

Direct-acting 2-way basic proportional valve



- High dynamics
- Orifice sizes DN0.8 ... 2.0 mm
- Good range

Type 2861 can be combined with...



Type 8605
Digital control electronics DIN-rail version



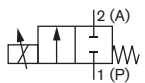
Type 2507
Cable plug



Type 8611
Universal controller

Type 2861 is an extremely compact solenoid control valve and is available with an orifice up to 2 mm. It is based on the standard version of Type 2871. It is used as an actuator in closed control loops (pressure, flow, temperature, etc.). Compared with the standard version, the valve is essentially of simpler construction and assembly and testing procedures are optimized, easing high volume series production with shorter delivery times.

Circuit function A



2/2 way direct-acting, solenoid proportional control valve

Valve control takes place through a PWM signal¹⁾. The duty cycle of the PWM signal determines the coil current and hence the position of the plunger.

The Bürkert control electronics Type 8605 (see relevant datasheet) converts an analog signal to a reference value corresponding to the valve type PWM signal and provides additional functions such as temperature compensation (coil heating), ramp function and the adjustment of min. and max. duty cycle/coil current for the control range.

Please note the sizing comments for such a control valve on page 2.

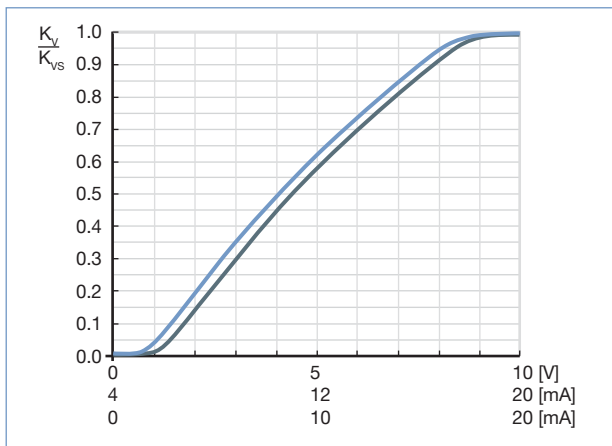
| Technical Data - Valve | |
|--|---|
| Body material | Brass, stainless steel |
| Seal material | FKM, EPDM on request |
| Medium | Neutral gases, liquids on request |
| Pressure range | 0 ... -12 bar ²⁾ |
| Medium temperature | -10 ... +90 °C |
| Ambient temperature | max. +55 °C |
| Power supply | 24 V DC |
| Max. current | 220 mA (at 24 V hold) |
| Power consumption | 5 W |
| Duty cycle | 100 % continuously rated |
| PWM control frequency | 800 Hz |
| Port connection | Sub-base , G 1/8, NPT 1/8, others on request |
| Electrical connection | Cable plug Type 2507, Form B industrial standard Article no. 423845 |
| Installation | As required, preferably with actuator in upright position |
| Typical control data³⁾ | |
| Hysteresis | <5 % |
| Repeatability | <1.0 % of F.S. |
| Sensitivity | <1.0 % of F.S. |
| Span | 1:25 |
| Protection class - valve | IP65 |

¹⁾ PWM pulse-width modulation

²⁾ Pressure values [bar]: Measured as overpressure to the atmospheric pressure, orifice further depends on nominal pressure

³⁾ Characteristic data of control behaviour depends on process conditions

Characteristics of a proportional valve



Advice for valve sizing

In continuous flow applications, the choice of appropriate valve size is much more important than with on/off valves. The optimum size should be selected such that the resulting flow in the system is not unnecessarily reduced by the valve. However, a sufficient part of the pressure drop should be taken across the valve even when it is fully opened.

Recommended value: $\Delta p_{\text{valve}} > 25\%$ of total pressure drop within the system

Otherwise, the ideal, linear valve curve characteristic is changed.

For that reason take advantage of Bürkert competent engineering services during the planning phase!

