Embracing Challenge

Gas sample probe Series SP®

SP2600-H/C/I/BB-F/0,1GF, SP2600-H/C/I/BB-F/1K190

Instruction Manual
Version 1.01.00

Dear customer,

Thank you for buying our product. In this instruction manual you will find all necessary information about this M&C product. The information in the instruction 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 manual.

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

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.
SP® is a registered trade mark.

Version: 1.01.00

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1 General information

The product described in this manual has been built and tested in our production facility.

All M&C products are packed to be shipped safely. To ensure the safe operation and to maintain the safe condition, all instructions and regulations stated in this manual need to be followed. This manual includes all information regarding proper transportation, storage, installation, operation and maintenance of this product by qualified personnel.

Please follow all instructions and warnings closely.

Please read this manual carefully before commissioning and operating the device. If you have any questions regarding the product or the application, please don't hesitate to contact M&C or your M&C authorized distributor.

2 Declaration of conformity

CE - Certification

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

Follow these safety directions and instructions regarding installation, commissioning and operation of this equipment:

Read this manual before commissioning and operating the product. Please make sure to follow all safety instructions.

Installation and commissioning of electrical devices must be carried out only by qualified skilled personnel in compliance with the current regulations.

The installation and commissioning of the device must conform to the requirements of VDE 0100 (IEC 364) 'Regulations on the Installation of Power Circuits with Nominal Voltages below 1000V' and must be in compliance with all relevant regulations and standards.

Before connecting the device, please make sure to compare the supply voltage with the specified voltage on the product label.

Protection against damages caused by high voltages:
Disconnect the power supply before opening the device for access. Make sure that all extern power supplies are disconnected.

Operate the device only in the permitted temperature and pressure ranges.

Install the device only in protected areas, sheltered from rain, sun and moisture. The product should not be exposure to the elements.

This device is NOT certified to be installed or operated in explosive hazardous areas.

Installation, maintenance, inspections and any repairs of the devices must be carried out only by qualified skilled personnel in compliance with the current regulations.

3.1 Intended Use

The **SP2600-H** gas sample probe must be operated properly under the conditions described in chapter 8. Only use the **SP2600-H** in permissible temperature and pressure ranges.
Refrain from any use other than for this purpose.
Improper use can lead to serious injuries, see the safety instructions at the appropriate point.

4 Warranty

In case of a device failure, please contact immediately M&C or your M&C authorized distributor.
We have a warranty period of 12 months from the delivery date. The warranty covers only appropriately used products and does not cover the consumable parts. Please find the complete warranty conditions in our terms and conditions.
The warranty includes a free-of-charge repair in our production facility or the free replacement of the device. If you return a device to M&C, please be sure that it is properly packaged and shipped with protective packaging. The repaired or replaced device will be shipped free of delivery charges to the point of use.

5 Used terms and signal indications

Danger

The 'Danger' warning sign indicates that death, serious injury and/or significant material damage will be the consequence, if the appropriate precautions should not be taken.

Warning

The 'Warning' warning sign indicates that death, serious injury or damage to property may occur if the relevant precautionary measures are not observed.

Caution

The 'Caution' warning sign indicates that slight personal injury can occur if the appropriate safety precautions are not observed.

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.

Caution

'Caution' indicates that damage to property can occur if the appropriate safety precautions are not observed.

Note

'Note' indicates important information relating to the product or highlights parts of the documentation for special attention.

Qualified personnel

'Qualified personnel' are experts who are familiar with the installation, mounting, commissioning and operation of these types of products.

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

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

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.

Wear safety footwear!

Use safety helmet and full protective goggles!

6 Introduction

The **M&C** gas sample probes type **SP2600-H** are based on the patented probe **SP2000-H** and are used for continuous gas sampling in processes with a high extent of dust, high temperature and/or high gas moisture.

6.1 Serial Number

The type plates are to be found where the electrical connection box is placed.

Note

Please indicate the serial number of the equipment in case of any question and when ordering spare parts.

7 Application

Due to its large filter surface and the possibility to back-purge the filter element, the probes **SP2600-H/C/I/BB-F** achieve a high service life especially in cases where no pre-filter can be applied. For this purpose, a back-purge valve and a pneumatic stop valve for the sample gas outlet is integrated in the probe.

Version **SP2600-H/C/I/BB-F/0,1GF** is suitable for dusts with extremely fine particles up to 0,1 µm and version **SP2600-H/C/I/BB-F/1K190** can be very efficiently back-purged thanks to the double-ply filter element and an external filter membrane of 1 µm porosity.

8 Technical data

Technical Data Series SP®	SP2600-H/C/I/BB-F/0,1GF	SP2600-H/C/I/BB-F/1K190
Part Number	**20S3550**	**20S3540**
Integrated back purging	Via the filter element	
Weather protection cap	Yes	
Protection terminal box	IP54 EN 60529	
Materials filter housing	Stainless steel 1.4571, 1.4404	
Sealing material	FKM*	
Material probe flange sealing	Novapress®	
Sample tube	Optionally	
Sampling pressure max.	0.4 – 6 bar* abs.	
Ambient temperature	-20 to +60 °C*** [-4 to 140 °F***] /Pt100, /Fe-CuNi, /Ni-CrNi** = -20 to +80 °C [-4 to 176 °F]	
Filter housing volume	300 cm^3	
Filter porosity	0.1 micron	1 micron
Thermostat, Temperature adjustments	0-180 °C* /PT100** /Fe-CuNi** /Ni-CrNi**	
Readyness for working	After 40 min	
Alarm contact for insufficient temperature	Capacity 250 V 3 A~, 0.25 A=, Switch point: ΔT 30 °C to T_{SOLL}	
Connection sample gas outlet	1 x ¼" NPT female* Tube connection Ø 6, 8 or 10 mm**	
Backpurge connection (BB-F)	Back purging: for tube Ø 8 mm	
Test gas connection (/C)	Ø 6 mm tube stub	
Connection stop valve (/I)	Ø 6 mm tube stub	
Pressure range control air (/I)	3 – 10 bar	
Power supply	230 V 50/60 Hz, 800 W or 115 V 60 Hz, 800 W (fuse 10 A)	
Electrical connection	Terminals: max. 4 mm^2, 2 x M 20 x 1.5 cable gland	
Standard electrical equipment	EN 61010, EN 60519-1	
Mounting flange	DN 65 PN 6, Form B, 1.4571* > DN or ANSI possible**	
Weight	Approx. 20 kg*	

