



SP3000V/RS/HEX4-135 resp. 180

## Gas Sample Probe Series SP®



Version SP3000 for sampling from zones with explosive dust

### Special Features

- Approval according to ATEX for sampling from Ex zones 20, 21 and 22
- Approval according to ATEX for mounting in Ex zones 1, 2 or 21, 22
- High operational reliability
- Universal applicability
- Adaptation to nearly all process conditions due to its compact and modular design
- Easy installation
- Straightforward maintenance
- Low internal dead volume

### Application

The M&C sample probes version SP3000 are used for continuous extraction of explosive gases (Ex zones 20, 21 and 22) from dust-loaded, high temperature and/or humid processes. The probes can be mounted in Ex zones 1, 2 or 21, 22.

### Description

The sample probes are designed for easy installation, reliable operation and straightforward maintenance. They are versatile in application and depending on the task to be performed, various pre-filters series V12/V20 with integrated volume displacer and optionally with extension tubes, not included in the scope of delivery, can be simply screwed into the mounting flange (G 3/4") of the basic probe. These process-internal M&C pre-filters are necessary for a valid Ex approval of the M&C probes type SP3000. The sample gas flow rate has to be observed externally for fault monitoring of the pre-filter.

The probe-internal M&C stainless steel filter element with a large surface and high capacity is located in the external housing. The design offers little or no stagnant space outside the process. The probe housing is covered with a protection shield which is part of the Ex approval.

The probes are designed in such a way that changing the filter element is possible without using tools. In this operation, neither the sample probe tube nor the sample line need to be removed, thus avoiding contamination of the clean gas path and maintaining the integrity of the system.

The special design of the optional heating of the M&C probes version SP3000 permits controlled heating of the complete filter housing, including the mounting flange. This ensures reliable operation outside the process preventing the temperature from falling below the dew point.

The temperature of the M&C probes version SP3000 is controlled by a self-regulating heater version HEX4-135 or HEX4-180 for Ex zones 1 and 21, temperature class T4 and T3, respectively and for gas sampling from zones 0, 1 or 2. In dependence of the ambient temperature and the heater version, the min. temperature in the probe is 90 °C [194 °F] or 120 °C [248 °F]. The max. temperature is 120 °C [248 °F] or 160 °C [320 °F].

For back-purging the M&C pre-filter, the option RS is available with mounted buffer vessel triggered by an explosion-proof solenoid valve. With the mounted option for back-purging type RS, gas can be sampled from zones 20, 21 and 22. The back-purging pressure has to be monitored externally and has to be at least 1 bar higher than the process pressure. For the pressure control while back-purging, a corresponding special valve is mounted in the sample gas outlet. Thus, an additional solenoid valve to shut off the sample gas outlet is not necessary. The back-purging inlet is shut off by a check valve.

