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
- 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



- **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	G⅜ female thread
Stainless steel	G¼ female thread	G⅜ 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 SO_2 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

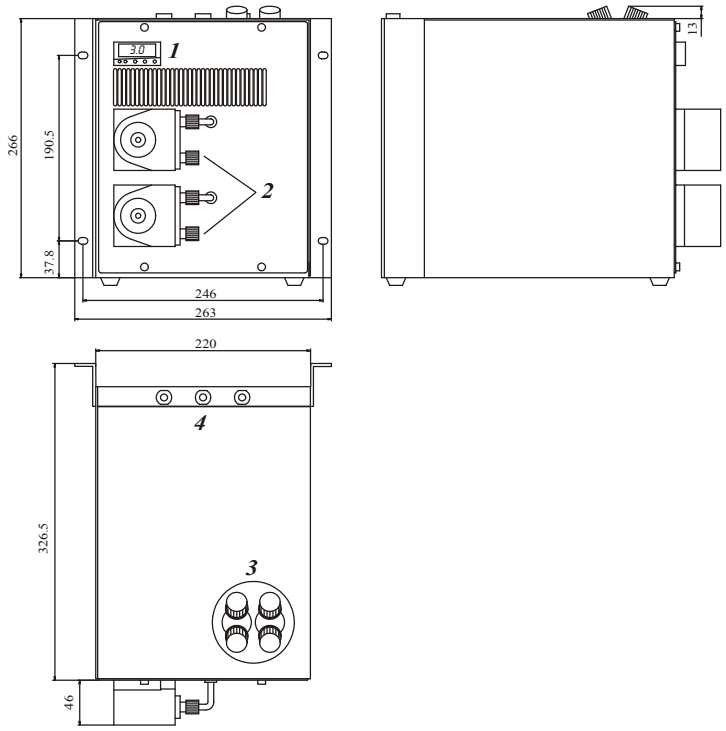
CSA – Safety
The SCC-C sample gas cooler is certified for use in general purpose environment, evidenced by full compliance with standards CAN/CSA-C22.2 No. 61010-1-12 und UL Std. No. 61010-1 (3rd Edition).
Certificate No. 70006295

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

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

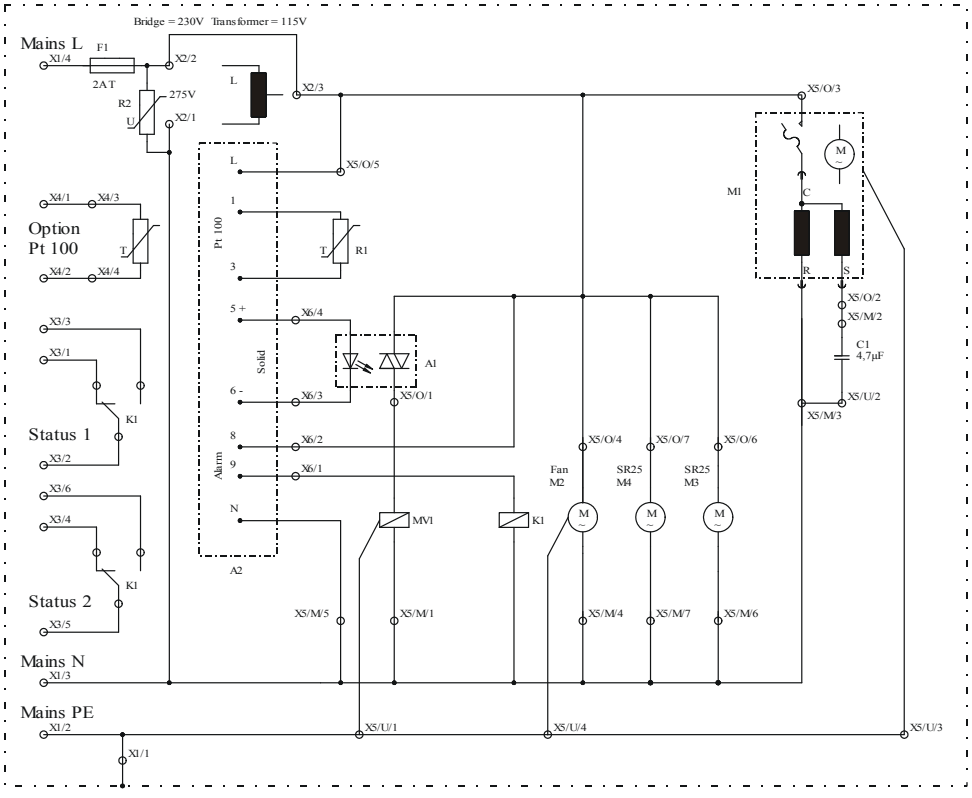
GOST – Import and operation permission
Declaration of conformity No. ЕАЭС N RU Д-DE.AB72.B.04753

Dimensions (in mm)



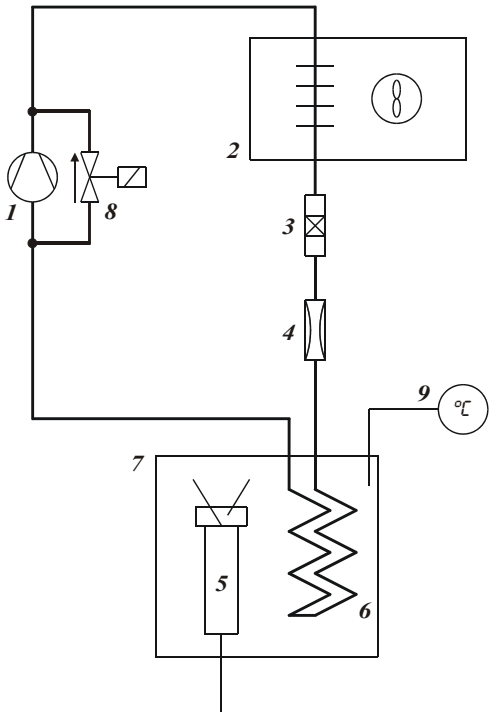
1 Temperature display
2 Condensate outlet (for option with peristaltic pumps)
3 Gas connections of heat exchangers
4 Conduits for the (permanently-connected) electrical connection lines

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 mm^2, 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

Sample gas pressure
p_{abs} = 70 to 105 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

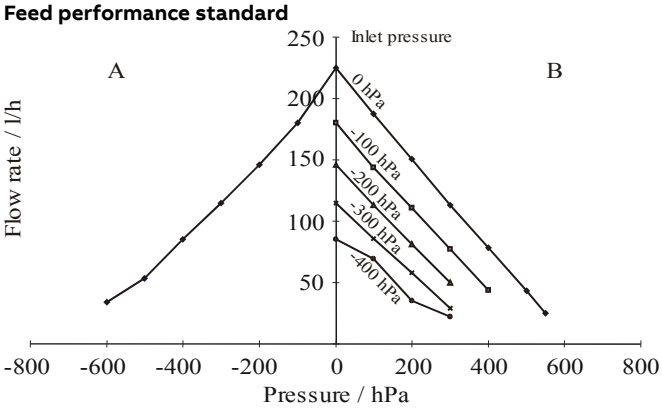
Warm-up time
Approx. 10 minutes (plus warm-up time of sample gas cooler)

Dead volume
Approx. 10 cm^3 (plus dead volume of heat exchanger)

Gas tightness
5×10^{-6} hPa l/s

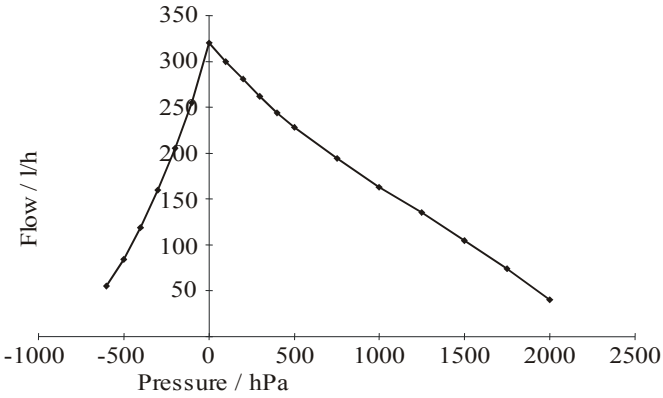
Flow rate display and adjustment
Rotameter 10 to 100 l/h with needle valve (metal-free)

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 mm^2

Status signals
Screw clamp terminals for stranded or solid wire max. 1.5 mm^2

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 SO_2 measuring ranges (< 1000 mg/m^3) 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

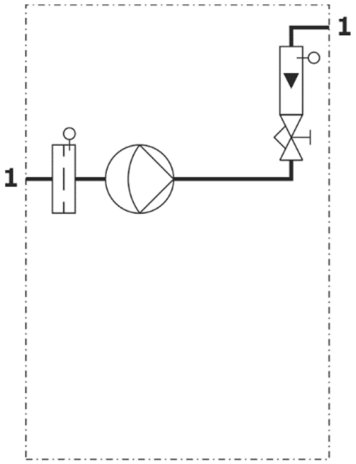
for use in hazardous areas Class 1, Div. 2, Groups A, B, C and D, temperature code T4, maximum ambient temperature +50 °C. Certificate No. 1105720

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

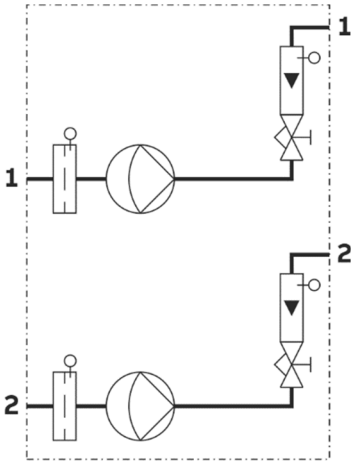
… SCC-F Sample gas feed unit

Pneumatic diagrams

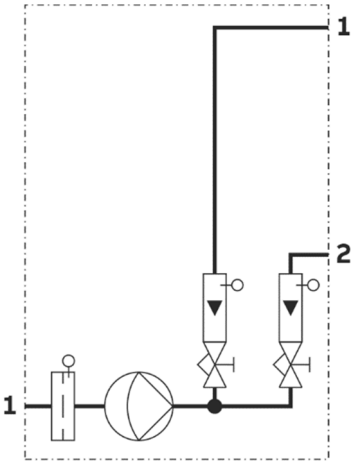
Catalog No. 23212-0-11XXXX000000



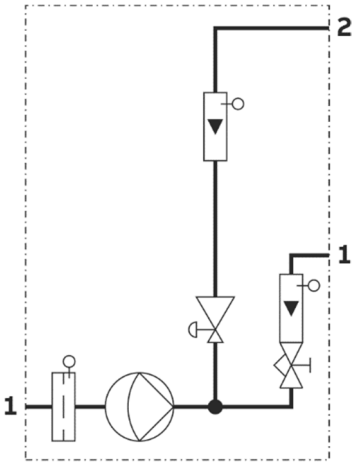
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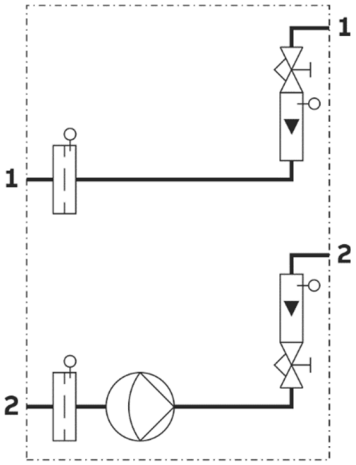
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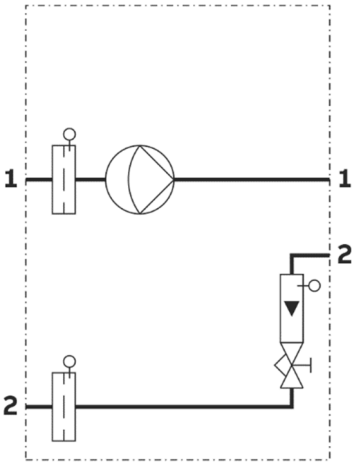
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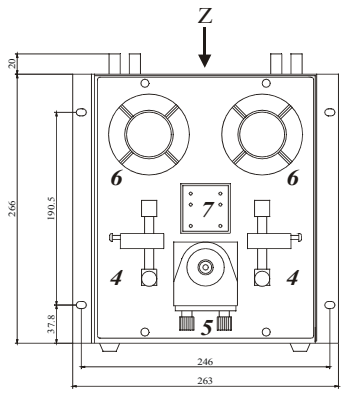
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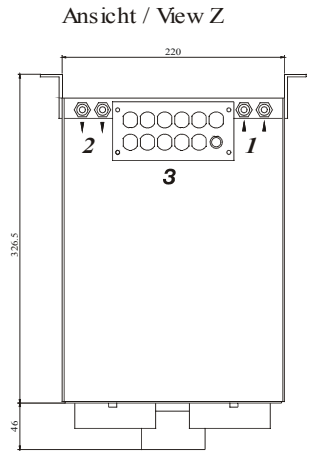


