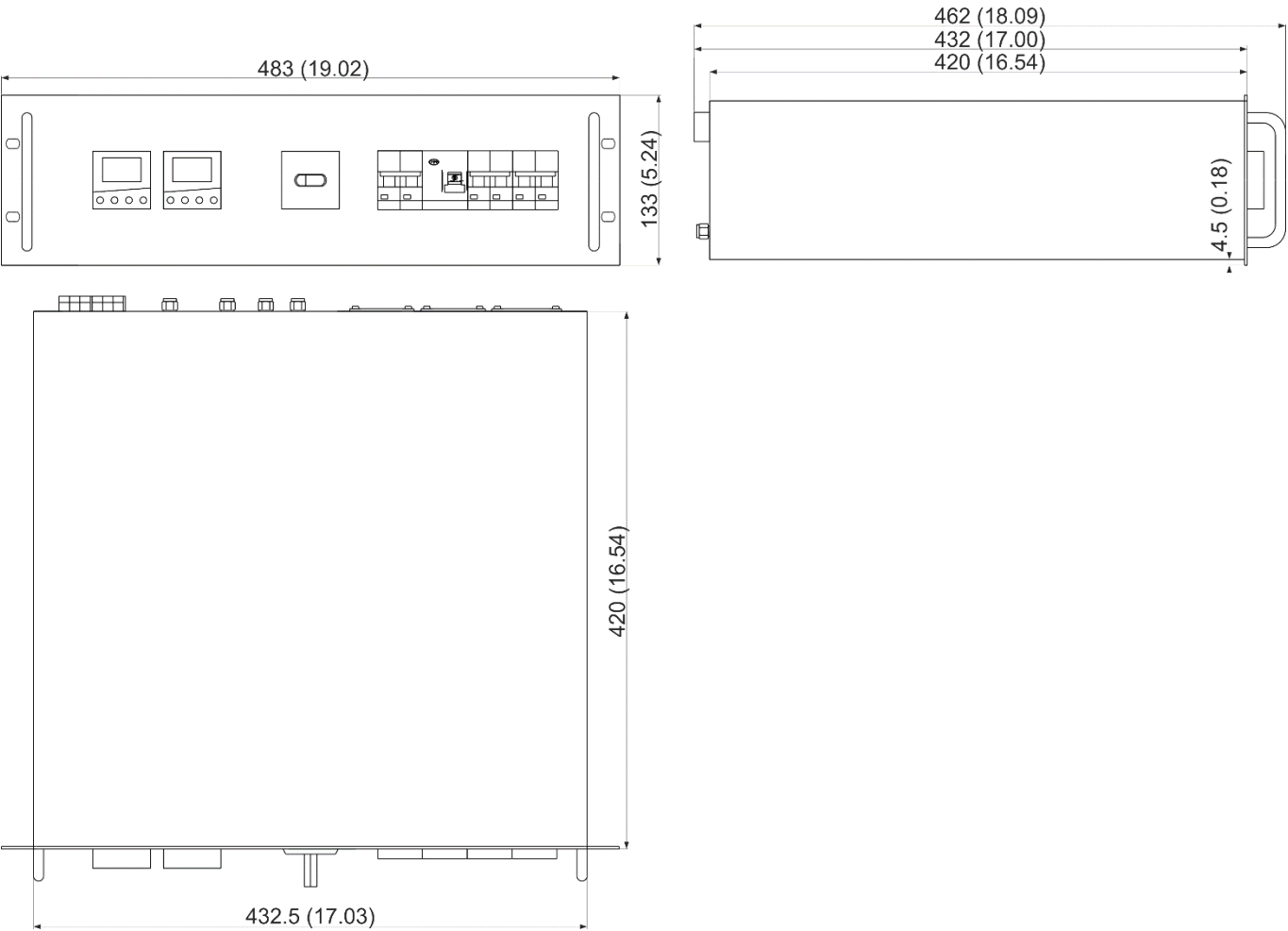


Catalog No. 23940-0-1100013X000

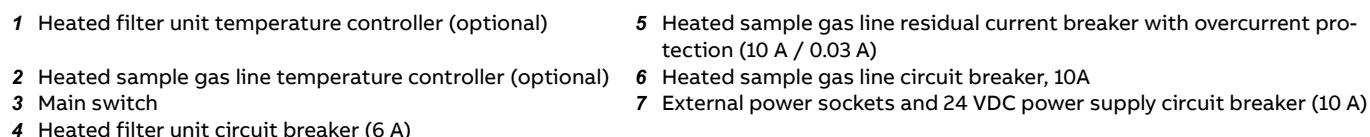
Version with 3 + 1 solenoid valves for switching up to three test gases and ambient air for calibration with test gas feeding at gas sampling probe



Dimensions (in mm [in])



Front panel



- X20 POWER OUT FILTER UNIT
- X21 POWER OUT SAMPLE GAS LINE
- X22 POWER OUT ANALYZER EASY LINE OR AO2000
- 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

1 TO ANALYZER 1ST DI/DO MODULE DI3:5	}	FAILURE FILTER UNIT/ SAMPLE GAS LINE
2 TO ANALYZER 1ST DI/DO MODULE DI3:4		
3 FROM NO-CONVERTER D-SUB 9-PIN:5	}	FAILURE CONVERTER
4 TO ANALYZER 1ST DI/DO MODULE DI4:1		
5 TO ANALYZER 1ST DI/DO MODULE DI4:3	}	FAILURE GAS COOLER/ CONVERTER
6 FROM SAMPLE GAS COOLER :3/ SAMPLE GAS FEED UNIT X3:3		
7 TO ANALYZER 1ST DI/DO MODULE DO4:13	}	FAILURE GAS COOLER
8 TO ANALYZER 1ST DI/DO MODULE DO4:15		
9 ANALYZER 2ND DI/DO MODULE DO3:16	}	SWITCHING SAMPLE GAS VALVE
10 ANALYZER 2ND DI/DO MODULE DO3:14		
11 ANALYZER 2ND DI/DO MODULE DO2:21	}	SWITCHING TEST GAS VALVE 3
12 ANALYZER 2ND DI/DO MODULE DO2:19		
13 ANALYZER 2ND DI/DO MODULE DO1:22	}	SWITCHING TEST GAS VALVE 2
14 ANALYZER 2ND DI/DO MODULE DO1:20		
15 SAMPLE GAS COOLER :2/ SAMPLE GAS FEED UNIT X3:2 AND NO CONVERTER D-DUB 9-PIN:9	}	SWITCHING TEST GAS VALVE 1
	}	FAILURE GAS COOLER/ CONVERTER AND CONVERTER

- 1 Pt100 FILTER UNIT white
- 2 Pt100 FILTER UNIT red
- 3 Pt100 FILTER UNIT red
- 4 Pt100 SAMPLE GAS LINE white
- 5 Pt100 SAMPLE GAS LINE red
- 6 Pt100 SAMPLE GAS LINE red

1) EARTHING SCREW

Ordering information

Catalog No. 23940-0-		1	0	0	0	0	0	0	0	0
Design										
19-inch housing for rack mounting, 3 height units, IP20		1								
Power supply										
Power supply 115 V AC and 230 V AC						1				
Solenoid valves										
Solenoid valve for calibration with calibration cells and ambient air								1		
Solenoid valves for calibration with test gases at the sample gas cooler								2		
Solenoid valves for calibration with test gases at the sampling probe								3		
Temperature controllers										
Without								0		
With 2 temperature controllers for heated filter unit and heated sample gas line								1		

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)

SCC-K NO ₂ /NO converter	SCC-U Utility unit
SCC-U Utility unit	EL3020 Gas analyzer
EL3020 Gas analyzer	SCC-S Sample gas feed unit
SCC-S Sample gas feed unit	

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 top-most 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).

