

# SCC-E Sample Gas Feed Unit

## Operator's Manual

42/23-58 EN Rev. 1



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# Preface

## Contents of this Operator's Manual

This operator's manual contains all the information you need to install, commission, operate and maintain the SCC-E sample gas feed unit safely and in accordance with the regulations.

This operator's manual contains information on all the function units of the sample gas feed unit. It is possible that the sample gas feed unit that you have been supplied with could differ from the model described here.

## Additional Document

Specification Sheet "System Components and Accessories for Sample Gas Conditioning", Document No. 10/23-5.20 EN

This publication can be ordered from your authorized ABB representative or from ABB Automation GmbH, Analytical Division, Marketing Communication, Fax: +49 69 79 30-45 66, E-mail: analytical-mkt.deapr@de.abb.com

## Further Details on the Internet

You can find further information on ABB Analytical products and services on the internet: "<http://www.abb.com/analytical>".

## Symbols and Typefaces



Identifies safety information to be heeded during unit operation in order to avoid risks to the operator.



Identifies specific information on operation of the unit as well as on the use of this manual.

**1, 2, 3, ...**

Identifies reference numbers in the figures.

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# General Safety Information

## Requirements for Safe Operation

In order to operate in a safe and efficient manner the unit should be properly handled and stored, correctly installed and started, properly operated and carefully maintained.

## Personnel Qualifications

Only persons familiar with the installation, set-up, operation and maintenance of comparable equipment and certified as being capable of such work should work on the unit.

## Important Notes and Regulations

It is important to comply with:


- The content of this operator's manual
- The safety information affixed to the unit
- 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 unit is used in other countries.

## Unit Safety and Safe Operation

The unit is designed and tested in accordance with EN 61010 Part 1, "Safety Provisions for Electrical Measuring, Control, and Laboratory Instruments" and has been shipped ready for safe operation.

To maintain this condition and to assure safe operation, read and follow the safety information identified with the  symbol in this manual. Failure to do so can put persons at risk and can lead to unit damage as well as damage to other systems and instruments.

## Additional Information

If the information in this manual does not cover a particular situation, ABB Service is prepared to supply additional information as needed.

Contact your local ABB service representative or

ABB Service, Telephone: +49-180-5-12 35 80, Fax: +49-6 21-3 81-51 35,  
E-mail: [callcenter.automation@de.abb.com](mailto:callcenter.automation@de.abb.com)

## Safety Tips for Handling Electronic Measurement Devices

<b>Protective Lead Connection</b>	The protective lead should be attached to the protective lead connector before any other connection is made.
<b>Risks of Loss of Protective Lead Continuity</b>	The unit can be hazardous if the protective lead is interrupted inside or outside the unit or if the protective lead is disconnected.
<b>Proper Operating Voltage</b>	The unit voltage must be set to match the line voltage before the power supply is activated.
<b>Risks Involved in Opening the Covers</b>	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.
<b>Risks Involved in Working with an Open Unit</b>	The unit must be disconnected from all power sources before any maintenance work is performed. Work on a unit that is open and connected to power should only be performed by trained personnel who are familiar with the risks involved.
<b>Charged Capacitors</b>	The unit capacitors can retain their charge even when the unit is disconnected from all power sources.
<b>Use of Proper Fuses</b>	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.
<b>When Safe Operation can no Longer be Assured</b>	<p>If it is apparent that safe operation is no longer possible, the unit should be taken out of operation and secured against unauthorized use.</p> <p>The possibility of safe operation is excluded:</p> <ul style="list-style-type: none"><li>• If the unit is visibly damaged</li><li>• If the unit is no longer operational</li><li>• After prolonged storage under adverse conditions</li><li>• After severe transport stresses.</li></ul>

## Normal Operation

### Normal Operation

The SCC-E sample gas feed unit is designed for continuous dosed sample gas feeding.

The SCC-E sample gas feed unit with Peltier cooler is additionally designed for cooling the sample gas and separating and removing the condensate.

The SCC-E sample gas feed unit must not be used

- for feeding mixtures of gas/air or gas/oxygen that are capable of ignition during normal service,
- for feeding flammable gas, which can combine with air or oxygen to form an ignition-capable mixture, or
- in a potentially explosive atmosphere or in hazardous areas.

## Requirements for the Installation Site

### Short Gas Feed Paths

The sample gas feed unit should be installed as close as possible to the gas analyzer.

### Adequate Air Circulation

Ensure adequate natural air circulation around the sample gas feed unit. Avoid heat accumulation.

### Protection against Adverse Environmental Conditions

The sample gas feed 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.

### Climatic Conditions

Ambient temperature

In operation: +10 to +45 °C

During Storage and transport: -25 to +60 °C

Relative humidity

≤ 75 % year-round average, ≤ 95 % on 30 days per year, occasional light condensation permissible

## Power Supply

<b>Power Supply</b>	Input voltage	230 VAC, 50 Hz or 115 V AC, 60 Hz
	Power consumption	230 V AC, 50 Hz: 1.05 A, 240 VA

## Sample Gas Inlet Conditions

<b>Sample Gas Inlet Conditions</b>	Sample gas pressure	$p_{\text{abs}} = 70$ to 105 kPa (0.7 to 1.05 bar)
	Sample gas flow	7 to 70 l/h
	Sample gas inlet temperature	+10 to +50 °C
	Sample gas inlet dew point	Version without cooler: The dew point of the sample gas must be at least 5 °C lower than the lowest ambient temperature anywhere in the sample gas feed path. If this is not the case, then a sample gas cooler unit or a condensate trap is required. Version with Peltier cooler: max. 50 °C

## Scope of Delivery

### Scope of Delivery

Quantity	Description
1	SCC-E Sample Gas Feed Unit
2	Operator's Manuals (1 copy in German, 1 in English)
1	Diaphragm Pump Spare Parts Set



