



SP2000-H/DIL.

- Based on probe SP2000H/....
- Electrically heated up to 180 °C or 320 °C
- External critical orifice is heated
- Including a dilution gas pre heater
- No dew point problems
- Dilution ratios from 10:1 up to 500:1
- With check gas connection
- Independent of the process temperature
- Easy operation and maintenance

Gas Sample Probe Series SP®

Version SP2000H/DIL... and SP2000H320/DIL...

Gas Sample Dilution Probe

Application

The electrically heated **M&C** dilution probe is applicable for such processes, where the measuring procedure or the handling of the process gas require the dilution of the sample respectively the component to be measured.

Typical applications are the use with toxic gases, the moisture measurement and the emission measurement in flue gases.

The **M&C** dilution probe **SP2000H/DIL...** is based on the well tested **M&C** gas sample probe **SP2000H**. This enables the user to adapt the probe to nearly every application, using for example special filter techniques or special materials.

Description

The dilution unit including the critical orifice is integrated in the probe outlet, heated up with the probe to a stable temperature. The incorporated pre-heater heats up the dilution gas to the probe temperature. Both steps avoid that sample gas decreases under the dewpoint. Calibration gas enters the probe via an integrated connection. The probe can be heated up to 180 °C or 320 °C. As an option a heated manual operated 2 way ball valve is available. It is integrated in the sample gas inlet and shuts off the probe head from the process, for example during the change of the filter element.

The necessary dilution gas pressure can be adjusted by the precision pressure controller with pressure gauge.

A vacuum pressure gauge indicates the function of the dilution system.

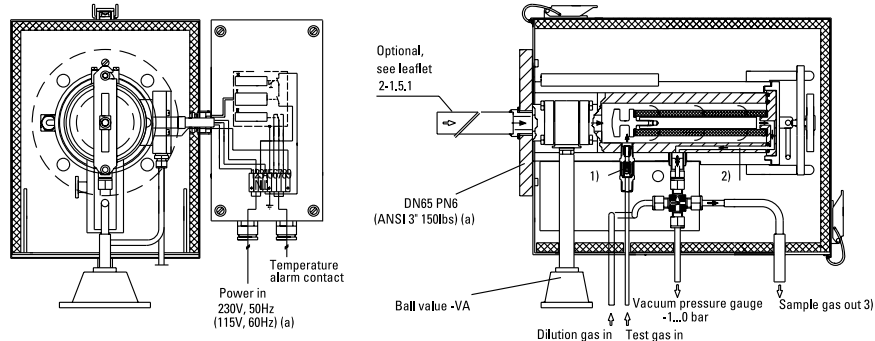
The pressure controller and pressure gauges, necessary for the dilution function, have to be ordered separately. Set **-A** can be directly mounted to the probe. The external control unit **-S** is equipped with an additional shut-off ball valve and a flowmeter to adjust the test gas quantity. The sets **-A1** respectively **-S1** include an additional pressure controller for the option bypass injector **-B** or **-BR**.

The dilution probe realises dilution rates in a range of 10:1 to 500:1. A high dilution rate causes a low sample flow from the process. With underpressure conditions the response time can be minimised using the optional heated bypass injector **-B** which is integrated directly upstream the dilution unit. It is available with recirculation into the process **-BR** as well. With overpressure a bypass needle valve **-BV** controls the bypass flow.

The construction of the probe guarantees an operation which is independent from the process temperature and is easy to maintain as well.

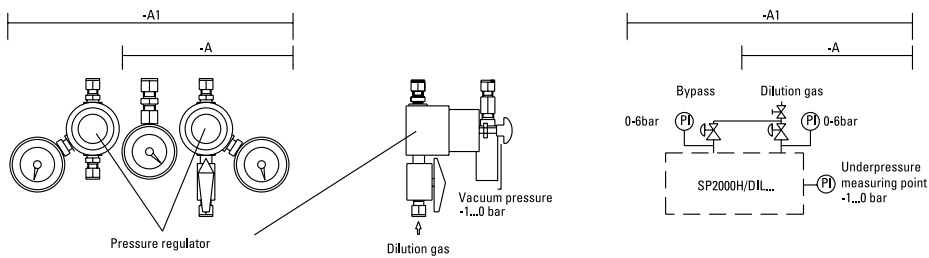
Dimensions

Gas sample dilution probe version SP2000H/DIL-VA

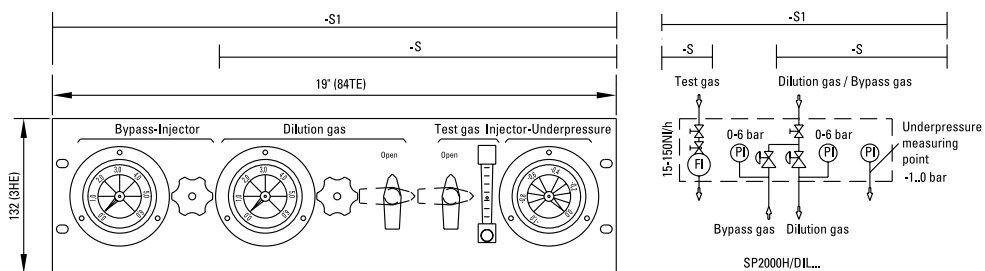


- 1) Option calibration / gas / value
- 2) Position of bypass connection
- 3) Tube ø 8 mm, (5/16") use at injector I tube connector 8 mm (5/16") and at II 8-12 mm (5/16-1/2")