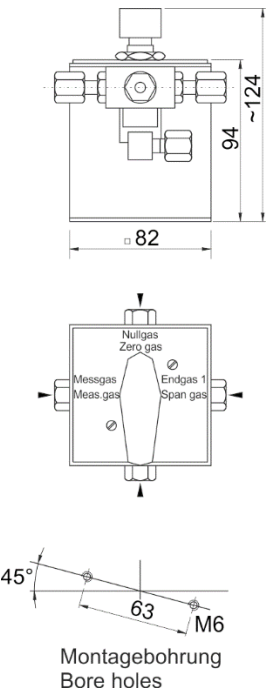
Multi-way test gas cock



Technical data

- Flow rate**
Approx. 1000 l/h at 50 hPa pressure difference and 20 °C
- Gas pressure**
 $p_{abs} \leq 17.6 \text{ MPa (176 bar)}$
- 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

	Catalog No.
Test gas cock stainless steel for wall mounting	23177-5-8308581

Membrane filter

Application

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

Technical data

Flow rate

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 $\geq 1 \mu\text{m}$

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, 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

G $\frac{1}{4}$ female thread or nozzles for hose internal diameter 4 mm

Scope of delivery

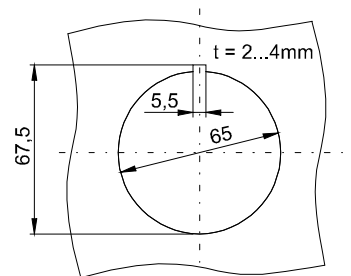
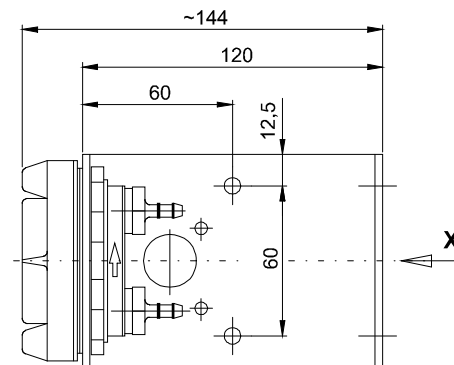
Membrane filter, mounting bracket, 2 nozzles, 2 round cord rings

Ordering information

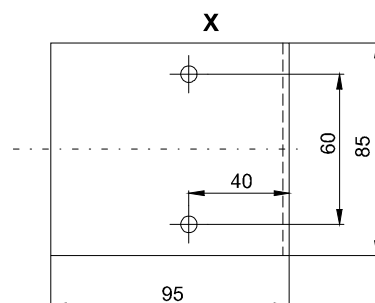
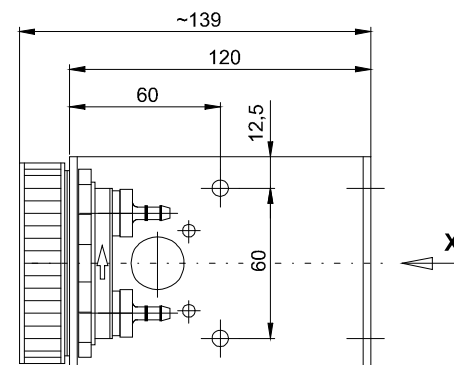
	Catalog No.
Membrane filter	
Membrane filter, PVC	23145-5-8018438
Membrane filter, stainless steel	23147-5-8018439
Condensate monitor (see page 32)	
Condensate monitor, PVC	23158-5-8018440
Condensate monitor, stainless steel	23157-5-8018039

Dimensions (in mm)

Membrane filter, PVC version



Membrane filter, stainless steel version



CGKW Condensate monitor

Application

The condensate monitor CGKW is used to indicate moisture (condensate) or any other electrically-conducting liquid which penetrates into the sample gas line to the gas analyzer. At the same time, the condensate monitor is a membrane filter and it therefore satisfies the double function of fine filtering the sample gas as well as of signaling moisture. The filter membrane holds back the penetrated concentrate for a short while. An independent condensate barrier (see application examples) can be constructed with the condensate monitor as sensor element and the switching unit ER-144A/Ex (see page 37).

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

Max. 55 °C

Retention rate

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

Pressure drop

2.5 to 20 hPa (mbar) at a flow rate of 30 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 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

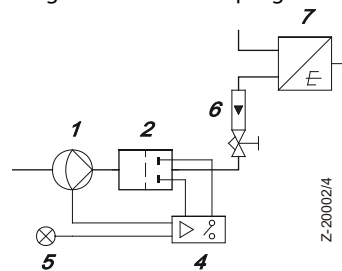
Explosion protection (only with stainless steel case)

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

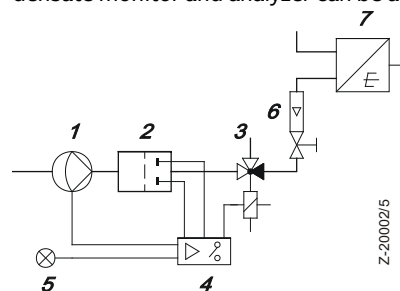
The process gas is present at zero pressure or with negative pressure

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.



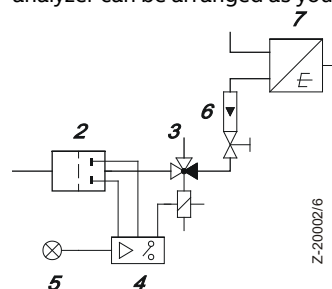
The process gas is present at zero pressure or with weak positive pressure

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



The process gas is present with positive pressure

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



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

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

Acid filter

Application and description

The acid filter is used in the gas conditioning system. Its purpose is to collect the sulfuric acid aerosols entrapped in the sample gas. The acid filter may always be required where the 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

$p_{\text{abs}} = 50 \text{ to } 200 \text{ kPa}$ (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

$+5 \text{ to } 50^\circ\text{C}$

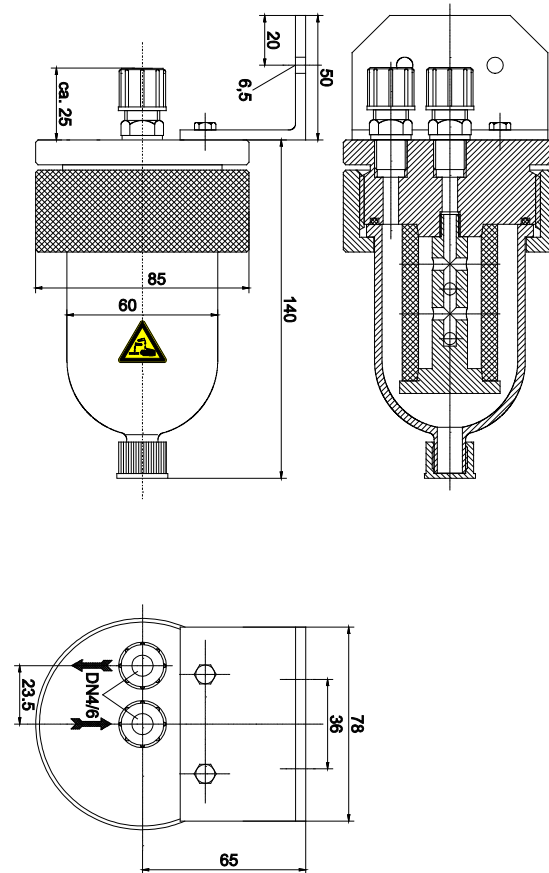
Service life

Change element if there is contamination and perceptibly higher pressure drop

Scope of delivery

Filter vessel with filter element, two male fittings, drainage connection GL14, mounting bracket, mounting and replacement instructions