Catalog No. 23212-0-16XXXX000000



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

Catalog No. 23212-0-							**0**	**0**	**0**	**0**	**0**	**0**
Design												
Wall-mounted housing ½ 19 Inch	**1**											
Gas paths (see pneumatic diagrams on page 10)												
1 gas path, 1 condensate monitor, 1 flow monitor, 1 diaphragm pump		**1**										
2 separate gas paths, 2 condensate monitors, 2 flow monitors, 2 diaphragm pumps		**2**										
1 gas path, 1 condensate monitor, 2 flow monitors, 1 diaphragm pump		**3**										
1 gas path, 1 condensate monitor, 2 flow monitors, 1 diaphragm pump, 1 pressure controller		**4**										
2 separate gas paths, 2 condensate monitors, 2 flow monitors, 1 diaphragm pump		**5**										
2 separate gas paths, 2 condensate monitors, 1 flow monitor, 1 diaphragm pump		**6**										
Dosing												
without			**0**									
with dosing pump			**1**									
Electronic processing unit												
with 1 electronic processing unit				**1**								
with 2 electronic processing units				**2**								
with I/O interface board				**3**								
Power supply												
230 V, 50/60 Hz					**1**							
115 V, 50/60 Hz					**2**							
Certification												
without						**0**						
with CSA certification						**1**						
with GOST certification						**2**						

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

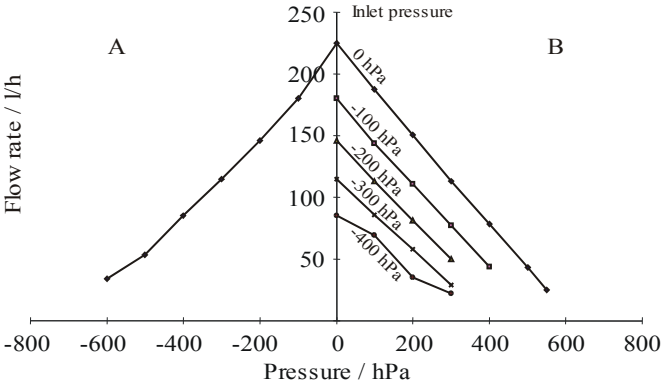
Gas tightness
5×10^{-6} hPa l/s

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
SO_2 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
SO_2 0 to 400 mg/m³, NO 0 to 100 mg/m³, measurement with Uras26 (also for CO, CO_2 and O_2)

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

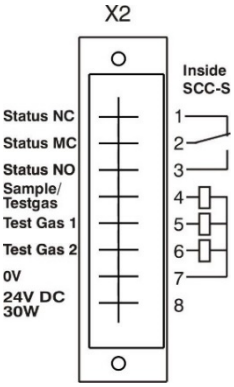
Gas outlets
PPH coupling for tube 6 × 4 × 1 mm

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



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

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

Safety

Testing to EN 61010-1

Protective class
I

Overvoltage category/degree of contamination
II/2

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

Electromagnetic compatibility

Tested to EN 61326-1

Emitted interference
Class B

Immunity to interference
Industrial environment

… SCC-S Sample gas feed unit

Ambient conditions

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

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

Power supply

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

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

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

Options

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

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

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

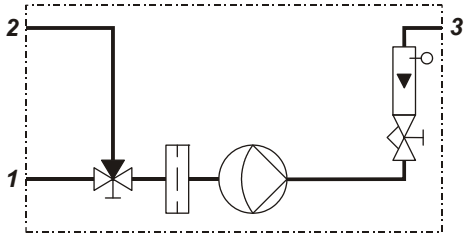
Certifications

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

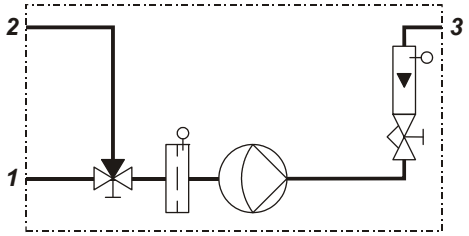
CSA – Safety
The SCC-S sample gas feed unit is certified for use in general purpose environment, evidenced by full compliance with standards CAN/CSA-C22.2 No. 61010-1-04 und UL Std. No. 61010-1 (2nd Edition).
Certificate No. 2504652

Pneumatic diagrams

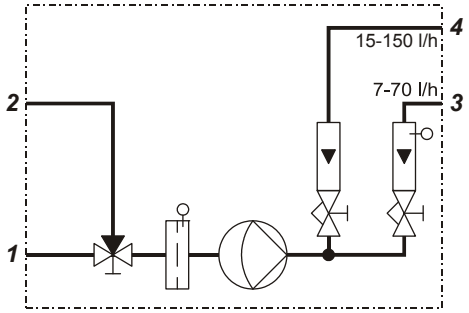
Version 1 Catalog No. 23236-0-X11000XX0000



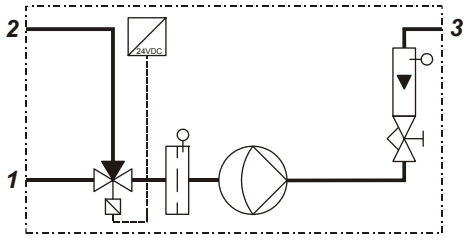
Version 2 Catalog No. 23236-0-X21000XX0000



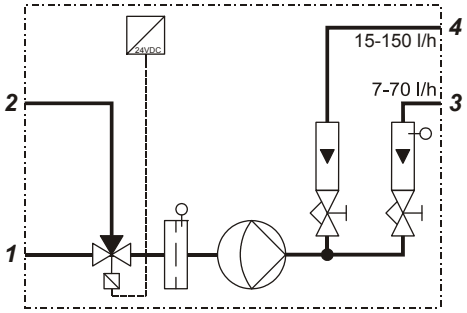
Version 3 Catalog No. 23236-0-X31000XX0000



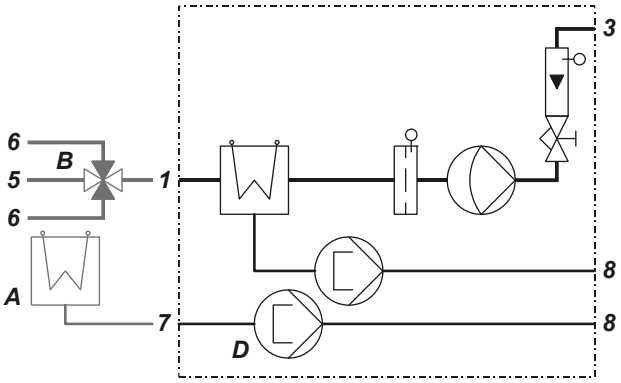
Version 4 Catalog No. 23236-0-X22000XX0000



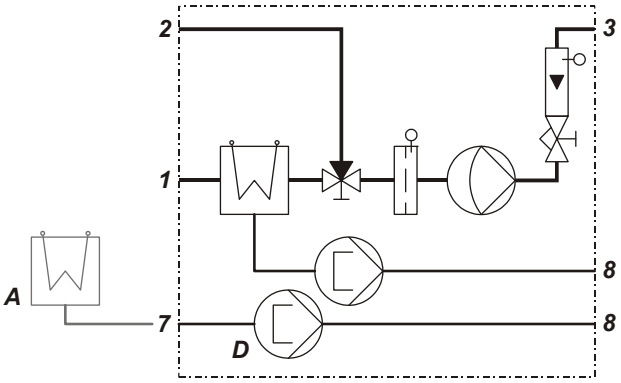
Version 5 Catalog No. 23236-0-X32000XX0000



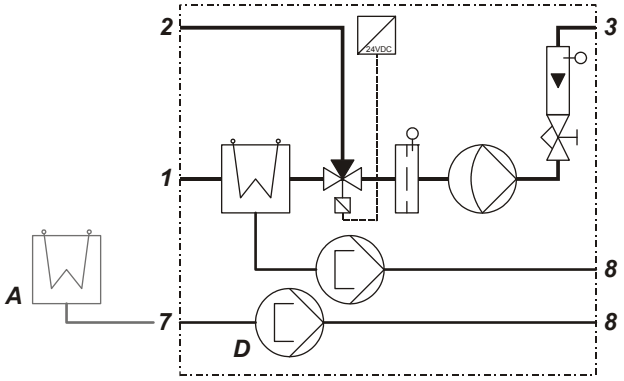
Version 6 Catalog No. 23236-0-X2001XXX0000



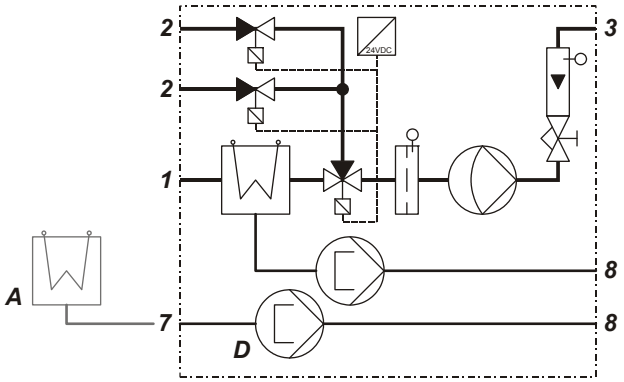
Version 7 Catalog No. 23236-0-X2101XXX0000



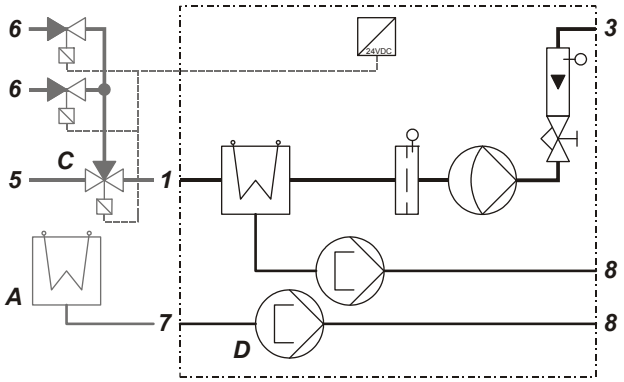
Version 8 Catalog No. 23236-0-X2201XXX0000



Version 9 Catalog No. 23236-0-X2301XXX0000



Version 10 Catalog No. 23236-0-X2011XXX0000



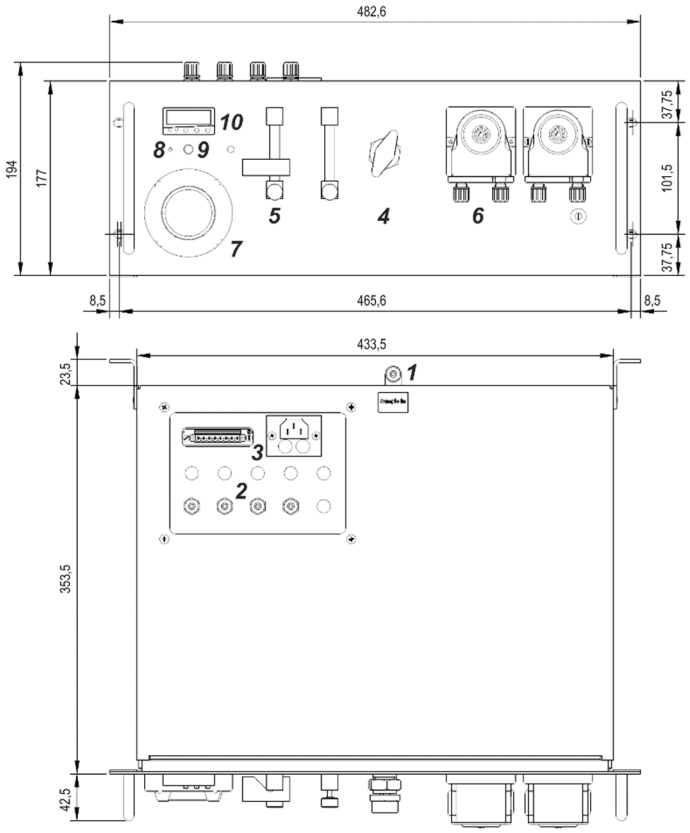
1 Sample gas inlet
2 Test gas inlet
3 Gas outlet
4 Bypass outlet
5 Sample gas inlet for external infeed
6 Test gas inlet for external infeed
7 Condensate inlet from the external cooler
8 Condensate outlet

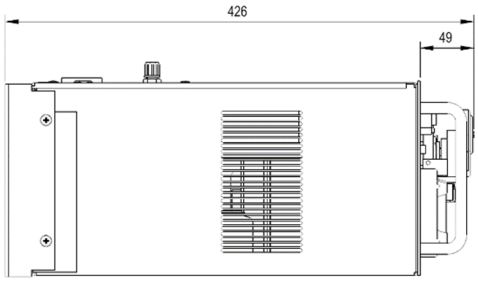
Not supplied:
A External cooler
B External multi-way cock
C External solenoid valves

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.