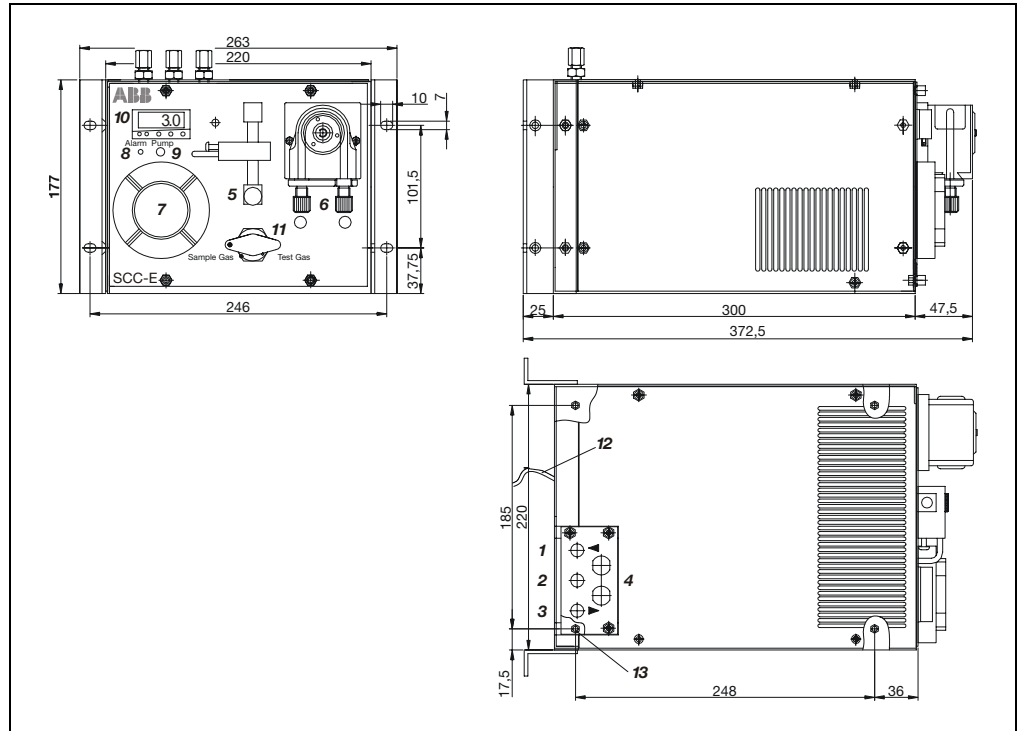
The mounting brackets are fitted in the factory.

# Dimensional Drawing

**Fig. 1**

**Dimensional Drawing**

(Dimensions in mm)



- 1** Sample gas inlet
  - 2** Test gas inlet
  - 3** Sample gas outlet
  - 4** Power supply and status signal cables
  - 5** Flow meter with needle valve
  - 6** Peristaltic pump <sup>1)</sup>
  - 7** Condensate monitor <sup>1)</sup>/diaphragm filter
  - 8** Red LED indicator “condensate alarm” <sup>1)</sup>
  - 9** Pump switch
  - 10** Temperature controller for cooler <sup>1)</sup>
  - 11** 3-way cock “sample gas/test gas”
  - 12** Condensate outlet <sup>1)</sup>
  - 13** 4 x M5 threaded holes in ground plate
- 1) only in version with Peltier cooler and condensate pump



- You should allow for the additional space required for the cooling air inlet on the left side of and above the unit.
- The mounting brackets are fitted in the factory, with about 2.5 cm projection to the rear wall.
- Slope max. 5°.







- If there is shipping damage which points to improper handling, file a damage claim with the shipper (railway, mail or freight carrier) within seven days.
- Make sure that none of the enclosed accessories are lost during unpacking (see section “Scope of Delivery”, page 7).
- Keep the shipping box and packaging material for future shipping needs.

### Installing the Sample Gas Feed Unit


#### Install the Sample Gas Feed Unit on the Wall

Step	Action
1	Mount the sample gas feed unit on the wall using 4 M6 screws (not supplied). The mounting brackets required for this purpose are mounted on the rear of the side panels in the factory.   To enable the cooling air to pass unobstructed out of the sample gas feed unit to the rear, the projection of the mounting brackets of around 2.5 cm to the rear wall, which is set up in the factory, must not be reduced.
2	If necessary, remove the condensate outlet hose from the peristaltic pump and pull it out backwards.
3	If necessary, remove the handle and close the threaded holes.

#### Install the Sample Gas Feed Unit in a 19-inch Cabinet/Rack

Step	Action
1	Unscrew the mounting brackets from the rear of the side panels and screw them securely at the front of the side panels, flush with the front panel, using the threaded holes provided for this purpose.
2	Exchange the fittings flange on the case cover with the blank flange on the rear wall.   Take care not to bend or squash any hoses.
3	If necessary, remove the handle and close the threaded holes.
4	If necessary, remove the adhesive pads from the bottom.
5	Mount the feed unit in a 19-inch cabinet/rack using 4 M5 screws.

#### Desktop Installation

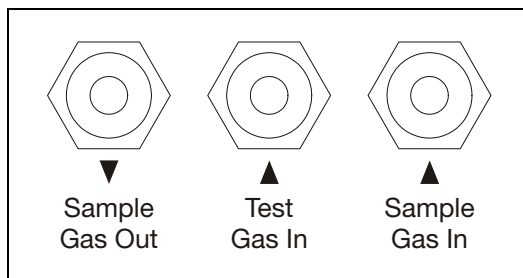
Step	Action
1	Unscrew the mounting brackets from the rear of the side panels.
2	If necessary, exchange the fittings flange on the case cover with the blank flange on the rear wall.   Take care not to bend or squash any hoses.

## Connecting the Sample Gas Pipes

**Fig. 2**

**Gas Connections**

(View from above)



**Gas Connections**

The gas connections are PPH screw connections for DN 4/6 mm hose.

**Connect Gas Pipes**

Connect the gas pipes to the gas inlets and outlet. The gas pipes should be made from material that is suited to the measuring task.

# Connecting the Electrical Cables



## CAUTION!

Follow all applicable national safety regulations for the installation and operation of electrical devices as well as the following safety precautions.

The sample gas feed unit voltage must be set to match the line voltage before the power supply is connected (see rating plate).

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

The sample gas feed unit can be hazardous if the protective lead is interrupted inside or outside the feed unit or if the protective lead is disconnected.

