

Direct-acting 2-way standard solenoid control valve



- Excellent range
- Very good response
- Compact valve design
- Orifice sizes 0.05 ... 2.0 mm
- Port connection 1/8" or sub-base

Type 2871 can be combined with...



Type 8605
Digital control electronics DIN-rail version



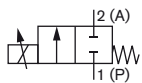
Type 2507
Cable plug



Type 8611
Universal controller

The direct-acting solenoid control valve Type 2871 is used as the regulating unit in control loops. Due to an elastomeric seat seal the valve closes tight (integrated shut-off function), up to the DN specific nominal pressure. The plunger of the valve is assembled frictionless, which leads to an extraordinary adjustment characteristic. This valve is particularly suitable for demanding control tasks (high control range, dry gases, etc.).

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. Optionally the valve can also be driven with DC voltage.

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

¹⁾ PWM pulse width modulation

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

³⁾ Maximum value, value depends on operating pressure

⁴⁾ Characteristic data of control behaviour depends on process conditions

⁵⁾ By flow measurement

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⁾ – also applicable for technical vacuum |
| Medium temperature | -10 ... +90 °C |
| Ambient temperature | max. +55 °C |
| Power supply | 24 V DC |
| PWM frequency | 1500 Hz |
| Max. coil current | 220 mA ³⁾ |
| Power consumption | 2 W (up to DN0.6), 5 W (from DN0.8) |
| Duty cycle | 100 % continuously rated |
| Port connection | Sub-base, G 1/8, NPT 1/8, others on request |
| Electrical connection | Cable plug Type 2507, Form B industrial standard |
| Installation | As required, preferably with actuator in upright position |
| Typical control data⁴⁾ at PWM control | |
| Hysteresis | < 5 % |
| Repeatability | < 0.25 % FS ⁵⁾ |
| Sensitivity | < 0.25 % FS – < 0.1 % FS with DN < 0.8 mm ⁵⁾ |
| Span | 1:200 (DN0.8-2), 1:500 (DN0.05-0.6) |
| Response time (10-90 %) | < 15 ms |
| Protection class valve | IP65 |

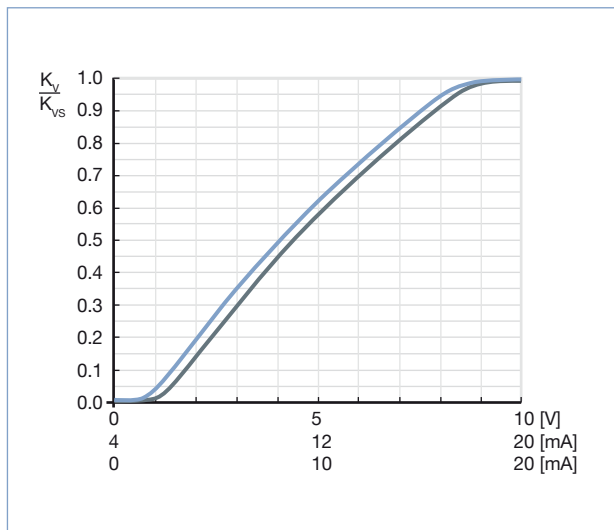
Technical data - Control electronics Type 8605 (see separate datasheet)

The valve control can take place through the control electronics of Type 8605, which converts an analogue input signal into a PWM signal.

Further functional features of the Type 8605 electronic control unit:

- Temperature compensation for coil heating by internal current regulation
- Simple adaptation of zero and span settings
- Ramp function to dampen fast set point changes

Characteristics of a solenoid control valve



Advice for valve sizing

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, the characteristics may change.

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 $p_2 > \frac{p_1}{2}$ | $= Q \sqrt{\frac{\rho}{1000 \Delta p}}$ | $= \frac{Q_N}{514} \sqrt{\frac{T_1 \rho_N}{p_2 \Delta p}}$ |
| 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] ⁶⁾ |
| Q_N | Standard flow rate | [m ³ /h] ⁷⁾ |
| p_1 | Inlet pressure | [bar] ⁸⁾ |
| p_2 | Outlet pressure | [bar] ⁸⁾ |
| 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] |

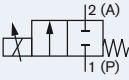
⁶⁾ measured for water 20 °C, Δp 1 bar over the value

⁷⁾ At reference conditions 1.013 bar and 0 °C (273K)

