

Type 3280, 3285

Electromotive control valve
Elektromotorisches Regelventil
Vanne de régulation électromotorisée



Operating Instructions

Bedienungsanleitung
Manuel d'utilisation

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Technische Änderungen vorbehalten.
Sous réserve de modifications techniques.

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Electromotive control valve Type 3280, 3285

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1 OPERATING INSTRUCTIONS

The operating instructions describe the entire life cycle of the device. Keep these instructions in a location which is easily accessible to every user, and make these instructions available to every new owner of the device.

Important safety information.

Read the operating instructions carefully and thoroughly. Study in particular the chapters entitled "[Basic safety instructions](#)" and "[Authorized use](#)".

- ▶ The operating instructions must be read and understood.

1.1 Symbols

DANGER!

Warns of an immediate danger!

- ▶ Failure to observe the warning may result in a fatal or serious injury.

WARNING!

Warns of a potentially dangerous situation!

- ▶ Failure to observe the warning may result in serious injuries or death.

CAUTION!

Warns of a possible danger!

- ▶ Failure to observe this warning may result in a moderate or minor injury.

NOTE!

Warns of damage to property!

- Failure to observe the warning may result in damage to the device or the equipment.



Indicates important additional information, tips and recommendations.



Refers to information in these operating instructions or in other documentation.

→ Designates a procedure which you must carry out.

1.2 Definition of terms

In these instructions the term "device" always refers to the electromotive control valve Type 3280 and 3285.

2 AUTHORIZED USE

Non-conforming use of the electromotive control valve Type 3280 and 3285 may be a hazard to people, nearby equipment and the environment.

- ▶ The electromotive control valve is designed to control the flow of non-aggressive, clean and non-corrosive liquid and gaseous medium.
- ▶ Do not use the device outdoors.
- ▶ Do not expose the valve to direct sunlight.
- ▶ Use Type 3280 and 3285 only in conjunction with third-party devices and components recommended and authorized by Bürkert.
- ▶ The device must be used in compliance with the characteristics and commissioning and use conditions specified in the contractual documents and in the user manual.
- ▶ Use the control valve only when in perfect condition and always ensure proper storage, transportation, installation and operation.
- ▶ Only use the device as intended.

2.1 Restrictions

If exporting the device, observe any existing restrictions.

3 BASIC SAFETY INSTRUCTIONS

These safety instructions do not make allowance for any

- contingencies and events which may arise during the assembly, operation, and maintenance.
- local safety regulations – the operator is responsible for observing these regulations, also in relation to the installation personnel.



Risk of injury from high pressure.

- ▶ Before loosening lines and valves, cut off the pressure and deaerate or drain lines.

Risk of injury due to electrical shock.

- ▶ Before working on the system or device, switch off and isolate the power supply to prevent reactivation of the device.
- ▶ Observe applicable accident prevention and safety regulations for electrical equipment!

Risk of burns or risk of fire if used for a prolonged duty cycle through hot device surface.

- ▶ Keep the device away from highly flammable substances and medium and do not touch with bare hands.

General hazardous situations.

To prevent injuries:

- ▶ Do not use Type 3280 and 3285 in potentially explosive areas.
- ▶ Do not subject the actuator housing and actuator cover to mechanical loading.
- ▶ Do not make any internal or external modifications on the device. Do not paint housing parts or screws.
- ▶ Avoid using the control valve in the vicinity of strong magnetic fields.
- ▶ Secure the device from unintentional actuation.
- ▶ Only trained technicians may perform installation and maintenance work.
- ▶ After an interruption in the power supply, ensure that the process is restarted in a defined or controlled manner.
- ▶ Observe the general rules of technology.

NOTE!

Electrostatic sensitive components and modules!

The device contains electronic components which react sensitively to electrostatic discharge (ESD). Contact with electrostatically charged persons or objects are hazardous to these components. In the worst case scenario, they will be destroyed immediately or will fail when energized.

- Observe the requirements in accordance with EN 61340-5-1 to minimize or avoid the possibility of damage caused by sudden electrostatic discharge!
- Do not touch electronic components while the supply voltage is switched on!

4 GENERAL INFORMATION

4.1 Contact address

Germany

Bürkert Fluid Control Systems
Sales Center
Christian-Bürkert-Str. 13-17
D-74653 Ingelfingen
Tel. + 49 (0) 7940 - 10 91 111
Fax + 49 (0) 7940 - 10 91 448
E-mail: info@de.buerkert.com

International

Contact addresses are found on the final pages of the printed operating manual.

You can also find information on the Internet under:

www.burkert.com

4.2 Warranty

The warranty is only valid if the electromotive control valve Type 3280 and 3285 is used correctly in accordance with the specified operating conditions.

4.3 Information on the Internet

The operating instructions and data sheets for Types 3280 and 3285 can be found on the Internet at:

www.burkert.com

5 SYSTEM DESCRIPTION

5.1 Intended use

The electromotive control valve Type 3280 and 3285 is designed to control the flow of non-aggressive, clean and non-corrosive liquid and gaseous medium. Only clean, liquid or gaseous medium, which does not react with the bodies and sealing materials, may be controlled.

NOTE!

Unsuitable medium will damage the body and the seals.

Unsuitable medium may damage the body and the seals.

- Use suitable medium only.
- Check chemical compatibility in individual cases.

5.2 General description

The control valve regulates the flow rate with the aid of a stepper motor drive which is controlled by the control electronics. Therefore, no external motor control is required.

Basic functions of the control electronics:

- Control of the valve opening by processing the external set-point values (via analog input or digitally via bÜS or CANopen)
- Output of the valve states via the LED display
- Position detection after power failure
 - if power fails, the current position of the valve is retained
 - when power is restored, the internal control electronics automatically detects it's current position
- Reduction in the energy consumption
 - The valve is designed to hold its position without the active use of the motor. As soon as the desired position is achieved, motor is turned off and the valve uses only fraction of power required to move the valve

5.3 Designs

The following versions of the electromotive control valve are available:

- electromotive 2/2-way stroke valve Type 3280 (DN2, DN3, DN4, DN6)
 - Control standard
 - Control positioner
- electromotive 2/2-way disk valve Type 3285 (DN8, DN10, DN12, DN15, DN20, DN25)
 - Control standard
 - Control positioner

5.3.1 Electromotive stroke valve Type 3280

The valve spindle is driven by a stepper motor. The angular movement of the motor is converted to translational movement with the aid of a threaded spindle. The valve spindle is connected rigidly to the threaded spindle. The valve spindle is connected to a control cone. Depending on the angular position of the motor, the position of the control cone varies with respect to the valve seat. This results in the different positions (e. g open/close) of the valve. The valve seat is sealed by an elastomer seal.