Ordering information

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

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)

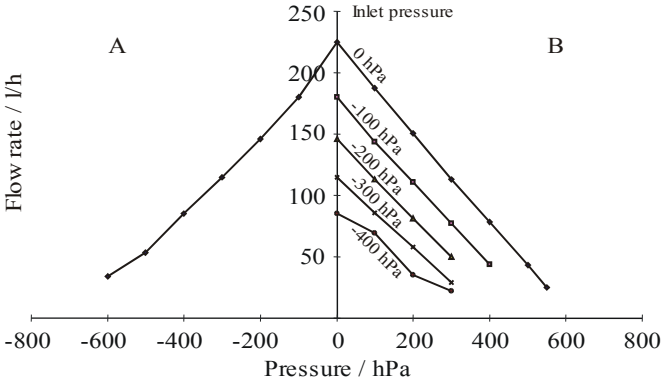
Flow rate
Max. 250 l/h at atmospheric pressure

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 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-tetrafluorethylene)

Gas connections

G¼ 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

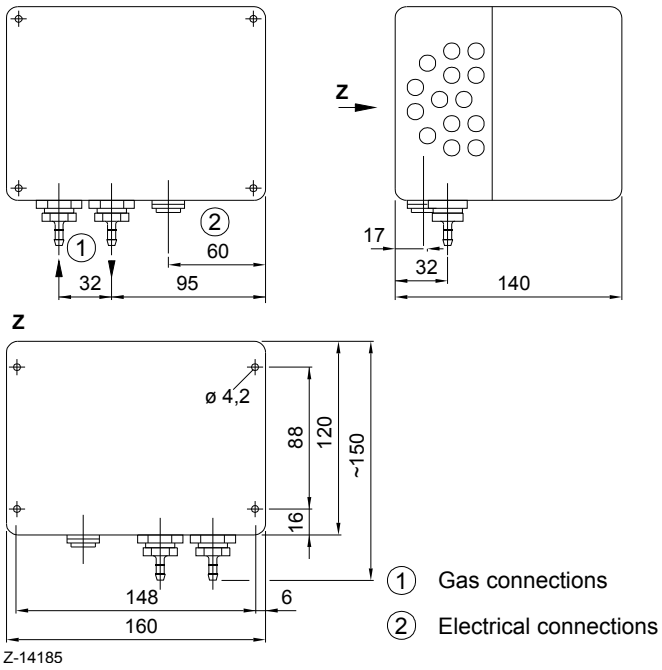
Climatic class
3K4 to EN 60721-3-3

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)



Z-14185

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



NO_2/NO converter

- **Catalytic converter based on carbon-molybdenum**
- **High catalyst service life**
- **Catalyst cartridge can be changed without tools**
- **Option: Version with heated sample gas inlet**
- **Application: Reduction of NO_2 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 NO_2/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 NO_2 and O_2 content of the sample gas. It is > 6 months for 320 °C, 30 l/h, 10 ppm NO_2 and 5 Vol.-% O_2.

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

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

Warm-up time
Approx. 30 min

90% time
T_{90} ≤ 10 s at 60 l/h

Operating data of thermal converter

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

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

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

Effectivity
≥ 99 %

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

Pressure drop
≤ 0.5 kPa (5 mbar)

Warm-up time
Approx. 60 min

90-% time
T_{90} ≤ 10 s at 60 l/h

Applications of thermal converter

Pulp and paper industry
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 H_2 to HCl using Cl_2. 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

NO_2/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 NO_2/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 NO_2/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-DE.AB72.B.04753

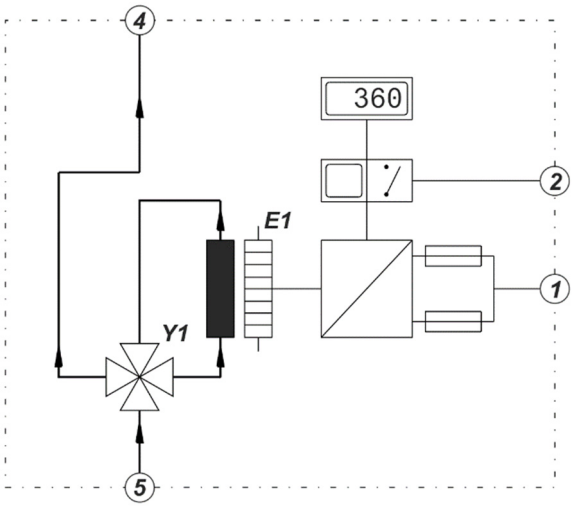
Ordering information

	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

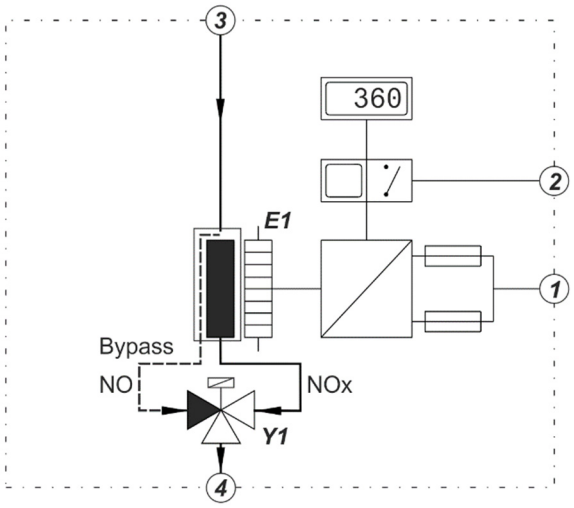
Pneumatic diagrams

NO_2/NO converter, standard version with 4-way ball valve



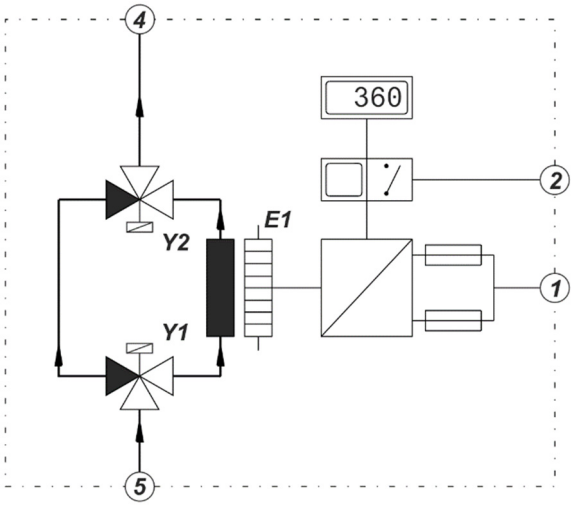
1 Power supply
2 Status signal
4 Sample gas outlet
5 Sample gas inlet
E1 Tube furnace
Y1 4-way ball valve

NO_2/NO converter, option with heated sample gas inlet



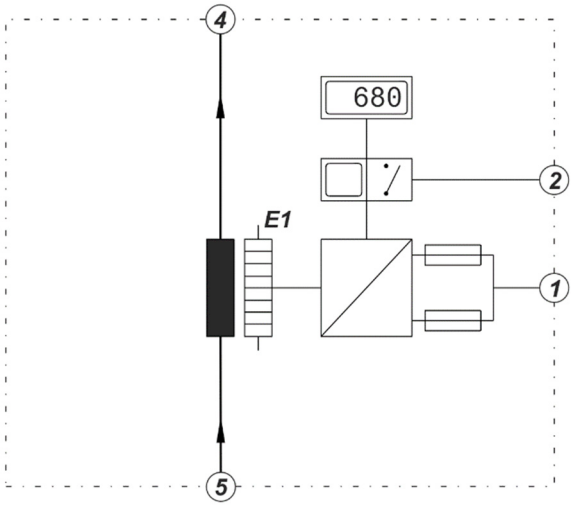
1 Power supply
2 Status signal
3 Heated sample gas inlet
4 Sample gas outlet
E1 Tube furnace
Y1 3/2-way solenoid valve

NO_2/NO converter, option with two solenoid valves



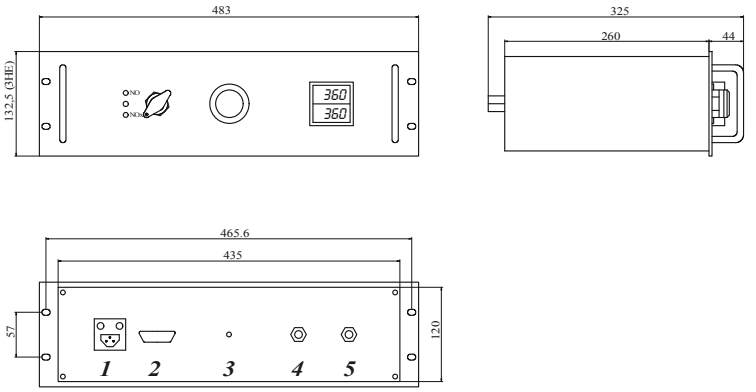
1 Power supply
2 Status signal
4 Sample gas outlet
5 Sample gas inlet
E1 Tube furnace
Y1 3/2-way solenoid valve
Y2 3/2-way solenoid valve

Thermal converter with quartz-glass reaction tube



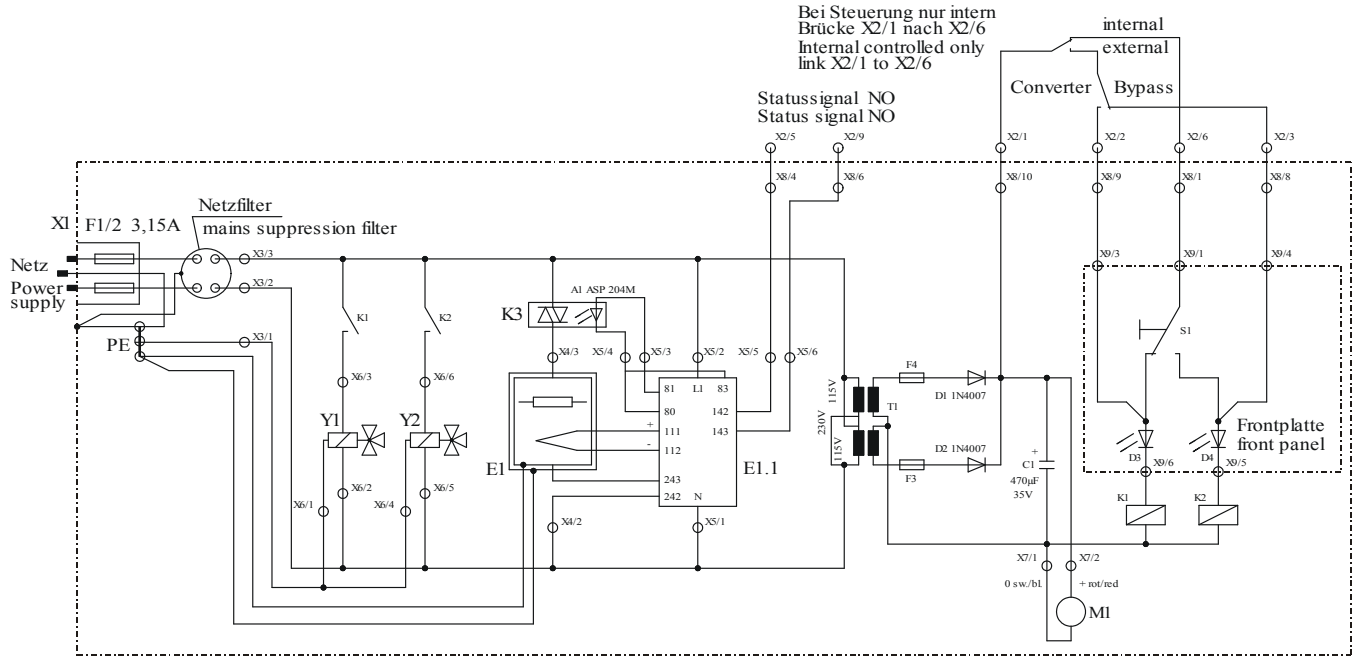
1 Power supply
2 Status signal
4 Sample gas outlet
5 Sample gas inlet
E1 Heated reaction tube

Dimensions (in mm)

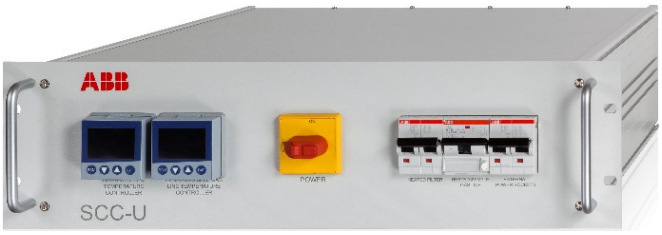


1 Power supply input X1
2 Status signal output X2
(9-pin Sub-D female connector)
3 Heated sample gas inlet 6 mm
(only in NO_2/NO converter)
4 Sample gas outlet G¼ female thread
5 Sample gas inlet G¼ female thread

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

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} ≤ 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)]

[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 con-nections 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

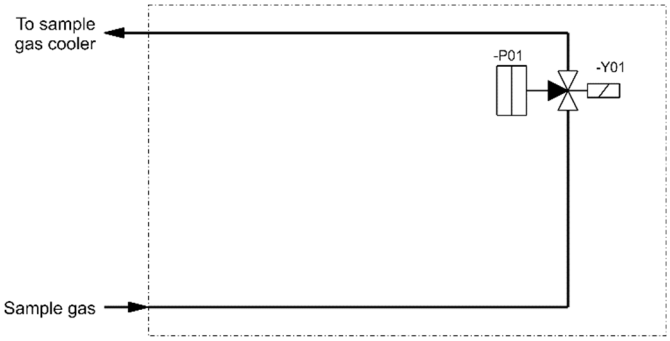
IECEE CB Scheme – Safety
The SCC-U utility unit is certified to the IEC system for mutual recognition of test certificates for electrical equipment'. It complies with standard IEC 61010-1 (3rd Edition).

