



SP2000-H

## Gas Sample Probe Series SP®

Versions SP2000, SP2000-H, SP2300-H, SP2400-H

### Special Features

- **Optimum operational reliability**
- **Universal applicability**
- **Adaptation to nearly all process conditions due to its compact and modular design**
- **Easy installation and maintenance**
- **Low dead volume**

### Application

The M&C sample probe versions SP2000, SP2000-H, SP2300-H and SP2400-H are used for continuous gas sampling from dust-loaded, high-temperature and/or humid processes.

Depending on the gas composition, it is possible that the standard material of the probe body (stainless steel 316L) will not be sufficiently corrosion-resistant. In this case, probe SP2300-H made of PTFE or SP2400-H made of Titanium should be used.

### Description

The sample probes are designed for easy installation, reliable operation and trouble-free maintenance. They are versatile in application and depending on the task to be performed, various sample tubes or pre-filters (see data sheets 2.14 and 2.17) that are not included in the scope of delivery, can be simply screwed into the probe (G 3/4" thread).

The depth filter element (ceramic is standard, optionally glass-fiber or spun-glass filling) with a large surface area is located in a housing with low dead volume outside the process.

The probes are designed in such a way that no tools are required when changing the filter element, the sample line does not have to be dismantled and contamination of the clean gas path is excluded.

The sample tube can be cleaned and purged back from outside the process. The special design of the heating element of the SP2000-H, SP2300-H, SP2400-H (with protective cover) permits controlled heating of the complete filter housing, including the mounting flange up to 180 °C [356 °F] (version /H320 up to 320 °C [608 °F]). This ensures reliable operation outside the process by preventing the temperature from falling below the dew point.

In the standard version, temperature control is carried out by an integrated capillary sensor thermostat with high-temperature limiter and alarm function for low temperature in a compact design. Test gas injection and reference sampling are also possible at the probe.

## Technical Data

Gas Sample Probe Version	SP2000	SP2000-H	SP2300-H	SP2400-H
Part No.	20S1000	20S2000	20S3000	20S3500
Protective cover	No	Yes	Yes	Yes
Degree of protection	IP54 EN 60529			
Filter housing material	Stainless steel 316Ti/316L*		PTFE	Titanium
Sealing materials	FKM* /7aT** = PTFE /H320** = graphite			
Probe flange sealing material	Novapress®			
Sample tube/pre-filter	Optional			
Sample pressure max.	0.4 to 6 bar* abs., /7aT** = 2 bar abs., /HP** = 25 bar abs.		0.4 to 2 bar abs.	0.4 to 6 bar abs.
Ambient temperature	20 to 180 °C [68 to 356 °F]		-20 to +60 °C*** [-4 to 140 °F***] /PT100, /Fe-CuNi, /Ni-CrNi** = -20 to +80 °C [-4 to 176 °F]	
Filter chamber volume	120 cm <sup>3</sup>			
Filter element, porosity	S-2K150 = ceramic*, 2 µm /F-0,1GF150 = glass fiber**, 0.1 µm, /FW = spun glass**			
Thermostat, temperature adjustment	0 to 180 °C* [32 to 356 °F*] /H320** = 0 to 320 °C [32 to 608 °F] /PT100** /Fe-CuNi** /Ni-CrNi**			
Ready for operation	After 40 min /H320** = after 60 min			
Low-temperature alarm contact*	Contact rating: 250 V, 3 A~, 0.25 A= Alarm point: ΔT 30 °C [86 °F]			
Sample gas outlet connection	1 x 1/4" NPT i* tube connectors ø 6, 8 or 10 mm** /H320** = 6 mm			
Blowback/test gas connection	1/4" NPT i* /R**, /H320** = tube ø 6 mm			
Power supply	230 V, 50/60 Hz, 800 W /115 V** = 115 V, 60 Hz, 800 W (fuse protection 10 A)			
Electrical connections	Terminals max. 4 mm <sup>2</sup> , 2 x M20 x 1.5 cable glands			
Electrical equipment standard	EN 61010, EN 60519-1			
Mounting flange	DN 65 PN 6-B	> DN or ANSI possible** /HP** = DN 50 PN 25		
Mounting flange material	SS 316Ti		PTFE	Titanium
Weight	7 kg* [≈ 15.4 lbs*]	15.4 kg* [≈ 34 lbs*]	15.4 kg* [≈ 34 lbs*]	14.5 kg* [≈ 32 lbs*]

\* Standard

\*\* Options (/H320 not for SP2300-H, /7aT\*\* not for SP2300-H and SP2400-H)

\*\*\* For higher ambient temperatures, use option PT100 (Part No. 20S9025) or thermocouple Fe-CuNi and Ni-CrNi, respectively (Part No. 20S9027 or 20S9028) instead of the thermostat controller. Then, an additional electronic temperature controller (see data sheet 4.3) is necessary.

Novapress® is a registered trademark used for elastomer-bonded gasket materials produced by Frenzelit GmbH, Germany.

