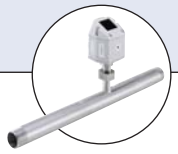
2/2 way Proportional Valve (motor-driven)

- Actuator isolated from flow path
- Excellent range and fast response times
- Low power consumption
- Orifice sizes 8 to 25 mm
- Versions: Standard, positioner, process controller

Type 3285 can be combined with …

Type 8311
Pressure transmitter

Type 8006
Mass Flow Meter



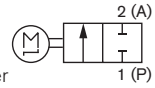
Type 8008
BigFlow

Type 8611
Compact PI Controller

The direct-acting proportional valve of type 3285 is used for dosing of liquids and gases in closed or open control loops. The valve features a stepper motor as the actuator. The integrated electronics simplifies the process integration; additional actuation modules are not necessary. The motor's power consumption to hold a specific opening position of the valve is zero. This key feature can reduce the energy consumption of a plant dramatically and thus make it more efficient. Type 3285 is available as a standard ON/OFF or proportional valve, as a version with integrated positioner and as a version with integrated process controller.

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, others on request (NBR, EPDM, ...)
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 to +70 °C
Ambient temperature	-10 to +60 °C
Power supply	24 V DC ± 10% (max. residual ripple 10%)
Power consumption	<1 W in holding position, Max. 12 W (depending on motor control)
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
Typical control data [2]	
Hysteresis	< 5%
Repeatability	<1% FS
Sensitivity	<1% FS
Span	1:100
Protection class - valve	IP50
Installation	As required, preferably with actuator upright
Status display	LED (details: see manual)
Dimensions	See drawings on page 5
Weight	~ 800 g (DN8) … 1500 g (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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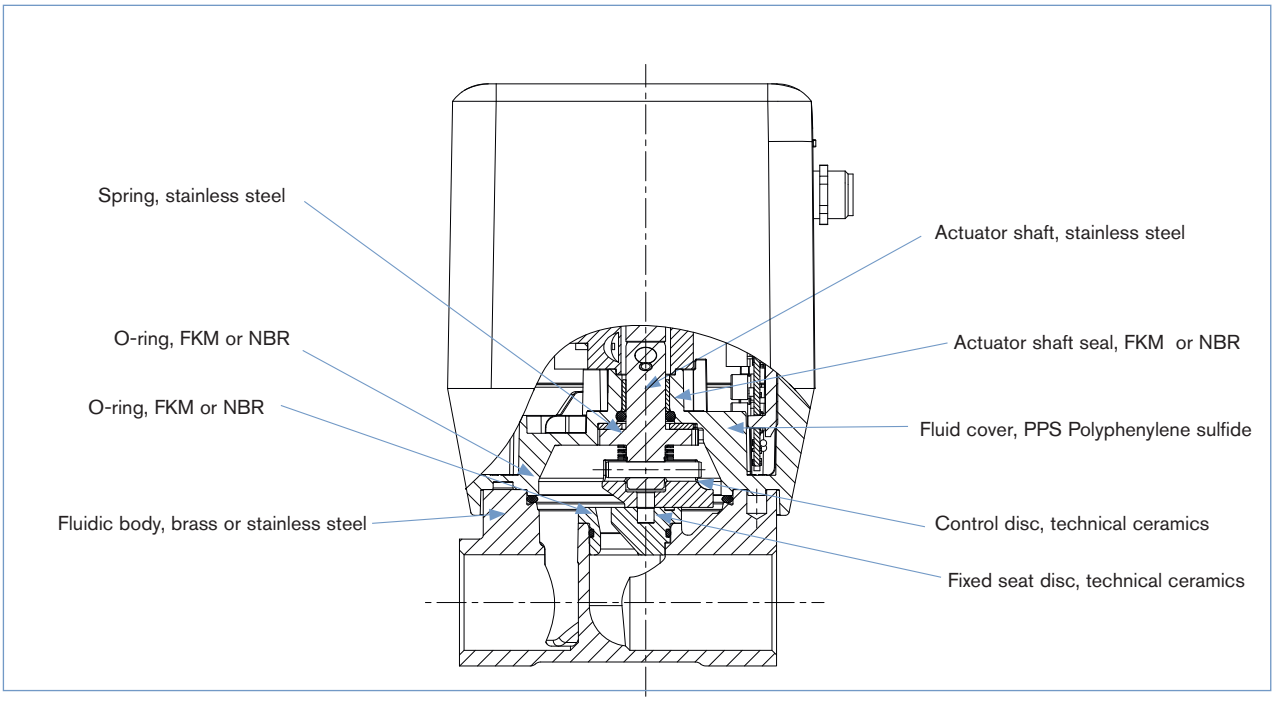
Technical data, continued