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).

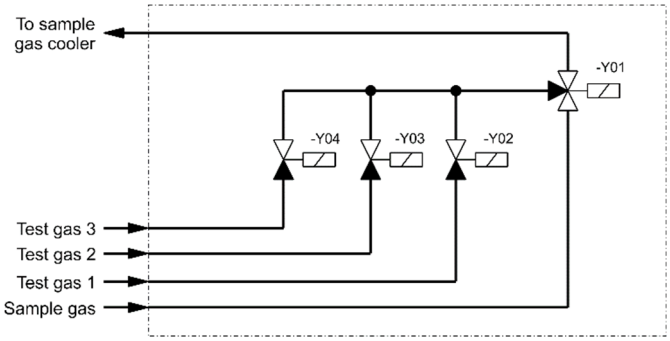
Pneumatic diagrams

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

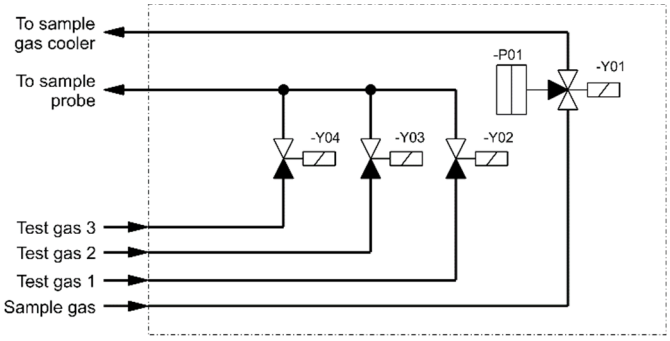
Catalog No. 23940-0-1100011X000
Version with 1 solenoid valve for switching ambient air for calibration using calibration cells



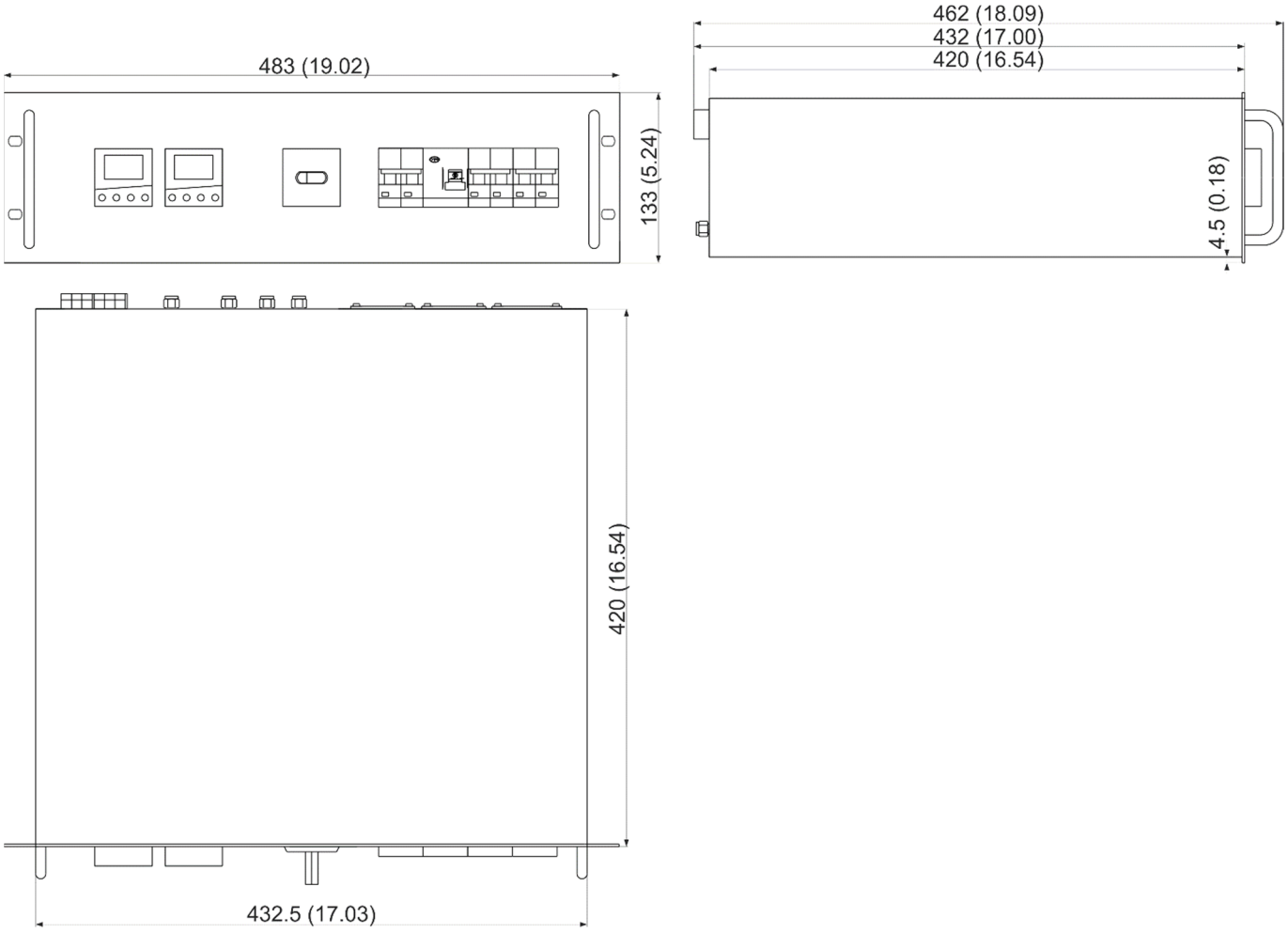
Catalog No. 23940-0-1100012X000
Version with 3 + 1 solenoid valves for switching up to three test gases for calibration with test gas feeding at sample gas cooler



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

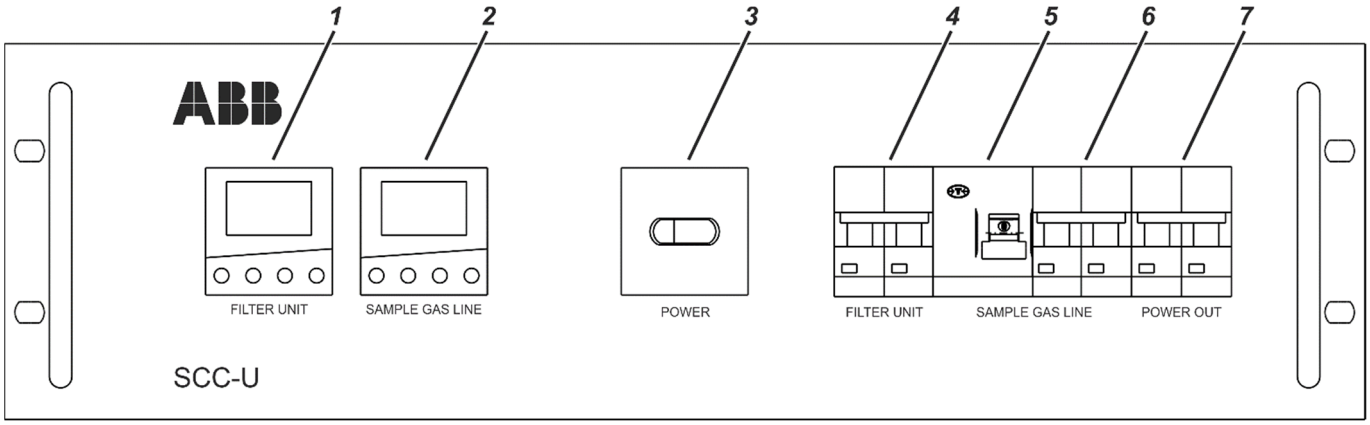


Dimensions (in mm [in])



… SCC-U Utility unit

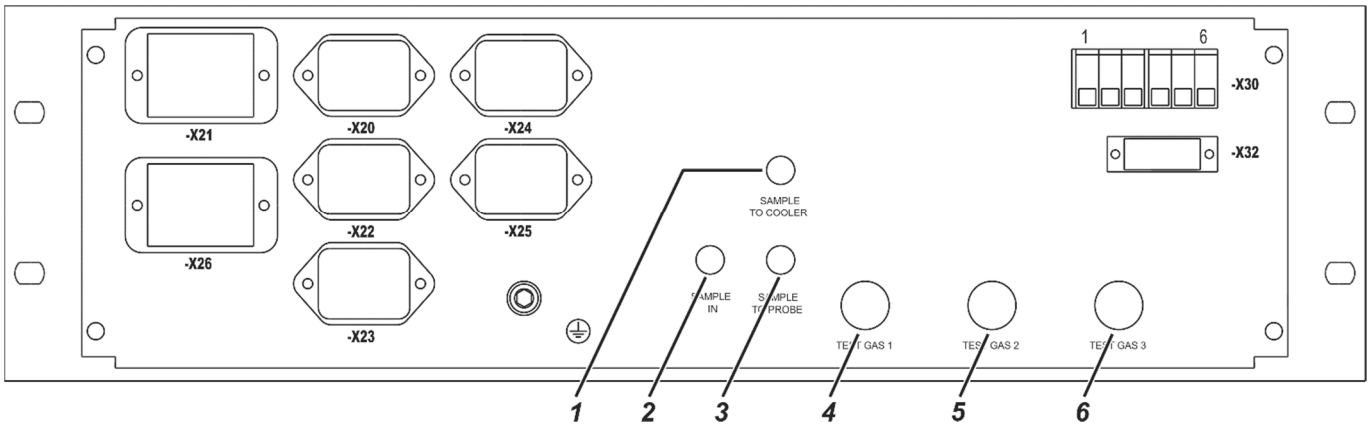
Front panel



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, 10A
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 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

-X30 Pt100 TERMINAL (SCREW TERMINALS)

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

-X32 STATUS SIGNALS (D-SUB 15-PIN)

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	├ FAILURE GAS COOLER/ CONVERTER
5 TO ANALYZER 1ST DI/DO MODULE DI4:3	
6 FROM SAMPLE GAS COOLER :3/ SAMPLE GAS FEED UNIT X3:3	├ FAILURE GAS COOLER
7 TO ANALYZER 1ST DI/DO MODULE DO4:13	├ SWITCHING SAMPLE GAS VALVE
8 TO ANALYZER 1ST DI/DO MODULE DO4:15	
9 ANALYZER 2ND DI/DO MODULE DO3:16	├ SWITCHING TEST GAS VALVE 3
10 ANALYZER 2ND DI/DO MODULE DO3:14	
11 ANALYZER 2ND DI/DO MODULE DO2:21	├ SWITCHING TEST GAS VALVE 2
12 ANALYZER 2ND DI/DO MODULE DO2:19	
13 ANALYZER 2ND DI/DO MODULE DO1:22	├ SWITCHING TEST GAS VALVE 1
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	├ FAILURE GAS COOLER/ CONVERTER AND CONVERTER

Ordering information

Catalog No. 23940-0-	1	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 NO_2/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_{abs} ≤ 17.6 MPa (176 bar)

Leakage rate
≤ 5 × 10^{-3} hPa l/s

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

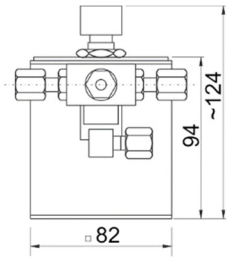
Weight
Approx. 0.8 kg

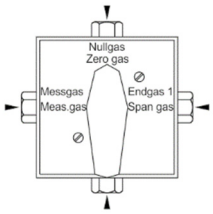
Mounting
Wall mounting (with accessories) or panel mounting

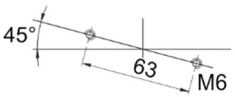
Gas connections
⅛ NPT and screw fitting for pipes with 6 mm outer diameter

Ambient temperature
+10 to 65 °C

Dimensions (in mm)







Montagebohrung
Bore holes

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 ≥ 1 µm, in order to protect the analysis instruments from contamination in the event of disturbances in the sample gas conditioning chain.

