

# PAUL-GOTHE-GmbH Bochum

Wittener Straße 82  
D-44789 Bochum



## Manual for Gas Sampler Art.-No.: 26.02-CP

Compact and robust gas-sampler for gas sampling up to 300 l/h by 300 mbar vacuum.

In a carrying rack material stainless-steel-square-tube 15 x 15 mm is installed:

- Drying-tower (material: PVC, dimensions: Ø 75 mm x 170 mm), dry-area approximately 0,6 l,
- flow meter with valve, range: 30-350 l/h,
- Membrane pump (vacuum: 800 mbar; performance: 300 l/h; 230 V/0,27 A)
- Gas meter with thermometer (BK 4, 0,04 m<sup>3</sup>/h - 6m<sup>3</sup>/h)
- with Gothe CP-Module: (constant flow by pressure fluctuation )

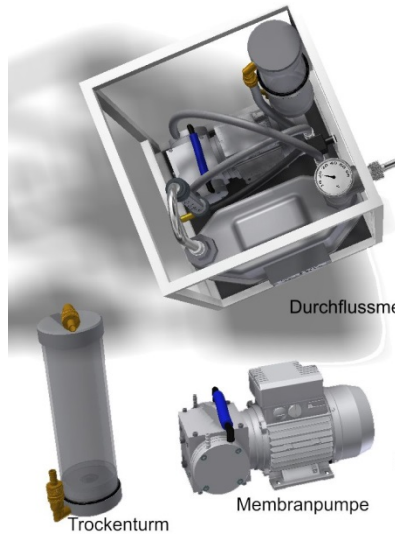
The integrated Gothe CP-Module holds constant the adjusted gas flow also if the pressure changes. E.g. 200 l/h adjusted by needle valve will be constant, if the pressure drop behind a filter increase from initially 50 mbar to 250 mbar vacuum.

Dimensions: approximately 300 x 400, high: 400, weight approximately 7 kg.

Before use check proper condition of the appliance. If any damages don't connect to the power supply, sent it to the manufacturer for your safety. Power supply; use protection according to your local regulations.

Fill drying tower with Silica gel. Use the needle valve to adjust the suction rate. For the volume determination must record the gas meter temperature.

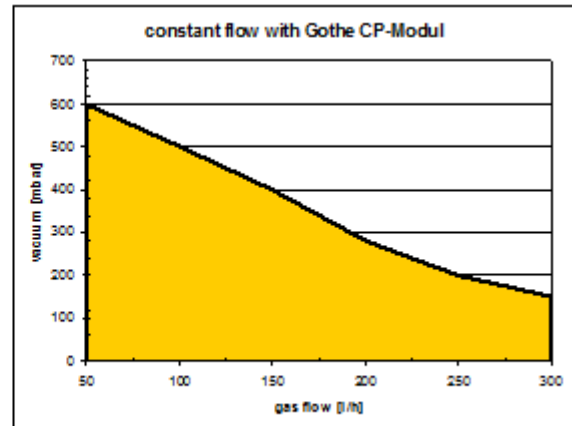
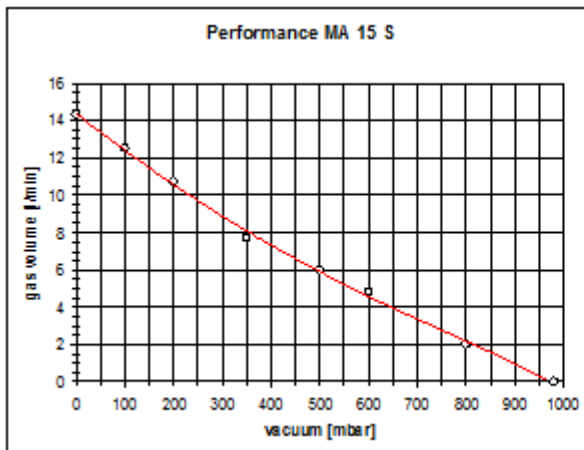
More information see data sheet for flow meter, gas meter and pump.



- Im Lieferumfang:
1. Gaszähler G4
  2. Durchflussmesser mit Nadelventil
  3. Membranpumpe
  4. Trockenturm
  5. CP-Modul (konstanter Volumenstrom)



These products is according to / Dieses Produkt entspricht den EG-Richtlinien 89/336/EWG (Elektromagnetische Verträglichkeit, 23/73/EWG (Niederspannungsrichtlinie)



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## Manual for flowmeter

The flowmeter should use always in a upright position and without high pressure or vacuum.

The indicated value must corrected by correction factors.

More information and the Declaration of Conformity can be found at service and support.

