

Sample Gas Pumps for Hazardous Areas

P 2.2-ATEX, P 2.4 ATEX, P 2.2-AMEX, P 2.4 AMEX, P 2.82 AMEX, P 2.84 AMEX



The transportation of sample gas in sample conditioning systems requires reliable sample pumps. The corrosive nature of the gas and the potential of condensate formation are the real challenges for any pump.

These sample pumps are equipped with a bellows made from solid PTFE. This design has demonstrated the highest reliability and long lifetime in numerous applications. Designed specifically for harsh gas applications that have entrained liquids present or where condensate is expected to form, it is recommended that the pump head be pointed downwards to accommodate draining of these liquids.

A special flange design makes the P2.4 and P2.84 designs suitable for hot applications. The flange is designed in two parts -- one carrying the pump head is installed in a heated cabinet and the other carrying the electrical motor is flanged to the outside of the cabinet keeping the motor in ambient conditions.

The pumps employ explosion-proof motors. The ATEX models are suitable for Category 2. The AMEX models are CSA C-US and FM approved and suitable for Class I Division 2.

For easy installation, a support console with vibration dampers is included for the P 2.2ATEX, P 2.2AMEX and P 2.82AMEX.

- **Robust and reliable design**
- **Easy to replace valves**
- **Bellow made of one solid piece**
- **Suitable for corrosive gases**
- **Pumps gases with entrained liquid**
- **Low noise**
- **Vibration dampening console**
- **Optional adjustable bypass valve**
- **Long life**
- **ATEX versions for Category 2**
- **CSA / C-US and FM approved versions for Class I Div. 2**

Overview of the basic pump models and links to further information

| | One piece Pumps (See drawing 1; Ordering table 1) | | Pumps with intermediate flange (See drawing 2; Ordering table 2) | |
|---|--|--------------------|---|--------------------|
| Nominal free flow (see flow curve) | 400 l/h (0.24 cfm) | 800 l/h (0.47 cfm) | 400 l/h (0.24 cfm) | 800 l/h (0.47 cfm) |
| ATEX types (Europe) EX II 2 G EEx c IIC T1-T4 | P 2.2 ATEX | | P 2.4 ATEX | |
| AMEX types (US) CL.I Div.2 Gr BCD T1-T4 CSA C-US approval no. 1703338 FM approval no. 3038101 | P 2.2 AMEX | P 2.82 AMEX | P 2.4 AMEX | P 2.84 AMEX |
| Weight | 7.5 kg | | 8.5 kg | |

General technical data for all pumps

Power supply See order number (p.3)
 Protection class Electrical IP 54
 Mechanical IP 20
 Dead space 8.5 ml

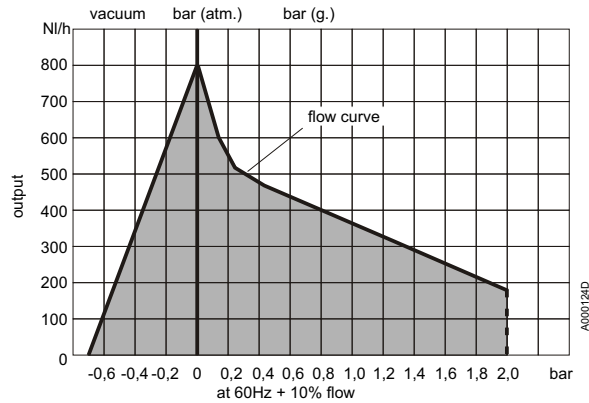
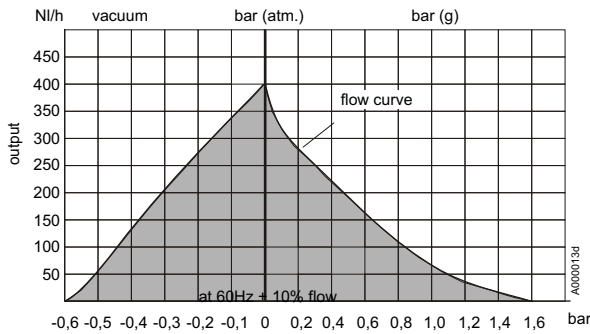
Gas wetted materials:
 PTFE, PVDF (Standard pump)
 + PCTFE, Viton (integrated needle valve)
 + FFKM/1.4401/1.4571 (SS head)

Pumps 400 l/h

Ambient temperature
 Motors 115 V, 230 V -20 to 50°C (-4 to 122°F)
 Motor 380 - 420 V -20 to 40°C (-4 to 104°F)
 Pump head See table below
 Media temperature valves PTFE/PVDF 100 °C (212 °F)
 PTFE/PEEK 140 °C (284 °F)

