

## 2/2-Way Solenoid Control Valve



Type 2871 can be combined with...



**Type 8605**

Digital control electronics  
DIN-rail version



**Type 2507**

Cable plug



**Type 8611**

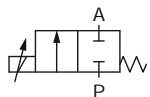
Universal controller

- Excellent range (1:200)
- Very good response
- Compact valve design
- Orifice sizes 0.05 ... 2.0 mm
- Port connection 1/8" or sub-base

The direct-acting solenoid control valve Type 2871 (20mm installation width) 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, see ordering chart on page 3.

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



direct acting 2-way  
solenoid control valve,  
normally closed

Valve control takes place through a PWM signal<sup>1)</sup>. 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.

<sup>1)</sup> PWM pulse width modulation

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

<sup>3)</sup> Maximum value, value depends on operating pressure

<sup>4)</sup> Characteristic data of control behaviour depends on process conditions

<sup>5)</sup> By flow measurement

### Technical Data - Valve

<b>Body material</b>	Brass, stainless steel
<b>Seal material</b>	FKM, EPDM on request
<b>Medium</b>	Neutral gases, liquids on request
<b>Pressure range</b>	0 ... 12 bar <sup>2)</sup> – also applicable for technical vacuum
<b>Medium temperature</b>	-10 ... +90 °C
<b>Ambient temperature</b>	max. +55 °C
<b>Power supply</b>	24 V DC
<b>PWM frequency</b>	1500 Hz
<b>Max. coil current</b>	220mA <sup>3)</sup>
<b>Power consumption</b>	2 W (up to DN 0,6), 5 W (from DN 0,8)
<b>Duty cycle</b>	100% continuously rated
<b>Port connection</b>	Sub-base , G 1/8, NPT 1/8, others on request
<b>Electrical connection</b>	Cable plug Type 2507, Form B industrial standard
<b>Installation</b>	As required, preferably with actuator in upright position
<b>Typical control data<sup>4)</sup> at PWM control</b>	
Hysteresis	< 5%
Repeatability	< 0.25% FS <sup>5)</sup>
Sensitivity	< 0.25% FS – <0.1% FS with DN <0.8 mm <sup>5)</sup>
Span	1:200 (DN0.8-2), 1:500 (DN0.05-0.6)
Response time (10 -90%)	< 15 ms
<b>Protection class valve</b>	IP65

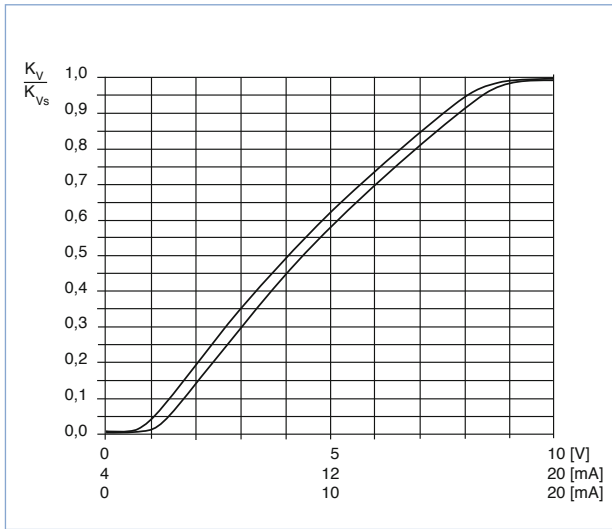
### Technical data - Control electronics Type 8605 (see separate datasheet)

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 <sup>3</sup> /h]	$k_v$ value for gases [m <sup>3</sup> /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<sup>3</sup>/h]<sup>6)</sup>
- $Q_N$  Standard flow rate [m<sup>3</sup>/h]<sup>7)</sup>
- $p_1$  Inlet pressure [bar]<sup>8)</sup>
- $p_2$  Outlet pressure [bar]<sup>8)</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]

