bürkert
FLUID CONTROL SYSTEMS

2/2-Way Solenoid Control Valve



- Excellent range (1:200)
- 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



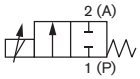
Type 2507
Cable plug



Type 8611
Universal controller

The direct-acting solenoid control valve Type 2871 (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 friction-less, which leads to an extraordinary adjust-ment 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 [1]. 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	220mA [3]
Power consumption	2 W (up to DN 0,6), 5 W (from DN 0,8)
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 data [4] 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

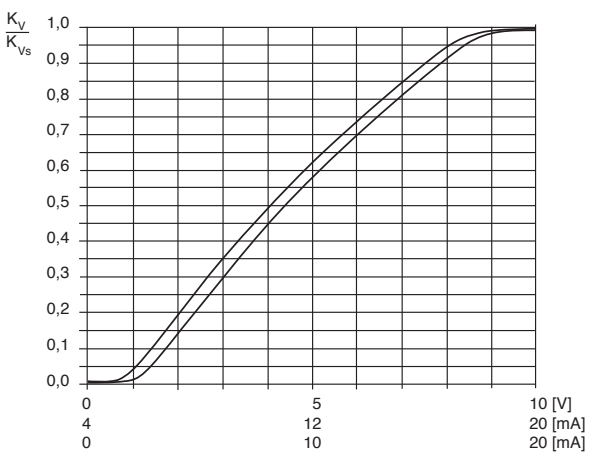
Technical data - Control electronics Type 8605 (see separate datasheet)

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

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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: Δp_{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 [m³/h]	k_v value for gases [m³/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	[m³/h] [6]
Q_N	Standard flow rate	[m_N^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/m³]
ρ_N	Standard density	[kg/m³]
T_1	Medium temperature	[(273+t)K]

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

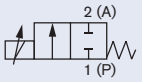
[7] At reference conditions 1.013 bar and 0°C (273K)

[8] Absolute pressure

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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 [m³/h] [9]	Nominal pressure [10] [bar]	Max. differential pressure [bar]	Item no. Brass	Item no. Stainless steel
A 	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

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

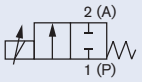
[11] Pressure data [bar]: Overpressure with respect to atmospheric pressure, with a differential pressure (difference between inlet and outlet pressure) above half of the nominal pressure there are discontinuities in the valve's characteristics possible."

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

DTS 1000173853 EN Version: I Status: RL (released | freigegeben | validé) printed: 16.11.2016

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 [11]	Port connection [12]	k_{vs} value water [m³/h]	Nominal pressure [bar]	Max. differential pressure [bar]	Item no. Brass	Item no. Stainless steel
A 	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
		DVGW	G 1/8	0.001	10	10	on request	on request
	0.3	UR	G 1/8	0.002	10	10	274 910	274 928
			NPT 1/8	0.002	10	10	274 911	274 929
		DVGW	G 1/8	0.002	10	10	on request	on request
	0.4	UR	G 1/8	0.004	8	8	274 912	274 930
			NPT 1/8	0.004	8	8	274 913	274 931
		DVGW	G 1/8	0.004	8	8	on request	on request
	0.6	UR	G 1/8	0.01	6	6	274 914	274 932
			NPT 1/8	0.01	6	6	274 915	274 933
		DVGW	G 1/8	0.01	6	6	on request	on request
	0.8	UR	G 1/8	0.018	12	6	274 916	274 934
			NPT 1/8	0.018	12	6	274 917	274 935
		DVGW	G 1/8	0.018	12	6	275 039	on request
	1.0	UR	G 1/8	0.027	10	5	274 918	274 936
			NPT 1/8	0.027	10	5	274 919	274 937
		DVGW	G 1/8	0.027	10	5	275 040	on request
	1.2	UR	G 1/8	0.038	8	4	274 920	274 938
			NPT 1/8	0.038	8	4	274 921	274 939
		DVGW	G 1/8	0.038	8	4	275 041	on request
	1.6	UR	G 1/8	0.055	6	3	274 922	274 940
			NPT 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
		DVGW	G 1/8	0.090	3	1.5	275 043	on request

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

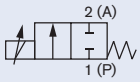
[12] **Port connection:** others on request.

