

Gas Conditioning Unit Series CSS®

CSS-VC1, CSS-VC2

19", wall mount or portable in
carrying case with software version
1.6

Instruction Manual
Version 1.02.01



**Dear Customer,**

Thank you for buying our product. In this manual you will find all necessary information about this M&C product. The information in the manual is fast and easy to find, so you can start using your M&C product right after you have read the manual.

If you have any question regarding the product or the application, please don't hesitate to contact M&C or your M&C authorized distributor. You will find all the addresses in the appendix of this instruction manual.

For additional information about our products, please go to M&C's website www.mc-techgroup.com. There you can find the data sheets and manuals of our products in German and English.

This manual does not purport to be complete and is subject to technical changes.

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With the release of this version all older manual versions will no longer be valid. The German instruction manual is the original instruction manual. In case of arbitration only the German wording shall be valid and binding.

Version: 1.02.01

Software version: 1.6

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1 GENERAL INFORMATION

The product described in this manual has been supplied in a safe and tested condition. For safe operation and to maintain this condition, the information and instructions in this manual must be followed. In addition, the appropriate transportation, proper storage and installation as well as careful operation and maintenance are necessary.

For the proper use of this product, all information required for technical personnel is contained in this manual.

2 DECLARATION OF CONFORMITY



The product described in this operating manual complies with the following EU directives:

EMV-Instruction

The requirements of the EU directive 2014/30/EU "Electromagnetic compatibility" are met.

Low Voltage Directive

The requirement of the EU directive 2014/35/EU "Low Voltage Directive" are met.

The compliance with this EU directive has been examined according to DIN EN 61010.

RoHS Directive

The requirements of the RoHS2 ("Restriction of Hazardous Substances 2") directive 2011/65/EU and its annexes are met.

Declaration of conformity

The EU Declaration of conformity can be downloaded from the **M&C** homepage or directly requested from **M&C**.



3 SAFETY

Note the following safety precautions when installing, commissioning and operating the device:

Before operation and use of the equipment, read the operating manual. The instructions and warnings listed in the operating manual must be followed.

Work on electrical equipment must only be performed by qualified personnel in accordance with the regulations currently in force.

The requirements of VDE 0100 together with its associated standards and regulations must be complied with for the creation of power installations with nominal voltages up to 1000 V.

When connecting the device, ensure the correct mains voltage in accordance with the specifications on the rating plate.

Protection against contact with dangerously high electrical voltages:
Before opening the equipment, it must be switched off. This also applies to any connected external control circuits.

Only use the device in approved temperature and pressure ranges.

Ensure installation is weather-protected. Do not directly expose to dust, rain or liquids.

The device must not be operated in hazardous areas;

Installation, maintenance, monitoring and any repairs must be performed by authorised personnel in compliance with the relevant provisions.

3.1 INTENDED USE

The CSS-VC1 and CSS-VC2 are intended for use in general purpose areas (non-hazardous environments). They may only be operated in compliance with the information starting in chapter 8. You must meet the requirements of the ambient temperature and pressure characteristics in particular.

Do not use this product for any other purpose. Improper use and handling can create hazards and cause damage. For more information, please refer to the safety information in this instruction manual.

4 WARRANTY

If the device fails, please contact **M&C** directly, or your **M&C** authorised dealer.

Provided that the device is used correctly, we undertake to provide a 1 year warranty from the date of delivery according to our terms of sale. Consumables are not covered by the warranty. The warranty covers free repair at the factory or free replacement of the device sent free to the point of use. Returns must be made in sufficient and proper protective packaging.



5 USED TERMS AND SIGNAL INDICATIONS



means that death, serious personal injury and/or substantial property damage will result if proper precautions are not taken.



indicates that death, serious personal injury and/or substantial property damage might occur if proper precautions are not taken.



means that minor personal injury may result if proper precautions are not taken.

Caution

without a warning triangle symbol, indicates that property damage may result if proper measures are not taken.



This is important information about the product or the appropriate part of the manual to which particular attention should be paid.

Qualified personnel

These are persons with necessary qualification who are familiar with installation, use and maintenance of the product.



High voltages!
Protect yourself and others against damage which might be caused by high voltages.



Toxic!
Acute toxicity (oral, dermal, inhalation)! Toxic when in contact with skin, swallowed or inhaled.



Corrosive!
These substances destroy living tissue and equipment upon contact. Do not breathe vapors; avoid contact with skin and eyes.



Hot surface!
Contact may cause burn! Do not touch!



Caution, risk of being crushed due to rotating parts.
Do not open the device. Use personal protective equipment (PPE).



Wear protective gloves!

Working with chemicals, sharp objects or extremely high temperatures requires wearing protective gloves.



Wear safety glasses!

Protect your eyes while working with chemicals or sharp objects. Wear safety glasses to avoid getting something in your eyes.



Wear protective clothes!

Working with chemicals, sharp objects or extremely high temperatures requires wearing protective clothes.



Use foot protection



Use safety helmet and full protective goggles



6 INTRODUCTION

The gas conditioning **CSS-VC** unit, either for 19"- or wall mounting or as a portable unit in carrying case, is a fully pre-assembled compact continuously operating gas purification system, which, depending on the design, can supply a sample gas volume of max. 1 x 250 NI/h (CSS VC1) or 2 x 150 NI/h (CSS-VC2). Sample gas conditioning units are suitable due to their equipment and additional options for the wide-ranging requirements of continuous gas analysis.

The entire gas conditioning unit is housed in a compact, rugged steel housing so that gas analyses can be performed rapidly without a great deal of effort, with low maintenance and reliability.

Gas conditioning unit **CSS-VC** must not be used to support gas/air or gas/oxygen mixtures that are ignitable during operation, for the supply of combustible gases that can form an ignitable mixture in combination with air or oxygen, or in potentially explosive atmospheres and in potentially explosive locations.

7 APPLICATION

With the **CSS-VC**, fully pre-installed gas conditioning systems are created for continuous use, which can be integrated perfectly into analytical systems. The compact design makes few demands on space. The gas conditioning systems are operational within minutes. This renders time-consuming and expensive procurement of individual components and small parts and their assembly unnecessary. A portable version is also available in a carrying case.

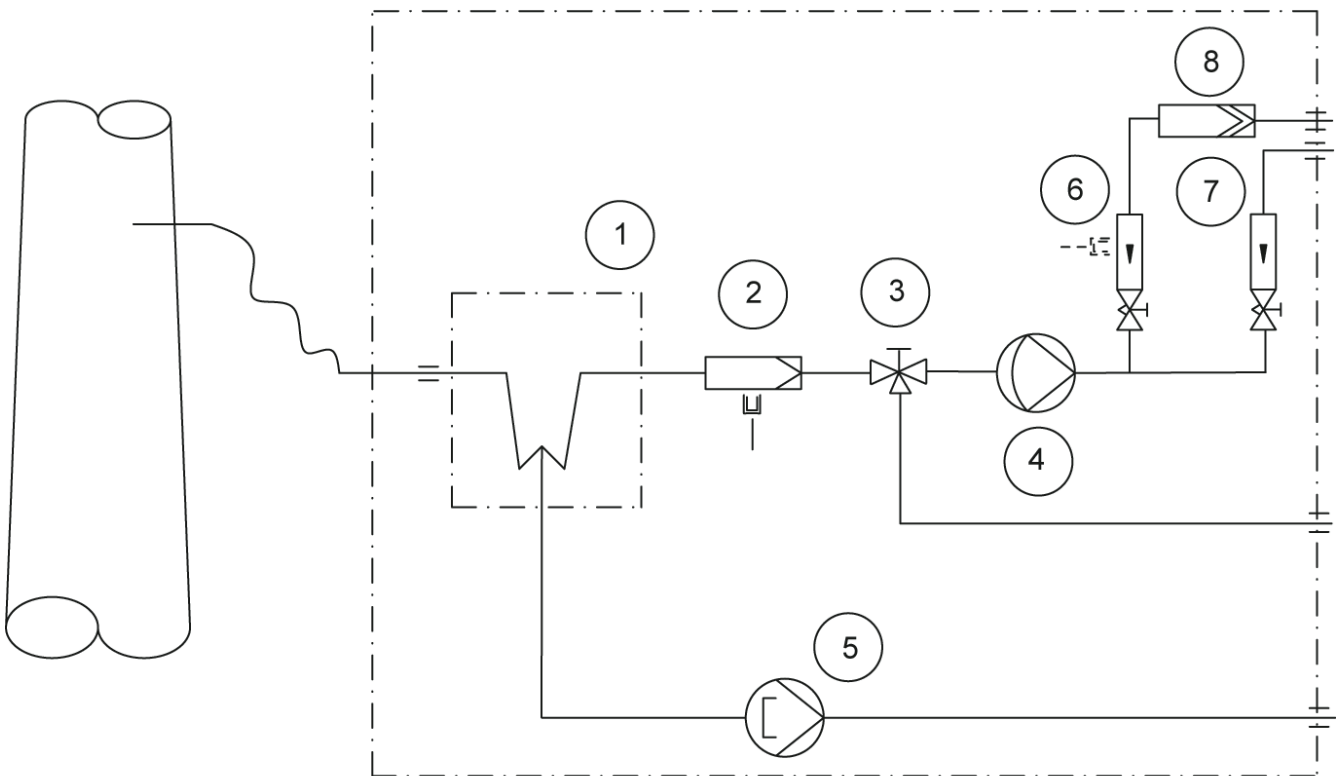


Figure 1 Example of a gas flow diagram CSS-VC1

- ① Gas cooler series **ECM-1**
- ② Option universal filter or front-installed filter **FPF-0, 1GF**, 0.1 μm , with optional liquid alarm **LA** or front-installed filter **FPF-2-0, 3GF**, 0.3 μm , with integrated humidity alarm
- ③ Option 3 or 5-way ball valve **3L/PV** or **5L/PV**
- ④ Option sample gas pump **N3/5/9KPE**
- ⑤ Option peristaltic pump **SR25.2**
- ⑥ Option flow meter **FM40** with flow alarm
- ⑦ Option flow meter **FM40**
- ⑧ Option liquid particulate filter **CLF-5/W** or **CLF-T (SS)**

In version **CSS-VC2** there are 2 parallel gas lines in one gas conditioning unit.

8 TECHNICAL SPECIFICATIONS

Gas conditioning series CSS ®	Version CSS-VC1	Version CSS-VC2
Article number 230 V 50 Hz	01G6050	01G6055
Article number 115 V / 50-60 Hz	01G6050a	01G6055a
Gas outlet dew point	Setting range: +2 to +7 °C [35.6 to 44.6 °F], factory setting: +5 °C [41 °F]	
Dew point stability	Under constant conditions < ± 0.1 °C [±0.18 °F]	
Gas inlet temperature	Max. 180 °C** [356 °F]**	
Gas inlet water-vapour saturation	Max. +80 °C** [176 °F]**	
Gas flow	**Max. 250 l/h	**Max. 2 x 150 l/h
Ambient temperature	10 to +40 °C** [50 to 104 °F]**	
Storage temperature	-25 to +65 °C [-13 to 149 °F]	
Pressure	0.7 bar to 1.4 bar abs.	
Total cooling capacity **	Max. 144 kJ/h	
Number of gas inlets	1	2
Number of gas outlets	1	2
Condensate connection	1	2
Medium connections	Hose connection 4/6 mm	
Material of parts in contact with medium	Heat exchangers: Glass, PVDF or stainless steel 1.4571 Hoses/screwed connectors: PTFE/PVDF Universal filter e.g. FP-2T-D: PVDF, FKM, glass, PTFE Front-installed filter FPF-0.1GF: PVDF, glass, FKM Front-installed filter FPF-2-0.3GF: PVC, FKM, PPH Peristaltic pump SR25.2: PVDF, Novoprene ® Liquid particle e.g. CLF-5/W: PVDF, glass, FKM, PTFE Sample gas pumps N3/5/9: PVDF, PTFE, FKM Flow meter FM40: PVDF, glass, FKM, Hastelloy Ball valve 3L/PV and 5L/PV: PVDF, FKM	
Operational	Approx. 10 minutes.	
Mains connection	230 V 50-60 Hz ±10 % or 115 V 50-60 Hz ±10 % ***	
Power input	Max. 220 VA + max. 300 VA for sample gas pumps	
Device fuse	6.3 A time-lag, 5 x 20 mm	
Electrical connection	<ul style="list-style-type: none"> - Cold-device connector with 2 m cable - Single alarm connections (11 & 12-pole) or status alarm(s) (6-pole) : maximum capacity of the relays 24 V 500 mA - mA-outlet : maximum load 500 Ohm, accuracy ±2 % of measuring range end value for display indication - Heated sample line : maximum length 10 m [≈ 82.81 ft] 	
Device protection class	IP20 to EN 60529	
Housing design	Steel housing for 19"- or wall mounting, painted RAL 7035	
Device dimensions (H x W x D)	267.5 x 483 x 301.5 mm [≈ 10.53" x 19.02" x 11.87"] (Portable version: 355 x 515 x 395 mm [≈ 13.98" x 20.28" x 15.55"])	
Electrical device standard	EN 61010	

FKM = Viton®, Fluorinated rubber PVDF = Polyvinylidene fluoride PVC = Polyvinyl chloride
PPH = Hard polypropylene PTFE = Polytetrafluoroethylene

**Technical specifications with maximum values must be rated in consideration of total cooling capacity at 25 °C [77 °F] and an outlet dew point of 5 °C [41 °F].

*** 115 V / 50 Hz sample gas pump available as a special item

8.1 OPTIONS

Beyond the standard scope of options of this for the **CSS-VC**, other customised options are possible that cannot be listed in this manual.