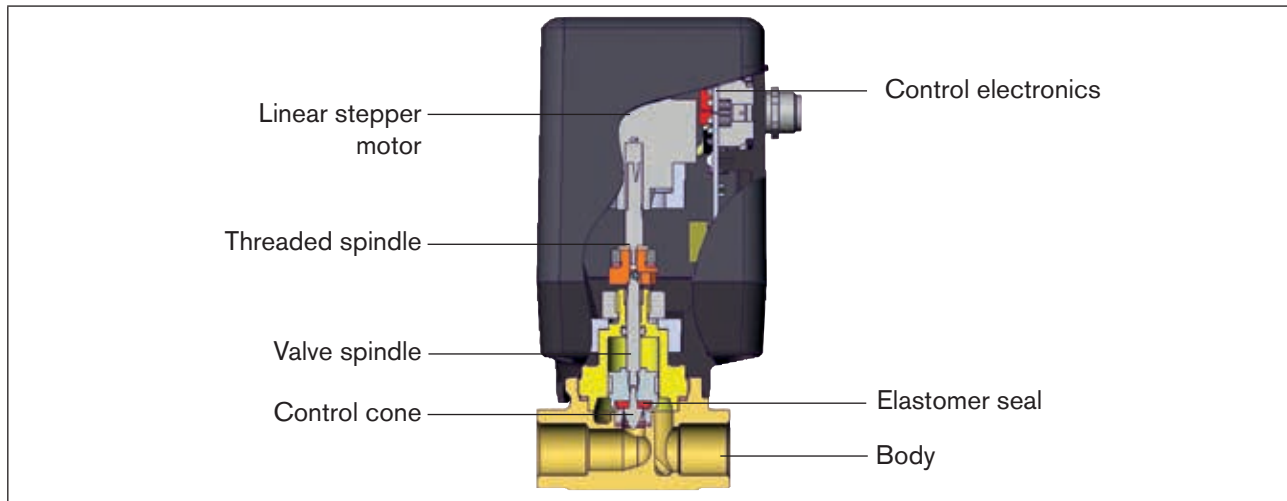


Figure 1: Electromotive stroke valve Type 3280

5.3.2 Electromotive disk valve Type 3285

The disk valve consists of a stepper motor with gearbox which transfers the rotational torque to the actuator shaft via coupling. The actuator shaft has control disc attached to it. A fixed disc with a mouth attached to the body is used as a valve seat. The control disc is pressed onto the fixed disc by a supporting spring. The fixed disc and the control disc are positioned in such a way that the rotational movement of control disc opens or closes the opening mouth in the fixed disc; thereby opening or closing the valve. The design of the fixed disc enables the flow rate values to be changed continuously depending on the position of the control disc.

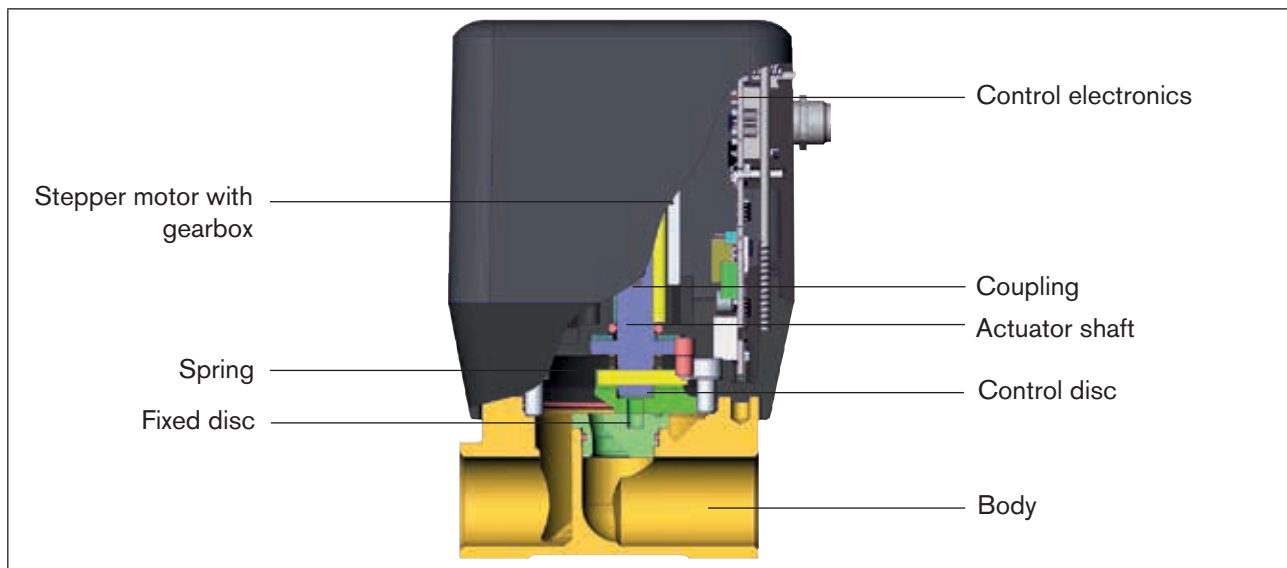


Figure 2: Electromotive disk valve Type 3285

5.3.3 Electric control

The control valves 3280 and 3285 feature an electromotive actuator with an electric control.



The device version is stated on the type label: 0 means standard, x means positioner.

Control standard:

The standard control 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.

Control positioner:

The positioner control 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.

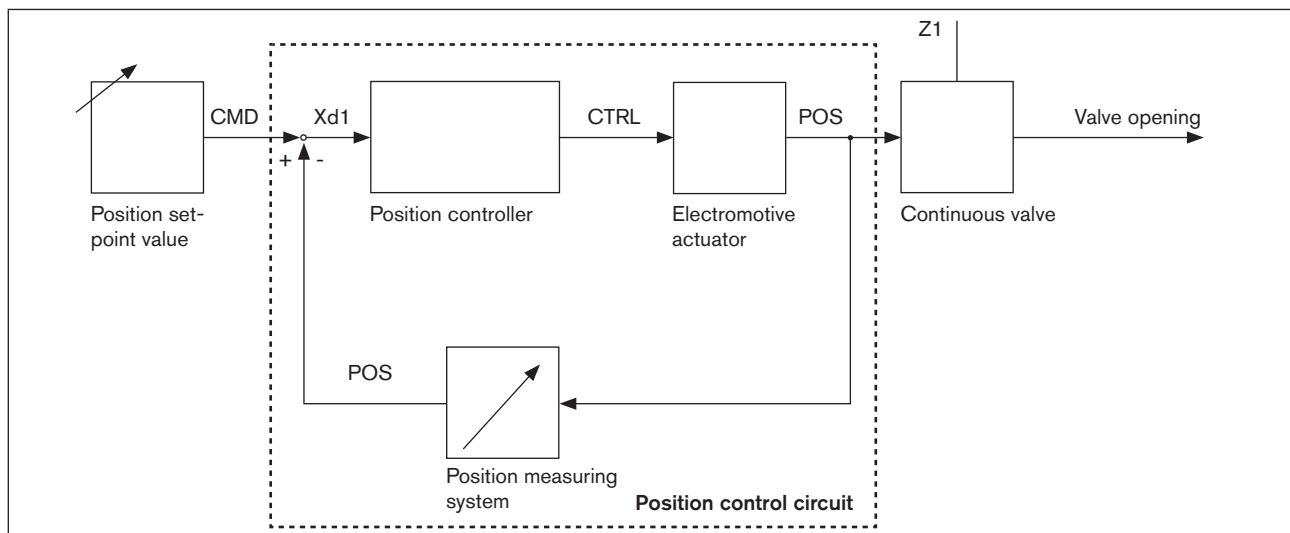


Figure 3: Signal flow diagram position controller

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.

It is possible to communicate with the device digitally (e.g. for transferring the set-point or the actual value) via CANopen* or bÜS**.



* CANopen - A CAN-based field bus (Controller Area Network) used in automation technology to link devices.

** bÜS - A CANopen-based field bus with additional functions.

The positioner version also features some special functions (see chapter "8.2.1"), which can be set up using the Bürkert Communicator.



The operating instructions for the Bürkert Communicator can be found at www.burkert.com.

6 TECHNICAL DATA

6.1 Conformity

The electromotive control valve Type 3280 and 3285 is compliant with EC directives as stated in the EC Declaration of Conformity.

6.2 Standards

The applied standards, which are used to demonstrate compliance with the EC Directives, are listed in the EC type test certificate and/or the EC Declaration of Conformity.

6.3 Operating conditions



WARNING!

Risk of injury due to malfunction if device used outdoors.

- ▶ Do not use the device outdoors and avoid heat sources which may cause the permitted temperature range to be exceeded.
- ▶ Protect the device from direct sunlight and humidity.

