bürkert
FLUID CONTROL SYSTEMS

Type 3360, 3361,
AE3360, AE3361, AE33

Electromotive control valve

MAN 1000274112 EN Version: M Status: RL (released | freigegeben) printed: 05.08.2026

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Operating Instructions

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Operating Instructions 2606/11_ENen_00810490 / Original DE

Electromotive control valve

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1 OPERATING INSTRUCTIONS

The operating instructions describe the entire life cycle of the device. Keep these instructions in an easily accessible location for every user. The instructions must be available to each new owner of the device.

Important safety information.

Carefully read through the operating instructions. Study in particular the chapters entitled *Basic safety instructions* and *Intended use*.

▸ The operating instructions must be read and understood.

1.1 Symbols

DANGER!

Warns of an immediate danger!

▸ Failure to observe these instructions will result in death or serious injuries.

WARNING!

Warns of a potentially hazardous situation!

▸ Failure to observe these instructions may result in serious injuries or death.

CAUTION!

Warns against a possible risk.

▸ Failure to observe these instructions may result in moderate or minor injuries.

ATTENTION!

Warns of damage to property.

• Failure to observe these instructions may result in damage to the device or the system.

Indicates important additional information, advice and recommendations.

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

▸ Indicates an instruction to be carried out to avoid danger.

→ Indicates a procedure to be carried out.

Designates a result.

MENU Symbol for software interface texts.

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1.2 Definition of terms

- **Device:** The term “Device” used in these instructions applies to the types described in these instructions:
  Type 3360, electromotive angle seat control valve
  Type 3361, electromotive globe control valve
- AG2: Actuator size 2 with a nominal force of 1300 or 2500 N for seat size 3...50
  AG3: Actuator size 3 with a nominal force of 7700 or 10000 N for seat size 40...100
- **Ex:** The abbreviation “Ex” used in these instructions stands for “potentially explosive”.
- The term “büS” (Bürkert system bus) used in these instructions stands for the communication bus developed by Bürkert and based on the CANopen protocol.
- In these instructions, the unit bar stands for relative pressure. The absolute pressure is stated separately in bar(abs).

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2 INTENDED USE

Improper use of the electromotive Type 3360 and 3361 control valve may be dangerous for people, nearby equipment and the environment.

The electromotive control valve is designed to control the flow of liquid and gaseous media.

- Standard devices must not be used in the potentially explosive atmosphere. They do not possess the separate Ex type label denoting the approval for use in potentially explosive atmosphere.
- The use of alkaline cleaning agents is not permitted for cleaning the surface of the device.
- If the position of the valve has a bearing on safety concerns in the event of a power failure: Only use devices that have the SAFEPOS energy-pack (optional energy storage system).
- When using the device, observe the authorised data, operating conditions and deployment conditions specified in the contract documents and in the operating instructions.
- Protect device from harmful environmental influences! (e.g. radiation, air humidity, fumes, etc.) For any matters requiring clarification, contact the relevant sales department.

Only use the device

- in conjunction with third-party devices and components recommended or approved by Bürkert.
- when it is protected from electromagnetic interference, UV radiation and, when used outdoors, weather influences.
- in perfect condition and only when proper storage, transportation, installation and operation are ensured.
- as intended.

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3 BASIC SAFETY INSTRUCTIONS

This safety information does not take into account any contingencies or occurrences that may arise during installation, use and maintenance of the device. The operating company is responsible for the respect of the local safety regulations, including staff safety.

Risk of injury from high pressure.

- Before working on the system or device, switch off the pressure and ventilate or empty the lines.

Danger of burns and risk of fire.

The surface of the device may become hot following an extended duty cycle or as a result of a hot medium.

- Only touch the device when wearing protective gloves.
- Keep the device away from highly flammable substances and media.

Danger due to loud noises.

- Depending on the usage conditions, the device may generate loud noises. More detailed information on the likelihood of loud noises is available from the relevant sales department.
- Wear hearing protection when in the vicinity of the device.

Discharge of medium if packing gland worn.

- Relief bore must be regularly inspected for any medium leakages.
- If medium is leaking from the relief bore, the packing gland must be replaced (see chapter “Maintenance”).
- If the medium is hazardous, secure the area around the leakage to prevent risks.

Risk of crushing by mechanically powered parts.

- Installation work on the control cone, diaphragm and valve body must only be performed while electrically isolated.
  For devices with SAFEPOS energy-pack: completely remove the SAFEPOS energy-pack. Wait until the LED ring is no longer lit and ensure that the LED status is not in “LED off” mode.
- Do not reach into the openings of the valve body.

Risk of uncontrolled process in the event of a power failure.

For devices without the optional SAFEPOS energy-pack, the valve will not stop in a defined position in the event of a power failure.

- Only use devices that have a SAFEPOS energy-pack (optional energy storage system).
- Select a valve position that is safe in respect of the process in the SAFEPOS menu.

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General hazardous situations.

