

SP2006-H/DIL

## Gas Sample Probe Series SP®

Versions SP2006-H/DIL and SP2006-H280/DIL  
Gas Sample Dilution Probes

### Special Features

- Based on probe SP2000H
- Completely electrically heated up to 180 °C [356 °F] or 280 °C [536 °F]
- NEMA 4, FRP housing
- External, heated critical orifice with additional safety filter
- Including a dilution gas pre-heater
- No dew point problems
- Dilution ratios from 10:1 up to 500:1
- With test gas connection at the probe
- Independent of the process temperature
- Easy installation
- Smooth operation
- Straightforward maintenance
- Changing of dilution and bypass block without any tools within a few minutes
- No disconnection of any tubes or hoses for changing the dilution or bypass block

### Application

The electrically heated M&C gas sample dilution probe is used in processes, in which the measuring procedure or the handling of the process gas require the dilution of the sample gas or the component(s) to be measured, e.g. in the case of extremely toxic gases, moisture measurement or emission measurement in flue gases.

Since the M&C dilution probe SP2006-H/DIL is based on the well-proven gas sample probe SP2000-H, a variety of applications requiring special filter techniques, materials, etc. can be easily carried out with this dilution probe.

### Description

In order to prevent the temperature from falling below the dew point at the dilution point, the dilution unit with the critical orifice is mounted in a temperature-stable manner in the heated section of the filter gas sample probe directly in the "clean gas outlet" and a gas pre-heater heats the dilution gas to probe temperature.

For analyzer calibration, test gas can be injected at the probe via the integrated test gas inlet connection. The probe is available with 180 °C [356 °F] or 280 °C [536 °F] heating. Optionally, the probe can be equipped with a manually operated, heated ball valve at the VA inlet, e.g. to shut off the filter chamber from the sampling process when changing the filter. In addition, the option of backpurging upstream of the ball valve is possible via the probe flange.

The optional blowback valve BB, which protrudes into the heated filter chamber, enables the backpurging of the filter chamber, the sample tube or the pre-filter. Via the optional blowback valve BB/F mounted in the heated filter chamber wall, backpurging of the filter element and indirectly the filter chamber and the sample tube or the pre-filter is possible.

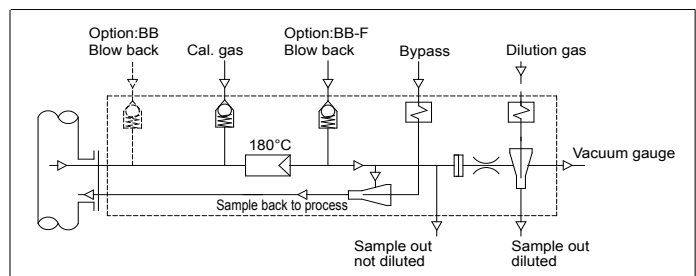
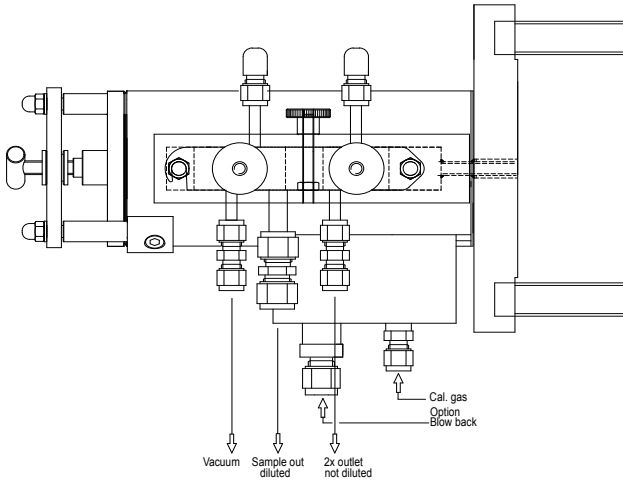
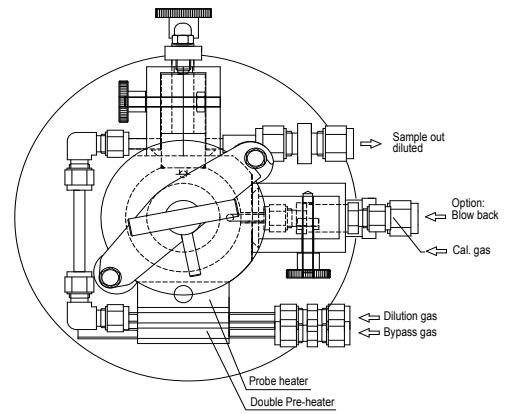
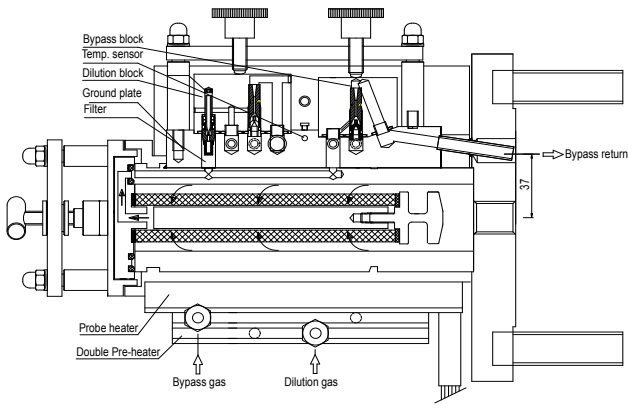
The optional isolation valve I shuts off the sample outlet from the heated chamber. To optimize backpurging, a 2-liter pressure accu-