Determination of the k_v value

| Pressure drop | k_v value for liquids [m ³ /h] | k_v value for gases [m ³ /h] |
|--|--|---|
| Subcritical $p_2 > \frac{p_1}{2}$ | $= Q \sqrt{\frac{\rho}{1000 \Delta p}}$ | $= \frac{Q_N}{514} \sqrt{\frac{T_1 \rho_N}{p_2 p}}$ |
| Supercritical $p_2 < \frac{p_1}{2}$ | $Q \sqrt{\frac{\rho}{1000 \Delta p}}$ | $= \frac{Q_N}{257 p_1} \sqrt{T_1 \rho_N}$ |

| | | |
|------------|-----------------------------------|-----------------------------------|
| k_v | Flow coefficient | [m ³ /h] ⁴⁾ |
| Q_N | Standard flow rate | [m ³ /h] ⁵⁾ |
| p_1 | Inlet pressure | [bar] ⁶⁾ |
| p_2 | Outlet pressure | [bar] ⁶⁾ |
| Δp | Differential pressure $p_1 - p_2$ | [bar] |
| ρ | Density | [kg/m ³] |
| ρ_N | Standard density | [kg/m ³] |
| T_1 | Medium temperature | [(273+t)K] |

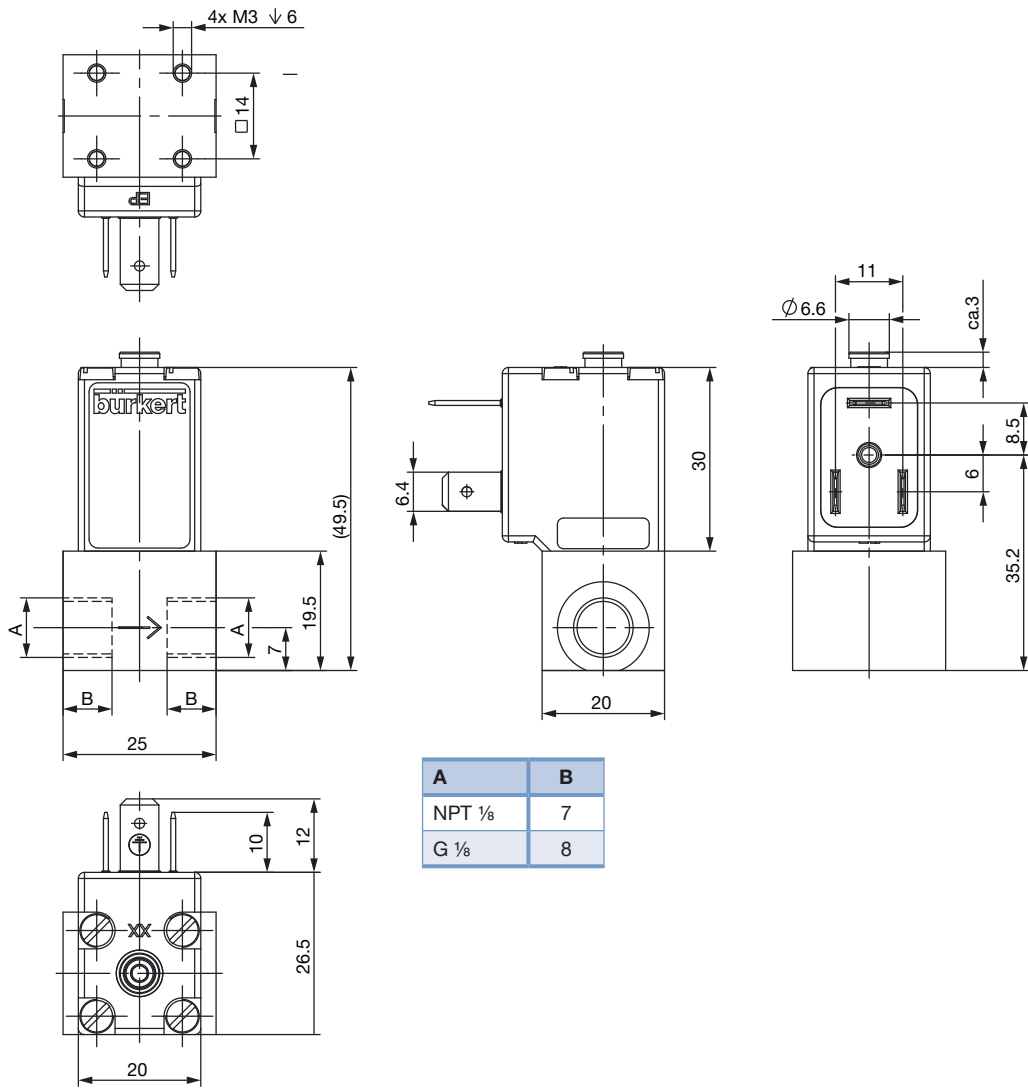
⁴⁾ measured for water, $\Delta p = 1$ bar, via the device