To prevent injury, ensure that:

- In potentially explosive atmosphere the device must only be used in accordance with the specifications on the separate type label.
- The additional information and safety instructions relating to potentially explosive atmospheres enclosed with the device or the separate operating instructions relating to potentially explosive atmospheres must be heeded when using the device.
- In potentially explosive atmospheres, only use devices with a separate “Ex” type label for use in such atmospheres.
- Feed only those media listed in chapter “8 Technical data” into the medium ports.
- Do not make any internal or external changes to the device and do not subject it to mechanical stress.
- Transport, install and dismantle a heavy device only with the aid of a second person and using suitable equipment.
- Secure the device against unintentional activation.
- Only trained technicians carry out installation and maintenance work.
- Following an interruption in the power supply, ensure that the process is restarted in a controlled manner. Observe the sequence.
  1. Connect supply voltage.
  2. Pressurise the device with medium.
- Observe the general rules of technology.
- The valves must be installed according to the regulations applicable in the country of use.

ATTENTION!

Electrostatically sensitive components and assemblies.

The device contains electronic components that are susceptible to the effects of electrostatic discharging (ESD). Components that come into contact with electrostatically charged persons or objects are at risk. In the worst-case scenario, they will be destroyed immediately or will fail after start-up.

- Observe the requirements for minimizing or avoiding the possibility of damage caused by sudden electrostatic discharge in accordance with EN 61340-5-1!
- Do not touch electronic components when the supply voltage is connected!

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4 GENERAL NOTES

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@burkert.com

International

Contact addresses can be found on the final pages of the printed operating instructions.

Also on the Internet at:

country.burkert.com

4.2 Warranty

A precondition for the warranty is that the device is used as intended and that the specified usage conditions are adhered to.

4.3 Information on the Internet

Operating instructions and data sheets for Types 3360 and 3361 can be found on the Internet at:

country.burkert.com

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5 PRODUCT DESCRIPTION

5.1 General description

The electromotive control valve Type 3360 and 3361 is suitable for controlling the flow of liquid and gaseous media. This may be neutral gas, water, alcohol, oil, fuel, hydraulic fluid, salt solution, caustic soda, organic solvent or vapour.

The control valve has an electromotive linear actuator with actuation electronics assembly. The actuation electronics assembly for position control or process control is actuated either via standard signals (analogue) or a fieldbus (digital). The electromotive linear actuator is set up such that it is optimally effective. At the same time, when idling without power, it also keeps the valve sealed and in position even under the maximum specified operating pressure.

The device can also be equipped with the energy storage system (SAFEPOS energy-pack). In the event of a supply voltage failure, the energy storage system supplies the actuator with the energy required to move the valve to the position defined in the SAFEPOS menu.

The valve position can be manually changed in 2 ways.
1. Electrical manual override: used if supply voltage is present.
2. Mechanical manual override: Must only be used if there is no supply voltage present.

The device can be set and operated either with 2 buttons and 4 DIP switches, or on a display with buttons for touch operation. It is also always possible to set the device with the büS service interface and by using the software Bürkert Communicator. The USB büS interface set, available as an accessory, is required for configuration with Bürkert Communicator.

One special characteristic of the Type 3361 globe control valve is the screwed-in valve seat, which can be replaced to reduce the seat size.

5.2 Properties

- High seal tightness due to self-adjusting packing gland.
- Devices with PTFE seal material are kept sealed without power.
- High flow rate values due to the stainless steel valve body that aids in flow.
- External, directly accessible display with buttons for touch operation.
- Mechanical position indicator shows the valve position even in the event of a supply voltage failure.
- 360° LED light ring for displaying device states, valve end positions and operating state.
- No electrical energy is required to hold the valve position even under maximum operating pressure, except for basic consumption for the control unit.
- Easy and quick replacement of the control cone.
- Valve actuator can be rotated by 360°.
- Integrated control unit for position control or process control.
- Contact-free, high-resolution and wear-free position sensor.
- The actuator housing consists of a robust and heat-dissipating aluminium body. The coating is resistant to common detergents. The plastics used for the actuator housing are also detergent-resistant.

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5.2.1 Special characteristics of the 2-way globe control valve (Type 3361):

- Simple and quick replacement of the screwed-in valve seat.
- Large expansion space above the valve seat that prevents body erosion caused by cavitation.
- Optimal valve selection for the application.
  By default, 3 variants with different Cv values are available for each pipe size
  (5 variants of different Cv values for pipe size ½").

5.3 Variants

The following variants are described in these instructions:

Type 3360:

- Electromotive angle seat control valve with position control function
- Electromotive angle seat control valve with process control function

Type 3361:

- Electromotive globe control valve with position control function
- Electromotive globe control valve with process control function

5.3.1 Variants (valve sizes and actuator sizes)

Angle seat control valve Type 3360 AG2:

Available actuator size in nominal force [N]							
DN connection (valve body)		Valve seat size					
[DN]	[NPS]	15	20	25	32	40	50
15	1/2	1300	-	-	-	-	-
20	3/4	-	1300	-	-	-	-
25	1	-	-	1300	-	-	-
32	1 1/4	-	-	-	1300, 2500	-	-
40	1 1/2	-	-	-	-	1300, 2500	-
50	2	-	-	-	-	-	1300, 2500

Table 1: Angle seat control valve variants, Type 3360 AG2

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Angle seat control valve Type 3360 AG3:

Available actuator size in nominal force [N]				
DN connection (valve body)		Valve seat size		
[DN]	[NPS]	40	50	65
40	1 1/2	7700	-	-
50	2	-	7700	-
65	2 1/2	-	-	10000

Table 2: Angle seat control valve variants, Type 3360 AG3

Globe control valve Type 3361 AG2:

Available actuator size in nominal force [N]											
DN connection (valve body)		Valve seat size									
[DN]	[NPS]	3	4	6	8	10	15	20	25	32	40	50
10	3/8	1300	1300	1300	1300	1300	-	-	-	-	-	-
15	1/2	1300	1300	1300	1300	1300	1300	-	-	-	-	-
20	3/4		-	-	-	1300	1300	1300	-	-	-	-
25	1	1300	1300	1300	1300	1300	1300	1300	1300	-	-	-
32	1 1/4		-	-	-	-	-	1300	1300	1300, 2500	-	-
40	1 1/2		-	-	-	-	-	-	1300	1300, 2500	1300, 2500	-
50	2		-	-	-	-	-	-	-	1300, 2500	1300, 2500	1300, 2500

Table 3: Globe control valve variants, Type 3361 AG2

Globe control valve Type 3361 AG3:

Available actuator size in nominal force [N]						
DN connection (valve body)		Valve seat size				
[DN]	[NPS]	40	50	65	80	100
40	1 1/2	7700	-	-	-	-
50	2	7700	7700	-	-	-
65	2 1/2	10000	10000	10000	-	-
80	3	-	10000	10000	10000	-
100	4	-	-	10000	10000	10000

Table 4: Globe control valve variants, Type 3361 AG3

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5.3.2 Options

- Energy storage system (SAFEPOS energy-pack) for reaching safety position.
  The safety position that the valve is supposed to take in the event of a supply voltage failure is specified in the SAFEPOS menu.
- Various fieldbus systems for transmitting the control parameters.
- Display module with buttons for touch operation.
- SIM card for saving and transmitting device-specific values and settings.

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6 STRUCTURE AND FUNCTION

The electromotive control valve consists of an electromotive linear actuator, a control cone and a 2-way globe valve body or a 2-way angle seat valve body.

The control electronics and “SAFEPOS energy-pack” are housed in the side of the linear actuator.

The control electronics consist of the microprocessor-controlled electronic mechanism and the position sensor.

The actuation electronics assembly for position control or process control is actuated either via standard signals (analogue) or a fieldbus (digital).

Standard devices are operated with 2 buttons and 4 DIP switches, while devices with a display module can be display-operated.

The electromotive linear actuator consists of a brushless direct current motor, a gear and a threaded spindle. The valve spindle connected to the threaded spindle transfers the force to the control cone.

- The linear actuator does not use any electrical energy when holding the valve position. This means that, when idling, only the control electronics require energy.
- The stainless steel valve body aids in flow and facilitates high flow rates.
- The self-adjusting packing gland guarantees a high degree of tightness.
- The control cone is connected to the actuator spindle via a spring-type straight pin, and can thus be quickly replaced.
- The actuator housing consists of a robust and heat-dissipating aluminium body with a detergent-resistant coating. The plastics used are also detergent-resistant.
- The flow direction is always below the valve seat.

Valve seat:

- For a globe control valve, the valve seat is screwed-in.
  The seat size can easily be reduced by exchanging the screwed-in valve seat.
- For an angle seat control valve, the valve seat is machined into the valve body. This means the seat size cannot be reduced.

The valve seat is always closed against the medium flow. The flow direction must thus be such that the flow reaches the valve below the seat.

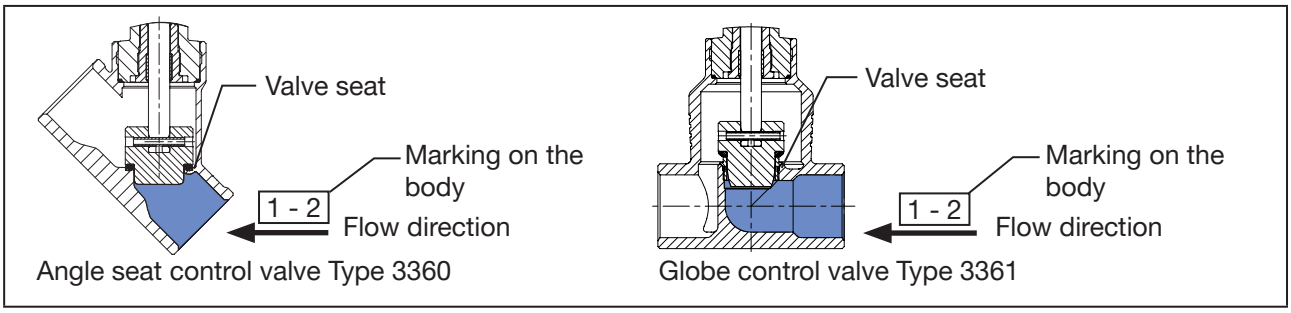

Image 1: Flow direction below seat, flow direction

Fluidic connections:

- Threaded socket connection, welded connection or clamp connection are available for all valve bodies.
- The valve body with flange connection is also available for globe control valve Type 3361.