mulator is available as an option. In addition, it is possible to integrate a pneumatic or solenoid valve.

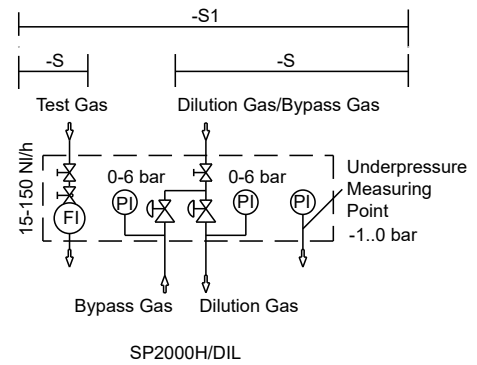
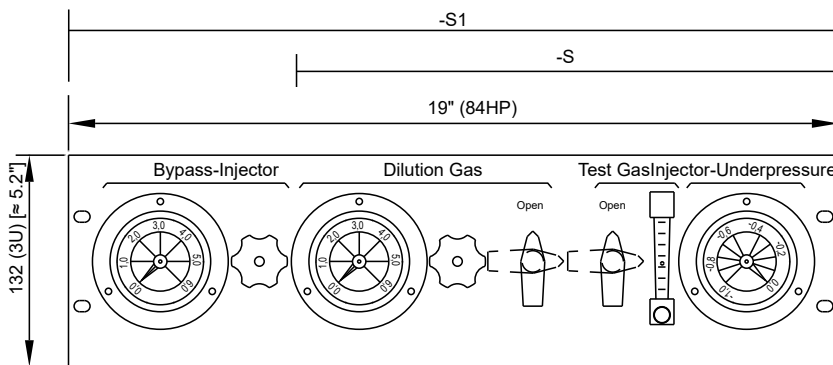
A precision pressure regulator with pressure gauge is used to set the required dilution gas inlet pressure. The function check of the dilution injector is carried out via a vacuum gauge. The pressure regulator required for the dilution function and the pressure gauges must be ordered separately. The mounting set A is installed directly on the probe. The control panel S for external mounting is additionally equipped with a shut-off valve and a flow meter for adjusting the test gas volume. Options A1 and S1 contain an additional pressure regulator for option bypass injector B or BR.

Dilution factors from 10:1 to 500:1 can be applied with the dilution probe. With large dilution factors, a correspondingly small amount of sample gas is extracted from the process. For this reason, a heated bypass injector integrated directly upstream of the dilution section is optionally offered to shorten the response time in vacuum operation: option B without gas recirculation, BR with gas recirculation, and a bypass needle valve BV is used for adjusting the bypass volume in overpressure operation.

The design of the dilution unit ensures smooth operation independent of the process temperature and pressure, as well as straightforward maintenance.



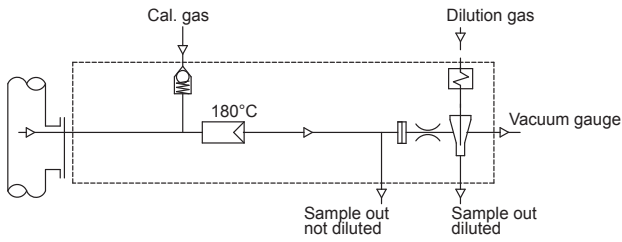
**Option S/S1 external control panel**



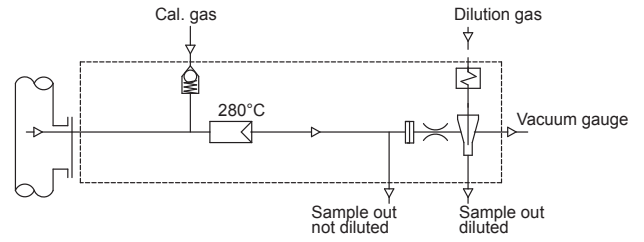
Gas connections  
 dilution gas, test gas, pressure control, bypass gas:  $\varnothing$  6 mm or on request 1/4" a  
 sample gas out:  $\varnothing$  8 or 12 mm or on request  $\varnothing$  5/16" or 1/2" a

