

PAUL-GOTHE-GmbH Bochum

Wittener Straße 82
D-44789 Bochum



Manual for Gas Sampler Art.-No.: 26.03

Compact and robust gas-sampler for gas sampling up to 2.4 m³/h.

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

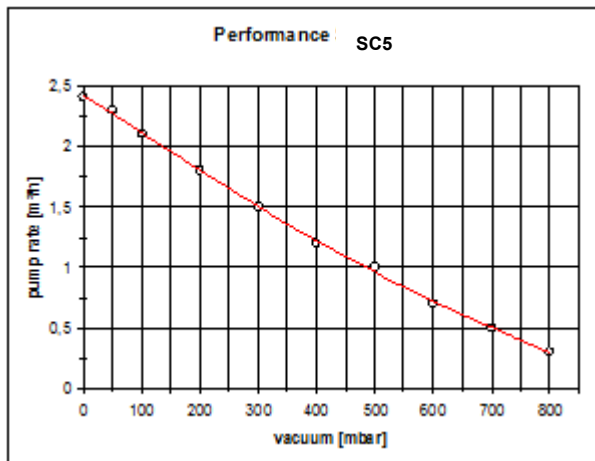
- Drying-tower (material: PVC, dimensions: Ø 75 mm x 320 mm), dry-area approximately 0,6 l,
- flow meter with valve, range: 0,2-2.4 m³/h,
- rotary vane pump (vacuum: 800 mbar; performance: 3 m³/h; 230 V/1 A)
- Gas meter with thermometer (BK 4, 0,04 m³/h - 6m³/h)

Dimensions: approximately 340 x 340, high: 450, weight approximately 14 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 sees data sheet for flow meter, gas meter and pump.



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

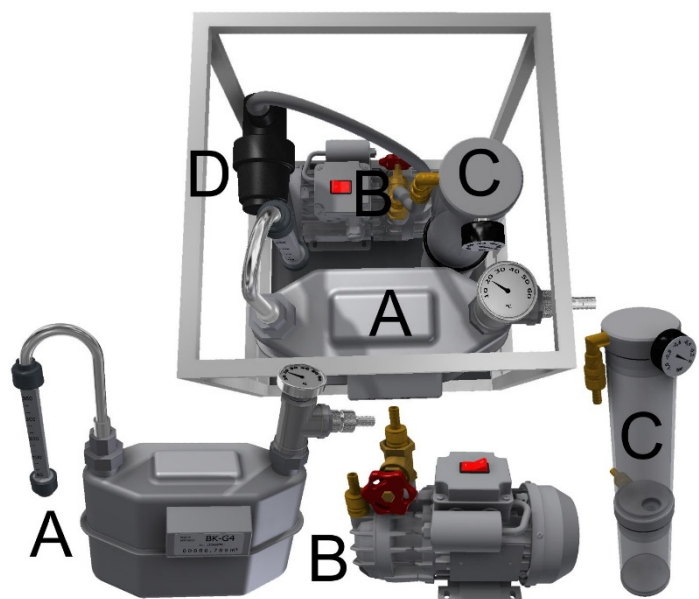
Parts:

A: Gas meter BK G4

B: gas tight rotary vane pump with valve

C: Drying-tower with water trap and gauge

D: Pulsation damper



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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.

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

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

δ_B : gas density NPT [kg/m³]
 δ_E : calibrate density NPT [kg/m³]
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*¹

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

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.

*¹ 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 m³/h

f: Humidity in percent

T: Temperature in Kelvin

p: absolute pressure in mbar



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Manual for pump Art.-No.: 17.2-SA5, 17.03-SC8 and 17.04

Operating:



The pump was designed to work with clean air or inert gases. The temperature of intake gases must be between 0 and 40°C. The pump must not be used to pump aggressive, harmful, polluting gases, or oxygen.

Make sure that pump exhaust is not obstructed by either its connecting hose or fittings.

The pump may reach high temperatures when operating.

On the suction side is installed a vacuum gauge, to indicate the vacuum in the system. The pump is gas tight, which means the gas meter can install at the exit of the pump. Please make always a leak check according to EN 13284-1. If the pump is not gas tight, place the gas meter in front of the pump. The pump should be checked. Avoid overpressure on the exit.

At the version with Bypass-valve can regulate the suction rate by using the gate valve. Open means that parts of the gas runs in cycle and less of the gas will be sucked. The screw fitting at the gate valve seals against wrong air and fixed the shaft.

Too tighten means the gate valve is difficult to turn and too loose make a leak.

Power off:

Before the pump is switched off, let it run with open intake for about 15-30 minutes. This is to eliminate any moisture built up inside the intake chamber and avoid rotor oxidation.

If the pump is left unused for long periods, it should be disconnected from mains supply and the user system in addition to carrying out the above procedure.

If the pump don't start after long unused, please disconnect the power supply from the pump and turn the rotor manual by carefully turning of the fans. If the fans cannot be turned, the carbon blades are blocked or corroded. Please bring in the pump for maintenance.

Maintenance:

Shorter maintenance intervals may be required according to specific operating conditions and installation. If the pump is gas tight and the vacuum is more as 800 hPa, no exchange of the carbon blade is necessary.

The pump is a dry running pump and no oil is necessary.

Only use spare parts kits supplied by the manufacturer, as they include all parts and instructions required to ensure successful maintenance.

Fan guard and pump should be cleaned to remove any dust deposits. This can be done using compressed air and a dry cloth. Do not use any fluids or detergents.

Make sure that operator is specifically trained for operating vacuum pumps and observes all rules in force regarding personal safety and protective equipment.

The dismantling and assembling requires professional knowledge and special tools, that again the pump is gas tight. This maintenance work we would like to perform for you. Please get in contact with us.

Data:

	17.2-SA5	17.03-SC8	17.04
Rated flow rate (50 Hz) m³/h	4	6,5	10
Final pressure (Absolute) hPa	120	120	120
Motor power kW	0,15	0,23	0,37
Working temperature (room temperature 20°C) °C	45-50	65-70	70-75
Voltage V (Current A)	220 (1)	220 (1,6)	220 (3,3)
Weight kg	6	12	15