Dimensions (in mm)



Ordering information

	Catalog No.
Acid filter	23045-5-8018419

Disposable filter

Application and description

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

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

Technical data

Flow rate

Max. 250 l/h (air)

Gas pressure

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

Sample gas temperature

+5 to 50 °C

Retention rate

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

Pressure drop

Approx. 2 hPa at 60 l/h

Dead time

Approx. 3 s at 60 l/h

Materials of gas-conducting parts

Case: PA, Filter element: borosilicate glass micro fiber

Case volume

11.5 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

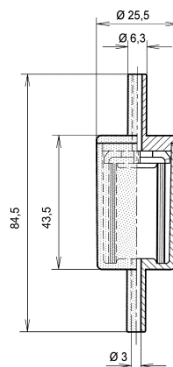
Service life

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

	Catalog No.
Disposable filter	23044-5-8018418

Flow meters, flow monitors



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

Flow meter 7 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	SO ₂	49 l/h	Hydrogen	H ₂	159 l/h
Carbon dioxide	CO ₂	55 l/h	Helium	He	77 l/h
Carbon monoxide	CO	60 l/h	Argon	Ar	49 l/h
Oxygen	O ₂	54 l/h	Air		59 l/h
Methane	CH ₄	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

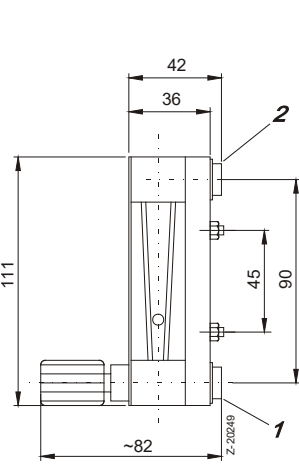
Scope of delivery

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

... Flow meters, flow monitors

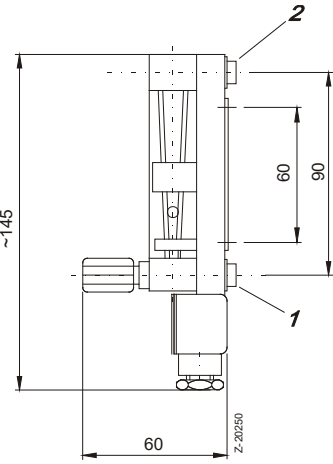
Dimensions (in mm)

Flow meter



- 1 Gas inlet
- 2 Gas outlet

Flow monitor



- 1 Gas inlet
- 2 Gas outlet

Ordering information

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

ER-144A/Ex Switching unit

Application and description

The switching unit ER-144A/Ex acts as switching amplifier for the condensate monitor CGKW (see page 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-k Ω 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	$\leq 13.1 \text{ V}$	$\leq 13.1 \text{ V}$
Short-circuit current I_0	$\leq 5 \text{ mA}$	$\leq 5 \text{ mA}$
Power P_0	$\leq 65 \text{ mW}$	$\leq 65 \text{ mW}$
Permissible external capacitance C_0	$\leq 0.97 \text{ }\mu\text{F}$	$\leq 6 \text{ }\mu\text{F}$
Permissible external inductance L_0	$\leq 0.9 \text{ H}$	$\leq 1 \text{ H}$

Output

2 potential-free changeover contacts, max. 250 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 $\pm 10 \%$, 48 to 62 Hz, $\leq 1 \text{ VA}$

EC type examination certificate

TÜV 00 ATEX 1604

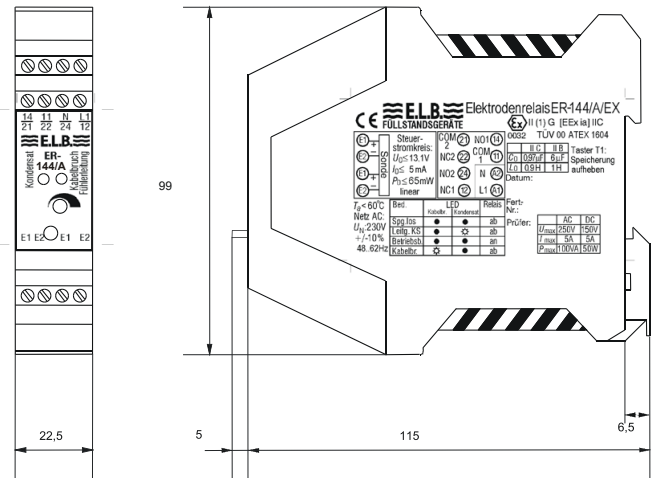
Designation

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

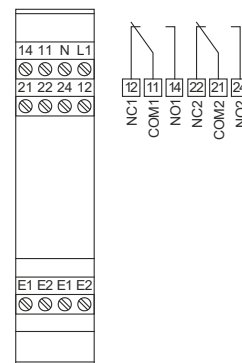
Installation location

Outside the hazardous area

Dimensions (in mm)



Electrical connections



Relays are shown in the unpowered state.

Ordering information

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

KFA Isolated switch amplifier



Application and description

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

$U_0 \leq 10.6 \text{ V}$, $I_0 \leq 19.1 \text{ mA}$, $P_0 \leq 51 \text{ mW}$

Permissible connection values

Explosion group	IIA	IIB	IIC
External capacitance	72 μF	16.2 μF	2.32 μF
External inductance	780 mH	390 mH	97 mH

Output relays

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

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, $\leq 1 \text{ VA}$

EC type examination certificate

PTB 00 ATEX 2081

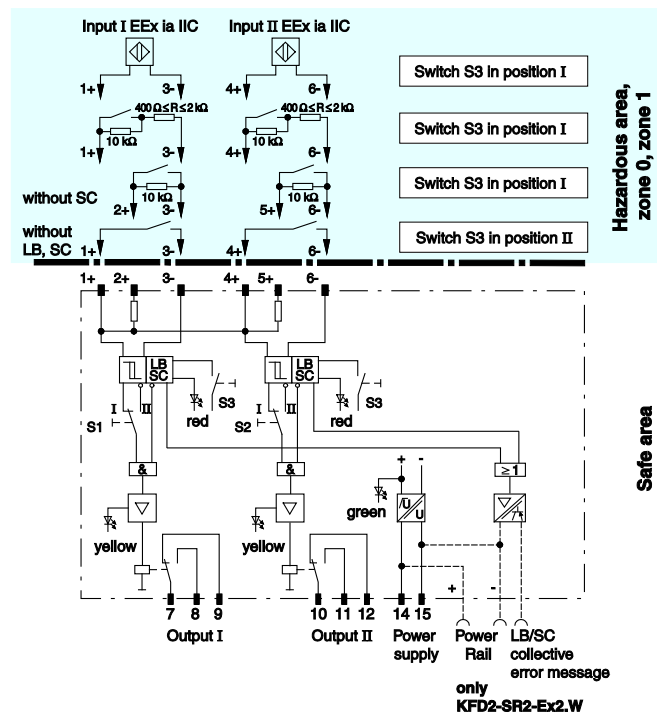
Designation

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

Installation location

Outside the hazardous area

Electrical connections



Ordering information

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

Cylinder pressure reducers

Application and description

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

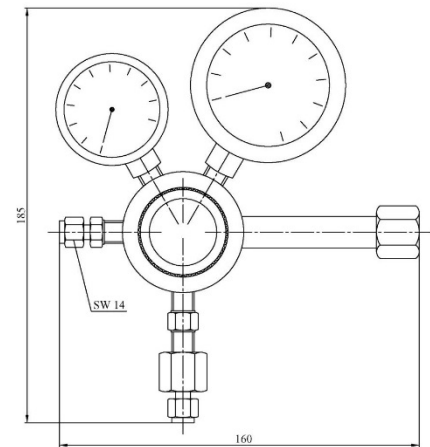
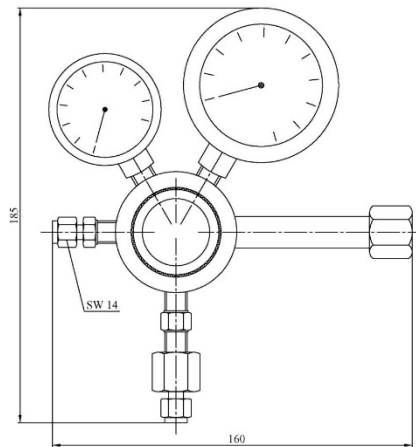
Ordering information