Description	Part No.
Extra charge for gas connections directly to a heat exchanger	01G6062
Extra charge for glass heat exchanger ECM-1 for CSS-VC1 , sample gas connections on the heat exchanger	93K0140
Extra charge for stainless steel heat exchanger ECM-1 for CSS-VC1 , sample gas connections on the heat exchanger	93K0160
Extra charge for PVDF heat exchanger ECM-1 for CSS-VC1 , gas connections on the heat exchanger	93K0170
Extra charge for gas connections directly to two heat exchangers	01G6063
Extra charge for glass heat exchanger ECM-2 for CSS-VC2 , sample gas connections on the heat exchangers	97K0100
Extra charge for stainless steel heat exchanger ECM-2 for CSS-VC2 , sample gas connections on the heat exchangers	97K0115
Extra charge for PVDF heat exchanger ECM-2 for CSS-VC1 , sample gas connections on the heat exchangers	97K0110
Extra charge for gas connections of a heat exchanger in the connection plate for e.g. 19" mount	01G6060
Extra charge for glass heat exchanger ECM-1 90° for CSS-VC1 , sample gas connections in the connection plate for e.g. 19" mount	93K0150
Extra charge for PVDF heat exchanger ECM-1 90° for CSS-VC1 sample gas connections in the connection plate for e.g. 19" mount	93K0170
Extra charge for gas connections of 2 heat exchangers in the connection plate for e.g. 19" mount	01G6061
Extra charge for glass heat exchanger ECM-2 90° for CSS-VC2 sample gas connections in the connection plate for e.g. 19" mount	97K0150
Extra charge for PVDF heat exchanger ECM-2 90° for CSS-VC2 sample gas connections in the connection plate for e.g. 19" mount	97K0110
Extra charge for gas connections directly to a heat exchanger	01G6062
Extra charge for glass heat exchanger ECM-1 for CSS-VC1 , sample gas connections on the heat exchanger	93K0140
Extra charge for stainless steel heat exchanger ECM-1 for CSS-VC1 , sample gas connections on the heat exchanger	93K0160
Extra charge for PVDF heat exchanger ECM-1 for CSS-VC1 , gas connections on the heat exchanger	93K0170
Extra charge for gas connections directly to two heat exchangers	01G6063
Extra charge for glass heat exchanger ECM-2 for CSS-VC2 , sample gas connections on the heat exchangers	97K0100
Extra charge for glass heat exchanger ECM-2 for CSS-VC2 , sample gas connections on the heat exchangers	97K0100
Peristaltic pumps for condensate disposal (max. 2 pcs.)	
Extra charge for mounting a peristaltic pump SR25.2 for condensate disposal, with hoses pre-installed (one required for each gas line)	01G6140
Filter (max. 2 pcs. Front-installed filters and 2 pcs. Universal or aerosol filters) and liquid alarm (max. 2 pcs.)	
Extra charge for installation of a sample gas filter FPF-0, 1GF	04F1000
Extra charge for liquid alarm with flow chamber LS/LA2 with sample gas filter FPF-0, 1GF	03E3010
Extra charge for installation of a sample gas filter FPF+	04F2100

Description	Part No.
Extra charge for filter element for FPF+ (see datasheet "Front-Panel Mounting Fine Filter Series FP [®] ")	To be selected
Extra charge for liquid sensor LA3 integrated into FPF+	03E1300
Extra charge for universal filter (see data sheet "Universal Filter Series FP [®] , FT [®] ")/aerosol filter CLF... (see data sheets for "Liquid Particle Filter Series CLF [®] ")	To be selected
Extra charge for installation of universal filter/aerosol filter CLF on front plate (max 2 pcs.)	01G6075
Extra charge for liquid alarm LA1S with universal filter F. -.-D	03E1001
Ball valves for calibration gas feeding (max. 1 pc.)	
Extra charge for installation of a 3-way ball valve 3L/PV	01G9045
Extra charge for installation of a 5-way ball valve 5L/PV	01G9046
Sample gas pumps (max. 2 pcs., only with evaluation electronic system 01G6175)	
Extra charge for installing sample pumps N.. KPE	01G6070
Extra charge for sample gas pump N3KPE	01G6125
Extra charge for gas pump N5KPE	01G6130
Extra charge for gas pump N9KPE	01G6135
Flow meter (max. 4 pc. total) and flow alarm (max. 2 pcs.)	
Extra charge for installation of a flow meter FM40 7-70 NI/h in the sample gas outlet	09F4000
Extra charge for installation of a flow meter FM40 15-150 NI/h in the sample gas outlet	09F4005
Extra charge for installation of a flow meter FM40 25-250 NI/h in the sample gas outlet	09F4010
Extra charge for installation of a flow meter FM40 50-500 NI/h in the sample gas outlet	09F4015
Extra charge for flow alarm with forked light barrier FA-20mo	02E3500
Extra charge for second sample gas output or bypass flow meter FM40 7-70 NI/h	01G6200
Extra charge for second sample gas output or bypass flow meter FM40 15-150 NI/h	01G6210
Extra charge for second sample gas output or bypass with flow meter FM40 25-250 NI/h	01G6220
Extra charge for second sample gas output or bypass flow meter FM40 50-500 NI/h	01G6230
Electronic evaluation system	
Extra charge for electronic evaluation system with group status alarm	01G6170
Extra charge for electronic evaluation system with individual alarm (temperature, flow, liquid in system) including MA output for cooler temperature for external temperature display, factory setting: 4-20 mA (0 to 50 °C [32 to 122 °F]), on request 0-20 mA available	01G6175
Transport case (19" version only)	
Extra charge for carrying case for portable gas conditioning	01G6250
Temperature controller for portable version (only with electronic evaluation system 01G6175)	
Extra charge for thermostat for maximum 10 m [≈ 32.8 ft] heated line, 230 V with Pt100, with solid-state relays and 7-pin connector	01G6190
Kink protection for portable gas conditioning	
Extra charge for kink protection for heated line DN 4/6	01G9060
Extra charge for kink protection for heated line DN 6/8	01G9061

9 DESCRIPTION

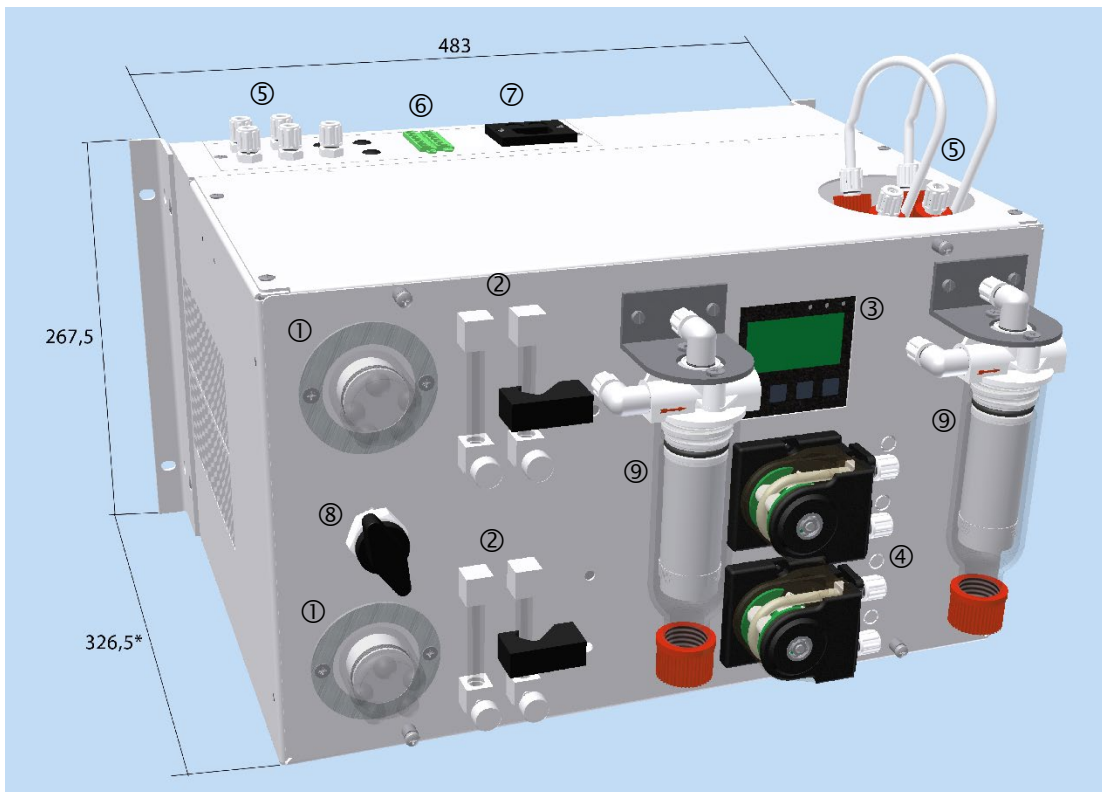


Figure 2 Dimensions and possible construction CSS-VC..

- ① Fine filter **FPF-0, 1GF**
- ② Flow meter **FM40** with and without forked light barrier **FA-20mo**
- ③ Multifunctional controller unit **TCU**
- ④ Peristaltic pumps **SR25.2** with condensate output at the pump
- ⑤ Sample gas inputs and outputs DN4/6 in connection plate or sample gas inputs on the heat exchanger
- ⑥ Connection of group alarms (temperature, flow, liquid penetration)
- ⑦ Cold-device socket
- ⑧ 3 or 5-way ball valve for calibration gas feeding or **3L/PV** or **5L/PV**
- ⑨ Aerosol filter **CLF**

All components of the gas conditioning systems are installed in a strong compact steel housing for wall or 19" mount. The ventilation grilles in the side walls provide adequate forced ventilation.

Filter, flow meter and peristaltic pumps are located in the front panel and thus ensure very simple maintenance. Due to a removable lid and a hinged front panel, quick and easy inspection and maintenance of all other built-in components is possible, in particular the easy changing of heat exchangers.

The compressor gas cooler can be equipped with one or two heat exchangers made of glass, stainless steel or PVDF.

Peristaltic pumps of type **SR25.2** are used for continuous condensate removal or as a metering pump.

The current cooler temperature is displayed on the multi-functional control unit **TCU** mounted on the front panel. The setpoint temperature of the cooler can be set by pressing keys. In the event of warnings or faults, plain text information appears on the display and is also indicated by LEDs (e.g. cooler within the setpoint range and no other alarms - green LED, flow alarm (option) - yellow LED, temperature $\pm 3^{\circ}\text{C}$ [$\pm 5.4^{\circ}\text{F}$] from the setpoint and humidity alarm (option) - red LED).

The fine filter downstream of the cooler (different filter types available) provides for the necessary separation of solids. The condition of the filter can be judged from the outside. To protect the downstream analyzers against liquid penetration and to increase the operating reliability of the whole system, according to the selected filter type, a suitable liquid alarm is possible or already integrated into the filter.

A group alarm or on request individual alarms including mA output for the cooler temperature at the output terminals is available wired. Via potential-free contacts for the group alarm or the individual alarms (cooler temperature, flow, fluid in the system), an alarm message and shutdown of the sample gas pump, if present, occurs.

Integrated sample gas pumps are available in three performance levels to choose from **N3/5/9 KPE**.

The flow meter **FM40** arranged in the sample gas outlet with a measuring range adapted to the pump power can be supplied for flow monitoring with a flow sensor **FA-20mo**. In addition, each sample gas line can be equipped with a second sample gas outlet or bypass flow meter and flow control.

In the event of an aerosol problem, a liquid particulate filter **CLF** can be added downstream of the flow meter in the sample gas outlet.

10 GOODS RECEIVING AND STORAGE

The gas conditioning unit **CSS-VC..** is a fully pre-assembled unit. In addition, there are included:

- 1 x connection cable
- 1 x 6-pin or 11 and 12-pin connector
- 1 x Instruction manual

- Immediately after arrival carefully remove the **CSS-VC..** and any special accessories from the dispatch packaging and check the supplied items in accordance with the delivery note and the list;
- Check the goods for shipping damage and, if necessary, inform your transport insurer immediately of any damage.



Note

Storage of the gas conditioning unit should be in a sheltered frost-free room!

11 INSTALLATION INSTRUCTIONS



Note

So that the unit is safe and operates reliably, it should be mounted horizontally and without vibration. Only then is proper separation and drainage of the condensate in the heat exchanger of the cooler ensured.

The mounting of the gas conditioning unit should take place away from heat sources and be freely ventilated so that there can be no disruptive accumulation of heat.

When installed outdoors, adequate protection against direct sunlight and moisture needs to be ensured. In winter, the place of installation must be frost-free; ensure correct protection for the device.

Temperature variations, strong air movement and aggressive atmospheres at the place of installation are to be avoided.

To ensure safe operation of the gas conditioning unit and downstream analyzers and to avoid false alarms, the gas conditioning unit should not be used outside the specified temperature range. It must also be protected against the ingress and accumulation of dust.

Downstream analyzers and lines must operate at temperatures significantly above the specified gas outlet dew point of +5 °C [41 °F]. This will avoid subsequent condensation of the gas in the connecting lines to the analyzers.

Unheated gas sample lines must be laid on a slope to the cooler.

11.1 CONVERSION TO WALL MOUNTED OR 19" RACK HOUSING

Gas conditioning units **CSS-VC..**, if not in a carrying case, are delivered with wall-mounting or 19" housing. Depending on which housing is required, the gas conditioning unit can be converted very simply by moving the mounting bracket:

1. Remove two screws per bracket.
2. Align bracket to the mounting holes according to the desired housing forwards or backwards.
3. Secure the bracket flush with the housing panel (19" mounting) or with protrusion to the rear (wall mounting) with the two fixing screws on the housing.