Dimensions in inch

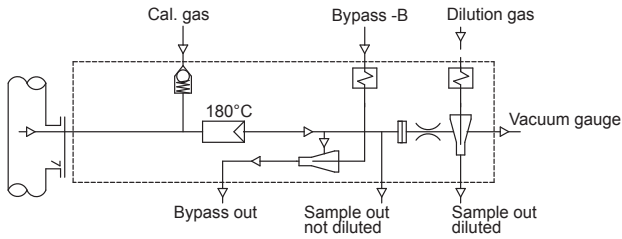
SP2006-H/DIL



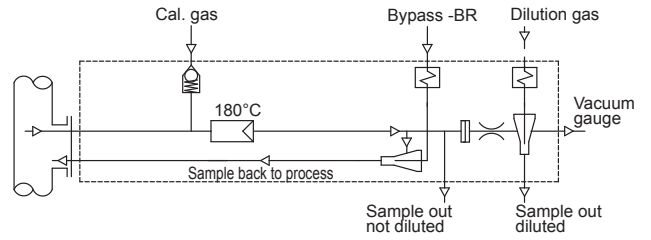
SP2006-H280/DIL



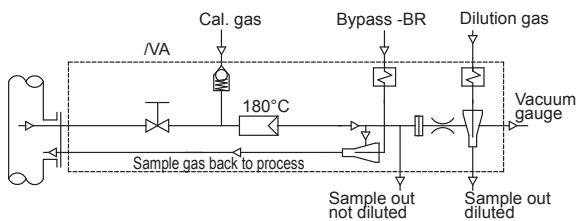
SP2006-H/DIL-B



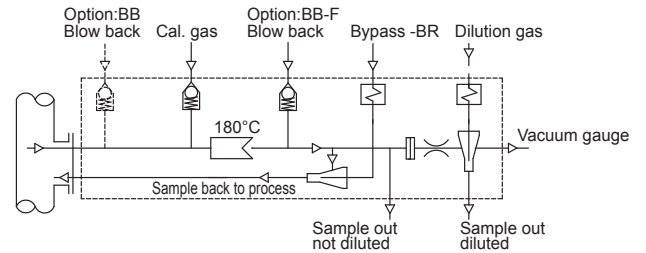
SP2006-H/DIL-BR



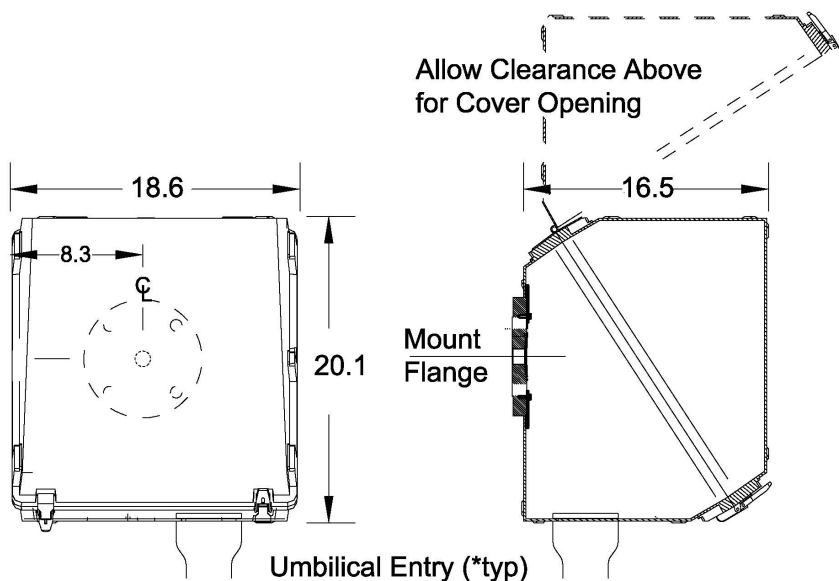
SP2006-H/DIL-BR-VA



SP2006-H/DIL-BR-BBF (-BB)



