bürkert
FLUID CONTROL SYSTEMS

Direct-acting 2-way standard solenoid control valve

- Excellent range
- Very good response
- Compact valve design
- Orifice sizes 0.8 … 6 mm
- Optional: Explosion-protected coil

Type 2873 can be combined with…

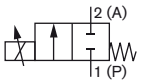
Type 8605
Digital control electronics Cable plug version

Type 2508
Cable plug

Type 8611
Universal controller

The direct-acting solenoid control valve Type 2873 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 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, orifice further depends on nominal pressure
[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 … 16 bar[2]
Medium temperature	-10 … +90 °C
Ambient temperature	max. +55 °C
Power supply	24 V DC
PWM frequency	1200 Hz
Power consumption	9 W
Max. coil current[3]	420 mA
Duty cycle	100 % continuously rated
Port connection	Sub-base, G ⅛, G ¼, NPT ⅛, NPT ¼, further on request
Electrical connection	Cable plug Type 2508 according to DIN EN 17530-803, industrial standard Form A
Installation	As required, preferably with actuator in upright position
Typical control data[4] at PWM control	
Hysteresis	<5 %
Repeatability	<0.5 % FS[5]
Sensitivity	<0.25 % of FS[5]
Span	1:200
Response time (10-90 %)	<20 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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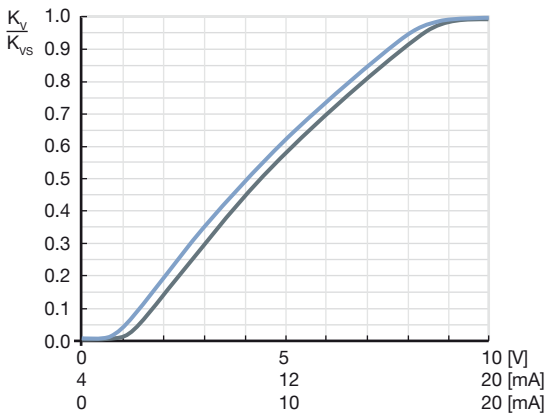
Characteristics of a solenoid control valve



Advice for valve sizing

In continuous flow applications, the choice of 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 [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] [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/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, via the device

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

[8] Absolute pressure

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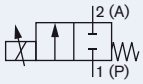
Ordering chart

All valves with FKM seal

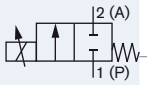
Circuit function	Orifice [mm]	Port connection	k_{VS} value water [m^3/h] [9]	Nominal pressure [bar] [10]	Max. differential pressure [bar]	Article no. Brass	Article no. Stainless steel
A 	0.8	sub-base FK01	0.018	16	8	234291	234306
		G ⅛	0.018	16	8	234289	234305
		NPT ⅛	0.018	16	8	236229	236230
	1.2	sub-base FK01	0.040	12	6	234293	234308
		G ⅛	0.040	12	6	234292	234307
		NPT ⅛	0.040	12	6	236231	236232
	1.5	sub-base FK01	0.060	10	5	234295	234310
		G ⅛	0.060	10	5	234294	234309
		NPT ⅛	0.060	10	5	236233	236234
	2.0	sub-base FK01	0.100	8	4	234298	234313
		G ⅛	0.100	8	4	234296	234311
		NPT ⅛	0.100	8	4	236235	236236
		G ¼	0.100	8	4	234297	234312
		NPT ¼	0.100	8	4	236237	236238
	2.5	sub-base FK01	0.150	5	2.5	234300	234315
		G ¼	0.150	5	2.5	234299	234314
		NPT ¼	0.150	5	2.5	236239	236241
	3.0	sub-base FK01	0.220	3.5	1.75	234302	234317
		G ¼	0.220	3.5	1.75	234301	234316
		NPT ¼	0.220	3.5	1.75	236242	236243
	4.0	sub-base FK01	0.320	2	1	234304	234319
		G ¼	0.320	2	1	234303	234318
		NPT ¼	0.320	2	1	236244	236245

