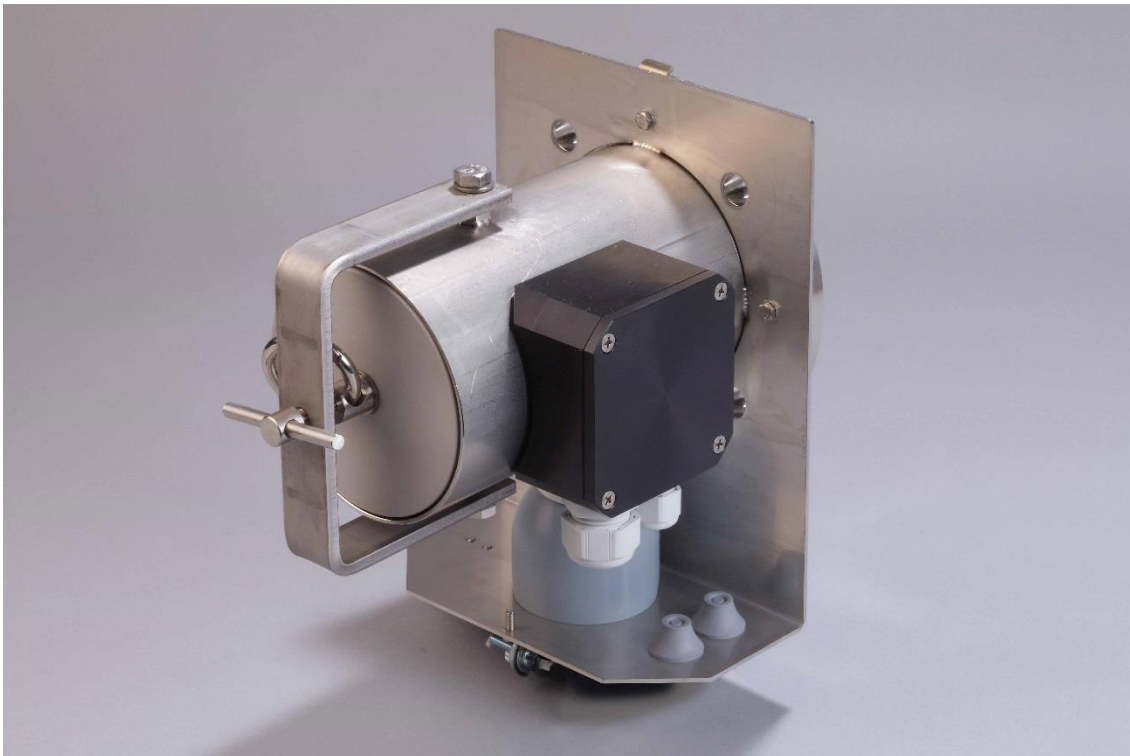


Gas Sample Probe Series SP[®]

SP210-H, SP210-H/W

Instruction Manual
Version 1.00.01





Dear customer,

we have made up this operating manual in such a way that all necessary information about the product can be found and understood quickly and easily.

Should you still have any question, please do not hesitate to contact **M&C** directly or go through your appointed dealer. Respective contact addresses are to be found in the annexe to this operating manual. Please also contact our homepage www.mc-techgroup.com for further information about our products. There, you can read or download the data sheets and operating manuals of all **M&C** products as well as further information in German, English and French.

This Operating Manual does not claim completeness and may be subject to technical modifications.

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SP® is a registered trade mark.

Version: 1.00.01

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1 GENERAL INFORMATION

The product described in this operating manual has been examined before delivery and left our works in perfect condition related to safety regulations. In order to keep this condition and to guarantee a safe operation, it is important to heed the notes and prescriptions made in this operating manual. Furthermore, attention must be paid to appropriate transportation, correct storage, as well as professional installation and maintenance work.

All necessary information a skilled staff will need for appropriate use of this product are given in this operating 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.

