

SCC-U

Utility unit



Measurement made easy

—
SCC-U

Introduction

- 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)

Additional information

Additional documentation on SCC-U is available for download free of charge at www.abb.com/analytical. Alternatively simply scan this code:



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1 Safety

General information and instructions

These instructions are an important part of the product and must be retained for future reference.

Installation, commissioning, and maintenance of the product may only be performed by trained specialist personnel who have been authorized by the plant operator accordingly. The specialist personnel must have read and understood the manual and must comply with its instructions.

For additional information or if specific problems occur that are not discussed in these instructions, contact the manufacturer.

The content of these instructions is neither part of nor an amendment to any previous or existing agreement, promise or legal relationship.

Modifications and repairs to the product may only be performed if expressly permitted by these instructions.

Information and symbols on the product must be observed.

These may not be removed and must be fully legible at all times.

The operating company must strictly observe the applicable national regulations relating to the installation, function testing, repair and maintenance of electrical products.

Warnings

The warnings in these instructions are structured as follows:

DANGER

The signal word '**DANGER**' indicates an imminent danger. Failure to observe this information will result in death or severe injury.

WARNING

The signal word '**WARNING**' indicates an imminent danger. Failure to observe this information may result in death or severe injury.

CAUTION

The signal word '**CAUTION**' indicates an imminent danger. Failure to observe this information may result in minor or moderate injury.

NOTICE

The signal word '**NOTICE**' indicates possible material damage.

Note

'**Note**' indicates useful or important information about the product.

... 1 Safety

Intended use

The SCC-U utility unit is designed for:

- Power supply for system components such as gas analyzer, sample gas cooler and sample gas feed unit,
- Temperature control for heated sample gas line and heated filter unit (optional),
- Test gas switching for automatic adjustment (optional).

Any other use is not as specified.

The specified use also includes taking note of this operating instruction.

Improper use

The SCC-U utility unit must not be used in a potentially explosive atmosphere or in hazardous areas.

Safety instructions

Requirements for safe operation

In order to operate in a safe and efficient manner the device should be properly handled and stored, correctly installed and set-up, properly operated and correctly maintained.

Special information and precautions

These include:

- The content of this operating instruction,
- The safety information affixed to the device,
- The applicable safety precautions for installing and operating electrical devices,
- Safety precautions for working with gases, acids, condensates, etc.

National regulations

The regulations, standards and guidelines cited in this operator's manual are applicable in the Federal Republic of Germany. The applicable national regulations should be followed when the device is used in other countries.

Device safety and safe operation

The device is designed and tested in accordance with the relevant safety standards and has been shipped ready for safe operation.

To maintain this condition and to assure safe operation, read and follow the safety information in this operator's manual.

Failure to do so can put persons at risk and can lead to device damage as well as damage to other systems and devices.

Warranty provisions

Using the device in a manner that does not fall within the scope of its intended use, disregarding this manual, using underqualified personnel, or making unauthorized alterations releases the manufacturer from liability for any resulting damage. This renders the manufacturer's warranty null and void.

Manufacturer's address

**ABB Automation GmbH
Measurement & Analytics**

Stierstädter Str. 5
60488 Frankfurt am Main
Germany
Tel: +49 69 7930-4666
Email: cga@de.abb.com

Service address

If the information in this Operating Instruction does not cover a particular situation, ABB Service will be pleased to supply additional information as required.

Please contact your local service representative.

For emergencies, please contact:

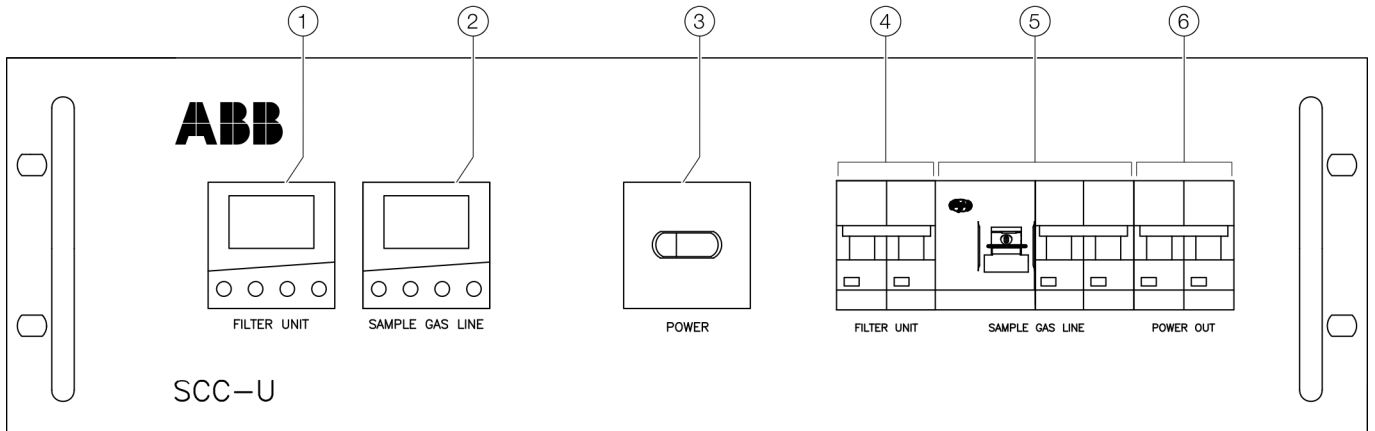
Customer service center

Tel: +49 180 5 222 580
Email: automation.service@de.abb.com

2 Design and function

Overview

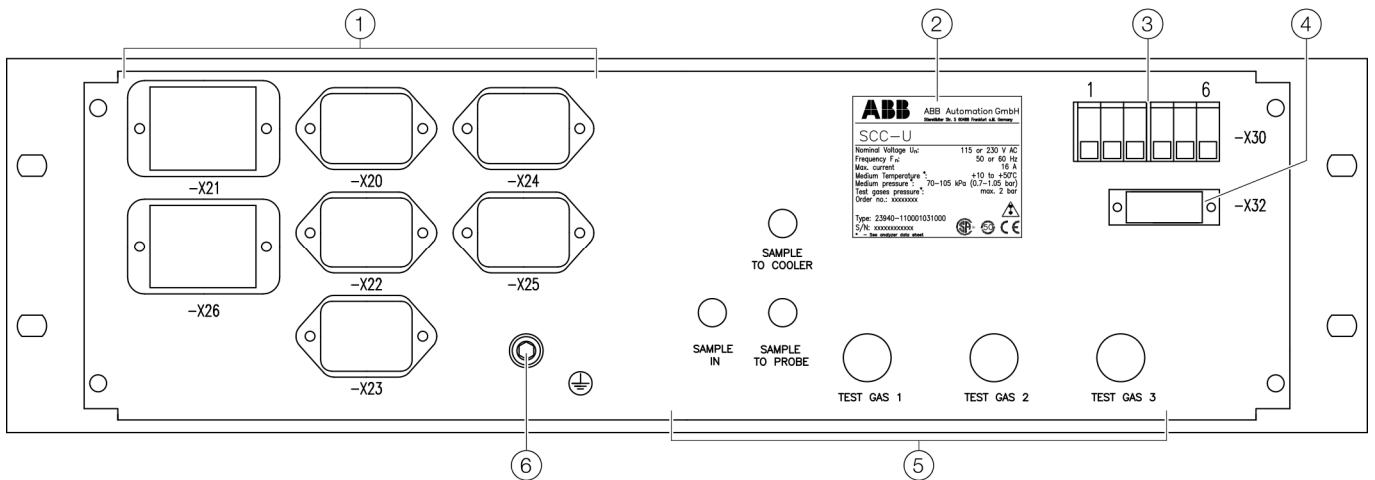
Front view



- ① Heated filter unit temperature controller (option)
- ② Heated sample gas line temperature controller (option)
- ③ Main switch
- ④ Heated filter unit circuit breaker (6 A)
- ⑤ Heated sample gas line residual current breaker with overcurrent protection (16 A / 0.03 A)
- ⑥ External power sockets and 24 VDC power supply circuit breaker (10 A)

Figure 1: SCC-U front view

Rear view



- ① Electrical power connections
- ② Name plate
- ③ Electrical connections for Pt100 of heated filter unit and heated sample gas line
- ④ SUB-D connector for control and status signals
- ⑤ Sample gas connections
- ⑥ Ground terminal

Figure 2: SCC-U rear view

Pneumatic diagrams

See also

... Technical drawings

Internal construction on page 24.