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6.1 Illustration – Structure of the electromotive control valve AG2

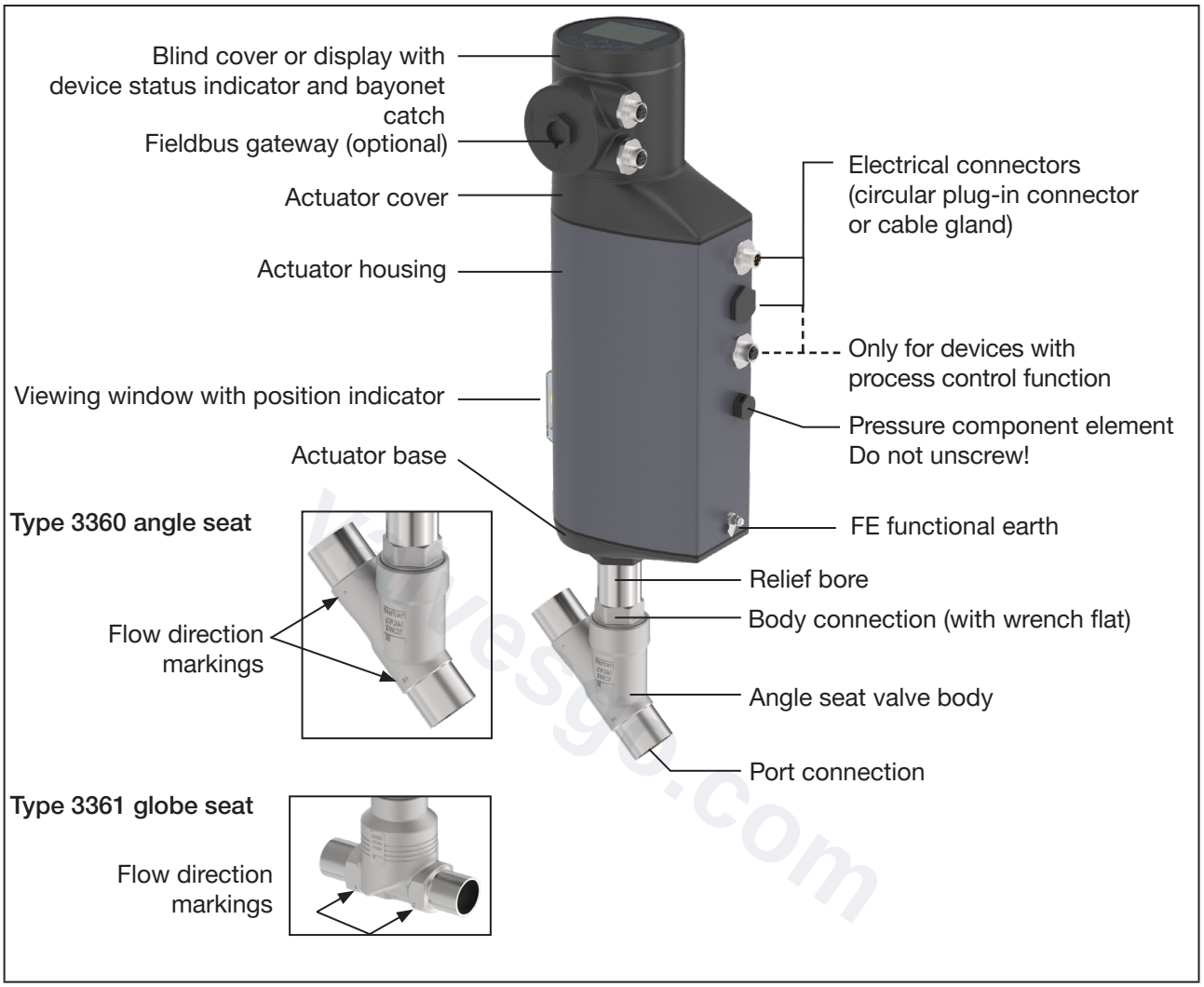

Image 2: Structure of electromotive control valve AG2

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6.2 Illustration – structure of the electromotive control valve AG3