* Standard
** Options
*** If there are high ambient temperatures, please choose option Pt100 (Part No. 20S9025) or thermoelement Fe-CuNi or Ni-CrNi (Part No. 20S9027 resp. 20S9028) instead of thermostat regulator. In this case, an additional electronic temperature regulator is necessary (see data sheet for temperature controller).
Novapress® is a registered trademark for elastomer-bonded gasket material by Frenzelit GmbH, Germany.

9 Description

The probe has been designed for easy installation, safe operation, easy maintenance and a great variety of applications. Depending on the particular problem, various sample tubes or pre-filters (see data sheets), which are not included in the scope of supply of the probe, are screwed into the G3/4" female thread of the filter holder.

The large surface ceramic or glass fibre filter element is installed outside the process area in a housing with minimal dead space. The probes are designed for replacement of the filter element without having to remove the sample line so that contamination of the clean gas side is avoided.

Owing to the special design of the heating element of probe **SP2600-H**, the entire filter housing including mounting flange can be heated adjustable to 180 °C [356 °F], thus ensuring reliable operation without cooling down below the dew point in the external area.
Temperature control of the standard version takes place by means of an integrated capillary sensor thermostat with excess temperature limiter and alarm function for insufficient temperature in a compact arrangement directly on the probe. Test gas feeding is possible via an integrated check valve.

Additional functions of the **SP2600-H**:

- The calibration gas can be supplied directly at the check valve/**C** (return valve) to the probe outlet. Calibration gas supply at the probe is possible without any expensive gas loss via the otherwise open probe inlet.
- The cut-off valve **/I** cuts off the gas outlet of the heated filter chamber.
- The filter element, and via this indirectly, the filter space and sample tube or preliminary filter can be back-flushed via the check valve **/BB-F** installed in the heated chamber wall.

9.1 Options

The following list shows the options available. The diversity of options and the modular design of the **M&C** gas sample probes ensure optimum probe selection to suit the particular process and ambient conditions.

Description	Part No.
Basic version SP2600-H/C/I/BB-F/0,1GF, heated up to 0-180 °C, with weatherproof cover, material stainless Steel 1.4571	20S3540
Basic version SP2600-H/C/I/BB-F/1K190, heated up to 0-180 °C, with weatherproof cover, material stainless Steel 1.4571	20S3550
Power supply 115 V/60 Hz	20S9030
Type with back-flush/calibration gas valve (C*), opening pressure 0.7 bar, tube stub 6 mm*	20S9435
Type with Pt100 sensor instead of capillary controller, without thermostat /Pt100	20S9025
Type with thermo-element Fe-CuNi (Typ J) instead of capillary controller, without thermostat /Fe-CuNi	20S9027
Type with thermo-element Ni-CrNi (Typ K) instead of capillary controller, without thermostat /Ni-CrNi	20S9028
Type with second PT100 sensor /2-PT100	20S9026
Type with special intermediate flange adapter DN..PN6 or ANSI..150 lbs /DN	20S9004
Type with gas pre-heater GVW1, material stainless Steel 2-1.2.5 /GVW1	20S9058
Junction of the gas pre-heater to the connection „BB“ and to the gas inlet /GVW	20S9062
Type with steam heating without thermostat and valves instead of the capillary controller /D	20S9033

10 Receipt of goods and storage

- Please take the probe and possible special accessories carefully out of the packaging immediately after receipt and compare the goods with the items listed on the packing list.
- Check the goods for any damage caused during delivery and, if necessary, notify your transport insurance company without delay of any damage discovered.

Note

The probe must be stored in a weather-protected and frost-proof area!

11 Installation and dimensions

During installation, the prescriptions for accident prevention and safety instructions for mounting and operation have to be heeded.
Please strictly observe the notifications of chapter 3 „Safety instructions".

Furthermore, you have to consider the following:

- Select the optimum sampling point according to the prescriptions actually valid and coordinate with the responsible persons.
- Place the sampling point in such a way that sufficient space for mounting and dismounting of the probe is available. Also consider the insertion length of the sample tube.
- Take care of easy access to the probe in order to enable you to execute any maintenance work necessary in future without problem.
- The bleeder connection must be prepared so that the temperature of the connection piece remains above the acid dew point in order to avoid problem due to corrosion and obstruction.
- In case the temperature in the area of the connection piece is > 60 °C due to radiant heat, you have to mount a device of sheet steel in order to reflect the radiant heat.
- The mounting flange of the connection piece should be connected with size DN 65 PN 6. Should you desire other dimensions, we can provide you suitable adapter intermediate flanges as option. The minimum flange size or connection piece diameter respectively is determined by the sample tube diameter or pre-filter diameter you apply.
- We recommend mounting the probe horizontally with an angle of inclination of 10° to the process.