Catalog no. 23940-0-1100011X000

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

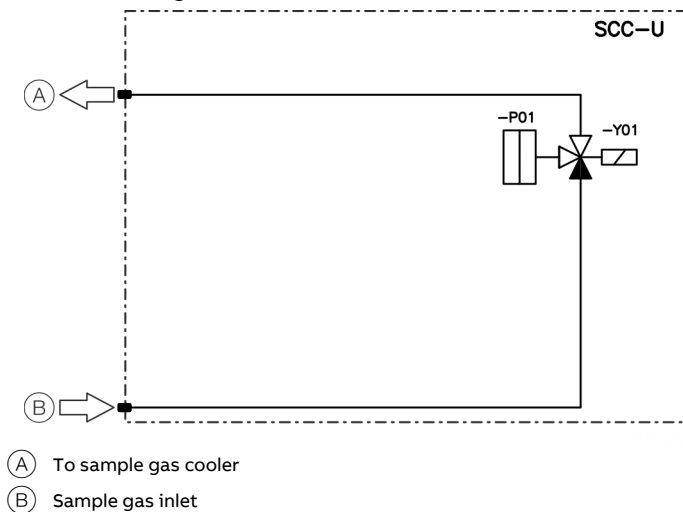


Figure 3: Pneumatic diagram

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.

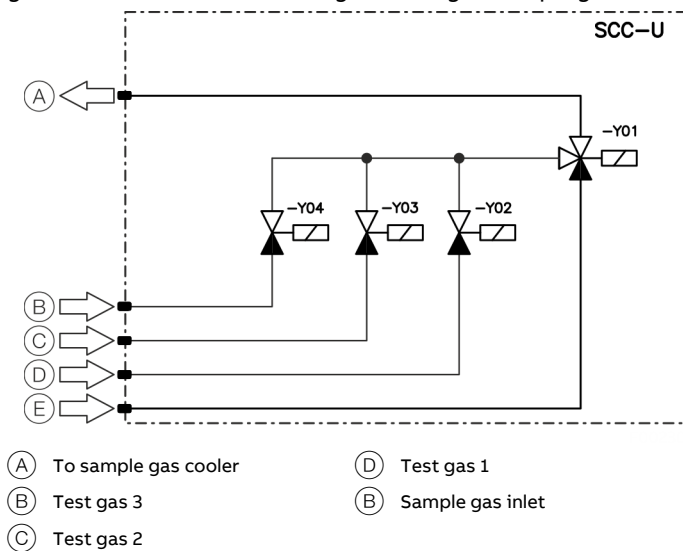


Figure 4: Pneumatic diagram

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.

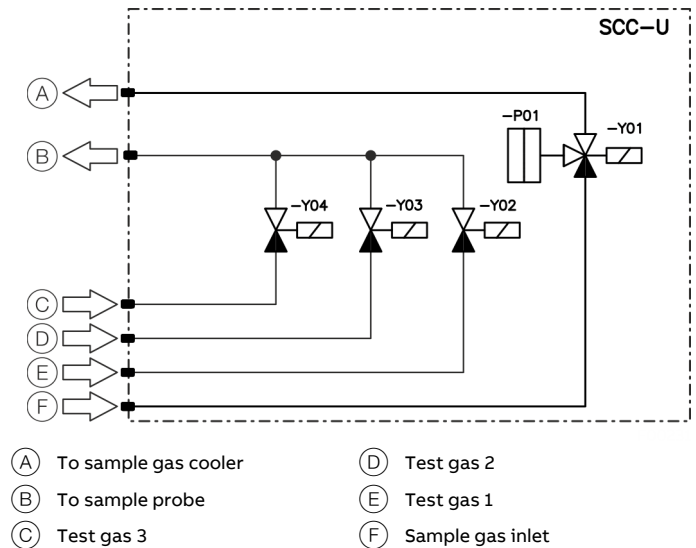


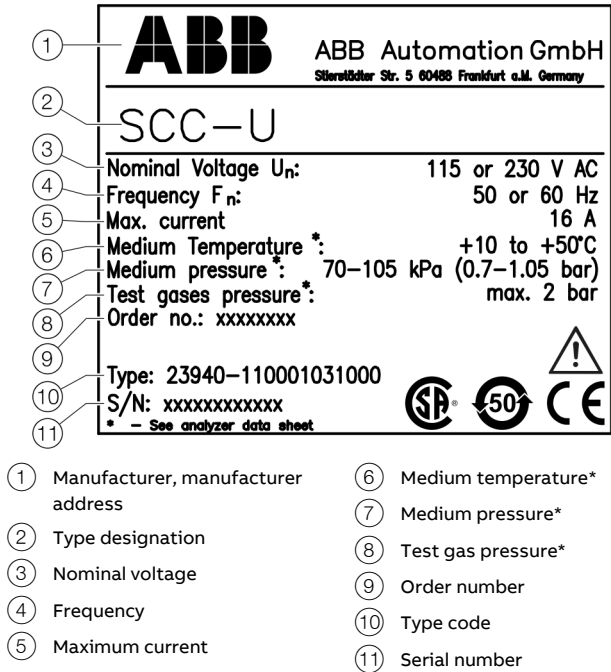
Figure 5: Pneumatic diagram

3 Product identification

Name plate

Note

The name plates displayed are examples. The device identification plates affixed to the device can differ from this representation.



* See analyzer data sheet

Figure 6: Name plate (example)

Plates and symbols

The following labels and symbols are attached to the analyzer system or to the individual components.

Label / Symbol	Meaning
	Consult documentation, i.e. consult this operating instruction.
	Risk of electric shock!
	Corrosive material!
	Hot surface! (Temperature > 60 °C)

Scope of delivery

Quantity	Description
1	SCC-U utility unit with power supply cable, length 3 m
1 to 4	Power supply cables (as per order), length 2 m
1	Plug for connecting the power supply cable of the heated filter unit (as per order)
1	Plug for connecting the power supply cable of the heated sample gas line (as per order)
1	Sub-D plug, 15-pole, with connected signal lines, length 2 m
1	PTFE tube, 6/4 x 1, length 3 m
1	Operating instruction
1	Drawings set

4 Transport and storage

Inspection

Check the devices immediately after unpacking for possible damage that may have occurred from improper transport.

Details of any damage that has occurred in transit must be recorded on the transport documents.

All claims for damages must be submitted to the shipper without delay and before installation.

Transporting the device

Observe the following instructions:

- Do not expose the device to humidity during transport. Pack the device accordingly.
- Pack the device so that it is protected against vibrations during transport, for example, by using air-cushioned packing.

Storing the device

Bear the following points in mind when storing devices:

- Store the device in its original packaging in a dry and dust-free location.
- Observe the permitted ambient conditions for transport and storage.
- Avoid storing the device in direct sunlight.
- In principle, the devices may be stored for an unlimited period. However, the warranty conditions stipulated in the order confirmation of the supplier apply.

Ambient conditions

Refer to **Ambient conditions** on page 10.

Packaging

1. If the original packing material is no longer available, wrap the device in bubble foil or corrugated cardboard. When shipping overseas, also heat-seal the device air-tight in 0.2 mm thick polyethylene, including a desiccant (e.g. silica gel). The amount of desiccant used should be adequate for the package volume and the probable shipping time (at least 3 months).
2. Pack the device in an adequately large box lined with shock absorbent material (e.g. foam material). The thickness of the cushioning material should be adequate for the weight of the device and the mode of shipping. The box should also be lined with a double layer of bitumen paper for overseas shipping.
3. Mark the box 'Fragile! Handle with care!'.

Returning devices

Use the original packaging or a secure transport container of an appropriate type if you need to return the device for repair or recalibration purposes.