Declaration of conformity

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

3 SAFETY INSTRUCTIONS

Please take care of the following basic safety procedures when mounting, starting up or operating this equipment:

Read this operating manual before starting up and use of the equipment. The information and warnings given in this operating manual must be heeded.

Any work on electrical equipment is only to be carried out by trained specialists as per the regulations currently in force.

Attention must be paid to the requirements of VDE 0100 (IEC 364) when setting high-power electrical units with nominal voltages of up to 1000 V, together with the associated standards and stipulations.

Check the details on the type plate to ensure that the equipment is connected to the correct mains voltage.

Protection against touching dangerously high electrical voltages:

Before opening the equipment, it must be switched off and hold no voltages. This also applies to any external control circuits that are connected.

The device is only to be used within the permitted range of temperatures and pressures.

Check that the location is weather-protected. It should not be subject to either direct rain or moisture.

The device must not be used in hazardous areas.

Installation, maintenance, monitoring and any repairs may only be done by authorized personnel with respect to the relevant stipulations.

4 WARRANTY

If the equipment fails, please contact **M&C** directly or else go through your **M&C** authorised dealer. We offer a one year warranty as of the day of delivery as per our normal terms and conditions of sale, and assuming technically correct operation of the unit. Consumables are hereby excluded. The terms of the warranty cover repair at the factory at no cost or the replacement at no cost of the equipment free ex user location. Reshipments must be send in a sufficient and proper protective packaging.

5 USED TERMS AND SIGNAL INDICATIONS



DANGER!

This means that death, severe physical injuries and/or important material damages **will occur** in case the respective safety measures are not fulfilled.



WARNING!

This means that death, severe physical injuries and/or important material damages **may occur** in case the respective safety measures are not fulfilled.



CARE!

This means that minor physical injuries **may occur** in case the respective safety measures are not fulfilled.

CARE!

Without the warning triangle means that a material damage may occur in case the respective safety measures are not met.

ATTENTION!

This means that an unintentional situation or an unintentional status may occur in case the respective note is not respected.



NOTE!

These are important information about the product or parts of the operating manual which require user's attention.

SKILLED STAFF

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



6 INTRODUCTION

M&C gas sample probes provide direct insitu ultra-fine filtration during continuous gas sampling for analytic measurements. In this way, part of the necessary maintenance work for a system is concentrated on a single point. This filter technology has the major advantage that dust mixtures consisting of ultra-fine and coarse dusts can be optimally retained with the least possible maintenance work.

Optimal adaptation of the sample probe to processing conditions and to measurement work is a necessary condition for a measurement system to work smoothly. Basically, the gas sample should be kept to a necessary minimum. This is made possible thanks to optimised downstream gas processing using **M&C** components. Only in this way it is possible to reduce maintenance to a minimum while ensuring maximum availability.

6.1 SERIAL NUMBERS

The nameplates bearing the serial number are located on the side of the electrical connection box. Always quote the device's serial number when making enquiries and ordering replacement parts.

6.2 POWER SUPPLY

The probe can be operated on alternating current in the range from 110 to 240V.

7 TECHNICAL DATA

Gas Sample Probe Series SP®	SP210-H	SP210-H/W
Part No.	02S1000	02S1010
Weather protection shield	no	yes
Sample tube	Type SP210/SS, stainless steel 316Ti, length 1 m* optional*	
Sample temperature	max. 600 °C*	
Sample pressure	0.4 to 2 bar abs.	
Ambient temperature	-20 °C to +60 °C	
Recommended for dust loadings	up to 1 g/m ³ *	
Filter chamber volume	100 ml	
Filter element	S-2K, filter porosity 2 µm, ceramic	
Probe heating temperature	+180 °C self-regulating	
Ready for operation	after 2 hours	
Temperature alarm contact, alarm point	<160 °C, NO	
Temperature alarm, contact rating	250V-3A AC, 30V-3A DC	
Connection sample outlet	1/4"-NPT inside, with 6 mm tube connector	
Power supply	110 up to 240V 50 / 60Hz	
Power consumption	start up: 400VA, usual: 100VA, (fuse 6A)	
Electrical connection	terminals max. 2,5 mm ² , 2x PG11 cable gland	
Electrical equipment standard	EN 61010, EN 60335-1	
Degree of protection	IP54, EN 60529	IP55, EN 60529
Mounting flange	DN65 PN6,B stainless steel 316Ti	
Material of sample contacting parts	SS 316 / 316Ti, FPM, ceramic	
Weight	6,5 kg	8,5 kg
Option		
Part No.: 02 S 9200	Insitu probe tube out of stainless steel 316Ti type SP210/SS, connection G3/4" o, ø 10/12, length 1 m*, incl. flange gasket.	