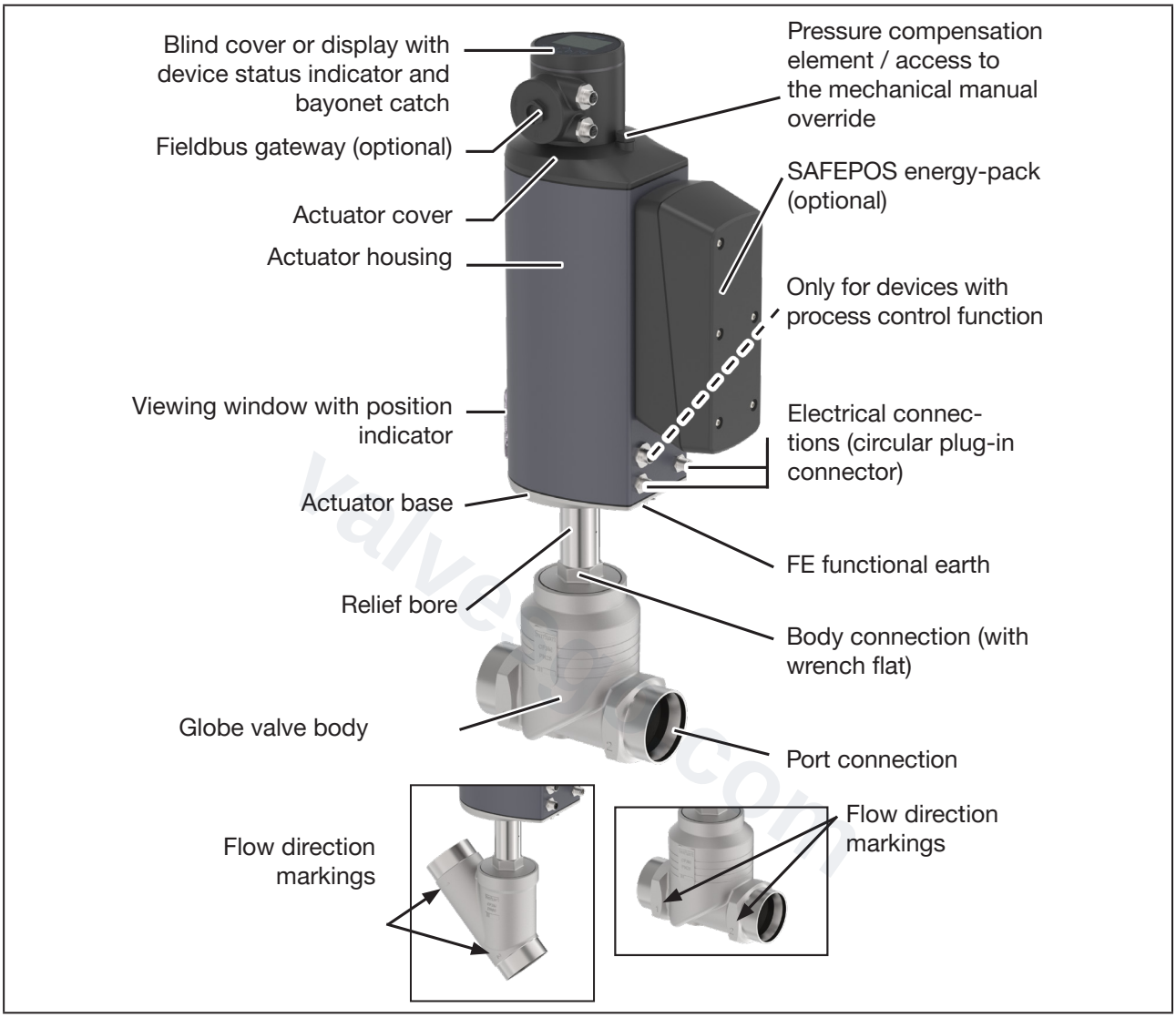

Image 3: Structure of electromotive control valve AG3

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6.3 Valve position after supply voltage failure

Valve position for devices without the SAFEPOS energy-pack:

If the electromotive actuator idles upon a supply voltage failure, the valve remains in the last position that it was in.

If the supply voltage fails while the actuator is changing the valve position, the valve remains in an undefined position. The flywheel mass of the actuator and the operating pressure continue to influence the valve spindle until it finally idles.

Valve position for devices with the SAFEPOS energy-pack energy storage:

The valve assumes the safety position defined in the SAFEPOS menu.

For a description of the SAFEPOS energy-pack energy storage system, see chapter “7.4 Energy storage SAFEPOS energy-pack (option)” on page 31

6.4 Safety position

The safety position is only approached when the device is in the AUTOMATIC operating state; see chapter “11.13 Set AUTOMATIC operating state”.

The safety position that the valve assumes in the following scenarios is defined in the SAFEPOS menu:

- Internal error
- Cable break if parameterised accordingly
- Digital input if parameterised accordingly
- Supply voltage failure (optional)
  This function is only available in devices that have the optional SAFEPOS energy-pack energy storage accessory.

The following safety positions are available to choose from in the SAFEPOS menu:

- Close = valve closed
- Open = valve opened
- User-Defined = freely defined safety position input by a per cent value (0% = closed, 100% = open).
- Inactive = valve remains in an undefined position in the event of a supply voltage failure.

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6.5 Display of the device status

The device status is displayed on the LED light ring. Various LED modes may be configured to display the device's status and valve position:

- Valve mode
- Valve mode + warnings (factory pre-set)
- NAMUR operation mode

* The description for setting the LED mode can be found in chapter "12.2.2 Set LED operation mode" on page 88.

6.5.1 Valve mode

The valve position and device status "Failure" are displayed in the valve mode.

Notifications on device statuses "Out of specification", "Maintenance required" and "Function check" are not displayed in the valve mode.

The factory-set colours for displaying the valve positions "open" and "closed" can be switched. The described can be found in the software description for Types 3360, 3361 on our homepage country.burkert.com

Displays in valve mode:

For device status "Normal": Continuously lit in the colour of the valve position.
For device status "Failure": Alternating flashing between red and the valve position colour.

Valve position	Colour for valve position	Colour for device status "Failure"
open	yellow	red
in between	white	
closed	green	

Table 5: Display of device status in valve mode

6.5.2 Valve mode + warnings

In this operation mode, the valve position and device statuses "Failure", "Out of specification", "Maintenance required" and "Function check" are displayed.

If several device statuses exist simultaneously, the device status with the highest priority is displayed. The priority is based on the severity of the deviation from standard operation (red = failure = highest priority).

Displays in valve mode + warnings:
For device status "Normal": Continuously lit in the colour of the valve position.
For device statuses that deviate from "Normal": flashes alternately with the colours for the valve position and the device status.