Fill out the return form (see **Return form** on page 21) and include this with the device.

In accordance with the EU Directive governing hazardous materials, the owner of hazardous waste is responsible for its disposal or must observe the following regulations for shipping purposes:

All devices delivered to ABB must be free from any hazardous materials (acids, alkalis, solvents, etc.).

Address for the return:

ABB Automation GmbH

Service Analystechnik – Parts & Repair

Stierstädter Straße 5

60488 Frankfurt, Deutschland

Fax: +49 69 7930-4628

E-Mail: repair-analytical@de.abb.com

www.abb.de/prozessautomatisierung-service

5 Installation

Requirements for the installation site

Installation location

The environmental conditions should be observed (see **Ambient conditions**).

The device should be installed near the gas analyzer and the other connected devices.

The length of the delivered power supply cables is 2 meters.

Adequate air circulation

- Ensure adequate natural air circulation around the device.
- Avoid heat buildup.

Protection against adverse environmental conditions

The utility unit should be protected from:

- Cold
- Radiated heat, e.g. from the sun, kilns or boilers
- Temperature fluctuations
- Strong air movement
- Dust deposits and dust penetration
- Corrosive atmosphere
- Vibration

Ambient conditions

Ambient temperature

- Operation: 10 to 40 °C
- Storage and transport: -25 to 60 °C

Relative humidity

≤ 75 % annual average

Installation location

- Indoors only
- Installation in general purpose environment only.

Construction

Design

19 in 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)

IP protection of housing

IP 20 according to EN 60529

Dimensions

See **Dimensions** on page 22.

Weight

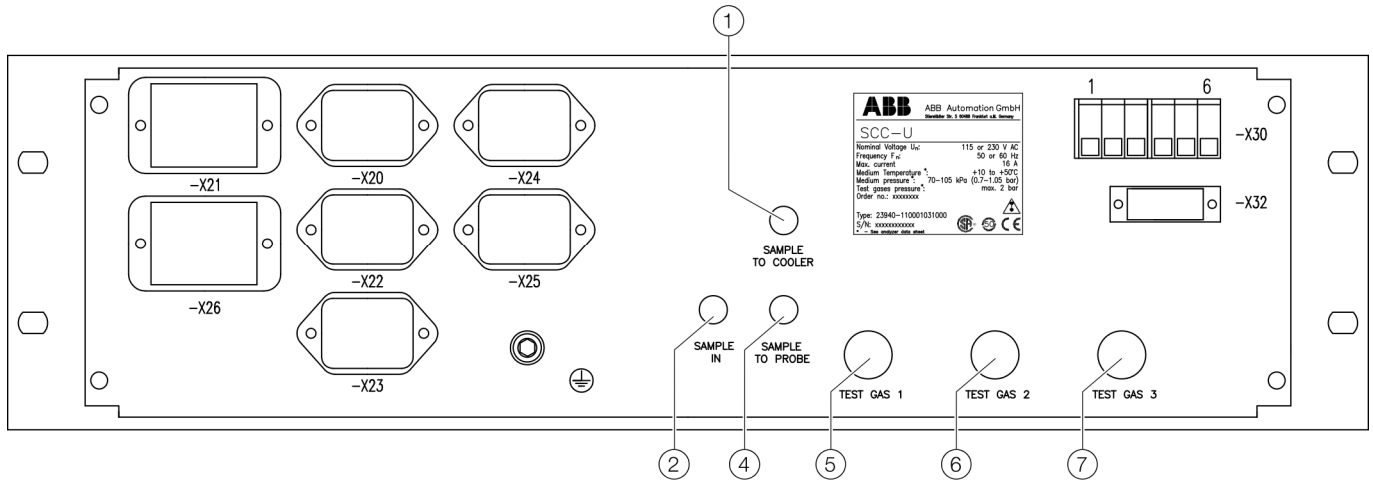
Approx. 15 kg

Mounting

Installation in a 19 in cabinet / rack

1. If necessary, install mounting rails in the cabinet / rack.
2. Mount the utility unit in a 19 in cabinet / rack using 4 × M6 screws (not supplied).

Gas connections



- ① Outlet to sample gas cooler (standard)
- ② Sample gas inlet (standard)
- ③ Outlet to gas sampling probe (option)
- ④ Test gas inlet 1 (option)
- ⑤ Test gas inlet 2 (option)
- ⑥ Test gas inlet 3 (option)

Figure 7: Gas connections on the rear panel

Sample gas inlet conditions

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

Sample gas pressure

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

Test gas pressure

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

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.

Gas connections

The gas connections are PVDF fittings for DN 4 / 6 mm tube.

Connecting the gas lines

- Use gas lines made from material that is suited to the measuring task.
- Connect the gas lines to the gas inlet and outlet fittings on the rear panel.

... 5 Installation

Electrical connections

Safety instructions for electrical installation

WARNING

Risk of injury due to live parts.

Improper work on the electrical connections can result in electric shock.

- Connect the device only with the power supply switched off.
- Observe the applicable standards and regulations for the electrical connection.

Note

Route the signal lines separately from the power supply lines.

Note

Observe the current rating of the connected devices.

- Maximum current 16 A!

Protective lead connection

The protective lead (ground) should be attached to the protective lead connector before any other connection is made.

Risks of a disconnected protective lead

The device can be hazardous if the protective lead is interrupted inside or outside the device or if the protective lead is disconnected.

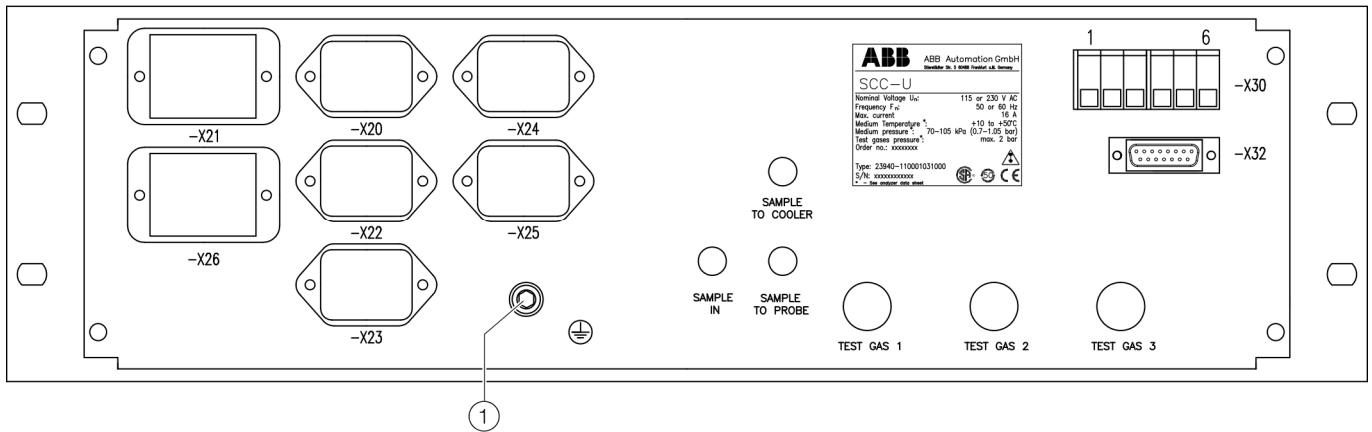
Risks involved in opening the covers

Current-bearing components can be exposed when the covers or parts are removed, even if this can be done without tools. Current can be present at some connection points.

Risks involved in working with an open device

All work on a device that is open and connected to power should only be performed by trained personnel who are familiar with the risks involved.