Pumps 800 l/h

Ambient temperature
 Motors 115 V, 230 V -20 to 50 °C (-4 to 122 °F)
 Motor 380 - 420 V -20 to 40°C (-4 to 104°F)
 Pump head See table below
 Media temperature valves PTFE/PEEK max. 120 °C (248 °F)



Restrictions for sample and ambient temperature

| P 2.2 ATEX and AMEX | | Media temp. |
|---|----|-----------------|
| Sample without flammable gases | T3 | 140 °C (284 °F) |
| | T4 | 120 °C (248 °F) |
| Sample with flammable gases above the lower explosion limit | T3 | 120 °C (248 °F) |
| | T4 | 50 °C (122 °F) |

Restrictions for sample and ambient temperature

| P 2.82 AMEX | | Media temp. |
|---|----|-----------------|
| Sample without flammable gases | T3 | 120 °C (248 °F) |
| | T4 | 80 °C (176 °F) |
| Sample with flammable gases above the lower explosion limit | T3 | 100 °C (212 °F) |
| | T4 | 50 °C (122 °F) |

| P 2.4 ATEX and AMEX | | Media temp. | Pump head temp. |
|---|----|-----------------|-----------------|
| Sample without flammable gases | T3 | 120 °C (248 °F) | 100 °C (212 °F) |
| | T4 | 80 °C (176 °F) | 80 °C (176 °F) |
| Sample with flammable gases above the lower explosion limit | T3 | 100 °C (212 °F) | 80 °C (176 °F) |
| | T4 | 50 °C (122 °F) | 50 °C (122 °F) |

| P 2.84 AMEX | | Media temp. | Pump head Temp. |
|---|----|-----------------|-----------------|
| Sample without flammable gases | T3 | 120 °C (248 °F) | 100 °C (212 °F) |
| | T4 | 80 °C (176 °F) | 80 °C (176 °F) |
| Sample with flammable gases above the lower explosion limit | T3 | 100 °C (212 °F) | 80 °C (176 °F) |
| | T4 | 50 °C (122 °F) | 50 °C (122 °F) |

Please indicate with order

x stands for the number below, yy for the numbers above

one piece pumps

| | |
|-------|---|
| 61 | P 2.2 ATEX Cat. 2; 400 l/h (0,24 cfm) |
| 71 | P 2.2 AMEX Cl.1 Div. 2; 400 l/h (0,24 cfm) |
| 73 | P 2.82 AMEX Cl.1 Div. 2; 800 l/h (0,48 cfm) |
| 42 yy | x x x x 99 |
| | 1 2 3 4 5 |
| | 1 2 |
| | 1 2 3 |
| | 1 2 |

Motors
 230 V, 50 Hz, 0.88 A
 230 V, 60 Hz, 0.89 A
 115 V, 50 Hz, 1.76 A
 115 V, 60 Hz, 1.78 A
 380 - 420 V, 50 Hz, 0.41 A

Pump head position
 1 normal pos. vertical
 2 pointed downwards

Pump head material
 1 PTFE
 2 SS 1.4571 / viton / 1.4401
 3 PTFE with bypass valve

Valves material
 1 up to 100 °C PTFE / PVDF
 (can not be used with P2.82 AMEX)
 2 up to 140 °C PTFE / PEEK

Hints for variations:

Position of pump head:

(P2.2 and P2.82 types only):

If the gas contains entrained liquids, the pump head must point downwards. Although the pump head may be turned by the customer as described in the manual, we suggest ordering it in the required configuration.

Pump head material:

The standard material is PTFE. This can be equipped with a bypass valve to reach all the operation points in the grey area in the flow curve of the pump head (P2.2 and P2.82 types only). Depending on the tubing requirements, a stainless steel body may be ordered (bypass valve not available).

Valve material:

(P2.2 and P2.82 types only)

For standard non-heated applications with sample temperatures up to 100 °C (212 °F), the PTFE/PVDF valves are sufficient. For higher temperatures, the valves for temperatures up to 140 °C (284 °F) are required. Please note that maximum temperatures may be limited for certain temperature classes (see the tables on page 2).

