burkert
FLUID CONTROL SYSTEMS

2-way motor valve



- Actuator isolated from flow path
- Excellent range and fast response times
- Low power consumption
- Orifice sizes 1 to 10 mm
- Versions: Standard, positioner, process controller and high pressure version up to 22 bar

UR approval optional

FDA conformity optional

Type 3280 can be combined with…



Type 8006
MFM



Type 8008
BigFlow



Type 8746
MFC/MFM



Type 8611
Universal controller



Type 8311
Pressure transmitter

The direct-acting motor valve of Type 3280 is used for dosing of liquids and gases in closed or open control loops.

The valve features a linear stepper motor as actuator. The integrated electronics simplify 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 3280 is available as standard ON/OFF or proportional valve, as version with integrated positioner and as version with integrated process controller.

Technical data	
Materials Body Housing Seals[1]	 Brass or stainless steel PC (Polycarbonate), PPS (Polyphenylene sulfide) NBR for liquids, EPDM for liquids and special gases (e. g. ammonia, acetylene), FKM for neutral gases
Medium	Neutral gases, liquids
Pressure Range[2]	0…6 bar (high pressure version up to 22 bar (depending on orifice size, see ordering chart) available)
Closure time	2.5 sec. (0…100 % stroke)
Fluid temperature	0 to +70 °C
Ambient temperature	-10 to +60 °C
Viscosity	Max. 600 mm²/s (cSt)
Power supply	24 V DC ±10 % (max. residual ripple 10 %)
Power consumption	<1 W in holding position max. 8 W (DN2 – 6) resp. max. 12 W (DN8 & 10, as well as high-pressure versions)
Duty cycle	Up to 100 % (depending on fluid and ambient temperature)
Port connection	G or NPT ¼, ⅜, ½, sub-base, Cartridge (on request)
Typical control data[3] Hysteresis Repeatability Sensitivity Span	 <5 % <1 % FS <1 % FS 1:100
Protection class - valve	IP54
Installation	As required, preferably with actuator upright
Status display	LED (details: see manual)
Dimensions	See drawings on page 6 – 7
Weight	~0.7 kg

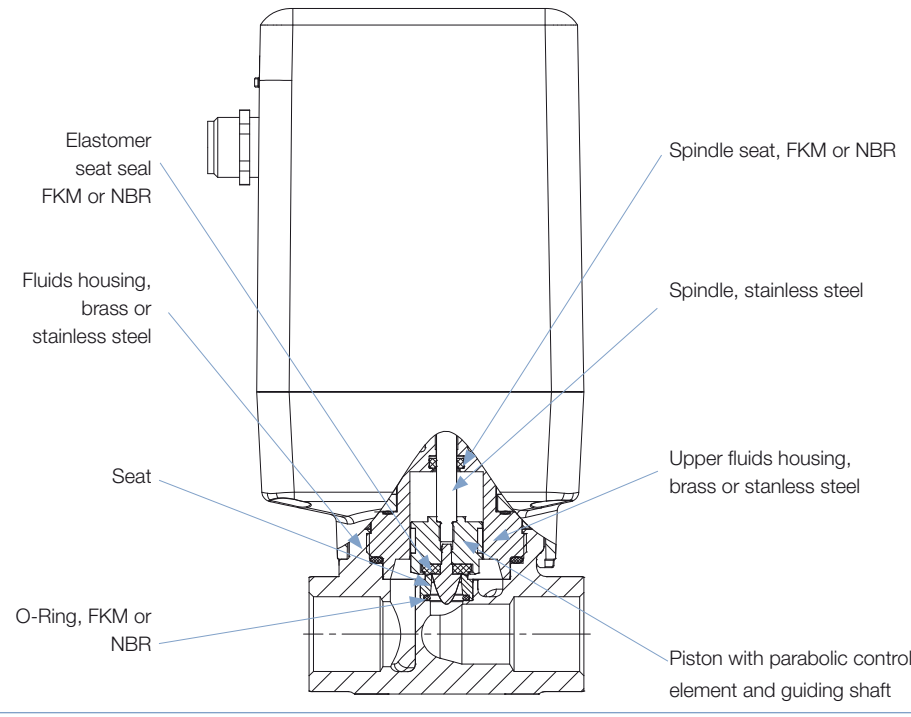
[1] PEEK seat seals are used for orifice sizes 1, 1.5, 5 and in the high-pressure version additionally for orifice sizes 4. In this case, the seat tightness of the valve is reduced.
[2] Pressure data [bar]: Overpressure with respect to atmospheric pressure
[3] Characteristic data of control behaviour depends on process conditions