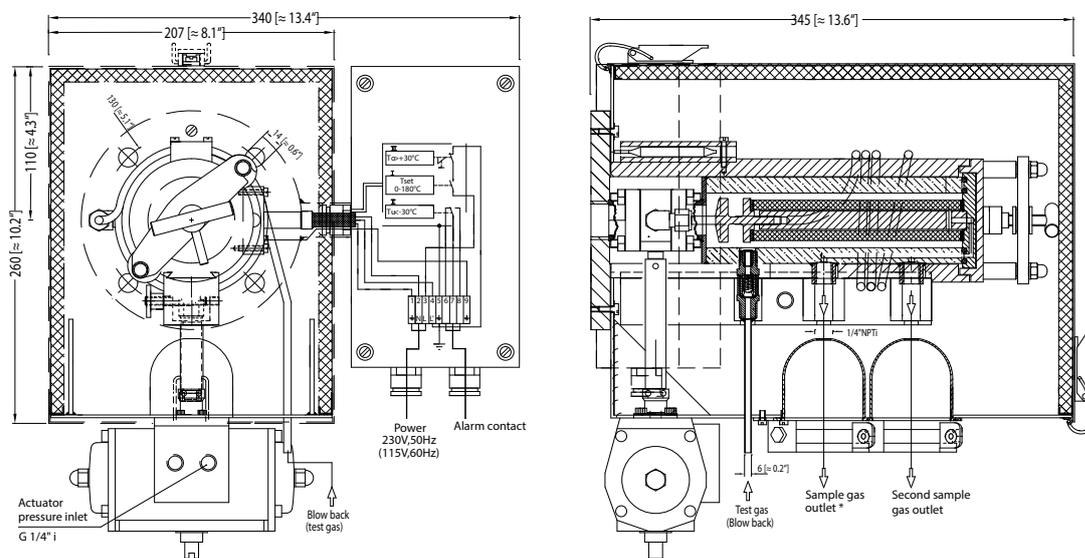
## Differential pressure and T<sub>90</sub> Time

ΔP and T <sub>90</sub> at a flow rate of:	100	200	500	1000	1500	3000 (only /HF)	Nl/h
ΔP with new filter element S-2K150/GF150	0.007	0.011	0.02	0.058	0.135	0.240/0.225	bar
T <sub>90</sub> time for SP2000-H without tube	6	3.5	1	< 0.5	< 0.5	< 0.5	s

Please note: Nl/h and Nl/min refer to the German standard DIN 1343 and are based on these standard conditions: 0 °C [32 °F], 1013 mbar.

## Dimensions

### SP2000-H Basic Version with Options (Examples)

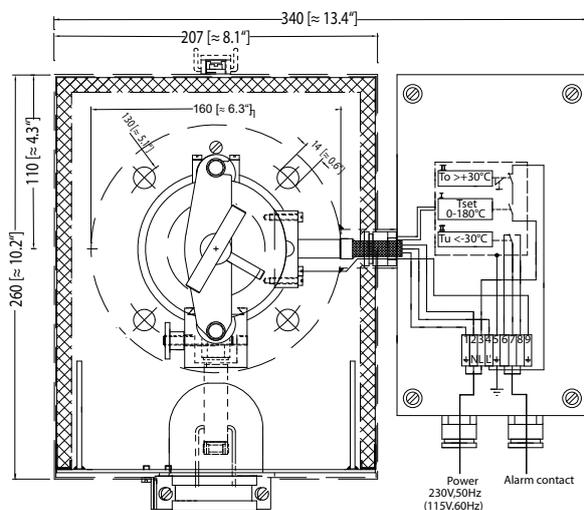


Dimensions in mm [inch]

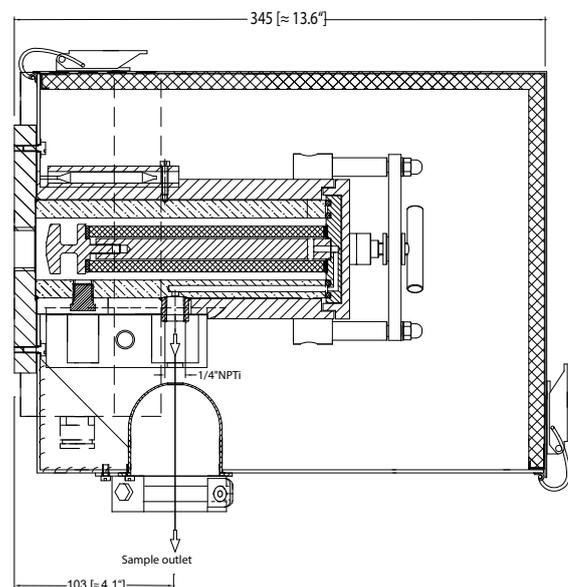
## Basic Versions and Options (Selection)

