



## Direct-acting 2-way basic proportional valve

- High dynamics
- Orifice sizes DN 0.8 ... 2.0 mm
- Good range



Product variants described in the data sheet may differ from the product presentation and description.

### Can be combined with

|                                                                                     |                                                                                     |   |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---|
|   | <b>Type 8605</b><br>PWM control electronics for electromagnetic proportional valves | ▶ |
|  | <b>Type 2507</b><br>Cable plug - industry standard plug Form B                      | ▶ |
|  | <b>Type 8611</b><br>eCONTROL - Universal controller                                 | ▶ |

### Type description

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.

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## 1. General Technical Data

|                                                              |                                                                                                                                                        |
|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Product properties</b>                                    |                                                                                                                                                        |
| Dimensions                                                   | Detailed information can be found in chapter <b>"4. Dimensions"</b> on page 5.                                                                         |
| <b>Material</b>                                              |                                                                                                                                                        |
| Body                                                         | Brass, stainless steel                                                                                                                                 |
| Seal                                                         | FKM, EPDM                                                                                                                                              |
| <b>Performance data</b>                                      |                                                                                                                                                        |
| <b>Typical values of positioning behaviour<sup>1.)</sup></b> |                                                                                                                                                        |
| Hysteresis                                                   | < 5 %                                                                                                                                                  |
| Reproducibility                                              | < 1 % of end value <sup>2.)</sup>                                                                                                                      |
| Response sensitivity                                         | < 1 % of end value <sup>2.)</sup>                                                                                                                      |
| Setting range                                                | 1:25                                                                                                                                                   |
| Pressure range <sup>3.)</sup>                                | 0...12 bar                                                                                                                                             |
| Nominal operating mode                                       | 100 % continuous operation                                                                                                                             |
| <b>Electrical data</b>                                       |                                                                                                                                                        |
| Operating voltage                                            | 24 V DC (12 V on request)                                                                                                                              |
| Power consumption                                            | Maximum 5 W                                                                                                                                            |
| Maximum coil current <sup>4.)</sup>                          | 220 mA (at 5 W and 24 V coil)                                                                                                                          |
| PWM frequency <sup>5.)</sup>                                 | 800 Hz                                                                                                                                                 |
| <b>Medium data</b>                                           |                                                                                                                                                        |
| Operating medium                                             | Neutral gases, liquids on request                                                                                                                      |
| Medium temperature                                           | -10 °C...+90 °C (with FKM)<br>-30 °C...+90 °C (with EPDM)                                                                                              |
| Viscosity                                                    | Maximum 21 mm <sup>2</sup> /s (21 cSt)                                                                                                                 |
| <b>Process/Port connection &amp; communication</b>           |                                                                                                                                                        |
| Port connection size                                         | Sub-base, G 1/8, NPT 1/8                                                                                                                               |
| Electrical connection                                        | Cable plug Type 2507 acc. to DIN EN 175301-803 form B<br>Detailed information can be found in chapter <b>"Cable plug Type 2507, Form B"</b> on page 9. |
| <b>Approvals and certificates</b>                            |                                                                                                                                                        |
| Degree of protection                                         | IP65                                                                                                                                                   |
| <b>Environment and installation</b>                          |                                                                                                                                                        |
| Installation position                                        | Any, preferably actuator face up                                                                                                                       |
| Ambient temperature                                          | Maximum +55 °C                                                                                                                                         |

1.) Characteristic data of control behaviour depends on process conditions

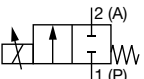
2.) By flow measurement

3.) Pressure data: Overpressure with respect to atmospheric pressure, depending on nominal diameter, tightness seal or nominal pressure

4.) Maximum value: value depends on operating pressure

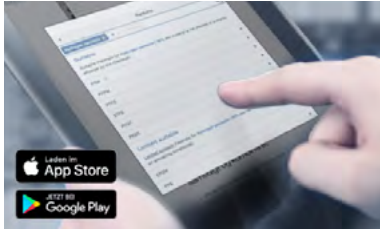
5.) PWM: pulse width modulation

## 2. Circuit functions

| Circuit functions                                                                   | Description                                                                               |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
|  | <b>Type: A, proportional control valve</b><br>2/2 way<br>Direct-acting<br>Normally closed |