DTS 1000240084 EN Version: S Status: RL (released | freigegeben | validé) printed: 09.04.2018

Technical data, continued

Device variations	Standard		Positioner		Process controller	
	ON/OFF	Control valve	Analogue	Digital (fieldbus)	Analogue	Digital (fieldbus)
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



DTS 1000240084 EN Version: S Status: RL (released | freigegeben | validé) printed: 09.04.2018

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 [m^3/h]	K_V value for gases [m^3/h]
Subcritical $p_2 > \frac{p_1}{2}$	$= Q \sqrt{\frac{\rho}{1000\ \Delta p}}$	$= \frac{Q_N}{514} \sqrt{\frac{T_1\ \rho_N}{p_2\ \Delta p}}$
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] [4]
Q_N	Standard flow rate	[m_N^3/h] [5]
p_1	Inlet pressure	[bar] [6]
p_2	Outlet pressure	[bar] [6]
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]

[4] Measured with water, Δp =1 bar, differential pressure over the valve
[5] Standard conditions at 1.013 bar and 0 °C (273K)
[6] 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.

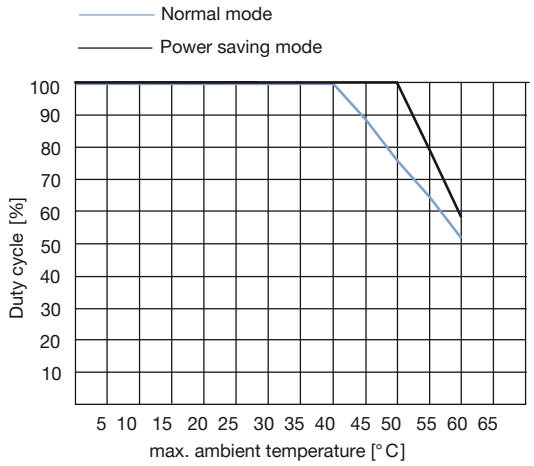
Duty Cycle Derating Curve

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.

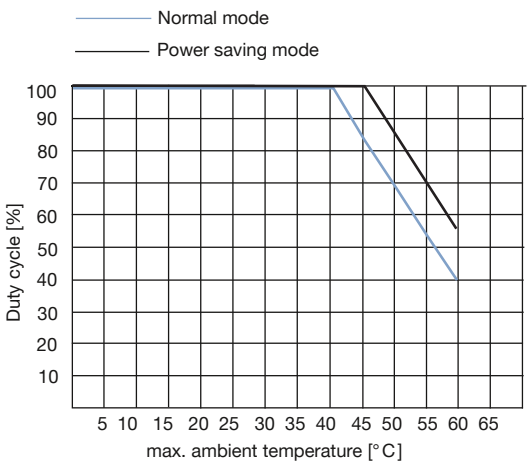
The duty cycle does not refer to the duty cycle of the device but to the duty cycle of the motor. This is not switched on unless the valve is to move. Frequent set-point value changes will drastically increase the duty cycle of the motor.