Pumps with intermediate flanges

| | |
|-------|---|
| 62 | P 2.4 ATEX Cat. 2; 400 l/h (0.24 cfm) |
| 72 | P 2.4 AMEX Cl.1 Div. 2; 400 l/h (0.24 cfm) |
| 74 | P 2.84 AMEX Cl.1 Div. 2; 800 l/h (0.48 cfm) |
| 42 yy | x 1 x 2 99 |
| | 1 2 3 4 5 |
| | 1 2 |

Motors
 230 V, 50 Hz, 0.88 A
 230 V, 60 Hz, 0.89 A
 115 V, 50 Hz, 1.76 A
 115 V, 60 Hz, 1.78 A
 380 - 420 V, 50 Hz, 0.41 A

Pump head material
 1 PTFE
 2 SS 1.4571 / viton / 1.4401

Ordering example:

Part no.

| | | | | | | |
|----|----|---|---|---|---|----|
| 42 | 73 | 4 | 1 | 1 | 2 | 99 |
| | 73 | 4 | 1 | 1 | 2 | 99 |

for 800 l/h pump P2.82 AMEX

for 115 V 60 Hz Motor

for pump head pointing up

pump head PTFE

for 140°C (284 °F) valves

Please keep in mind the required protection device for the pump's motor

Motor protection switches

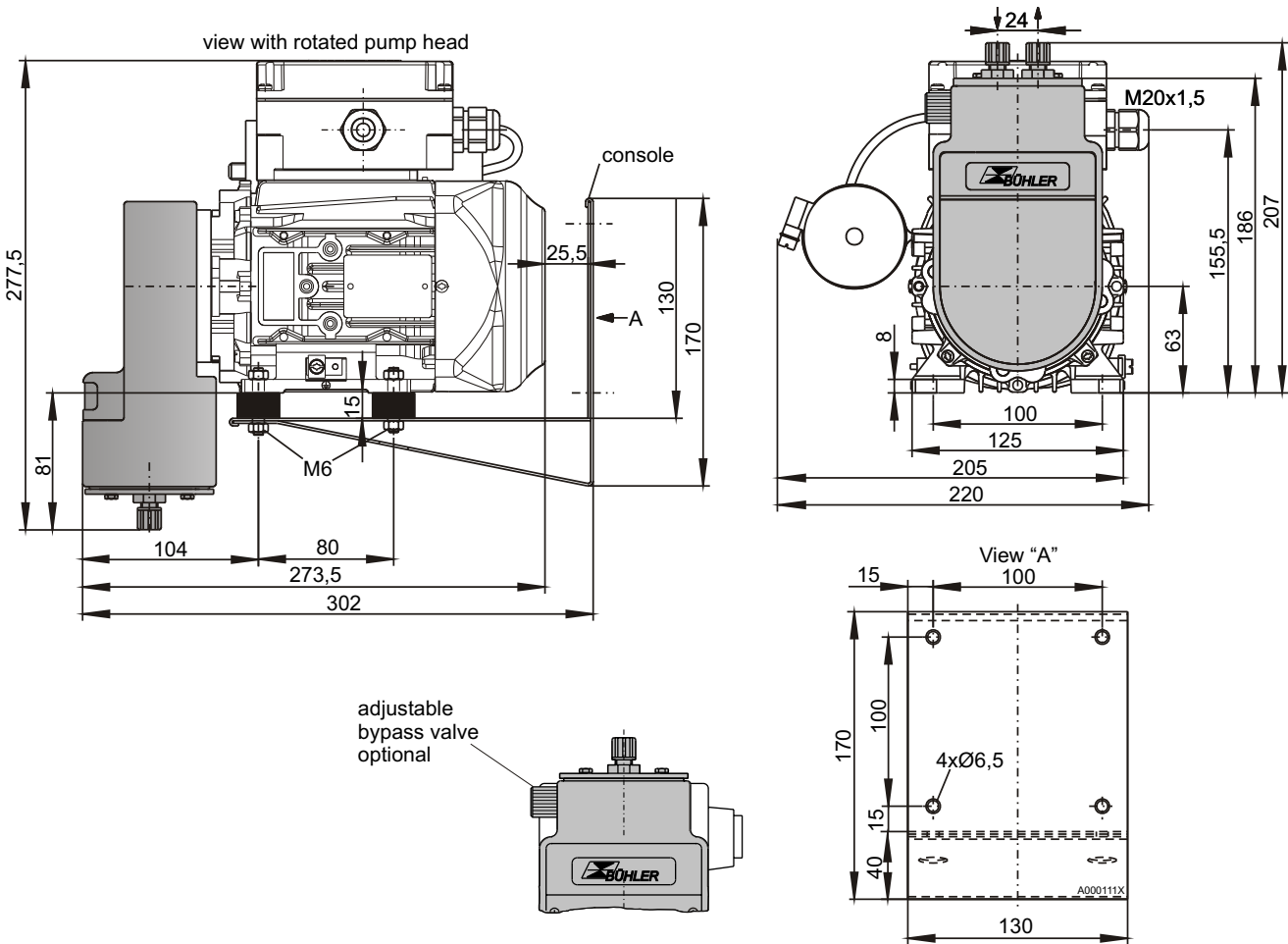
- For mounting outside of hazardous area
 230 V; 380-400 V, 0-1 A 9132020021
 115 V, 1.6-2.5 A 9132020030
- For mounting inside of zone 1 or 2 (ATEX only)
 230 V; 380-400 V, 0-1 A 9132020036
 115 V, 1.6-2.5 A 9132020033