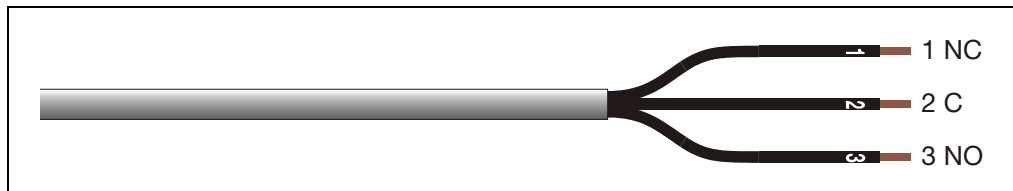


You should route the signal lines separately from the power supply lines.




## Connecting the Signal Lines

The signal lines (status signal of flow monitoring and – in the version with Peltier cooler – condensate monitoring and cooler temperature) should be connected in accordance with the wire numbering (see Fig. 3).

Fig. 3  
Signal Lines



## Connecting the Power Supply

Step	Action
1	 Make sure the voltage setting shown on the rating plate matches the line voltage.  The operating voltage cannot be switched over.
2	Make sure the power supply leads have an adequately dimensioned protective device (breaker).
3	Install either a mains disconnecter in the power supply wiring or a switched socket, in either case close to the sample gas feed unit. This should allow the sample gas feed unit to be completely disconnected from the power supply if necessary. The mains disconnecter should be identified in such a way that its relationship to the equipment that it is designed to disconnect can be clearly seen.
4	Connect the power supply leads to the power supply.  The sample gas feed unit may start when the power supply is connected.

## Power Supply and Sample Gas Activation



**CAUTION!**

Before activating the power supply check once again that the operating voltage setting (see rating plate) matches the line voltage.



**CAUTION!**

The needle valve must never be closed completely.

**Version  
without Cooler:**

Step	Action
1	Activate the power supply.
2	The sample gas feed unit is ready for operation without delay.
3	The sample gas must not be switched on until the upstream cooler unit's lead time has finished.
4	Set the sample gas flow using the needle valve (max. 70 l/h).

**Power Supply and  
Sample Gas Activation**

**Version  
with Peltier Cooler:**

Step	Action
1	Activate the power supply.
2	The condensate pump starts to run.
3	The lead time is approx. 10 minutes.
4	The flow alarm and the cooler temperature alarm are present during the lead time. The condensate alarm may also be present.
5	The lead time is finished and the sample gas feed unit is ready for operation when the sample gas outlet temperature of the Peltier cooler is within the factory-set limit values ("K1" LED on the temperature controller lights up yellow). The sample gas pump starts to run if the "Pump" push-button is pressed (lights up green).
6	The sample gas may be switched on.
7	Set the sample gas flow using the needle valve (max. 70 l/h).

**Power Supply and  
Sample Gas Activation**

## Sample Gas Pump Control

### Operation

The “Pump” push-button must always be pressed during operation (lights up green).

The sample gas pump can be switched off with the push-button, e.g. for maintenance work.

### Alarm (only in the Version with Peltier Cooler)

The sample gas pump is switched off when

- a condensate alarm (“Alarm” LED next to the “Pump” push-button lights up red) or
- a cooler temperature alarm (“K1” LED on the temperature controller is off) is present. The “Pump” push-button continues to light up green.

## Cooler Control

	Indication	LED K1	LED K2
After start-up	> 5 °C (room temp.)	Off (status alarm + pump off)	Lights up constantly yellow (cooling)
After lead time end (approx. 10 min)	≤ 5,5 °C	Lights up yellow (status alarm switches to “good” state)	Lights up constantly yellow (cooling)
Normal operation	3° C	Lights up yellow	Blinks (cooler regulation)
Cooler overloaded	> 3,5 °C	Lights up yellow	Lights up constantly yellow (cooling)
	> 5 °C	Off (status alarm + pump off)	Lights up constantly yellow (cooling)
Ambient temperature too low	< 2,5 °C	Lights up yellow	Off
	< 0 °C	Off (status alarm + pump off)	Off



See section “Troubleshooting” for further information on cooler problems (see page 22).

**CAUTION!**

The operations described in this chapter require specialized knowledge, and sometimes involve the necessity of working on the sample gas feed unit with its cover open and live. They must therefore only be carried out by qualified and specially trained persons.

## Replacing the Condensate Pump Hose

### When does the hose need to be replaced?

Depending on the operating cycle, the condensate pump hose should be replaced at least every 5 months.

**CAUTION!**

Never lubricate the condensate pump hose.