* Standard, other versions on request.

ΔP und T90 at flow of:	100	200	500	NI/h
ΔP pressure loss with new filter element S-2K:	0,007	0,011	0,020	bar
T90 time-without sample tube/prefilter-	6,0	3,5	1,0	Sec.

8 APPLICATIONS

The electrically heated **M&C** gas sample probes **SP210-H** and **SP210-H/W** gas sample probes are used for continuous gas sampling in processes with dust densities of up to 1g/m³, operating pressure up to max. 2 bar abs., temperatures of up to a maximum of 600°C or higher gas humidity. Thanks to its compact design it requires only limited space. It has to be mounted in a weatherproof position. The gas sample probe **SP210-H/W** is equipped with an extra protective cover preferably for outdoor mounting.

9 DESCRIPTION

The sample probes are designed for easy installation, reliable operation and trouble-free maintenance. Advantages are:

- Gas sampling with dust loaded processes;
- Low volume, fast response time;
- Filter elements can be changed without tools and without disconnecting the (heated) sample line;
- The filter chamber can be easily cleaned;
- The probe tube can be cleaned without dismantling the probe;
- Self-regulated electrical heating with undertemperature alarm contact;
- Different probe tubes and pre-filters as an option.

The 75 mm ceramic filter element with a filter fineness of 2mm and a large surface is located in the heated stainless steel filter housing of the probe. The gas sample probe is heated up to +180°C using a special self-regulated heating element. No thermostat or temperature limiter is necessary. A separate thermo switch is provided for undertemperature monitoring (< 160°C, NO).

10 PROBE DESIGN

The filter housing with its all-round heating element forms a unit with the standard mounting flange DN65 PN6 and the laterally mounted junction box.

A mounting clamp and a tube connector are located on the underside of the probe for the connection of heated **M&C** sampling lines with external diameters of 40mm to a max. 55mm and a tube diameter of 6mm. The **SP210-H/W** is additionally equipped with an integrated silicon cap. A red silicon ring for the heat insulation of the tube connector is part of the standard delivery.

We are pleased to help you finding a suitable heated **M&C** sample line for your application.

The gas sample probe outlet connection has a 1/4" NPT internal thread with a screwed in temperature resistant stainless steel tube connector for a 6mm sample line to connect it in a gas tight manner. Tube connectors for other sample line dimensions can also be supplied by **M&C**.

After assembly of the sample line the sample gas outlet connection is enclosed with the red silicon insulation provided. The mounting clamp and the integrated silicon cap close off the connection to the exterior.

The stainless steel sampling tube of one meter length (part No.: 02S9200) can optional be provided and is connected to the G 3/4" thread of the mounting flange. The maximum operating temperature for stainless steel sampling tube is 600° C. The modular system of our sample probes allows the usage of all **M&C** sample tubes and prefilters with G 3/4" connection thread. This guarantees an optimal adaptation to the process conditions.

The following cross-sectional drawing shows the probe **SP210-H** resp. **SP210-H/W**.