Permitted temperatures

| | |
|-------------------------------|---|
| Ambient temperature | -10 to +60 °C (observe derating curve, see chapter "6.5.1") |
| Medium temperature | 0 to +70 °C |
| Medium temperature for oxygen | 0 to +60 °C |

Permitted air humidity

| | |
|--------------|------------------------|
| Air humidity | < 95 %, non-condensing |
|--------------|------------------------|

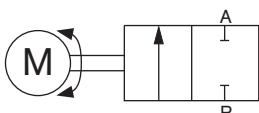
Authorized medium

| | |
|--------|---|
| Medium | non-aggressive, clean and non-corrosive liquid and gaseous medium which do not attack the bodies and sealing materials. Check resistance in individual cases (see chemical resistance chart at www.burkert.com). If medium is contaminated or contain particals, connect a suitable dirt filter upstream. |
|--------|---|

Control functions

Depending on the version, the seat of the valve is closed with or against the medium flow:
Type 3280: flow direction under seat
Type 3285: flow direction over seat

Circuit function



2/2-way valve for continuous control of the flow rate in output A, motorized, without power motionless

6.4 Mechanical data

| Materials | Type 3280 | Type 3285 |
|-----------------------------------|---|--|
| Actuator housing | Black Plastic parts: PPS GF40, Anthracite Plastic parts: PC GF10 | Black Plastic parts: PPS GF40, Anthracite Plastic parts: PC GF10, in contact with medium: PPS GF40 |
| Body | Brass (MS) or stainless steel (VA) | Brass (MS) or stainless steel (VA) |
| Sealing material | FKM, NBR or EPDM | FKM or NBR, technical ceramic |
| Other materials in the fluid area | Stainless steel (VA) | Stainless steel (VA) |

Connections

Type 3280 G 1/4, G 3/8, NPT 1/4 or NPT 3/8

Type 3285 G 1/2, G 3/4, G 1, NPT 1/2, NPT 3/4 or NPT 1

Weight

Type 3280 ~ 0.7 kg (with VA body)

Type 3285 DN8/10 ~ 0.8 kg (with VA body)

 DN12/15 ~ 1.2 kg (with VA body)

 DN20/25 ~ 1.5 kg (with VA body)

Dimensions

see data sheet

6.5 Electrical data

| Electrical data | Control standard | Control positioner |
|---|--|--|
| Connections | circular plug-in connector (M12 x 1, 8-pole) | circular plug-in connector (M12 x 1, 8-pole) |
| Operating voltage | 24 V DC $\pm 10\%$ - residual ripple < 10 % | 24 V DC $\pm 10\%$ - residual ripple < 10 % |
| Power consumption | Type 3280: max. 8 W | Type 3280: max. 8 W |
| | Type 3285: max. 12 W | Type 3285: max. 12 W |
| Standby power consumption | approx. 1 W | approx. 2 W |
| Actuating time (0...100 %) | Type 3280: approx. 2.5 s, for setting "Valve actuating speed normal", see chapter "7.4" | Typ 3280: approx. 2.5 s, for setting "Valve actuating speed normal", see chapter "8.2.1" |
| | Type 3285: approx. 4 s, for setting "Valve actuating speed normal", see chapter "7.4" | Type 3285: approx. 4 s, for setting "Valve actuating speed normal", see chapter "8.2.1" |
| Analog input (Set-point value input) | 4...20 mA or 0...10 V (adjustable, see chapter "7.4") | 0...20 mA, 4...20 mA, 0...5 V or 0...10 V, see chapter "8.2.1" |
| Input impedance for analog input | 60 Ω at 4...20 mA / resolution 40 μ A 22 k Ω at 0...10 V / resolution 20 mV | 60 Ω at 0...20 mA and 4...20 mA / resolution 40 μ A 22 k Ω at 0...5 V and 0...10 V / resolution 20 mV |

| Electrical data | Control standard | Control positioner |
|-------------------------------------|--|--|
| Analog output (actual value output) | - | 0...20 mA, 4...20 mA, 0...5 V, 0...10 V (adjustable, see chapter "8.2.1") |
| Analog output | - | max. current for voltage output 10 mA max. load for current output 560 Ω |
| Digital output | active, max. 100 mA current limitation, PNP, switching voltage = $U_{\text{supply}} - 1 \text{ V}$ short-circuit proof | - |
| Limit switch | contactless end position detection | - |
| Position measuring system | - | non-contact, high resolution, and thus wear-free position measuring system |
| Communication interface | - | büS or CANopen* |
| Duty cycle | as per EN 60034-1: S3 50 %, depending on the operating conditions. Observe derating curve, see chapter "6.5.1" | as per EN 60034-1: S3 50 %, depending on the operating conditions. Observe derating curve, see chapter "6.5.1" |

* 3.3 V signal voltage, reliable communication decreases as the line length and transfer rate increases

6.5.1 Derating

The maximum duty cycle of the valve depends on the maximum ambient temperatures and the current required by the stepper motor. The derating curve can be used to indicate the maximum duty cycle permissible at the corresponding ambient temperature. By switching on the low power function a higher duty cycle can be achieved (Warning: during low power function, max medium pressure is reduced; if violated Valve will not move or malfunction).

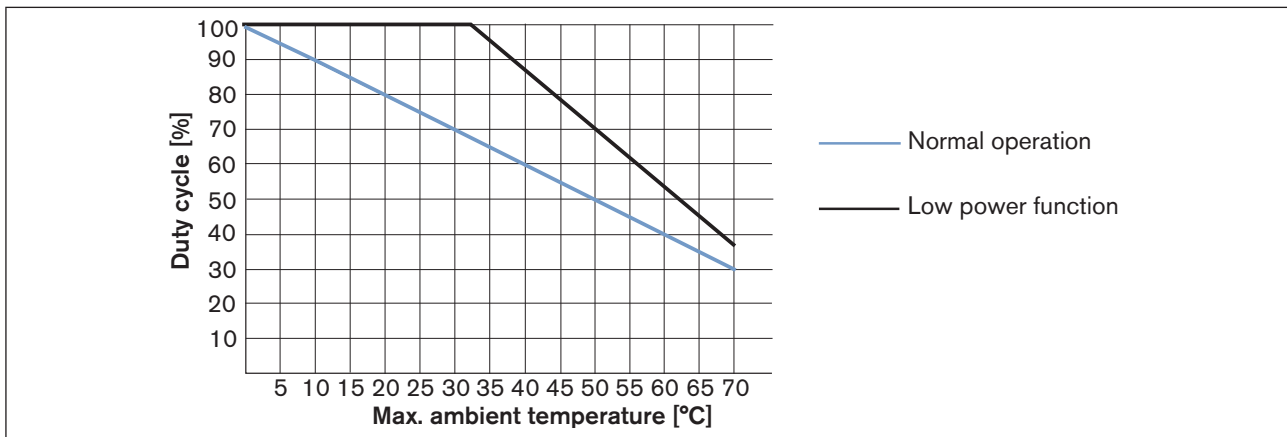


Figure 4: Derating curve

6.6 Fluidic data



Definition DN

DN designates the orifice of the seat, not the orifice of the port connection.

| Type | Orifice | Port connection | KV _{s value} [m ³ /h] ¹⁾ | Max. pressure for flammable gases [bar] | Max. pressure [bar] |
|------|---------|-----------------|---|---|---------------------|
| 3280 | 2 | G 1/4 | 0.15 | 3 | 6 |
| | | NPT 1/4 | 0.15 | 3 | 6 |
| | 3 | G 1/4 | 0.3 | 3 | 6 |
| | | NPT 1/4 | 0.3 | 3 | 6 |
| | 4 | G 3/8 | 0.5 | 3 | 6 |
| | | NPT 3/8 | 0.5 | 3 | 6 |
| 6 | G 3/8 | 0.9 | 3 | 6 | |
| | NPT 3/8 | 0.9 | 3 | 6 | |
| 3285 | 8 | G 1/2 | 1.8 | 3 | 6 |
| | | NPT 1/2 | 1.8 | 3 | 6 |
| | 10 | G 1/2 | 2.5 | 3 | 6 |
| | | NPT 1/2 | 2.5 | 3 | 6 |
| | 12 | G 3/4 | 3.9 | 3 | 6 |
| | | NPT 3/4 | 3.9 | 3 | 6 |
| | 15 | G 3/4 | 6.0 | 3 | 6 |
| | | NPT 3/4 | 6.0 | 3 | 6 |
| | 20 | G 1 | 8.8 | 3 | 6 |
| | | NPT 1 | 8.8 | 3 | 6 |
| | 25 | G 1 | 12.3 | 3 | 6 |
| | | NPT 1 | 12.3 | 3 | 6 |

¹⁾ The KV_{s value} is a flow rate value for water, measurement at +20 °C and 1 bar pressure difference above the fully opened valve.