Device variations	Standard		Positioner		Process controller	
	ON/OFF	Proportional valve	Analogue	Digital	Analogue	Digital
Electrical connection	M12 Plug, A-coded, 8-pin	M12 Plug, A-coded, 8-pin	M12 Plug, A-coded, 8-pin	M12 Plug, A-coded, 5-pin	M12 Plug, A-coded, 8-pin and M12 Socket, A-coded, 5-pin	M12 Plug, A-coded, 5-pin and M12 Socket, A-coded, 5-pin
Input signal (setpoint)	Digital input: 0…5 V (log. 0, valve closed) or 10…30 V (log. 1, valve open)	4…20 mA, 0…10 V, or PWM (800 Hz)	4…20 mA, 0..20 mA, 0…10 V, or 0…5 V	---	4…20 mA, 0..20 mA, 0…10 V, or 0…5 V	---
Input signal (actual value from ext. Sensor)	---	---	---	---	4…20 mA, 0..20 mA, 0…10 V, 0…5 V	4…20 mA, 0..20 mA, 0…10 V, 0…5 V, or Frequency (5…2000 Hz)
Input impedance for analogue input	22 kΩ	60 Ω (current), 22 kΩ (voltage)	60 Ω (current), 22 kΩ (voltage)	---	60 Ω (current), 22 kΩ (voltage)	60 Ω (current), 22 kΩ (voltage)
Output signal (actual value)	Digital output: PNP, max. 100 mA current limits, feedback function (output signal active, when valve closed)	Digital output: PNP, max. 100 mA current limits, feedback function (output signal active, when valve closed)	0/4…20 mA (max. load: 560 Ω), 0…5/10 V (max. current: 10 mA)	---	0/4…20 mA (max. load: 560 Ω), 0…5/10 V (max. current: 10 mA)	---
Fieldbus interface	---	---	---	büS / CANopen	---	büS / CANopen
Parameterization Tool	---	---	Bürkert Communicator (Connection via büS stick)	Bürkert Communicator (Connection via büS stick)	Bürkert Communicator (Connection via büS stick)	Bürkert Communicator (Connection via büS stick)

Materials



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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

Please 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] [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/m³]
ρ_N	Standard density	[kg/m³]
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.

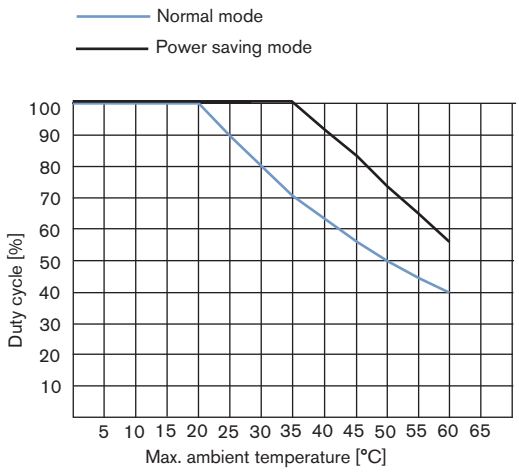
Duty Cycle Derating Curve

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.

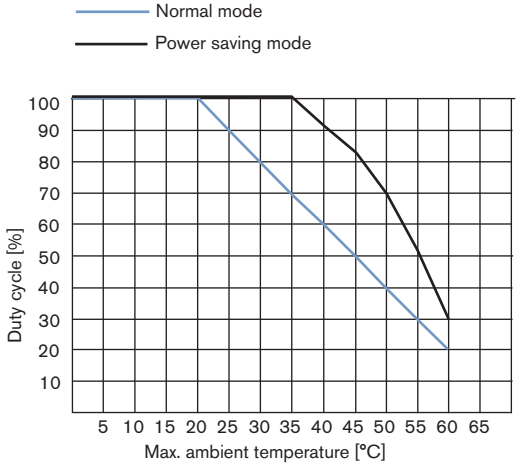
The duty cycle does not refer to the duty cycle of the device but to the duty cycle of the motor. This is not switched on unless the valve is to move. Frequent set-point value changes will drastically increase the duty cycle of the motor.