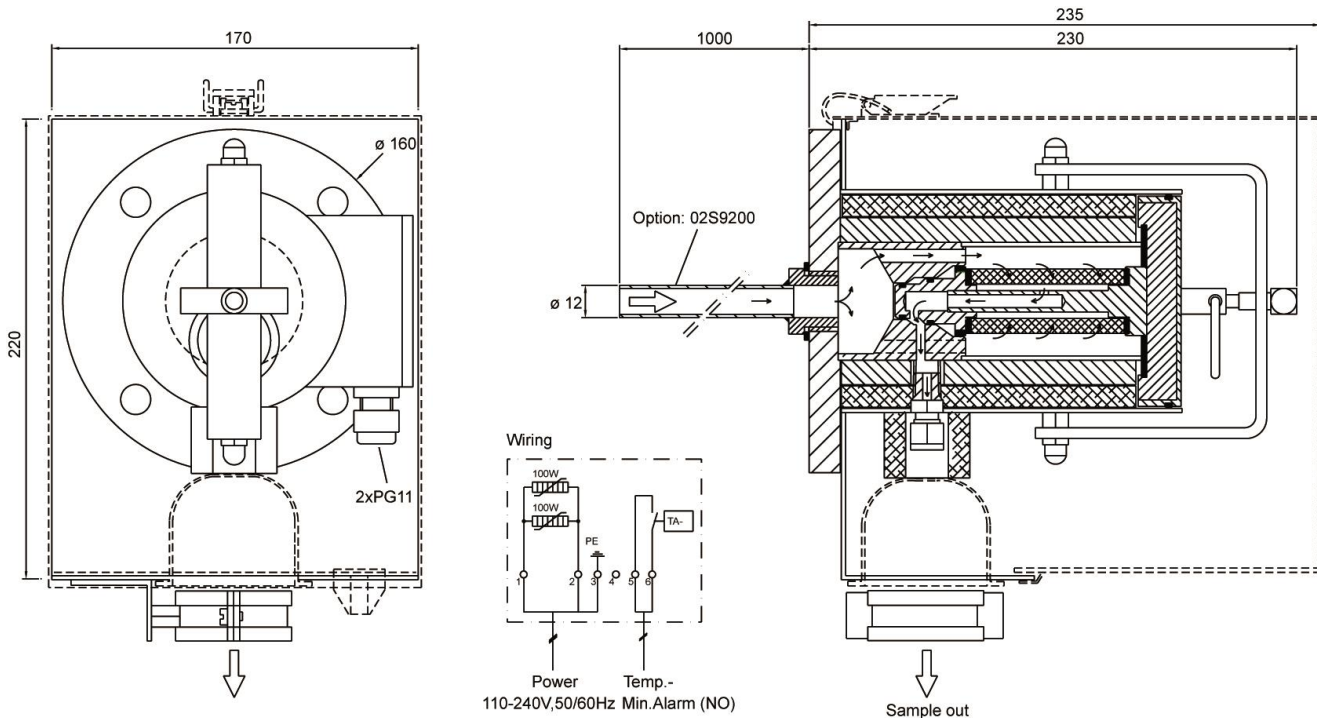


Figure 1 Dimensions **SP210-H/W**

11 RECEPTION

The gas sample probe is normally delivered in two packaging units:

1. The gas sample probe with the screws, nuts and flange seal required for mounting.
2. Sample tube with gasket.

The gas sample probe should be removed carefully from the packaging and checked immediately for completeness against the delivery note.

Check the goods for any damage incurred during transport and if necessary inform your transport insurer of any damage.

12 PREPARATION FOR INSTALLATION

- Select the optimal sampling point in accordance with the generally applicable guidelines or consult the competent persons.
- Locate the sampling point in such a way that there is adequate space for inserting and removing the probe and pay attention to the insertion length of the probe tube.
- Make certain that the probe is easily accessible so that you can carry out any subsequent maintenance work without trouble.
- Locate the probe connections in such a way that the connections' temperature is always above the acid dew point in order to avoid corrosion and blockage problems. If this is not possible, a heated **SP35/SP30** probe tube is recommended for cold connections.

- If the ambient temperature in the area of the connections is >80°C as a result of radiated heat, then a radiated-heat deflector must be mounted to protect the probe.
- The connection's mounting flange connection should comply with DN65 PN6. If other connection sizes are required, a special adapter flange **/S010** can be supplied as an option.
- Before mounting, the probe must be adjusted to the existing operating conditions.