12 SUPPLY CONNECTIONS

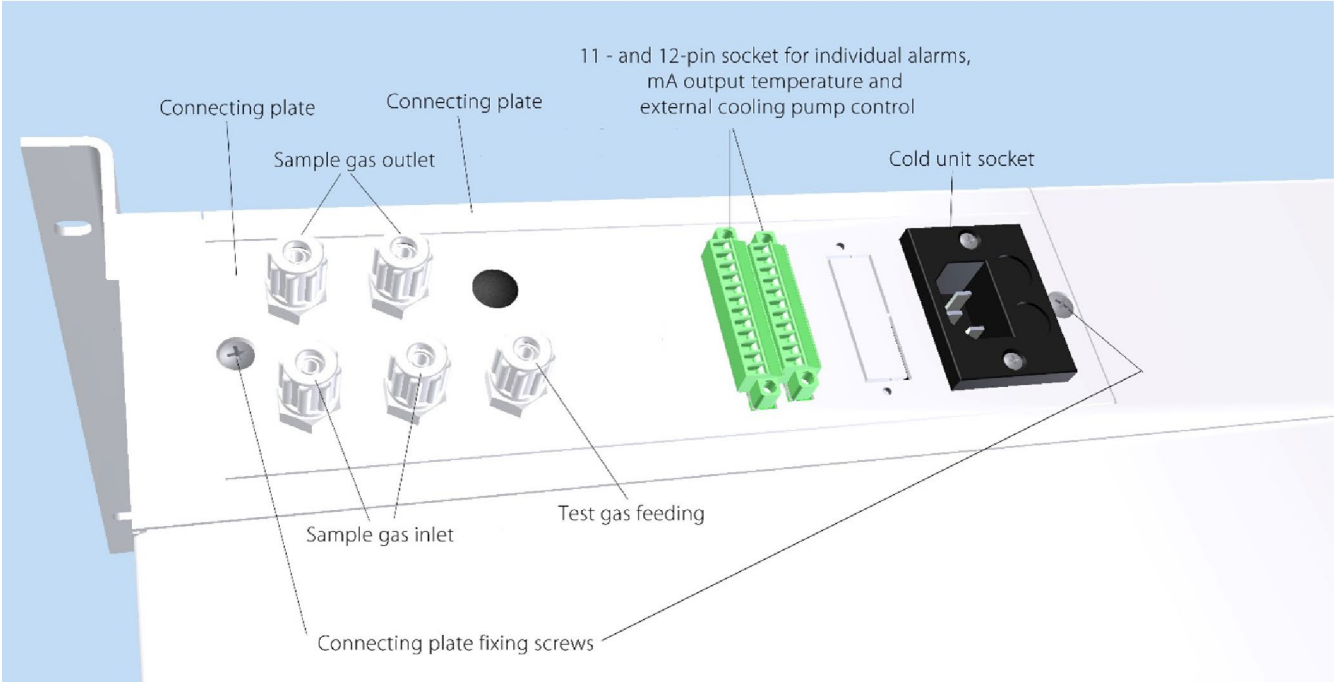


Figure 3 Connections in the connection panel of the CSS-VC..

Depending on the version of the **CSS-VC**, instead of the 11 and 12-pin connector for single alarms, mA output cooler temperature and external sample gas pump control, a 6-pin connector may also be present for group alarm (see Figure 4). The sample gas inlet, depending on the version, may also lie directly on the heat exchangers.

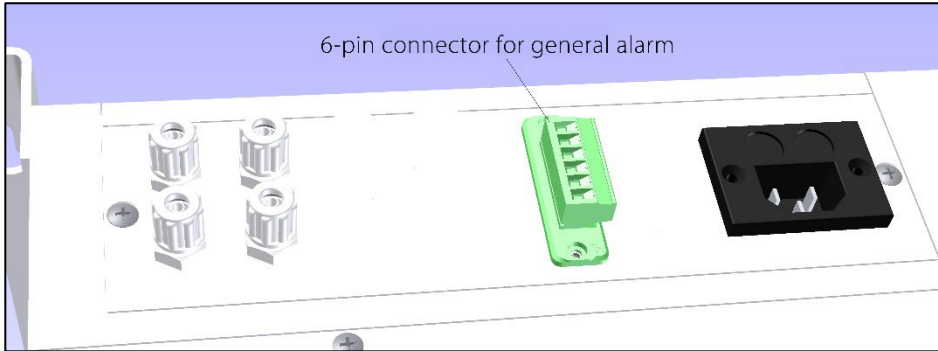


Figure 4 Connection group alarm

In the portable version of the **CSS-VC**., the supply connectors shown above are located on the rear panel of the housing.

12.1 HOSE CONNECTIONS

The connection of the sample gas input, depending on the connection type, is directly on the heat exchanger or on the clamping plate.



Do not confuse the hose connections. They are marked appropriately.
After connecting all the lines, they should be checked to ensure there are no leaks.

The condensate connections are made directly to the hose pump.

All hose connections are standard DN 4/6 mm ferrule hose fittings made of PVDF, for gas inlet temperatures up to 105° C [221 °F] (see chapter 8).

Installation of the sample gas hoses or the condensate hose must be carried out as follows:

1. Loosen the clamping ring screwed fitting counterclockwise; It is important to ensure that the nut is carefully removed from the threaded joint, so that the loose clamping ring which is in the nut is not lost;
2. Slide the nut over the hose connection;
3. Slide the clamping ring with the thicker bulge facing the nut, onto the connection hose;
4. Attach the hose to the nipple in the threaded support;



The tightness of the connection can only be guaranteed if the hose has a straight end edge (using a hose cutter).

5. Hand-tighten the nut.

The hose is now mounted slip-proof and pressure-tight.
The dismantling of the hoses is carried out in the reverse order.



Aggressive condensate is possible.



Chemical burns caused by aggressive media possible!

Wear protective gloves and protective glasses!

Wear proper protective clothing!

12.2 RELOCATE THE CONNECTIONS TO THE BACK OF THE HOUSING

If, for example with the 19" mounting, mounting conditions require the connections to be moved up in the connection panel onto the back of the device, this is quite possible:

1. Remove the connection-panel mounting screws (see Figure 3)
2. Remove the cover-bracket mounting screws on the rear panel
3. Mount the connection plate with 2 mounting screws on the rear panel
4. Mount the cover bracket with 2 connection screws on the device cover

12.3 CONNECTION OF THE HEATED LINE WITH ANTIKINK ADAPTER FOR PORTABLE VERSION (ART. NO. 01G9060 OR 01G9061)

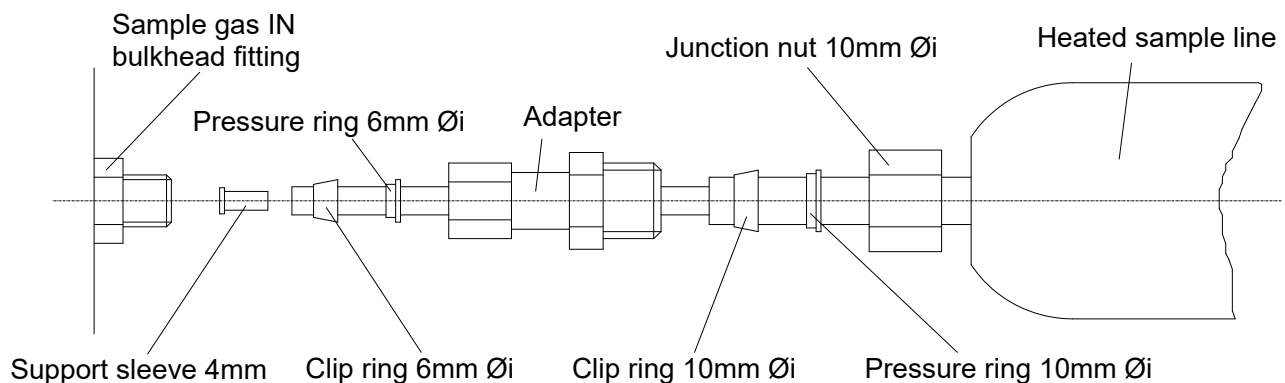


Figure 5 Connecting heated line DN4/6 with antikink adapter

1. Place special adapters according to the above drawing on Teflon tubing;
2. Slide the support sleeve slide into the Teflon tubing;
3. Draw the Teflon tubing all the way into the bulkhead union 'Sample Gas ON' and hand-tighten the adapter;
4. Tighten the adapter with wrench (SW 14) 1 1/4 turns; here hold the lock nut of the bulkhead union with a wrench (SW 15);
5. Insert the 10 mm pipe of the heating line all the way into the adapter and hand-tighten using the nut;
6. Tighten nut with wrench (SW 19), 1 1/4 turns; here hold the adapter with wrench;

The union is now cut to be gas-tight and can be loosened as often as required.

12.4 ELECTRICAL CONNECTIONS



Incorrect voltage can destroy the device. On connection, ensure the correct mains voltage in accordance with the rating plate!



For the erection of power installations with nominal voltages up to 1000 V the requirements of VDE 0100 and relevant standards and regulations must be complied with!

The **CSS-VC1** or **CSS-VC2** is to be supplied in voltages 230 V/50 Hz or 115 V/50-60 Hz (for the circuit diagram see appendix). Protection is provided as standard with two 6.3 A fuses. These fuses are located in the cold-device socket.

The electrical connection is via the 2 m [≈ 6.56 ft] long power cord with cold-device connector depending on the mounting of the connection plate either at the back or in the lid of the housing (see chapter 12.2).

12.4.1 GROUP CONNECTION ALARM (PART NO. 01G6170)

The electrical connection of the general alarm (condenser, fluid and flow) is via a 6-pin connector, depending on the mounting of the connection plate, either at the back or in the lid of the housing.

The corresponding 6-pin socket is included.

The connector is wired as follows:

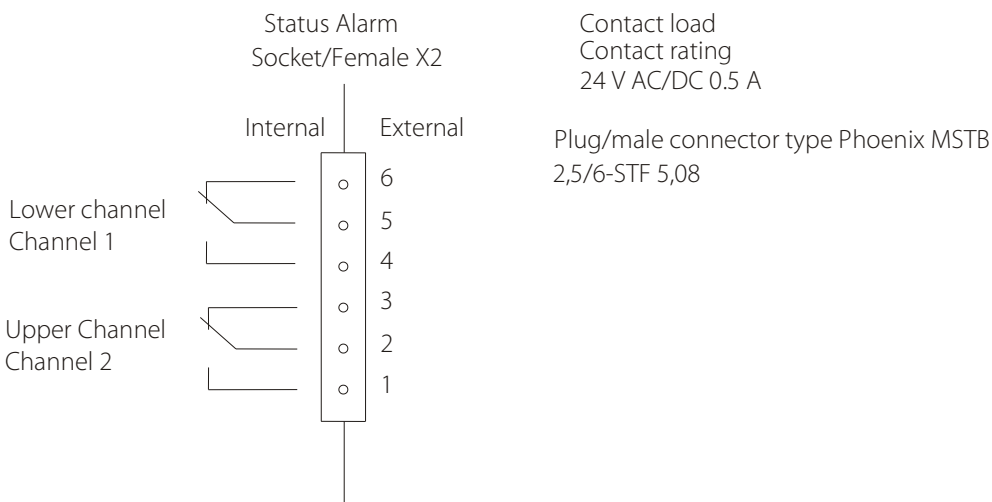


Figure 6 Plug assignment for the version with group alarm (Part No. 01G6170)

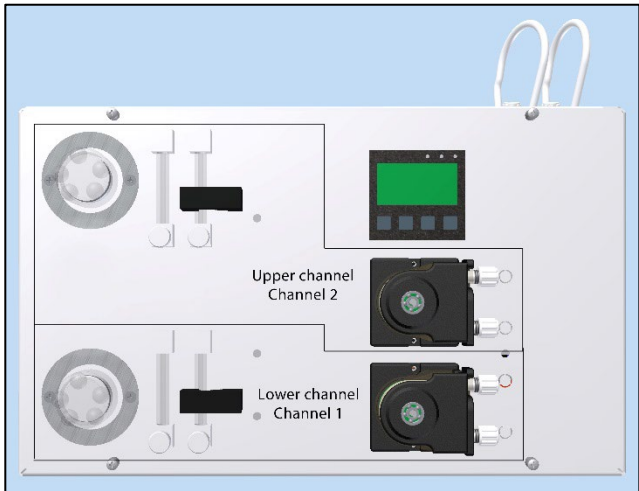


Figure 7 Upper and lower channel of CSS-VC2

12.4.2 CONNECTION OF INDIVIDUAL ALARMS, EXTERNAL PUMP CONTROL AND EXTERNAL COOLER TEMPERATURE DISPLAY (PART NO. 01G6175)

The electrical connection of the individual alarms is via two connectors, depending on the mounting of the connection plate, either on the back or in the lid of the housing. The corresponding 11 and 12-pin connectors are included.

The connectors are assigned as follows:

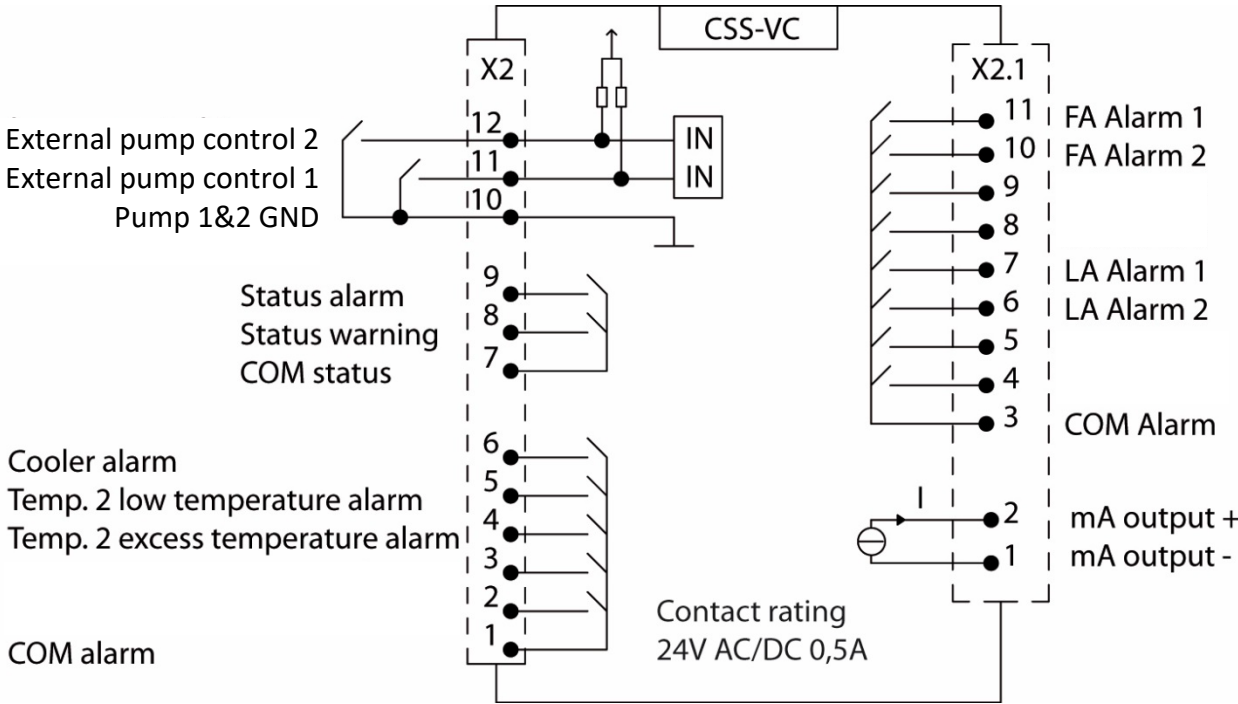


Figure 8 Plug assignment for design with individual alarms (Part No. 01G6175)



With the alarm relays, "safety first" applies, i.e. the contacts are de-energized and open in the event of an alarm.