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

Derating curve for standard version



Derating curve for positioner and process controller



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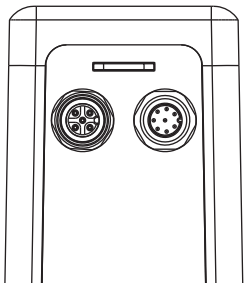
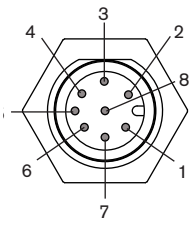
Pin Assignment

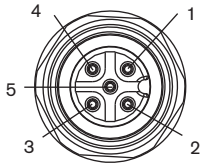
Analogue version



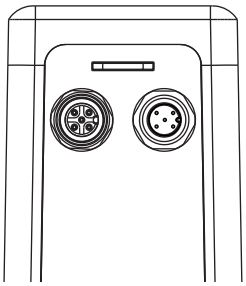
Circular connector M12 - 8-pin	Pin	Assignment
	1	24 V DC
	2	Power supply GND
	3	Internal use[6)]
	4	Internal use[6)]
	5	Internal use[6)]
	6	Signal input +
	7	Signal output
	8	Signal GND

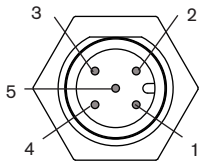
[6)] Only for positioners and process controllers version, for connection of the parameterization tools: Bürkert Communicator. The connection is via the büS-Stick. Using an adapter cable (M12 8-pin to M12 5-pin) the büS-Stick can be connected (see ordering chart for accessories).

Additional for process controller version

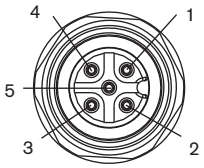
Socket M8 - 5-pin	Pin	Assignment
	1	24 V DC sensor power supply
	2	Analogue IN (0-20 mA, 4-20 mA, 0-5 V or 0-10 V)
	3	GND
	4	GND (Bridge acc. to GND Pin 3)
	5	not connected

Digital version (fieldbus)



Circular connector M12 - 8-pin	Pin	Belegung
	1	Shield
	2	24 V DC
	3	GND
	4	CAN high
	5	CAN low

Bei Prozessreglerausführung zusätzlich:

Socket M8 - 5-pin	Pin	Belegung
	1	24 V DC sensor power supply
	2	Analogue IN (0-20 mA, 4-20 mA, 0-5 V oder 0-10 V)
	3	GND
	4	GND (Bridge acc. to GND Pin 3)
	5	not connected

For parameterisation and configuration of the positioner and the process controller versions, please use the Bürkert Communcator software tool.
http://www.burkert.com/en/sitesearch?search_term=3280+communicator

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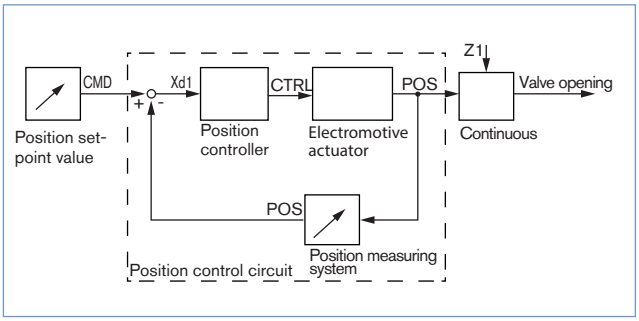
Electrical control

Standard ON/OFF

In the ON / OFF version, an external voltage signal is digitized and the valve is closed or opened. The status of the two end positions of the valve are indicated on the LED. In addition, the valve position “closed” is reached via the digital output.

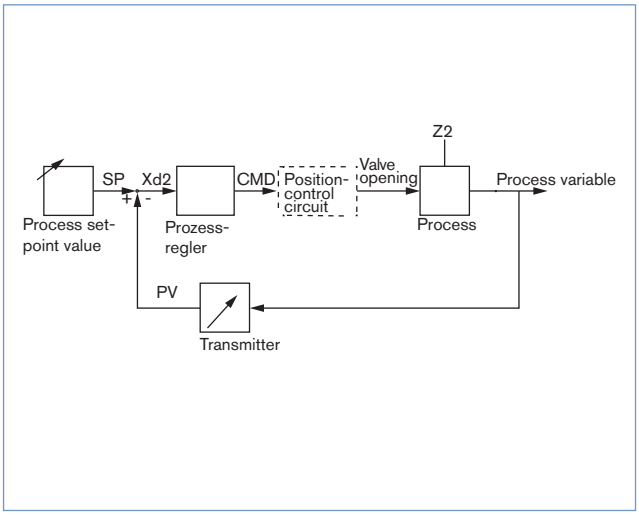
Standard proportional valve

The standard proportional valve converts an external standard signal (position set-point value) into a valve position. Both valve end positions are indicated by the LED status. Additionally, the digital output indicates when the “closed” valve position has been achieved.