⁵⁾ Standard conditions at 1.013 bar³⁾ and 0 °C (273K)

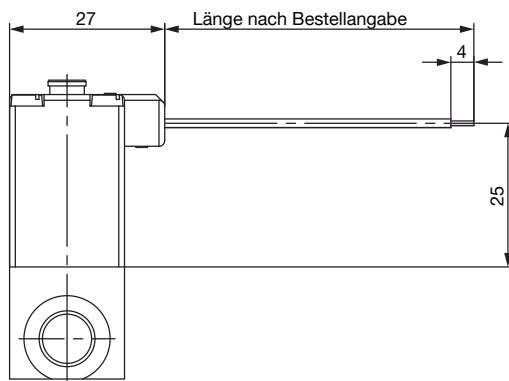
⁶⁾ Absolute pressure

Dimensions for threaded body version [mm]

Threaded body

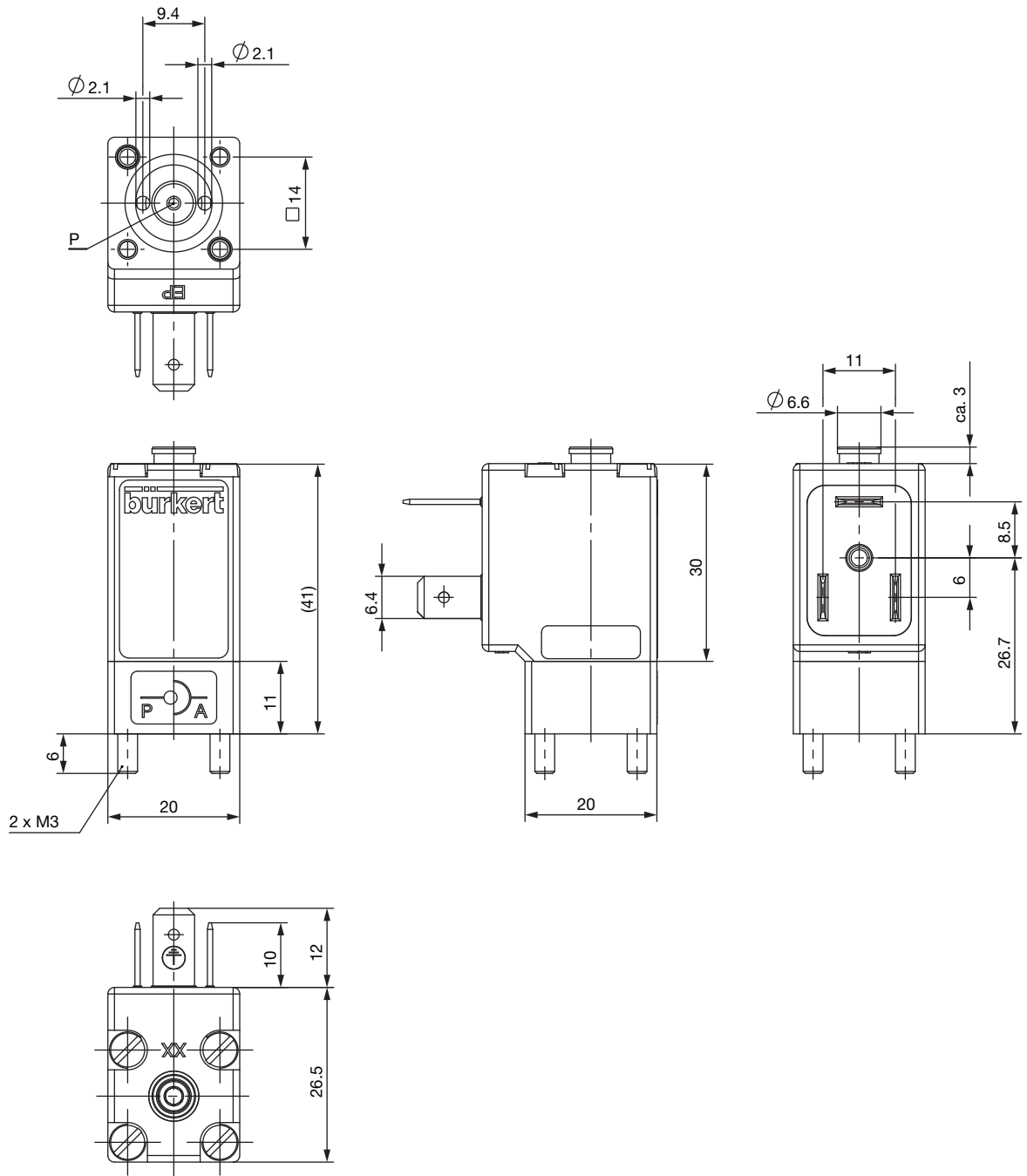


Flying leads version

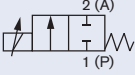


Dimensions for sub-base body version [mm]