Reading of the flowmeter: read the measured value at the top edge of the float.

$$Volume(gasmeter) = scale(rotameter) \cdot K_{\delta} \cdot K_t \cdot K_p$$

$$scale(rotameter) = \frac{volume(gasmeter)}{K_{\delta} \cdot K_t \cdot K_p}$$

$\delta_B$ : gas density NPT [kg/m<sup>3</sup>]  
 $\delta_E$ : calibrate density NPT [kg/m<sup>3</sup>]  
b: atmospheric pressure [mbar]  
p: operating pressure [mbar]  
 $p_N$ : NPT-pressure (1013 mbar)  
T: NPT temperature (273 K)  
t: operating temperature [°C]

Calculation of the factor\*<sup>1</sup>

$$K_{\delta} = \sqrt{\frac{\delta_E}{\delta_B}}, \quad K_t = \sqrt{\frac{293}{(273+t)}}, \quad K_p = \sqrt{\frac{p}{1000}}$$

Respect: Disturbances in the ad (dead loss) can happen through pumps in front of the flowmeter (rotary vane- and membrane-pumps). To avoid this, use a pulsation dumper in front of the flowmeter! Calibrate the flowmeter with the gas meter.

Working medium:

Inert and corrosive gas which have no negative impact on the physical and chemical properties of the tube , float, seal and union materials.

Operating pressure: tubes with plastic unions: 10 bar.

Accuracy class: 4 according to VDE/VDI 3513, part 2,  $\pm 1\%$  from final value and  $\pm 3\%$  from measured value.

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\*<sup>1</sup> For the calculation of the volume flow rate see the guideline:  
VDI/VDE 3513 part 1:2014-03: Variable-area flowmeters - Calculation methods, Beuth-Verlag

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## Manual for gas meter

Gas meter is resistant and durable finish (interior parts out of plastic). Our recommendation: Place the drying tower in front of the gas meter so that dry air flows in. Let ~ 500 l of dry and clean air flow through the gas meter and vacuum pump after the measurement. Operating temperature: -20 to 60°C, limits of calibration errors: from 0,2 Qmax: 1.5 %,

For determination of the volume must be recorded the temperature on the gas meter. If the gas meter operated under vacuum, then the vacuum has to be noted too. When operating in vacuum the supplied calibration certificate is not valid.

Calculation of the NPT Volume:

$$V_{NPT, \text{gasmeter}, \text{dry}} = V_{\text{gasmeter}, \text{dry}, p, t} \cdot \frac{(b - p_{\text{gasmeter}}) \cdot T_{NPT}}{p_{NPT} \cdot (T_{NPT} + t)}$$

Conversion gas volume:

$$V_{\text{Gasmeter}} = V_{\text{duct}} \frac{100 - f_{\text{duct}} T_{\text{gasmeterKelvin}} P_{\text{duct}}}{100 - f_{\text{gasmeter}} T_{\text{ductl(Kelvin)}} P_{\text{gasmeter}}}$$

V: Volumetric gas flow in m<sup>3</sup>/h

f: Humidity in percent

T: Temperature in Kelvin

p: absolute pressure in mbar

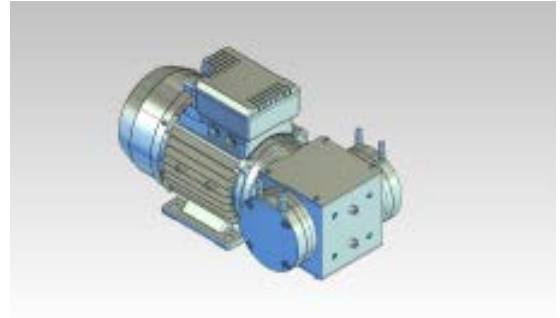
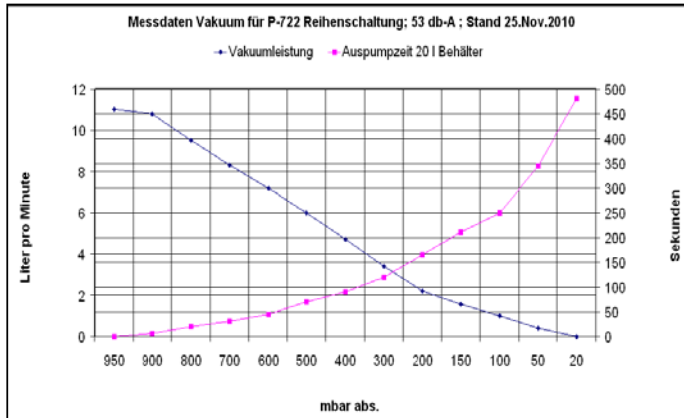


# PAUL-GOTHE-GmbH Bochum

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## Manual for 2 Cylinder diaphragm pump for gas sampler 26.021-CP(P-722)



Pneumatic Performance	
Suction performance at 20°C	In series 11,5 l/min
Max. vacuum in mbar/abs	In series up to 20 mbar abs.
Pressure against atmospheric	0,5 Bar does not exceed
Number of cylinders	2
Pneumatic connections	Hose nozzles
Electrical supply ratings of engine	
Engine power (AC~);Upm	120 W; 220-240V~50Hz; 1360Upm 1 phase alternating current
Current consumption I	0,96 A
TH-CI / protection	F / IP 55
General information	
Acceptable gas inlet temperature	+ 5°C ... + 45°C
Acceptable ambient temperature	+10°C ... + 45°C
Sizes	265mm x 120mm x 155mm
Weight ca.	4,6 kg
Material	
Pump heads and chambers Aluminum; valve FKM; O-rings EPDM; membrane FKM; washer Aluminum	

Pump type: P-722/W