Option -A / -A1 pressure control set



Option -S / -S1 external control panel

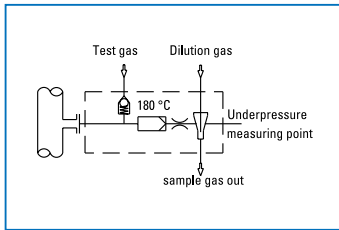


Gas connections
 dilution gas, test gas, pressure control, bypass gas: ø 6 mm or on request 1/4" (a)
 sample gas out: ø 8 or 12 mm or on request ø 5/16" or 1/2" (a)

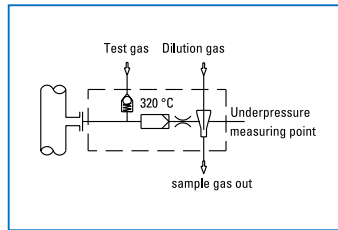
Dimensions in mm

Function Diagrams

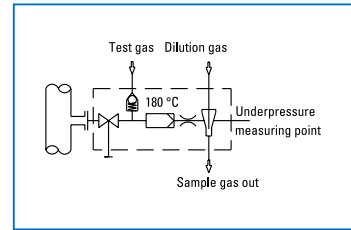
SP2000H/DIL



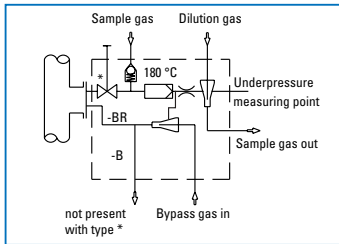
SP2000H320/DIL



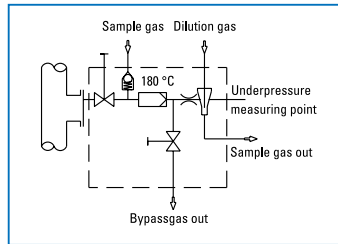
SP2000H/DIL-VA



SP2000H/DIL-B* -BR* SP2000H/DIL-VA-B



SP2000H/DIL-VA-BV



Technical Data

Series SP [®]	Version gas sample dilution probe SP2000H/DIL ...
Insitu sample tubes and pre filters optional on request	see leaflet 2-1.1a; 2-1.5.1; 2-1.6.1; 2-1.9.5
Dilution rates with the critical orifices "a" - "g" ³⁾	a = 500 b = 200 c = 100 d = 50 e = 30* f = 20 g = 10 : 1
Sample flow rate depending on the critical orifices "a" - "g"	a = 1,4 b = 2,7 c = 5,5 d = 11 e = 19* f = 28 g = 55 l/hr ¹⁾
Possibility to adapt the dilution factor	with dilution gas pressure-adjustment -5% to +30% ²⁾
Dilution gas flow rate with injector version I or II	I: 480 - 600NI/hr, optional for higher dilution rates II: 1800-3000 NI/hr
Dilution gas pressure on inlet of pressure controller	min. 4,5 bar g, max. 16 bar g
Bypass injector /B: gas pressure-gas flow rate-sample gas flow rate	at approx. 2 bar g - injector gas approx. 300 l/hr - sample gas approx. 150 l/hr
Process pressure	0,9 up to 2 bar g abs.
Fault caused by process temperature variations	operation independent from 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 given to 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, quartz glass, FPM, graphite
Weight	approx. 20 kg

*Standard, others to be indicated along with order, intermediate values possible. 1) approx. at 3 bar dilution gas behind pressure controller. 2) -5% not possible for orifice „g“. 3) with injector version I. Further technical data see leaflet SP2000, 2-1.1a.

Part No.	Type	M&C gas sample dilution probe SP2000H/DIL with orifice "e" for dilution ratio 30 : 1 standard
20 S 4002	SP2000H/DIL	dilution probe 180 °C without ball valve upstream of the filter element
20 S 4102	SP2000H320/DIL	dilution probe 320 °C without ball valve upstream of the filter element
20 S 4005	SP2000H/DIL-VA	dilution probe 180 °C with heated manual operated ball valve upstream of the filter element
20 S 4022	SP2000H/DIL-B	dilution probe SP2000H/DIL with bypass injector and bypass gas to the vent
20 S 4024	SP2000H/DIL-BR	dilution probe SP2000H/DIL with bypass injector and bypass recirculation
20 S 4026	SP2000H/DIL-VA-B	dilution probe SP2000H/DIL-VA with bypass injector and bypass gas to vent
20 S 4030	SP2000H/DIL-VA-BV	dilution probe SP2000H/DIL-VA with bypass-needle valve and bypass gas to vent
20 S 4200	SP2000H/DIL-A	option: 1 pressure controller, 2 gauges, mounting set incl. connector set for dilution probe
20 S 4210	SP2000H/DIL-A1	option: 2 pressure controllers, 3 gauges, mounting set incl. connector set for dilution probe with bypass
20 S 4250	SP2000H/DIL-S	option: control panel with 1 pressure controller, 2 gauges, flowmeter, 2 ball valves
20 S 4260	SP2000H/DIL-S1	option: control panel with 2 pressure controllers, 3 gauges, flowmeter, 2 ball valves

Please set an (a) after the part no. for dilution probe with power 115V 60Hz, mounting flange ANSI 3" 150lbs or for connectors with inches dimensions.

Part no. 20 S 4300 : compl. set critical orifice a-g , injector orifice II , orifice seals
control panel -S, -S1 incl. wall mounting housing optional available: -S-G, -S1-G.

Other versions on request.