Note

Before mounting the probe, you have to check its suitability on the basis of the given operating parameters. (see type plate).

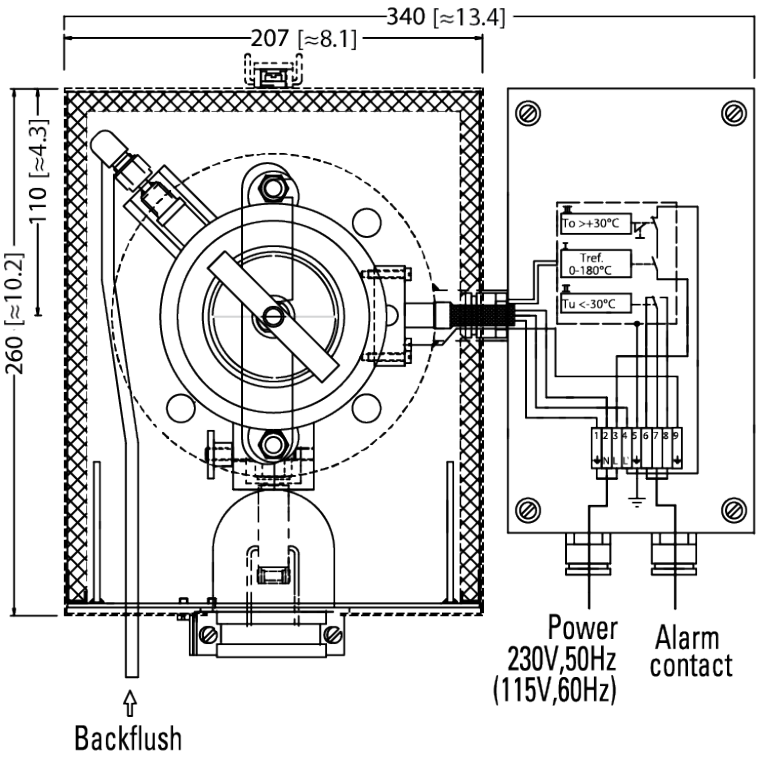


Figure 1 View with heater SP2600-H/C/I/BB-F

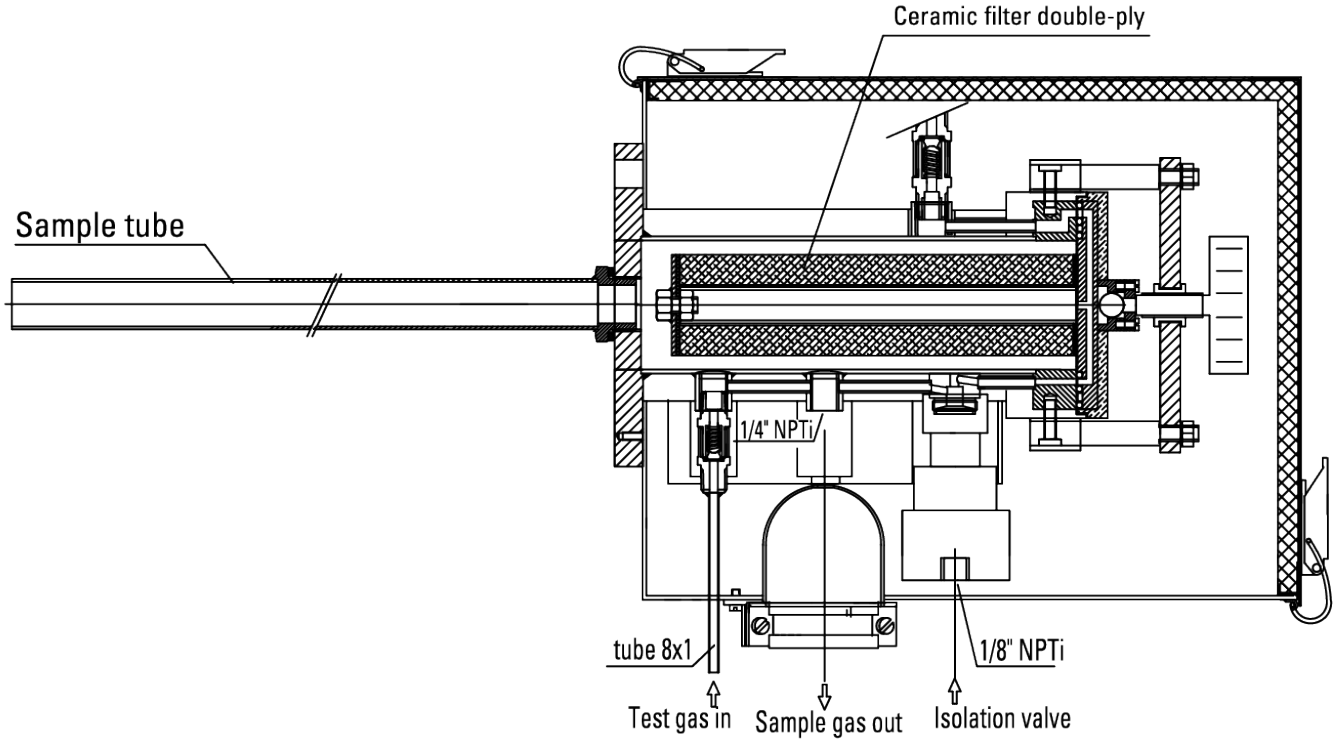


Figure 2 Side view: SP2600-H/C/I/BB-F/01K190

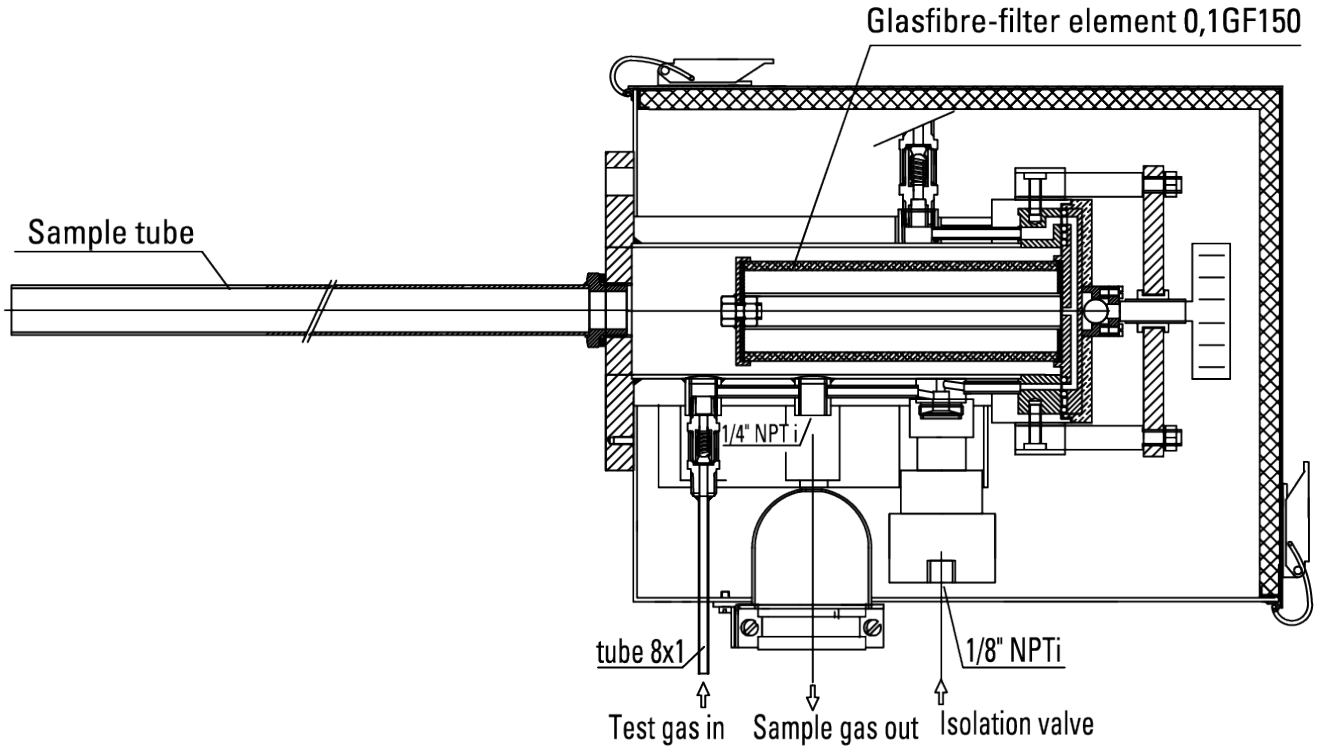


Figure 3 Side view: SP2600-H/C/I/BB-F/0,1GF

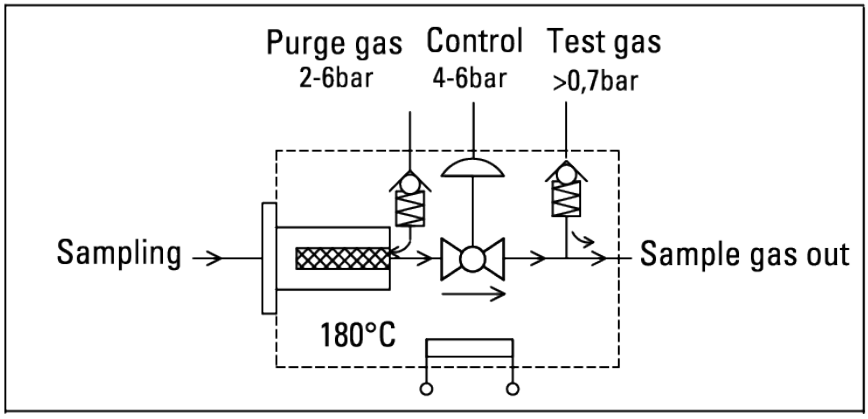


Figure 4 Gas flow diagram: SP2600-H/C/I/BB-F

12 Mounting

The **M&C** probes **SP2600-H..** are designed for stationary use and provide a long service life and a minimum of maintenance work under the premise of professional selection of the sampling point and professional mounting.

12.1 Mounting of the prefilter respectively the sample tube

The pre-filter or sample tube is mounted together with a suitable sealing by screwing into the G ¾" thread of the probe flange.