Valve position	Colour for valve position	Colour for device status			
		Failure, error or fault	Function check	Out of specification	Maintenance required
open	yellow	red	orange	yellow	blue
in between	white				
closed	green				

Table 6: Display of device status in valve mode + warnings

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6.5.3 NAMUR operation mode

In NAMUR mode the LED light ring lights up in the colour specified for the device status as per NAMUR NE 107.

If several device statuses exist simultaneously, the device status with the highest priority is displayed. The priority is based on the severity of the deviation from standard operation (red = failure = highest priority).

Indicators in NAMUR operation mode:

Status indicator in line with NE 107, issue 2006-06-12			
Colour	**Colour code**	**Description**	**Meaning**
red	5	Failure, error or fault	Due to a malfunction in the device or its peripherals, closed-loop control mode is not possible.
orange	4	Function check	Work is being carried out on the device, which means that closed-loop control mode is temporarily not possible.
yellow	3	Out of specification	The ambient or process conditions for the device are not within the specified range. Internal device diagnostics indicate problems within the device or with the process properties.
blue	2	Maintenance required	The device is in closed-loop control mode, but function will soon be restricted. → Carry out the required maintenance.
green	1	Diagnostics active	Device is in error-free operation. Status changes are highlighted in colour. Messages are sent via any fieldbus that may be connected.
white	0	Diagnostics inactive	Device is switched on. Status changes are not displayed. Messages are not transferred via a fieldbus that may be connected.

Table 7: Indication of the device status in NAMUR operation mode

*A detailed fault description can be found in chapter „22 Fehlerbehebung und Meldungen“ auf Seite .“22 Troubleshooting and messages” on page 159

6.5.4 Flashing of the LED light ring

Flashing indicates that a connection with the software Bürkert Communicator has been established.

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6.5.5 Notifications on device status

Notifications on device status are recorded in the logbook. Chapter “21 Maintenance” contains the most common notifications and the measures that they require.

Notifications on device status “Function check”
The notifications are presented when closed-loop control mode is interrupted by work on the device.

Notifications on device status “Function check”
MANUAL operating state active
X.TUNE active
P.TUNE active
P.LIN active
Process Simulation active
Signal generator active

Table 8: Notifications on device status “Function check”

6.6 Factory settings

Operating state:
Devices in their factory default state have their operating state preset to MANUAL.

The pre-set factory settings for the individual menu options can be found in chapter “17 Operating structure and factory setting”.

The factory settings are depicted in blue in the operating structure to the right of the menu.

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7 CONTROL ELECTRONICS

- **Variants**
  Types 3360, 3361 with position control function
  Types 3360, 3361 with process control function (optional)
- **Position sensor**
  contact-free, high-resolution and wear-free.
- **Microprocessor-controlled electronics assembly**
  for signal processing, closed-loop control and motor control.
- **Electrical interfaces**
  (circular plug-in connector or cable gland (only AG2)