Technical data

Flow rate
Max. 300 l/h (air)

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

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

Retention rate
100 % for particles ≥ 1 µm

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

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

Filter surface
Approx. 24 cm^2

Dead volume
Approx. 15 cm^3

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

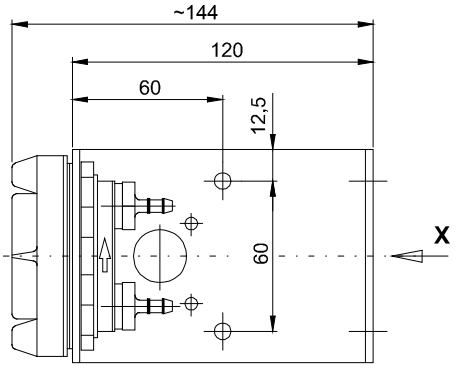
Scope of delivery
Membrane filter, mounting bracket, 2 nozzles, 2 round cord rings

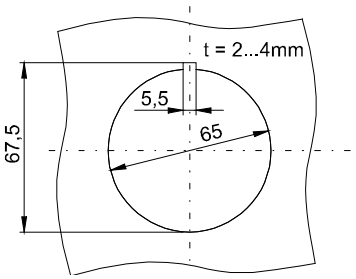
Ordering information

	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**

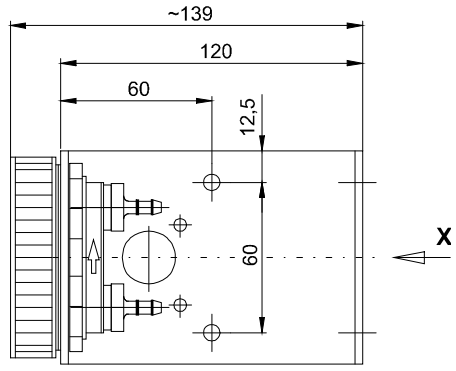
Dimensions (in mm)

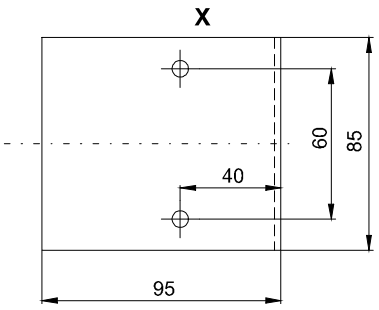
Membrane filter, PVC version





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 ≥ 1 µm

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

Materials of gas-conducting parts
Case: PVC or stainless steel 1.4571 (SAE 316Ti), gas connections: PTFE, electrodes: stainless steel 1.4305 (SAE 303), round cord rings: FPM, filter membrane: glass fiber

Filter surface
Approx. 24 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
G¼ female thread or nozzles for hose inside diameter 4 mm

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

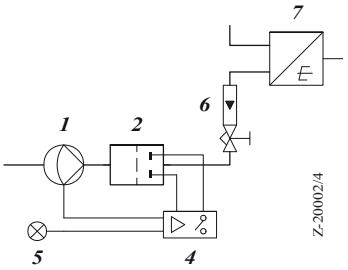
Ordering information
See page 31

Explosion protection (only with stainless steel case)

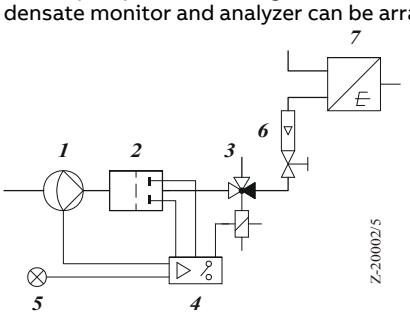
The condensate monitor is a device without voltage source. If the condensate monitor is being operated in the intrinsically-safe control circuit of the switching unit ER-144A/Ex, the apparatus is permitted in hazardous areas of Zones 1 and 2 up to a gas and ambient temperature of 55 °C without restriction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

Application examples

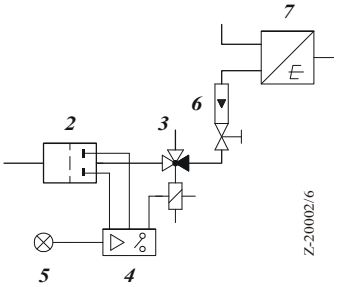
The process gas is present at zero pressure or with negative pressure
Sample gas feeding by pump. Condensate barrier by switching off the pump. Condensate monitor and analyzer must be arranged above the sample gas conditioning chain.



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
2 Condensate monitor
3 Solenoid valve [1)]
4 Switching unit
5 Pilot lamp
6 Flow meter
7 Analyzer

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

Acid filter

Application and description

The acid filter is used in the gas conditioning system. Its purpose is to collect the sulfuric acid aerosols entrapped in the sample gas. The acid filter may always be required where the SO_3 content in the sample gas is greater than 1 mg/m³ or the SO_2 content is greater than 1000 mg/m³ – for example in flue gas from heavy-oil or hard coal firings.

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

Technical data

Flow rate
Max. 250 l/h (air)

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

Sample gas temperature
Max. 150 °C

Sample gas dew point
Max. 70 °C

Retention rate
99.99 % for particles ≥ 0.1 µm

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

Dead time
Approx. 20 s

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

Dead volume
Approx. 130 ml

Weight
Approx. 0.6 kg

Mounting
Wall mounting with mounting bracket, mounting orientation vertical

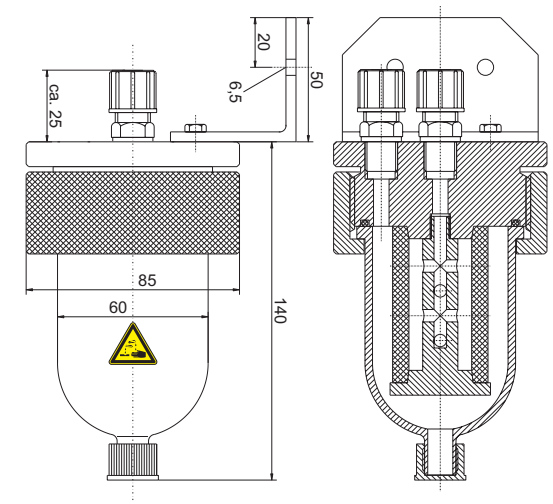
Gas connections
Male fitting (PVDF) for 4/6/1 mm, drainage connection GL14 with terminal fitting 4/6/1 mm (PVDF)

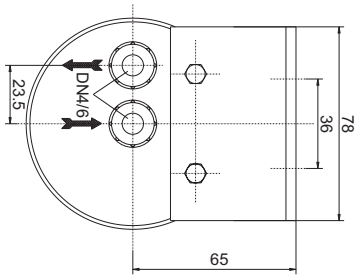
Ambient temperature
+5 to 50 °C

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

	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} ≤ 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 cm^3

Weight
Approx. 0.1 kg

Mounting
Mounting orientation preferably vertical

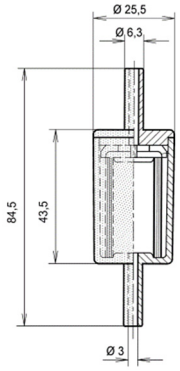
Gas connections
Two pipe nipples, outside diameter 6.3 mm

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

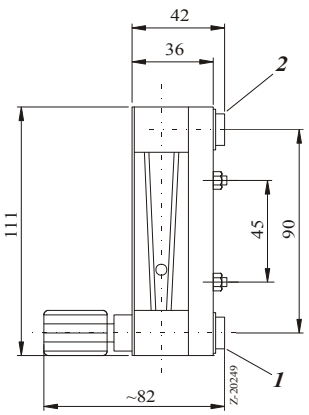
Electrical connections
Terminal boxes with EMC filter and cable gland M16

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

… Flow meters, flow monitors

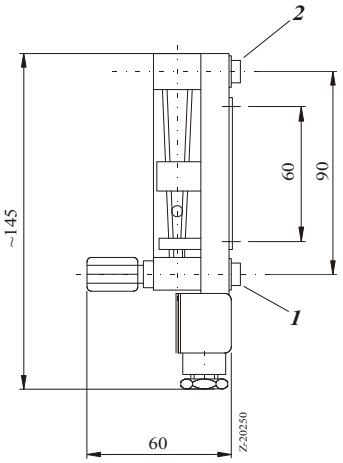
Dimensions (in mm)

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

Technical data

Input	'ia'	'ib'
No-load voltage U_0	≤ 13.1 V	≤ 13.1 V
Short-circuit current I_0	≤ 5 mA	≤ 5 mA
Power P_0	≤ 65 mW	≤ 65 mW
Permissible external capacitance C_0	≤ 0.97 µF	≤ 6 µF
Permissible external inductance L_0	≤ 0.9 H	≤ 1 H

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

Indication
One LED each for line breakage and condensate penetration

Construction
Surface-mounting case

Degree of protection
Housing IP40, terminals IP20 to EN 60529

Safety
Protection class II, over-voltage category III, degree of pollution 2

Weight
Approx. 0.2 kg

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

Ambient temperature
−25 to +60 °C

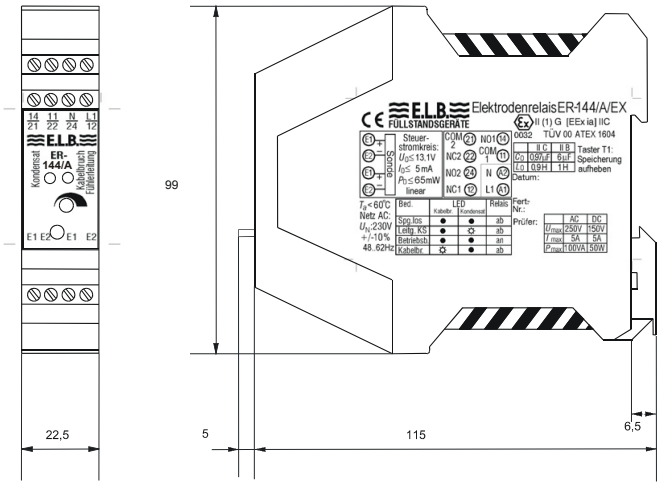
Power supply
230 V AC or 115 V AC ±10 %, 48 to 62 Hz, ≤ 1 VA

EC type examination certificate
TÜV 00 ATEX 1604

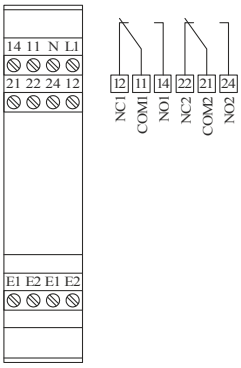
Designation
Ex II (1) G [Ex ia Ga] IIC

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)
$U_0 \leq 10.6$ V, $I_0 \leq 19.1$ mA, $P_0 \leq 51$ 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 φ > 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

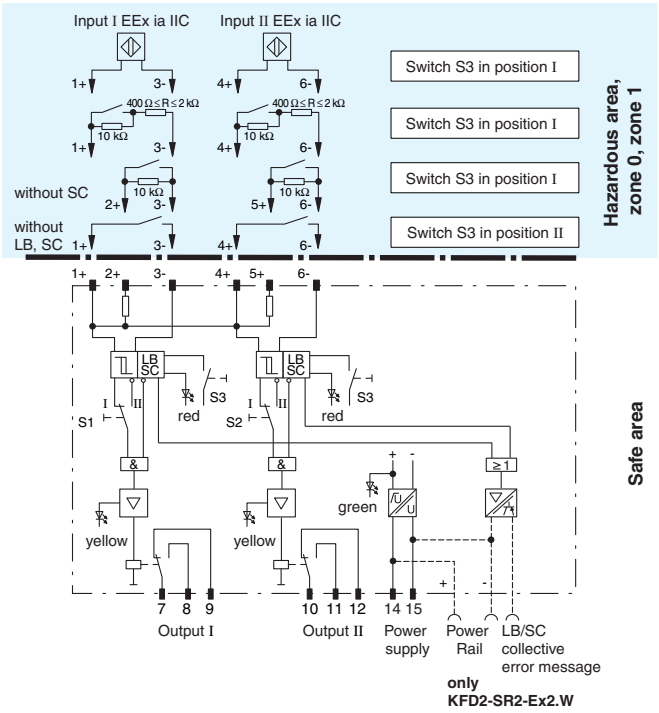
Power supply
207 to 253 V AC or 103.5 to 126 V AC, 45 to 65 Hz, ≤ 1 VA

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

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

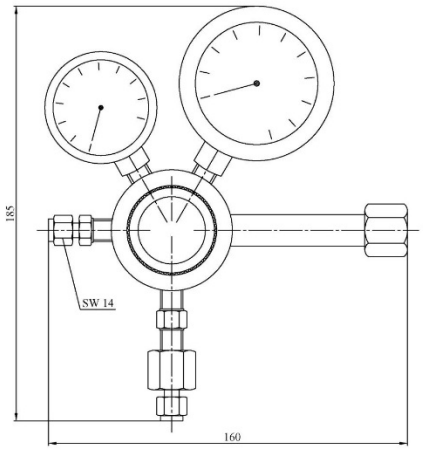
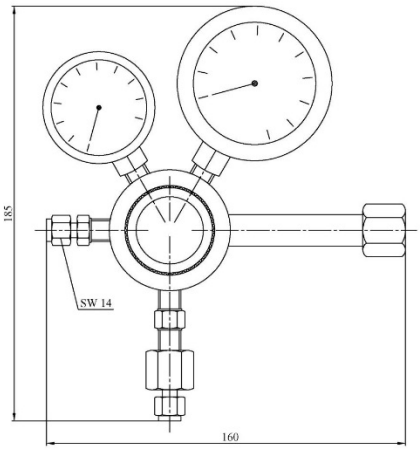
Application and description

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.