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

Type 3280
Seat DN1…6 < 6 bar Standard



Type 3280
Seat DN1…6 < 6 bar positioner and process controller
DN8…10 < 6 bar standard
DN1…10 > 6 bar standard

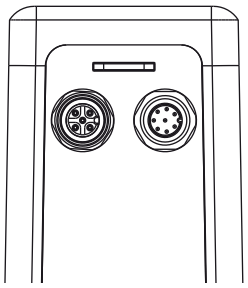


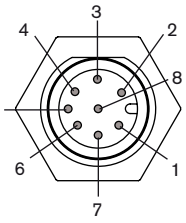
Derating curve for positioner and process controller DN8 – 10: see manual

DTS 1000240084 EN Version: S Status: RL (released | freigegeben | validé) printed: 09.04.2018

Pin Assignment

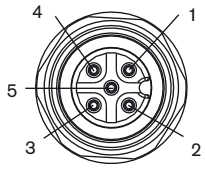
Analogue version



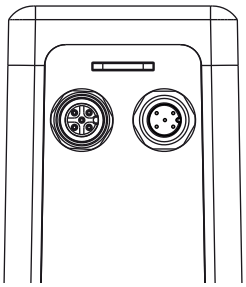
Circular connector M12 – 8 pin	Pin	Assignment
	1	24 V DC
	2	Power supply GND
	3	Internal use[7)]
	4	Internal use[7)]
	5	Internal use[7)]
	6	Signal input +
	7	Signal output
	8	Signal GND

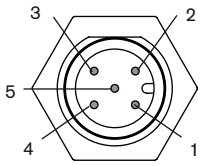
[7)] Only for positioners and process controllers version, for connection of the parameterization tools: Bürkert Communicator. The connection is via the büS-Stick. Using an adapter cable (M12 8 pin to M12 5 pin) the büS-Stick can be connected (see ordering chart for accessories).

Additional for process controller version

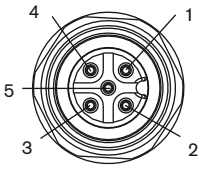
Socket M12 – 5 pin	Pin	Assignment
	1	24 V DC sensor power supply
	2	Analog IN (0 – 20 mA, 4 – 20 mA, 0 – 5 V or 0 – 10 V)
	3	GND
	4	GND (Bridge acc. to GND Pin3)
	5	not connected

Digital version (fieldbus)



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

Additional for process controller version

Socket M12 – 5 pin	Pin	Belegung
	1	24 V DC sensor power supply
	2	Analog IN (0 – 20 mA, 4 – 20 mA, 0 – 5 V oder 0 – 10 V)
	3	GND
	4	GND (Bridge acc. to GND Pin3)
	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**

DTS 1000240084 EN Version: S Status: RL (released | freigegeben | validé) printed: 09.04.2018

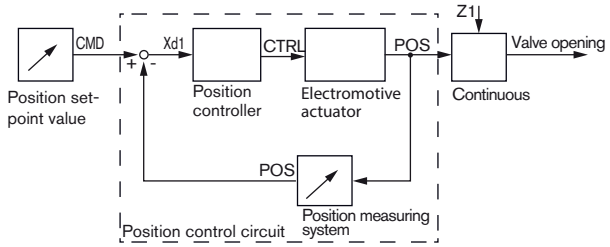
Versions

Standard On/Off valve

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.

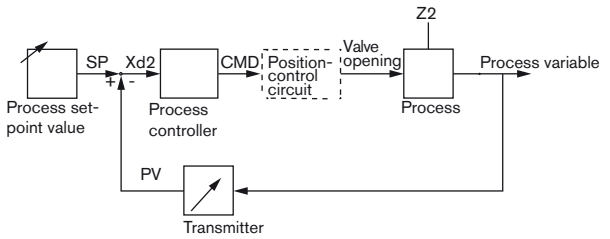
Standard Control Valve

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.

DTS 1000240084 EN Version: S Status: RL (released | freigegeben | validé) printed: 09.04.2018

Versions

Please use the product filter of our eShop on the Bürkert website to order from the standard program. Alternatively, the form can be used at the end of the data sheet.

Valve function	Orifice [mm]	Port Connection[8]	K_{VS} value water [m^3/h][9]	Pressure range [bar(g)]
Control valve, without safety position in case of power failure	1	G ¼	0.03	0 – 6
	1.5	G ¼	0.065	0 – 6
	2	G ¼	0.15	0 – 6
	3	G ¼	0.3	0 – 6
	4	G ⅜	0.5	0 – 6
	5	G ⅜	0.7	0 – 6
	6	G ⅜	0.9	0 – 6
	8[11]	G ½	1.5	0 – 6
	10[11]	G ½	1.9	0 – 6

[8] Other cable connections (NPT, sub-base) on request
[9] k_{VS}-value: Measured with water (20 °C) and 1 bar pressure drop over valve.