### 3. Materials

#### 3.1. Chemical Resistance Chart – Bürkert resistApp



##### Bürkert resistApp – Chemical Resistance Chart

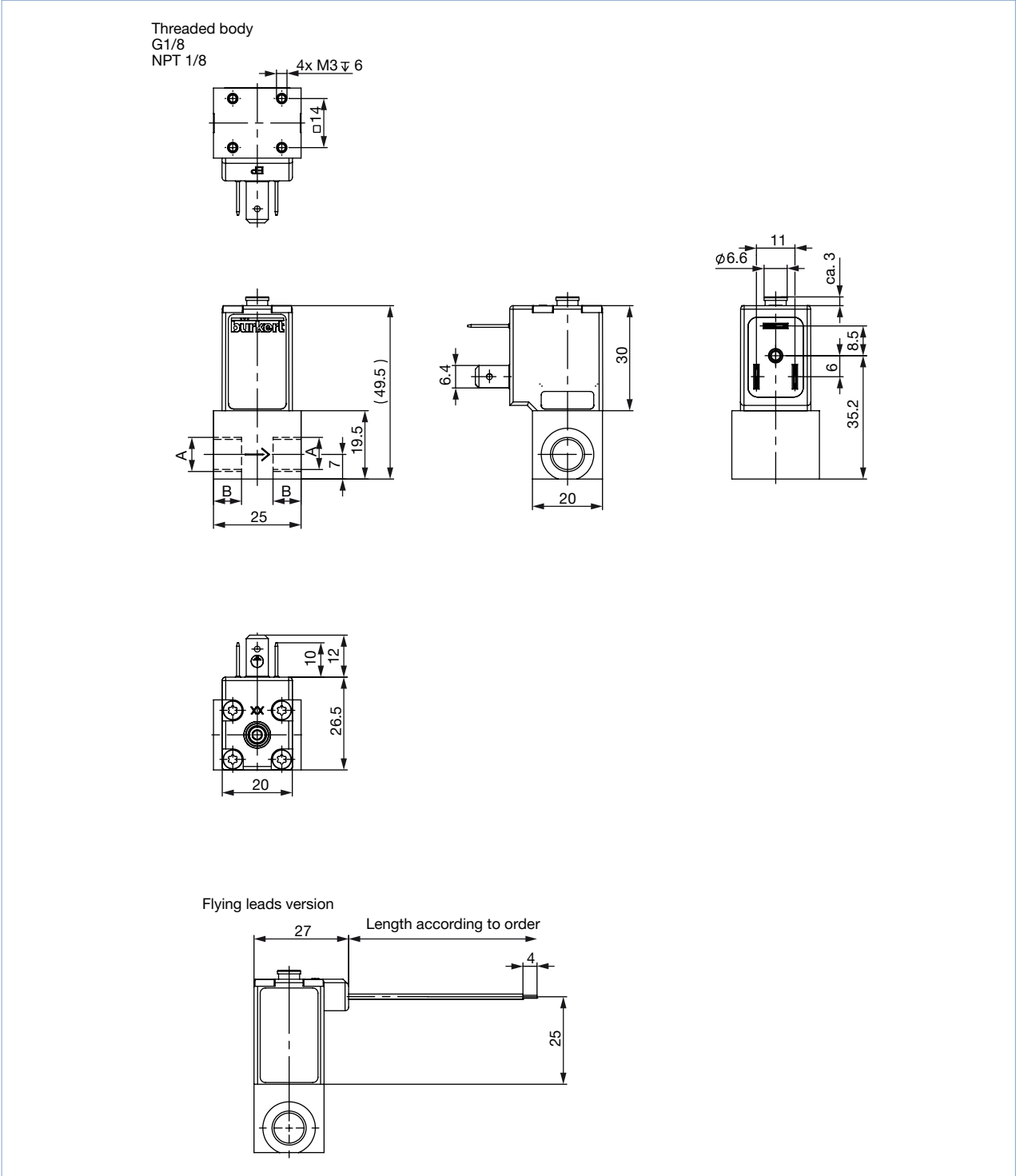
You want to ensure the reliability and durability of the materials in your individual application case? Verify your combination of media and materials on our website or in our resistApp.

[Start Chemical Resistance Check](#)