The existing operational parameters are to be checked accordingly prior to commencing mounting work:

weatherproof mounting position	_____ present	_____ set	
Under / over pressure situation	mbar	bar	
Process temperature	°C, Min.	°C, Max.	
Dust loading	g/m ³		
Dust composition - grain size	µm		
Gas composition	corrosive	toxic	explosive
Which parameters should be measured, e.g. O₂, CO, SO₂, NO_x,...	Vol.%	mg/Nm ³	ppm
Required amount of gas	l/h, Min.	l/h, Max.	
Necessary T₉₀ time	sec.		

13 MOUNTING

M&C SP210-H probes are designed for stationary use and if properly selected and mounted a long service life and minimum maintenance are guaranteed. It is advisable to mount the probe in an operational position which is at a 10% inclination to the process.

Checking the filter element:

- Turn the U-bolt at the front end of the filter receptacle several times to the left until the retaining bolt can also be turned sideways.
- Remove the filter receptacle at the ring from the probe and check whether the filter element is screwed on tightly.
- Replace the filter receptacle.
- Place the retaining bolt in its original position and tighten the U-bolt.

Connection of the heated sample line:

- In order to connect the sample line, a threaded tube connector for dimension Ø 6x1mm is available – other dimensions on request
- Push the silicon cap onto the end of the heated sampling tube
- Introduce the tube connection piece into the bolted pipe joint and connect.
- If a PTFE tube is used as sample line, a carrying bracket must under all circumstances be inserted in the end of the tube in order to prevent the tube being pressed together.
- The temperature-resistant, stainless steel connectors supplied by **M&C** have a double-blade ring system to ensure reliable sealing. After tightening the nuts of these connectors by hand, they should then be tightened exactly 1¼ of a turn using a flat spanner and are then properly mounted.



NOTE!

Make sure that the connection is leakproof !

- Now place the red silicon heat insulation around the connection.

Mounting of sample tube and adapter flange:

- Screw either the probe tube directly into the $\frac{3}{4}$ " inner thread in the flange of the probe with the $\frac{3}{4}$ " flat gasket and tighten.
- If the heated probe tube type **SP30/35** is used then the probe is to be screwed to their flange (with welded threaded bolt). First insert the flange seal between the two flanges.
- If the probe connection does not correspond to the standard flange connection DN65 PN6, then the optionally supplied adapter flange should be mounted to the probe in the same way.
- Attach the flange seal to the probe connection.
- Now insert the process-internal probe section of the complete probe unit into the probe connection using the screws and nuts supplied.



NOTE!

A preferred mounting position is to have the probe with its sample gas outlet pointing downwards, although this is not absolutely necessary for perfect functioning.

14 ELECTRICAL CONNECTION



WARNING!



When connecting the equipment, please ensure that the supply voltage is identical with the information provided on the model type plate.



NOTE!

Attention must be paid to the requirements of IEC 364 (DIN VDE 0100) when setting high-power electrical units with nominal voltages of up to 1000 V, together with the associated standards and stipulations.

In any case we recommend the use of temperature resistant cable !
A main switch and matching fuse must be provided externally!

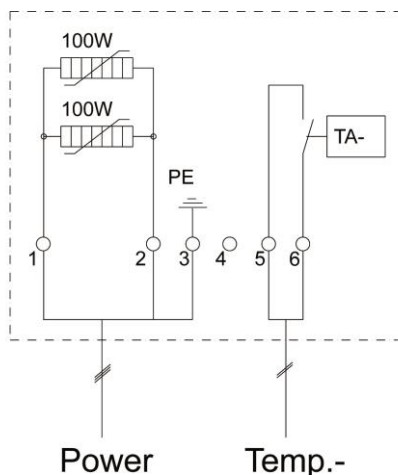
The main circuit must be equipped with a fuse corresponding to the nominal current (over current protection); for electrical details see technical data.

It is recommended to use the low temperature alarm. In case of an alarm the flow can be stopped and the components downstream the probe are safe for damage.