⁸⁾ Absolute pressure

Ordering chart

All valves with FKM seals (DN0.05 and DN0.1 with PCTFE seat seal)

| Circuit function | Orifice [mm] | Port connection | k_{vs} value water [m ³ /h] ⁹⁾ | Nominal pressure [bar] ¹⁰⁾ | Max. differential pressure [bar] | Article no. Brass | Article no. Stainless steel |
|---|---------------|-----------------|--|---------------------------------------|----------------------------------|-------------------|-----------------------------|
|  | 0.05 | sub-base FK01 | 0.00006 | 10 | 10 | 254985 | 254986 |
| | | G 1/8 | 0.00006 | 10 | 10 | 254443 | 254444 |
| | | NPT 1/8 | 0.00006 | 10 | 10 | 254968 | 254971 |
| | 0.1 | sub-base FK01 | 0.00025 | 10 | 10 | 254987 | 254988 |
| | | G 1/8 | 0.00025 | 10 | 10 | 254446 | 254447 |
| | | NPT 1/8 | 0.00025 | 10 | 10 | 254972 | 254973 |
| | 0.2 | sub-base FK01 | 0.001 | 10 | 10 | 254989 | 254990 |
| | | G 1/8 | 0.001 | 10 | 10 | 254448 | 254450 |
| | | NPT 1/8 | 0.001 | 10 | 10 | 254974 | 254975 |
| | 0.3 | sub-base FK01 | 0.002 | 10 | 10 | 254991 | 254992 |
| | | G 1/8 | 0.002 | 10 | 10 | 254451 | 254452 |
| | | NPT 1/8 | 0.002 | 10 | 10 | 254977 | 254978 |
| | 0.4 | sub-base FK01 | 0.004 | 8 | 8 | 254993 | 254994 |
| | | G 1/8 | 0.004 | 8 | 8 | 254453 | 254454 |
| | | NPT 1/8 | 0.004 | 8 | 8 | 254979 | 254980 |
| | 0.6 | sub-base FK01 | 0.01 | 6 | 6 | 254995 | 254996 |
| | | G 1/8 | 0.01 | 6 | 6 | 254455 | 254457 |
| | | NPT 1/8 | 0.01 | 6 | 6 | 254981 | 254982 |
| | 0.8 | sub-base FK01 | 0.018 | 12 | 6 | 235992 | 235993 |
| | | G 1/8 | 0.018 | 12 | 6 | 235994 | 235995 |
| | | NPT 1/8 | 0.018 | 12 | 6 | 235996 | 235997 |
| | 1.0 | sub-base FK01 | 0.027 | 10 | 5 | 235998 | 235999 |
| | | G 1/8 | 0.027 | 10 | 5 | 236000 | 236001 |
| | | NPT 1/8 | 0.027 | 10 | 5 | 236002 | 236003 |
| | 1.2 | sub-base FK01 | 0.038 | 8 | 4 | 236004 | 236260 |
| | | G 1/8 | 0.038 | 8 | 4 | 236261 | 236262 |
| | | NPT 1/8 | 0.038 | 8 | 4 | 236263 | 236264 |
| 1.6 | sub-base FK01 | 0.055 | 6 | 3 | 236265 | 236266 | |
| | G 1/8 | 0.055 | 6 | 3 | 236267 | 236268 | |
| | NPT 1/8 | 0.055 | 6 | 3 | 236269 | 236270 | |
| 2.0 | sub-base FK01 | 0.090 | 3 | 1.5 | 236271 | 236272 | |
| | G 1/8 | 0.090 | 3 | 1.5 | 236273 | 236274 | |
| | NPT 1/8 | 0.090 | 3 | 1.5 | 236275 | 236276 | |

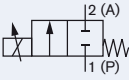
⁹⁾ k_{vs} value: Flow rate value for water, measured at +20 °C and 1 bar pressure differential over a fully opened valve.

¹⁰⁾ Pressure data [bar]: Overpressure with respect to atmospheric pressure, with a differential pressure (difference between inlet and outlet pressure) above half of the nominal pressure there are discontinuities in the valve's characteristics possible."

Please note that the valves are delivered without control electronics and cable plug (see accessory ordering information).

Ordering chart - variants with approvals

All valves with FKM seals (DN0.05 and DN0.1 with PCTFE seat seal)