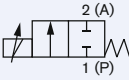
<sup>6)</sup> measured for water 20°C,  $\Delta p$  1 bar over the valve

<sup>7)</sup> At reference conditions 1.013 bar and 0°C (273K)

<sup>8)</sup> Absolute pressure

## Ordering chart

All valves with FKM seals (DN 0.05 and DN 0.1 with PCTFE seat seal)

Circuit function	Orifice [mm]	Port connection	$k_{vs}$ value water [m <sup>3</sup> /h <sup>9)</sup>	Nominal pressure <sup>10)</sup> [bar]	Max. differential pressure [bar]	Item no. Brass	Item no. Stainless steel
	0.05	sub-base FK01	0.00006	10	10	254 985	254 986
		G 1/8	0.00006	10	10	254 443	254 444
		NPT 1/8	0.00006	10	10	254 968	254 971
	0.1	sub-base FK01	0.00025	10	10	254 987	254 988
		G 1/8	0.00025	10	10	254 446	254 447
		NPT 1/8	0.00025	10	10	254 972	254 973
	0.2	sub-base FK01	0.001	10	10	254 989	254 990
		G 1/8	0.001	10	10	254 448	254 450
		NPT 1/8	0.001	10	10	254 974	254 975
	0.3	sub-base FK01	0.002	10	10	254 991	254 992
		G 1/8	0.002	10	10	254 451	254 452
		NPT 1/8	0.002	10	10	254 977	254 978
	0.4	sub-base FK01	0.004	8	8	254 993	254 994
		G 1/8	0.004	8	8	254 453	254 454
		NPT 1/8	0.004	8	8	254 979	254 980
	0.6	sub-base FK01	0.01	6	6	254 995	254 996
		G 1/8	0.01	6	6	254 455	254 457
		NPT 1/8	0.01	6	6	254 981	254 982
	0.8	sub-base FK01	0.018	12	6	235 992	235 993
		G 1/8	0.018	12	6	235 994	235 995
		NPT 1/8	0.018	12	6	235 996	235 997
	1.0	sub-base FK01	0.027	10	5	235 998	235 999
		G 1/8	0.027	10	5	236 000	236 001
		NPT 1/8	0.027	10	5	236 002	236 003
1.2	sub-base FK01	0.038	8	4	236 004	236 260	
	G 1/8	0.038	8	4	236 261	236 262	
	NPT 1/8	0.038	8	4	236 263	236 264	
1.6	sub-base FK01	0.055	6	3	236 265	236 266	
	G 1/8	0.055	6	3	236 267	236 268	
	NPT 1/8	0.055	6	3	236 269	236 270	
2.0	sub-base FK01	0.090	3	1.5	236 271	236 272	
	G 1/8	0.090	3	1.5	236 273	236 274	
	NPT 1/8	0.090	3	1.5	236 275	236 276	

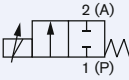
<sup>9)</sup>  $k_{vs}$  value: Flow rate value for water, measured at +20 °C and 1 bar pressure differential over a fully opened valve.

<sup>10)</sup> 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 (DN 0.05 and DN 0.1 with PCTFE seat seal)

