



SP2006-H/DIL...

Gas Sample Probe Series SP®

Versions SP2006-H/DIL... and SP2006-H280/DIL
Gas Sample Dilution Probe

Special Features

- Based on probe SP2000-H/....
- Electrically heated up to 180 °C or 280 °C
- 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 check gas connection
- Independent of the process temperature
- Changing of dilution and bypass block without any tools within a few minutes
- No disconnection of any tubes or hoses for changing of dilution or bypass block
- Easy operation and maintenance

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 SP2006-H/DIL... is based on the well tested M&C gas sample probe SP2000-H. 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 mounted directly at the probe body and therefore 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 280 °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. Additionally the option 'blow back in front of ball valve' via the probe flange is available.

Through an optional high flow rate check valve /BB, which is fixed to the internal probe area, blow back of the filter housing area and the insitu probe tube will be done. Through the optional high flow rate check valve /BB/F, which is fixed to the filter housing wall, blow back of the incorporated ceramic filter will be done incl. the filter area and the insitu probe tube. The optional isolation valve /I shuts off the sample outlet from the internal filter area.

To optimize the blow back, an incorporated accumulator tank with a volume of two liters is available as option. To drive this tank an optional air actuated or solenoid valve is offered.

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

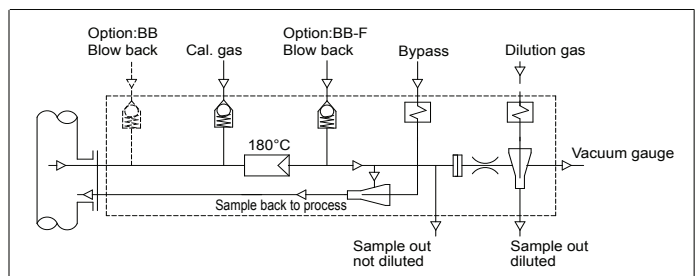
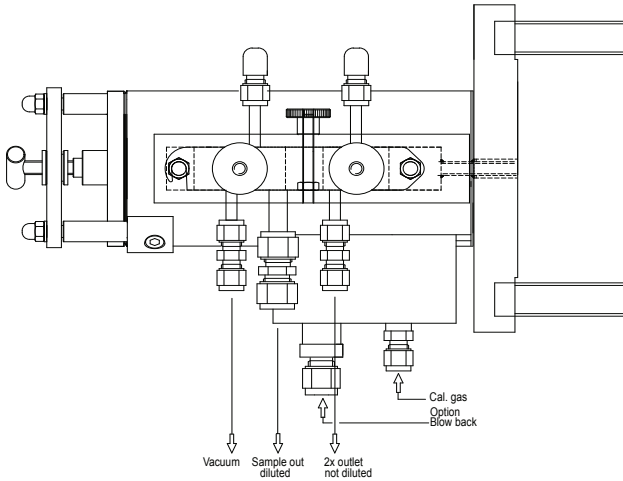
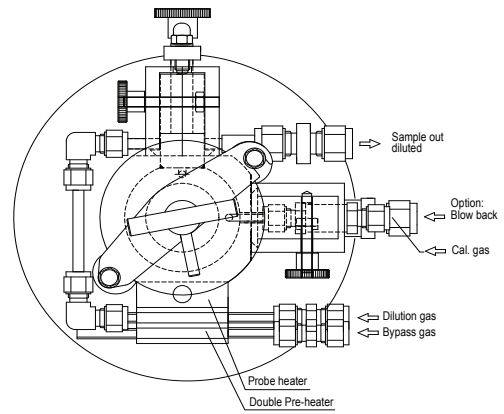
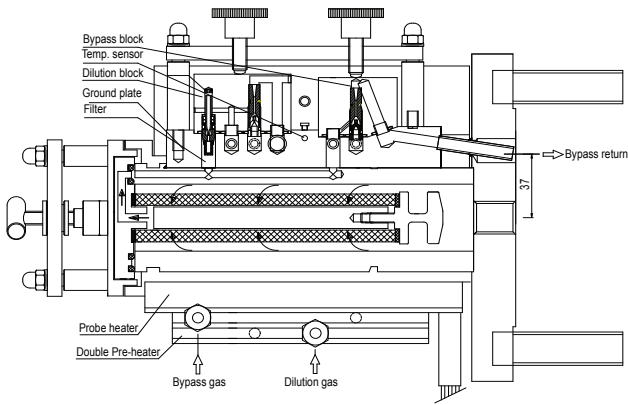
A vacuum pressure gauge indicates the function of the dilution system.