Positioner version

The positioner proportional valve converts an external standard signal (position set-point value) into a valve position. The position of the actuator is controlled according to the position set-point value. The current position (POS) of the electromotive valve is recorded by the position measuring system. The position controller compares this position actual value to the set-point value (CMD) specified as the standard signal. In case of a control difference (Xd1), the motor control signal is sent to the actuating drive as the actuating variable. Z1 is a disturbance value. Both valve end positions are indicated by the LED status. Moreover, the position actual value recorded using the position measuring system is output via the M12 circular plug-in connector.



Process controller version

The additionally implemented PID controller can perform not only the actual position control but also a process control in the sense of a cascade control. The process controller is integrated in a control circuit. The position set-point value of the valve is calculated from the process set-point value and the process actual value using the control parameters (PID controller). The process set-point value can be specified by an external signal. During the process control the position control mentioned above becomes the subordinate auxiliary control circuit; this results in a cascade control. The process controller in the main control circuit has a PID function.
The process set-point value (SP) is specified as a set-point value and is compared with the actual value (PV) of the process variable to be controlled. The position measuring system records the current position (POS) of the electromotive linear actuator. This position actual value is compared by the position controller with the set-point value (CMD) specified by the process controller. If there is a control difference (Xd2), the actual position (POS) and therefore the valve opening are changed by the control variable (CTRL). Z2 represents a disturbance variable.

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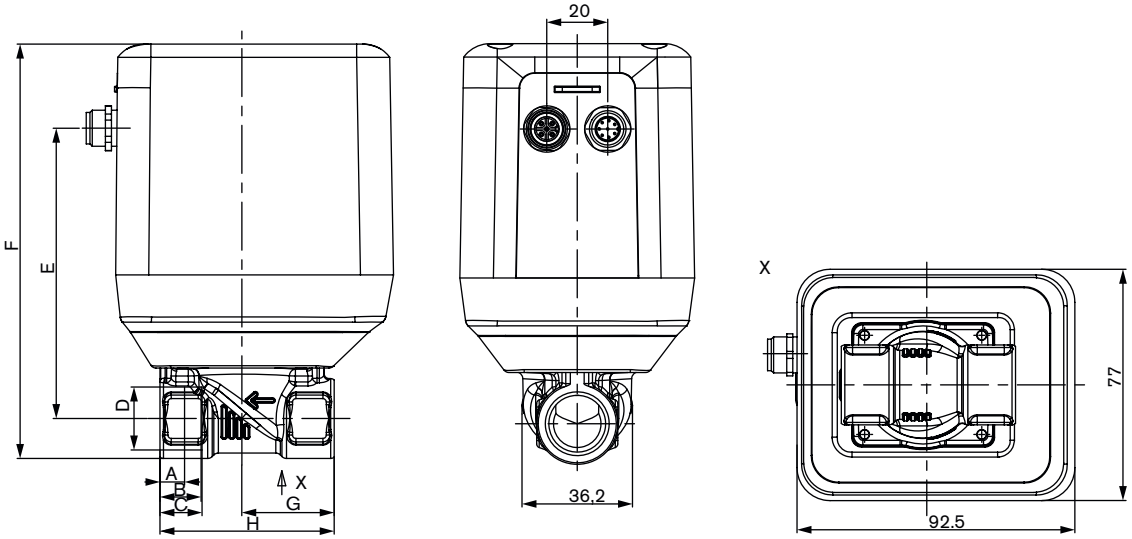
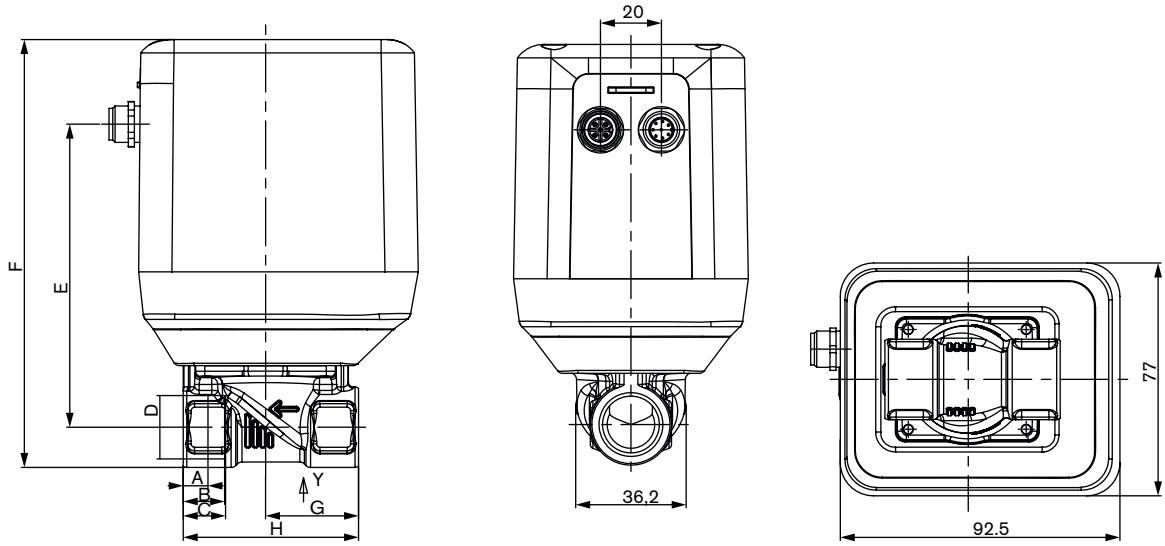
Dimensions [mm]