For external pump control potential free contacts have to be used!

Switch open => pump off

Switch closed => pump on

On **X2** connector **pin 10-12**, external switches can be connected for controlling the sample gas pumps (internal or external).

On **X2** connector **pin 7+8**, an indicator can be connected that warning messages are present (yellow LED lights up on the front of the TCU).

On **X2** connector **pin 7+9**, an indicator can be connected that alarm messages are present (red LED lights up on the front of TCU).

On **X2** connector pin **1+6**, an indicator can be connected that a cooler temperature alarm is present (excess or low temperature alarm).

On **X2.1** connector **pin 3+8, 3+9, 3+10, 3+11** respectively, an indicator can be connected that flow alarm messages are present. Since this is a warning message, the yellow LED on the front of the TCU lights up.

On **X2.1** connector **pin 3+4, 3+5, 3+6, 3+7** respectively, an indicator can be connected that liquid alarm messages are present. Since this is an alarm message, the red LED on the front of the TCU lights up.

On **X2.1** connector **pin 1+2**, an indicator of cooler temperature can be connected (standard 4-20 mA (0 to 50 °C [32 to 122 °F]), 0-20 mA if ordered).



Install the signal lines separately from the power supply lines.

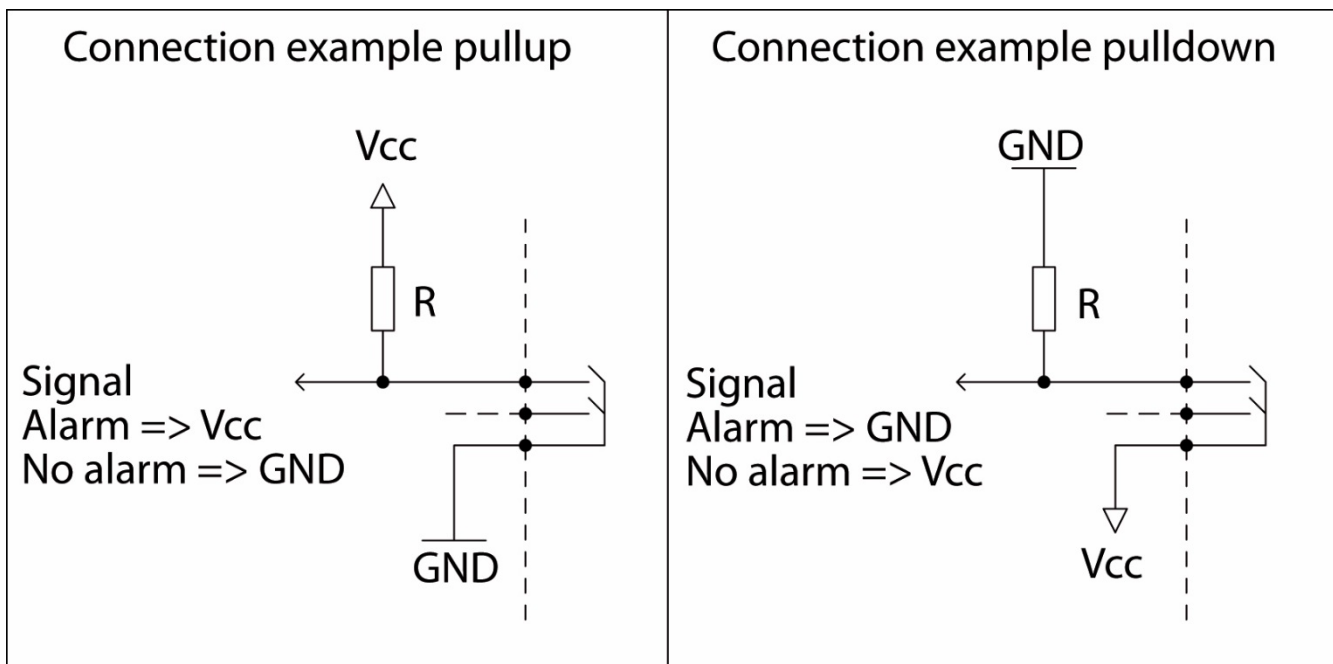


Figure 9 Connection examples for alarm outputs

12.4.3 CONNECTION OF HEATED LINE FOR PORTABLE VERSION (PART NO. 01G6190)

If, for the portable version in a carrying case, the option temperature controller for heated line (Part No. 01G6190) is selected, on the rear of the housing of the **CSS-VC..** there is a 7-pin connector for connection of heated lines type **PSP** and **PSP 4M** and **PSP 4M-W**. These have at the point of connection and termination a 7-pin connector and a 7-pin socket for connection to the portable gas conditioning unit **CSS-VC..** and the portable gas sampling probe type **PSP4000H**. This is the power supply to the heated line and gas sampling probe using the **CSS-VC..**

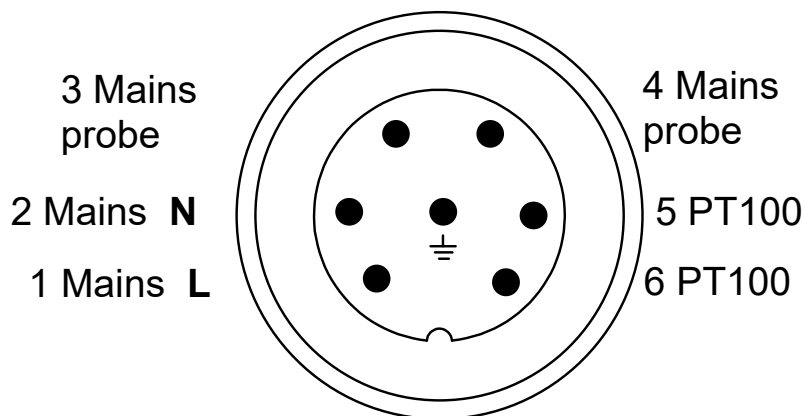


Figure 10 Heated line connection for portable version up to 10 A

13 PREPARATIONS FOR COMMISSIONING

Before initial startup, all plant- and process-specific safety measures must be observed. It is mandatory for the operator to complete the enclosed risk assessment of the product.

The gas exposure risk must be assessed by the operator with regard to the hazards posed by process and calibration gas and the setup at the installation site (e.g. tubing, system cabinet/container/plant). If the risk assessment reveals increased exposure hazards, further measures are required.

A visible label must be attached to the installation site in accordance with the risk assessment provided by the operator.

14 COMMISSIONING

Before commissioning, the plant and process-specific safety measures must to be observed.

Before switching on the power supply, it should be checked again that the operating voltage (see nameplate) and the power supply voltage correspond!



Before commissioning exclude that for one channel as well internal as external a Pt100 is connected.

The following steps are to be carried out before initial commissioning:

1. Plug the cold-device connector of the supplied mains connection cable into the cold-device socket for gas conditioning;
2. Connect power cord to the network;
3. Switch on power supply.

After the end of the lead time, the gas conditioning unit is ready for operation (green LED on the controller lights up).



Note

In the case of long-term measurements with high dust content in the sample gas, a suitable gas sampling probe to protect the sample line from clogging must be provided.

14.1 COOLER CONTROLLER

	Display	LED red	LED yellow	LED green	Status message
After commissioning	> 8 °C [> 46.4 °F] (room temperature)	ON (status alarm)	Lights up in the case of an existing flow alarm	OFF	Hightemp.: 1 Pump-warn.: 1,2 (when pump is connected and configured accordingly, see chapter 17.2)
After about 10 min.	≤ 5.5 °C [≤ 41.9 °F]	OFF	OFF	ON (cooling)	OK
Normal operation	5 °C [41 °F]	OFF	OFF	ON (cooling)	OK



Note

If a cooler temperature alarm is present, after default setting, the gas sample pumps are switched off (if available) to prevent the transport of wet sample gas into the analyzer.

15 DECOMMISSIONING



Note

The location of the compact conditioning unit must remain frost-free, even during periods when the unit is switched off.

On short-term decommissioning of the gas conditioning unit **CSS-VC..** no special measures need to be taken.

For long-term decommissioning, it is recommended to flush the gas conditioning unit with ambient air or inert gas. A flushing time of 3 to 5 minutes is sufficient under normal conditions. Likewise, condensate residue must be removed from the system.



Warning

Aggressive condensate is possible.



Chemical burns caused by aggressive media possible!

When disassembling, repairing or cleaning, wear safety glasses and proper protective clothing!

16 THE MULTIFUNCTIONAL CONTROL UNIT TCU

The multifunctional control unit TCU in the front panel of the gas conditioning unit **CSS-VC..** can undertake a series of different tasks centrally and provide wide-ranging system information.

16.1 BASIC FUNCTIONS OF THE TCU

- 1 x temperature controller for the integrated sample gas cooler
- Evaluation of max. 2 liquid alarm sensors
- Evaluation of max. 2 flow monitoring sensors
- An mA output for external cooler temperature display e.g. in the control room
- Control (on/off) of 2 sample gas pumps depending on the cooler temperatures and liquid alarms or permanent switching on or off. In addition, setting of external pump control yes/no
- Optional 1 x temperature controller for max. 10 m [≈ 32.8 ft] heated hose for portable version (Part No. 01G6190)

16.2 PROPERTIES OF THE TCU

- Menu navigation with 3 language selections (German, English, French)
- Error history (32 messages)
- Detailed status indicators: Group alarm or individual alarm (cooler temperature, liquid flow), warnings, OK condition, control temperature, temperature gradient, total running time after service, error-free time
- Configuration options: Service interval, language, pump control and regulating temperature

17 OPERATION OF THE MULTIFUNCTIONAL CONTROL UNIT TCU

In normal fault-free operation, the TCU display shows the current cooling temperature and the green LED is lit constantly when the cooler temperature is within the alarm limits. The bottom line of the display shows "status: OK" or current warning and error messages.

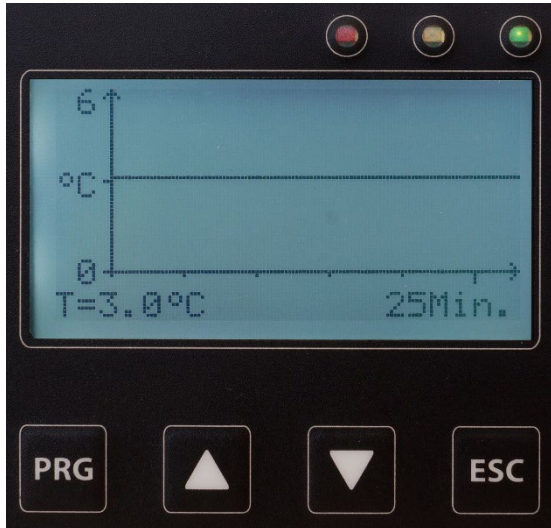


Figure 11 Front view of the TCU in normal operation

From any screen (except single temperature view and Service Reset) returns the **TCU** after 60 s back into the temperature overview without any key being pressed. If appropriate, altered and unapproved settings jump back to the original state.

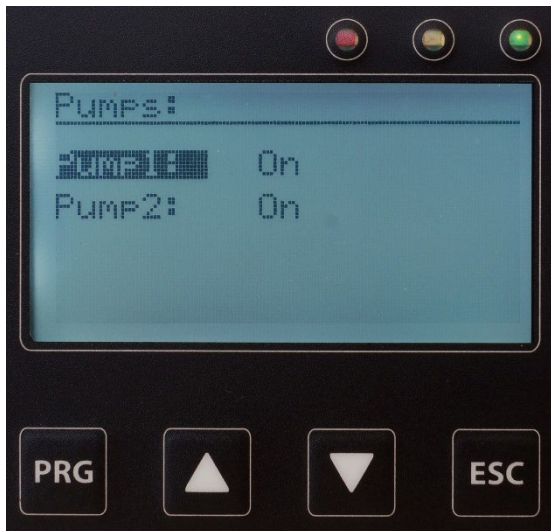
17.1 DISPLAY OF CONTROL TEMPERATURES OR COOLING TEMPERATURE CURVE




By 1 x pressing of the arrow button,  the following screen will appear on the **CSS-VC**:

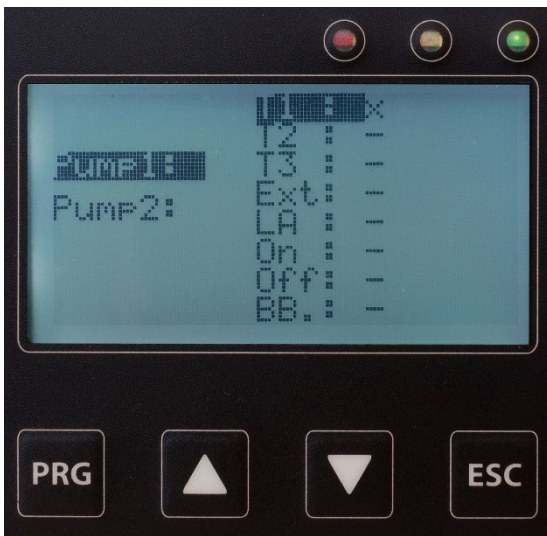









17.2 CONFIGURE THE SWITCHING ON AND OFF OF THE SAMPLE PUMPS

By 2 x pressing of the arrow key  and then 1 x pressing of the PRG key,  the following view appears:



Here it is visible whether the pump is working or not. Using the arrow keys,   the pump to be configured can be selected. By pressing the PRG key again,  the following view will appear:



Using the arrow keys,   the parameters to be changed can be selected. By pressing the PRG key,  the parameter can now be changed with the arrow keys   and then confirmed with the PRG key  or discarded with the ESC key .





