

Electrically Heated Sample Probe Tube Series SP[®]

SP 30-H..., SP35-H...

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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Version: 1.00.01

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Head Office

M&C TechGroup Germany GmbH ♦ Rehhecke 79 ♦ 40885 Ratingen ♦ Germany
Telephone: 02102 / 935 - 0
Fax: 02102 / 935 - 111
E - mail: info@mc-techgroup.com
www.mc-techgroup.com

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 note the following basic safety procedures when using this equipment:

Read these operating instructions carefully before start-up and use of the equipment! The information and warnings given in these operating instructions must be heeded.

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** when setting high-power electrical units with nominal voltages of up to 1000V, together with the associated standards and stipulations.

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

Protection against touching dangerously high electrical voltages. Before opening the equipment, it must be switched and hold no voltages. This also applies to any external control circuits that are connected.

The equipment is only to be set within the permitted range of temperatures and pressures.

The device must not be used in hazardous areas.

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

Installation, maintenance, monitoring and any repairs may only be done by authorised 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 APPLICATION

The electrically heated **M&C** sample probe tube **SP30/35-H...** is used in extractive sampling systems to avoid cooling and condensation of the sample in the insitu tube from the sample point to the heated sample probe **SP2000-H**. To avoid a premature damage by cooling and condensation in dust loaded processes, we recommend a heated tube type **SP30-H1.1-V**, including an insitu pre-filter **V20-2/30**, heated up with the tube.

7 DESCRIPTION

The electrically heated **M&C** sample tube **SP30-H...** is available in 0,6 m, 1,0 m, 1,5 m and 2,0 m length and the **SP35-H...** in 0,175 m length. The standard lengths for the pre-filter version **SP30-H1.1-V** are 0,6 m and 1,0 m. The tube version **SP30-H.../SP35-H...** has an internal diameter of 22 mm. The internal diameter of the version **SP30-H1.1-V** is reduced to 6 mm to optimize the tube dead volume.

With a mounting flange with 4 welded screws the heated sample tube **SP30-H.../V**, **SP35-H..** can be easily fixed both to the flange at the sample point and the probe head **SP2000-H**. The heated sample tube **SP30-H.../SP35-H...** is equipped with a G3/4"i thread connector at the tube end. This enables fixing a standard non heated sample tube or pre-filter to the heated insitu tube.

The electrical cartridge heater is located inside a double tube system, completely separated from the process. At the version **SP30-H1.1-V** the included large pre-filter **V20-2/30** is heated up with the sample tube. The temperature of the heated tube has to be adjusted in relation to the process temperature and corresponding to the max. admissible sampling temperature. Depending on the operating temperature the sample tubes are equipped either with a thermocouple (max. 320 °C) or a PT100 temperature sensor (max. 200 °C).