7.1 Interfaces

AG2 variant

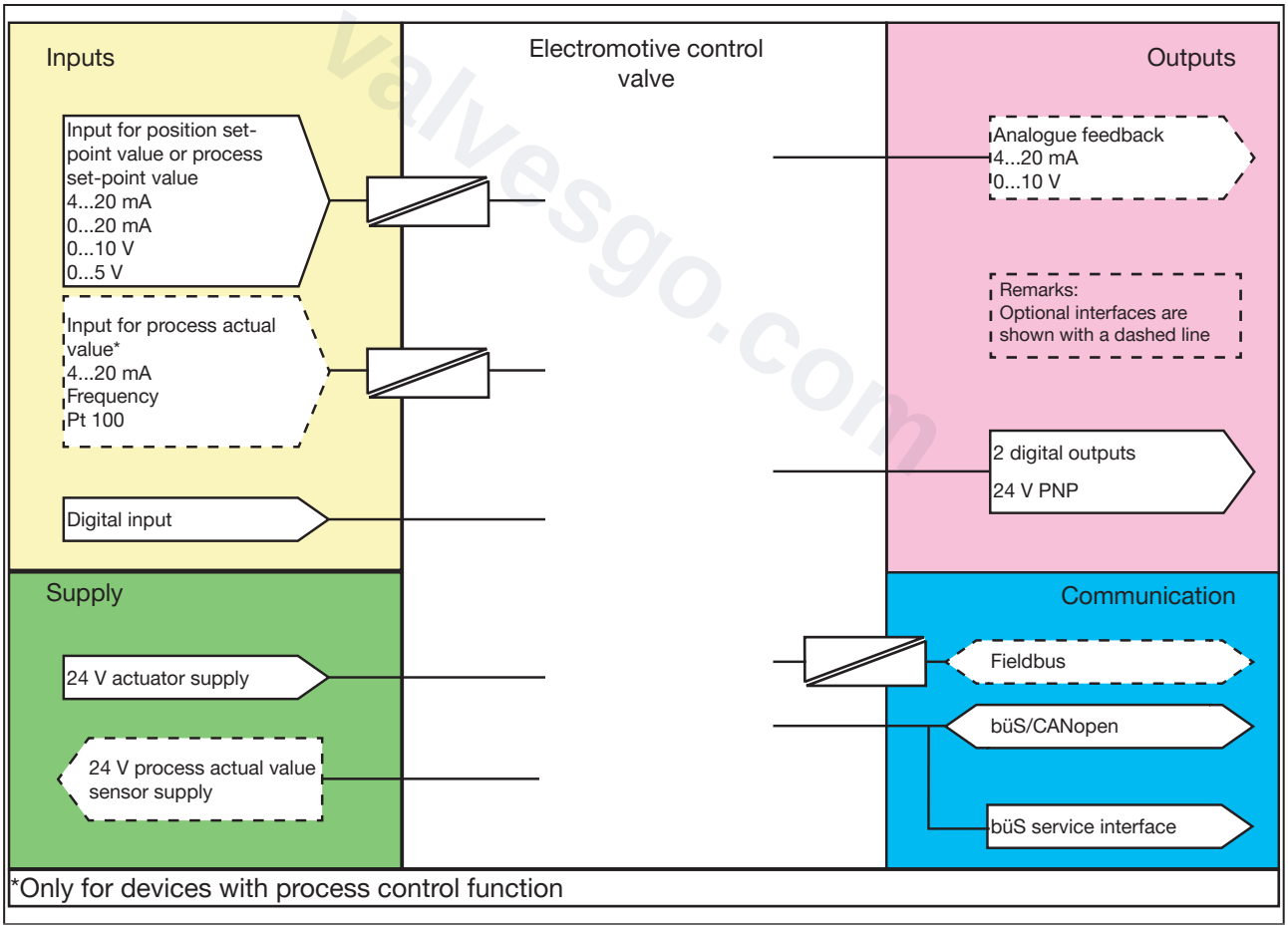

Image 4: Overview of galvanic isolations AG2

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AG3 Variant

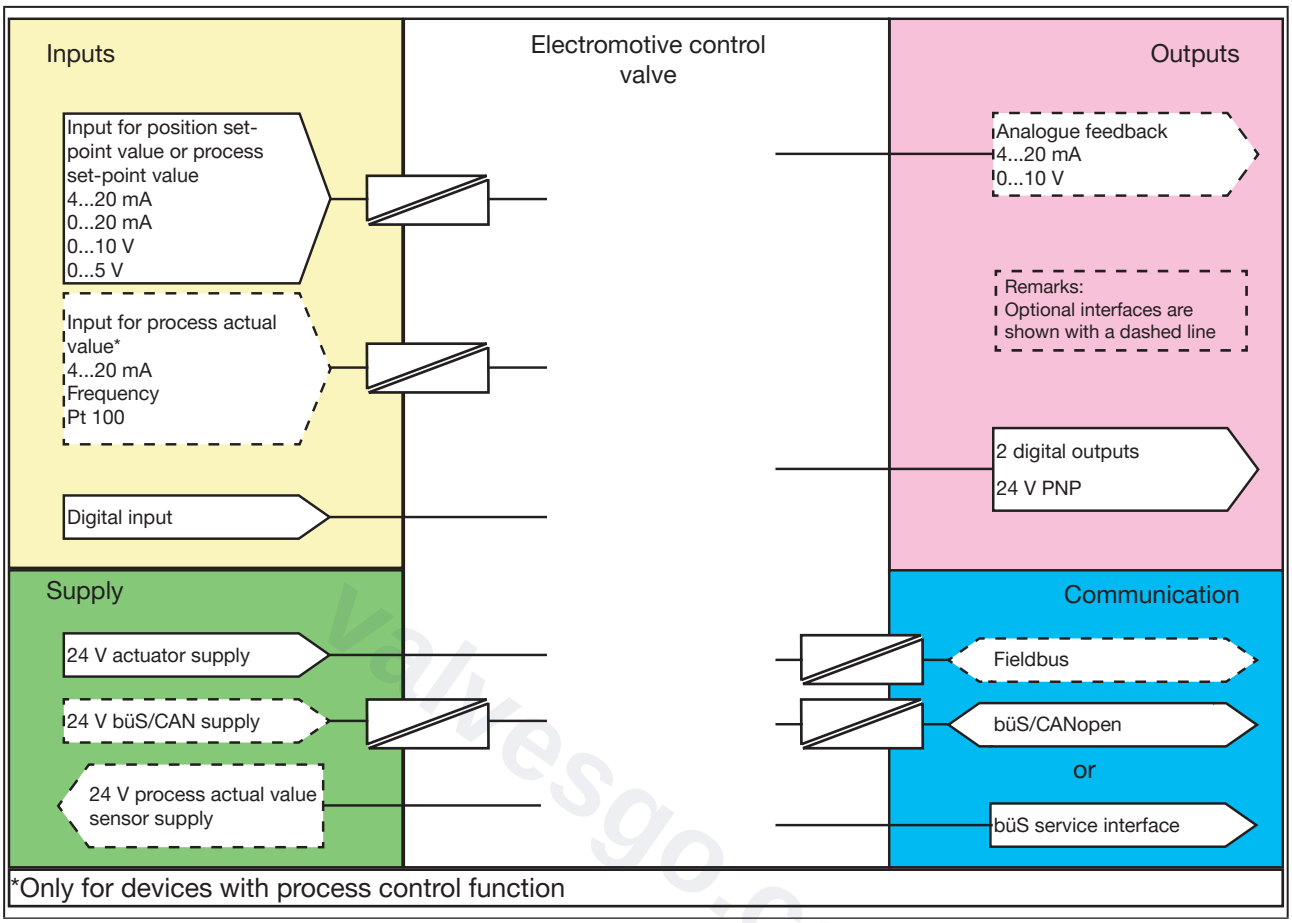

Image 5: Overview of galvanic isolations AG3

The electromotive control valve is designed with the three-wire technique, i.e. the electrical supply (24 V DC) is separate from the set-point signal.