4. Dimensions

4.1. Threaded body

**Note:**  
Dimensions in mm

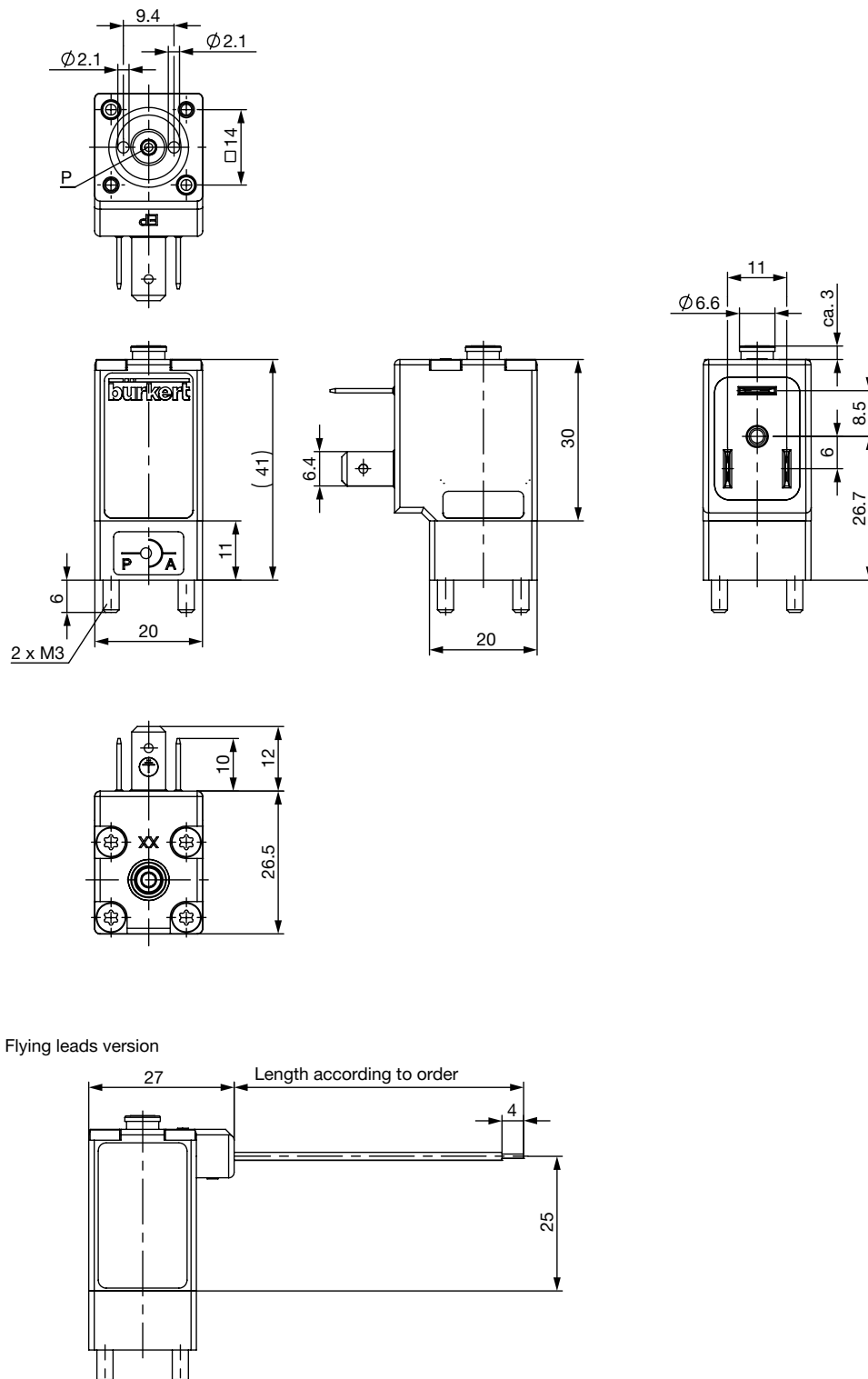


| Body version | Threaded body |         |
|--------------|---------------|---------|
| A            | G 1/8         | NPT 1/8 |
| B            | 8             | 7       |

## 4.2. Sub-base body

**Note:**

Dimensions in mm



## 5. Performance specifications

### 5.1. Flow characteristic

#### Determination of the $K_v$ value

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

|            |                                   |                                    |
|------------|-----------------------------------|------------------------------------|
| $K_v$      | Flow coefficient                  | [m <sup>3</sup> /h] <sup>1.)</sup> |
| $Q_N$      | Standard flow rate                | [m <sup>3</sup> /h] <sup>2.)</sup> |
| $p_1$      | Inlet pressure                    | [bar] <sup>3.)</sup>               |
| $p_2$      | Outlet pressure                   | [bar] <sup>3.)</sup>               |
| $\Delta p$ | Differential pressure $p_1 - p_2$ | [bar]                              |
| $\rho$     | Density                           | [kg/m <sup>3</sup> ]               |
| $\rho_N$   | Standard density                  | [kg/m <sup>3</sup> ]               |
| $T_1$      | Medium temperature                | [(273+t)K]                         |

1.) Measured for water,  $\Delta p = 1$  bar, over the valve

2.) At reference conditions 1.013 bar and 0 °C (273 K)