Connection on the device



- X20** Power out for filter unit
- X21** Power out for sample gas line
- X22** Power out for gas analyzer EL3000 or AO2000
- X23** Power out for 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 for filter unit or sample gas line
- X32** Status signal (D-Sub 15-pin)
- (1) Ground terminal

Figure 8: Electrical connections rear panel

X30 Pt100 terminal assignment

Terminal	Function / comments
1	Pt100 from filter unit, white conductor
2	Pt100 from filter unit, red conductor
3	Pt100 from filter unit, red conductor
4	Pt100 from sample gas line, white conductor
5	Pt100 from sample gas line, red conductor
6	Pt100 from sample gas line, red conductor

X32 D-sub 15 pin assignment

Pin	Comments	Function
1	To analyzer 1st DI/DO module DI 3:5	Failure filter unit /
2	To analyzer 1st DI/DO module DI 3:4	sample gas line
3	From NO converter D-sub 9, Pin 5	Failure NO converter
4	To analyzer 1st DI/DO module DI 4:1	Failure gas cooler /
5	To analyzer 1st DI/DO module DI 4:3	converter
6	From gas cooler X3:3 / gas feed unit X3:3	Failure gas cooler
7	To analyzer 1st DI/DO module DO 4:13	Switching sample gas
8	To analyzer 1st DI/DO module DO 4:15	valve
9	To analyzer 2nd DI/DO module DO 3:16	Switching test gas
10	To analyzer 2nd DI/DO module DO 3:14	valve 3
11	To analyzer 2nd DI/DO module DO 2:21	Switching test gas
12	To analyzer 2nd DI/DO module DO 2:19	valve 2
13	To analyzer 2nd DI/DO module DO 1:22	Switching test gas
14	To analyzer 2nd DI/DO module DO 1:20	valve 1
15	From gas cooler X3:2 / gas feed unit X3:2 and NO Failure gas cooler /	converter D-sub 9, Pin 9
		converter

... 5 Installation

... Electrical connections

Electrical Data

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)
- 10 A (internal 24 V supply, external devices)

External fuse protection

16 A (to be provided by customer)

Electrical safety

Tested to EN 61010-1:2010

Protective class

I

Overvoltage category / degree of contamination

II / 2

Elektromagnetic compatibility

Tested to EN 61326-1:2013

Emitted interference

Class B

Immunity to interference

Industrial environment

Connecting the Pt100 temperature sensors (option)

The temperature sensors of the heated filter unit (option) and the heated sample gas line must be connected to the utility unit:

- Connect the Pt100 temperature sensor of the heated filter unit and the heated sample gas line to terminals **-X30** (see **X30 Pt100 terminal assignment** on page 13).

Refer to the wiring diagrams in the delivered drawings set.

Connecting the control and status signals

Depending on the version of the utility unit or the built-in options, these signals must be connected between the utility unit and the gas analyzer:

- Control signals of the test gas solenoid valves,
 - Status signals of the temperature controllers.
1. Connect the D-sub plug of the supplied cable to the connector **-X32** (see **X32 D-sub 15 pin assignment** on page 13) on the utility unit.
 2. Connect the leads at the other end of the supplied cable to the corresponding inputs and outputs of the digital I/O modules in the gas analyzer.

Refer to the wiring diagrams in the delivered drawings set and to the operator's manual of the gas analyzer.

Connecting the power supply of the external devices

1. Connect the cable from the heated sample gas line to the supplied plug and connect the cable to socket **-X21**.
2. Connect the cable from the heated filter unit to socket **-X20**.
3. Use the delivered cables to connect the power supply of the gas analyzer and sample handling devices to sockets **-X22** to **-X25**.

Refer to the wiring diagrams in the delivered drawings set.

Connecting the utility unit to the power supply

1. Make sure the power supply leads have an adequately dimensioned (16 A) protective device (breaker).
2. Make sure the **POWER** switch on the front panel of the utility unit is switched **OFF**.
3. Install a switched outlet or a breaker in the power supply wiring near the utility unit. This should allow the utility unit to be completely disconnected from the power supply if necessary.
The disconnection device should be easily accessible and identified in such a way that its relationship to the equipment that it is designed to disconnect can be clearly seen.
4. Connect the fixed power supply cable to the power supply.

Refer to the wiring diagrams in the delivered drawings set.

6 Commissioning and operation

Safety instructions for operation

When safe operation can no longer be assured

If it is apparent that safe operation is no longer possible, the device should be taken out of operation and secured against unauthorized use.

The possibility of safe operation is excluded:

- If the device is visibly damaged,
- If the device no longer operates,
- After prolonged storage under adverse conditions,
- After severe transport stresses.

Checks prior to commissioning

The following points must be checked before commissioning the device:

- Correct wiring in accordance with **Electrical connections** on page 12.
- Correct grounding of the device.
- The ambient conditions must meet the requirements set out in the specification.
- The power supply must meet the requirements set out on the name plate.

Starting-up the utility unit

NOTICE

Damage to the gas analyzer

Condensation might damage the connected gas analyzer.

- The sample gas and test gases must not be switched on until the upstream cooler unit's lead time is finished.

1. Activate the power supply using the main switch.
 - The utility unit is ready for operation without delay.
2. Switch on the power supply of the external devices using the corresponding circuit breakers:
 - Heated filter unit,
 - Heated sample gas line
 - Gas analyzer and other sample handling devices
3. **Only for version with temperature controllers:**

The temperature controllers are set at the factory and no operations are required.

Wait until the temperature reaches the set point. This can take approx. 2 hours.
4. **Only for version with solenoid valves:**

Check the gas connections.

7 Diagnosis / Troubleshooting

Malfunctions

Problem	Cause	Corrective action
Utility unit not working	Power supply interrupted	Reconnect the power supply
No power supply in external device	Utility unit not activated	Turn on main switch
	Incorrect cable connection	Reconnect the cables
Inability to switch on the circuit breaker	Short circuit	Switch off utility unit and repair defective external device
	Overload	Check max. current/power consumption relative to current rating of the circuit breaker
Incorrect calibration	Signal cable is not correct connected between utility unit and gas analyzer	Reconnect the cable, check digital outputs in the gas analyzer
	Incorrect configuration of digital outputs in gas analyzer	Change the configuration of digital outputs
	Test gas supply not connected or closed	Connect and open the test gas supply
	Test gas solenoid valve defective	Notify service
Lack of zero air calibration	Clogged filter	Replace filter
	Fuses blown	Replace fuses
	Sample solenoid valve defective	Notify service
	Gas pump installed downstream is not activated	Activate gas pump
	Incorrect temperature sensor connection	Check cable and reconnect
Temperature of heated line or heated filter unit does not increase	Temperature sensor defective	Replace temperature sensor
	Temperature controller working incorrectly	Notify service
	Utility unit working incorrectly	Check utility unit
Sample gas flow insufficient	Gas line blocked	Remove blockage, check upstream modules (filters, cooler, etc.)
	Leaking gas path	Check gas path seal integrity and repair leakage

8 Maintenance / Repair

Safety instructions

CAUTION

Risk of injury

Risk of injury due to improperly performed maintenance work. The operations described in this chapter require specialized knowledge, and sometimes involve the necessity of working on the utility unit with its cover open and live!

- Maintenance work must therefore only be carried out by qualified and specially trained persons.

NOTICE

Damage to the device!

Damage to the device due to incorrect fuses.

- Only fuses of the specified type and rated current should be used as replacements.
- Never use patched fuses.
- Do not short-circuit the fuse holder contacts.

When safe operation can no longer be assured

If it is apparent that safe operation is no longer possible, the device should be taken out of operation and secured against unauthorized use.

The possibility of safe operation is excluded:

- If the device is visibly damaged,
- If the device no longer operates,
- After prolonged storage under adverse conditions,
- After severe transport stresses.

Spare parts

Repair and maintenance activities may only be performed by authorized customer service personnel.

When replacing or repairing individual components, use original spare parts.

Checking gas path seal integrity

It is necessary to check the tightness of the gas paths regularly.

1. Block off all gas outlets.
2. Activate the power supply of the utility unit (otherwise, the solenoid valves cannot be activated).
3. Apply a positive pressure of 100 mbar to the sample gas inlet.
4. Using a U-pipe manometer (or other type) check the drop in pressure; this must not exceed 1 mbar per minute.
5. Repeat steps 3. and 4. for all test gas inlets; the appropriate solenoid valve must be activated.

9 Dismounting and disposal

Dismounting

WARNING

Risk of injury due to process conditions.