| Circuit function | Orifice [mm] | Approvals ¹¹⁾ | Port connection ¹²⁾ | k_{vs} value water [m ³ /h] | Nominal pressure [bar] | Max. differential pressure [bar] | Article no. Brass | Article no. Stainless steel |
|---|--------------|--------------------------|--------------------------------|--|------------------------|----------------------------------|-------------------|-----------------------------|
|  | 0.05 | UR | G 1/8 | 0.00006 | 10 | 10 | 274900 | 274904 |
| | | | NPT 1/8 | 0.00006 | 10 | 10 | 274901 | 274905 |
| | 0.1 | UR | G 1/8 | 0.00025 | 10 | 10 | 274902 | 274906 |
| | | | NPT 1/8 | 0.00025 | 10 | 10 | 274903 | 274907 |
| | 0.2 | UR | G 1/8 | 0.001 | 10 | 10 | 274908 | 274926 |
| | | | NPT 1/8 | 0.001 | 10 | 10 | 274909 | 274927 |
| | | DVGW | G 1/8 | 0.001 | 10 | 10 | on request | on request |
| | 0.3 | UR | G 1/8 | 0.002 | 10 | 10 | 274910 | 274928 |
| | | | NPT 1/8 | 0.002 | 10 | 10 | 274911 | 274929 |
| | 0.4 | UR | G 1/8 | 0.004 | 8 | 8 | 274912 | 274930 |
| | | | NPT 1/8 | 0.004 | 8 | 8 | 274913 | 274931 |
| | 0.6 | UR | G 1/8 | 0.01 | 6 | 6 | 274914 | 274932 |
| | | | NPT 1/8 | 0.01 | 6 | 6 | 274915 | 274933 |
| | | DVGW | G 1/8 | 0.01 | 6 | 6 | on request | on request |
| | 0.8 | UR | G 1/8 | 0.018 | 12 | 6 | 274916 | 274934 |
| | | | NPT 1/8 | 0.018 | 12 | 6 | 274917 | 274935 |
| | | DVGW | G 1/8 | 0.018 | 12 | 6 | 275039 | on request |
| | 1.0 | UR | G 1/8 | 0.027 | 10 | 5 | 274918 | 274936 |
| | | | NPT 1/8 | 0.027 | 10 | 5 | 274919 | 274937 |
| | | DVGW | G 1/8 | 0.027 | 10 | 5 | 275040 | on request |
| | 1.2 | UR | G 1/8 | 0.038 | 8 | 4 | 274920 | 274938 |
| | | | NPT 1/8 | 0.038 | 8 | 4 | 274921 | 274939 |
| | | DVGW | G 1/8 | 0.038 | 8 | 4 | 275041 | on request |
| | 1.6 | UR | G 1/8 | 0.055 | 6 | 3 | 274922 | 274940 |
| NPT 1/8 | | | 0.055 | 6 | 3 | 274923 | 274941 | |
| DVGW | | G 1/8 | 0.055 | 6 | 3 | 275042 | on request | |
| 2.0 | UR | G 1/8 | 0.090 | 3 | 1.5 | 274924 | 274942 | |
| | | NPT 1/8 | 0.090 | 3 | 1.5 | 274925 | 274943 | |
| | DVGW | G 1/8 | 0.090 | 3 | 1.5 | 275043 | on request | |

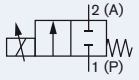
¹¹⁾ Approvals: UR (UL recognized)
DVGW - Approval acc. to European gas device guidelines (DIN 3394-1)

¹²⁾ Port connection: others on request.

Note: Delivered without electronic control, Type 8605 and cableplug (see ordering table for accessories).

Ordering chart - variants for higher differential pressures

All valves with FKM seal

| Circuit function | Orifice [mm] | Approvals | Port connection | k_{vs} value water [m ³ /h] | Nominal pressure [bar] | Article no. Brass | Article no. Stainless steel |
|--|--------------|-----------|-----------------|--|------------------------|-------------------|-----------------------------|
|  A | 0.8 | | G 1/8 | 0.018 | 12 | 238928 | 238930 |
| | | UR | G 1/8 | 0.018 | 12 | 275025 | 275030 |
| | 1.0 | | G 1/8 | 0.027 | 10 | 238936 | 238931 |
| | | UR | G 1/8 | 0.027 | 10 | 275026 | 275031 |
| | 1.2 | | G 1/8 | 0.038 | 8 | 238937 | 238932 |
| | | UR | G 1/8 | 0.038 | 8 | 275027 | 275032 |
| | 1.6 | | G 1/8 | 0.055 | 6 | 238939 | 238933 |
| | | UR | G 1/8 | 0.055 | 6 | 275028 | 275033 |
| | 2.0 | | G 1/8 | 0.090 | 3 | 238940 | 238934 |
| | | UR | G 1/8 | 0.090 | 3 | 275029 | 275034 |

Note: The following technical data changes compared with the data on page 1
 PWM frequency 800 Hz, span 1:100.
 Other connection variations (sub-base, NPT) on request.