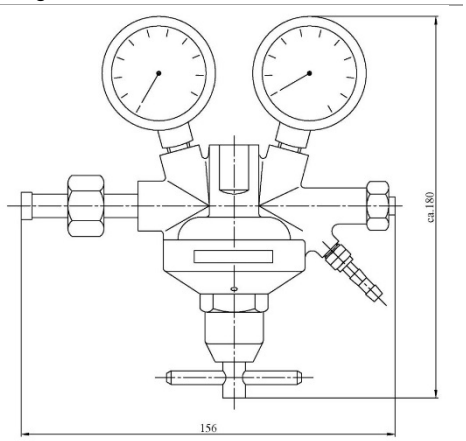
Ordering information

	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

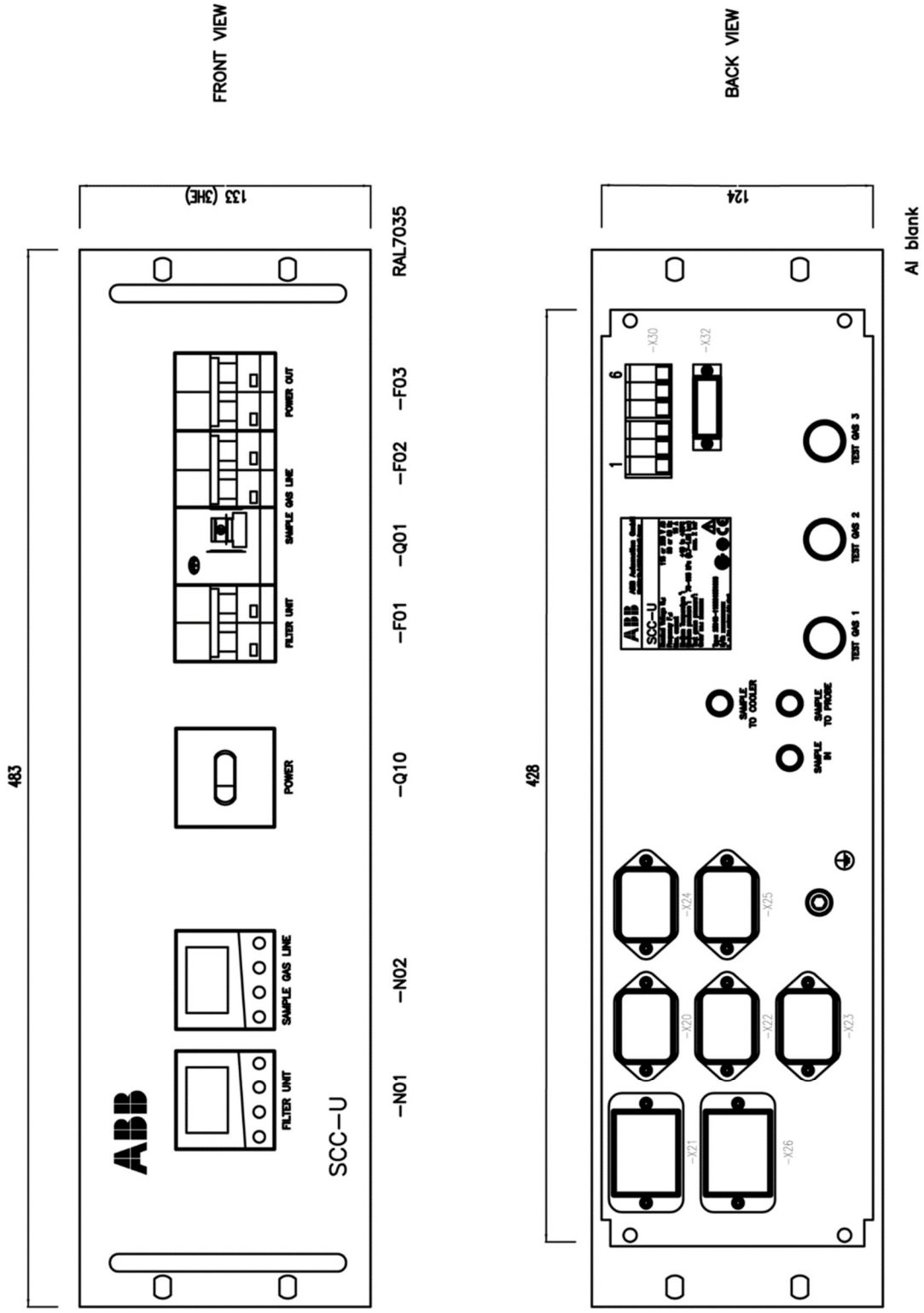
Catalog No.	**23422-4-0730654**
Gas type	Nitrogen
Construction	1-stage, brass
Inlet pressure	21 MPa (210 bar)
Control range	0 to 250 kPa (2.5 bar)
Pressure gauge	31.5 MPa (315 bar)
Outlet pressure gauge indication range	0 to 400 kPa (0 to 4 bar)
Body material	Brass
Membrane material	NBR
Case seal material	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