The process conditions, for example high pressures and temperatures, toxic and aggressive measuring media, can give rise to hazards when working on the device.

- Before working on the device, make sure that the process conditions do not pose any hazards.
- If necessary, wear suited personal protective equipment when working on the device.
- Depressurize and empty the device / piping, allow to cool and purge if necessary.

NOTICE

Damage to the analyzer system!

Damage to the analyzer system and its components due to improper decommissioning.

- Before the utility unit is shut down it must be purged to prevent the accumulation of condensate and deposits.
- Make sure the utility unit is free of residual moisture that can freeze if low temperatures are encountered during storage and transport.

Shutting down the utility unit

1. Switch off the power supply of the external devices using the corresponding circuit breakers.
 2. Switch off the power supply using the main switch.
 3. Shut off the sample gas supply to the utility unit.
 4. Remove the gas lines from the connections on the utility unit.
 5. Thoroughly purge the utility unit gas paths with an inert gas.
 6. Fully tighten the gas connections.
 7. Disconnect the electrical leads.
- Use suited tools to disassemble the device, taking the weight of the device into consideration.
 - If the device is to be used at another location, the device should preferably be packaged in its original packing so that it cannot be damaged.
 - Observe the notices in **Returning devices** on page 9.

Disposal

Note



Products that are marked with the adjacent symbol may **not** be disposed of as unsorted municipal waste (domestic waste).

They should be disposed of through separate collection of electric and electronic devices.

This product and its packaging are manufactured from materials that can be recycled by specialist recycling companies.

Bear the following points in mind when disposing of them:

- As of 8/15/2018, this product will be under the open scope of the WEEE Directive 2012/19/EU and relevant national laws (for example, ElektroG - Electrical Equipment Act - in Germany).
- The product must be supplied to a specialist recycling company. Do not use municipal waste collection points. These may be used for privately used products only in accordance with WEEE Directive 2012/19/EU.
- If there is no possibility to dispose of the old equipment properly, our Service can take care of its pick-up and disposal for a fee.

10 Specification

Note

The device data sheet is available in the ABB download area at www.abb.com/analytical.

11 Additional documents

Note

All documentation, declarations of conformity, and certificates are available in ABB's download area.

www.abb.com/analytical

12 Appendix

Return form

Statement on the contamination of devices and components

Repair and/or maintenance work will only be performed on devices and components if a statement form has been completed and submitted.

Otherwise, the device/component returned may be rejected. This statement form may only be completed and signed by authorized specialist personnel employed by the operator.

Customer details:

Company: _____

Address: _____

Contact person: _____ Telephone: _____

Fax: _____ Email: _____

Device details:

Type: _____ Serial no.: _____

Reason for the return/description of the defect: _____

Was this device used in conjunction with substances which pose a threat or risk to health?

Yes No

If yes, which type of contamination (please place an X next to the applicable items):

biological corrosive / irritating combustible (highly / extremely combustible)

toxic explosive other toxic substances

radioactive

Which substances have come into contact with the device?

1. _____

2. _____

3. _____

We hereby state that the devices/components shipped have been cleaned and are free from any dangerous or poisonous substances.

Town/city, date

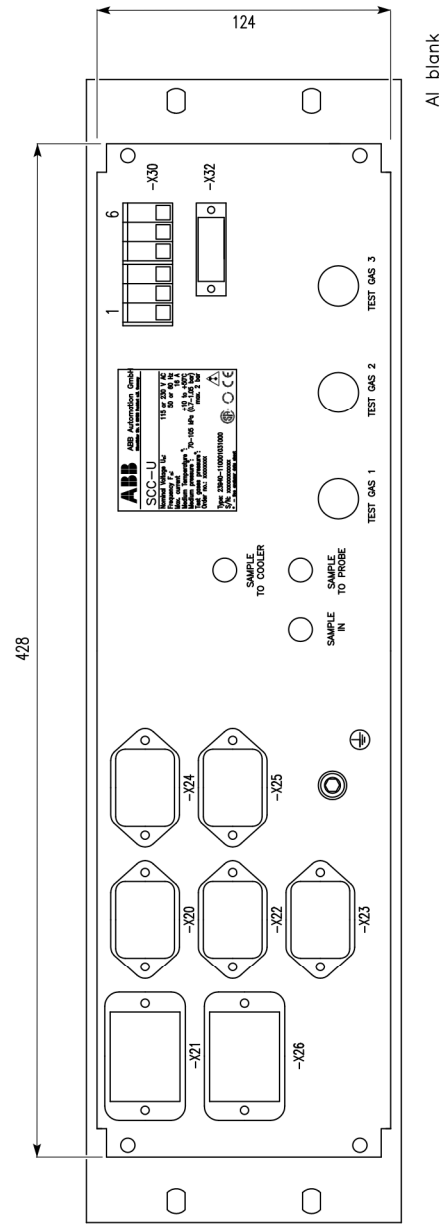
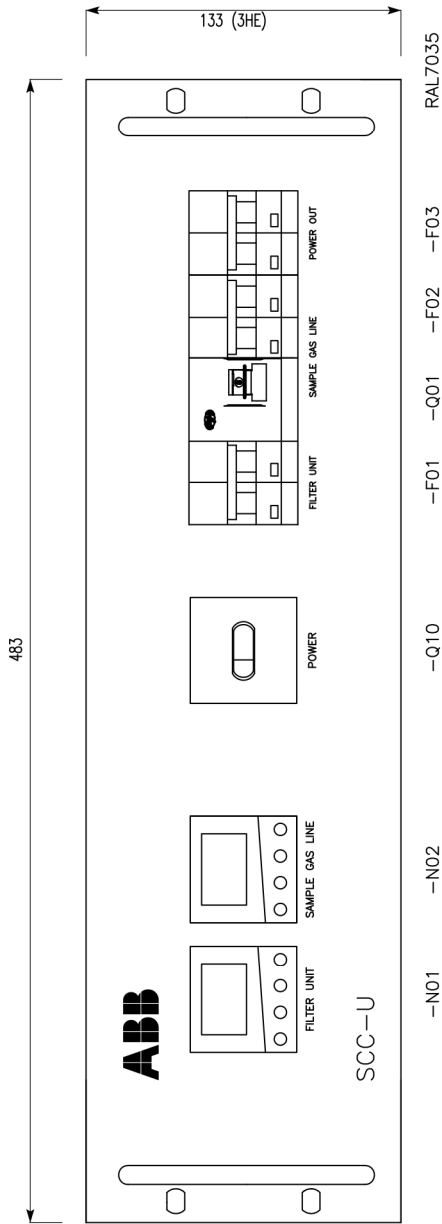
Signature and company stamp