Sub-base body



Ordering chart

| Circuit function | Orifice [mm] | Port connection ⁷⁾ | k_{vs} value water [m ³ /h] ⁸⁾ | Q_{Nn} value [l/min] ⁹⁾ | Nominal pressure ¹⁰⁾ [bar] | Article no. brass | Article no. stainless steel |
|--|--------------|-------------------------------|--|--------------------------------------|---------------------------------------|-------------------|-----------------------------|
| A  | 0.8 | Flange FK01 | 0.018 | 19 | 12 | 255637 | 275076 |
| | | G 1/8 | 0.018 | 19 | 12 | 255638 | 275070 |
| | 1.0 | Flange FK01 | 0.027 | 29 | 10 | 275073 | 275077 |
| | | G 1/8 | 0.027 | 29 | 10 | 249896 | 265373 |
| | 1.2 | Flange FK01 | 0.038 | 41 | 8 | 275074 | 275078 |
| | | G 1/8 | 0.038 | 41 | 8 | 255640 | 267087 |
| | 1.6 | Flange FK01 | 0.055 | 59 | 6 | 249009 | 275079 |
| | | G 1/8 | 0.055 | 59 | 6 | 249897 | 275071 |
| | 2.0 | Flange FK01 | 0.090 | 97 | 3 | 275075 | 275080 |
| | | G 1/8 | 0.090 | 97 | 3 | 275069 | 275072 |

⁷⁾ Port Connections: NPT on request.

⁸⁾ k_{vs} value: Flow rate value for water, measured at +20 °C and 1 bar pressure differential over a fully opened valve.

⁹⁾ Q_{Nn} value: Flow rate for air with inlet pressure of 6 bar, 1 bar pressure differential and +20 °C.

¹⁰⁾ Pressure data [bar]: Overpressure with respect to atmospheric pressure.

Please use page 4 of this datasheet to inquire about your individual requirements.

Further versions on request



Material

Other seal materials



Analytical

Oxygen version

Parts oil-, fat- and silicon free



Coil

Other coil power

Specific, power setting for lower pressure

Other operating voltages

coil with flying leads



Valve armature

Special valve orifice

Note

You can fill out the fields directly in the PDF file before printing out the form.

Design data for custom engineered solenoid control valves

▶ Please fill out this form and send to your local Bürkert Sales Centre* with your inquiry or order

| | |
|---------------|----------------|
| Company | Contact person |
| Customer No | Department |
| Address | Tel./Fax |
| Postcode/Town | E-mail |

= Mandatory fields Quantity Requested delivery date

Process data

| | | | |
|---|----------------------------------|----------------------------------|----------------------|
| <input type="checkbox"/> Medium | <input type="text"/> | | |
| <input type="checkbox"/> State of medium | <input type="checkbox"/> liquid | <input type="checkbox"/> gaseous | |
| Medium temperature | <input type="text"/> | °C | |
| <input type="checkbox"/> Maximum flow rate | $Q_{nom} =$ <input type="text"/> | Unit: | <input type="text"/> |
| <input type="checkbox"/> Minimum flow rate | $Q_{min} =$ <input type="text"/> | Unit: | <input type="text"/> |
| <input type="checkbox"/> Inlet pressure at nominal operation $p_1 =$ | <input type="text"/> | barg | |
| <input type="checkbox"/> Outlet pressure at nominal operation $p_2 =$ | <input type="text"/> | barg | |
| Max. inlet pressure (nominal pressure) $p_{1max} =$ | <input type="text"/> | barg | |
| Ambient temperature | <input type="text"/> | °C | |

Additional specifications

| | | | |
|---------------|--------------------------------|--|---|
| Body material | <input type="checkbox"/> Brass | <input type="checkbox"/> Stainless steel | <input type="checkbox"/> other <input type="text"/> |
| Seal material | <input type="checkbox"/> FKM | <input type="checkbox"/> other | <input type="text"/> |

Note Please state all pressure values as **overpressures with** respect to atmospheric [barg].

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In case of special application conditions, please consult for advice.

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