6.7 Type label

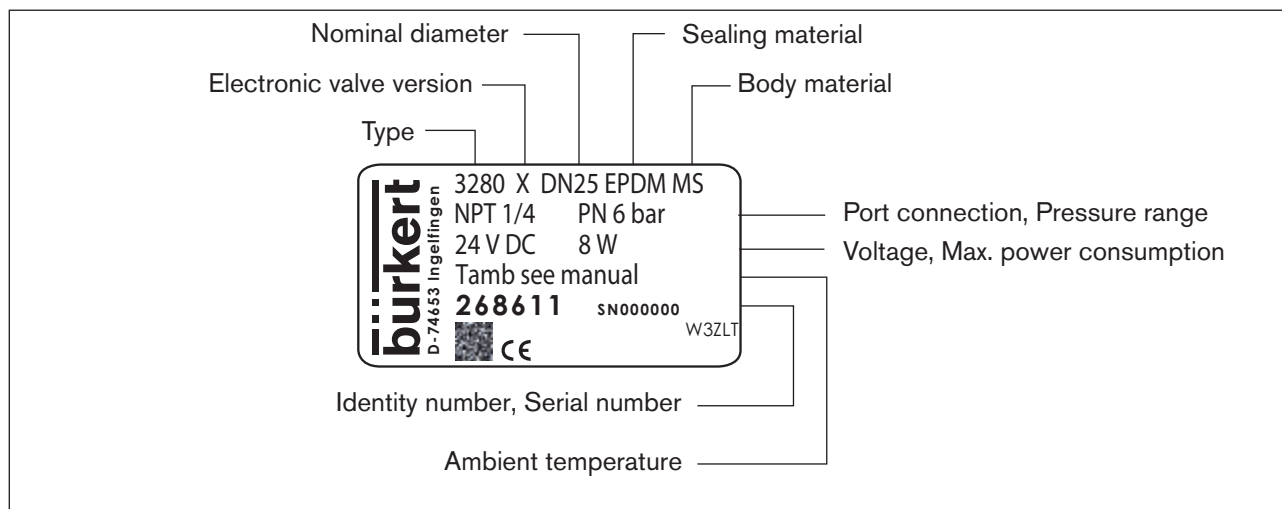


Figure 5: Description of the type label (Example)

7 INSTALLATION

7.1 Safety instructions



DANGER!

Risk of injury from high pressure in the system or device.

- ▶ Before working on the system or device, cut off the pressure and deaerate/drain lines.

Risk of injury due to electrical shock.

- ▶ Before working on the system or device, switch off the power supply and secure to prevent reactivation.
- ▶ Observe applicable accident prevention and safety regulations for electrical equipment.



WARNING!

Risk of injury from improper installation.

- ▶ Installation may be carried out only by trained technicians and with the appropriate tools!
- ▶ Secure system against unintentional activation.
- ▶ Following installation, ensure a controlled or defined restart.

7.2 Fluid installation



DANGER!

Risk of injury from high pressure in the system or device.

- ▶ Before working on the system or device, cut off the pressure and deaerate or drain lines.

Installation position: any position, preferably with actuator above and installed vertically with the actuator cover upwards

Procedure:

- Clean pipelines and port connections.
- Install a dirt filter before the valve inlet (≤ 0.3 mm).

NOTE!

Caution risk of breakage!

- Do not use plastic actuator housing as a lever arm.

→ Hold the device with a suitable tool (open-end wrench) on the body and screw into the pipeline.

- Observe flow direction. The arrow on the body indicates the direction of flow.
Type 3280: Flow direction below seat, is always closed against the medium flow;
Type 3285: Flow direction above seat, is always closed with the medium flow.

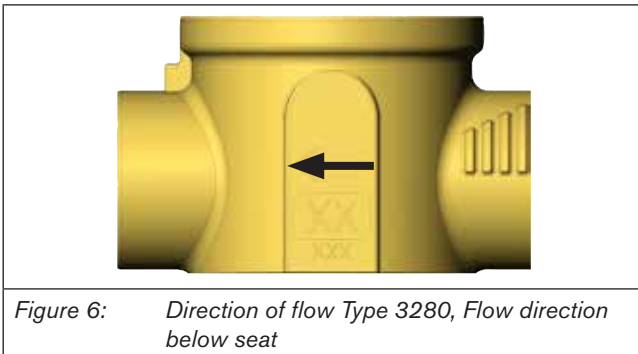


Figure 6: Direction of flow Type 3280, Flow direction below seat

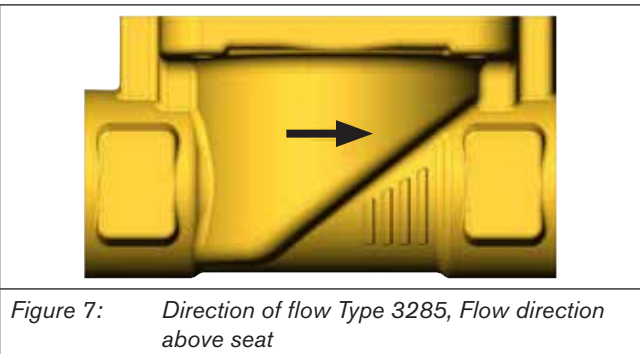


Figure 7: Direction of flow Type 3285, Flow direction above seat

7.3 Electrical installation



None of the electrical inputs and outputs of the device are galvanically isolated from the supply voltage.



DANGER!

Risk of injury due to electrical shock.

- ▶ Before working on the system or device, switch off and isolate the power supply to prevent reactivation of the device.
- ▶ Observe applicable accident prevention and safety regulations for electrical equipment.

NOTE!

Damage to the electromotive control valve due to incorrect supply voltage.

- The supply voltage must correspond with the voltage indicated on the type label.
- If the ground connection is not connected, the conditions of the EMC Law will not be met.

Procedure:

- Connect the electromotive control valve according to the table.
When the supply voltage is applied, the electromotive control valve is ready for operation.

Designation of the circular connector (M12 x 1, 8-pole):

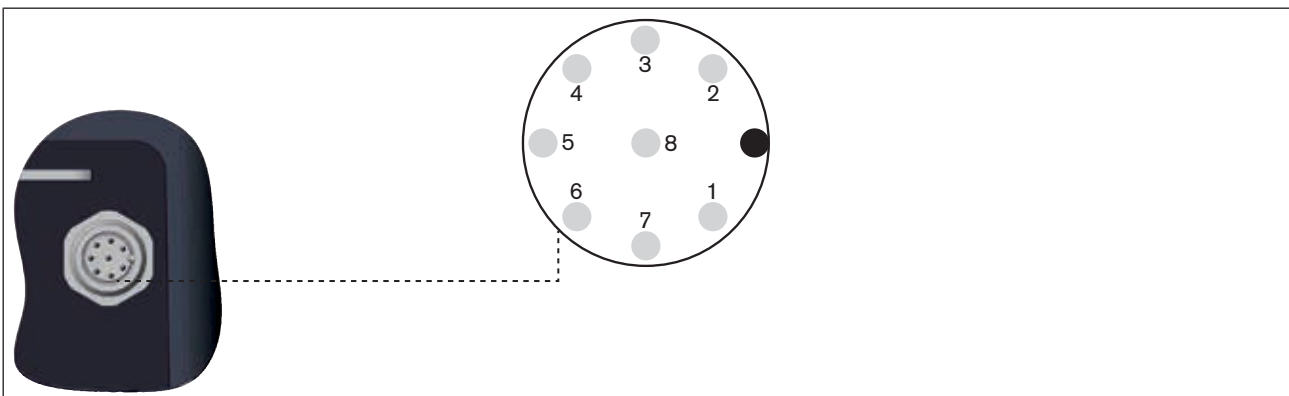


Figure 8: Circular connector M12 x 1, 8-pole

Pin assignment for the standard version:

| Pin | Configuration | External circuit |
|--------|-------------------------|---|
| 1 | Supply + | 24 V DC $\pm 10\%$, max. residual ripple 10 % |
| 2 | Supply GND | 24 V DC GND |
| 3 | do not connect! | Electrically insulate wire on connection line |
| 4 | do not connect! | Electrically insulate wire on connection line |
| 5 | do not connect! | Electrically insulate wire on connection line |
| 6 | Set-point value input + | 4...20 mA / 0...10 V, not galvanically isolated |
| 7 | Binary output | 0...5 V (log. 0), 10...30 V (log. 1), not galvanically isolated |
| 8 | Signal GND | Signal GND |
| Body * | Shielding | - |

* The threaded sleeve of the M12 circular connector is connected to the valve body. Connect the body to a suitable ground connection. To ensure electromagnetic compatibility (EMC), ensure that the cable is as short as possible and the cross-section is as large as possible.