Circuit function	Orifice [mm]	Approvals <sup>11)</sup>	Port connection <sup>12)</sup>	$k_{vs}$ value water [m <sup>3</sup> /h]	Nominal pressure [bar]	Max. differential pressure [bar]	Item no. Brass	Item no. Stainless steel	
	0.05	UR	G 1/8	0.00006	10	10	274 900	274 904	
			NPT 1/8	0.00006	10	10	274 901	274 905	
	0.1	UR	G 1/8	0.00025	10	10	274 902	274 906	
			NPT 1/8	0.00025	10	10	274 903	274 907	
	0.2	UR	G 1/8	0.001	10	10	274 908	274 926	
			NPT 1/8	0.001	10	10	274 909	274 927	
	0.3	UR	DVGW	G 1/8	0.001	10	10	on request	on request
			G 1/8	0.002	10	10	274 910	274 928	
	0.4	UR	NPT 1/8	G 1/8	0.002	10	10	274 911	274 929
			DVGW	G 1/8	0.002	10	10	on request	on request
	0.6	UR	G 1/8	0.004	8	8	274 912	274 930	
			NPT 1/8	0.004	8	8	274 913	274 931	
	0.8	UR	DVGW	G 1/8	0.004	8	8	on request	on request
			G 1/8	0.01	6	6	274 914	274 932	
	1.0	UR	NPT 1/8	G 1/8	0.01	6	6	274 915	274 933
			DVGW	G 1/8	0.01	6	6	on request	on request
	1.2	UR	G 1/8	0.018	12	6	274 916	274 934	
			NPT 1/8	0.018	12	6	274 917	274 935	
	1.6	UR	DVGW	G 1/8	0.018	12	6	275 039	on request
			G 1/8	0.027	10	5	274 918	274 936	
2.0	UR	NPT 1/8	G 1/8	0.027	10	5	274 919	274 937	
		DVGW	G 1/8	0.027	10	5	275 040	on request	
2.0	UR	G 1/8	0.038	8	4	274 920	274 938		
		NPT 1/8	0.038	8	4	274 921	274 939		
2.0	UR	DVGW	G 1/8	0.038	8	4	275 041	on request	
		G 1/8	0.055	6	3	274 922	274 940		
2.0	UR	NPT 1/8	G 1/8	0.055	6	3	274 923	274 941	
		DVGW	G 1/8	0.055	6	3	275 042	on request	
2.0	UR	G 1/8	0.090	3	1.5	274 924	274 942		
		NPT 1/8	0.090	3	1.5	274 925	274 943		
2.0	UR	DVGW	G 1/8	0.090	3	1.5	275 043	on request	

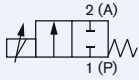
<sup>11)</sup> Approvals: UR (UL recognized)  
DVGW - Approval acc. to European gas device guidelines (DIN 3394-1)

<sup>12)</sup> 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 <sup>3</sup> /h]	Nominal pressure [bar]	Item no. Brass	Item no. Stainless steel
 A	0.8		G 1/8	0.018	12	238 928	238 930
		UR	G 1/8	0.018	12	275 025	275 030
	1.0		G 1/8	0.027	10	238 936	238 931
		UR	G 1/8	0.027	10	275 026	275 031
	1.2		G 1/8	0.038	8	238 937	238 932
		UR	G 1/8	0.038	8	275 027	275 032
	1.6		G 1/8	0.055	6	238 939	238 933
		UR	G 1/8	0.055	6	275 028	275 033
	2.0		G 1/8	0.090	3	238 940	238 934
		UR	G 1/8	0.090	3	275 029	275 034