	Catalog No.
2-stage for nitrogen	23422-5-8018376
2-stage for non-corrosive test gases	23422-5-8018377
2-stage for corrosive test gases	23422-5-8018378
1-stage for nitrogen, brass	23422-4-0730654

Technical data

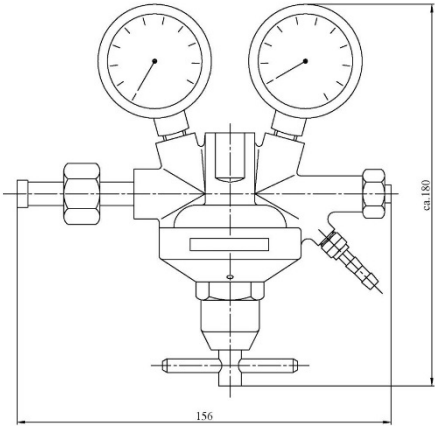
Catalog No.	23422-5-8018376	23422-5-8018377	23422-5-8018378
Gas type	Nitrogen	Non-corrosive test gases	Corrosive test gases
Construction	2-stage, brass, with minimum contact		2-stage, stainless steel, with min. contact
Inlet pressure	Max. 21 MPa (210 bar)		Max. 21 MPa (210 bar)
Outlet pressure (adjustable)	10 to 150 kPa (0.1 to 1.5 bar)		10 to 150 kPa (0.1 to 1.5 bar)
Safety valve set to	Approx. 1.6 MPa (16 bar)		Approx. 1.6 MPa (16 bar)
Relief valve set to	Approx. 200 kPa (2 bar)		Approx. 200 kPa (2 bar)
Pressure gauge indication inlet pressure	0 to 25 MPa (0 to 250 bar)		0 to 25 MPa (0 to 250 bar)
Pressure gauge indication outlet pressure	–100 to +300 kPa (–1 to +3 bar)		–100 to +300 kPa (–1 to +3 bar)
Flow rate	25 to 500 l/h		25 to 500 l/h
Control action	Back pressure increase with falling cylinder pressure down to 3 bar equals zero		Back pressure increase with falling cylinder pressure down to 3 bar equals zero
Status signal	Reed contact 100 V, 0.5 A		Reed contact 100 V, 0.5 A
Membrane material	Stainless steel		Stainless steel
Seal material	ETFE, PVDF, EPDM		ETFE, PVDF, EPDM
Case material	Brass chromium plated		Stainless steel 1.4401 (SAE 316)
Dimensions (W × H × D)	Approx. 160 × 185 × 167 mm		Approx. 160 × 185 × 167 mm
Weight	Approx. 2.1 kg		Approx. 2.1 kg
Connection to cylinder (thread to DIN 477)	Hexagon		Hexagon
Gas outlet connection	Clamping ring screw fitting Swagelok® for pipe with 6 mm outside diameter		Clamping ring screw fitting Swagelok® for pipe with 6 mm outside diameter
Safety valve connection	Clamping ring screw fitting Swagelok® for pipe with 6 mm outside diameter		Clamping ring screw fitting Swagelok® for pipe with 6 mm outside diameter
Relief valve connection	¼ NPT male thread		¼ NPT male thread
Ambient temperature	–5 to +75 °C		–5 to +75 °C
Scope of delivery	Pressure reducer, pressure gauge, safety valve and clamping ring screw fitting attached; replacement seals, manual		Pressure reducer, pressure gauge, safety valve and clamping ring screw fitting attached; replacement seals, manual

Dimensions (in mm)