Technical drawings

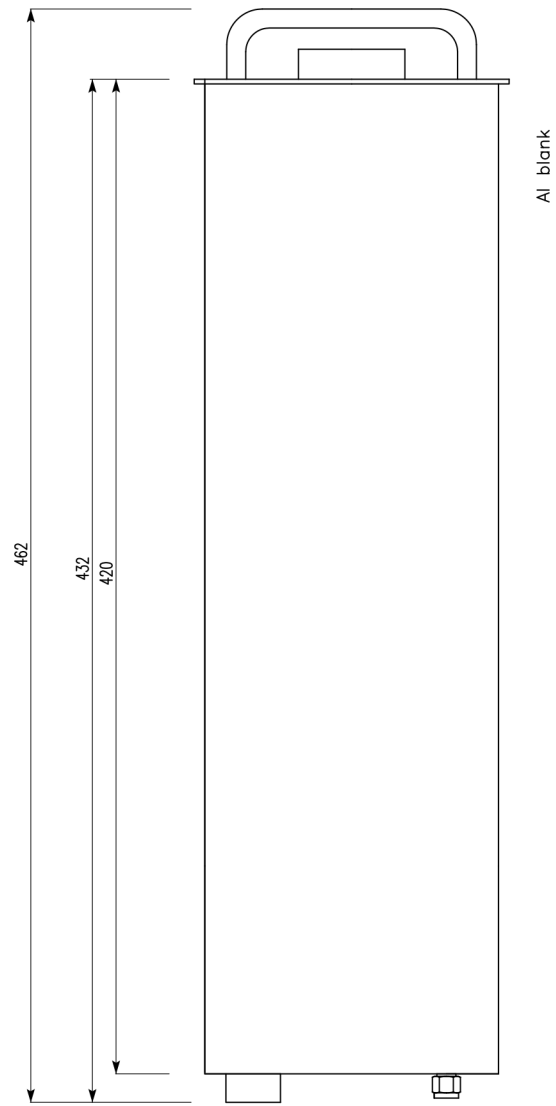
Dimensions

FRONT VIEW

BACK VIEW



LEFT VIEW

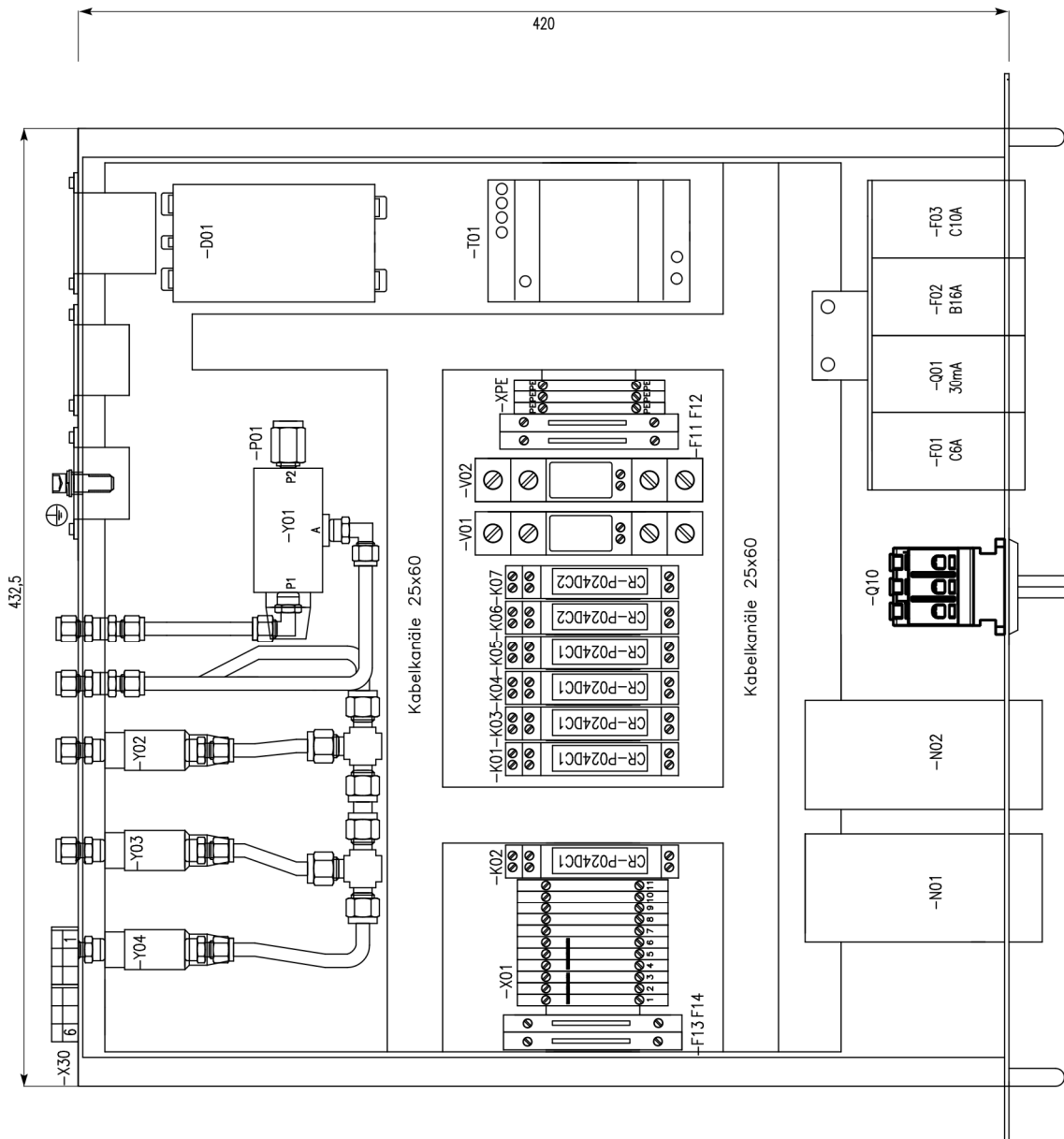


... 12 Appendix

... Technical drawings

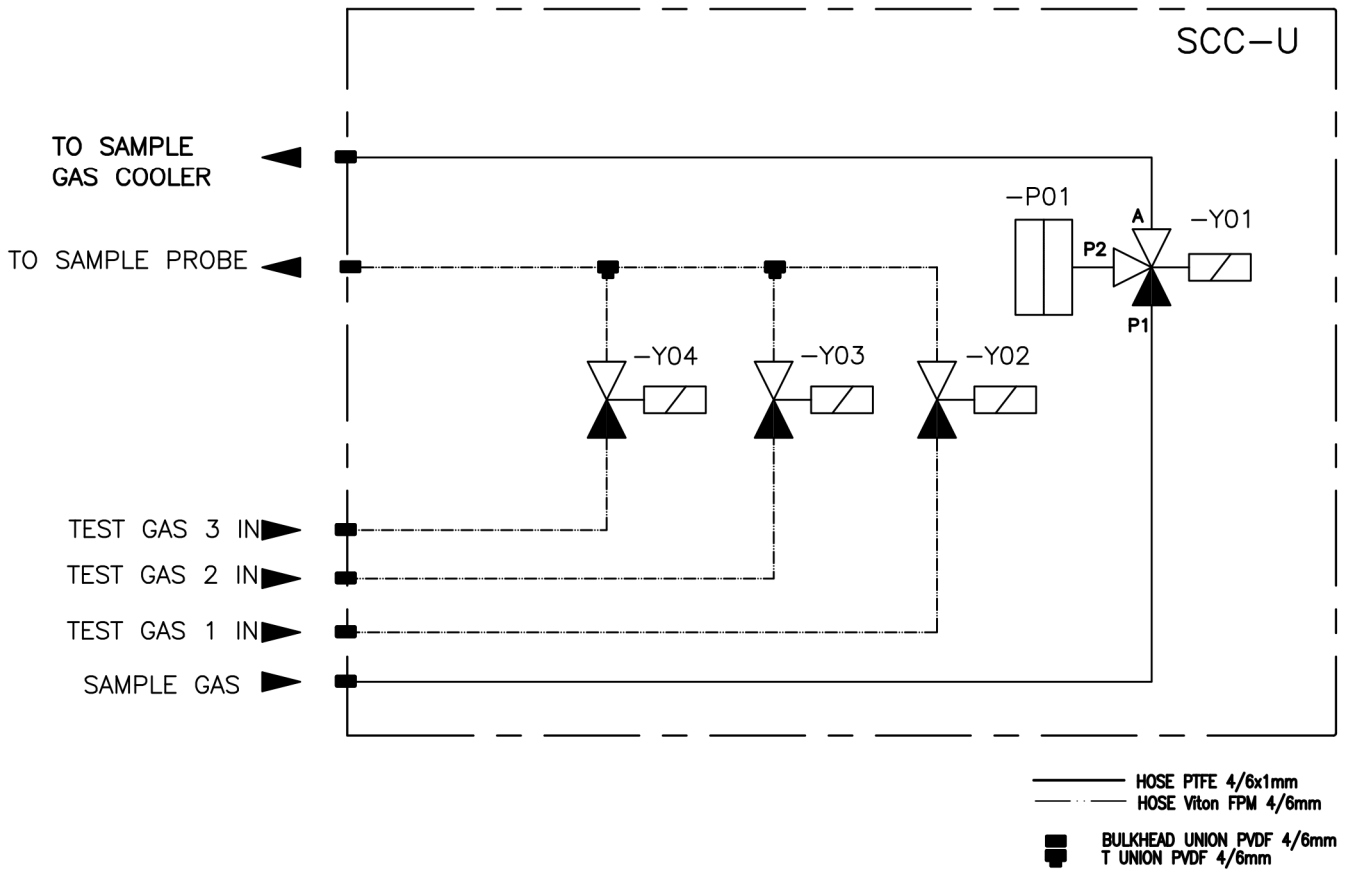