Pin assignment for the positioner version:

| Pin | Configuration | External circuit |
|--------|-------------------------|---|
| 1 | Supply + | 24 V DC $\pm 10\%$, max. residual ripple 10 % |
| 2 | Supply GND | 24 V DC GND |
| 3 | CAN low | CAN low** |
| 4 | CAN high | CAN high** |
| 5 | CAN GND | CAN GND** |
| 6 | Set-point value input + | 0...20 mA / 4...20 mA / 0...5 V / 0...10 V, not galvanically isolated |
| 7 | Actual value output | 0...20 mA / 4...20 mA / 0...5 V / 0...10 V, not galvanically isolated |
| 8 | Signal GND | Signal GND |
| Body * | Shielding | - |

* The threaded sleeve of the M12 circular connector is connected to the valve body. Connect the body to a suitable ground connection. To ensure electromagnetic compatibility (EMC), ensure that the cable is as short as possible and the cross-section is as large as possible.

** 3.3 V signal voltage, reliable communication decreases as the line length and transfer rate increases.

7.4 DIP switch settings



DANGER!

Risk of injury due to electrical shock.

- ▶ Before opening the actuator cover, switch off and isolate the power supply to prevent reactivation of the device.
- ▶ Observe applicable accident prevention and safety regulations for electrical equipment.

Although the factory settings are ideal for most applications, the settings can be adjusted with DIP switches. The DIP switches can be set to "ON" or "OFF" position depending on the factory order code.

The DIP switches are accessible on the electronic PCB by opening the actuator cover.

7.4.1 Setting the DIP switch for Type 3280

Opening the actuator cover

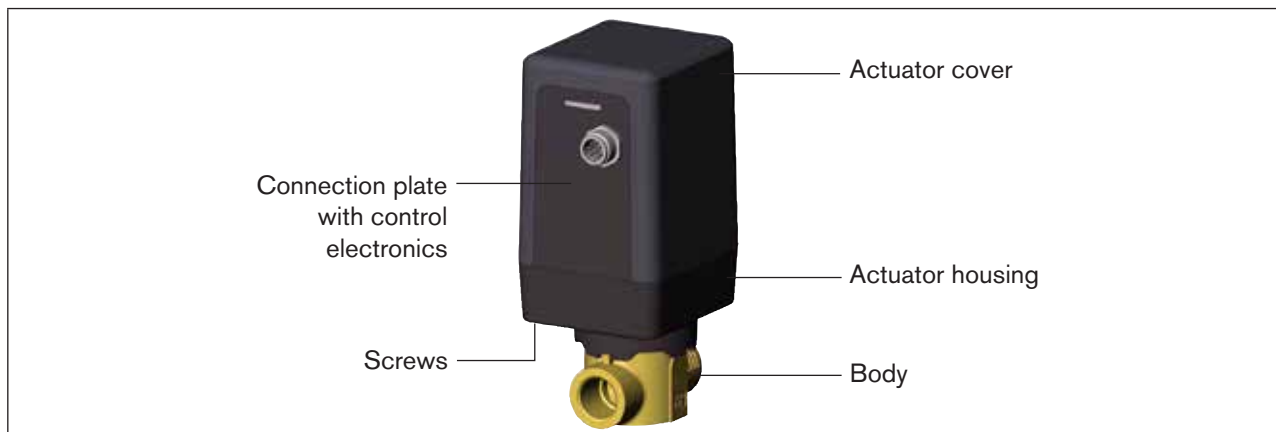


Figure 9: Opening the actuator cover, Type 3280

→ Disconnect the power supply from the device.

→ Carefully loosen the 4 screws on the underside of the actuator housing using a suitable tool. The screws need not be completely unscrewed, as they are designed not to fall out.

NOTE!

The connection plate is only plugged in and may fall down when the actuator cover is removed.

→ Secure actuator cover and connection plate with control electronics against falling down and remove the actuator cover.

Setting the DIP switch

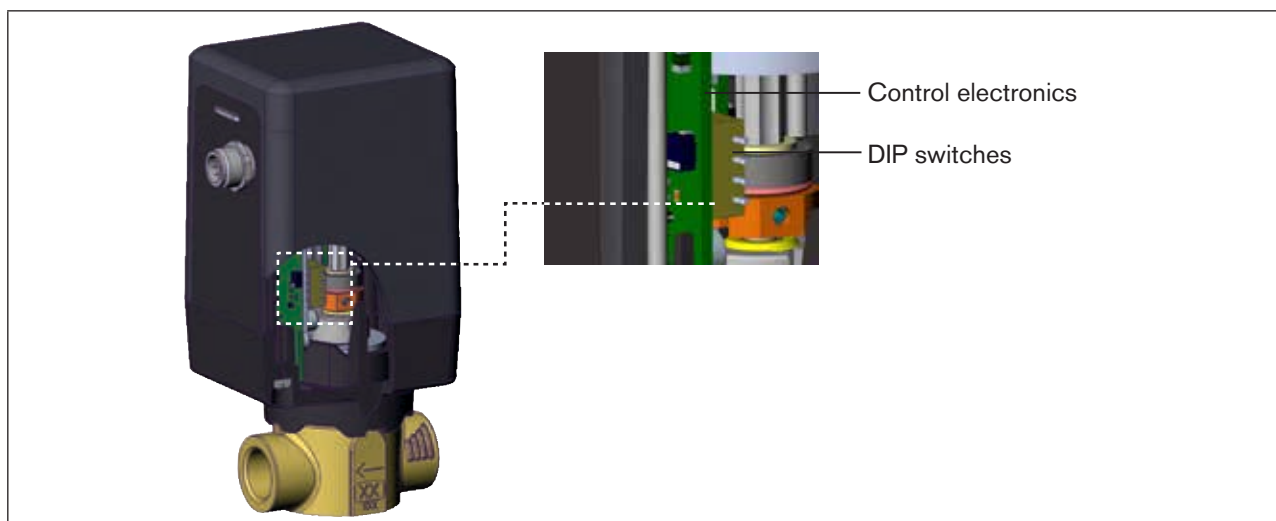


Figure 10: Location of the DIP switch, Type 3280

→ DIP switch, set to "ON" or "OFF" depending on required function. To do this, carefully actuate the particular DIP switch using a suitable tool.

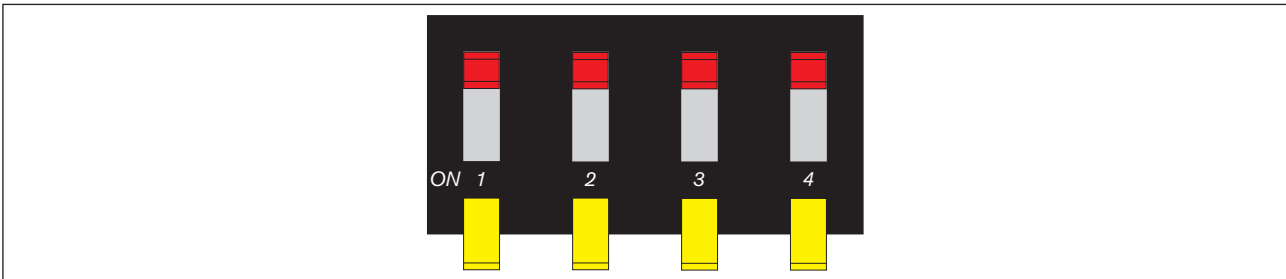


Figure 11: DIP switches

Description of the function

| DIP switches | Position | Function for the standard version | Function for the positioner version |
|--------------|----------|---|---|
| 1 | OFF | Normal operating direction of the set-point value (e.g. set-point value 4...20 mA corresponds to position 0...100 %), increasing | no function |
| | ON | Reversal of the operating direction of the set-point value (e.g. set-point value 20...4 mA corresponds to position 0...100 %), decreasing | no function |
| 2 | OFF | Set-point value input 4...20 mA | Set-point value source analog input |
| | ON | Set-point value input 0...10 V | Set-point value source field bus (büS or CANopen) |
| 3 | OFF | Valve actuating speed: normal mode | büS |
| | ON | Valve actuating speed: slow mode | CANopen |
| 4 | OFF | Low power function: off | no function |
| | ON | Low power function: on, lower force, less heat generation in the valve | no function |



The change in function does not become effective until the supply voltage is applied again. A more precise description of the functions can be found in chapter ["8 Start-up"](#).