The junction box is mounted on the side of the probe. The wiring plan is located in the lid of the junction box. Two separate cable bushings are available for the mains and the signal cable.

Carry out the following steps:

- Remove the weather protection shield at version **SP210-H/W**;
- Remove the lid of the junction box;
- Insert the mains cable (min. 3 x 1.5 mm²) through the cable gland and connect it to the appropriate terminals as in the wiring beside;
- Insert the signal cable through the other cable gland and connect it to the appropriate terminals as in the wiring below;
- Screw lid back on;
- Put on the weather protection shield at version **SP210-H/W**;



110-240V,50/60Hz Min.Alarm (NO)

Figure 2 Electrical connection diagram

15 STARTING UP

Before starting up check whether the mains power supply voltage corresponds with the information stated on the probe's nameplate.

- Switch on mains power supply. The total heating-up time is approximately 2 hours. After about 1 hour the probe is already sufficiently heated for the temperature to have exceeded the temperature failure alarm value (160°C), but it still takes about another hour until operating temperature is reached.
- The sample gas can now be extracted via the probe after this minimum heating-up time of 2 hours.

16 MAINTENANCE

The safety measures specific to the plant and process are to be consulted prior to any maintenance work!



WARNING!

**Prior to carrying out maintenance work on electrical parts, mains voltage should be disconnected from all poles!
This also applies to any external control circuits which may be connected.**

It is difficult to give any recommendations as to a particular maintenance cycle. Depending on your process conditions, a meaningful maintenance cycle must be elaborated for the specific application. An indication that probe-maintenance may be necessary could be shown by a constant decline in the amount of sample gas in the analysis system.

Probe maintenance is restricted essentially to replacing filter elements and checking seals:



WARNING!

**Aggressive condensate is possible.
Wear protective glasses and proper protective clothing!
High surface temperatures!
Wear protective gloves!**

- At version **SP210-H/W** remove the weather protection shield;
- Loosen u-bolt ① and swing retaining bolt to the side;
- Pull out the complete filter unit with lid ② and o-rings ⑥ and ⑦, the filter element ③, the clamp ④ and the knurled screw ⑤;
- Screw out the filter's knurled screw ⑤ and renew filter element ③;
- Check filter element seals ⑥ and replace if necessary;
- Check o-rings ⑦ and change if necessary;
- Check the sealing in the lid ③ and change if necessary;
- Clean filter chamber; It is also possible to rod through the probe tube in order to remove deposits.
- O-Ring ⑧ is only for guidance of the probe lid and has no sealing function.

The rebuilding has to be done in the reverse order.