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

DTS 1000173853 EN Version: I Status: RL (released | freigegeben | validé) printed: 16.11.2016

Ordering chart - variants for higher differential pressures

All valves with FKM seal

Circuit function	Orifice [mm]	Approvals	Port connection	k_{VS} value water [m³/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 elecronics, Type 8605 – see separate datasheet

Further versions on request

Materials
Seal materials EPDM, FFKM

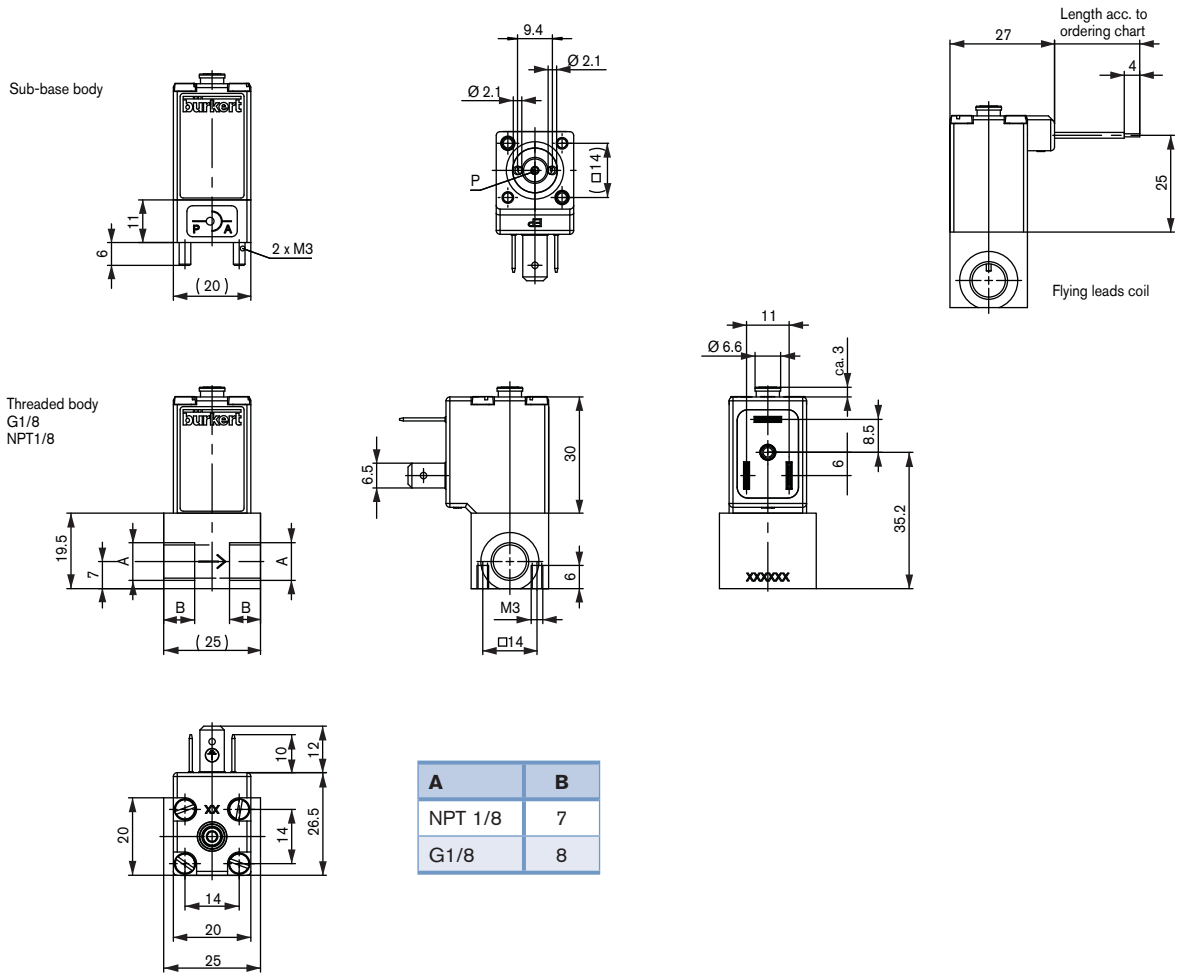
Analytical
Oxygen version
Parts oil-, fat- and silicon free

Electrical connection
12 V Coil
Wire leads 300mm

Approvals
UR (UL recognized)
DVGW / device guidelines

DTS 1000173853 EN Version: I Status: RL (released | freigegeben | validé) printed: 16.11.2016

Dimensions [mm]



A	B
NPT 1/8	7
G1/8	8

DTS 1000173853 EN Version: I Status: RL (released | freigegeben | validé) printed: 16.11.2016

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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



Type 2871
Orifice 0.05 to 2 mm
20 mm coil width



Type 2873
Orifice 0.8 to 4 mm
32 mm coil width



Type 2875
Orifice 2 to 8 mm
49 mm coil width

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