Basic Versions	Version	Part No.
Basic version, non-heated, without weather protection shield, material: SS 316Ti	SP2000	20S1000
Basic version, heated from 0 to 180 °C [32 to 356 °F], with weather protection shield, material: SS 316Ti	SP2000-H	20S2000
Basic version, heated from 0 to 180 °C [32 to 356 °F], with weather protection shield, material: PTFE	SP2300-H	20S3000(a)
Basic version, heated from 0 to 180 °C [32 to 356 F], with weather protection shield, material: titanium	SP2400-H	20S3500
Options integrated in the gas sample probe (extract)		
Power supply 115 V/60 Hz	/115V	20S9030
Top of filter case with PTFE rings and seals of PTFE	/7aT	20S9010
Second outlet for sample gas 1/4" NPT i	/2x	20S9015
Back-purging/calibration gas valve, opening pressure 0.7 bar, tube 6 mm, blowback and test gas feeding via filter chamber	/R	20S9045
Back-purging/calibration gas valve for SP2400-H, opening pressure 0.7 bar, 1/4" NPT i, blowback and test gas feeding via filter chamber	/R-Ti	20S9048
Fiber glass filter element 0,1GF150, filter porosity 0.1 µm, sealing PTFE	/GF150	20S9020
Special filter housing lid and screw-on receptacle incl. spun-glass filling, sealing FPM, Novapress®	/FW	20S9047
Special filter housing lid and screw-on receptacle incl. spun-glass filling for 320 °C [608 °F], sealing graphite	/FW 320	20S9046
Electrical heating of the external filter from 0 to 320 °C [32 to 608 °F]	/H320	20S9021
Version for max. 25 bar operating pressure, mounting flange DN 50 PN 25	/HP	20S9017
Gas pre-heater GVW1, material: SS 304	/GVW1	20S9058
Connection of the gas pre-heater to valve "R" and to gas inlet	/GVW	20S9062
PT100 sensor instead of the thermostat, without temperature controller	/PT100	20S9025
Thermocouple FE-CuNi ( type J) instead of thermostat, without temperature controller	/Fe-CuNi	20S9027
Thermocouple Ni-CrNi (type K) instead of thermostat, without temperature controller	/Ni-CrNi	20S9028
Second PT100 sensor	/2-PT100	20S9026
Version with electrical safety separation according to VDE106T101 in connection with thermostat	/ST	20S9031
Steam heating, without controller and valves	/D	20S9033
Adapter flange size DN..PN 6 or ANSI..150 lbs	/DN	20S9004
Mounting fitting R2" a or 2"-NPT a instead of the mounting flange	/SO1	20S9005
Integrated 2-way ball valve with lock function in the inlet	/VA	20S9050
Integrated 3-way ball valve with T-function in the inlet	/3VA	20S9325
Integrated 2-way ball valve with lock function in the inlet, up to 320 °C [608 °F]	/VA320	20S9053
Integrated 3-way ball valve with T-function in the inlet, up to 320 °C [608 °F]	/3VA320	20S9330
Pneumatic drive for ball valves VA and 3VA, 2 operating states	/MS1	20S9055
Pneumatic drive for valves VA 320 °C [608 °F] and 3VA 320 °C [608 °F], 2 operating states	/MS3	20S 056
Electrical actuating drive for ball valves VA and 3VA, 2 operating states, 230 V/50 Hz	/EA230	20S9342
Electrical actuating drive for ball valves VA and 3VA, 2 operating states, 115 V/60 Hz	/EA115	20S9342a
Electrical actuating drive for ball valves VA and 3VA, 2 operating states, 24 V DC	/EA24	20S9342d
Filter housing lid for high flow rate with filter element 0,1GF	/HF	20S9016

## Basic Version



Dimensions in mm [inches]



## Options for Basic Versions

Short term	SP2000	SP2000-H	SP2300-H	SP2400-H
/115V	–	X	X	X
/7aT	X	X	–	–
/2x	X	X	X	X
/R	X	X	X	X
/R-Ti	X	X	X	X
/GF150	X	X	X	X
/FW	X	X	–	X
/FW 320	–	X	–	X
/H320	–	X	–	X
/HP	X	X	–	–
/GWW1	–	X	X	X
/GWW	–	X	X	X
/PT100	–	X	X	X
/FeCuNi	–	X	X	X
/Ni-CrNi	–	X	X	X
/2-PT100	–	X	X	X
/ST	–	X	X	X
/D	–	X	X	X
/DN	X	X	–	–
/SO1	X	X	–	X
/VA	X	X	–	–
/3VA	X	X	–	–
/VA320	–	X	–	–
/3VA320	–	X	–	–
/MS1	X	X	–	–
/MS3	X	X	–	–
/EA230	X	X	–	–
/EA115	X	X	–	–
/EA24	X	X	–	–
/HF	X	X	–	–

– not possible

X possible

The above table only indicates the possible options for the different probe types. It does not provide information regarding the possible combinations of these options with each other in a probe model. In case you are looking for several options to be combined, please ask our sales team for technical advice.