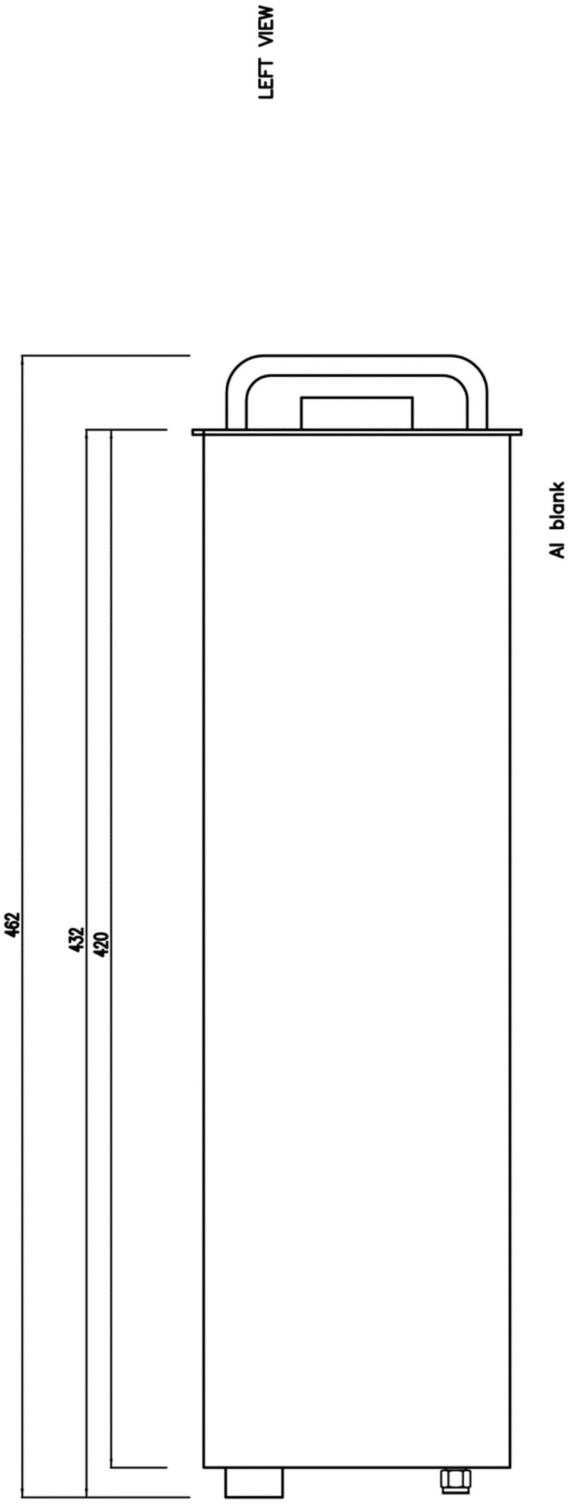
… Appendix

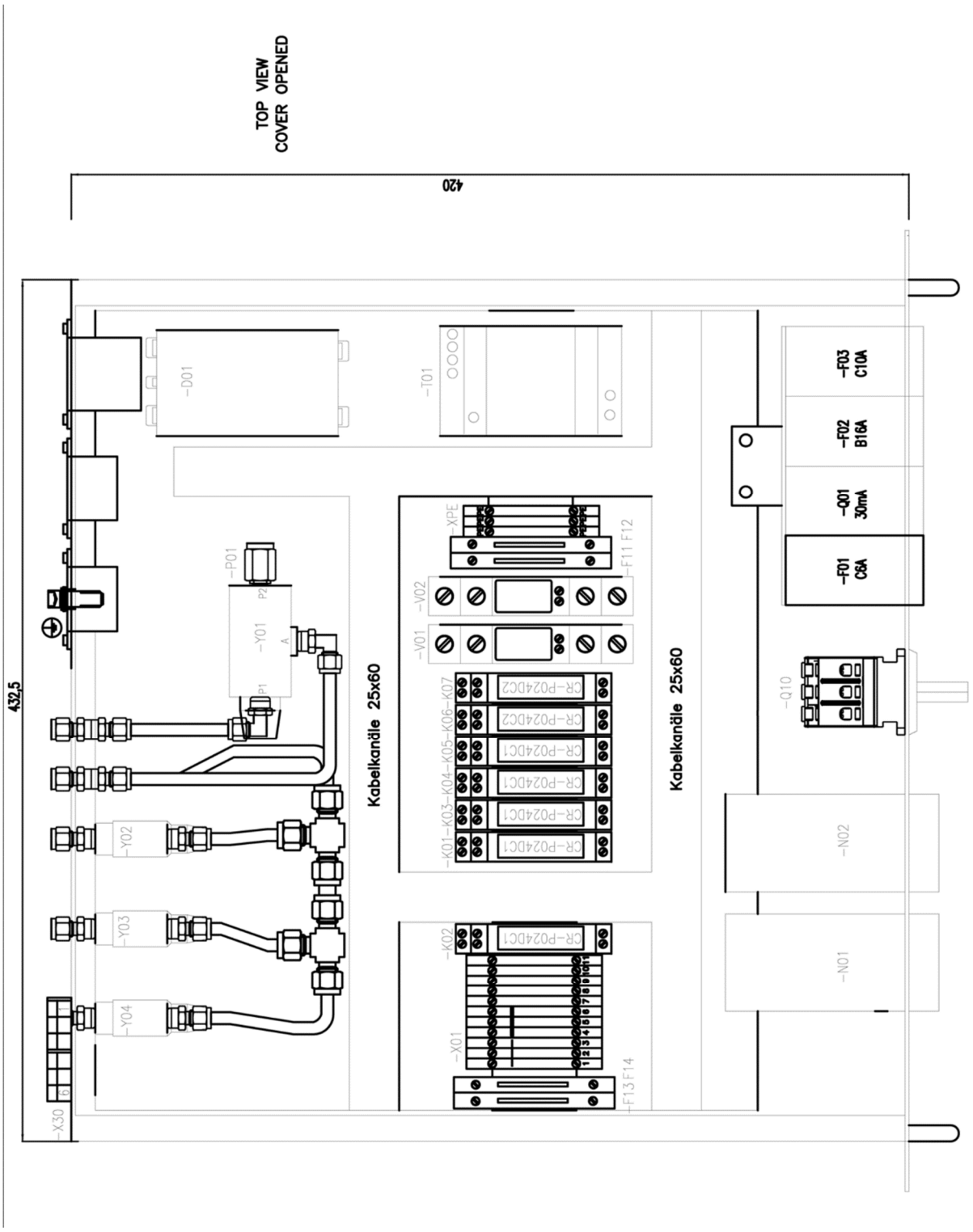
… Technical drawings SCC-U



… Appendix

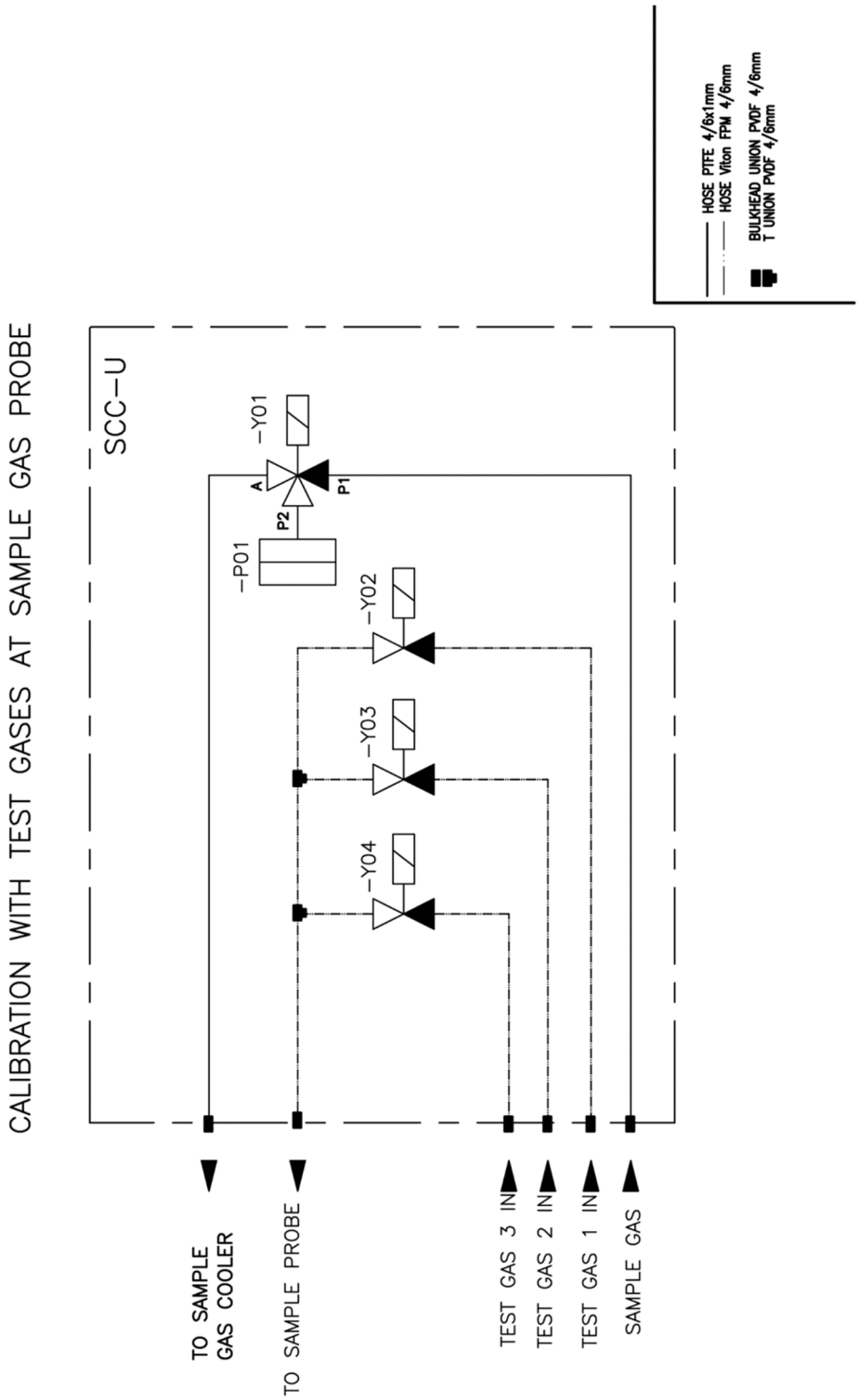
… Technical drawings SCC-U



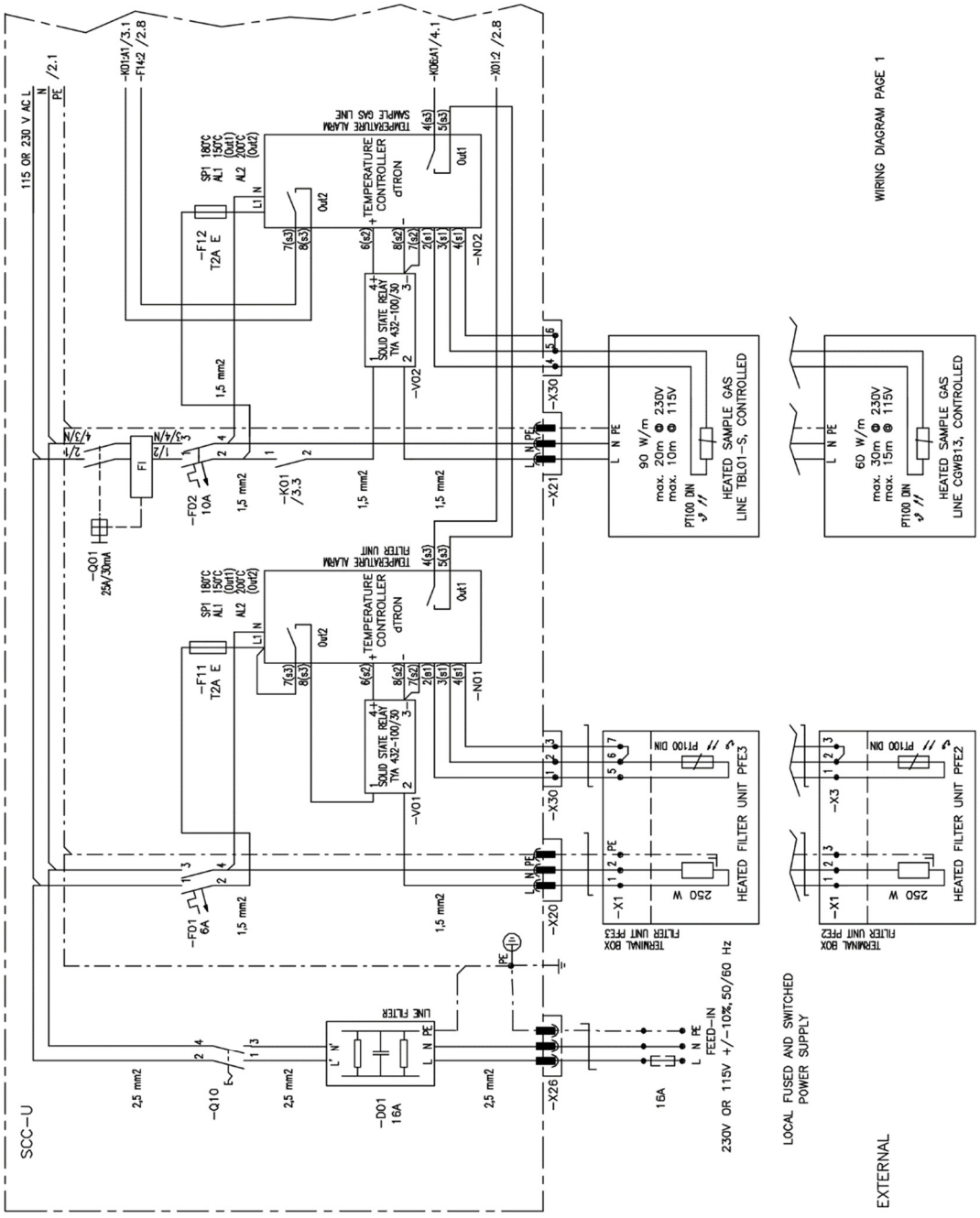

TOP VIEW
COVER OPENED
420
432,5
-D01
-T01
-F03
C10A
-F02
B16A
-Q01
30mA
-F01
C6A
-Q10
-N02
-N01
-P01
-Y01
-Y02
-Y03
-Y04
-X30
-XPE
-V02
-V01
-F11 F12
-K01 -K02 -K03 -K04 -K05 -K06 -K07
CR-P024DC1
CR-P024DC2
-X01
-F13 F14
Kabelkanäle 25x60
Kabelkanäle 25x60