Closing the actuator cover

NOTE!

Damage or malfunction due to ingress of dirt and moisture!

- To guarantee protection class IP, ensure that the actuator housing has been installed correctly.



Do not clamp any loose cables!

→ Carefully attach actuator cover.

→ Insert 4 screws by hand into the designated holes on the underside of the actuator housing and screw in first thread turn.

→ Tighten screws (tightening torque: 2 Nm).

7.4.2 Setting the DIP switch for Type 3285

Opening the actuator cover

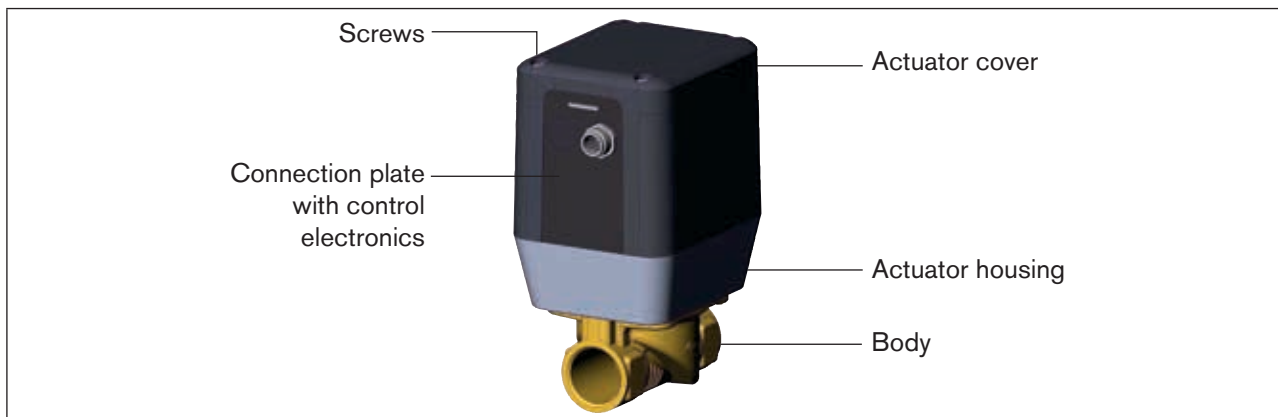


Figure 12: Opening the actuator cover, Type 3285

- Disconnect the power supply from the device.
- Carefully loosen the 4 screws on top of the actuator housing using a suitable tool. The screws need not be completely unscrewed, as they are designed not to fall out.

NOTE!

The connection plate is only plugged in and may fall down when the actuator cover is removed.

- Secure actuator cover and connection plate with control electronics against falling down and remove the actuator cover.

Setting the DIP switch

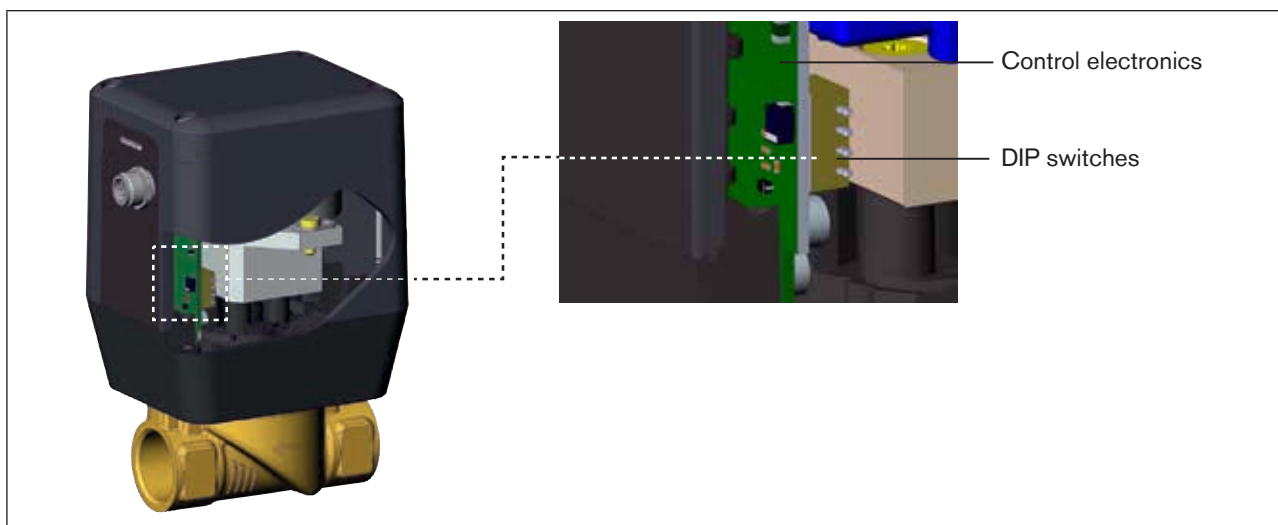


Figure 13: Location of the DIP switch for Type 3285

- DIP switch, set to "ON" or "OFF" depending on required function. To do this, carefully actuate the particular DIP switch using a suitable tool.

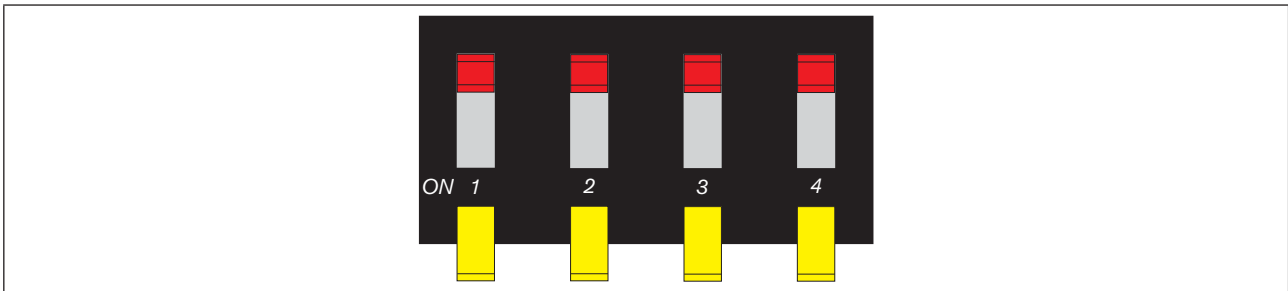


Figure 14: DIP switches

Description of the function

| DIP switches | Position | Function for the standard version | Function for the positioner version |
|--------------|----------|---|---|
| 1 | OFF | Normal operating direction of the set-point value (e.g. set-point value 4...20 mA corresponds to position 0...100 %), increasing | no function |
| | ON | Reversal of the operating direction of the set-point value (e.g. set-point value 20...4 mA corresponds to position 0...100 %), decreasing | no function |
| 2 | OFF | Set-point value input 4...20 mA | Set-point value source analog input |
| | ON | Set-point value input 0...10 V | Set-point value source field bus (büS or CANopen) |
| 3 | OFF | Valve actuating speed: normal mode | büS |
| | ON | Valve actuating speed: slow mode | CANopen |
| 4 | OFF | Low power function: off | no function |
| | ON | Low power function: on, lower force, less heat generation in the valve | no function |



The change in function does not become effective until the supply voltage is applied again. A more precise description of the functions can be found in chapter ["8 Start-up"](#).

