bürkert
FLUID CONTROL SYSTEMS

2/2-Way Proportional Valve (motor-driven)

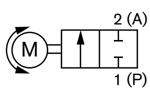
- Disc valve with stepper motor - Actuator isolated from flow path
- Excellent range (1:100)
- Low power consumption
- Orifice sizes 8 ... 25 mm
- Port connection 1/2", 3/4" and 1"

Type 3285 can be combined with …

Type 8611
Compact PI Controller

The direct-acting motor control valve Type 3285 is used as the regulating unit in various control loops. A stepper motor as actuator drives the valve which is incorporated in a compact and robust housing. Analogue setpoint signals are processed by the integrated control electronics. The drive shaft shifts a very smooth ceramic disc over a second fixed ceramic disc. The fixed ceramic disc is simultaneously the valve seat. By turning the ceramic disc the valve opens. The seat tightness is achieved by the very smooth surface of the stacked ceramic discs. In case of power failure the actual valve position will be kept. The motor's power consumption to hold a specific opening position of the valve is nearly zero. The motor needs power only during set point changes. This key feature can reduce the energy consumption of a plant dramatically and thus make it more efficient. This valve is particularly suitable for demanding control tasks (high control range, dry gases, etc.).

Circuit function
2-way valve for continuous control, motor driven, remains in position without further electrical power



Technical data	
Materials	
Body	Brass or stainless steel
Housing	PC (Polycarbonate), PPS (Polyphenylene sulfide)
Seals	FKM or NBR, others on request
Seat sealing	Technical ceramics
Medium	Neutral gases, liquids
Seat leakage based on IEC/EN 60534-4	Shut-off class IV
Pressure Range [1]	0…6 bar
Closure time	Ca. 4 sec
Medium temperature	0…+70 °C
Ambient temperature	-10 ... +60 °C
Power supply	24 V DC ± 10% (max. residual ripple 10%)
Power consumption	Max. 12 W (depending on motor control) Ca. 1 W in holding position
Duty cycle	Up to 100 % (depending on fluid and ambient temperature)
Port connection	G 1/2, G 3/4, G 1, NPT 1/2, NPT 3/4, NPT 1
Electrical connection	M12 connector, 8-pin, male
Input signal	4-20mA or 0-10 V
Input impedance	60 Ω (with current input) 22 kΩ (with voltage input)
Output signal	Load capacity: 10…30V, max 100mA, PNP (Output signal active, if valve is closed)
Typical control data [2]	
Hysteresis	< 5%
Repeatability	<1 % FS
Sensitivity	<1 % FS
Span	1:100
Protection class - valve	IP 50
Installation	As required, preferably with actuator upright
Status of LED	White: Normal operation and powered, Yellow: Valve opened, Green: Valve closed, Red: Failure
Dimensions	See drawings
Weight	~ 800g (DN8) … 1500g (DN25)

[1] Pressure data [bar]: Overpressure with respect to atmospheric pressure
[2] Characteristic data of control behaviour depends on process conditions

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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: Pressure drop of 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	[m^3/h] [3]
Q_N	Standard flow rate	[m$_N{}^3$/h] [4]
p_1	Inlet pressure	[bar] [5]
p_2	Outlet pressure	[bar] [5]
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]

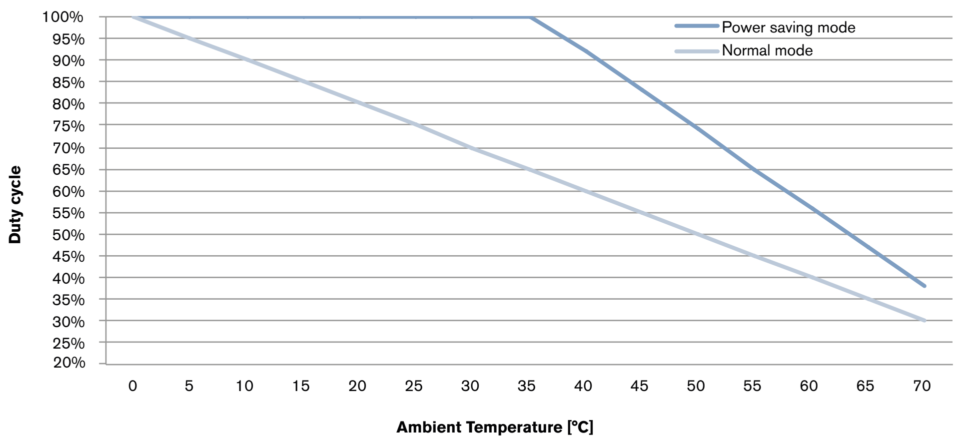
[3] Measured with water, Δp =1 bar, differential pressure over the valve
[4] Standard conditions at 1,013 bar and 0 °C (273K)
[5] Absolute pressure

Once the k_V value needed for the application has been calculated, you can compare it with the k_{Vs} values shown in the ordering chart. The k_{Vs} must be higher than the k_V value of the application, but neither too high, nor too close – as a recommendation: 10% higher.