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

Standard proportional valve (Item no. for 4-20 mA input signal)

Valve function	Orifice [mm]	Port Connection [7]	Seal material [7]	k_{Vs} value water [m³/h] [8]	Nominal pressure [barg] [9]	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
	10	G 1/2	FKM	2.5	6	269 245	269 257
	12	G 3/4	FKM	3.9	6	269 246	269 258
	15	G 3/4	FKM	5.4	6	269 247	269 259
	20	G 1	FKM	8.1	6	269 248	269 260
	25	G 1	FKM	9.6	6	269 249	269 261

Positioner (Item no. for 4-20 mA input signal (selectable via Bürkert Communicator))

Valve function	Orifice [mm]	Port Connection [7]	Seal material [7]	k_{Vs} value water [m³/h] [8]	Nominal pressure [barg] [9]	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	278 370	278 386
	10	G 1/2	FKM	2.5	6	278 371	278 387
	12	G 3/4	FKM	3.9	6	278 372	278 388
	15	G 3/4	FKM	5.4	6	278 373	278 390
	20	G 1	FKM	8.1	6	278 374	278 391
	25	G 1	FKM	9.6	6	278 375	278 392

Process controller (Item no. for 4-20 mA input signal (selectable via Bürkert Communicator))

Valve function	Orifice [mm]	Port Connection [7]	Seal material [7]	k_{Vs} value water [m³/h] [8]	Nominal pressure [barg] [9]	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	287 890	287 896
	10	G 1/2	FKM	2.5	6	287 891	287 897
	12	G 3/4	FKM	3.9	6	287 892	287 898
	15	G 3/4	FKM	5.4	6	287 893	287 899
	20	G 1	FKM	8.1	6	287 894	287 900
	25	G 1	FKM	9.6	6	287 895	287 901

[7] Other cable connections (NPT, flange) and sealing materials (EPDM, NBR) on request
[8] k_{Vs}-value: Measured with water (20°C) and 1 bar pressure drop over valve.
[9] Fuel gases may differ

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Fieldbus version - positioner (item no. for CANopen)

Valve function	Orifice [mm]	Port Connection [7]	Seal material [7]	k_{Vs} value water [m³/h] [8]	Pressure range [bar(g)] [9]	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	312 313	312 320
	10	G 1/2	FKM	2.5	6	312 314	312 321
	12	G 3/4	FKM	3.9	6	312 316	312 322
	15	G 3/4	FKM	5.4	6	312 317	312 323
	20	G 1	FKM	8.1	6	312 318	312 324
	25	G 1	FKM	9.6	6	312 319	312 325

Fieldbus version - process controller (item no. for CANopen and 4...20 mA Signal input)