For applications requiring a higher operating pressure, high-pressure versions are available. Please note that for the high-pressure version, the control in the lower range of the characteristic curve (<5% of the max. set point) can be impaired.

Valve function	Orifice [mm]	Port Connection[8]	K_{VS} value water [m^3/h][9]	Pressure range [bar(g)] fluid media	Pressure range [bar(g)] gaseous media
Control valve, without safety position in case of power failure	1	G ¼	0.03	0 – 15	0 – 22
	1.5	G ¼	0.065	0 – 15	0 – 22
	2	G ⅜	0.15	0 – 15	0 – 22
	3	G ⅜	0.3	0 – 15	0 – 22
	4	G ⅜	0.5	0 – 15	0 – 22
	5	G ⅜	0.7	0 – 15	0 – 22
	6	G ⅜	0.9	0 – 15	0 – 16
	8	G ½	1.5	0 – 12	0 – 12
	10	G ½	1.9	0 – 10	0 – 10

[8] Other cable connections (NPT, sub-base) on request
[9] k_{VS}-value: Measured with water (20 °C) and 1 bar pressure drop over valve.

Further versions on request

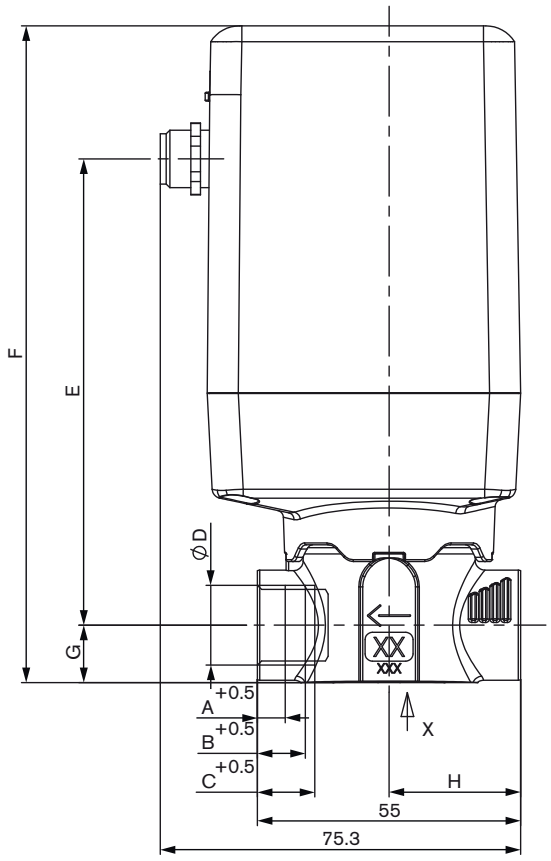
Analytical
Oxygen version
Parts oil-, fat- and silicon free

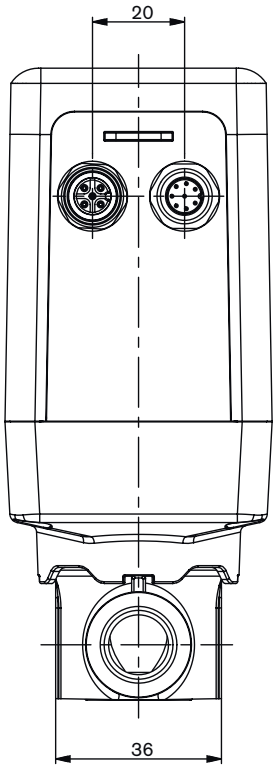
Approvals
cURus
FDA conformity

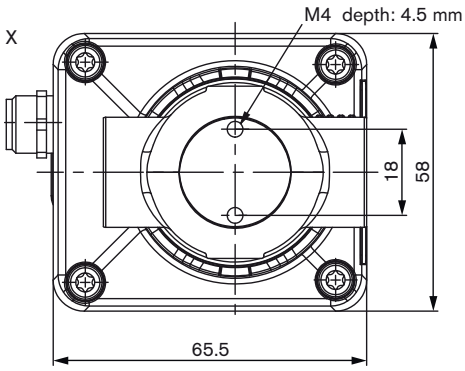
DTS 1000240084 EN Version: S Status: RL (released | freigegeben | validé) printed: 09.04.2018