... Cylinder pressure reducers

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



Sales

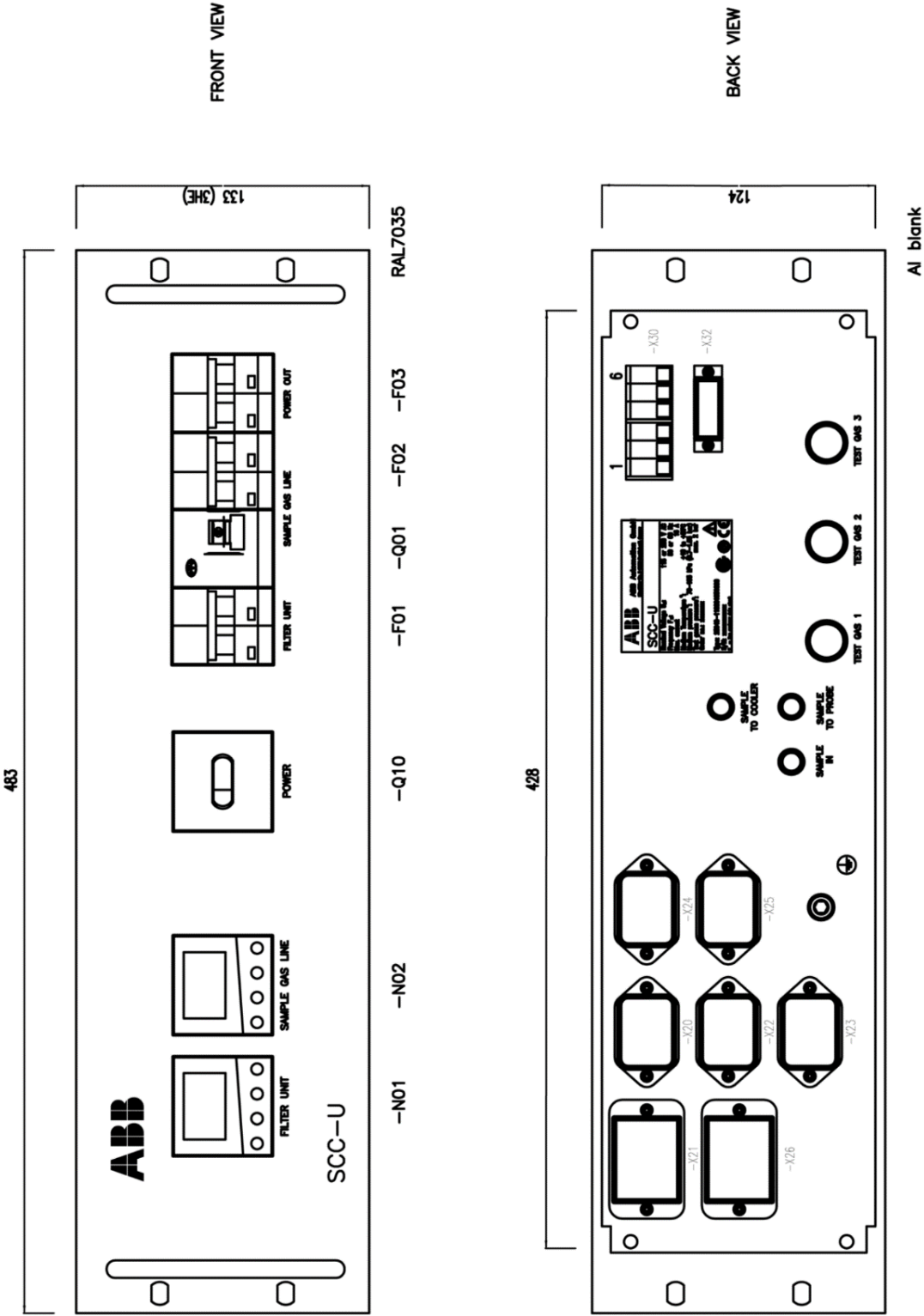


Service



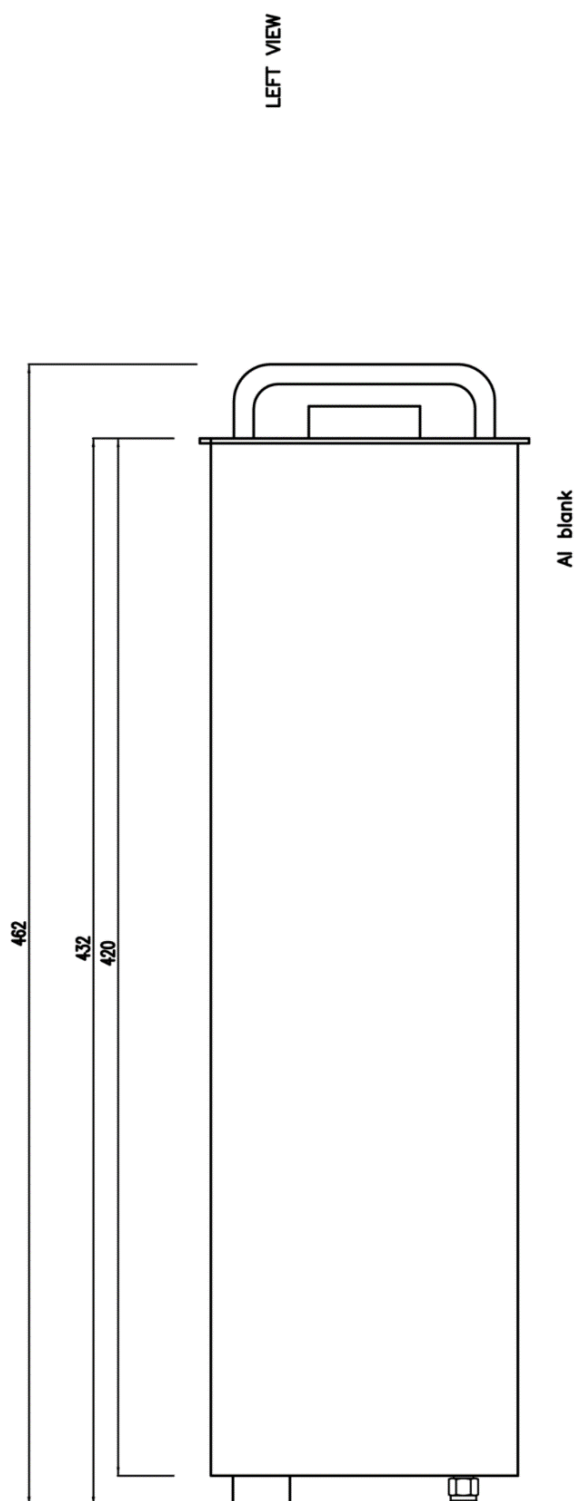
Appendix