[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 p

Ordering chart - variants for higher differential pressures

All valves with FKM seal

Circuit function	Orifice	Port connection	Approvals	k_{VS} value water [m^3/h]	Nominal pressure [bar]	Article no. Brass	Article no. Stainless steel
A 	0.8	G ⅛		0.018	16	239070	239072
		G ⅛	UR	0.018	16	275009	275016
		G ⅛	ATEX / IECEx	0.018	8	304465	on request
	1.2	G ⅛		0.040	12	239073	239074
		G ⅛	UR	0.040	12	275010	275018
		G ⅛	ATEX / IECEx	0.040	6	330865	on request
	1.5	G ⅛		0.060	10	239075	239076
		G ⅛	UR	0.060	10	275011	275019
		G ⅛	ATEX / IECEx	0.060	6	326019	on request
	2	G ⅛		0.100	8	239077	239078
		G ⅛	UR	0.100	8	275012	275020
		G ⅛	ATEX / IECEx	0.100	6	330866	on request
	2.5	G ¼		0.150	5	239079	239080
		G ¼	UR	0.150	5	275013	275022
		G ¼	ATEX / IECEx	0.150	3	330867	on request
	3.0	G ¼		0.220	3.5	239081	239082
		G ¼	UR	0.220	3.5	275014	275023
		G ¼	ATEX / IECEx	0.220	2	330868	on request
	4.0	G ¼		0.320	2	239083	239084
		G ¼	UR	0.320	2	275015	275024
		G ¼	ATEX / IECEx	0.320	1	330869	on request
	5.0	G ¼		0.430	0.8	280645	on request
	6.0	G ¼		0.580	0.5	254419	on request

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.

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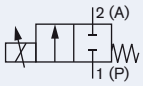
Ordering chart - variants with approvals

All valves with FKM seal

Circuit function	Orifice	Port connection[12]	Approvals[11]	k_{VS} value water [m^3/h]	Nominal pressure [bar]	Max. differential pressure [bar]	Article no. Brass	Article no. Stainless steel
A 	0.8	UR	G ⅛	0.018	16	8	274944	274960
			NPT ⅛	0.018	16	8	274945	274961
		ATEX / IECEx	G ⅛	0.018	8	4	304473	on request
	1.2	UR	G ⅛	0.040	12	6	274946	274962
			NPT ⅛	0.040	12	6	274947	274963
		ATEX / IECEx	G ⅛	0.040	6	3	304474	on request
	1.5	UR	G ⅛	0.060	10	5	274948	274964
			NPT ⅛	0.060	10	5	274949	274965
		ATEX / IECEx	G ⅛	0.060	6	3	304475	on request
	2	UR	G ⅛	0.100	8	4	274950	274966
			NPT ⅛	0.100	8	4	274951	274967
		ATEX / IECEx	G ⅛	0.100	6	3	304476	on request
		UR	G ¼	0.100	8	4	274952	274968
			NPT ¼	0.100	8	4	274953	274969
	2.5	UR	G ¼	0.150	5	2.5	274954	274970
			NPT ¼	0.150	5	2.5	274955	274971
		ATEX / IECEx	G ¼	0.150	3	1.5	304470	on request
	3.0	UR	G ¼	0.220	3.5	1.75	274956	274972
			NPT ¼	0.220	3.5	1.75	274957	274973
		ATEX / IECEx	G ¼	0.220	2	1	304477	on request
	4.0	UR	G ¼	0.320	2	1	274958	274974
			NPT ¼	0.320	2	1	274959	274975
		ATEX / IECEx	G ¼	0.320	1	0.5	304472	on request

[11] **Approvals:** UR (UL recognized)
ATEX – II 2 G Ex mb IIC T4…T5 Gb, II 2 D Ex mb IIIC T130°C Db
IECEx - Ex mb IIC T4…T5 Gb, Ex mb IIIC T130°C Db

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

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

Ordering chart for accessories

Cable plug Type 2508 according to DIN EN 175301-803 Form A

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

Circuitry	Voltage/ Frequency	Article no.
None	0-250 V AC/DC	008376
None, with 3 m cable	0-250 V AC/DC	783573