3.) Absolute pressure

### 5.2. Exemplary characteristic curve of a proportional valve

#### Note:

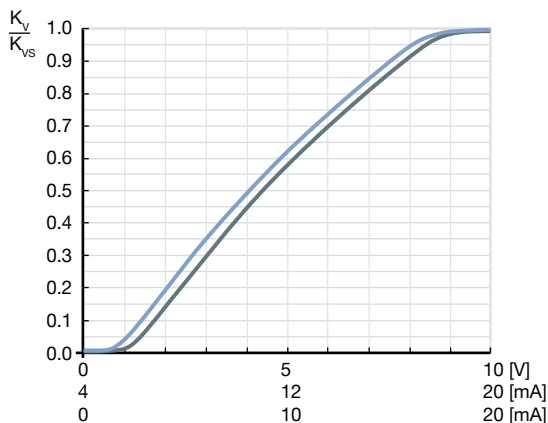
In continuous flow applications, the choice of an appropriate valve size is much more important than with on/off valves. The optimum size should be selected such that the resulting flow in the system is not unnecessarily reduced by the valve. However, a sufficient part of the pressure drop should be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

If the differential pressure (difference between inlet and outlet pressure) exceeds half the value of the nominal pressure discontinuities may occur.

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



## 6. Product operation

### 6.1. Control unit

Valve control takes place through a PWM signal (pulse-width modulation). 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 data sheet **Type 8605** ►) converts an analogue 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 in chapter **"5.2. Exemplary characteristic curve of a proportional valve"** on page 7.

## 7. Ordering information

### 7.1. Bürkert eShop – Easy ordering and quick delivery



#### Bürkert eShop – Easy ordering and fast delivery

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### 7.2. Recommendation regarding product selection

#### Note:

- Please use the **Product Inquiry Form** at the end of this data sheet for the specifications of the device configuration and send us a copy of the inquiry with information about the application.
- Please note the chapter **"5.2. Exemplary characteristic curve of a proportional valve"** on page 7 on product selection.

### 7.3. Bürkert product filter



#### Bürkert product filter – Get quickly to the right product

You want to select products comfortably based on your technical requirements? Use the Bürkert product filter and find suitable articles for your application quickly and easily.

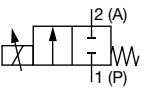
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## 7.4. Ordering chart

### Standard version

#### Note:

- All valves with FKM seal
- Please note that the cable plug must be ordered separately, see **"Cable plug Type 2507, Form B"** on page 9 or separate data sheet for **Type 2507** ▶.

| Circuit function                                                                                                                                                         | Orifice | Port connection <sup>1.)</sup> | K <sub>vs</sub> value<br>water <sup>2.)</sup> | Nominal pres-<br>sure <sup>3.)</sup> | Article no.<br>brass body | Article no.<br>stainless<br>steel body |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------------------------------|-----------------------------------------------|--------------------------------------|---------------------------|----------------------------------------|
|                                                                                                                                                                          | [mm]    |                                |                                               |                                      |                           |                                        |
| <b>A, proportional control valve</b><br>2/2 way<br>Direct-acting<br>Normally closed<br> | 0.8     | Sub-base FK01                  | 0.018                                         | 12                                   | 255637 ㉞                  | 275076 ㉞                               |
|                                                                                                                                                                          |         | G 1/8                          | 0.018                                         | 12                                   | 255638 ㉞                  | 275070 ㉞                               |
|                                                                                                                                                                          | 1.0     | Sub-base FK01                  | 0.027                                         | 10                                   | 275073 ㉞                  | 275077 ㉞                               |
|                                                                                                                                                                          |         | G 1/8                          | 0.027                                         | 10                                   | 249896 ㉞                  | 265373 ㉞                               |
|                                                                                                                                                                          | 1.2     | Sub-base FK01                  | 0.038                                         | 8                                    | 275074 ㉞                  | 275078 ㉞                               |
|                                                                                                                                                                          |         | G 1/8                          | 0.038                                         | 8                                    | 255640 ㉞                  | 267087 ㉞                               |
|                                                                                                                                                                          | 1.6     | Sub-base FK01                  | 0.055                                         | 6                                    | 249009 ㉞                  | 275079 ㉞                               |
|                                                                                                                                                                          |         | G 1/8                          | 0.055                                         | 6                                    | 249897 ㉞                  | 275071 ㉞                               |
|                                                                                                                                                                          | 2.0     | Sub-base FK01                  | 0.090                                         | 3                                    | 275075 ㉞                  | 275080 ㉞                               |
|                                                                                                                                                                          |         | G 1/8                          | 0.090                                         | 3                                    | 275069 ㉞                  | 275072 ㉞                               |

1.) NPT on request

2.) Flow rate value for water, measured at +20 °C and 1 bar pressure differential over a fully opened valve.