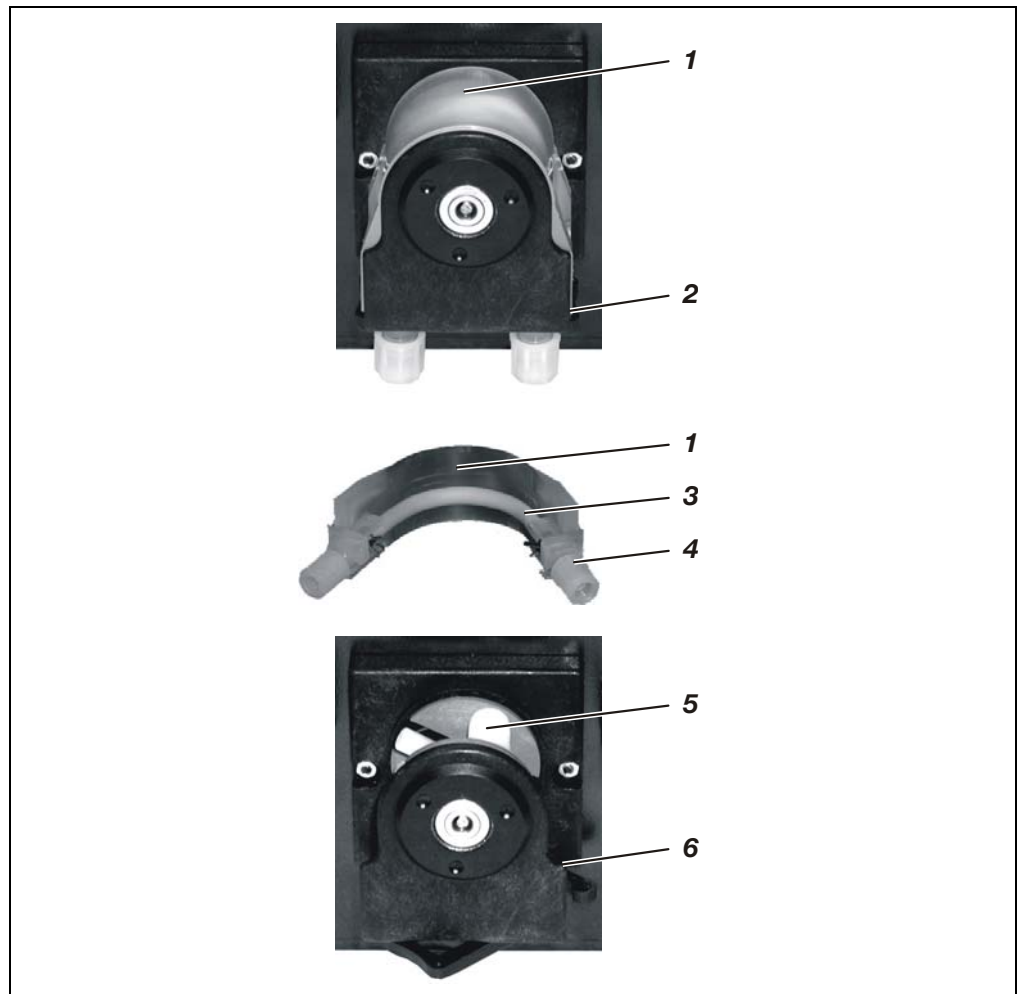
### Replace Condensate Pump Hose

(see Fig. 4)

Step	Action
1	Stop the sample gas supply and shut off the feed unit power supply.
Remove the old hose:	
2	Using the handles, press the moving belt <b>1</b> together and turn the S-clip <b>2</b> in a clockwise direction as far as its limit stop.
3	Remove the moving belt <b>1</b> from the pump head and pull the old hose <b>3</b> by the hose connections <b>4</b> to release it from the moving belt's guides.
4	Press the pressure rollers <b>5</b> together and check the spring pressure; if it is too weak, then the pressure springs and possibly rollers should be replaced (see p. 16).
Fit a new hose:	
5	Insert a new hose <b>3</b> with hose connections in the guides on the moving belt <b>1</b> .
6	Insert moving belt <b>1</b> with the new hose in the dovetail guide <b>6</b> in the pump head; using the handles, press the moving belt together while at the same time turning the S-clip <b>2</b> counterclockwise until it engages.
Start the feed unit again:	
7	Switch on power supply to feed unit.
8	The sample gas flow should only be restarted after the lead time period.

*Continued on next page*

**Fig. 4**  
**Condensate Pump,  
Hose and Pump Head  
with Roller Mounting**



**1** Moving belt  
**2** S-clip

**3** Hose  
**4** Hose connections

**5** Pressure rollers  
**6** Dovetail guides

# Replacing the Condensate Pump Pressure Rollers and Springs



## When do the pressure rollers and springs need to be replaced?

The pressure rollers in the condensate pump must be replaced when their surface is damaged.

The pressure springs in the condensate pump must be replaced when they are broken.

## Replace Pressure Rollers and Springs

(see Fig. 5)

Step	Action
1	 Stop the sample gas supply and shut off the feed unit power supply.
Remove the hose:	
2	Using the handles, press the moving belt <b>1</b> together and turn the S-clip <b>2</b> in a clockwise direction as far as its limit stop; then remove the moving belt and hose from the pump head.
Dismantle the pump head:	
3	Unscrew the two nuts <b>3</b> that secure the pump head (spanner size 5.5).
4	Pull the pump head <b>4</b> off the roller bearing axle, and remove the roller mounting <b>5</b> from the pump head.
Replace pressure rollers and springs:	
5	Pull the pressure springs <b>6</b> out of the hole in the roller mounting <b>5</b> and out of the retaining slot in the roller axle <b>7</b> . Remove the roller axle from the roller mounting, and pull the pressure roller <b>8</b> off the roller axle.
6	Push the new pressure roller <b>8</b> onto the roller axle <b>7</b> and secure with new pressure springs <b>6</b> in the roller mounting <b>5</b> .
Fit the pump head:	
7	Insert the roller mounting <b>5</b> in the pump head <b>4</b> , and push both components together onto the roller mounting axle. During this process, check to ensure that the roller mounting axle and roller mounting fit together properly.
8	Secure the pump head <b>4</b> with the two nuts <b>3</b> .
	 It is expedient to open the front panel forwards: this enables the pump's base plate with the fastening screws to be secured from inside.
Refit the hose:	
9	Insert moving belt <b>1</b> with the hose in the pump head; using the handles, press the moving belt together while at the same time turning the S-clip <b>2</b> counterclockwise until it engages.
Start the feed unit again:	
10	Switch on power supply to feed unit.
11	The sample gas flow should only be restarted after the lead time period.

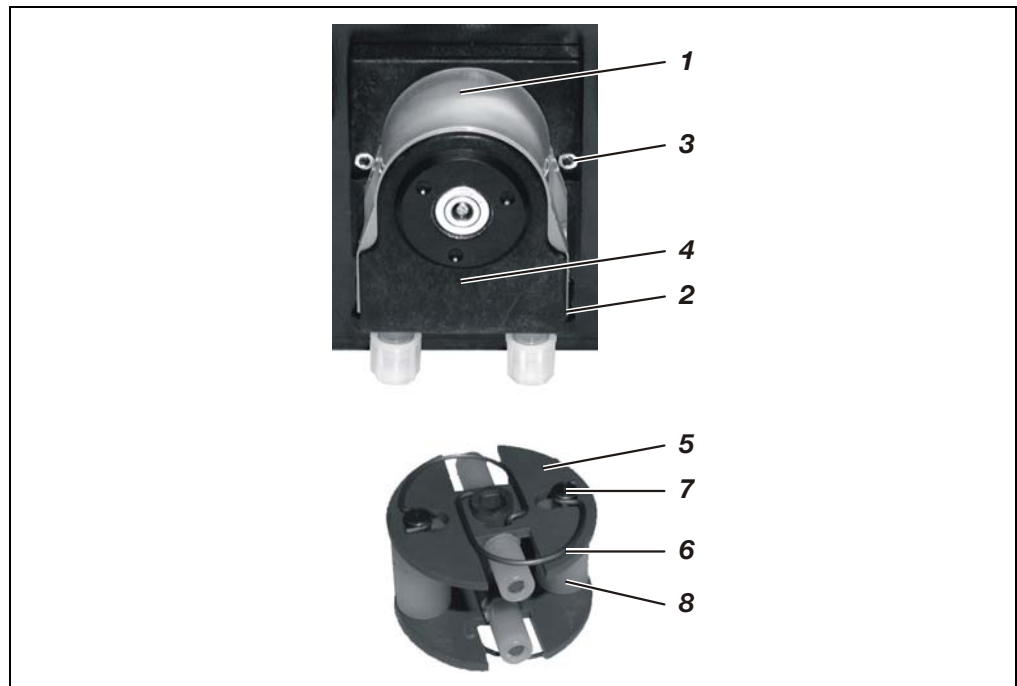
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# Replacing the Condensate Pump Pressure Rollers and Springs,