Internal construction

TOP VIEW
COVER OPENED



Pneumatic diagram

CALIBRATION WITH TEST GASES AT SAMPLE GAS PROBE

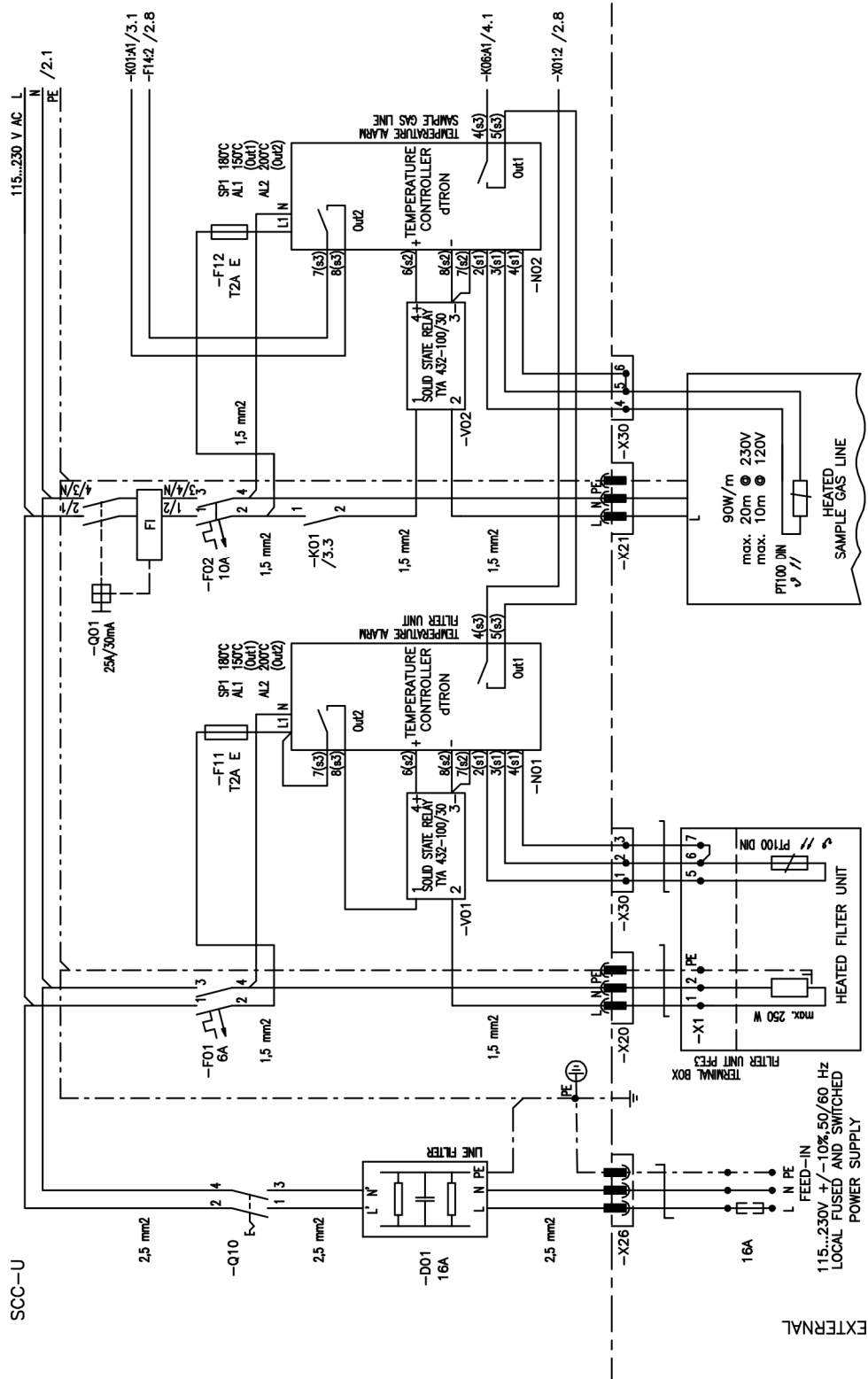


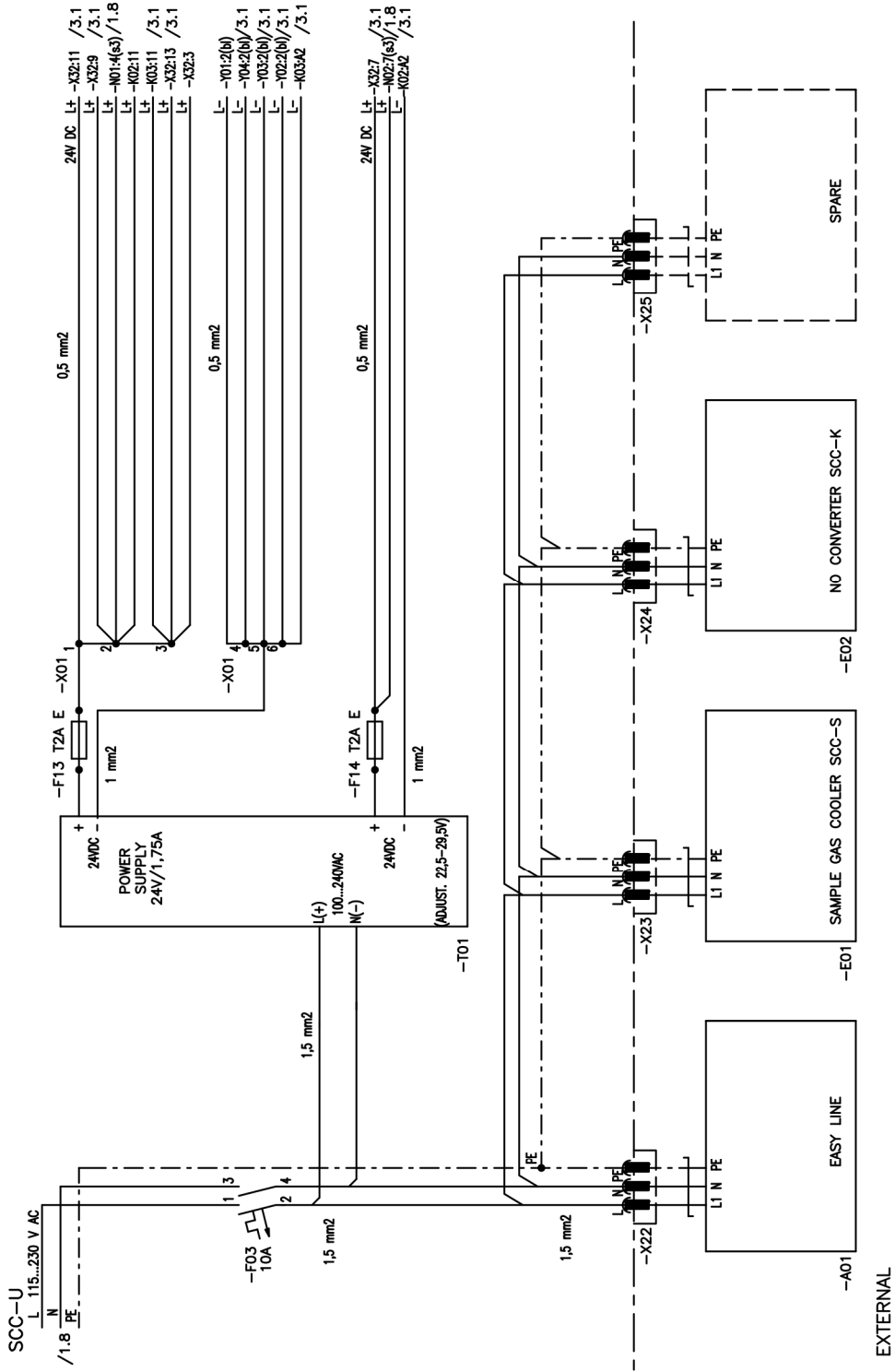
... 12 Appendix

... Technical drawings