3.) Pressure data: Overpressure with respect to atmospheric pressure.

| Further versions on request                                                         |                                                                                                                                     |                                                                                     |                                                                        |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------|
|  | <b>Material</b><br>Seal material FFKM<br>Seal material EPDM                                                                         |  | <b>Analytical</b><br>Oxygen version, Parts oil-, fat- and silicon free |
|  | <b>Coil</b><br>Other coil power<br>Specific, power setting for lower pressure<br>Other operating voltages<br>Coil with flying leads |  | <b>Process connection</b><br>Special valve orifice                     |

## 7.5. Ordering chart accessories

### Cable plug Type 2507, Form B

#### Note:

- The delivery includes the flat seal and fixing screw.
- Further versions see data sheet **Type 2507** ▶.

| Cable plug                                                                          | Version                   | Voltage         | Article no. |
|-------------------------------------------------------------------------------------|---------------------------|-----------------|-------------|
|  | Without circuitry (AC/DC) | 0...250 V AC/DC | 423845 ㉞    |
|                                                                                     |                           |                 |             |

Control electronics Type 8605

**Note:**  
Further versions see data sheet [Type 8605](#) ►.

| Control electronics                                                               | Version       | Max. coil current range [mA] | Type 2861 24 V DC | Type 2861 12 V DC | Article no.                                                                                |
|-----------------------------------------------------------------------------------|---------------|------------------------------|-------------------|-------------------|--------------------------------------------------------------------------------------------|
|                                                                                   |               |                              |                   |                   |                                                                                            |
|  | Standard rail | 40...220                     | x                 | –                 | 316531  |
|                                                                                   | Standard rail | 200...1000                   | x                 | x                 | 316532  |

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DTS 1000173850 EN Version: | Status: RL (released | freigegeben | valide) printed: 02.09.2021

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## Product Enquiry Form - Proportional valve

Thank you for your interest in our products! In order to provide you with optimum advice, please fill out the following form and send it to your **Bürkert representative** or e-mail address: [info@buerkert.com](mailto:info@buerkert.com). All information submitted will of course be kept strictly confidential.

Please fill in the **required fields!**   \*

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| Personal Information |  |                 |  |
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| Customer no.         |  | Department      |  |
| Street               |  | Postcode / Town |  |
| Telephone no.        |  | Email           |  |

| Delivery |                        |
|----------|------------------------|
| Quantity | Required delivery date |

| Operating data                                                                   |                      |         |     |
|----------------------------------------------------------------------------------|----------------------|---------|-----|
| Function<br>(Function of the control valve in the process / process description) |                      |         |     |
| Operating medium                                                                 |                      |         |     |
| Type of medium                                                                   | Fluid                | Steam   | Gas |
| Supply voltage                                                                   | V                    |         |     |
| Ambient temperature (max.)                                                       | t <sub>u,max</sub> = | °C / °F |     |

| Fluidic data                        |                             |                      |                          |
|-------------------------------------|-----------------------------|----------------------|--------------------------|
| Flow range Q <sub>Nom</sub>         | min.                        | max.                 | unit                     |
| Inlet pressure at Q <sub>Nom</sub>  | p <sub>1</sub> =            | barg <sup>1.)</sup>  |                          |
| Outlet pressure at Q <sub>Nom</sub> | p <sub>2</sub> =            | barg <sup>1.)</sup>  |                          |
| Max. inlet pressure                 | p <sub>1,max</sub> =        | barg <sup>1.)</sup>  |                          |
| Medium temperature (min./max.)      | t <sub>m,min</sub> =        | t <sub>m,max</sub> = | °C / °F                  |
| Port connection                     | G (DIN ISO 228/1)<br>Flange |                      | NPT (ANSI B1.2)<br>Other |

1.) Please indicate all pressure values as overpressure to atmospheric pressure [barg] (g = relative pressure)

| Material specifications |                 |       |       |
|-------------------------|-----------------|-------|-------|
| Body                    | Stainless steel | Brass | Other |
| Seals                   | FKM             | EPDM  | Other |

| Approvals / Conformities                               |
|--------------------------------------------------------|
| e. g. UL/UR, KTW W270, DVGW Gas, ATEX/IECEX, EAC, etc. |

| Additional Requirements / Comment        |
|------------------------------------------|
| <br><br><br><br><br><br><br><br><br><br> |