**When sampling from Ex zones, back purging is only allowed with a gas suitable for the sampling point.**

<b>Gas sample probe type</b>	<b>SP3000</b>	
Part No.	20S5500	
Weather protection shield	Yes	
Filter housing material	Stainless steel 316/316Ti	
Sealing materials	Graphite	
Probe flange sealing material	Graphite	
Pre-filter	Optionally, for a valid Ex approval according to ATEX, the probe SP3000 has to be operated with a pre-filter listed on page 4	
Sample pressure max.	0.5 to 6 bar abs.	
Ambient temperature	-20 to +60 °C [-4 to +140 °F] depending on option selected	
Permissible process gas temperature	Depending on the temperature class, however max. 200 °C [392 °F] at the probe inlet	
Filter chamber volume	120 cm <sup>3</sup>	
Filter element, porosity	F-3SS150 = stainless steel*, 3 µm S-2K150 = ceramic**, 2 µm	
Sample gas outlet connection	1x 1/4" NPT i for max. 8 mm tube connectors	
Connection gas outlet at option RS	6 mm Swagelok connector	
Mounting flange	DN 65 PN 6, FormB, SS316Ti* > DN or ANSI possible**	
Weight	7 kg [≈ 15.4 lbs]	
Marking	⊕ II 1D/2GD -20°C ≤ Ta ≤ +60°C EXAM BVS 04 ATEX H 045X	
Marking with option RS	⊕ II 1D/2GD -20°C ≤ Ta ≤ +60°C EXAM BVS 04 ATEX H 045X	
<b>Option back purge unit type RS</b>	<b>RS</b>	
Part No.	20S5560 (a)	
Power supply	230 V 50/60 Hz 9 W or 115 V 50/60 Hz 9 W (a)	
Electrical connection	Cable 3 x 1 mm <sup>2</sup>	
Marking	⊕ II 2GD Ex m II 135°C, in combination with SP3000	
Connection	G 1/2" at the buffer vessel	
Max. back purge pressure	6 bar abs.	
Volume buffer vessel	2 liters	
Ambient temperature	-20 to 55 °C [-4 to +131 °F]	
<b>Option heating type HEX4</b>	<b>HEX4-135</b>	<b>HEX4-180</b>
Part No.	20S5510	20S5520
Control	Self-regulating	
Power supply	115 V - 230 V 50/60 Hz	
Electrical connection	Cable gland, terminal range 7 to 12 mm, terminals max. 4 mm <sup>2</sup>	
Marking	⊕ II 2G Ex e mb IIC T4...T3 Gb / ⊕ II 2D Ex tb IIIC 135°C...180°C Db EXAM BVS 04 ATEX E 253 / IECEx BVS 15.0060	
Power	400 W	
Case protection	IP66; EN 60529	
Max. temperature	120 °C [248 °F]	160 °C [320 °F]
Min. temperature	90 °C [194 °F]	120 °C [248 °F]
Ambient temperature	-20 to +60 °C [-4 to +140 °F]	
Low temperature alarm contact	< 60 °C [140 °F], 1 contact MC-NO, 230 V 1.5A AC, 0.5 A DC	< 100 °C [212 °F], 1 contact MC-NO, 230 V 1.5 A AC, 0.5 A DC
<b>Option 2-way-ball valve in the probe inlet</b>	<b>/VA</b>	
Part No.	20S9050	
Operating temperature	-20 up to +185 °C [-4 up to +365 °F]	
<b>Option 2/3-way-ball valve in the probe inlet</b>	<b>/3VA</b>	
Part No.	20S9325	
Backflush / Test gas connection	6 mm tube	
Operating temperature	-20 up to +185 °C [-4 up to +365 °F]	
<b>Option pneum. drive for ball valve /VA o. /3VA</b>	<b>MS1</b>	
Part No.	20S9055	
Connection control air	G 1/4" i	
Pressure control air	5 to 10 bar	
Temperature class	T4	
<b>Option second sample gas outlet</b>	<b>/2X</b>	
Part No.	20S9015	
Connection	1/4" NPT female	