The pressure controller and pressure gauges, necessary for the dilution function, have to be ordered separately. The external control unit -S is equipped with an additional shut-off ball valve and a flowmeter to adjust the test gas quantity. The set -S1 includes an additional pressure controller for the option bypass injector -B or -BR.

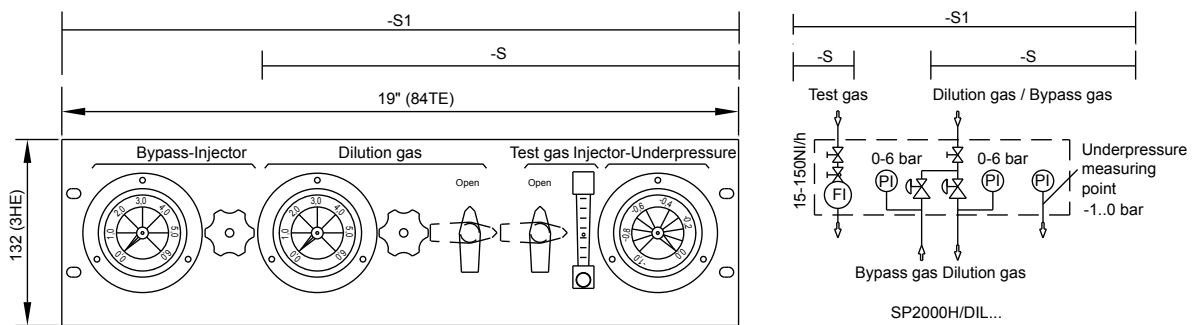
The dilution probe realises dilution rates in a range of 10:1 to 500:1. A high dilution rate causes a low sample flow from the process. With underpressure conditions the response time can be minimised using the optional heated bypass injector -B which is integrated directly upstream the dilution unit.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

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

Gas sample dilution probe version SP2006-H/DIL/BR/BB or /BBF



Option -S / -S1 external control panel

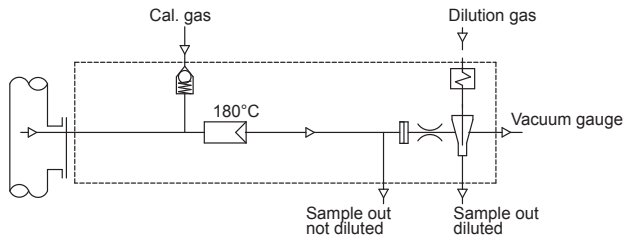


Gas connections
 dilution gas, test gas, pressure control, bypass gas: \varnothing 6 mm or on request 1/4" (a)
 sample gas out: \varnothing 8 or 12 mm or on request \varnothing 5/16" or 1/2" (a)