Duty Cycle Derating Curve

For motor valves it is essential to know the duty cycle during operation. Self-heating of the motor limits the maximum duty cycle. High ambient temperatures amplify the risk of damage due to overheating. The diagram below shows the suggested duty cycles dependent on the ambient temperature. Running the motor control valve in the power saving mode (lower actuator force) allows higher duty cycles. The motor is optimized for the valve function regarding dimensions, power consumption and costs.

Note: Operating the valve beyond the suggested duty cycles leads to a drastically reduced lifetime of the valve.



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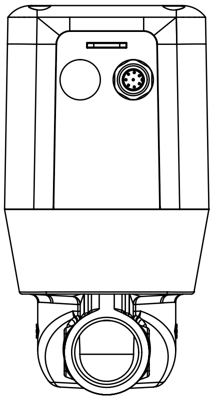
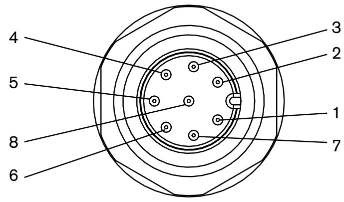
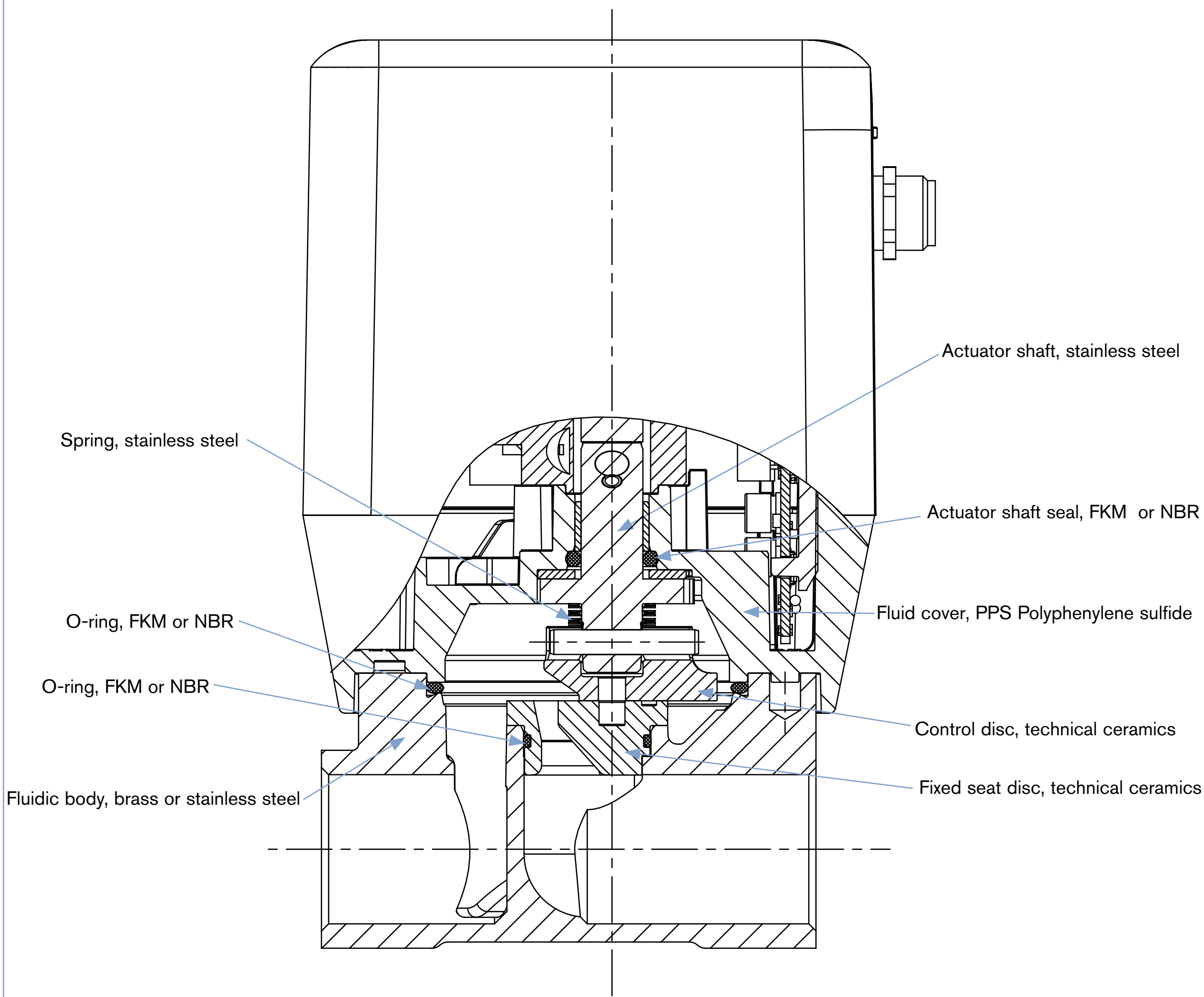
Pin Assignment