*continued*

**Fig. 5**  
**Condensate Pump,**  
**Roller Mounting**



- |  |                                 |
|--|---------------------------------|
| <b>1</b> Moving belt                           | <b>5</b> Roller Mounting        |
| <b>2</b> S-clip                                | <b>6</b> Pressure Springs (x 4) |
| <b>3</b> Nuts for Securing the Pump Head (x 2) | <b>7</b> Roller Axle            |
| <b>4</b> Pump Head                             | <b>8</b> Pressure Roller (x 2)  |

# Replacing the Diaphragm and Valve Plates in the Diaphragm Pump

**When do the diaphragm and valve plates need to be replaced?**

The diaphragm and valve plates in the diaphragm pump must be replaced when the diaphragm pump no longer feeds gas efficiently enough.





**CAUTION!**

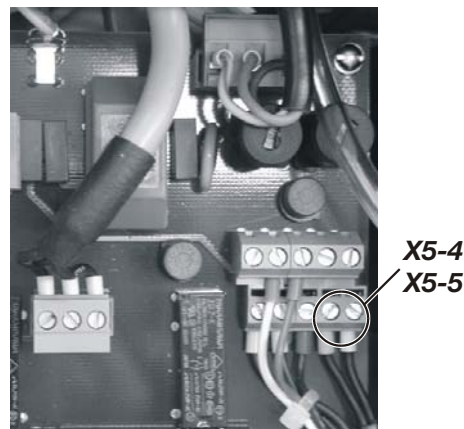
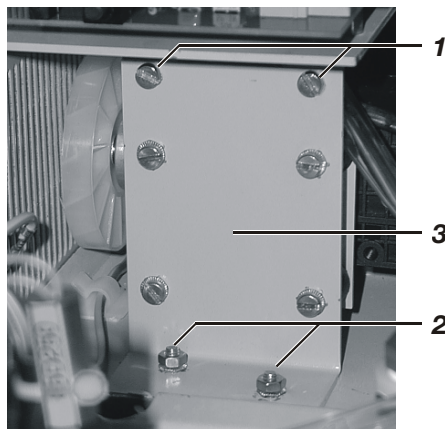
Residues from the gas that the pump has been feeding may be found on the diaphragm and valve plates. These materials can flow out when the diaphragm pump is opened. Take appropriate measures where needed to collect such residues.


The medium being fed may be corrosive and poisonous. Appropriate precautions must be taken.

**Replace Diaphragm and Valve Plates in the Diaphragm Pump**

(see Fig. 6)

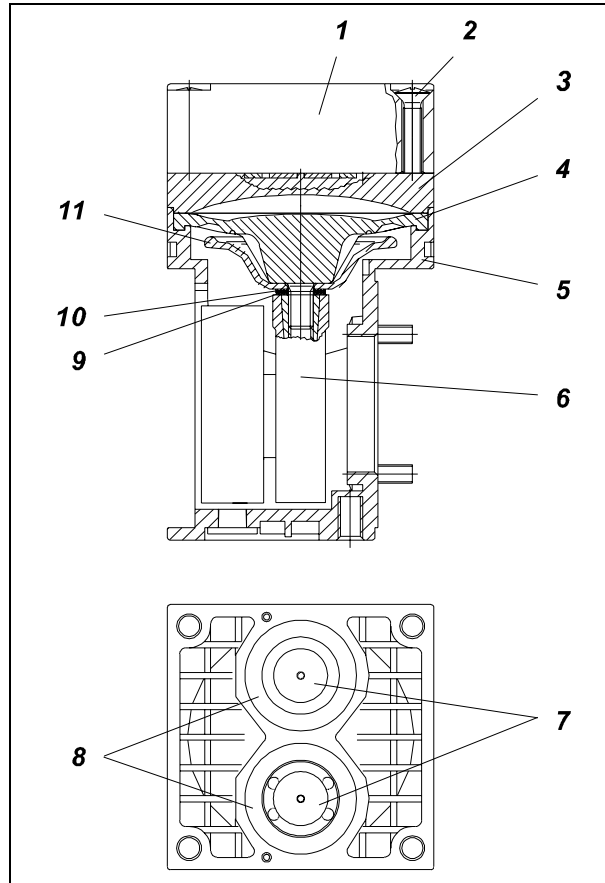
Step	Action
1	 Stop the sample gas supply and shut off the feed unit power supply.
Remove the diaphragm pump:	
2	Remove the case cover and the front panel of the feed unit.  Take care not to damage the temperature controller in the version with Peltier cooler.
3	Loosen screws <b>1</b> and <b>2</b> . Turn the mounting plate <b>3</b> with the diaphragm pump to the right and pull it out of the case.
4	When the diaphragm pump shall be removed completely, disconnect the pump's power supply leads from the terminals <b>X5-4</b> und <b>X5-5</b> .