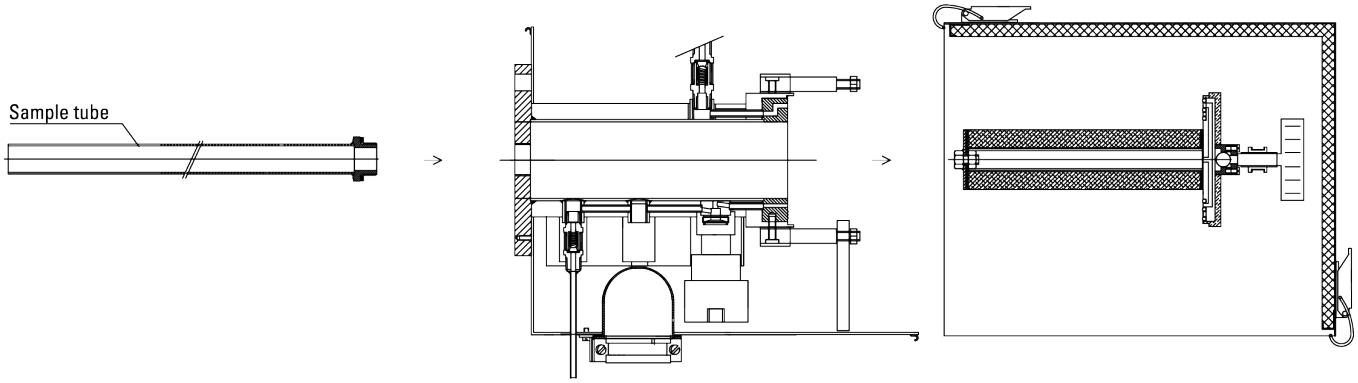


Figure 5 Mounting of the pre-filter or sample tube

12.2 Mounting of the probe

1. Remove the protection cover of the probe after having opened both bent-level closures.
2. Put the flange sealing on the bleeder connection.
3. Fit the mounting piece and the probe flange by means of the attached screws and screw nuts.

In case the bleeder connection does not fit with the standard flange connection DN65 PN6, please mount the attached optional adapter flange in the same way onto the probe.

Note

It is recommended to mount the probe with its sample gas outlet showing downwards (not necessary for perfect function).
Further it is recommended to mount the probe with a slight descending gradient downwards so that possible deposited drops may flow back into the process.

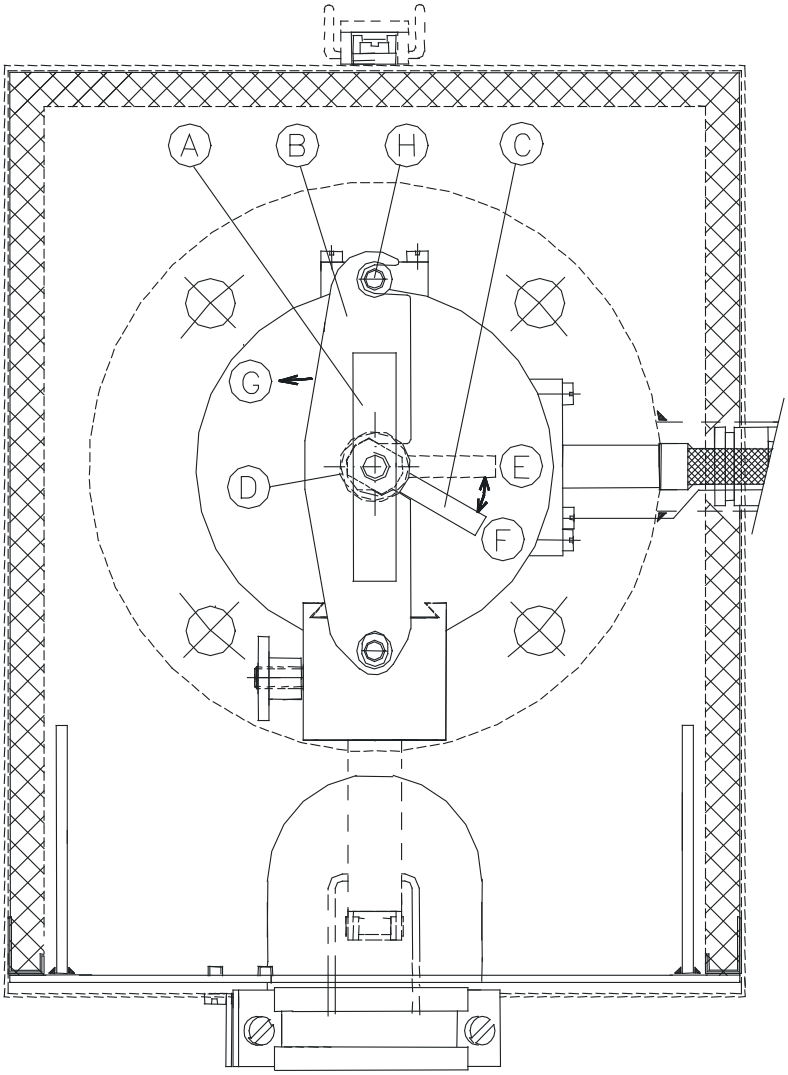
4. Remove the heat conducting jaws on the sample gas outlet after having unscrewed the knurled screw. For connection of the sample line, you have to screw in a correctly dimensioned tube joint connection **1/4"-NPT** by using a PTFE sealing tape.

Caution

The fittings must be tightened carefully in order to protect the integrated components against damage. Do not screw down the fittings too much.
In case of leakage, do not tighten the fittings further. Dismount the respective fitting completely, screw in and tighten it again.
Check the connection for tightness.

12.3 Dismounting of the filter housing lid and checking the filter element

The filter housing lid is dismounted as followed:



A Toggle handle
B Clamping bracket
C Handle
D Eyebolt (attached to handle **C**)
E Position of handle **C** (to close filter housing lid)
F Position of handle **C** (to open filter housing lid)
G Direction: counter-clockwise
H Threaded bolt

Figure 6 Schematic drawing of the filter housing cover

Removing the filter housing lid to check or change the filter element has to be done as follows:

Warning

When working during operation:

High surface temperatures!
Touching the surfaces can result in burns.
Wear protective gloves and any unauthorized access to the probe must be made impossible!