\* Standard, \*\* optional

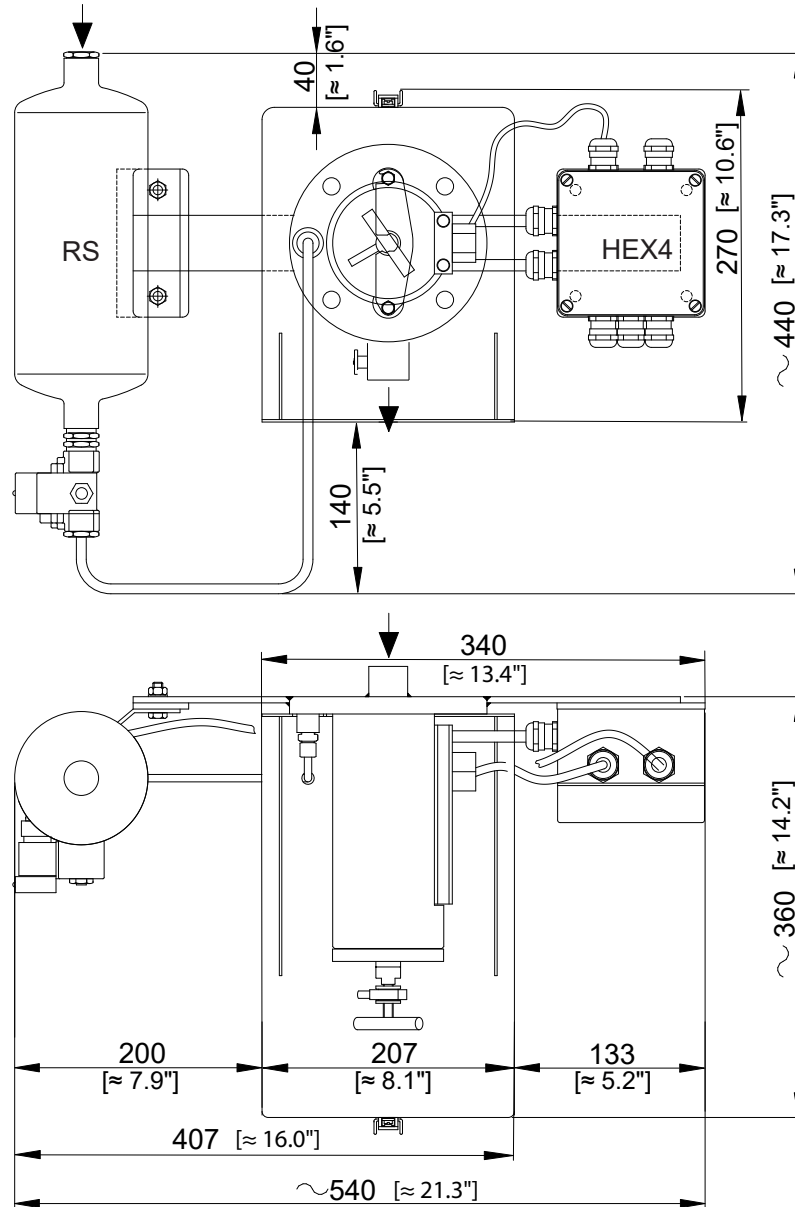
## Differential pressure and T<sub>90</sub> time

<b>ΔP and T<sub>90</sub> at a flow rate of:</b>	<b>100</b>	<b>200</b>	<b>500</b>	<b>1000</b>	<b>1500</b>	<b>NI/h</b>
ΔP with new filter element F-3SS150	0.006	0.012	0.040	0.110	0.215	bar
ΔP with new filter element S-2K150	0.003	0.005	0.02	0.058	0.135	bar
T <sub>90</sub> time for SP3000 without tube	6	3.5	1	< 0.5	< 0.5	s

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

## Dimensions

### SP3000 basic version with option back-purging type RS and heating type HEX4








Dimensions in mm [Inches]