Ordering chart for accessories

Cable plug Type 2507, form B

The delivery of a cable plug includes the flat seal and fixing screw

| Circuitry | Voltage / frequency | Article no. |
|-------------------|---------------------|-------------|
| Without circuitry | 0 ... 250 V AC/DC | 423845 |

Control electronics, Type 8605 – see separate datasheet

Further versions on request



Materials

Seal materials EPDM, FFKM



Analytical

Oxygen version
 Parts oil-, fat- and silicon free

Electrical connection



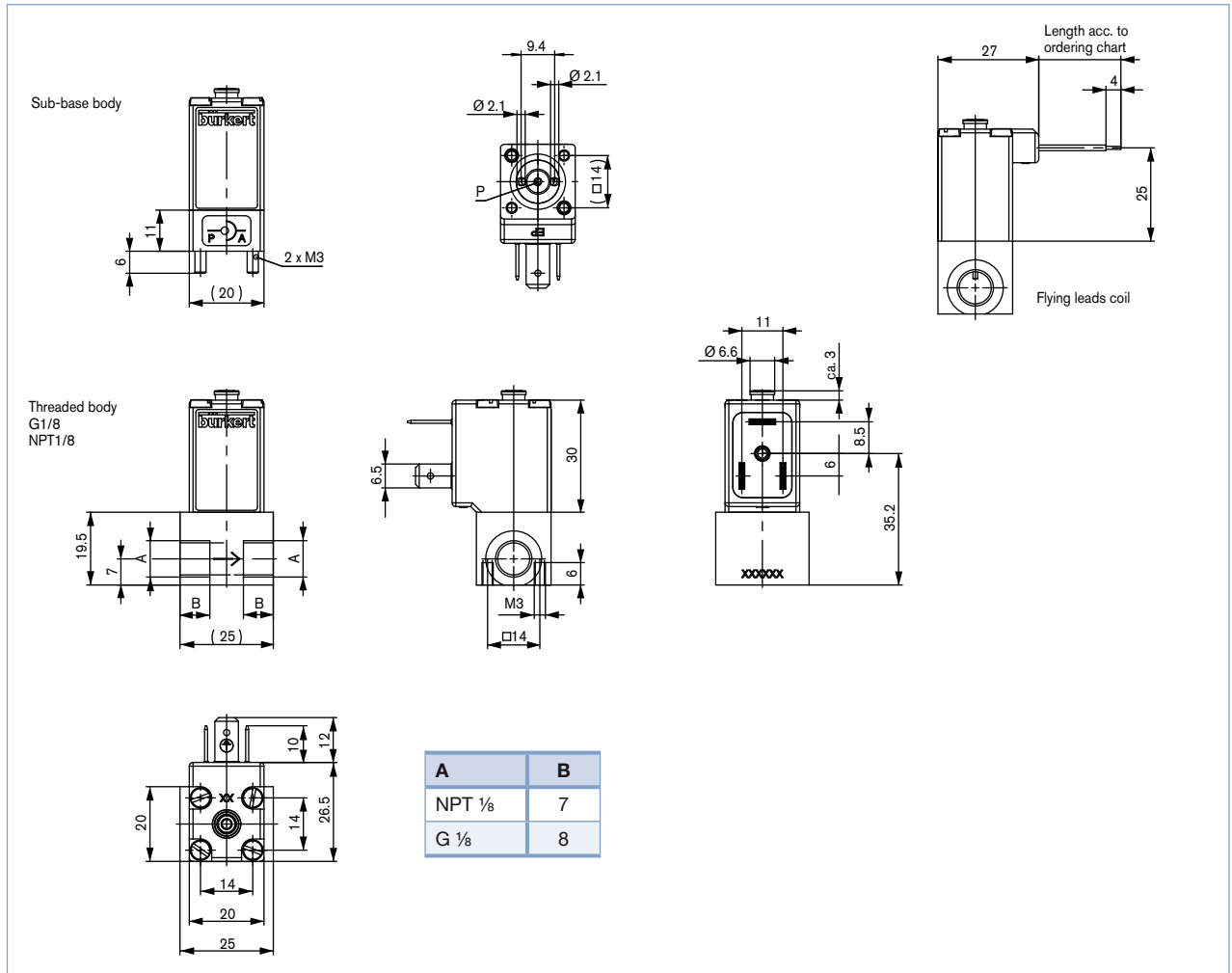
12 V Coil
 Wire leads 300 mm



Approvals

UR (UL recognized)
 DVGW / device guidelines

Dimensions [mm]



Design data for 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 |

| | | |
|---|-----------------------------------|---|
| <input type="checkbox"/> = Mandatory fields | <input type="text"/> Quantity | <input type="text"/> 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 |
| <input type="checkbox"/> 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 |
| <input type="checkbox"/> Max. inlet pressure (nominal pressure) | $p_{1max} =$ <input type="text"/> | barg |
| <input type="checkbox"/> Ambient temperature | <input type="text"/> °C | |
| Additional specifications | | |
| <input type="checkbox"/> Body material | <input type="checkbox"/> Brass | <input type="checkbox"/> Stainless steel |
| <input type="checkbox"/> 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 pressure [barg].

Standard series of solenoid control valves



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

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