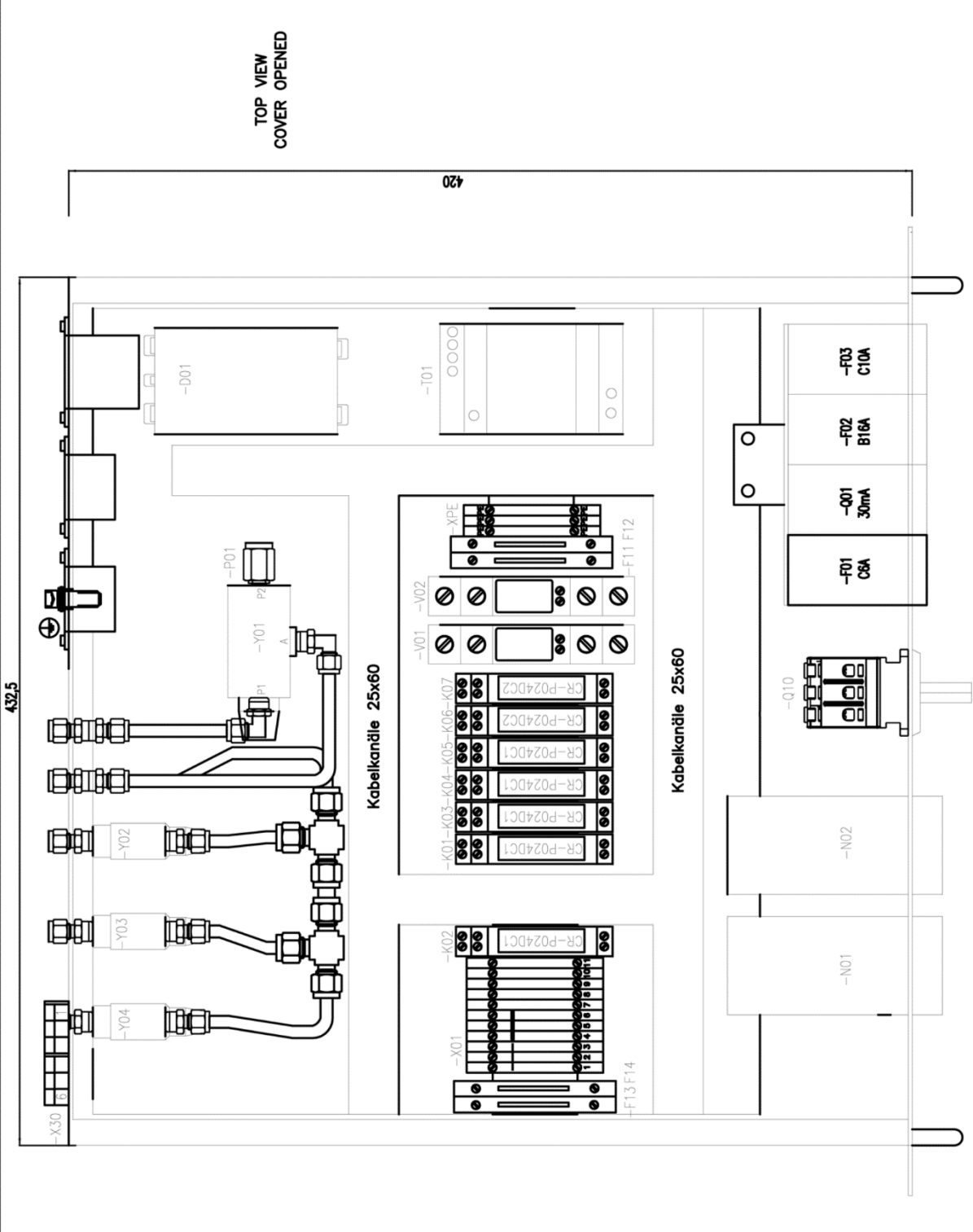
Technical drawings SCC-U



... Appendix

... Technical drawings SCC-U

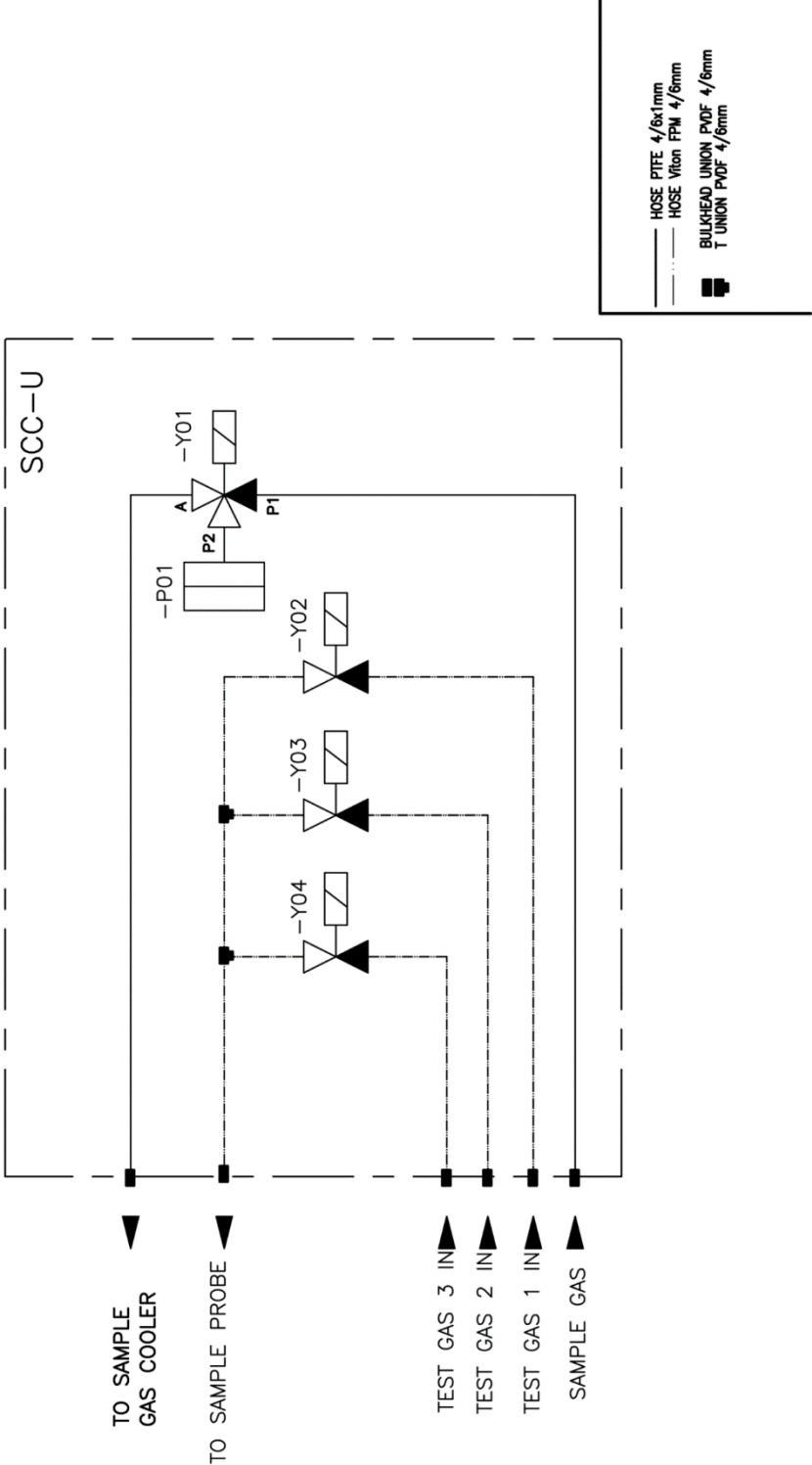


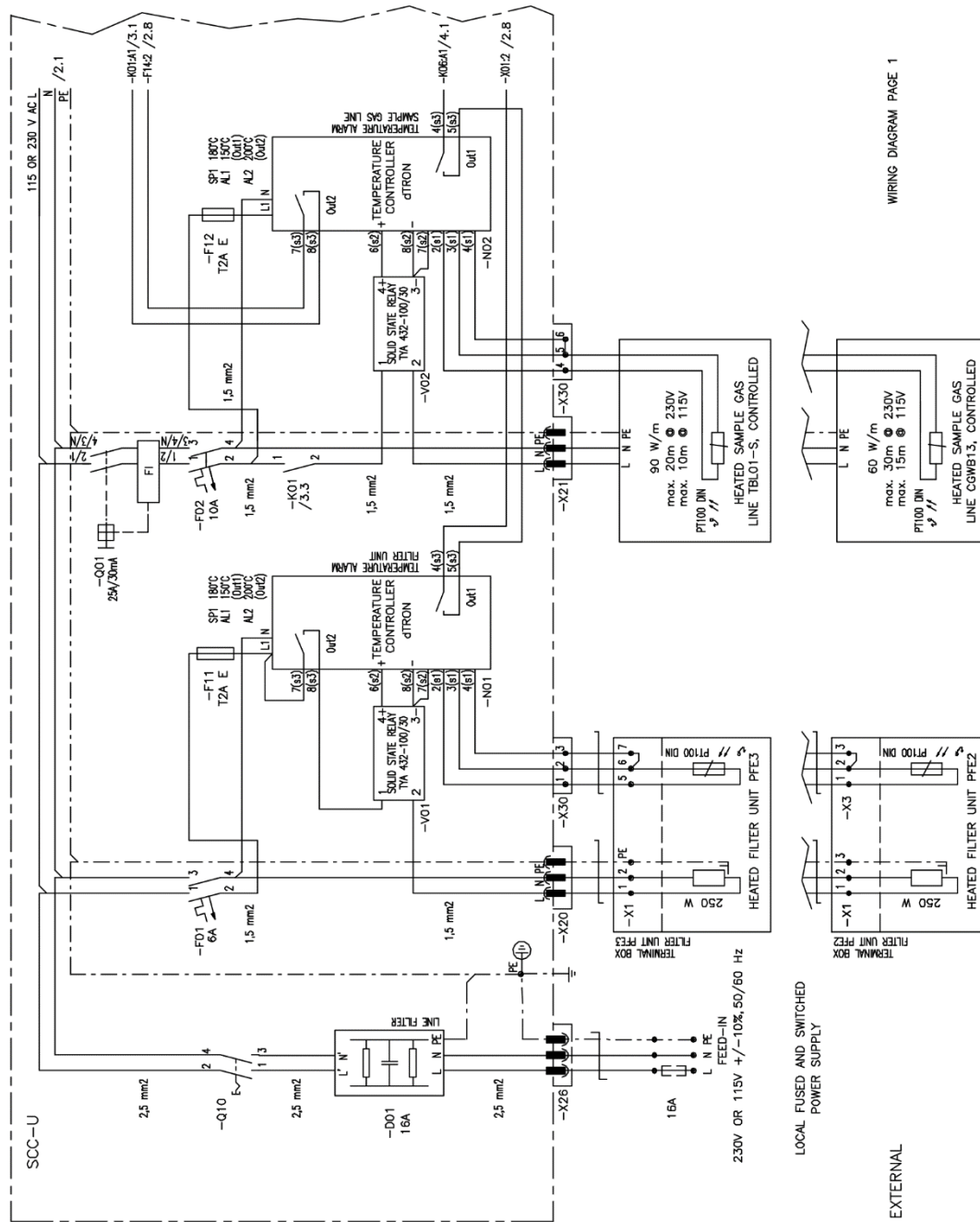


... Appendix