Closing the actuator cover

NOTE!

Damage or malfunction due to ingress of dirt and moisture!

- To guarantee protection class IP, ensure that the actuator housing has been installed correctly.



Do not clamp any loose cables!

→ Carefully attach actuator cover.

→ Insert 4 screws by hand into the designated holes on top of the actuator housing and screw in first thread turn.

→ Tighten screws (tightening torque: 2 Nm).

7.5 LED display

With the aid of the positioner version, it is possible to use the Bürkert Communicator Software to toggle the LED colors between standard and NAMUR NE 107.

7.5.1 Display elements standard

| LED color | Status | Display |
|---------------------|-----------------|--|
| white | continuously on | Normal operation |
| white | flashing | Booting phase when voltage applied |
| yellow | continuously on | Valve completely open |
| green | continuously on | Valve closed |
| red | flashing | Error |
| white, green or red | flashing | Is used to identify a device in the bus network. The „flashing“ status is started in the Bürkert Communicator Software when selecting the device |
| no color or LED off | - | Valve without power supply |

7.5.2 Display elements NAMUR NE 107

| LED color | Status | Display |
|---------------------|-----------------|--|
| white | continuously on | Normal operation |
| green | continuously on | Active diagnosis |
| red | continuously on | Error |
| white, green or red | flashing | Is used to identify a device in the bus network. The „flashing“ status is started in the Bürkert Communicator Software when selecting the device |
| no color or LED off | - | Valve without power supply |

8 START-UP



WARNING!

Danger due to improper operation.

Improper operation may result in injuries as well as damage to the device and the area around it.

- ▶ The operating personnel must know and have understood the contents of the operating instructions.
- ▶ Observe the safety instructions and intended use.
- ▶ Only adequately trained personnel may operate the device.



Before start-up, carry out fluid and electrical installation of the valve.

Electromotive control valve Type 3280 and 3285 has different functions which can be configured and parametrized via the DIP switches.

8.1 Functions of the standard version

The following basic functions can be activated or changed via the DIP switches.

| Function | Description |
|--------------------------------------|--|
| Zero point shut-off | The valve has a zero point shut-off which guarantees that the valve closes tight when input signals are below a threshold of 2 % of the input signal. The valve is closed when values are below this threshold. |
| Interruption in the power supply | When the power supply is interrupted, the valve remains in its respective position. When the supply voltage is applied again, the control electronics automatically detect its current valve position and will automatically adjust the valve position if standard signal has changed. |
| Digital output | When the valve reaches the closed position, the position can be relayed e.g. to a PLC via the binary output. 10 to 30 V = log "1" = valve closed |
| Analog input (set-point value input) | 0...10 V standard signal or 4...20 mA standard signal, see chapter "7.4". With a set-point value input of 4...20 mA, the valve stops in the current position and the LED flashes red (signal error detection) if the value of the input signal falls below 4 mA. |
| Effective direction | The normal effective direction of the set-point value can be set to increasing or decreasing (see chapter "7.4"). If valves are set to increasing, the valve is opened as far as possible with the largest set-point. |
| Valve actuating speed | Two valve actuating speeds can be set (see chapter "7.4"). At normal valve speed the electromotive control valve moves from the closed valve position to the open valve position (0...100 %) in 2.5 s (Type 3280), 4 s (Type 3285). At slow valve speed the control valve moves from 0...100 % in 5 s (Type 3280), 10 s (Type 3285). |

| | |
|--------------------|---|
| Low power function | The control valve has a low power function which can be adjusted (see chapter "7.4"). When the function is switched on, the motor is supplied with lower current. The motor then provides a lower torque; as a result the maximum permitted medium pressure is lower. The function may be used only at very low differential pressures from input to output (max. medium pressure 3 bar, max. differential pressure 1 bar). |
|--------------------|---|

8.2 Functions of the positioner version

Electromotive control valve Type 3280 and 3285 has different functions, which can be changed via the DIP switches and communications software.

| Function | Description |
|---|--|
| Zero point shut-off | The valve features a zero point shut-off which ensures sealing of the valve with input signals below a set input signal threshold. The valve is closed when values are below this threshold. See chapter "8.2.1". |
| Interruption in the power supply | When the power supply is interrupted, the valve remains in its respective position. When the supply voltage is applied again, the control electronics automatically detect its current valve position and will automatically adjust the valve position if standard signal has changed. |
| Correction characteristic for adapting the operating characteristic | Use this additional function to select a transfer characteristic in relation to the set-point value (set-point position, <i>CMD</i>) and the valve stroke (<i>POS</i>) for correcting the flow or operating characteristic. See chapter "8.2.1". |
| Insensitivity range | The position controller is only activated once a defined control difference has been achieved. See chapter "8.2.1". |
| Effective direction | Reversal of the effective direction of the set-point value. See chapter "8.2.1". |
| Safety position | Definition of the safety position for set-point value input < 4 mA. See chapter "8.2.1". |
| Value actuating speed | Input of the opening and closing time. See chapter "8.2.1". |
| Analog input (set-point value input) | 4...20 mA; 0...20 mA; 0...5 V; 0...10 V can be set as standard signals, see chapter "8.2.1". |
| Analog output (actual value output) | 4...20 mA; 0...20 mA; 0...5 V; 0...10 V can be set as standard signals, see chapter "8.2.1". |
| User calibration | Changing the factory calibration of the signal input. See chapter "8.2.1". |
| Energy save function | The control valve features a set table energy-saving function. When the energy-saving function is switched on, less current is supplied to the motor. The motor then provides a smaller torque, resulting in a reduced max. permissible medium pressure. Only use the energy-saving function with very low differential pressures from On-Closed output (max. medium pressure 3 bar, max. differential pressure 1 bar). See chapter "8.2.1". |
| büS / CANopen | büS or CANopen can be selected as the field bus. See chapter "7.4". |
| Analog input / Field bus (Set-point value source) | Analog output or field bus (büS/CANopen) can be selected as the set-point value source. See chapter "7.4". |

8.2.1 Setting options

The Bürkert Communicator software enables communication with valves 3280 and 3285.



The operating instructions for the Bürkert Communicator can be found at www.burkert.com.

INPUT/OUTPUT

Selected standard signal

Enter the used standard signal for the set-point value or actual value in this menu item (can be selected as the set-point value source for analog input, see chapter "7.4").

- Current 4...20 mA
- Current 0...20 mA
- Voltage 0...10 V
- Voltage 0...5 V

CHARACT

Select the transfer characteristic between input signal (position set-point value) and stroke (correction characteristic)

Use this auxiliary function to select a transfer characteristic with reference to set-point value (nominal position, *CMD*) and valve stroke (*POS*) for correction of the flow-rate or operating characteristic.

The flow characteristic $k_v = f(s)$ indicates the flow-rate of a valve, expressed by the k_v value depending on the position/angle s . It is specified by the design of the valve seat and the seat seal. In general two types of flow characteristics are implemented, the linear and the equal percentage.

In the case of linear characteristics identical k_v value changes k_v are assigned to identical stroke changes ds ($dk_v = n_{lin} \cdot ds$).

In the case of an equal percentage characteristic an equal percentage change of the k_v value corresponds to a stroke change ds ($dk_v/k_v = n_{eq\%prct} \cdot ds$).

The operating characteristic $Q = f(s)$ states the correlation between the volume flow Q , which flows through the valve installed in the system, and the position/angle s .

In the case of control tasks for closed-loop control systems it is usually particular demands which are placed on the course of the operating characteristic, e.g. linearity. For this reason it is occasionally necessary to correct the course of the operating characteristic in a suitable way. Equal percentage characteristics 1:25, 1:33, 1:50, 25:1, 33:1 and 50:1 and a linear characteristic can be set. Furthermore, a characteristic can be freely programmed via nodes or automatically calibrated.

CUTOFF

Sealing function for position controller

This function causes the valve to be sealed outside the control area. Enter the limits for the position set-point value (*CMD*) after which the actuator is closed fully.