Wiring diagram

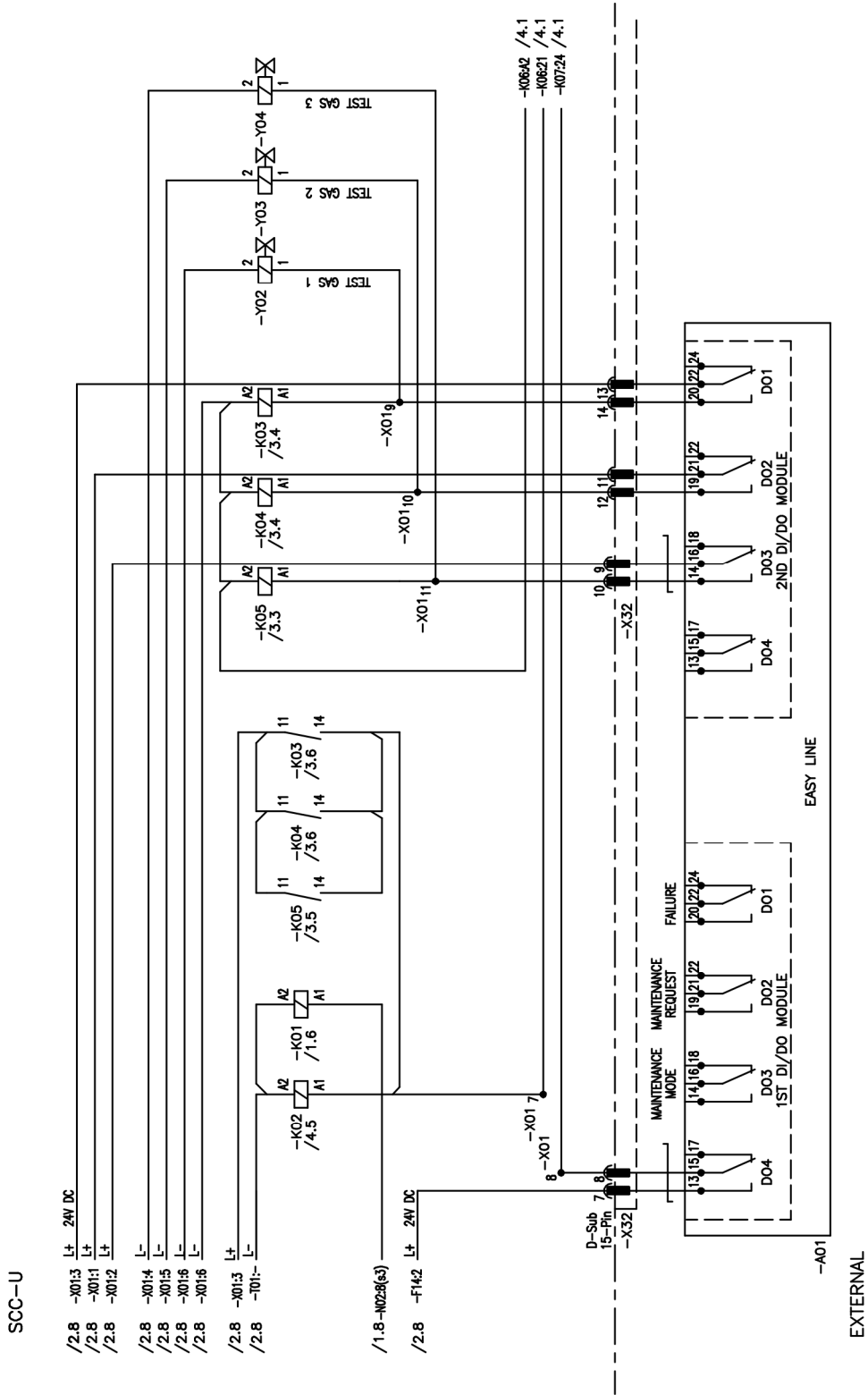
Page 1 of 4

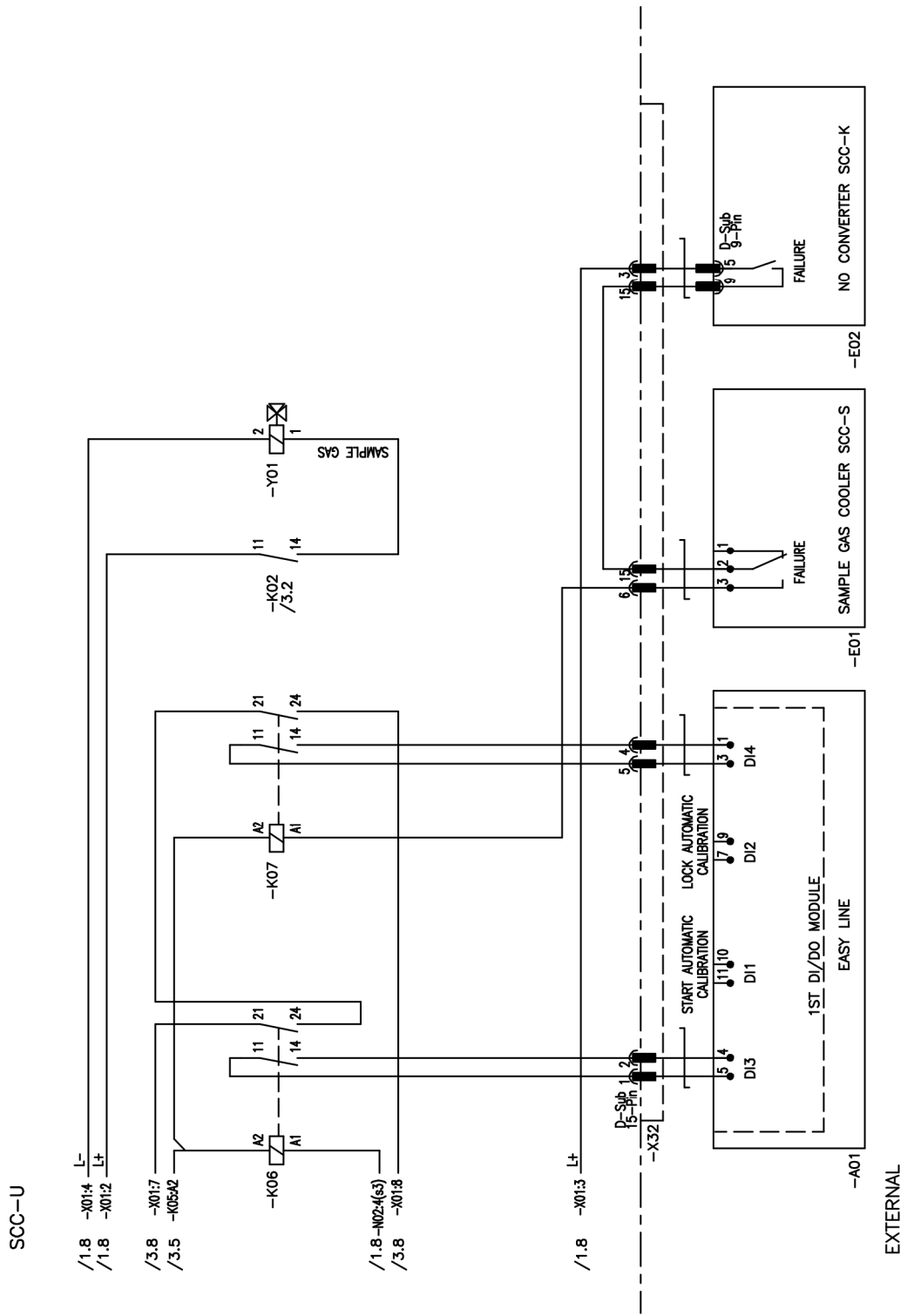




... 12 Appendix

... Technical drawings





Notes

Notes

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