Control elecronics, Type 8605 - please see datasheet

Further versions on request

Materials
Seal materials EPDM, FFKM

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

Electrical connection
12 V Coil

Approvals
UR (UL recognized)
DVGW / Gas device guidelines
ATEX / IECEx

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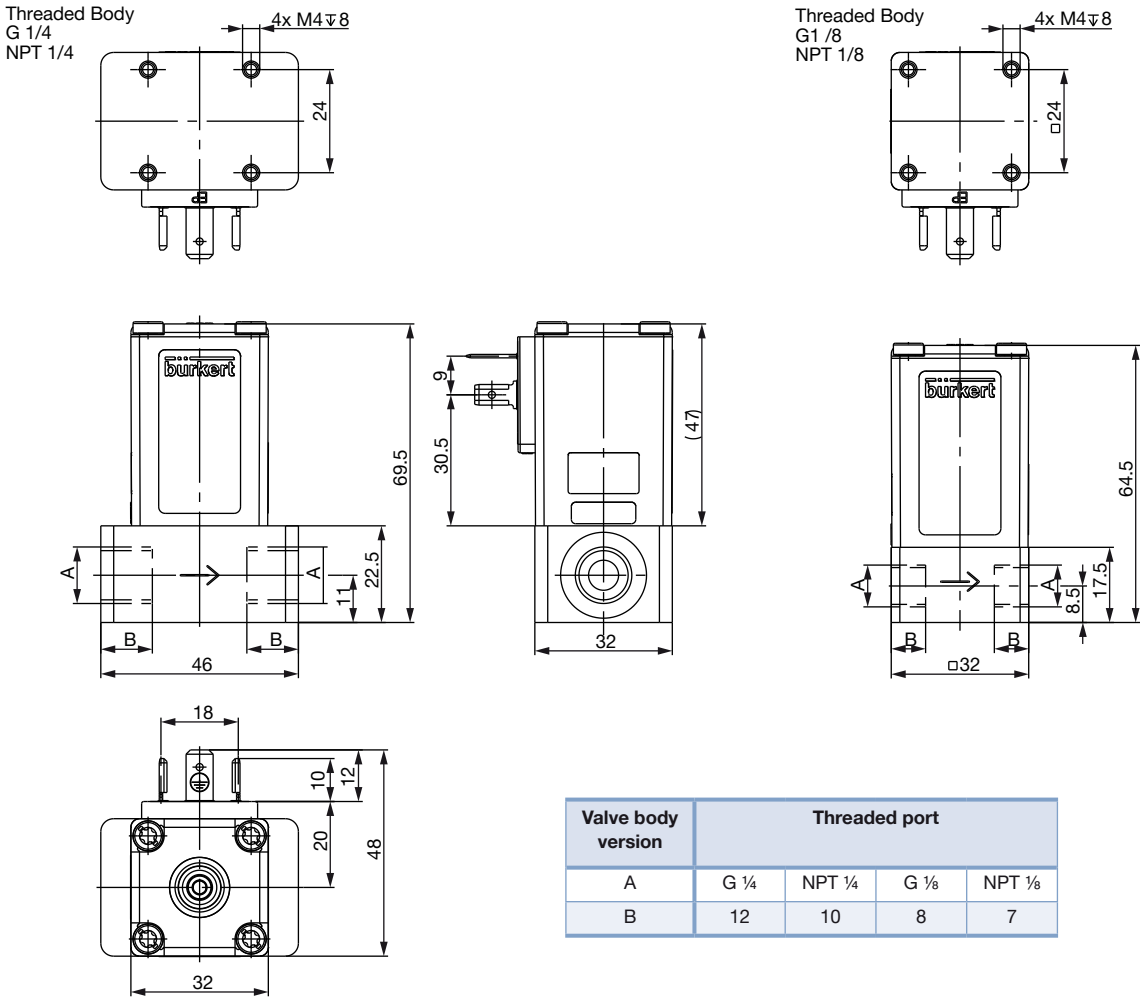
Dimensions [mm] - Threaded body