DIR.CMD

Effective sense or effective direction of the position controller set-point value

Use this auxiliary function to set the sense of effective direction between the input signal (*INPUT*) and the nominal position (*CMD*) of the actuator.

X.TIME

Limiting the control speed

Smaller control speeds can be entered in order to limit the control speed.

F.LIMIT

Energy-saving function

The control valve features a set table energy-saving function. When the energy-saving function is switched on, less current is supplied to the motor. The motor then provides a smaller torque, resulting in a reduced max. permissible medium pressure. Only use the energy-saving function with very low differential pressures from On-Closed output (max. medium pressure 3 bar, max. differential pressure 1 bar).

X.LIMIT

Limits the mechanical stroke range

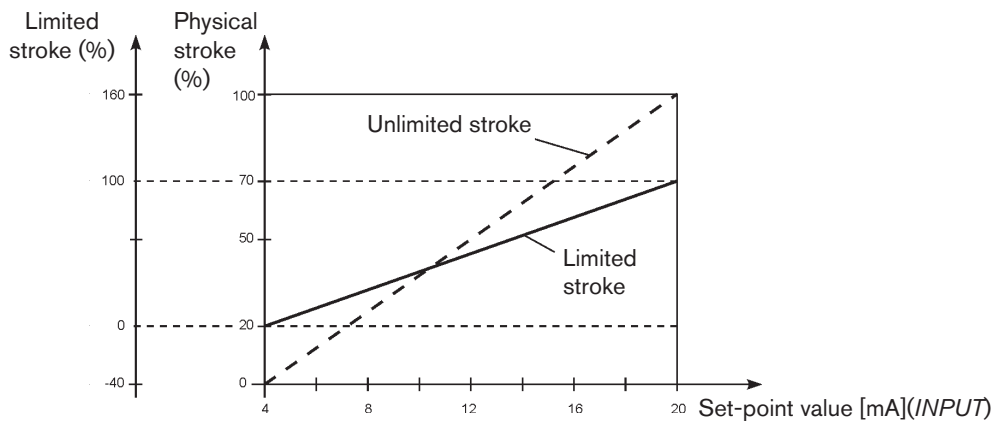
This function limits the (physical) stroke to specified % values (lower and upper). In doing so, the stroke range of the limited stroke is set equal to 100 %. If the limited stroke range is left during operation, negative actual position or actual position greater than 100 % are indicated.

Factory setting: Lower position limit = 0 %, Upper position limit = 100 %

Adjustment range:

Lower position limit: 0...20 % of the total stroke




Upper position limit: 80...100 % of the total stroke



SIGNAL.SIM

Simulation of the set-point value

Use this function to simulate the set-point value. The set set-point value source is ignored by the device during simulation. The following types of signal can be entered:

- Sinus** Sine wave 
- Square** Square wave 
- Triangle** Triangle wave 
- Fixed** Manual input of a fixed set-point value

The following parameters can be set for the selected waveform:

| Menu option | Parameter setting | Schematic representation with sine wave |
|------------------|-----------------------|---|
| Offset | (Zero offset as %) | |
| Amplitude | (Amplitude as %) | |
| Periode | (Cycle duration in s) | |

X.CONTROL

Parameterization of the position controller, insensitivity range (dead band) of the position controller

Input of the dead band in %, with regard to the scaled stroke/rotation angle range. This function ensures that the controller is only activated once a certain control difference has been achieved.

SAFEPOS

Input of the safety position

With a set-point value input of 4...20 mA, it is possible to enter how the actuator should react if the value of the input signal falls below 4 mA (signal error detection). The actuator can be moved to the respective end positions or stay in the current position.

CAL INP

Calibration of the position set-point value (4...20 mA; 0...20 mA; 0...5 V; 0...10 V)

The set-point value input can be re-calibrated using this auxiliary function. Acceptance of the min. input signal (0 mA; 4 mA; 0 V): Create the minimum value of the input signal at the input and confirm it in the software. Acceptance of the max. input signal (20 mA; 5 V; 10 V): Create the maximum value of the input signal at the input and confirm it in the software.

FACTORY RESET

Reset to the factory settings

Use this function to reset all user settings to the delivery status. All parameters, except for the calibration values, are reset to default values. The hardware is subsequently reset.

DIAGNOSIS

Errors can be read via this function.

TOGGLE LED DISPLAY

Toggle the LED colors between standard and NAMUR NE 107

Use this function to toggle the colors for displaying the device status between standard and NAMUR NE 107.

9 MAINTENANCE, TROUBLESHOOTING

9.1 Safety instructions



DANGER!

Risk of injury from high pressure in the system or device.

- ▶ Before working on the system or device, cut off the pressure and deaerate/drain lines.

Risk of injury due to electrical shock.

- ▶ Before working on the system or device, switch off and isolate the power supply to prevent reactivation of the device.
- ▶ Observe applicable accident prevention and safety regulations for electrical equipment.



WARNING!

Risk of injury from improper maintenance work.

- ▶ Maintenance may be carried out only by trained technicians and with the appropriate tools!
- ▶ Secure system against unintentional activation.
- ▶ Following maintenance, ensure a controlled restart.

9.2 Maintenance

The electromotive control valve Type 3280 and 3285 is maintenance-free under normal conditions.

9.3 Cleaning

Use the normal cleaning agents to clean the Type 3280 and 3285. Use no alkaline cleansing agents, as these have a damaging effect on the materials used.

9.4 Troubleshooting

In malfunctions occur, check:

- the port connectors,
- whether the operating pressure is within the permitted range,
- the power supply and the standard signals.

| Problem | Possible cause | Remedial action |
|--|---|---|
| LED is not lit | No power supply | → Check the electrical connections |
| LED flashes sporadically white | The power supply collapses periodically - device software reboots each time | → Select power supply with adequate power → Check cable for possible loose connections |
| LED flashes red / LED illuminates red | The residual ripple of the supply voltage is too high | → Use power supply with a smooth output voltage at the required power → After eliminating the fault, restart the device for normal operating (isolate from power supply) |
| | Temperature too high | → Observe max. ambient temperature / medium temperature; if required reduce duty cycle (see Derating curve) → After eliminating the fault, restart the device for normal operating (isolate from power supply) |
| | Standard signal is < 4 mA; cable break | → Check cable for possible loose connections |
| No flow rate available | The set-point value is below the limit for the zero point shut-off | → Increase set-point value |
| Valve opens even though it should close | Operating direction of the set-point value has been set incorrectly | → Change direction of the set-point |
| Motor is making an unusual droning noise | Gearbox or motor blocked | → Return device to the manufacturer to have the fault repaired |
| Valve is not opening / closing correctly | Low power function activated; motor torque for medium pressure too low | → Deactivate low power function |
| Valve is not sealed | Dirt between seal and valve seat | → Install dirt filter and return device to the manufacturer for cleaning |

10 SPARE PARTS



CAUTION!

Risk of injury and/or damage by the use of incorrect parts.

Incorrect accessories and unsuitable spare parts may cause injuries and damage the device and the surrounding area.

► Use original accessories and original spare parts from Bürkert only.

10.1 Accessories

| Designation | Order number |
|--|--|
| Connection cable M12 x 1, 8-pole, 2 m prefabricated cable | 919 061 |
| Connection cable M12 x 1, 8-pole, 2 m prefabricated shielded cable | 918 991 |
| buS stick set (including power supply unit) | 772 426 |
| Bürkert-Communicator-Software | Download at www.burkert.com |

11 PACKAGING AND TRANSPORT

NOTE!

Transport damage.

Inadequately protected devices may be damaged during transportation.

- Protect the device against moisture and dirt in shock-resistant packaging during transportation.
- Prevent the temperature from exceeding or dropping below the permitted storage temperature.
- Using protective caps, protect the electrical interfaces from damage.

12 STORAGE

NOTE!

Incorrect storage may damage the device.

- Store the device in a dry and dust-free location!
- Storage temperature: -20 °C...+70 °C.

13 DISPOSAL

NOTE!

Damage to the environment caused by parts contaminated with medium.

- Dispose of the device and packaging in an environmentally friendly manner.
- Observe applicable disposal and environmental regulations.



Observe the national waste disposal regulations.

