



DIL-1/H

## Gas Dilution Unit DIL-1/(H)

### Special Features

- Well-proven M&C dilution technique
- Operation at ambient temperature
- Optionally heated to 180 °C [356 °F] or 320 °C [608 °F]
- Integrated dilution pre-heater
- No dew point problems
- Dilution ratios from 10:1 to 500:1
- With test gas connection
- Independent of the ambient temperature
- Smooth operation
- Straightforward maintenance

### Application

The non-heated or electrically heated M&C dilution unit DIL-1/(H) is used in analytical technology for processes in which the measuring method or the handling of the process gas requires dilution of the measuring gas or the component(s) to be measured, e.g. extremely toxic gases, moisture measurement or emission measurement.

The dilution unit is based on the functional dilution technology which has proven itself for years in the M&C gas sample probe SP2000-H/DIL.

### Description

The M&C dilution units DIL are mounted on a plate for wall-mounting. The operating temperature of the non-heated version DIL-1 corresponds to the ambient temperature. The DIL-1/H version is heated to 180 °C [356 °F] and equipped with a thermally insulated cover 320 °C [608 °F] version on request).

The temperature is controlled by an integrated capillary sensor thermostat, adjustable from 0 to 180 °C [0 to 356 °F], including high temperature limiter and low temperature alarm.

The heated lines are connected without cold bridges in the heated section. Before entering the dilution unit, the dilution gas is heated to operating temperature by a gas pre-heater. Internal protective filters are provided for the sample gas and dilution gas to protect the dilution unit from contamination. For analyzer calibration, test gas can be supplied at the integrated test gas connection.

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 by means of a vacuum pressure gauge.

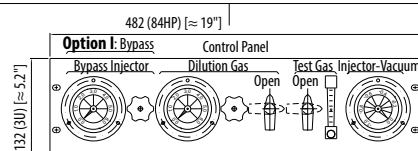
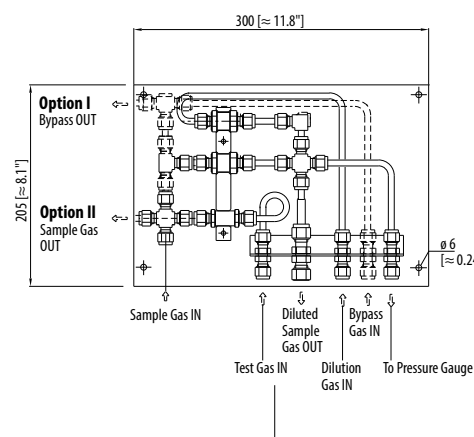
Pressure regulators and pressure gauges must be ordered separately and are available in 2 versions: The add-on set A (A1) for direct installation on the mounting plate and the control panel S (S1) for external 19" rack-mounting including shut-off valve and flow meter to adjust the test gas volume.

Dilution ratios from 10:1 to 500:1 can be realized with the dilution unit. With high dilution factors, a correspondingly small amount of sample gas is extracted from the process. An optional bypass injector (B) integrated directly upstream of the dilution section is therefore available to shorten the response time in operation with atmospheric pressure or in vacuum operation (option 1).

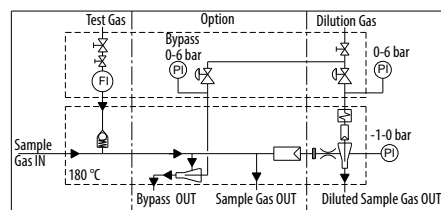
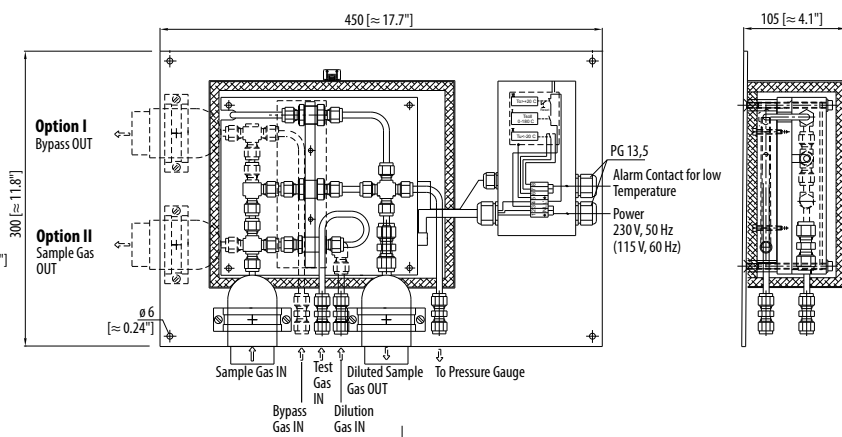
In the case of option 1, both mounting versions A1/S1 include the additional pressure regulator.

The design of the dilution unit guarantees smooth operation and straightforward maintenance independent of the process temperature.