… Appendix

… Technical drawings SCC-U

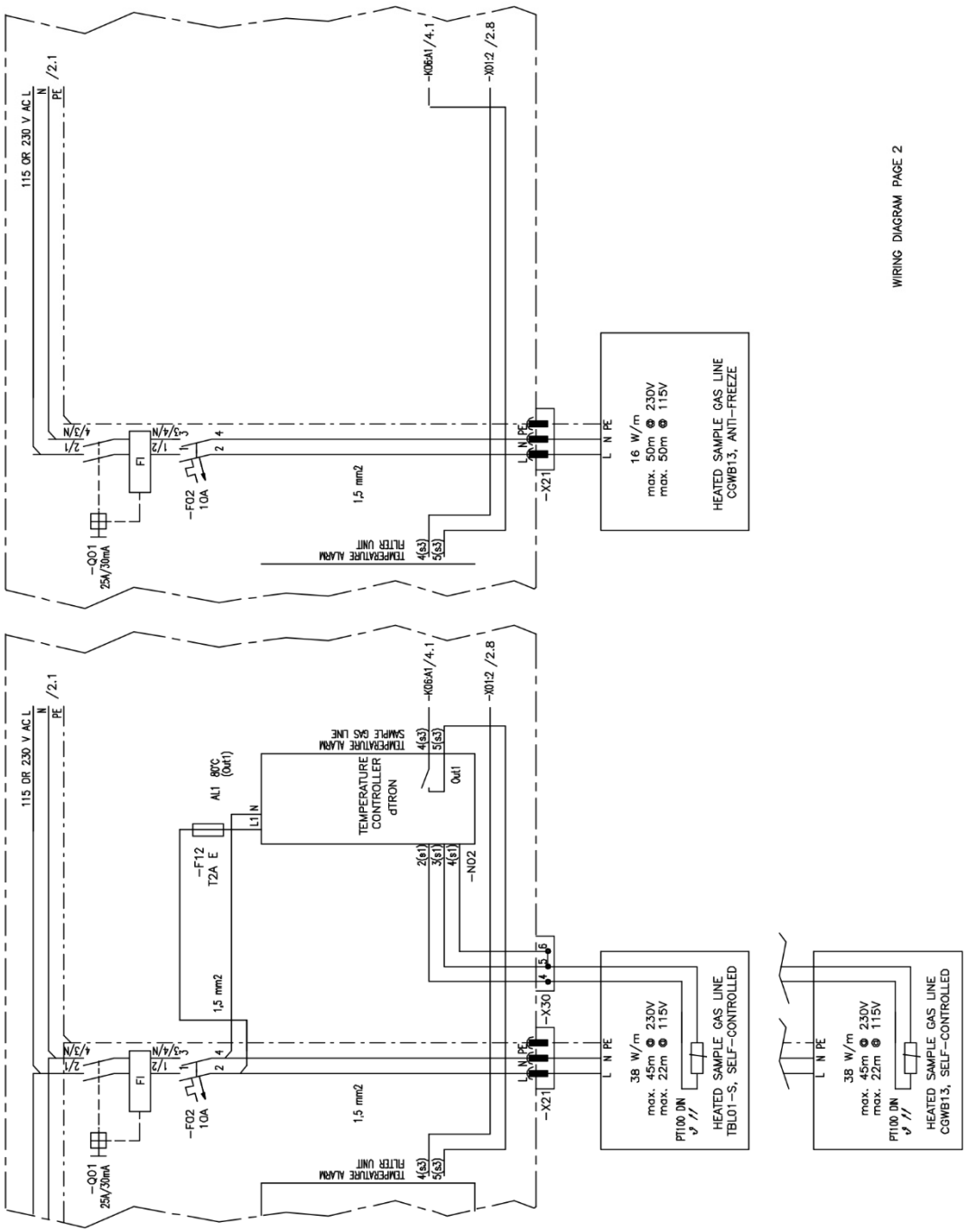


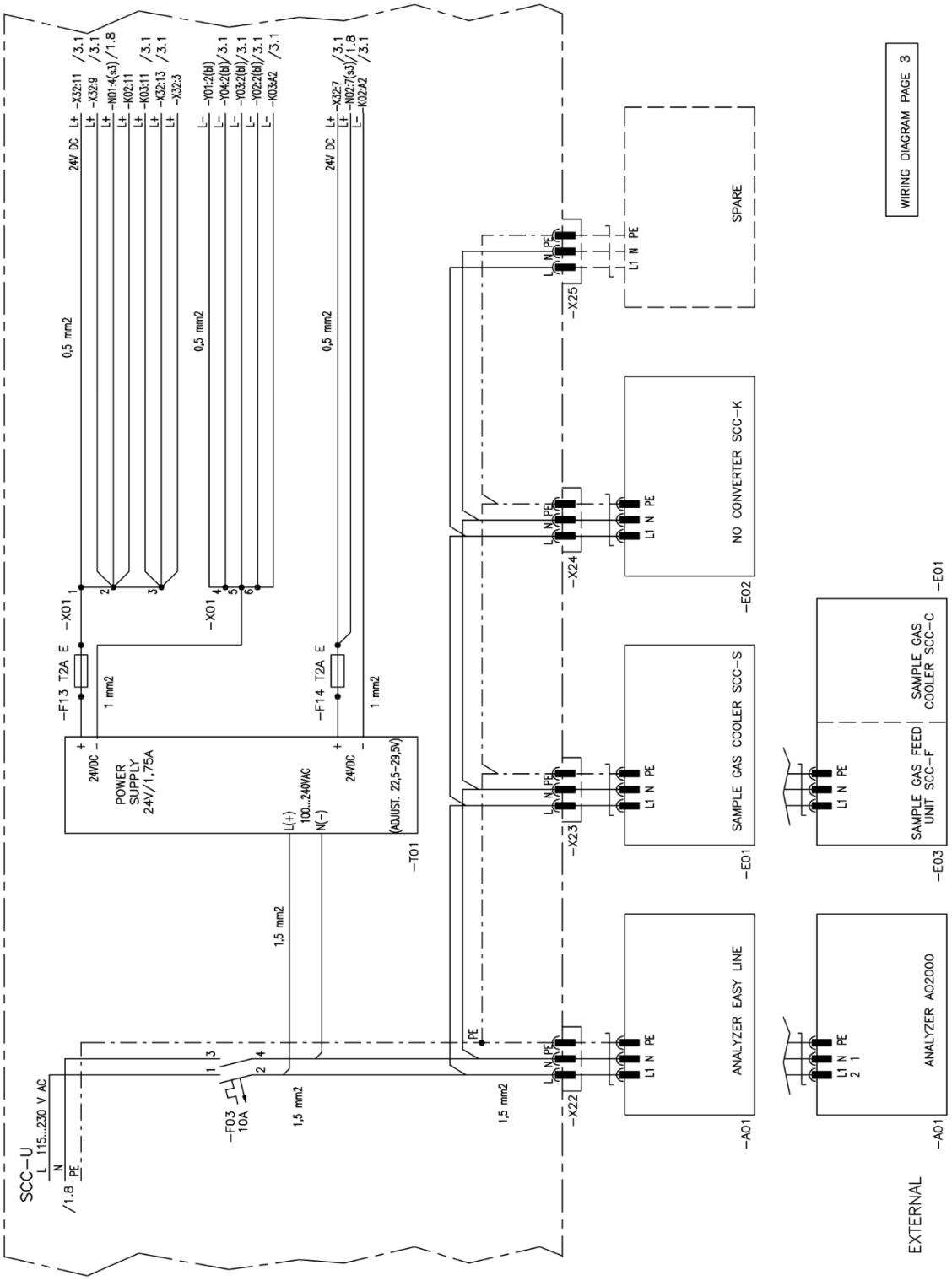
… Technical drawings SCC-U



… Appendix

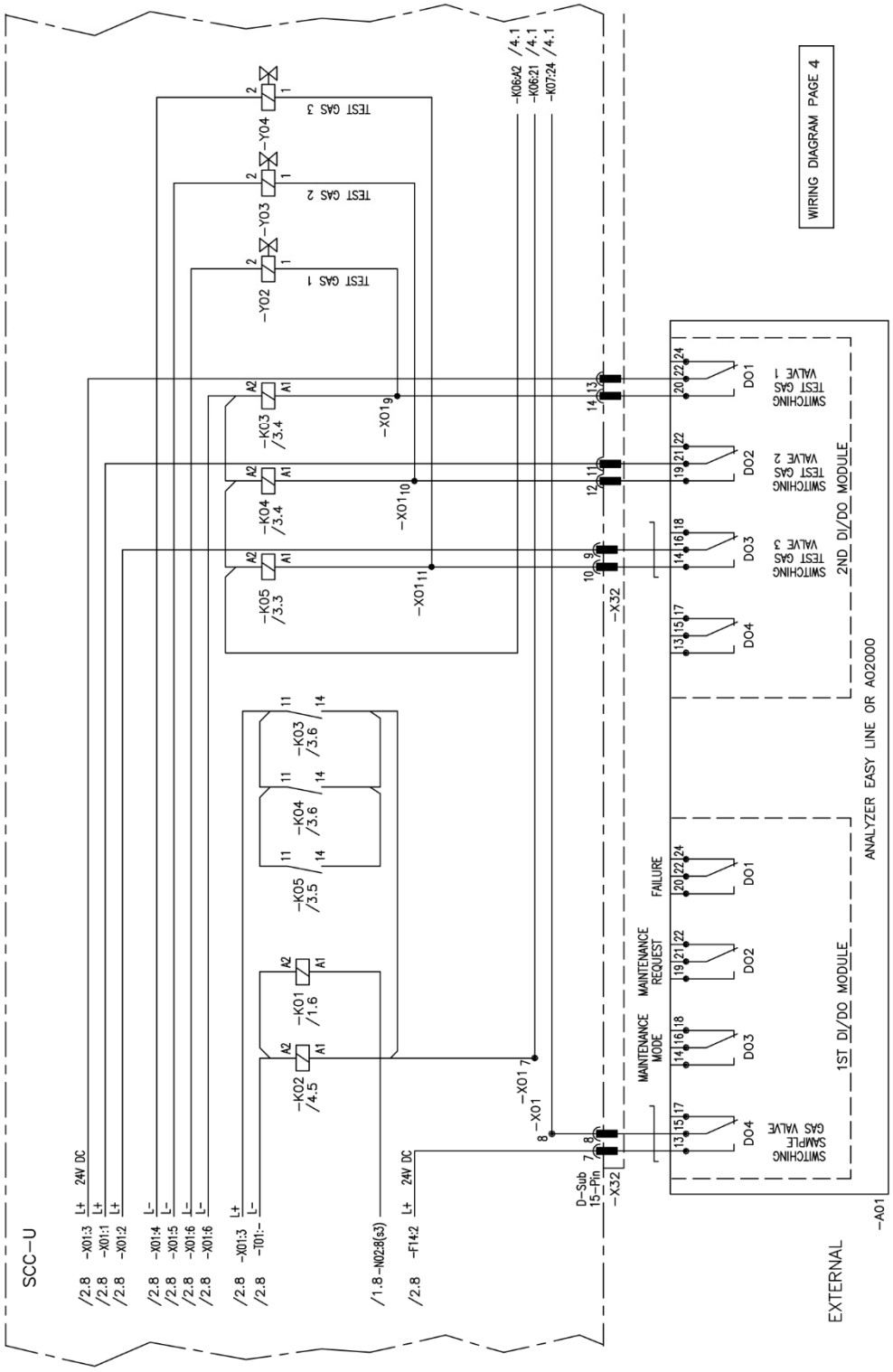
… Technical drawings SCC-U

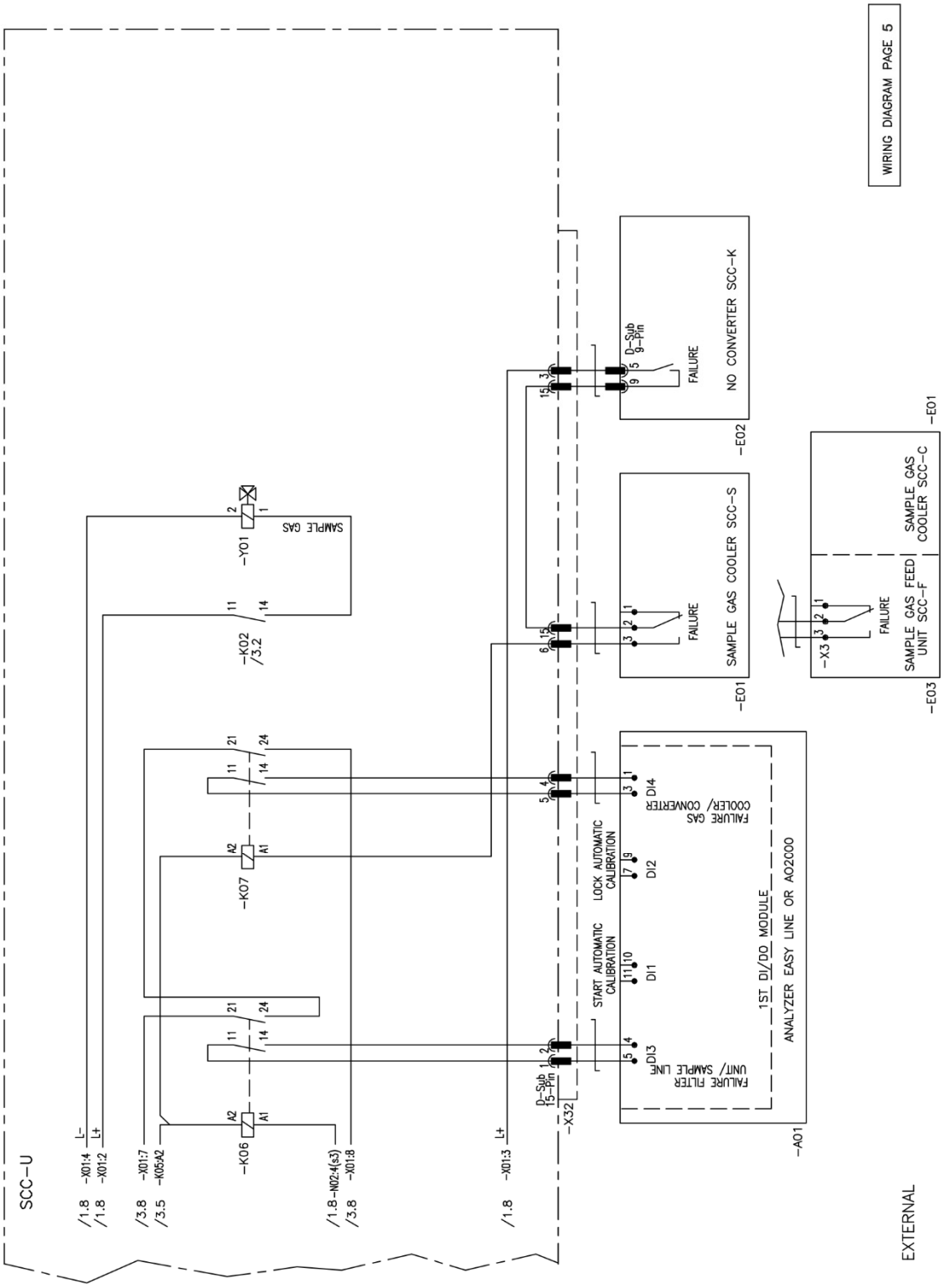



SCC-U
L 115...230 V AC
N
/1.8 PE
-F03 10A
1,5 mm2
POWER SUPPLY 24V/1,75A
24VDC
100...240VAC
L(+)
N(-)
(ADJUST. 22,5-29,5V)
-T01
-F13 T2A E
-F14 T2A E
-X01
0,5 mm2
1 mm2
24V DC
-X32:11 /3.1
-X32:9 /3.1
-N01:4(a3) /1.8
-K02:11 /3.1
-K03:11 /3.1
-X32:13 /3.1
-X32:3 /3.1
-Y01:2(bl) /3.1
-Y04:2(bl) /3.1
-Y03:2(bl) /3.1
-Y02:2(bl) /3.1
-K03:A2 /3.1
-X32:7 /3.1
-N02:7(a3) /1.8
-K02:A2 /3.1
-X22
-X23
-X24
-X25
L1 N PE
ANALYZER EASY LINE
-A01
SAMPLE GAS COOLER SCC-S
-E01
NO CONVERTER SCC-K
-E02
SPARE
SAMPLE GAS FEED UNIT SCC-F
-E03
SAMPLE GAS COOLER SCC-C
-E01
ANALYZER AO2000
-A01
2 1
WIRING DIAGRAM PAGE 3
EXTERNAL

… Appendix

… Technical drawings SCC-U




WIRING DIAGRAM PAGE 5
SCC-U
L-
L+
/1.8 -X01:4
/1.8 -X01:2
/3.8 -X01:7
/3.5 -K05:A2
/1.8 -N02:4(s3)
/3.8 -X01:8
/1.8 -X01:3
-K06
-K07
-K02
/3.2
-Y01
SAMPLE GAS
-X32
D-Sub 15-Pin
-A01
1ST DI/DO MODULE
ANALYZER EASY LINE OR AO2000
FAILURE FILTER UNIT/ SAMPLE LINE
DI3
START AUTOMATIC CALIBRATION
DI1
LOCK AUTOMATIC CALIBRATION
DI2
FAILURE GAS COOLER/ CONVERTER
DI4
-E01
SAMPLE GAS COOLER SCC-S
FAILURE
-E02
NO CONVERTER SCC-K
D-Sub 9-Pin
FAILURE
-E03
SAMPLE GAS FEED UNIT SCC-F
-X3
FAILURE
-E01
SAMPLE GAS COOLER SCC-C
EXTERNAL

Notes

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3KXG171200R1001

DS/SCC-EN Rev. B 08.2019