Here you select the parameter to be taken into consideration for switching off the pump.

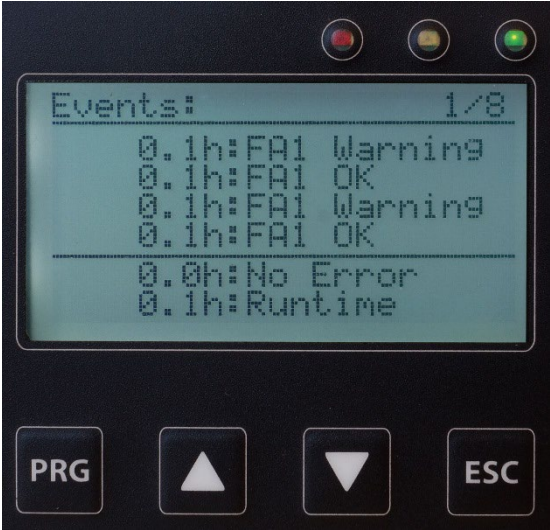
- = Not taken into consideration/= x is taken into consideration

T1	=	Pump off with cooler temperature alarm (default setting x)
T2	=	Pump off with temperature alarm from Temperature controller for heated line in portable version (Art. No.. 01G6190) (Factory setting x)
T3	=	Without functionality
Ext	=	External pump control (with closed switch on) (Default setting -)
LA	=	Pump 1 resp. 2 off with liquid alarm 1 resp. 2 (x factory setting) At activated reset (see 17.6) R occurs behind – or x.
On	=	Pump is always on (overrides all other settings) (default setting -)
Off	=	Pump is always off (overrides all other settings) (default setting -)
BB.	=	Without functionality



17.3 DISPLAY OF EVENTS

By 3 x pressing the arrow key  and then 1 x pressing of the PRG key,  the event list appears in which the last 32 error messages and warnings are listed on 8 pages. The individual pages can be seen by using the arrow keys  .

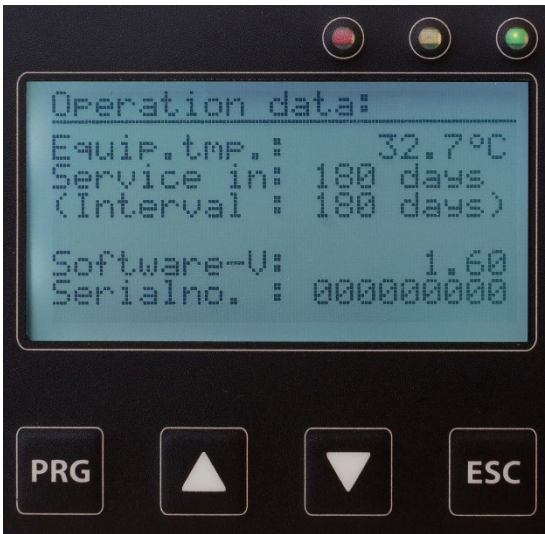


At the bottom of the list of events, furthermore, the error-free time and the total run time (operating time counter) are displayed. The error-free time indicates how much time has passed since the last error. The total running time indicates how long the device has been running since the last service.

If service reset is performed, the error messages are erased, and the times reset.

During a power failure, the data remains stored.

17.4 OPERATING DATA



By 4 x pressing the arrow key  (or 1 x pressing the arrow key  in the other direction) the following view appears:

Here the actual device temperature, the period until the next service warning, the service interval, the software version and serial number are displayed.


By pressing the arrow key again,  the display of the control temperature reappears.

17.5 RESETTING SERVICE AND OPERATING TIME

Service and operating time can be reset as follows:

- Press the ESC key  and press both arrow keys   at the same time. The following screen appears:



- Press the PRG key . Service life and operating time are reset and "Service OK" occurs. With the ESC key resetting can be cancelled.




Note

A reset can only be carried out when no alarm is present!

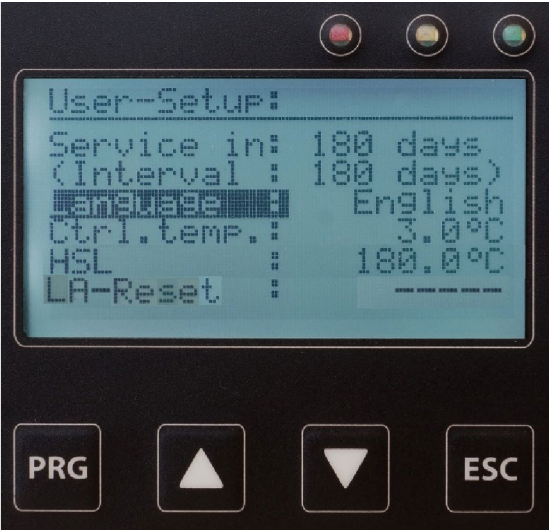








17.6 SETTING SERVICE INTERVAL, LANGUAGE, CONTROL TEMPERATURES, TEMPERATURE SENSOR TYPES AND LIQUID ALARM RESET

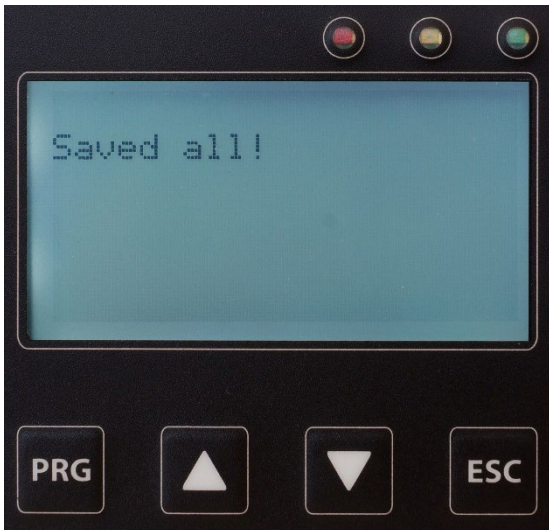
To change service interval, language, control temperatures, temperature sensor types and to reset the liquid alarm:


- 1. Disconnect the device from the mains.
- 2. Hold the PRG key  down and switch the device back on until the message to release the key is displayed.

The following is displayed (2nd screen ):



- 3. Select the parameter  to be changed using the arrow key  and confirm using the PRG key.
- 4. Use the arrow keys,   the settings and values can be changed and confirmed with the PRG key . Press and hold down the PRG key  for 5 seconds to apply all changes.



To discard the changed settings, keep the ESC key  pressed for 5 seconds.



After saving or discarding the settings, you will automatically return to the start screen.

If the unit is disconnected from the mains voltage while it is in user setup, all changes made are also rejected.

The following values can be set:

Service interval	=	(0 (-----) - 365 days/default setting 180 days/off). After the set time has elapsed, the warning LED (yellow) LIGHTS UP and the following appears in plain text: "Service required". In addition, the pending warning is also reported via the individual alarm connection (see Section 12.4.2).
Language	=	(German, English, French)
Ctrl. temp.	=	(0 - 7 °C [32 °F – 44.6 °F] (/default setting 5 °C [41 °F])
HSL	=	(0 – 240 °C [32 – 464 °F], default setting 180 °C [356 °F])
LA-Reset	=	(x = reset necessary, ----- = no reset necessary)



18 ALARMS AND FAULTS

In the event of warnings, or errors, plain text information appears on the screen and simultaneously via the LEDs on the controller front, as well as alarms via the group alarm connection (Part No. 01G6170) or alarms and warnings via the individual alarm connector (Part No. 01G6175) (see chapter 12.4.1. and 12.4.2).

In front of the plaintext information, is the serial number of the error message and the total number of messages is specified, e.g. 1/3 ... = Error message 1 of 3.

Depending on the alarm and TCU configuration, an alarm can result in further alarms and warnings:

E.g. the liquid alarm (LA-Alarm: 1,2) can trigger the pump alarm (Pump-Warn: 1,2) and that in turn can trigger the flow alarm (FA-Warn.: 1,2).

18.1 LED COLOR CODE

Green LED: Coolant temperature within the setpoint range, there are no faults.

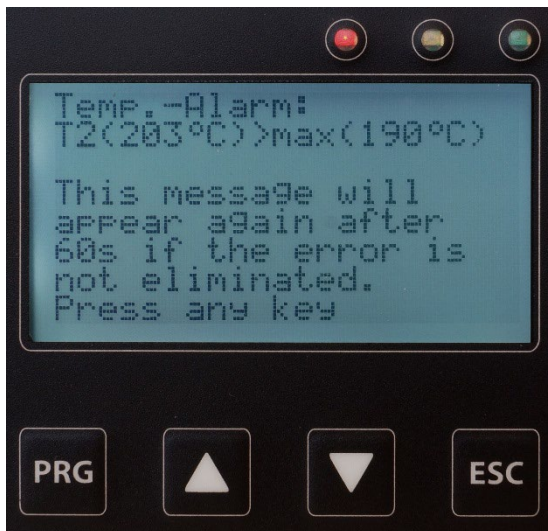
Yellow LED: Flow alarm, service time reached or exceeded. Message also via single alarm connection (see chapter 12.4.2). In addition, device temperature $< 1\text{ °C}$ [$< 33.8\text{ °F}$] or $> 50\text{ °C}$ [$> 122\text{ °F}$], internal error requiring the device to be returned.

Red LED: Temperature $> 8\text{ °C}$ [$> 46.4\text{ °F}$] or $< 2\text{ °C}$ [$< 35.6\text{ °F}$], and/or humidity alarm and/or breakage of the cable of the liquid sensor. Message also via group alarm connection (see Section 12.4.1), or via individual alarm connection (see Section 12.4.2). In addition, short circuit and cable break of a temperature sensor.

18.2 TEMPERATURE ALARMS FROM THE COOLER

Error message	Alarm	Warning	LED	Error
Lowtemp.: 1	x	-	red	Low temperature cooler
Hightemp.: 1	x	-	red	High temperature cooler
T> Max: 1	x		red	Temperature sensor range exceeded => sensor defective
T <min:1	x		red	Temperature sensor measuring range fallen below => sensor defective
Lowtemp.: 2	-	x	yellow	Low temperature channel 2
Hightemp.: 2	x	-	red	High temperature channel 2
T> Max.: 2	x		red	Temperature sensor range exceeded => sensor defective
T <Min: 2	x		red	Temperature sensor measuring range fallen below => sensor defective

The following screen appears for channel 2 if the control temperature (+ 10 °C alarm hysteresis) is exceeded:

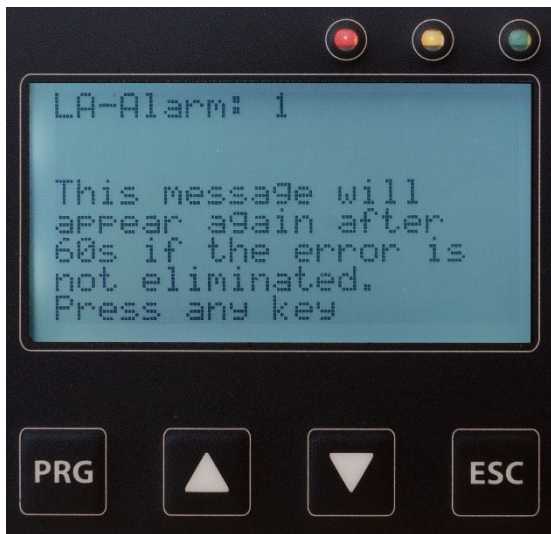


This prevents the heated line or the heated probe from overheating due to a defect! The triggered alarm (red LED) must be acknowledged by pressing any key. If the error is not corrected, the error screen comes back after 60 s.

18.3 FLOW DISTURBANCE AND LIQUID ALARMS

Error message	Alarm	Warning	LED	Error
FA-Warn: 1, 2	-	x	yellow	Flow disturbance channels 1 and/or 2
LA-Alarm: 1, 2	x	-	red	Liquid alarm channel 1 and/or 2
LA-Break: 1, 2	x	-	red	Cable break liquid sensor channel 1 and/or 2

In case of liquid alarm and activated LA-Reset (see chapter 17.6) the following screen occurs:



This prevents liquid pumped along to the analyzer and thus damaging! The triggered alarm (red LED) must be acknowledged by pressing any key. If the error is not corrected, the error screen comes back after 60 s.

18.4 OTHER FAULT AND ALARM MESSAGES

Error message	Alarm	Warning	LED	Error
Pump-Warn.: 1, 2	x	x	red + yellow	Pump 1 and/or 2 off due to an alarm (temperature, liquid)
Maintenance needed!	-	x	yellow	Maintenance interval expired
Temp.2	x	-	red	Pt100 for heated sample line connected

19 MAINTENANCE

Before performing maintenance work, the system and process-specific safety measures must be observed!



Hazardous voltage. Pull the mains plug out before carrying out work on the gas conditioning unit!

The maintenance intervals depend on the process conditions and therefore need to be determined for specific applications.

All serviceable parts are mounted in an easily accessible location in the front of the compact gas conditioning unit **CSS-VC...**

- Change filter elements of the dust and aerosol filters (FPF-0,1GF/FPF+/universal filter/aerosol filter) when there is too little flow or after visual inspection (see chapter 19.1);

**Note**

In order to protect downstream analyzers, in the event of a condensate breakthrough, the wet filter element must always be changed.

- Check the condensate pump SR25.2 every six months and replace if necessary (see chapter 19.3.2)
- Clean cooling fins on the compressor cooler of dust regularly using compressed air (see chapter 19.4)

19.1 CHANGE THE FILTER ELEMENTS AND O-RINGS

To change the filter elements and O-rings:

1. Unplug the gas conditioning unit from the mains
2. Unscrew filter glass
3. Unscrew filter element with filter holder
4. Exchange filter element and/or O-ring(s). Ensure correct seating of filter element and O-ring(s).
5. Screw glass filter cap back

19.2 MAINTENANCE OF THE SAMPLE GAS PUMP(S)

Diaphragm and valve plates are the only pump parts subject to wear. They are easy to change. Wear is indicated by a drop in pneumatic power.