1. Open the two clamping devices and remove the probe cover;
2. Turn toggle handle **A** approx. 1 turn counter-clockwise, that the filter housing lid will lift up;
3. Turn handle **C** in position **E**;
4. Turn clamping bracket **B** counter-clockwise in direction **G**;
5. Take toggle handle **A** and pull out the filter housing lid;
6. Check tight fit of filter element and tighten it if necessary (hand tight) or change filter element and corresponding sealings;
7. Push the filter housing lid into the filter area;
8. Turn clamping bracket **B** clockwise and turn with the handle **C** the eyebolt **D** in position **E**, that the clamping bracket **B** will latch into the eyebolt **D** and the threaded bolt **H**. It could be necessary to move the filter housing lid a little bit forward and backward;
9. Turn handle **C** in position **F** and fasten the filter housing lid by turning the toggle handle **A** clockwise hand-tight.

The photos illustrate the above mentioned steps.

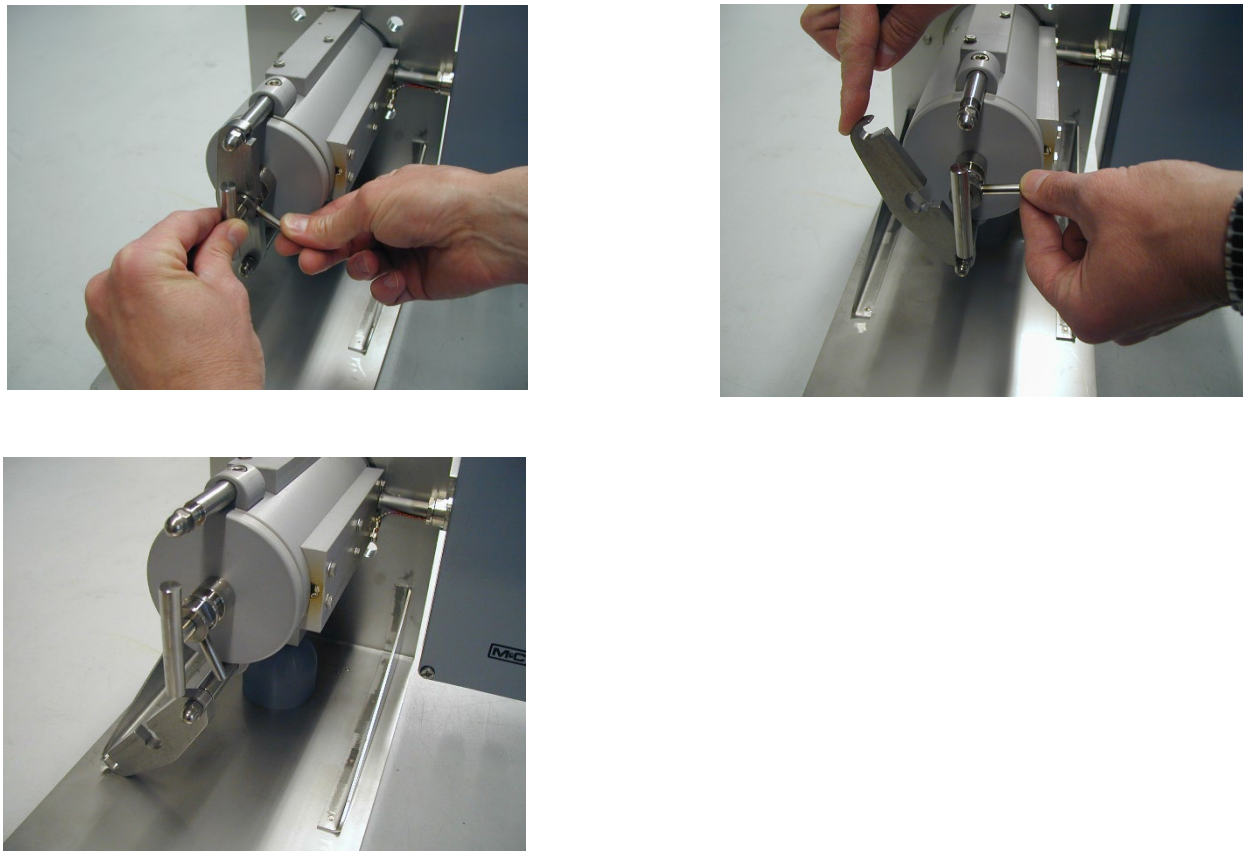


Figure 7 Dismounting of the filter housing cover

13 Connection of the sample line

On the probe, a thread ¼" NPT female is available for connecting the sample line. You can screw in respective connection joints for lines with dimensions of Ø 6 mm (standard), 8 mm or 10 mm.

The sample line is to be mounted as follows:

1. Loosen the bent-lever closures of the insulating cover and remove the cover;
2. If you have got the 180 °C [356 °F] version, screw the respective screws with insulating tape into the probe head (see also chapter 12.2);
3. Insert the line through the corresponding opening in the bottom of the probe and through the silicone retainer;
4. Connect the line to the tube joint.

For Swagelok®-Fittings, the following is valid:

1. Put the line with supporting socket into tube joint until the limit stop;
2. Screw the union nut hand-tight;
3. Before drawing up, mark the union nut on the "6-a'clock position";
4. Hold the body with a wrench and screw down the union nut by 1 ¼ rotations; after one entire rotation, the marking has to be turned furthermore up to the "9-a'clock position".

Note

For the connection of tube lines to stainless steel tube joints, you must always use a supporting socket.
Check the connection for tightness.

5. Place the probe cover again and shut it by both bent-lever closures.

14 Connection of the backpurge and calibration gas

Warning

The back-purge pressure must always be higher than the process pressure. The admissible maximum pressures must not be exceeded (see technical data).