5	Take off the pump hoses and clean the outside of the pump.  Mark both pump hoses: The pump inlet hose is connected to the diaphragm filter outlet and the pump outlet hose is connected to the flow meter inlet.
---	--

*Continued on next page*


**Fig. 6**  
**Diaphragm Pump**



- 1** Head cap
- 2** Head cap screws
- 3** Spacer plate
- 4** Structural diaphragm
- 5** Casing
- 6** Connecting rod
- 7** Valve plates
- 8** Sealing rings
- 9** Belleville spring
- 10** Distance ring(s)
- 11** Supporting bell

**Replace Diaphragm and Valve Plates in the Diaphragm Pump**

(continued)



Step	Action
<b>Remove the pump head:</b>	
6	Mark the head cap <b>1</b> , spacer plate <b>3</b> and casing <b>5</b> with a felt-tip pen. This prevents the possibility of these parts being fitted incorrectly when the pump is reassembled later.
7	Undo the four head cover screws <b>2</b> and remove the head cap along with the spacer plate from the pump casing.
<b>Replace diaphragm:</b>	
8	Move the structural diaphragm <b>4</b> by rotating the fan impeller to its upper return point.
9	Hold opposite sides of the structural diaphragm, raise it, then remove it by rotating in an anticlockwise direction. During this procedure you should take care to ensure that the Belleville spring <b>9</b> and the distance ring(s) <b>10</b> do not fall from the structural diaphragm's threaded bolt into the casing.
10	Remove the Belleville spring, distance ring(s) and supporting bell <b>11</b> from the structural diaphragm's threaded bolt and retain them.
11	Check all the parts for dirt and, if necessary, clean them with a dry cloth or compressed air.
	 Do not use solvents for cleaning as they can attack the plastic parts.

*Continued on next page*

## Replacing the Diaphragm and Valve Plates, *continued*

### Replace Diaphragm and Valve Plates in the Diaphragm Pump

(continued)

Step	Action
12	Push the supporting bell, the distance ring(s) and the Belleville spring in that order onto the threaded bolt of the new structural diaphragm.  The disk edge of the spring must be aligned with the structural diaphragm.
13	Move the connecting rod <b>6</b> to its upper return point.
14	Screw the new structural diaphragm with support bell, distance ring(s) and Belleville spring onto the connecting rod and hand-tighten it.
Replace valve plates:	
15	Separate head cap <b>1</b> from the spacer plate <b>3</b> .
16	Remove the valve plates <b>7</b> and the sealing rings <b>8</b> from the spacer plate.
17	Check that the valve seats, spacer plate and head cap are clean; if any of them display unevenness, scratches or corrosion they should be replaced.
18	Insert the new valve plates in the valve seats on the spacer plate. The valve plates for the compression and suction sides are identical; the same applies to the upper and lower sides of the valve plates.
19	Move the valve plates gently in a horizontal plane to ensure that they are not locked.
20	Insert sealing rings in the spacer plate.
Fit the pump head:	
21	Using the fan impeller, move the structural diaphragm to its upper dead point.
22	Place the spacer plate <b>3</b> , the valve plates <b>7</b> , sealing rings <b>8</b> and the head cap <b>1</b> on the casing in accordance with the markings.
23	Check that the head cap is centered correctly by moving it gently sideways.
24	Tighten the head cap screws <b>2</b> crosswise only slightly.
25	Check that the pump moves freely by turning the fan impeller.
26	Using the fan impeller, move the structural diaphragm to its upper dead point.
27	Hand-tighten the head cap screws.
Re-install the diaphragm pump:	
28	Attach the hose coming from the diaphragm filter outlet to the pump inlet and the hose going to the flow meter inlet to the pump outlet.
29	If necessary connect the pump's power supply leads to the terminals <b>X5-4</b> and <b>X5-5</b> .
30	Insert the mounting plate with the diaphragm pump into the case and fasten it.
31	Fasten the case cover and the front panel of the feed unit.  Take care not to bend or squash any hoses and not to damage the temperature controller in the version with Peltier cooler.
Start the feed unit again:	
32	Check that the gas feed paths have no leaks (see instructions on p. 21).
33	Switch on power supply to feed unit.
34	The sample gas flow should only be restarted after the lead time period.

## Checking the Gas Paths for Leaks

### When do the gas paths need to be checked for leaks?

The gas paths should be checked for leaks regularly.

They must be checked after the gas paths inside the feed unit have been opened.



The feed unit must be checked from both sample gas connections because of the valves in the built-in diaphragm pump.

### Check for Leaks

Step	Action
1	Block off the sample gas outlet.
2	Apply a positive pressure of 100 mbar to the sample gas inlet.
3	Using a U-pipe manometer, for example (pipe diameter 7 to 8 mm), check the drop in pressure; this must not exceed 0.1 mbar per minute.
4	Similarly, check for leaks from the other side.

## Troubleshooting

Problem	Cause	Remedy
Feed unit not working	Power supply interrupted	Reconnect the power supply.
	Fuse blown	Replace fuse (2 A T).
	Pump motor blocked	Remove blockage.
	Defective pump	Replace pump.
	Defective diaphragm	Replace diaphragm (see page 18).
Drops of condensate in the condensate monitor or flow monitor (liquid alarm)	Condensate being produced by the gas analysis system	1. Check operability of the upstream condensate separation device, and rectify cause.
	Fluid from the process penetrating	2. Empty, clean and dry the upstream sample gas pipe and sample gas conditioning units.
	Cooler unit's condensate collecting vessel full	3. Empty, clean and dry the condensate monitor.
		4. Replace filter diaphragm.
		5. Press reset switch on the front panel to deactivate the condensate lock.
Sample gas flow insufficient (flow alarm)	Upstream sample gas pipe or modules blocked or sealed off	Remove blockage or open modules.
	Downstream modules blocked or sealed off	Remove blockage or open modules.
	Negative pressure on the gas sampling side	Rectify negative pressure.
	Positive pressure in the waste gas pipe	Rectify positive pressure.
Cooler not working, temperature indicator off	Fuses blown	Check fuses F1 and F2.
Temperature indication > 3 °C	Power supply defective	Check voltage at filter capacitors C1 and C2.
	Fan defective	Check fan and replace if necessary.
	Ambient temperature > 45 °C	Check ambient temperature.
	Sample gas flow too high	Reduce sample gas flow.
Temperature indication = 1999	Temperature sensor defective	Disconnect white leads and measure the Pt100 sensor resistance: $107.79 + 0.4 \Omega$ at ambient temperature = +20 °C. Replace sensor when deviations are larger.
Temperature indication = room temperature, LED K1 lights up constantly	Transistor T1 BUZ11 defective	Check Peltier element voltage at terminals X2-3 and X2-4 (see circuit diagram on page 26): Voltage > 13 VDC $\Rightarrow$ transistor defective; replace transistor T1.