... Technical drawings SCC-U

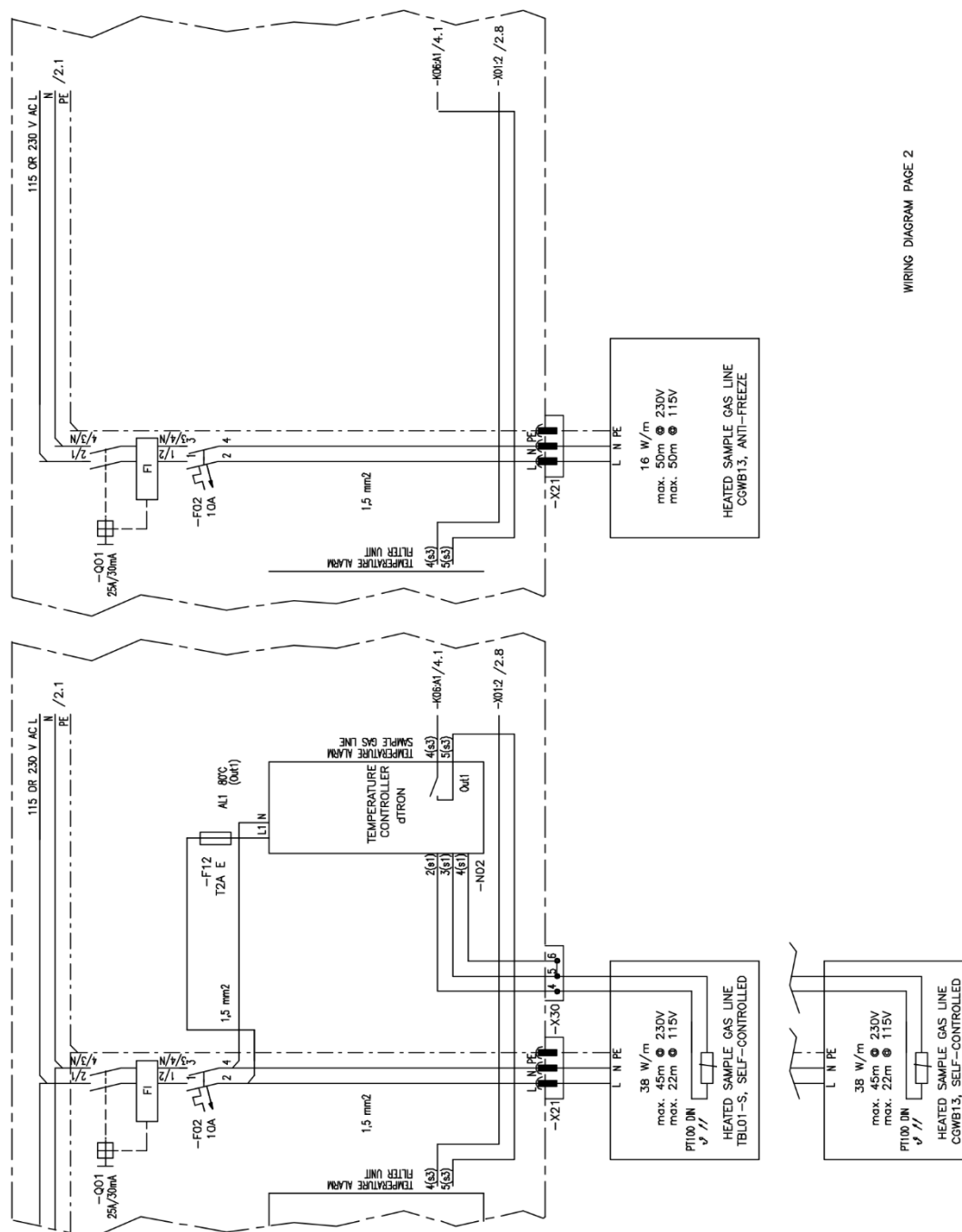
CALIBRATION WITH TEST GASES AT SAMPLE GAS PROBE

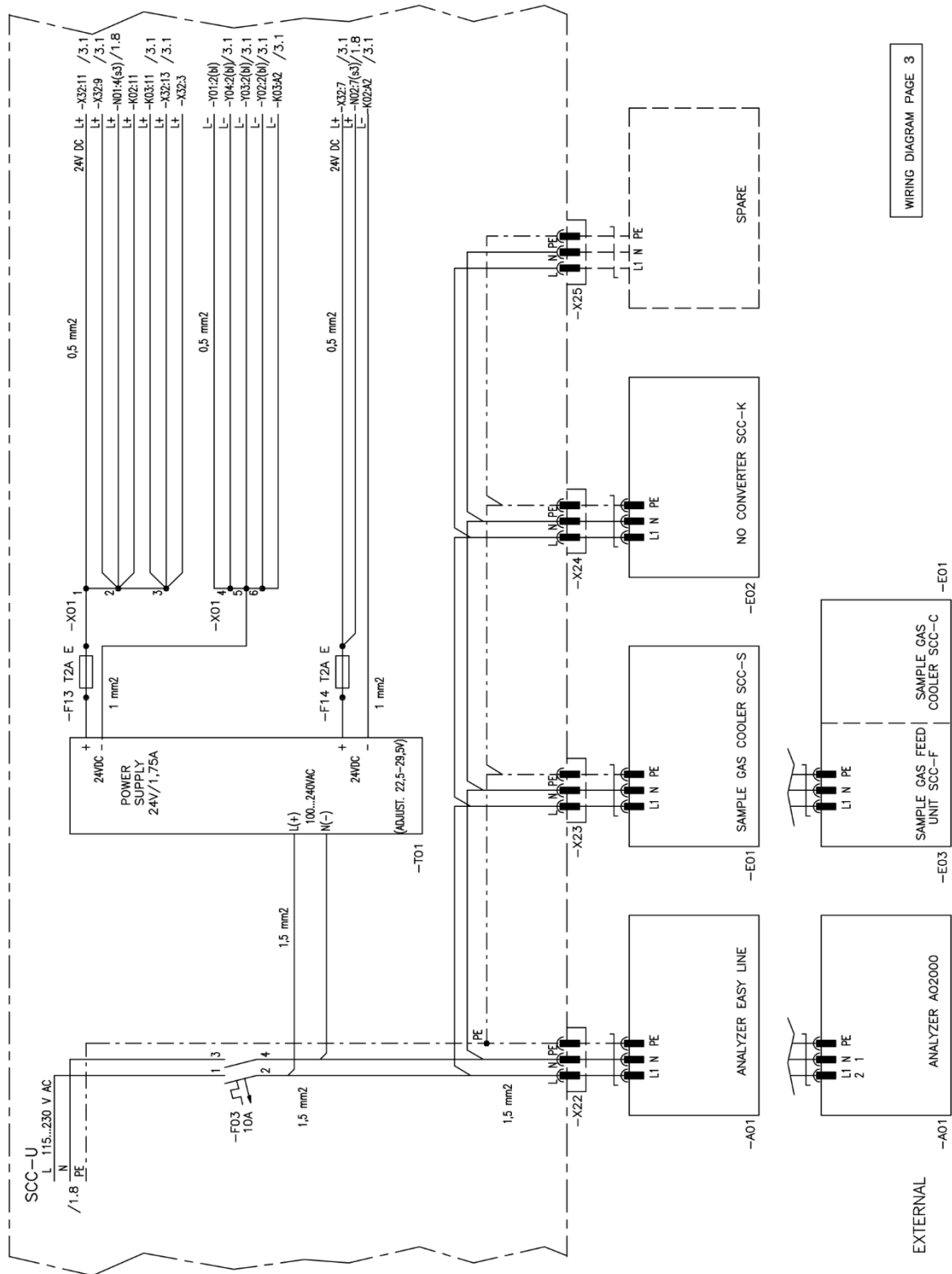




... Appendix

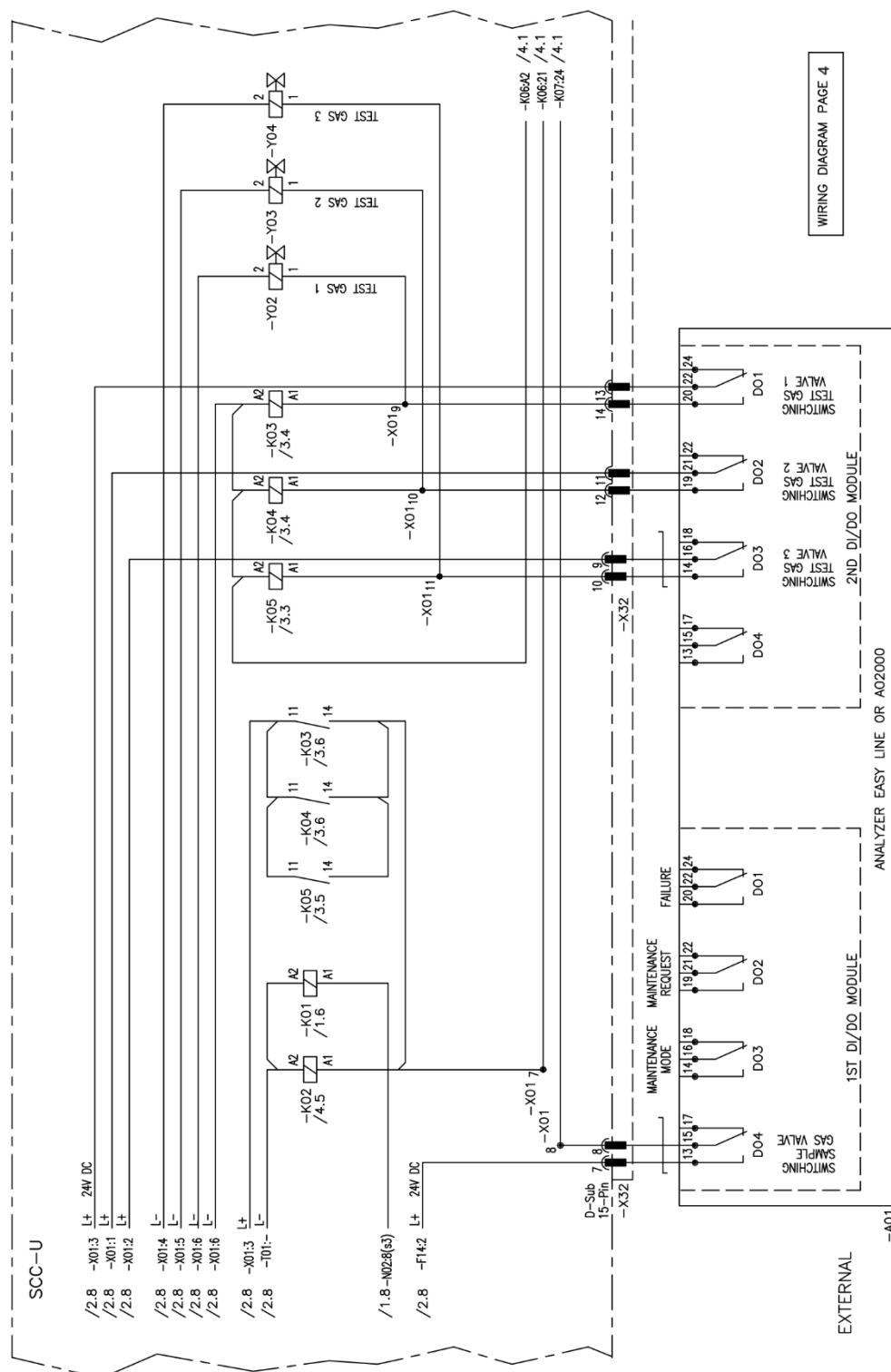