The return valve has got an opening pressure of 0.7 bar.
Versions**SP2600-H/C/I/BB-F** include separate connections for test gas feeding and back-purge gas (see Figure 1, Figure 2 and Figure 3):

- Back-purge gas for pipe Ø 8 x 1 mm, and
- Calibration gas pipe socket Ø 6 x 1 mm.

The control of the stop valve **/I** is made separately within a pressure range of 3 to 10 bar. It is equipped with a 6 mm tube stub.

15 Electrical connection

The temperature adjustment of probes type **SP2600-H** is effected with a capillary regulator as standard. Optionally, the probe can be equipped with a PT100 or thermocouple. This requires the connection of an external thermostat.

Warning

Incorrect supply voltage may damage the device. When connecting the equipment, please ensure that the supply voltage corresponds to the information given on the type plate!

Please install the probes in such a way that any contact of the live parts is impossible!

We recommend in any case to use heat-resistant cables!

The alarm contact for insufficient temperature must be monitored!

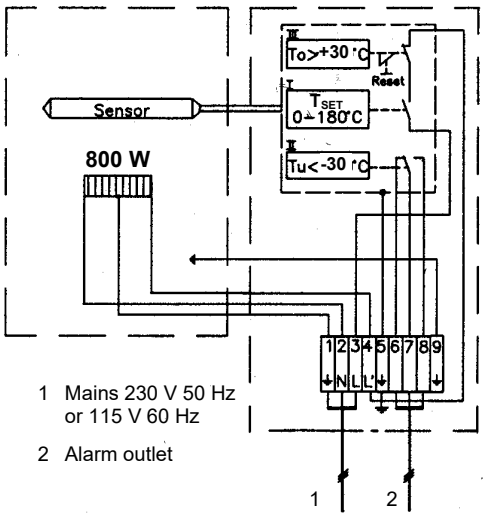
In case of a low temperature alarm (failure of the probe heating or sensor), the gas sampling must be interrupted in order to avoid a damage of the probe or downstream components.

Note

For the erection of high-power electrical units with nominal voltages of up to 1000V, the requirements of VDE 0100 (IEC 364) must be observed together with the associated standards and stipulations.
A main switch must be provided externally.
The main circuit of the device must be equipped with a fuse corresponding to the nominal voltage (over current protection); for electrical details see technical data.
When mounting the capillary regulator or PID regulator on the sampling place, the maximum admissible ambient temperature must be heeded (see chapter 8). In case it is exceeded, you must install a PID regulator externally and outside the critical temperature zone.

15.1 Version with internal capillary tube thermostat

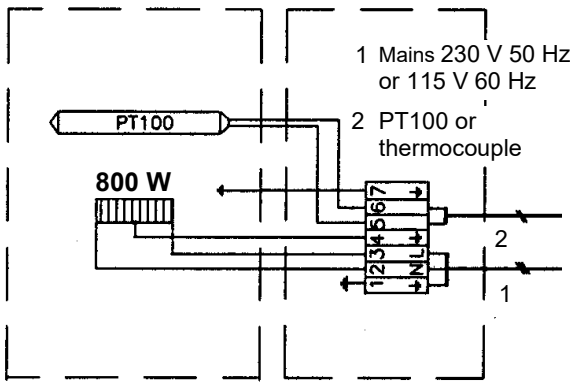
1. Remove the lid of the connection box. Inside the lid, you can find the electrical connection plan as shown here.
2. Insert the mains cable (min. 3 x 1.5 mm^2) through the cable gland and connect it to the appropriate terminals.
3. Insert the signal cable (insufficient temperature alarm) through the cable entry and connect it to the appropriate terminals (contact position T_u indicates the event of alarm).
4. Screw on the lid again.



Caution We recommend using heat-resistant cables!

15.2 Version with external temperature regulator

1. Remove the lid of the connection box. Inside the lid, you can find the electrical connection plan as shown here.
2. Insert the mains cable (min. 3 x 1.5 mm^2) through cable gland and connect it to the appropriate terminals.
3. Insert the temperature sensor cable through the cable entry and connect it to the appropriate terminals.
4. Screw on the lid again.



the

Caution If you apply thermocouples, please use corresponding calibration lines!

16 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.

17 Starting

Before starting the equipment for the first time, the safety instructions related to the installation and the process have to be heeded.

Please consider the appropriate safety requirements and respective measures regarding the mediums to be extracted.

Warning

Please ensure before starting that the mains supply corresponds to the indication on the type plate!

Be careful when you get in contact with the probe's surface during operation. The high surface temperatures may cause burnings. Protective gloves are to be born and any unauthorized access to the probe must be made impossible!

We recommend the following procedure:

- Check the temperature set value on the integrated thermostat or on the external controller.

Note

In case the adjustment of the temperature set value on the capillary controller should be changed during operation by more than 30 °C in one step, the thermostat's excess temperature cut-off is activated (push the reset key to switch it on again).

- Switch on power.

Note

The total heat up time is approximately 40 minutes. The probe is ready for work after having exceeded the below alarm level value (30 °C below set value).

Note

In case of insufficient temperature (failure of the probe heating), the feeding of sample gas must be interrupted by appropriate measures!

18 Closing down

Before closing down, i.e. switching off the heating, the probe should be purged with inert gas or air in order to avoid condensation of aggressive components from the sample gas.

19 Maintenance and repair

Before carrying out any maintenance and repair work, the specific installation and process safety measures are to be observed.

Warning

Aggressive condensate is possible. Wear protective glasses and appropriate protecting clothes!

Attention must be paid when touching the probe surface during operation. Due to the high surface temperatures, you may suffer from burnings. Protective gloves have to be worn, and the probe must absolutely be protected against unauthorized access!