Mounting Dimensions



Dimensions in inch

Series SP*	Version gas sample dilution probe SP2006-H/DIL
Sample tubes and pre-filters optional on request	See data sheets for sample tubes with G 3/4" connection thread and pre-filters with G 3/4" connection, with flange connection and with tube connection. See also data sheet "Electrically Heated Sample Probe Tube Series SP® Versions SP30-H, SP30-H1.1-V, SP35-H".
Dilution rates with the critical orifices "a" to "g" <sup>3)</sup>	a = 500    b = 200    c = 100    d = 50    e = 30*    f = 20    g = 10    : 1
Sample flow rate depending on the critical orifices "a" to "g"	a = 1.4    b = 2.7    c = 5.5    d = 11    e = 19*    f = 28    g = 55    NI/h <sup>1)</sup>
Possibility to adapt the dilution factor	With dilution gas pressure adjustment -5 % to +30 % <sup>2)</sup>
Dilution gas flow rate with injector version I or II	I: 480 to 600 NI/h optional for higher dilution rates II: 1800 to 3000 NI/h
Dilution gas pressure at the inlet of pressure controller	Min. 4.5 bar g, max. 16 bar g
Bypass injector/B: inlet pressure - gas flow rate - sample gas flow rate	At approx. 2 bar g - injector gas: approx. 300 NI/h - sample gas: approx. 150 NI/h
Process pressure	0.9 up to 2 bar abs.
Fault caused by process temperature variations	No fault, as operation is independent of process temperature
Fault caused by process under- or overpressure	No fault as long as the differential pressure ΔP at the dilution unit is > 0.5 bar g and test gas is fed into the probe under process conditions
Fault caused by atmospheric pressure variations	< 1 % with a variation of 50 mbar
Materials in contact with the sample gas	Stainless steel 316Ti, 316L, quartz glass, FKM, graphite
Weight	Approx. 30 kg [≈ 66.1 lbs]

\*Standard, others to be indicated when ordering, intermediate values possible.

<sup>1)</sup> approx. at 3 bar dilution gas behind pressure controller.

<sup>2)</sup> -5 % not possible for orifice "g".

<sup>3)</sup> with injector version I. Further technical data, see data sheet for gas sample probe SP2000

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.

## Versions and Options

Part No.	Type	M&C gas sample dilution probe SP2006-H/DIL with orifice "e" for dilution ratio 30 : 1 standard
	SP2006-H/DIL	Dilution probe 180 °C [356 °F] without ball valve upstream of the filter element
	SP2006-H280/DIL	Dilution probe 280 °C [356 °F] without ball valve upstream of the filter element
	SP2006-H/DIL-VA	Dilution probe 180 °C [356 °F] with heated manual operated ball valve upstream of the filter element
	SP2006-H/DIL-B	Dilution probe 180 °C [356 °F] with bypass injector and bypass gas to the vent
	SP2006-H/DIL-BR	Dilution probe 180 °C [356 °F] with bypass injector and bypass gas recirculation
	SP2006-H/DIL-BBF	Dilution probe 180 °C [356 °F] with blow back via the filter element
	SP2006-H/DIL-BB	Dilution probe 180 °C [356 °F] with blow back via the filter chamber
	SP2006-H/DIL-I	Dilution probe 180 °C [356 °F] with pneumatic isolation valve to shut off the sample outlet from the filter chamber
	SP2006-H/DIL-BR-I	Dilution probe 180 °C [356 °F] with bypass injector, bypass gas recirculation and isolation valve to shut off the sample outlet from the filter chamber
	SP2006-H/DIL-BR-BB	Dilution probe 180 °C [356 °F] with bypass injector, bypass gas recirculation and blow back via the filter chamber
	SP2006-H/DIL-BR-BBF	Dilution probe 180 °C [356 °F] with bypass injector, bypass gas recirculation and blow back via the filter element
	SP2006-H/DIL-BR-VA	Dilution probe 180 °C [356 °F] with bypass injector, bypass gas recirculation and heated manual operated ball valve upstream of the filter element
20S4402(a)	SP2006-H/DIL-2x	Dilution probe 180 °C [356 °F] with second sample outlet
20S4423(a)	SP2006-H/DIL-B-2x	Dilution probe 180 °C [356 °F] with bypass injector, bypass gas to the vent and second sample outlet
20S4424(a)	SP2006-H/DIL-BR-2x	Dilution probe 180 °C [356 °F] with bypass injector, bypass gas recirculation and second sample outlet
20S4250	SP2000H/DIL-S	Option: control panel with 1 pressure controller, 2 pressure gauges, flow meter, 2 ball valves
20S4260	SP2000H/DIL-S1	Option: control panel with 2 pressure controllers, 3 pressure gauges, flow meter, 2 ball valves

Part no. 20S4300 : compl. set critical orifice a to g , injector orifice II , orifice seals control panel S, S1 incl. wall mounting housing optional available: S-G, S1-G.

Other versions on request.