Circular connector M12 - 8-pin	Pin	Assignment
	1	24V DC
	2	GND
	3	Not connected
	4	Not connected
	5	Not connected
	6	Analogue input +
	7	Binary output
	8	Analogue input GND

Materials



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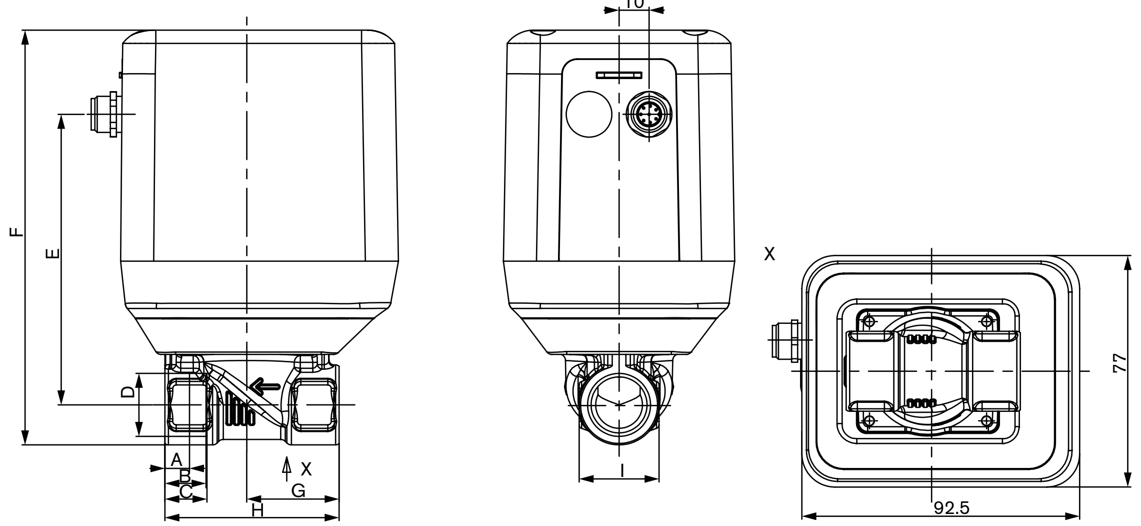
Dimensions [mm]