**Warnung**

Hazardous voltage. Pull the mains plug out before carrying out work on the gas conditioning unit!



1. Unplug the gas conditioning unit from the mains;
2. Loosen 4 screws (captive) on the front panel and, without removing the hoses and wiring, bring slightly forward and pull up out of the housing support; the front panel can now be suspended back in the housing holder by rotating it 90° (Figure 12).

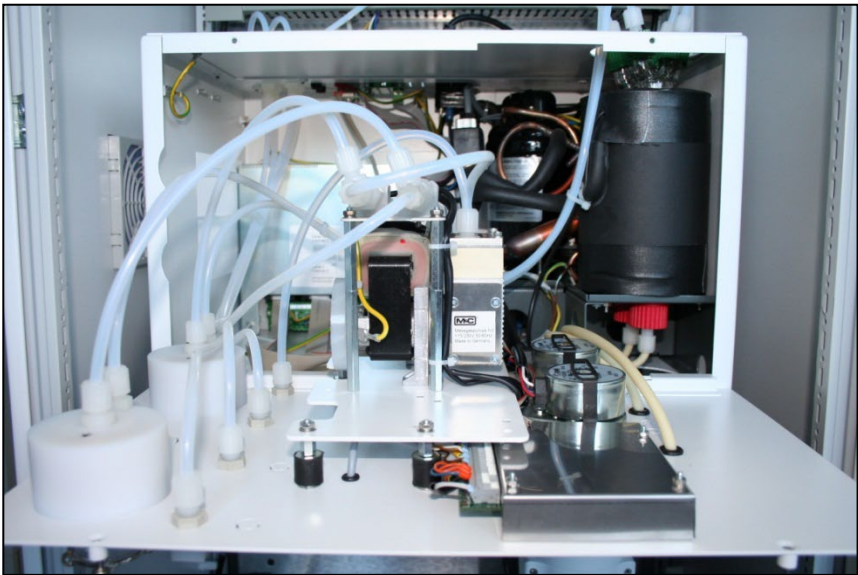


Figure 12 Maintenance of sample gas pump(s)

- 3. Loosen the tubing on the pump head; mount any existing flow chamber(s) with mounting plate from the stud bolts.

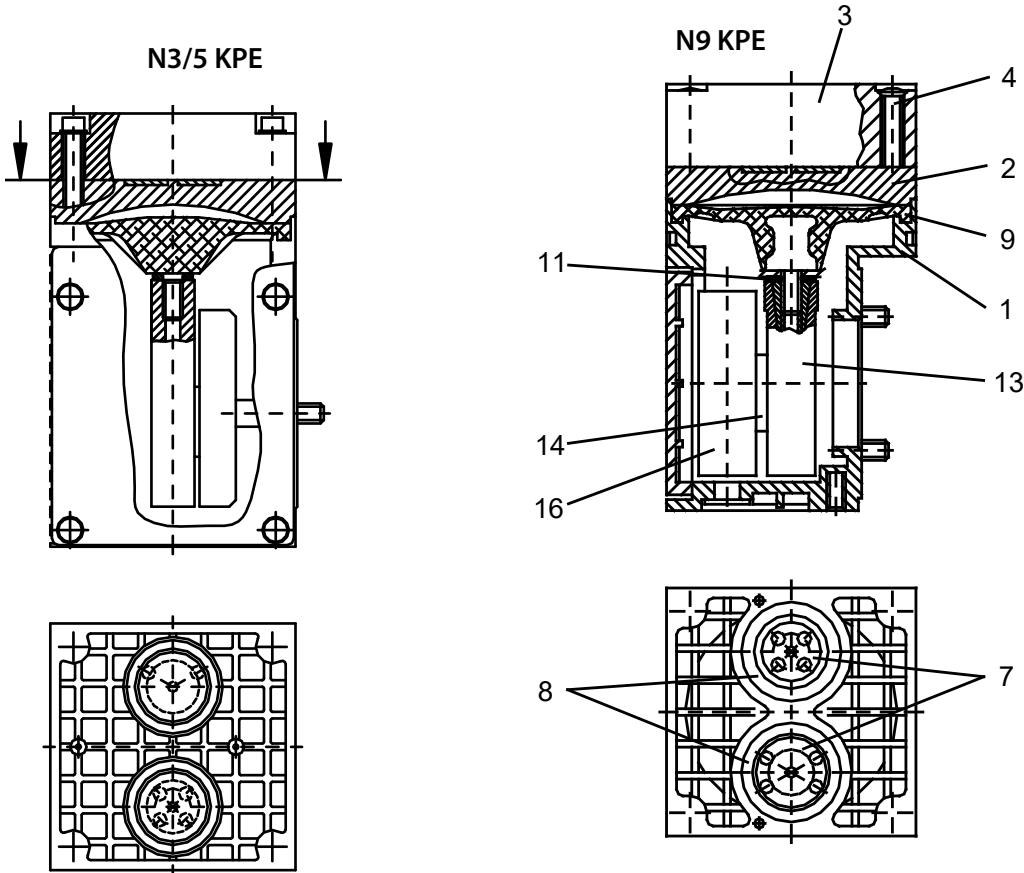


Figure 13 Sectional drawing N3/5 KPE and N9 KPE

**Note**

Valve plates, diaphragms and seals should always be replaced at the same time.

The changing of diaphragm(s), valve plates and sealing rings is to be carried out in the following order:

1. Remove pump head
2. Change the diaphragm
3. Change valve plates and sealing rings
4. Mount pump head

Proceed as follows:

19.2.1 REMOVE PUMP HEAD TYPE N 3/5/9 KPE

1. Mark head cover 3 (with metal frame with N3/5), intermediate plate 2 and housing 1 with a felt pen (M). This rules out parts being mounted incorrectly during subsequent assembly.
2. Loosen the four head cap screws 4 and remove the head cover from the pump housing together with the intermediate plate.

19.2.2 REPLACING THE DIAPHRAGM TYPE N 3/5/9 KPE

1. Move the structured diaphragm 9 by turning the fan wheel into the top dead centre position.
2. Lift the structured diaphragm on the opposite side edges, grip and unscrew counter clockwise. Make sure that the adjusting washer(s) 11 do not fall from the threaded bolt of the structure diaphragm into the housing.
3. Remove adjusting washer(s) 11 from the threaded bolt of the structure diaphragm and keep.
4. Inspect all parts for contamination and clean if necessary.
5. Place the adjusting washer(s) onto the threaded bolts of the new structure diaphragm.
6. Move the connecting rod 13 into the top dead centre position.
7. Screw the new structure diaphragm with washer(s) onto the connecting rod (clockwise) and hand-tighten.

19.2.3 VALVE PLATE CHANGE TYPE N 3/5/9 KPE

1. Separate head cover 3 (with metal frame with N3/5) from the intermediate plate 2.
2. Remove the valve plate 7 and the sealing rings 8 from the intermediate plate.
3. Check valve seat, intermediate plate and head cover for cleanliness; in the event of unevennesses, scratches and corrosion, these parts are to be replaced.
4. Insert the new valve plate 7 into the valve seat of intermediate plate 2; the valve plates for pressure and suction sides are identical; the same applies to upper and lower sides of the valve plates.
5. By slight horizontal movement of the valve plates, ensure that these are not strained.
6. Insert sealing rings into the intermediate plate.

19.2.4 MOUNT PUMP HEAD TYPE N 3/5/9 KPE

1. Move structure diaphragm via fan wheel into top dead centre (dead point) position.
2. Place intermediate plate 2 on the housing with valve plates 7 and 8 as well as head cover 3 in accordance with the marks (M).
3. Check its centering by slight lateral movement of the head cover.
4. Fit metal frame with N3/5.
5. Only slightly tighten 4 screws diagonally.
6. Check ease of movement of the pump by turning the fan wheel.
7. Move structure diaphragm via fan wheel into the top dead centre (dead point) position.
8. Now hand tighten the screws 4.

19.2.5 CLEANING PUMP TYPE N 3/5/9 KPE

- On changing valve plates and diaphragm, prior to assembly of the pump head, all parts should be checked for contamination and cleaned if necessary.
- Wipe the parts as dry as possible with a cloth. Solvents should not be used when cleaning because they may damage the plastic parts. If oil-free compressed air is available, blow out the parts.



Aggressive condensate is possible.



Chemical burns caused by aggressive media possible!

When disassembling, repairing or cleaning, wear safety glasses and proper protective clothing!

19.3 MAINTENANCE OF THE BUILT-IN PERISTALTIC PUMP TYPE SR 25.2

Pump hose, belt, pressure rollers and springs are the only wear parts of the pump. They are easy to change.

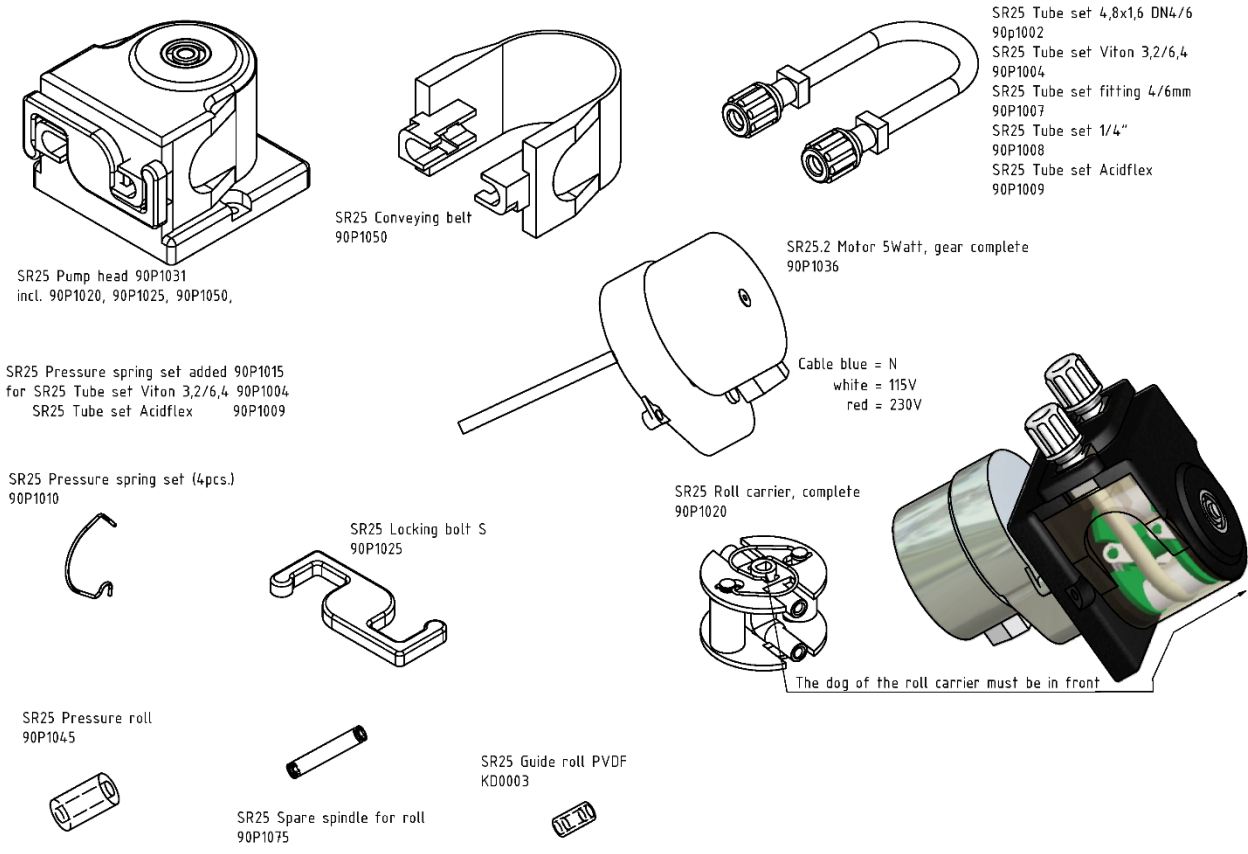
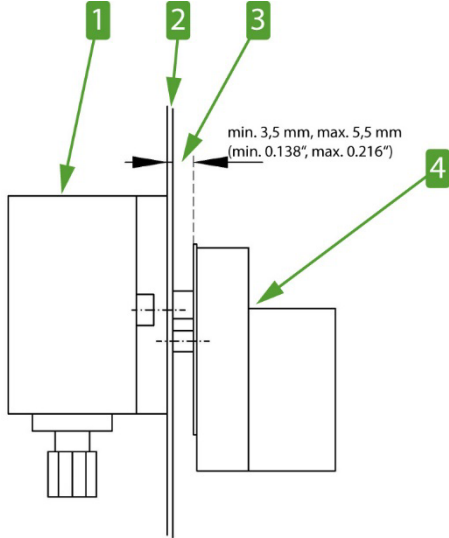


Figure 14 Components of the peristaltic pump SR25.2

19.3.1 MOUNTING INSTRUCTIONS FOR PERISTALTIC PUMP

Make sure to mount the pump to the front of the cooler with a minimum distance of 3.5 mm [≈ 0.138"] and a maximum distance of 5.5 mm [≈ 0.216"] between the pump motor and the front panel. The minimum distance avoids damage to the pump motor and the maximum distance prevents the motor shaft from getting loose.



- 1 Pump head (outside the device housing)
- 2 Device front panel
- 3 Recommended mounting distance
- 4 Pump motor (inside the device housing)

Figure 15 SR25.2: Mounting distance between front panel and pump motor



Note

For detailed mounting instructions, see the instruction manual for the peristaltic pump series SR®: The manual is available on our website www.mc-techgroup.com.

19.3.2 CHANGING THE PUMP TUBING



Aggressive media residues possible.

On disassembly, repairing or cleaning of the hose pump, wear protective glasses and appropriate protective clothing!



Warning

If you return the hose pump to M&C customer service for repair, we will ask for information concerning the delivered liquid. The pump should be cleaned of hazardous or highly aggressive contaminants prior to return shipment.