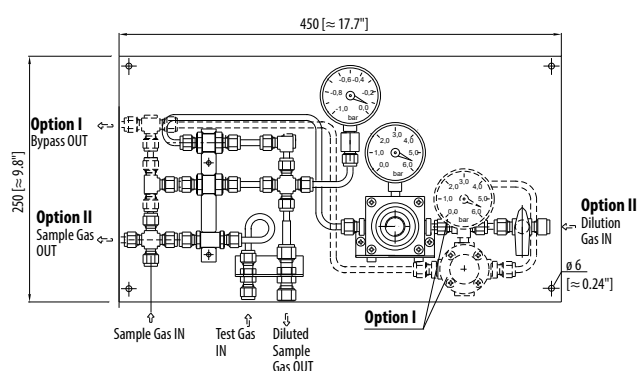
DIL-1 with control panel -S (S.1)



Electrically heated Gas-Dilution Unit DIL-1/H with control panel -S (S.1)



Gas-Dilution Unit DIL-1 with mounting set -A (-A1)

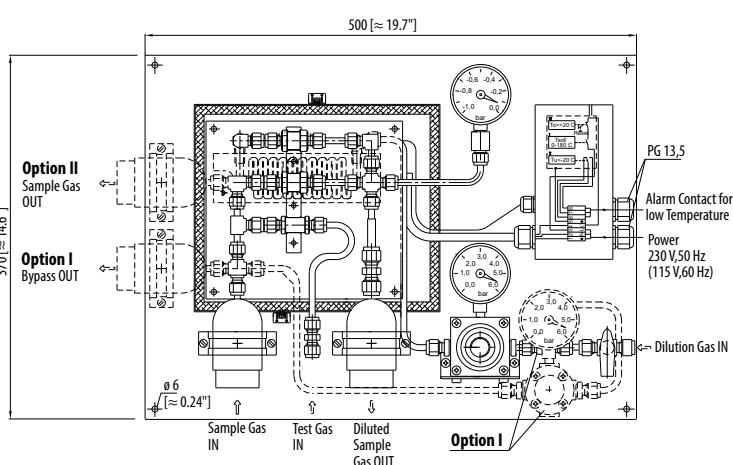


Gas conections:  
Diluted Sample Gas OUT for tube 8 x 1 mm  
All other connections for tube 6 x 1 mm

Connections in inches on request

Dimensions in mm [Inches]

Electrically heated Gas-Dilution Unit DIL-1/H with mounting set -A (-A1)



## Technical Data

	M&C Dilution Unit DIL-1/(H)							
Dilution rates with the critical orifices 'a' to 'g'	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	l/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 1 or 2	Version 1: 480 to 600 NI/h, version 2: 1800 to 3000 NI/h							
Dilution gas pressure at the inlet of pressure regulator	Min. 4.5 bar g, max. 16 bar g							
Bypass injector/B inlet pressure/gas consumption sample gas flow rate	Approx. 2 bar injector gas approx.: 300 l/h, sample gas: approx. 150 l/h							
Process pressure	0.9 to 2 bar abs.							
Fault caused by process temperature variations	Operation independent of process temperature							
Fault caused by process low- or overpressure	No fault as long as the differential pressure $\Delta P$ at the dilution unit is > 0.5 bar g and test gas is injected 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 316L/316Ti, quartz glass, FKM, graphite							
Power supply for DIL-1/H	230 V/50 Hz, 800 W							
Temperature controller for DIL-1/H	Capillary thermostat adjustable from 0 to 180 °C [32 to 356 °F], with high temperature limiter and low temperature alarm as changeover contact, voltage-free, alarm point $\Delta T_{30} \text{ °C to } T_{SET}$ , contact rating max. 250 V 3 A AC, 0.25 A DC							
Weight	Approx. 8 kg [ $\approx$ 17.6 lbs]							

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

1) approx. at 3 bar dilution gas.

2) -5 % not possible for orifice 'g'.

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.

Part No.	Type	M&C-Dilution Unit DIL-1/(H) with orifice 'e' for dilution ratio 30-40:1 (standard)
20S4900	DIL-1	Dilution unit type DIL-1, non-heated, installed on a mounting plate, dilution ratio: 30-40:1 (standard), consisting of: dilution section, 2 filters for sample gas and dilution gas, check valve for calibration gas
20S4905(a)	DIL-1/H (a)	Dilution unit electrically heated to 180 °C [356 °F], (a) to be added to the Part No. for power 115 V/60 Hz
20S4925	Option 1: DIL-1/B	DIL-1/B, additional bypass injector to reduce the response time in the case of high dilution ratios, bypass injector B
20S4930	Option 2: 2xOUT	Additional sample gas outlet undiluted
20S4205	DIL-1/-A	Option: add-on set: 1 pressure regulator, 2 pressure gauges, mounting kit for dilution unit
20S4215	DIL-1/-A1	Option: add-on set: 2 pressure regulators, 3 pressure gauges, mounting kit incl. fittings for dilution unit with bypass injector
20S4250	DIL-1/-S	Option: control panel with 1 pressure regulator, 2 pressure gauges, 1 flow meter, 2 ball valves
20S4260	DIL-1/-S1	Option: control panel with 2 pressure regulators, 3 pressure gauges, 1 flow meter, 2 ball valves
20S4206	DIL-1/-A-FM	Option: add-on set: 1 pressure regulator, 2 pressure gauges, 2 ball valves, 1 flow meter
20S4216	DIL-1/-A1-FM	Option: add-on set: 2 pressure regulators, 3 pressure gauges, 2 ball valves, 1 flow meter

Other versions upon request.