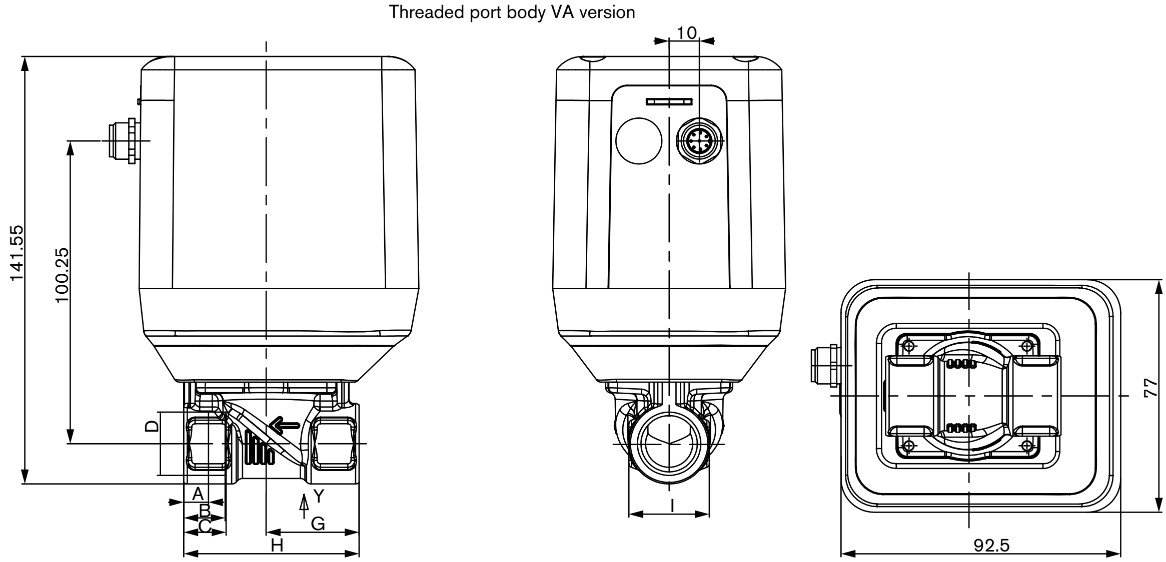
Standard version

Threaded port body MS version



A	B	C	D	E	F	G	H	I
8.2	13.7	-	NPT 1/2	96.65	137.95	30.75	58	26.6
-	-	14	G 1/2	96.65	137.95	30.75	58	26.6
8.6	14	-	NPT 3/4	103.34	147.01	43	80	32
-	-	16	G 3/4	103.34	147.01	43	80	32
10.2	16.8	-	NPT 1	108.31	156.35	49	95	41
-	-	18	G 1	108.31	156.35	49	95	41

Threaded port body VA version



A	B	C	D	E	F	G	H	I
8.2	13.7	-	NPT 1/2	100.25	141.55	30.75	58	26.6
-	-	14	G 1/2	100.25	141.55	30.75	58	26.6
8.6	14	-	NPT 3/4	107.81	151.35	43	80	32
-	-	16	G 1/2	107.81	151.35	43	80	32
10.2	16.8	-	NPT 1	113.09	161.15	49	95	41
-	-	18	G 1	113.09	161.15	49	95	41

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Ordering Chart

Valve function	Orifice [mm]	Port connec-tion	Seal material	k_{Vs} value water [m³/h] [6]	Nominal pressure [7] [barg]	Item no. Brass	Item no. Stainless steel
Control valve, without safety position in case of power failure	8	G 1/2	FKM	1.8	6	269 244	269 256
			NBR	1.8	6	269 250	269 262
		NPT 1/2	FKM	1.8	6	269 268	269 280
			NBR	1.8	6	269 274	269 286
	10	G 1/2	FKM	2.5	6	269 245	269 257
			NBR	2.5	6	269 251	269 263
		NPT 1/2	FKM	2.5	6	269 269	269 281
			NBR	2.5	6	269 275	269 287
	12	G 3/4	FKM	3.9	6	269 246	269 258
			NBR	3.9	6	269 252	269 264
		NPT 3/4	FKM	3.9	6	269 270	269 282
			NBR	3.9	6	269 276	269 288
	15	G 3/4	FKM	6.0	6	269 247	269 259
			NBR	6.0	6	269 253	269 265
		NPT 3/4	FKM	6.0	6	269 271	269 283
			NBR	6.0	6	269 277	269 289
	20	G 1	FKM	8.8	6	269 248	269 260
			NBR	8.8	6	269 254	269 266
		NPT 1	FKM	8.8	6	269 272	269 284
			NBR	8.8	6	269 278	269 290
	25	G 1	FKM	12.3	6	On request	On request
			NBR	12.3	6	On request	On request
		NPT 1	FKM	12.3	6	On request	On request
			NBR	12.3	6	On request	On request

41.6LPM

[6] Measured with water (20°C) and 1 bar pressure drop over valve
[7] Fuel gases may differ

Ordering Chart for Accessories

Article	Item No.
M12 connector with 2m cable, 8 pins	919 061
M12 connector with 2m cable, 8 pins (shielded cable)	918 991

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

Design data for proportional valves

Please fill out this form and send to your local Bürkert Sales Centre* with your inquiry or order

Company	Contact person
Customer no.	Dept.
Address	Tel./Fax
Town / Postcode	E-Mail

= Mandatory fields | Quantity | Requested delivery date

Process data

Fluid			
State of fluid	liquid	gaseous	vaporous
Fluid 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	
Maximum inlet pressure	p_{1max}=	barg	
Ambient temperature		°C	

Additional specifications

Body material	Brass	Stainless steel	
Seal material	FKM	NBR	other

Note Please state all pressure values as **overpressures with** respect to atmospheric [barg].

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

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