Fittings:

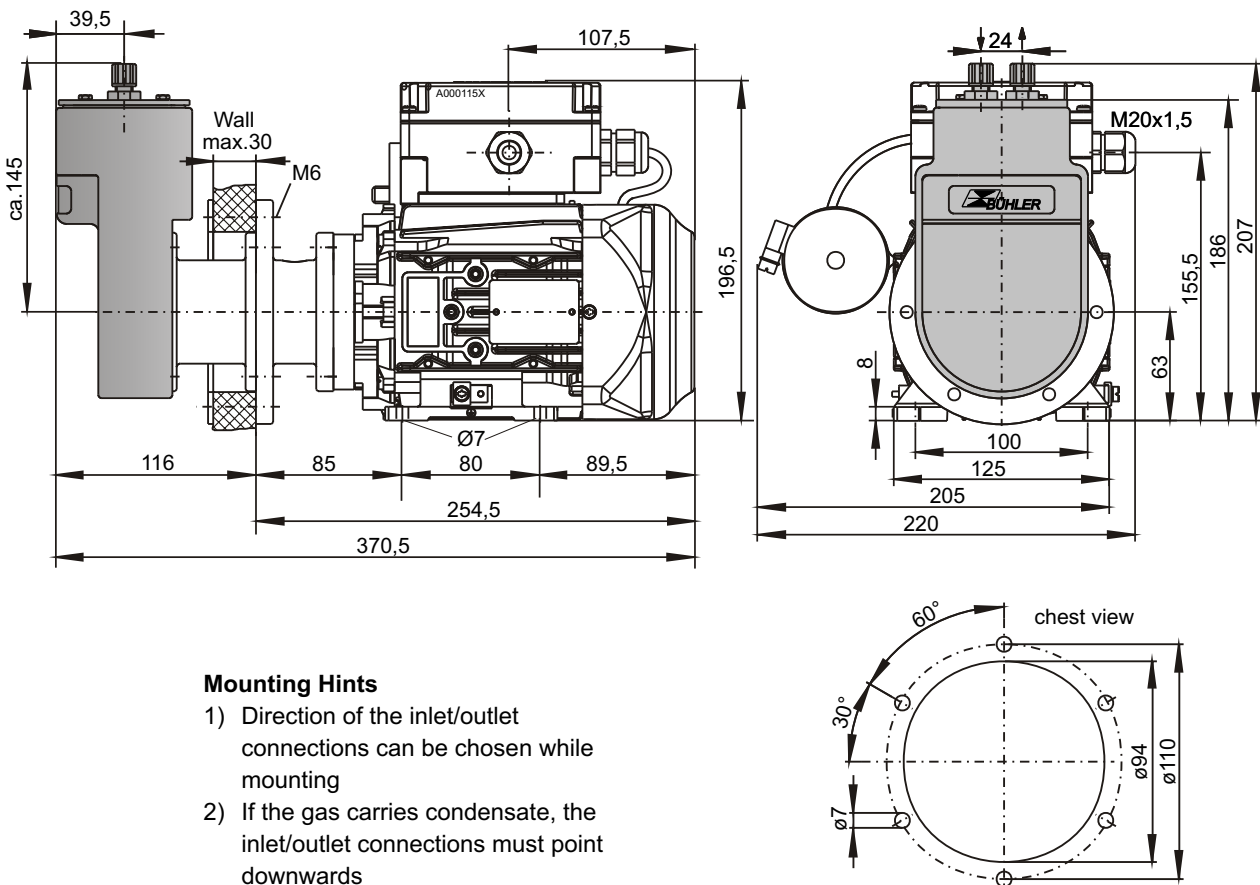
ATEX types DN 4/6 hose resp. 6mm tube

AMEX types 1/6"/1/4" hose resp. 1/4" tube

Dimensions of P 2.2 ATEX, P 2.2 AMEX, P 2.82 AMEX



Dimensions of P 2.4 ATEX, P 2.4 AMEX, P 2.84 AMEX



Mounting Hints

- 1) Direction of the inlet/outlet connections can be chosen while mounting
- 2) If the gas carries condensate, the inlet/outlet connections must point downwards