**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	Item no.
Without circuitry	0 ... 250 V AC/DC	423 845

**Control electronics, Type 8605** – see separate datasheet

#### **i** Further versions on request



##### Materials

Seal materials EPDM, FFKM



##### Analytical

Oxygen version  
 Parts oil-, fat- and silicon free



##### Electrical connection

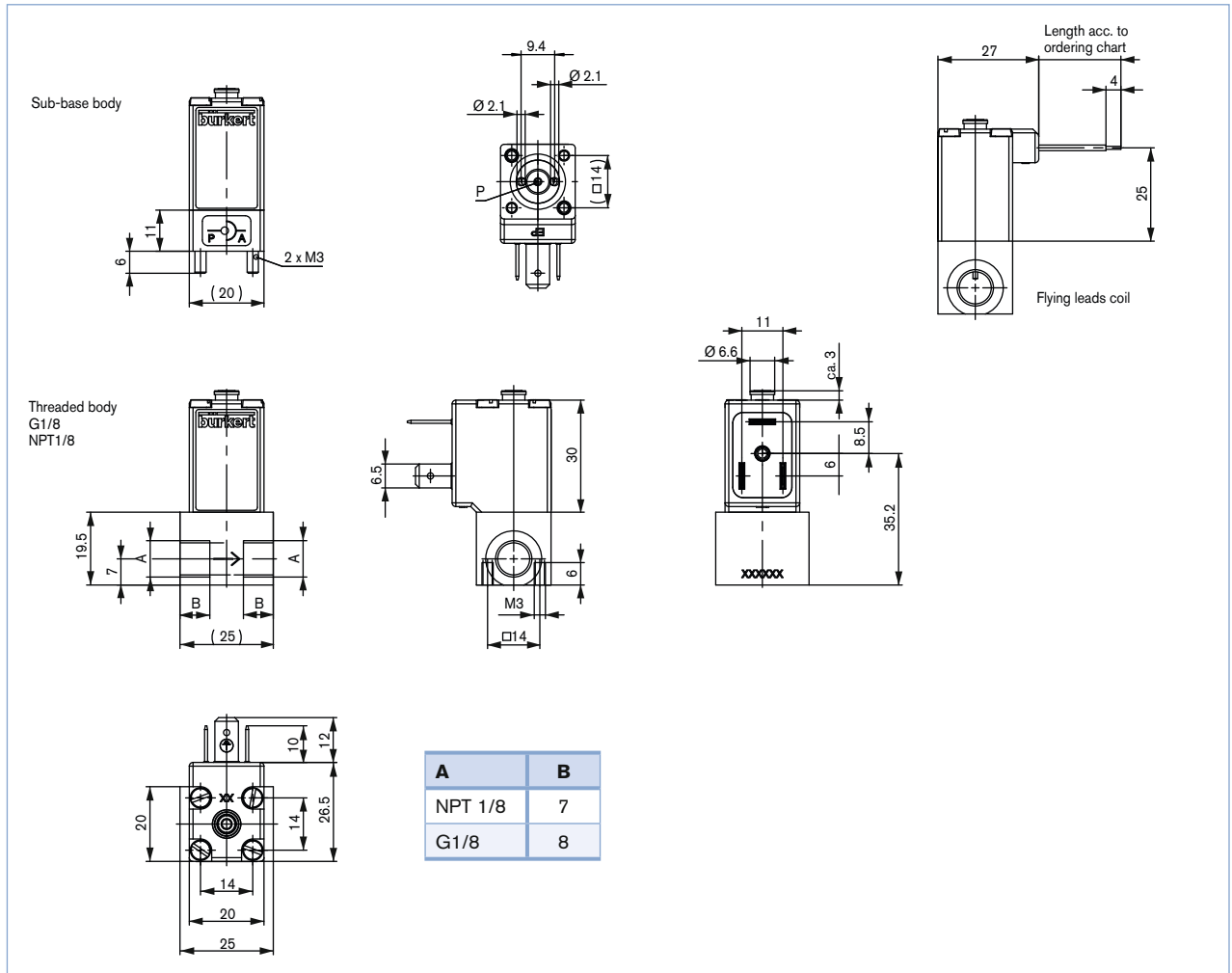
12 V Coil  
 Wire leads 300mm



##### Approvals

UR (UL recognized)  
 DVGW / device guidelines

Dimensions [mm]



**Note**

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

**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

= Mandatory fields       Quantity       Requested delivery date

**Process data**

**Medium**

**State of medium**       liquid       gaseous

**Medium temperature**       °C

**Maximum flow rate**       $Q_{nom} =$        Unit:

**Minimum flow rate**       $Q_{min} =$        Unit:

**Inlet pressure at nominal operation**       $p_1 =$        barg

**Outlet pressure at nominal operation**       $p_2 =$        barg

**Max. inlet pressure (nominal pressure)**       $p_{1max} =$        barg

**Ambient temperature**       °C

**Additional specifications**

**Body material**       Brass       Stainless steel

**Seal material**       FKM       other     

**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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