... Technical drawings SCC-U

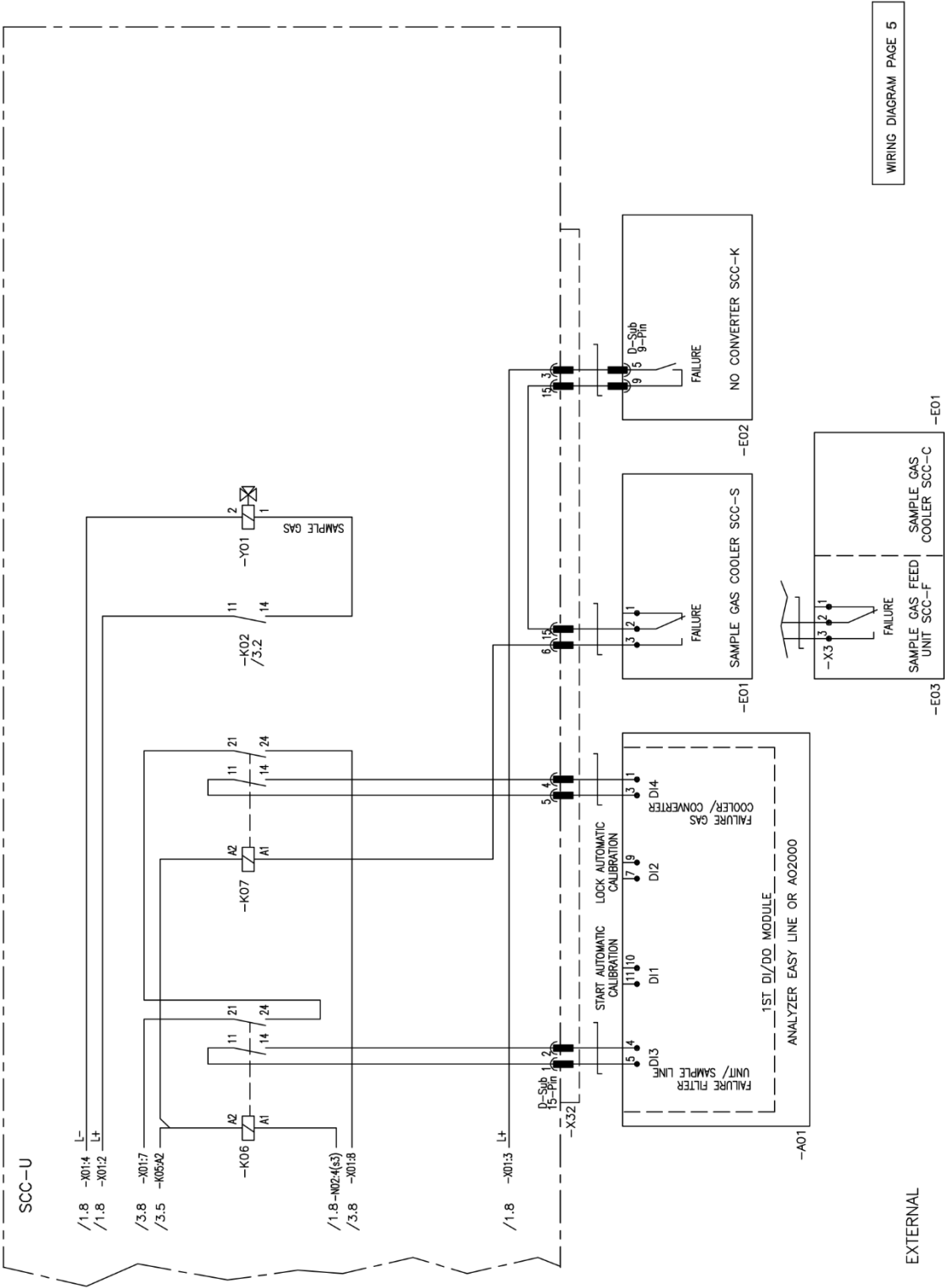




... Appendix

... Technical drawings SCC-U







Notes



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