Valve function	Orifice [mm]	Port Connection [7]	Seal material [7]	k_{Vs} value water [m³/h] [8]	Pressure range [bar(g)] [9]	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	312 339	312 345
	10	G 1/2	FKM	2.5	6	312 340	312 346
	12	G 3/4	FKM	3.9	6	312 341	312 347
	15	G 3/4	FKM	5.4	6	312 342	312 348
	20	G 1	FKM	8.1	6	312 343	312 349
	25	G 1	FKM	9.6	6	312 344	312 351

[7] Other cable connections (NPT, flange) and sealing materials (EPDM, NBR) on request
[8] k_{Vs}-value: Measured with water (20°C) and 1 bar pressure drop over valve.
[9] Fuel gases may differ

Further versions on request

Material
Seal material NBR
Seal material EPDM

Approvals
cURus

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

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Ordering Chart for Accessories

Article	Item No.
M12 socket, 8 pin with 2m ready to use cable	919 061
M12 socket, 8 pin with 2m ready to use cable shielded cable	918 991
Power supply Type 1573 for rail mounting, 100-240 V AC/ 24 V DC, 1.25A, NEC Class 2 (UL 1310)	772 438
Power supply Type 1573 for rail mounting, 100-240 V AC/ 24 V DC, 1A	772 361
Power supply Type 1573 for rail mounting, 100-240 V AC/ 24 V DC, 2A	772 362
Power supply Type 1573 for rail mounting, 100-240 V AC/ 24 V DC, 4A	772 363
Buffer module Type 1573 for safety positon when power failure	773 440

Ordering Chart for Accessories - for positioner and process controller versions

Article	Item No.
M12 plug, 5 pin with 2m ready to use cable shielded cable	559 177
büS adapter, M12 socket, 8 pin to M12 plug, 5 pin (for büS stick connection) [10)]	773 286
büS-Stick Set 1 (incl. power supply, büS-Stick, termination resistor, Y-connector, cable, ...)	772 426
büS-Stick Set 2 (incl. büS-Stick, termination resistor, Y-connector, cable)	772 551
Software Bürkert Communicator	Download from www.burkert.com

[10)] The büS-Stick contained in büS-Stick-Set 1 and 2 is connected via a 5-pin M12 cable. Therefore an adapter for 8-pin M12 connector of the valve is necessary. Please note that the valve must be supplied with power during the connection of the parameterization interface. In büS-Stick-Set 1 a corresponding power supply is included.

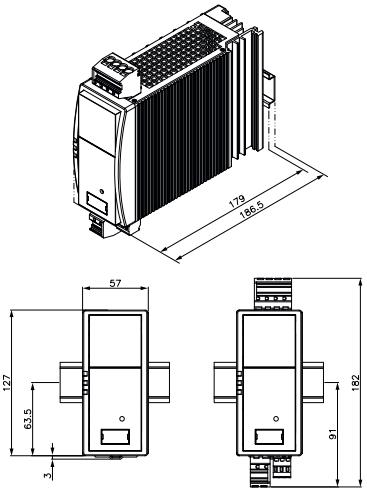
Further versions on request

Material
Seal material NBR
Seal material EPDM

Approvals
cURus

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

Capacitive buffer module ID 773 440 for safety position in case of power failure



In the case of power failure the valve can be moved into a safety position, using the capacitive buffer module. In case of power failure the buffer module maintains the power supply for a few seconds at 18 V DC. The reduced input voltage is detected by the valve, and the safety position is established. Up to three type 3280 valves and two type 3285 valves can be connected to one buffer module.
Factory setting of the safety position: “valve closed”
- For standard version (functionality available as of software version A.08): adjustable via DIP switches (for the reverse operating direction, the safety position changes to “valve open”)
- For positioner and process controller version (functionality available as of software version A.06): adjustable via Bürkert Communicator (user-defined safety position)

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bürkert

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

Control version	☐ Standard ON/OFF	☐ Standard Proportional	☐ Positioner controller	☐ Process controller
Input signal / Output signal	☐ 4-20 mA	☐ 0-20 mA[11)]		
	☐ 0-10 V	☐ 0-5 V[11)]		
	☐ büS	☐ CANopen		
Body material	☐ Brass	☐ Stainless steel		
Seal material	☐ FKM		others	
Port connection	☐ G-Threaded	☐ NPT-Threaded		
	☐ Flange			
Approval	☐ UR			

[11)] only with positioner and process controller version

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

Reset form

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