## Shutting Down the Feed Unit



### CAUTION!

Before the feed unit is shut down it must be purged to prevent the accumulation of condensate and deposits.



Make sure the feed unit is free of residual moisture that can freeze if low temperatures are encountered during shipping and storage.



Ambient temperature for storage and transportation: -25 to +60 °C

### Shut Down the Feed Unit

Step	Action
1	Disconnect the power supply.
2	Shut off the sample gas supply to the feed unit.
3	Remove the gas pipes from the connections on the feed unit.
4	Thoroughly purge the feed unit gas paths with an inert gas.
5	Fully tighten the gas connections.
6	Disconnect the electrical leads.

## Packing the Feed Unit

### Pack the Feed Unit

Step	Action
1	If the original packaging is not available, cover the feed unit with bubble paper or corrugated cardboard.
2	Place the feed unit in an adequately sized box lined with shock-absorbing material (e.g. foam).  The cushioning material's thickness should be adequate for the cooler unit's weight and the mode of shipping.
3	Mark the box "Fragile Item" and "Transport Upright".
Additional steps when shipping overseas:	
4	Add a drying agent (e.g. silica gel) and wrap the feed unit air-tight in an additional 0.2-mm thick polyethylene sheet.  The amount of drying agent used should be adequate for the package volume and the planned shipping time (at least 3 months).
5	The box should also be lined with a double layer of bitumen paper.

## Description

### Versions

The SCC-E sample gas feed unit is available in two versions:

- without cooler (see Fig. 7) and
- with Peltier cooler and condensate pump (see Fig. 8).

### Design

The SCC-E sample gas feed unit is produced in a 1/2 19-inch casing.

It contains in the version without cooler

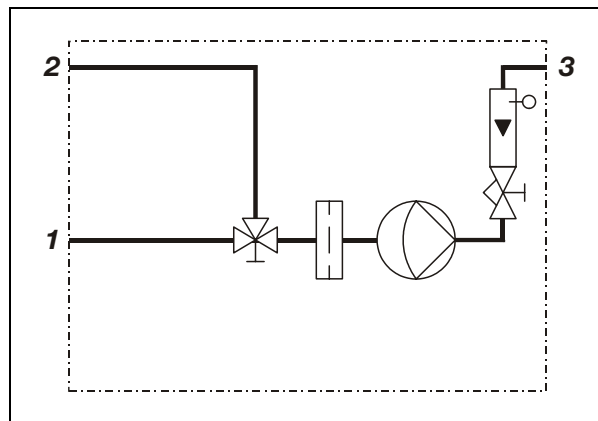
- a diaphragm pump,
- a flow meter with needle valve,
- a diaphragm filter and
- a 3-way cock for switching between sample gas and test gas.

In the version with Peltier cooler it contains additionally

- a condensate monitor (instead of the diaphragm filter) and
- a hose pump for condensate removal.

**Fig. 7**

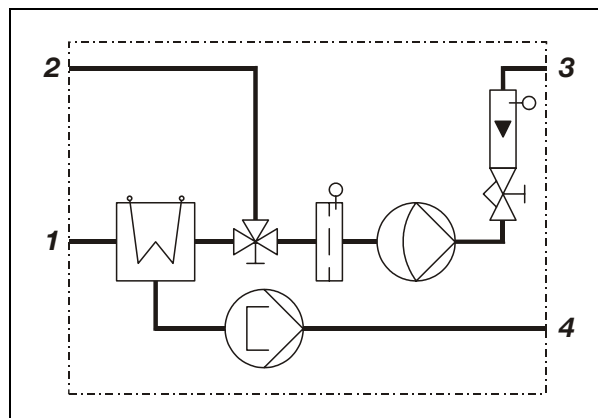
**Version  
without Cooler:  
Pneumatics Diagram**