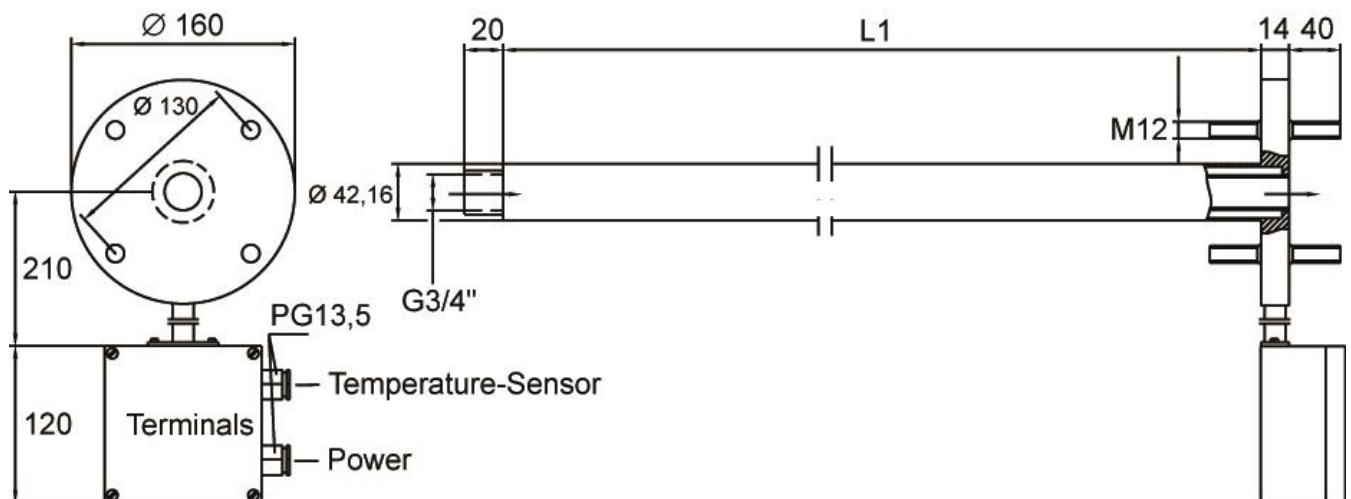


Figure 1 Dimensions SP30-H.. and SP35-H..

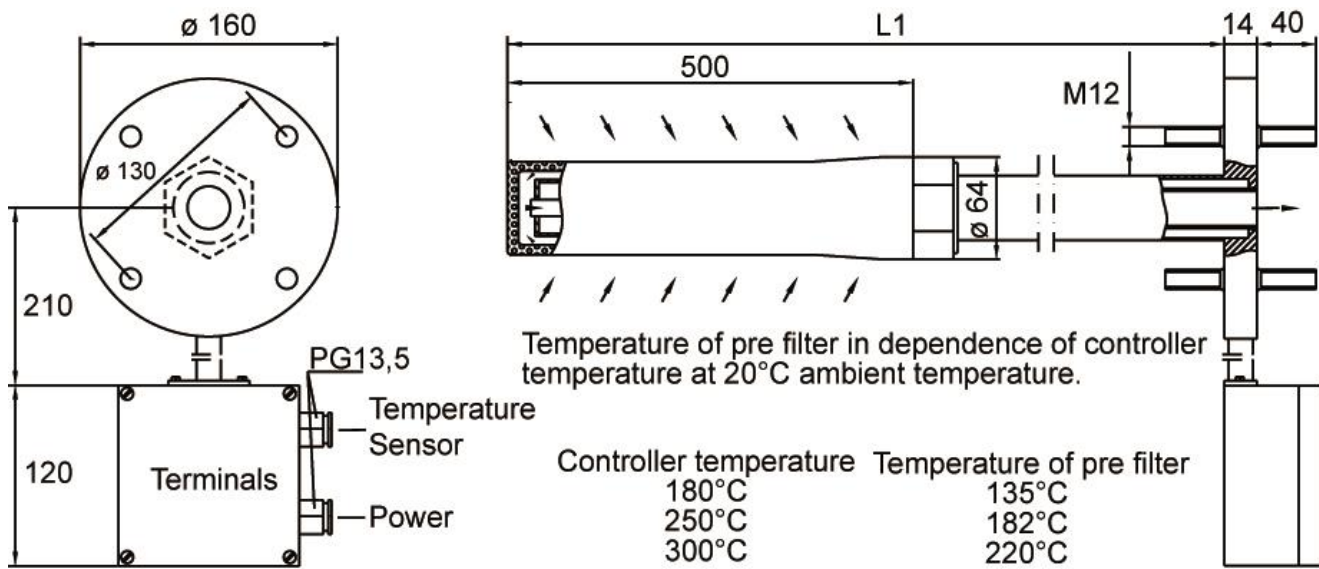


Figure 2 Dimensions SP30-H1.1-V and pre-filter temperatures

8 TEMPERATURE CONTROLLER

For operation an external temperature control has to be mounted. As temperature controller e.g. the **M&C-controller 70304G** (part no. 01B8451 for 230V or 01B8451a for 115V) in wall mounting enclosure is suitable.