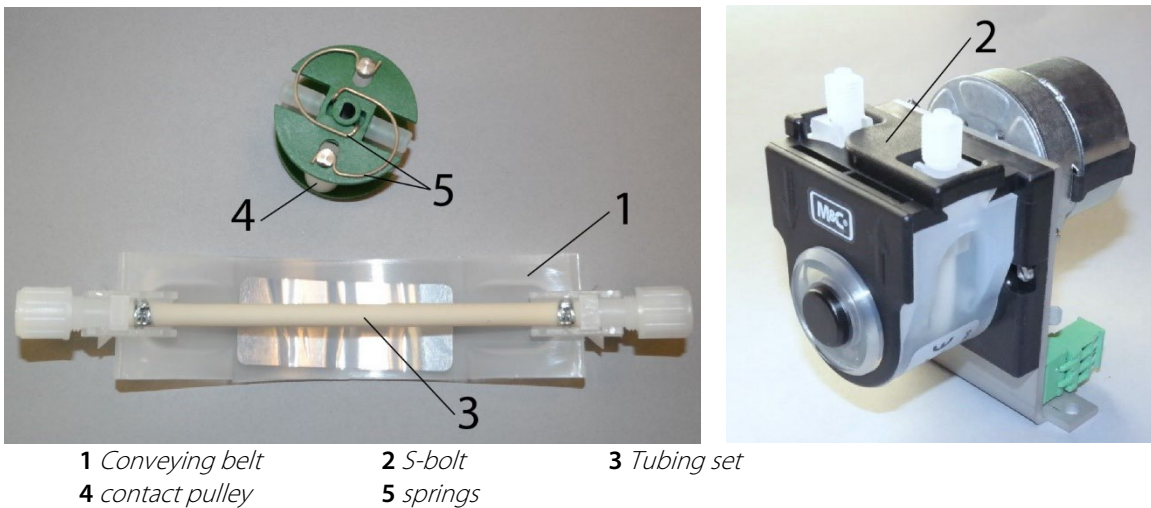


Figure 16 Changing the pump tubing

For changing the pump tubing please proceed as follows:

1. Unplug the pump from the mains voltage. The device needs to be voltage free.
2. Open tube connections at the pump;
3. Press conveying belt ① at the recessed grips and turn S-bolt ② clockwise up to limit stop;
4. Take away conveying belt ① and remove the old tubing set ③ from the guides by pulling on the tube connectors;
5. Press the two contact pulleys ④ and check whether the spring pressure is still sufficient, if not, the contact springs have to be changed (see chapter 19.3.3);
6. Put the new tubing set ③ with the tube connectors into the guides of the conveying belt ① ;



Warning

Only the usage of the original tubing set guarantees a proper functionality.
Never lubricate the tube.
Before mounting the pump check all parts for contaminations and clean if necessary.

7. Put the conveying belt ① with the new tubing ③ into the dovetail guide of the pump body;
8. Press conveying belt at the recessed grips and simultaneously turn the S-bolt ② anticlockwise until it snaps;
9. Switch on pump.

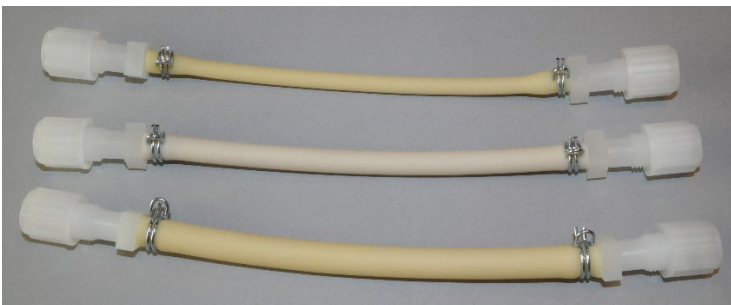


Figure 17 Different pump tube sizes

19.3.3 CHANGING CONTACT PULLEYS AND SPRINGS



Note

While mounting, make sure that the center of rotation and the driver are aligned.
Use genuine spare parts only!

Follow these instructions to change the contact pulley and springs:

1. Disconnect the peristaltic pump from power supply
2. Unscrew nuts of the pump head (wrench size 5.5) ①

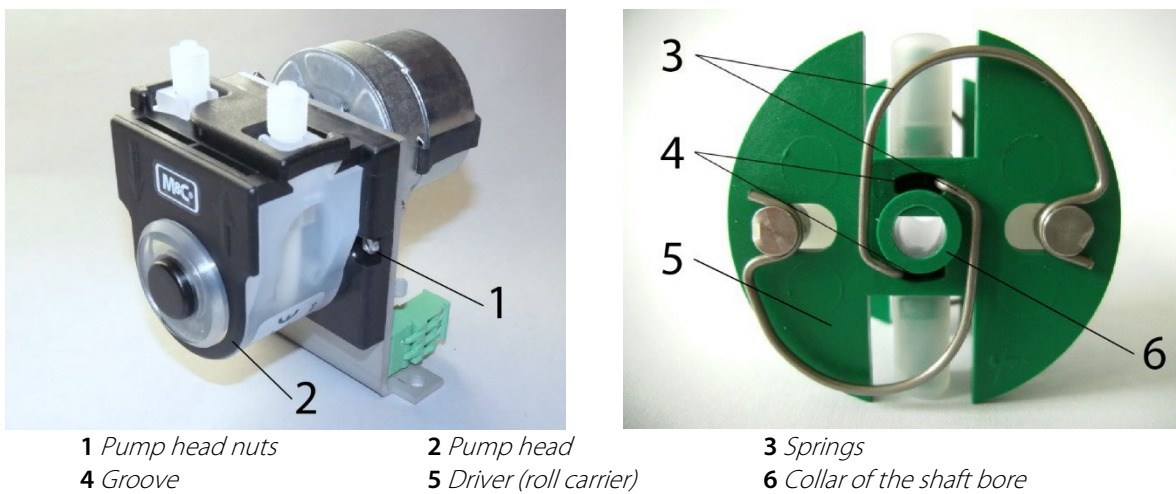


Figure 18 Disassembly of pump head and driver

3. Remove the pump head ② from the motor shaft
4. Now the driver can be removed from the pump head and is ready for maintenance.
5. The removal of the springs (4 pcs.) ③ away from the driver is easily possible without the aid of any tools. For this take spring out of the groove ④ near to the shaft bore.
6. Dismount roller axes and change contact pulleys. Take care that axles are not worn out by the springs and have damaged the dent at the axles front end. The axles must be replaced when worn out (see Figure 19).

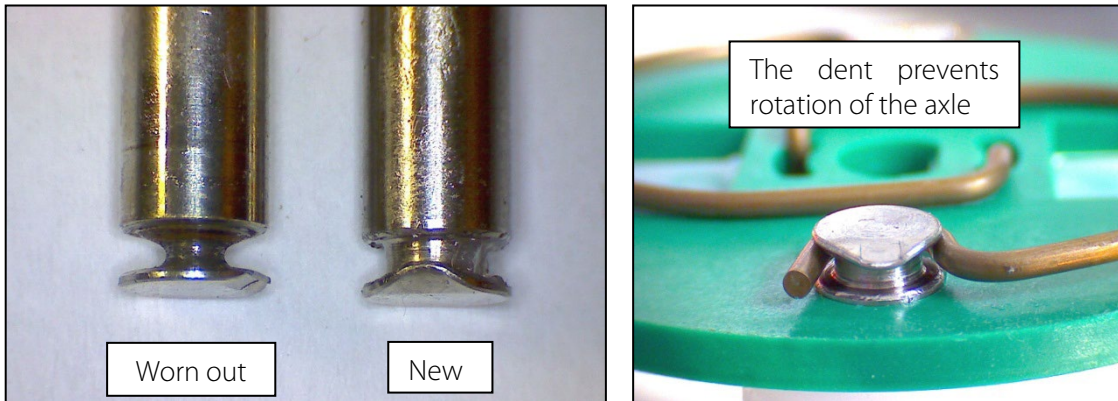


Figure 19 Check of axles and rolls



Note

The springs may come in different colorings. This is not a quality impairment. Make sure to use the right spring strength. This can be identified by the spring wire diameter. The 'standard version for Novoprene pump tubing' (Part No. 90P1010) has a diameter of 1.1 mm and the 'reinforced version for FKM-, Acidflex®- or Masterflex®-tubing' (Part No. 90P1015) has a diameter of 1.2 mm.



Note

Two different types of springs are mounted inside the driver (right and left springs) for the first delivery. When spare springs are ordered, for simplified storage, only one type will be delivered (right spring) which can be used for all four springs and will replace without any problems the initial springs. The replacement springs guarantee full functionality when all four springs are replaced.

- Make sure that contact pulleys roll easily on the axles. After remounting the axles with contact pulley into the driver the spring has to be mounted as shown in Figure 19. Please pay attention to the alignment of the dent.

19.3.4 REASSEMBLY OF THE DRIVER

Reassemble the driver in reverse order:

1. Insert the roll carrier back into the pump head
2. Push the pump head with the roll carrier onto the motor shaft ②
3. Tighten the nuts of the pump head fastening (SW 5.5) ①.



Note

While mounting, make sure that the center of rotation and the roll carrier (driver) are aligned.
Make sure that the collar of the shaft bore (see Figure 18) faces towards the front of the pump head while mounting the roll carrier.
Use genuine spare parts only!

19.3.5 CLEANING THE PUMP HEAD

When changing flexible tube or other parts, inspect all parts for dirt before assembling the pump head and clean them if necessary.

We recommend cleaning the parts with a dry cloth. Solvent should not be used, because it can damage the plastics and synthetic rubber parts. Use oil-free compressed air to clean the parts if available.



Aggressive condensate possible!

Media residues in tubing!

Chemical burns caused by aggressive media possible!

Wear protective gloves and protective glasses!

Wear proper protective clothing!

19.3.6 REPAIR INFORMATION FOR INTEGRATED PERISTALTIC PUMP TYPE SR25.2



Note

When sending the peristaltic pump to M&C customer service for repair, please indicate the type of medium pumped. Before shipping the pump, please remove hazardous or aggressive contaminations from all parts of the pump!

19.4 CLEANING THE COOLING FINS OF THE COMPRESSOR COOLER

To prevent a decrease of the cooling capacity the cooling fins have to be cleaned from dust periodical. For this purpose blow compressed air into the ventilation grid at the right side of the housing.



Note

With clean cooling fins a DIN A4 sheet of paper is sucked in and clings to the right side of the housing.

20 PROPER DISPOSAL OF THE DEVICE

At the end of the life cycle of our products, it is important to take care of the appropriate disposal of obsolete electrical and non-electrical devices. To help protect our environment, please follow the rules and regulations of your country regarding recycling and waste management.

21 SPARE PARTS LISTS

The wear and spare part requirements depend on specific operating conditions. The recommended quantities are based on experience and are not binding. They refer to the version of **CSS-VC1** with one gas line.

Gas conditioning versions CSS-VC1 and CSS-VC2					
(C) Consumable parts,					
(R) Recommended spare parts					
(S) Spare parts					
		Recommended quantity in operation [years]			
Part No.	Description	C/R/S	1	2	3
FPF-0, 1GF					
90F0009	Filter element type F-0,1GF, material: glass fiber, porosity: 0.1 µm	C	6	12	18
90F0045	O-ring for FPF, material: Viton®.	R	1	1	1
90F0118	Replacement filter glass F-45	R	1	1	1
FPF+					
90F0044	O-ring (35) for FPF, material: Viton®.	R	1	1	1
90F0210	Filter glass FPF+	R	1	1	1
90F0002	Filter element type F-2T, length: 75 mm, material: PTFE, filter porosity: 2 µm	R	6	12	18
90F0004	Filter element type F-20T, length: 75 mm, material: PTFE, filter porosity: 20 µm	R	6	12	18
90F0003	Filter element type F-50T, length: 75 mm, material: PTFE, filter porosity: 50 µm	R	6	12	18
90F0005	Filter element type F-3G, length: 75 mm, material: glass, filter porosity: 3 µm	R	6	12	18
90F0011	Filter element type F-2GF, length: 75 mm, material: glass fiber, filter porosity: 2 µm, pack of 25 pcs. (for assembly 2 x adapter rings type No. 93S0050 are required)	R	1	2	3
90F0016	Filter element type F-0, 1GF, length: 64 mm, material: glass fiber, filter porosity: 0.1 µm. (For assembly 2 x adapter rings Art. No.. 93S0050 are required)	R	6	12	18
90F0550	Filter element type F-0,05SiC, length: 75 mm, material: ceramics, filter porosity: 0.05 µm	R	6	12	18
90F0006	Filter element type F-2K, length: 75 mm, material: ceramics, filter porosity: 2 µm	R	6	12	18
90F0007	Filter element type F-20K, length: 75 mm, material: ceramics, filter porosity: 20 µm	R	6	12	18
90F0008	Filter element type F-3SS. Length: 75 mm, material: SS 1.4404, filter porosity: 3 µm	R	6	12	18
90F0010	Filter element type F-20SS, length: 75 mm, material: SS 1.4404, filter porosity: 20 µm	R	6	12	18
93S2083	Spec. glass wool resistant to high temperatures, for filter wool receiving element FW. Content: 1000 g	R	1	2	3
93S0050	Adapter ring for filter element F-0,1GF and F-2GF, material: PTFE (1 pc.)	R	-	-	2
Universal filter (replacement filter elements see FPF+)					
90F0040	O-ring (26) for the filter head, material: Viton®	R	2	4	6
90F0045	O-ring (26) for the filter head, material: FEP	R	2	4	6
90F0012	Replacement filter glass type F-120G	S	-	-	1
90F0015	Replacement filter glass type F-120G-D with condensate connection thread GL25	S	-	-	1