- 1** Sample gas inlet
- 2** Test gas inlet
- 3** Sample gas outlet

**Fig. 8**

**Version  
with Peltier Cooler:  
Pneumatics Diagram**

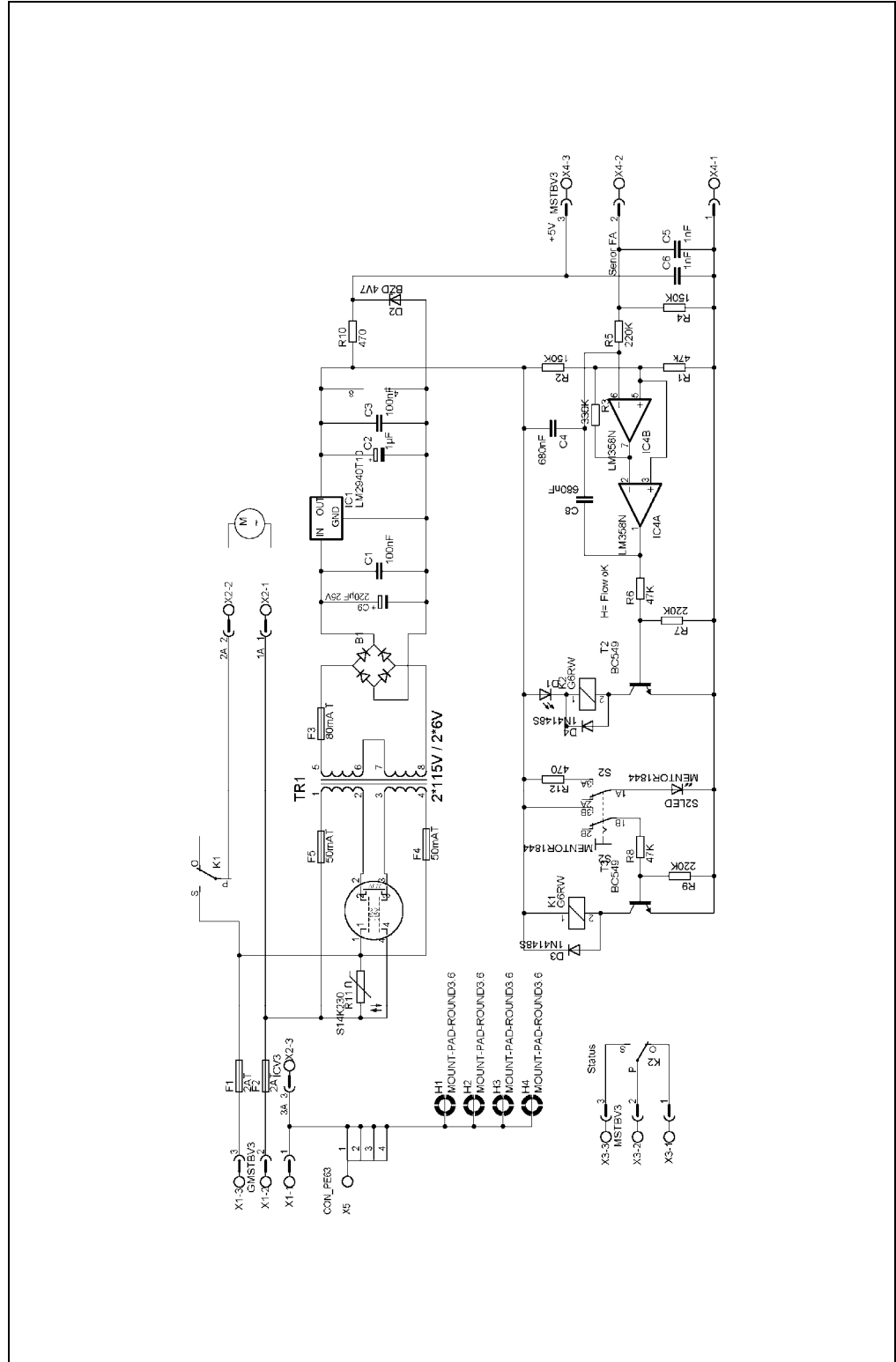


- 1** Sample gas inlet
- 2** Test gas inlet
- 3** Sample gas outlet
- 4** Condensate outlet



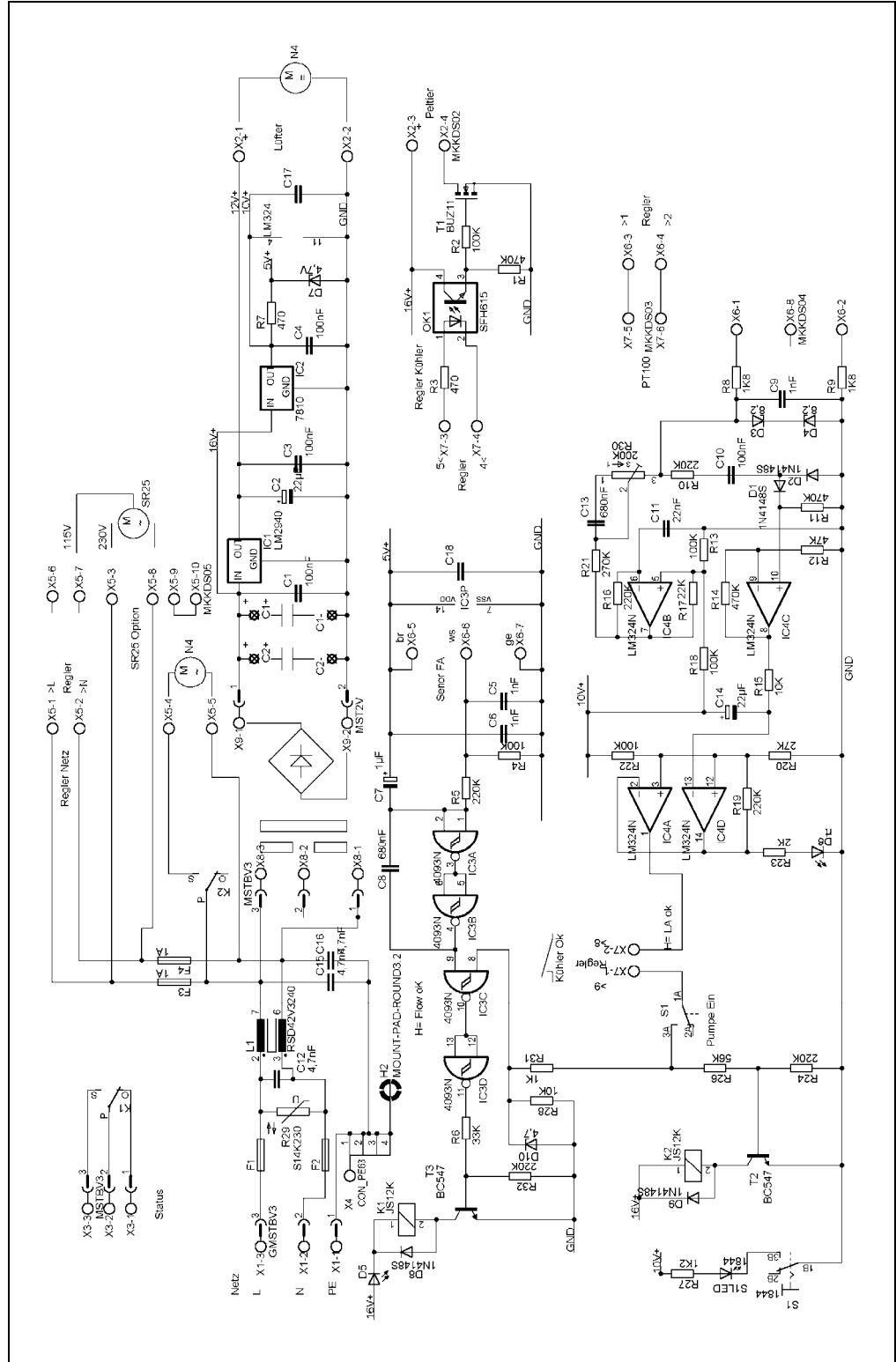
# Circuit Diagrams

**Fig. 9**  
**Version**  
**without Cooler:**  
**Circuit Diagram**



*Continued on next page*

**Fig. 10**  
**Version**  
**with Peltier Cooler:**  
**Circuit Diagram**





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