Dimensions [mm]

Threaded body







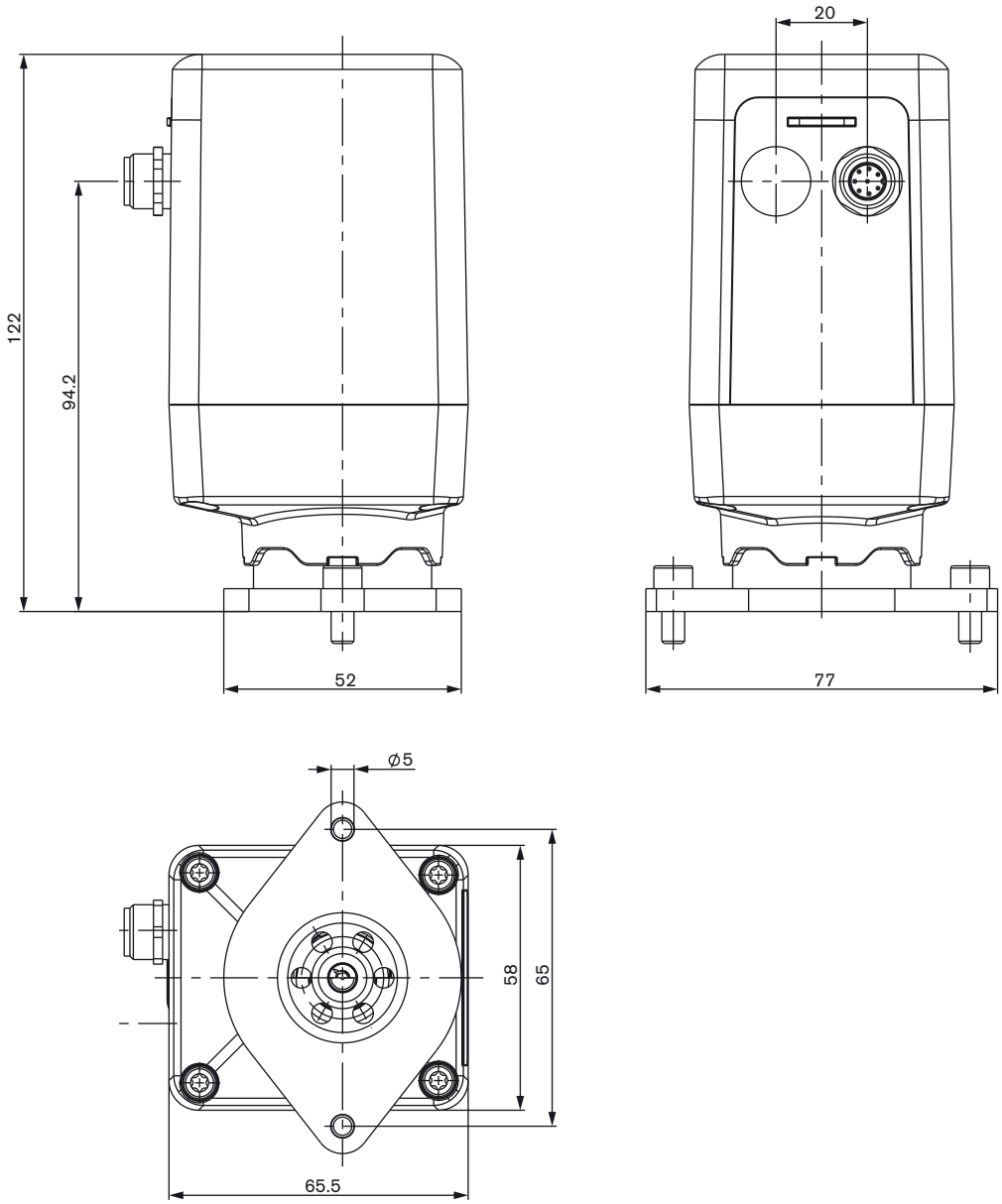
A	B	C	D	E	F	G	H
		12	G ⅜	97.4	137.2	12	27.5
6	10.3		NPT ⅜	97.4	137.2	12	27.5
		12	G ¼	96.4	134.2	10	27.5
5.8	10		NPT ¼	96.4	134.2	10	27.5
		14	G ½	97.4	139.2	14	29.5
8.2	13.7		NPT ½	97.4	139.2	14	29.5