9 TECHNICAL DATA

Series SP®	SP35-H1.1	SP35-H2	SP30-H1.1	SP30-H2	SP30-H1.1-V
Temperature sensor	Fe-CuNi	PT100 2-wire	Fe-CuNi	PT100 2-wire	Fe-CuNi
Temperature controller	external				
Probe tube length L1	175mm		max. 2 m		max. 2 m
Sample temperature	max. 550 °C				
Operating temperature max.	320°C	200°C	320°C	200°C	320°C
Pre-filter					V20-2/30 insitu filter length 520 mm, Ø 60 mm, filter porosity 2µm, integrated and heated
Sample gas inlet connection	G3/4"i DIN ISO 228/1				pre-filter with G1 1/2"i DIN ISO 228/1
Dust loading	max. 2 g/m ³				>2 g/m ³
Probe tube volume	380 ml/m				420 ml
Sample pressure	max. 5 bar g				
Ambient temperature	-20 °C to +80 °C				
Storage temperature	-30 °C to +90 °C				
Ready for operation	2 h				
Power supply	230V AC, (115V optional)		230V 50/60Hz oder 115V 50/60Hz switchable		
Heating capacity	200W		0,6m: 600W, 1m: 800W, 1,5m: 1200W, 2m: 1200W		
Electrical connections	terminals, max. 2,5 mm ² , 2x PG13,5 cable gland, terminal range 6-12mm				
Electrical standard	EN 61010, EN60519-1				
Degree of protection	IP54 EN 60529				
Mounting flange	DN65 PN6, Form B with 4 welded screws on both sides M 12x 40 mm				
Material of parts in contact with the sample	stainless steel 1.4539, version SP30-H1.1/HC: Hastelloy C				1.4539, 1.4571/1.4401

10 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.

If the ambient temperature in the area of the connections is $>70^{\circ}\text{C}$ 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, the stud bolts of the heated sample tube can be arranged accordingly as option.

The necessary minimum flange size and the minimum connection diameter depends on the diameter of the probe tube or pre filter used.

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 (see also technical data, chapter 9):

Under / over pressure situation	mbar	bar	
Process temperature	$^{\circ}\text{C}$	$^{\circ}\text{C}$	
	Min.	Max.	
Dust loading	g/m^3		
Dust composition - grain size	μm		
Gas composition	corrosive	toxic	explosive
Which parameters should be measured, e.g. O_2, CO, SO_2, NO_x,...	Vol.%	mg/Nm^3	ppm
Required amount of gas	l/h	l/h	
	Min.	Max.	
Necessary T_{90} time	sec.		

11 MOUNTING

CARE! The permitted ambient temperature for the connection box of the sample tubes SP30-H.. and SP35-H.. is -20 to $+80^{\circ}\text{C}$.

- Put flange sealings on the threaded bolts of the heated sample tube.
- Screw together gas sample probe with threaded bolts of the heated sample tube.
- Screw together gas sample probe at the sampling connection piece with threaded bolts on the process side of the heated sample tube.