Options	Version	Part No.
Pre-filter type V20-0 for SP probes, internal stainless steel filter frit with volume displacer inside, length: 220 mm [≈ 8.7"], 46 mm OD, filter porosity: 2 µm, temperature: max. 600 °C [1112 °F], connection: G 3/4", material: SS 316L and 316Ti	V20-0	20S9105
Pre-filter type V20-0/HC for SP probes, internal Hastelloy filter frit with volume displacer inside, length: 220 mm [≈ 8.7"], 46 mm OD, filter porosity: 2 µm, temperature: max. 900 °C [1652 °F], connection: G 3/4", material: Hastelloy X	V20-0/HC	20S9115
Pre-filter type V20-1 for SP probes, internal stainless steel filter frit with volume displacer inside, length: 520 mm [≈ 20.5"], 60 mm OD, filter porosity: 2 µm, temperature: max. 600 °C [1112 °F], connection: G 3/4", material: SS 316L and 316Ti	V20-1	20S9145
Pre-filter type V20-1/HC for SP probes, internal Hastelloy filter frit with volume displacer inside, length: 520 mm [≈ 20.5"], 60 mm OD, filter porosity: 2 µm, temperature: max. 900 °C [1652 °F], connection: G 3/4", material: Hastelloy-X	V20-1/HC	20S9155
Pre-filter type V20-1/HC for SP probes, internal Hastelloy filter frit with volume displacer inside, length: 520 mm [≈ 20.5"], 60 mm OD, filter porosity: 0.5 µm, temperature: max. 900 °C [1652 °F], connection: G 3/4", material: Hastelloy-C	V20-1/HC	20S9156
Pre-filter type V20-3 for SP probes, internal stainless steel filter frit with volume displacer inside, length: 300 mm [≈ 11.8"], 31 mm OD, filter porosity: 2 µm, temperature: max. 600 °C [1112 °F], connection: G 3/4", material: SS 316L/316Ti	V20-3	20S9300
Extra charge for extension of in-situ stainless steel filter frit V20-3 or V20-4 for each 100 mm [≈ 3.9"] additional length (from standard length 300 mm [≈ 11.8"] to .... mm), max. 1000 mm [~3.3 ft] total filter length, material: SS 316L/316Ti	V20-3	20S9310
Pre-filter type V20-T for SP probes, backflushable internal hose pre-filter with support tube, length: 400 mm [≈ 15.8"], 40 mm OD, filter porosity: 3 µm, temperature: max. 200 °C [392 °F], connection: G 3/4", material: PTFE, SS 316Ti	V20-T	20S9315
Extension tube Vm 500 mm for pre-filters at SP probes, with G 3/4" male connection and internal volume displacer, length: 500 mm [≈ 19.7"], incl. gasket set, sampling temperature: max. 600 °C [1112 °F], material: SS 316 Ti (for pre-filters V20)	Vm500	20S9165
Extension tube Vm1000 mm for pre-filters at SP probes, with G 3/4" male connection and internal volume displacer, length: 1000 mm [≈ 3.3 ft], incl. gasket set, sampling temperature: max. 600 °C [1112 °F], material: SS 316 (for pre-filters V20)	Vm1000	20S9170
Extension tube Vm1500 mm for pre-filters at SP probes with G 3/4" male connection and internal volume displacer, length: 1500 mm [≈ 4.9 ft], incl. gasket set, temperature: max. 600 °C [1112 °F], material: SS 316Ti (for pre-filters V20)	Vm1500	20S9175

\* For a valid Ex approval according to ATEX, the probe SP3000 is to be operated with one of the pre-filters listed above  
For choosing the adequate pre-filter, see also data sheet "Pre-Filters for Gas Sample Probes Series SP", Version SP2000/V20 with G 3/4" connection, SP2000/V12 with flange connection, Version SP2000/20SS 150 with tube connection"

## Temperature classes for sampling from Ex zones 20, 21 or 22

Type	Possible Options	Marking	Temperature class	Max. process gas temp. °C at probe inlet	Max. surface temperature °C
SP3000		 II 1 D / 2 GD	T6	≤ 80 [≤ 176 °F]	80 [176 °F]
SP3000		 II 1 D / 2 GD	T5	≤ 95 [≤ 203 °F]	95 [203 °F]
SP3000	/RS, /HEX4-135	 II 1 D / 2 GD	T4	≤ 130 [≤ 266 °F]	135 [266 °F]
SP3000	/RS, /HEX4-180	 II 1 D / 2 GD	T3	≤ 195 [≤ 383 °F]	195 [383 °F]
SP3000	/RS	 II 1 D / 2 GD	T2	≤ 200 [≤ 392 °F]	200 [392 °F]