Before carrying out any maintenance work on electrical equipment, the mains voltage must be switched off on all poles. The same is valid for eventually connected alarm and control circuits!

We cannot give any recommendation regarding maintenance cycles. This must be determined specifically depending on the process conditions.

The principal maintenance work of the probe is changing the filter element and control of the sealings.

Note

When carrying out any maintenance of repair work, the probe does not need being dismounted.

19.1 Change of the filter element and the sealings

Warning

Please ensure that no contaminations that are bad for one's health remain on the probe before carrying out any maintenance or repair work. An appropriate measure is to flush the probe with inert gas.

Before changing the filter element, the gas feeding must be stopped!

The following steps are recommended when changing the filter element or the sealings:

1 Remove the protection cap after having opened the bent-lever closures;
2 Dismount the filter housing lid according to chapter 12.3;
3 Screw out the filter pressing screw, check the filter element and exchange it if necessary;
4 Check the filter element sealings and exchange them if necessary;
5 Check the O-rings inside the lid and exchange them if necessary;
6 Clean the filter chamber;
7 Mount again the filter housing lid in reverse order and put it into the filter head;
8 Bolt the filter housing lid according to chapter 12.3;
9 Put on again the protection cover.

Note

Pay attention that after putting in the filter housing lid the strap bolt is screwed down hand-tight in cold condition and that it is tightened again after the operating temperature is reached.

20 Proper disposal of the device

At the end of the service life 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, follow the rules and regulations of your country regarding recycling and waste management.

21 Spare parts list

Wear, tear and replacement part requirements depend on the specific operating conditions.

The following table shows an extract of the recommended spare parts for probe of type **SP2600-H..** .

Recommended spare parts	
Part-No.	**Description**
90S0030	Spare filter element S-1K190, ceramic, 1 µm, 190 mm long
90S0035	Spare filter element S-0,1GF190, glass fiber, 0.1 µm, 190 mm long
93S1000	Spare O-ring (68), Viton®, for lid SP2600-H/C/I/BB-F..
93S1005	Spare O-ring (86), Viton®, for lid SP2600-H/C/I/BB-F..
93S1010	Spare O-ring (105), Viton®, for lid SP2600-H/C/I/BB-F..
90S2077	Novapress® flange sealing DN 65 PN 6B (67), for SP2000, SP2600-H/C/I/BB-F..
93S0010	Spare thermostat 0-180 °C [32-356 °F]
93S0015	Spare heating cartridge HLP, 230 V 800 W
93S0017	Spare heating cartridge HLP, 115 V 800 W
93S0018	Heat conducting paste for putting in the heating cartridge
93S2126	Clamp clip LK145 for SP2500/2600
90S0050	PTFE adapter for filter element S-0,1GF190
93S0059	Spare PT100 SP2000-H, SP2600-H
93S0044	Flange sealing (50) for filter element S-1K190, FKM

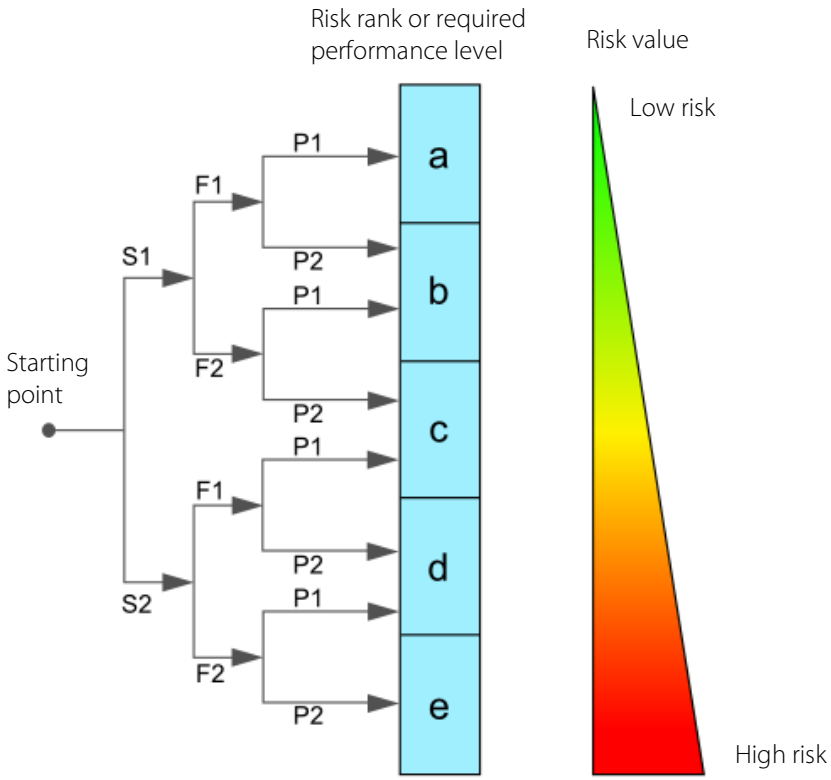
Viton® is a registered trademark for fluoroelastomers by DuPont Performance Elastomers, USA.
Novapress® is a registered trademark for elastomer-bonded gasket material by Frenzelit GmbH, Germany.

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 8 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 hot surfaces

Risk rank group A

The temperature inside the product can be higher than > 180 °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 > 180 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 Annex

Additional product information may be seen and downloaded under:
www.mc-techgroup.com

- Sample Tubes for Gas Sample Probes Series SP® with G 3/4" connection thread
- Electrically Heated Sample Probe Tube Series SP®
- Pre-Filters for Gas Sample Probes Series SP®