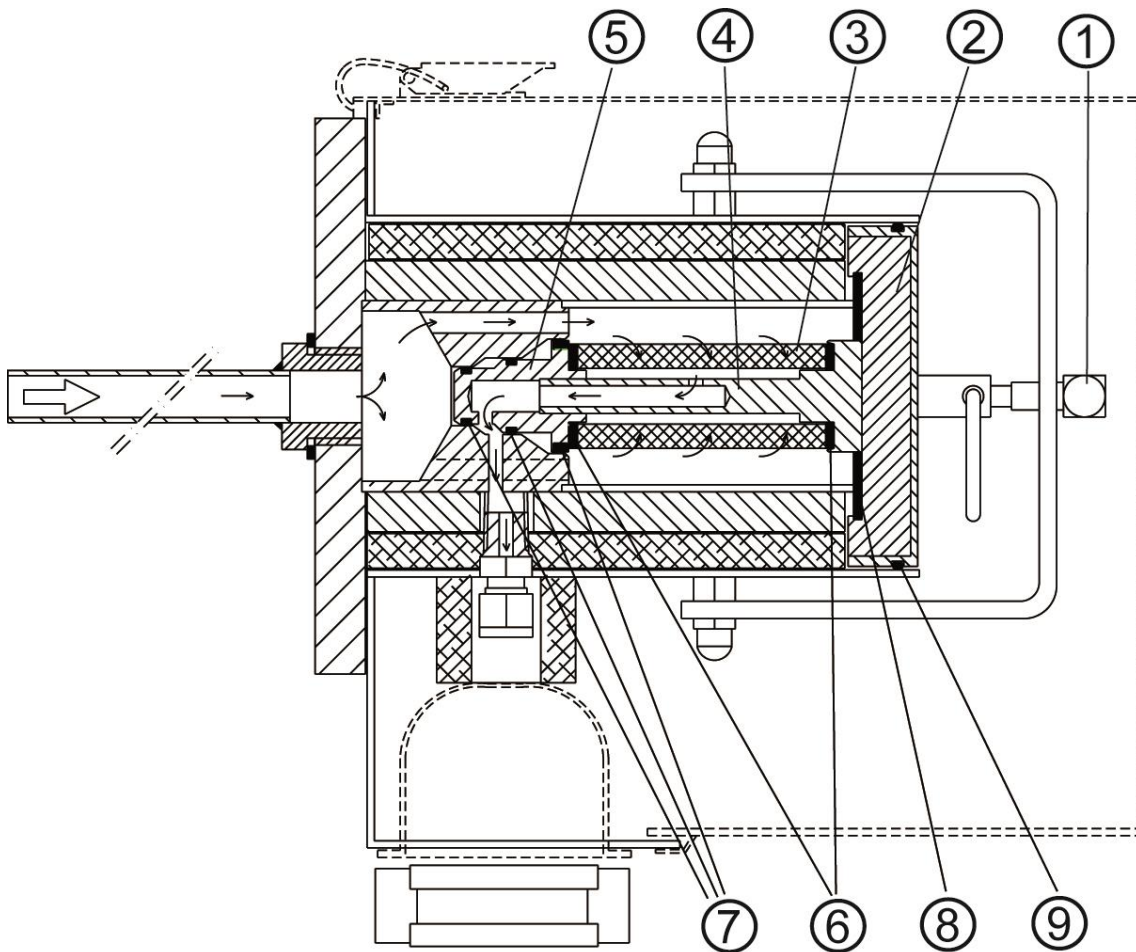


Figure 3 Replacing the filter element

17 SWITCHING OFF

Before switching off, i.e. switching off the heating, the probe be flushed with inert gas or air in order to avoid condensation of aggressive components from the process gas.

18 SPARE PARTS LIST

Wear, tear and replacement part requirements depend on specific operating conditions. The recommended quantities are based on experience and they are not binding.

Gas sample probe SP210-H, SP210-H/W					
(C) Consumable parts (R) Recommended spare parts (S) Spare parts					
		Recommended quantity being in operation [years]			
Part No.	Indication	C/R/S	1	2	3
90 S 0015	Ceramic filter element S-2K , 2 µm, 75 mm ③	C	6	12	18
93 S 0045	Viton - gasket (30) ⑥	R	4	8	12
93 S 0027	Probe heat sealing plate for SP210-H. Material: Viton. ⑧	R	2	4	6
93 S 0029	Viton O-ring set for SP210-H ⑦	R	2	4	8
93 S 0028	Viton O-ring ⑨	R	1	2	3
90 S 2080	Novapress gasket 3/4" (<i>blue</i>), max. 600°C	R	1	2	3
90 S 2077	Novapress flange gasket DN65PN6 (67mm i.)	R	1	1	1
90 S 2075	flange gasket set for DN65 PN6 B , consisting of Novapress gasket (67mm i.) and screws set M12	S	1	1	1
93 S 2105	Min. temperature contact <160°C	R	1	1	1
93 S 2110	Cartridge heater HLPSR, 100mm, 110-240V 100W	R	2	2	4
93 S 2130	Silicon-thermal insulation (red)	R	0	1	1

19 APPENDIX



Further product documentation can be seen and downloaded from our home page: www.mc-techgroup.com

- Sample tubes series **SP**, Document: **2-1.1.0.6**
- Prefilter series **SP**, Document: **2-1.1.0.8**