Gas conditioning unit version CSS-VC..					
(C) Consumable parts,					
(R) Recommended spare parts					
(S) Spare parts					
		Recommended quantity in operation [years]			
Part No.	Description	C/R/S	1	2	3
Aerosol filter CLF5					
90F2005	Filter element type CLF-5 for liquid particulate filters CLF and CLF-5.	R	1	2	3
90F0040	O-ring (26) for the filter head. Material: Viton®	R	1	2	3
90F3530	CLF-5/W spare parts set I, filter frit, membrane filters, flat ring washer, O-ring.	R	1	2	3
Sample gas pump N3/5/9					
90P2120	Moulded diaphragm type S3, for N3-N5 KPE, material: Viton®/PTFE	C	1	2	3
90P2111	Valve reed type V3 with O-ring type O3, for N3-N5, 1 pc, material: Viton® (2 pieces required)	C	2	4	6
90P2220	Moulded diaphragm type S9 for N9 KPE, material: Viton®/PTFE.	C	1	2	3
90P2211	Valve plate with gasket for N9 KPE, 1 piece, material: Viton®.	C	2	4	6
Peristaltic pump SR25.2:					
90P1007	SR25 pump hose with PVDF hose connector DN 4/6 mm	C	1	2	4
90P1010	1 set of pressure springs for roller support of SR25.2 (set = 4 pieces)	C	1	2	3
90P1020	Roller support complete for SR25.2	R	-	-	1
90P1045	Pressure roller (1 pc.) for SR25.2	C	-	2	4
90P1050	Belt for SR25.2	S	1	1	1
90P1025	S-lock for SR25.2	S	1	1	1
90P1031	Hose pump head complete for SR25.2 without synchronous motor and transmission	S	1	1	1
Flow meter FM40:					
90A0015	Flow meter glass for FM40 measuring range 7-70 l/h air	S	-	1	1
94F0010	Flow meter glass for FM40 measuring range 15-150 l/h air	S	-	1	1
94F0015	Flow meter glass for FM40 measuring range 25-250 l/h air	S	-	1	1
90A0018	Viton® O-ring 9 for FM40 glass	R	2	4	6
Miscellaneous:					
90G0030	Fuse 6.3 A T (time-delayed), 5 x 20 mm for CSS...	R	5	5	5
Hose and hose fittings:					
05V3215	Bulkhead union SV-PVDF DN 4/6	R	2	2	2
05V6600	Clamping ring 4/6 PVDF, see above	R	5	10	10
05V6605	Nut M10-4/6 PVDF, see above	R	5	10	10
02B1000	PTFE hose NW 4/6 (m)	S	1	2	3
10T1000	Tubing cutter	S	1	1	1

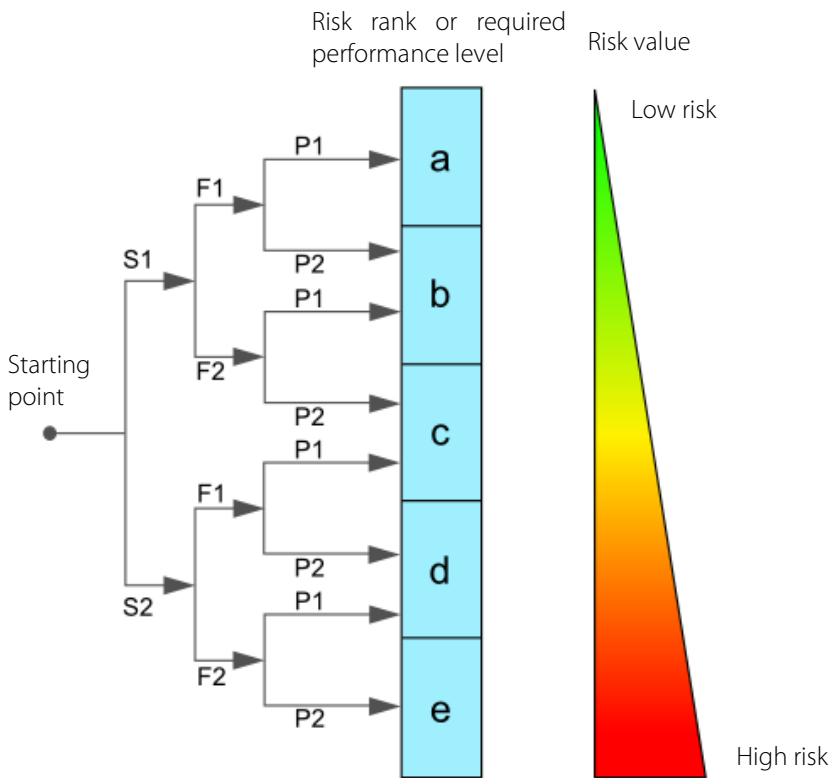
22 RISK ASSESSMENT

The risk assessment provided in this chapter is intended for all work activities on the product. The hazards can occur in the work steps of assembly, commissioning, maintenance, disassembly and in the event of a product fault. During normal operation, the product is protected by a system cabinet or appropriate covers.

Only qualified personnel is permitted to perform the work. The following minimum knowledge is required for the work:

- Employee instruction provided in process engineering
- Employee instruction provided in electrical engineering
- Detailed knowledge of the instruction manual and the applicable safety regulations

The product complies with the current regulations according to state-of-the-art science and technology. Nevertheless, not all sources of danger can be eliminated while observing technical protective measures. Therefore, the following risk assessment and the description of exposure hazards refer to the work steps mentioned above.



Severity of injury:

- S1 = 1 = minor (reversible injury)
- S2 = 2 = serious (irreversible injury, death)

Frequency and duration:

- F1 = 1 = infrequent or short exposure to hazard
- F2 = 2 = frequent (more than once per hour/shift)

Possibility of preventing or limiting the damage

- P1 = 1 = possible
- P2 = 2 = hardly possible

Figure 20 Overview risk assessment



Aggressive condensate possible

Risk rank group A

Chemical burns due to aggressive media possible!

This applies to all liquids in vessels and in the product.

In general, for electrical and mechanical work on the product, wear personal protective equipment (PPE) in accordance with the risk assessment.



Caution risk of being crushed by rotating parts

Risk rank - group A

The product contains rotating parts. Do not open covers until the device has been switched off.



Caution glass

Risk rank - group A

The product contains glass components. In general, for electrical and mechanical work on the product, wear personal protective equipment (PPE) in accordance with the risk assessment.



Caution hot surfaces

Risk rank group A

The temperature inside the product can be higher than $> 60\text{ }^{\circ}\text{C}$.

The hot parts are shielded by mechanical devices. Before opening the products, they must be disconnected from the power supply and a cooling time of more than > 20 minutes must be observed. In general, for electrical and mechanical work on the product, wear personal protective equipment (PPE) in accordance with the risk assessment.



Caution electric shock

Risk rank group C

When installing high-power systems with nominal voltages of up to 1000 V, the requirements of VDE 0100 and their relevant standards and regulations must be observed!

This also applies to any connected alarm and control circuits. Before opening the products, they must always be disconnected from the power supply.



Gas hazard

Risk rank group A-B-C

The hazard potential mainly depends on the gas to be extracted.

If toxic gases, oxygen displacing or explosive gases are conveyed with the product, an additional risk assessment by the operator is mandatory.

In principle, the gas paths must be purged with inert gas or air before opening the gas-carrying parts.

The escape of potentially harmful gas from the open process connections must be prevented.

The relevant safety regulations must be observed for the media to be conveyed. If necessary, flush the gas-carrying parts with a suitable inert gas. In the event of a gas leakage, the product may only be opened with suitable PPE or with a monitoring system. Furthermore, the work safety regulations of the operator must be observed.



Caution crushing hazard

Risk rank group A

The work must be performed by trained personnel only.

This applies to products weighing less than < 40 kg [≈ 88.2 lbs]:

The product can be transported by 1 to 2 person(s). The instructions for appropriate personal protective equipment (PPE) must be observed.

The weight specifications are contained in the technical data of this product.

Furthermore, the work safety regulations of the operator must be observed.

23 APPENDIX

- Incident messages and their meaning
- TCU menu



Further product documentation can be viewed and accessed on the home page:

www.mc-techgroup.com.

Messages that may appear in the list of events and their meanings:

Alarms

Event message	Significance
Everything OK	Everything OK
T1 alarm	Cooler temp. too high
T2 alarm	Temp. channel 2 is too high
T1 low alarm	T1 under the alarm hysteresis
LA1 cable br.	Cable break humidity sensor 1
LA2 cable br.	Cable break humidity sensor 2
LA1 alarm	Alarm humidity sensor 1
LA2 alarm	Alarm humidity sensor 2
T1-temp> max	T1 > 99.9 °C => possible cable break
T2-temp> max	T2 > 248 °C => possible cable break
T1-Temp <min	T1 < -70 °C => possible short circuit
T2-Temp <min	T2 < -50 °C => possible short circuit

Warnings

Event message	Significance
T2 low warning	T2 low temp. (outside of hysteresis)
Unit cold	Device temp. too low: < 1 °C
Device hot	Device temp. too high: > 50 °C
FA1 warning	Flow alarm channel 1
FA2 warning	Flow warning channel 2
Pump1 warning.	Pump1 out, caused by an alarm (fluid/temperature)
Pump2 warning.	Pump2 out, caused by an alarm (fluid/temperature)
Calibration defective	Internal error triggers service interval and requires return of the unit
Service int.	Service interval expired

Cancellation of alarms

Event message	Significance
T1 OK	T1 is in the control range or Pt100 is OK
T2 OK	T2 is in the control range or Pt100 is OK
LA1 OK	Humidity sensor 1 is OK or has no humidity
LA2 OK	Humidity sensor 2 is OK or has no humidity
T1-Temp <max	T1 <99.9 °C
T2-Temp <max	T2 <248 °C
T1-Temp > min	T1-Temp > min T1 > -70 °C
T2-Temp > min	T2-Temp > min T2 > -50 °C

Cancellation of warnings

Event message	Significance
T2 L warning OK	T2 now has no low temperature
Device OK	Device within the operating temperature (1 °C > T < 50 °C)
FA1 OK	Flow channel 1 OK
FA2 OK	Flow channel 2 OK
Pump1 OK	Pump1 running after alarm cancelled
Pump2 OK	Pump2 running after alarm cancelled
Calib. OK	Cancelling of an internal error after returning the device
Service OK	Service reset carried out



Error and status messages

Message	Significance
SysError	General internal error. Consult with M&C service department.
Sys OK	General error cancelled
P1 man. On	Pump 1 is set to On
P1 man. Off	Pump 1 is set to off
P2 man. On	Pump 2 is set to On
P2 man. Off	Pump 2 is set to off
P1 ext. On	Pump 1 external active
P1 ext. Off	Pump 1 external inactive
P2 ext. On	Pump 2 external active
P2 ext. Off	Pump 2 external inactive
P1 auto	Appears when ON or OFF is disabled in the pump menu
P2 auto	Appears when ON or OFF is disabled in the pump menu
T2 alm conf.	T2 alarm has been confirmed

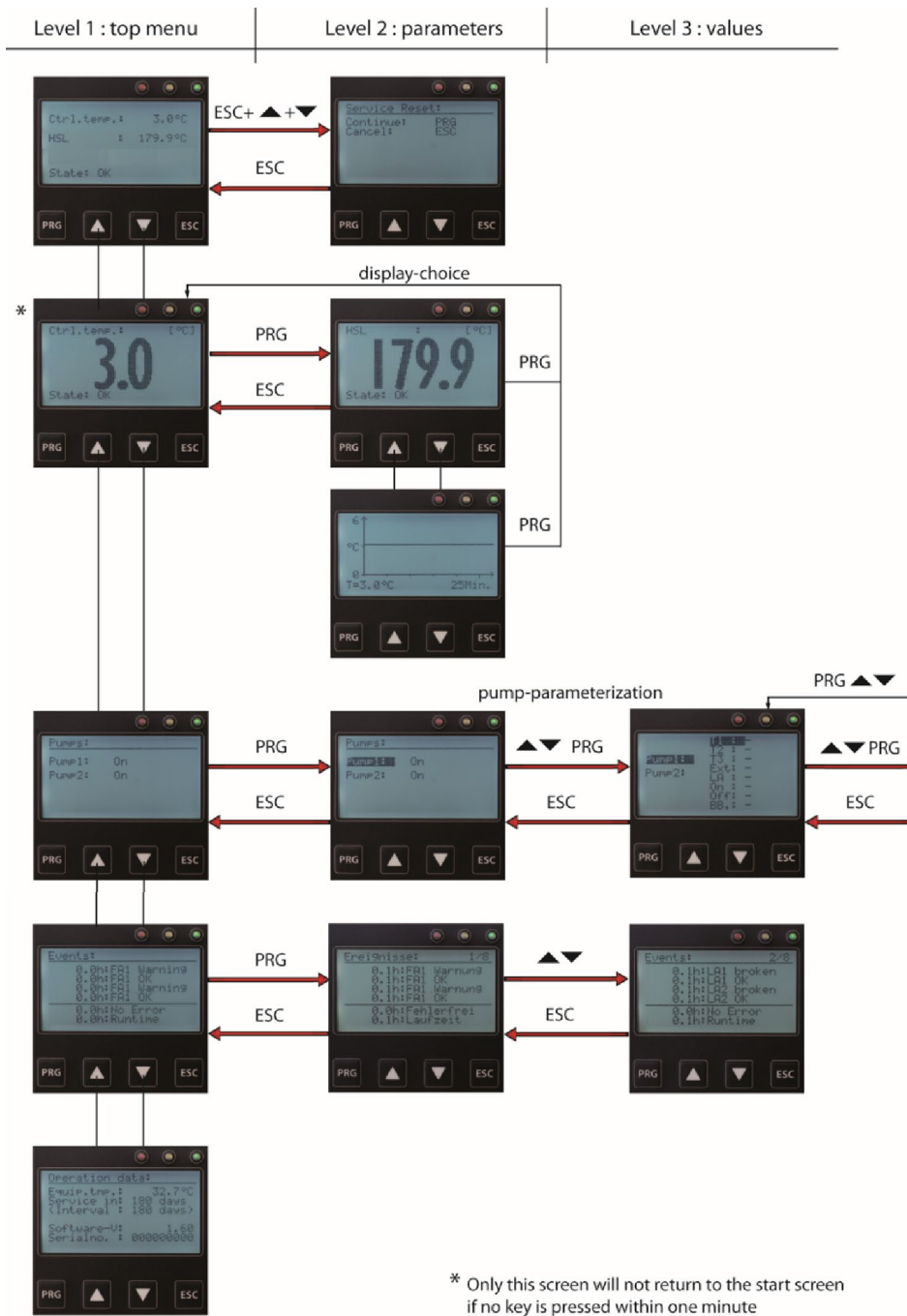


Figure 21 TCU menu