Valve body version	Threaded port			
A	G ¼	NPT ¼	G ⅛	NPT ⅛
B	12	10	8	7

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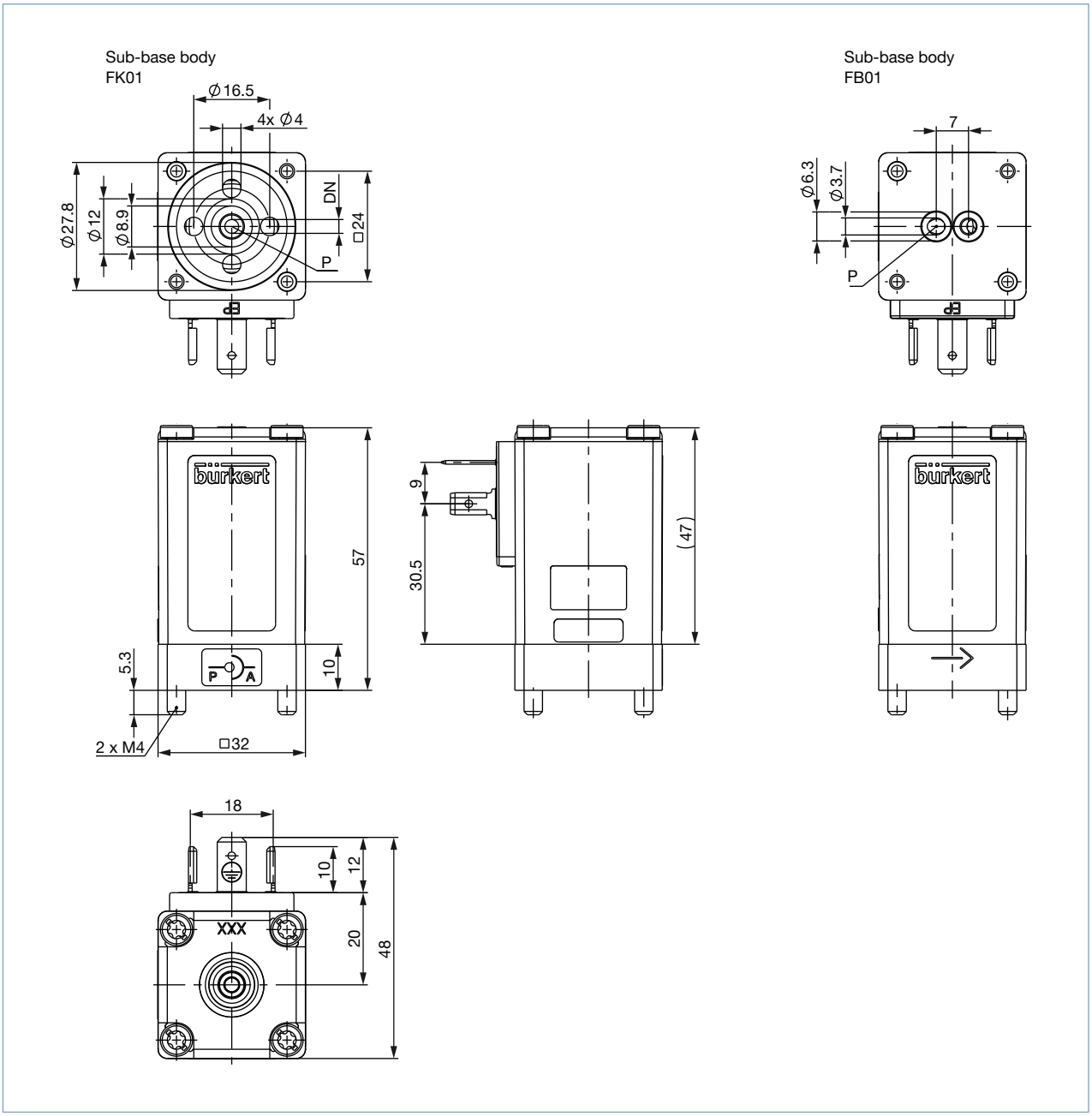
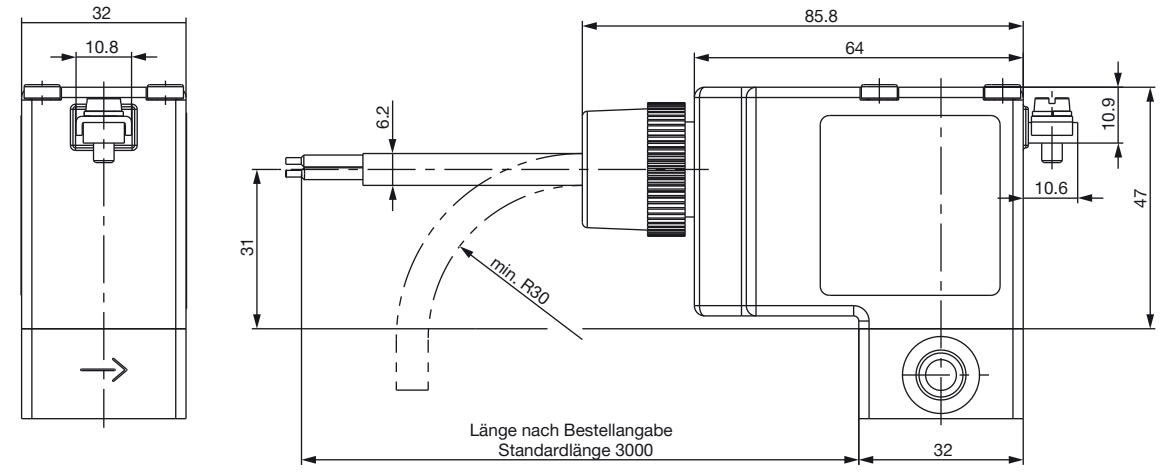
Dimensions [mm] - Sub-base body



Dimensions [mm] - ATEX



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