The acutator housing may be twisted against the fluidic body by up to 4.5°.

DTS 1000240084 EN Version: S Status: RL (released | freigegeben | validé) printed: 09.04.2018

Dimensions [mm]

Sub-base body



DTS 1000240084 EN Version: S Status: RL (released | freigegeben | validé) printed: 09.04.2018

Ordering Chart for Accessories

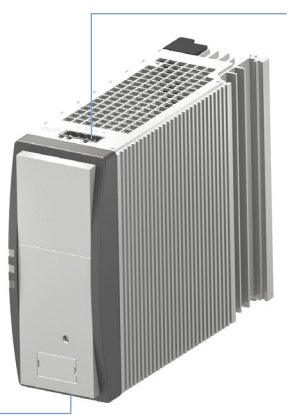
Article	Article no.
M12 socket, 8 pin with 2 m ready to use cable	919061
M12 socket, 8 pin with 2 m ready to use cable shielded cable	918991
Power supply Type 1573 for rail mounting, 100 – 240 V AC/ 24 V DC, 1.25 A, NEC Class 2 (UL 1310)	772438
Power supply Type 1573 for rail mounting, 100 – 240 V AC/ 24 V DC, 1 A	772361
Power supply Type 1573 for rail mounting, 100 – 240 V AC/ 24 V DC, 2 A	772362
Power supply Type 1573 for rail mounting, 100 – 240 V AC/ 24 V DC, 4 A	772363
Buffer module Type 1573 for safety positon when power failure	773440

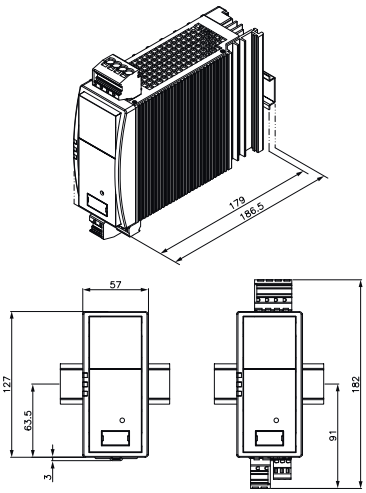
Ordering Chart for Accessories - for positioner and process controller versions

Article	Article no.
M12 plug, 5 pin with 2 m ready to use cable shielded cable	559177
büS adapter, M12 socket, 8 pin to M12 plug, 5 pin (for büS stick connection)[12)]	773286
büS-Stick Set 1 (incl. power supply, büS-Stick, termination resistor, Y-connector, cable, ...)	772426
büS-Stick Set 2 (incl. büS-Stick, termination resistor, Y-connector, cable)	772551
Software Bürkert Communicator	Download from www.burkert.com

[12)] For the fieldbus version this is not necessary. 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.

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)

DTS 1000240084 EN Version: S Status: RL (released | freigegeben | validé) printed: 09.04.2018

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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	$p_{1\,max}$ =		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[13)]			
	☐ 0 – 10 V	☐ 0 – 5 V[13)]	[13)]only with positioner and process controller version		
	☐ büS	☐ CANopen			
Body material	☐ Brass	☐ Stainless steel			
Seal material	☐ FKM	☐ EPDM	☐ NBR		
Port connection	☐ G-Threaded	☐ NPT-Threaded	☐ ¼″	☐ ⅜″	☐ ½″
	☐ Sub-base				
Approval	☐ UR	☐ FDA conformity			

Reset form

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

DTS 1000240084 EN Version: S Status: RL (released | freigegeben | validé) printed: 09.04.2018

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