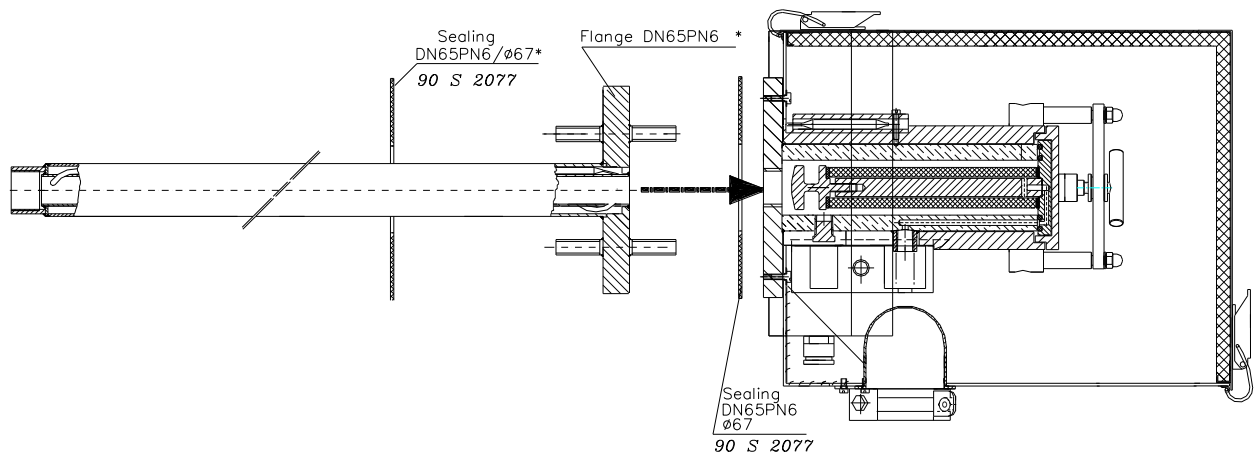


Figure 3 Mounting of the heated sample tube SP30-H./SP35-H..

12 ELECTRICAL CONNECTIONS



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



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.

- Remove lid of the connection box. In the lid there is also the electrical wiring plan.
- The used cables for the connection of the heating must have an outer diameter of 6-12mm corresponding to the clamping range of the cable glands to guarantee protection class IP54.
- Insert the power cable (min. 3 x 1,5 mm²) coming from the external temperature controller through the cable gland and connect it at the corresponding terminals 2, 5 and 6.
- Insert the temperature sensor cable through the other cable gland and connect it to the terminals 7 and 8.
- Remount lid.

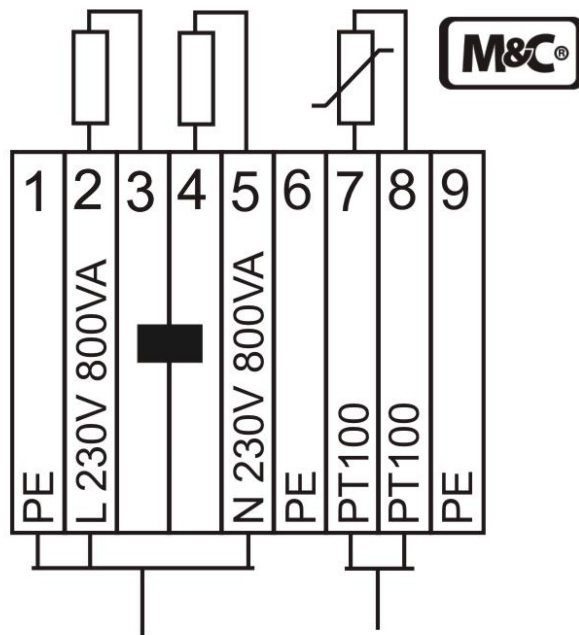


Figure 4 Electrical connection e.g. SP30-H2 with PT100

For executions with thermocouple the temperature sensor is also connected to terminals 7 and 8.

13 STARTING



WARNING!

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



WARNING!

Start up only the built-in heated probe tube because otherwise there is a risk of burning !



The following step-by-step procedure is recommended :

- Check temperature set value at external controller.
- Switch on mains power supply.
- The heated sample tubes are ready for operation after 2 hours heat-up time.

14 MAINTENANCE

Maintenance of the heated sample tubes is mainly limited to the change of the screwed-on or heated pre-filter (SP30-H1.1-V) and the check of the sealings. For the change or cleaning of the pre-filter the gas sample probe with the heated probe tube and the pre-filter has to be dismantled.

It is difficult to give any recommendations as to a particular maintenance cycle. Depending on process conditions, a meaningful maintenance cycle must be elaborated for the specific application.



WARNING!

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



WARNING!

When working during operation:

High surface temperatures!

Touching the surfaces can result in burns. Wear protective gloves and protect against unauthorized access !



15 CLOSING DOWN

For closing down no particular measures need to be taken.

16 SPARE PARTS LIST

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

Recommended spare parts	
Part No.	Description
20 S 9195	Pre-filter for probe SP30-H1.1-V. Large stainless steel insitu filter V20-2/30. length: 520mm, 60mm a.d., filter porosity: 2µm operating temperatures max 550°C. Material: SS316.
90 S 2077	Flange gasket DN65 PN6B (67). Material: Novapress.

17 APPENDIX



More product documentation is available on our Internet catalogue:
www.mc-techgroup.com

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