

SP2000-H/DIL

Gas Sample Probe Series SP®

Version SP2000H/DIL... and SP2000H320/DIL...
Gas Sample Dilution Probe

Special Features

- Based on probe SP2000H/....
- Electrically heated up to 180 °C (356 °F) or 320 °C (608 °F)
- 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

Application

The non-heated or electrically heated M&C dilution unit DIL-1/H is used in analysis technique to dilute the sample gas or components in the sample for example in case of toxic gases, moisture measurement or emission measurement.

The M&C dilution unit is based on the functional dilution technique which is proved since years in the M&C gas sample probe SP2000-H/DIL.

The dilution unit can realize dilution ratios of 10:1 to 500:1. In case of high dilution ratios, a respective small quantity of gas is sampled from the process. Optionally a bypass injector -B (Option I) is available integrated right in front of the dilution unit in order to shorten the response time in case of operation with atmospheric pressure or low pressure. In case of option I, an additional pressure controller is included in both mounting versions.

The construction of the dilution unit guarantees easy maintenance and operation independent from process temperatures.

Description

The M&C dilution units DIL... are mounted on a plate for wall mounting. The version DIL-1 is not heated and works at ambient temperature. The version DIL-1/H is electrically heated up to 180°C (356 °F). It is additionally equipped with a lagged cover (version for 320 °C (608 °F) on request).

A capillary thermostat controls the temperature, adjustable from 0-180 °C (32 °F to 356 °F). A high temperature limiter and a low temperature alarm is included.

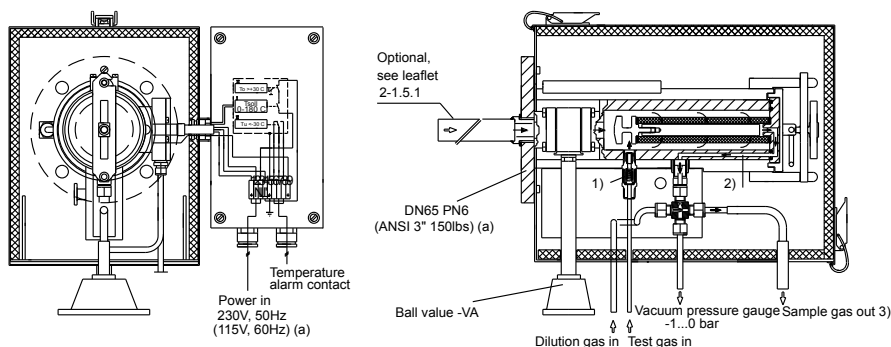
The connection of the heated lines is made without cold bridges in the heated part. Before the dilution gas enters the dilution unit, it is heated up to operating temperature via a gas pre-heater. In order to protect the dilution part against contaminations, internal protective filters are installed for the sample gas and the dilution gas stream. Calibration gas can be fed via the integrated connection.

A precision pressure controller with pressure gauge is used for adjustment of the necessary admission pressure of the dilution gas. Via a vacuum pressure gauge, the function of the dilution injector is controlled.

Both, pressure controller and pressure gauges have to be ordered separately. Two versions are available: Set -A (-A1) is mounted directly on the mounting plate and control panel type -S (-S1) is suitable for external 19" rack mounting. A shut off valve and a flowmeter for adjustment of the calibration gas are included in the version -S (-S1).

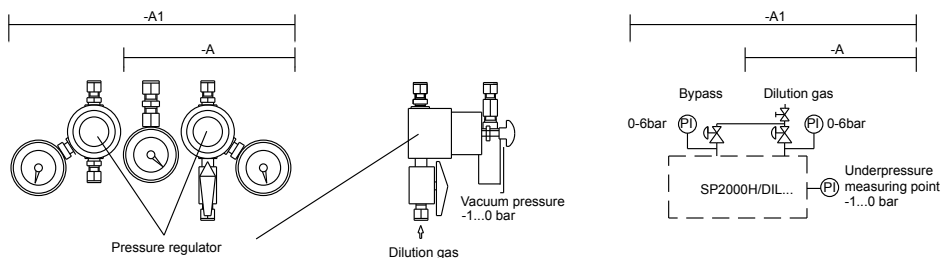
Dimensions

Gas sample dilution probe version SP2000H/DIL-VA

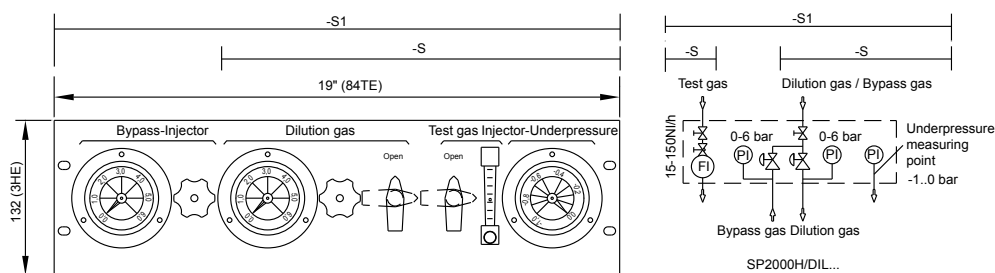


- 1) Calibration gas valve
- 2) Position of bypass connection
- 3) Tube \varnothing 8 mm, (5/16") use at injector I tube connector 8 mm (5/16") and at II 8-12 mm (5/16-1/2")

Option -A / -A1 pressure control set



Option -S / -S1 external control panel

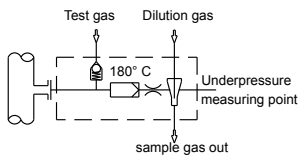


Gas connections
 dilution gas, test gas, pressure control, bypass gas: \varnothing 6 mm or on request 1/4" (a)
 sample gas out: \varnothing 8 or 12 mm or on request \varnothing 5/16" or 1/2" (a)

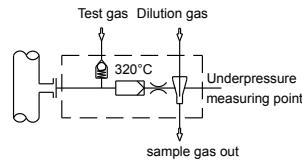
Dimensions in mm

Function Diagrams

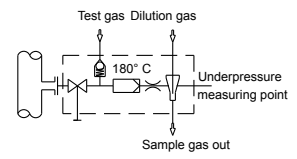
SP2000H/DIL



SP2000H320/DIL

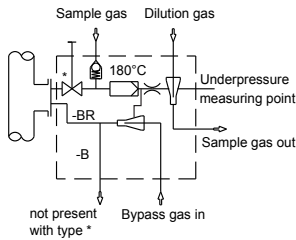


SP2000H/DIL-VA

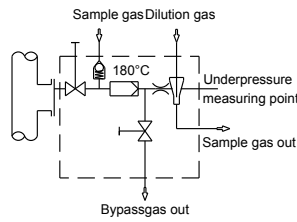


SP2000H/DIL-B* -BR*

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 leaflets 2.14 and 2.15
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/h, optional for higher dilution rates II: 1800-3000 NI/h
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/h - sample gas approx. 150 l/h
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 316 / 316Ti, quartz glass, FPM, graphite
Weight	approx. 20 kg (44.09 lbs)

*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, catalogue number 2.1.

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 (356 °F) without ball valve upstream of the filter element
20 S 4102	SP2000H320/DIL	dilution probe 320 °C (608 °F) without ball valve upstream of the filter element
20 S 4005	SP2000H/DIL-VA	dilution probe 180 °C (356 °F) 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 115 V 60 Hz, mounting flange ANSI 3" 150 lbs 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.