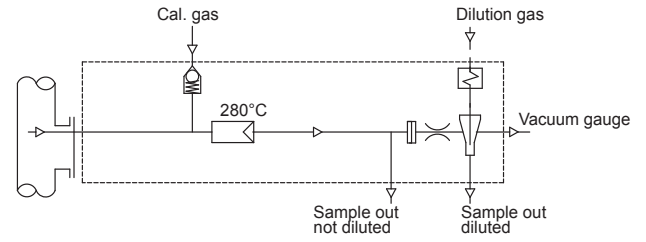
Dimensions in mm

Function Diagrams

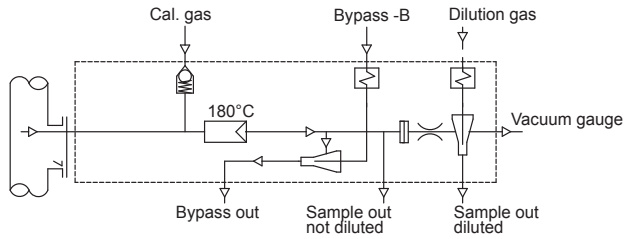
SP2006-H/DIL



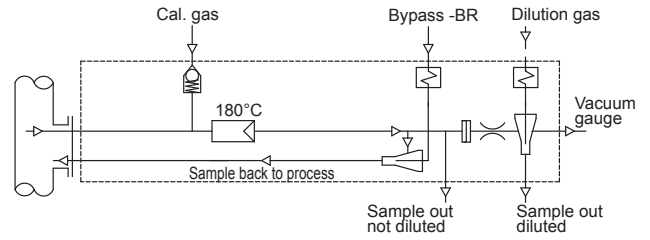
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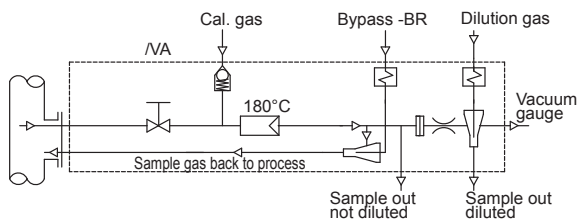
SP2006-H/DIL-B



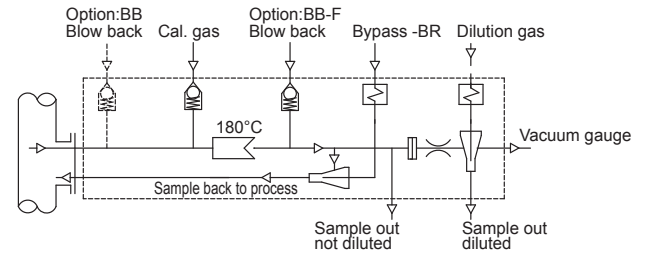
SP2006-H/DIL-BR



SP2006-H/DIL-BR-VA



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



Technical Data

Series SP*	Version gas sample dilution probe SP2006-H/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 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. 30 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 SP2006-H/DIL with orifice "e" for dilution ratio 30 : 1 standard
	SP2006-H/DIL	dilution probe 180 °C without ball valve upstream of the filter element
	SP2006-H280/DIL	dilution probe 280 °C without ball valve upstream of the filter element
	SP2006-H/DIL-VA	dilution probe 180 °C with heated manual operated ball valve upstream of the filter element
	SP2006-H/DIL-B	dilution probe 180 °C with bypass injector and bypass gas to the vent
	SP2006-H/DIL-BR	dilution probe 180 °C with bypass injector and bypass gas recirculation
	SP2006-H/DIL-BBF	dilution probe 180 °C with blow back via the filter element
	SP2006-H/DIL-BB	dilution probe 180 °C with blow back via the filter chamber
	SP2006-H/DIL-I	dilution probe 180 °C with pneumatic isolation valve to shut off the sample outlet from the filter chamber
	SP2006-H/DIL-BR-I	dilution probe 180 °C 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 with bypass injector, bypass gas recirculation and blow back via the filter chamber
	SP2006-H/DIL-BR-BBF	dilution probe 180 °C with bypass injector, bypass gas recirculation and blow back via the filter element
	SP2006-H/DIL-BR-VA	dilution probe 180 °C 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 with second sample outlet
20S4423 (a)	SP2006-H/DIL-B-2x	dilution probe 180 °C with bypass injector, bypass gas to the vent and second sample outlet
20S4424 (a)	SP2006-H/DIL-BR-2x	dilution probe 180 °C with bypass injector, bypass gas recirculation and second sample outlet
20S4250	SP2000H/DIL-S	option: control panel with 1 pressure controller, 2 gauges, flowmeter, 2 ball valves
20S4260	SP2000H/DIL-S1	option: control panel with 2 pressure controllers, 3 gauges, flowmeter, 2 ball valves

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.