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7.2 Functional diagram of the electromotive control valve

The black parts of the image describe the position control function. The additional elements for the process control function (optional) are depicted in blue.

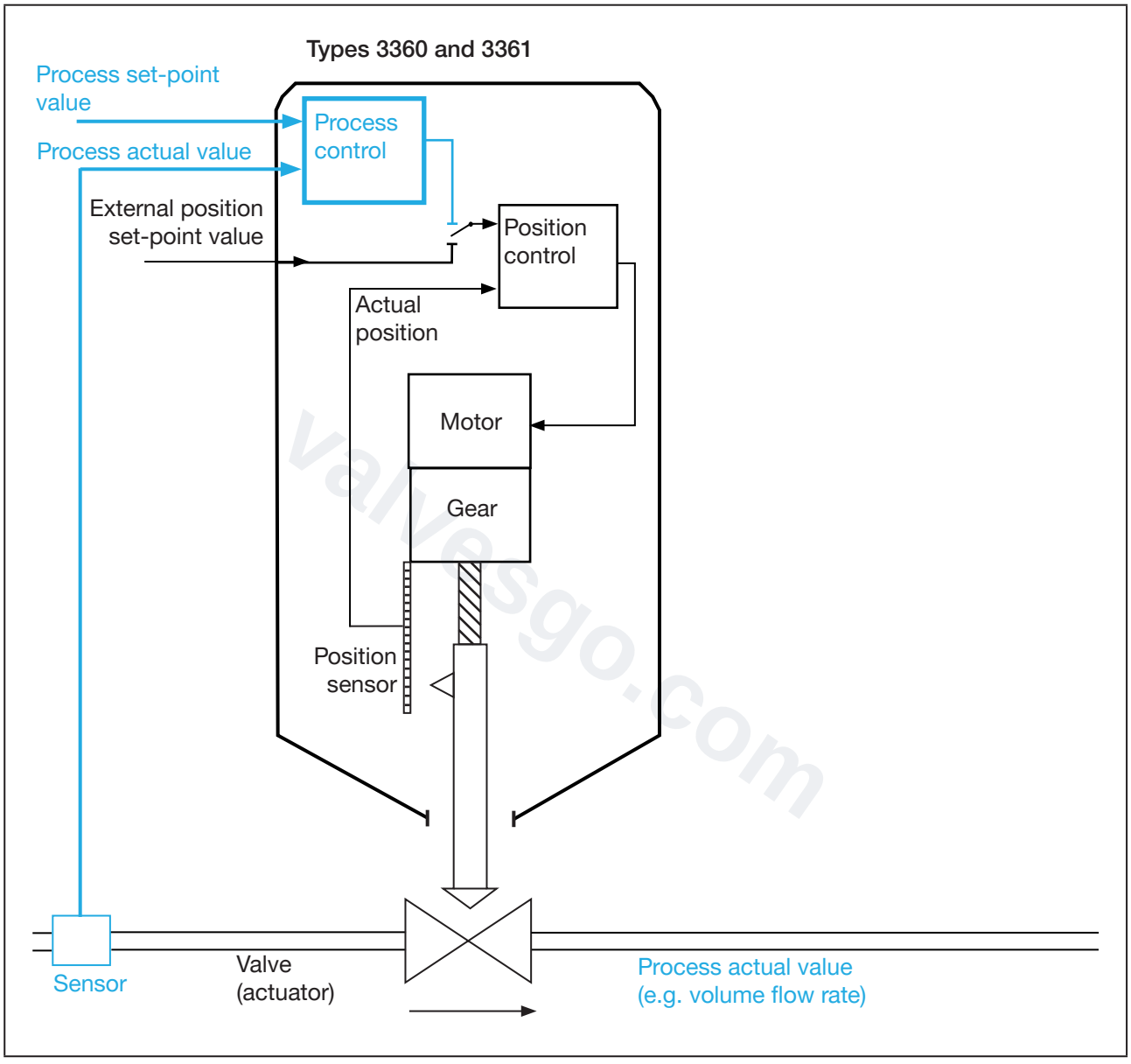

Image 6: Functional diagram, electromotive control valve

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7.3 Functionality of the control electronics

The additionally implemented PID controller can, except for the position control, also be used to conduct a process control (e.g. level, pressure, flow rate, temperature) for purposes of cascade control.

The process control function is integrated in a control loop. The position set-point value of the valve is derived from the process set-point value and the process actual value, with the control parameters (PID controller). The process set-point value can be specified by an external signal.

For process control, the position control becomes an auxiliary control loop, which in turn creates a cascade control. The process controller in the main control loop of the control valve has a PID function. The process set-point value (SP) is specified as the set-point value and compared with the actual value (PV) of the measured variable being controlled. The position sensor records the actual position (POS) of the electromotive linear actuator. The position control compares this actual position with the set-point value (CMD) of the process control. If there is a control difference (Xd1), the actuating variable (CTRL) is used to change the actual position (POS) and thus the valve opening.

Signal flow diagram

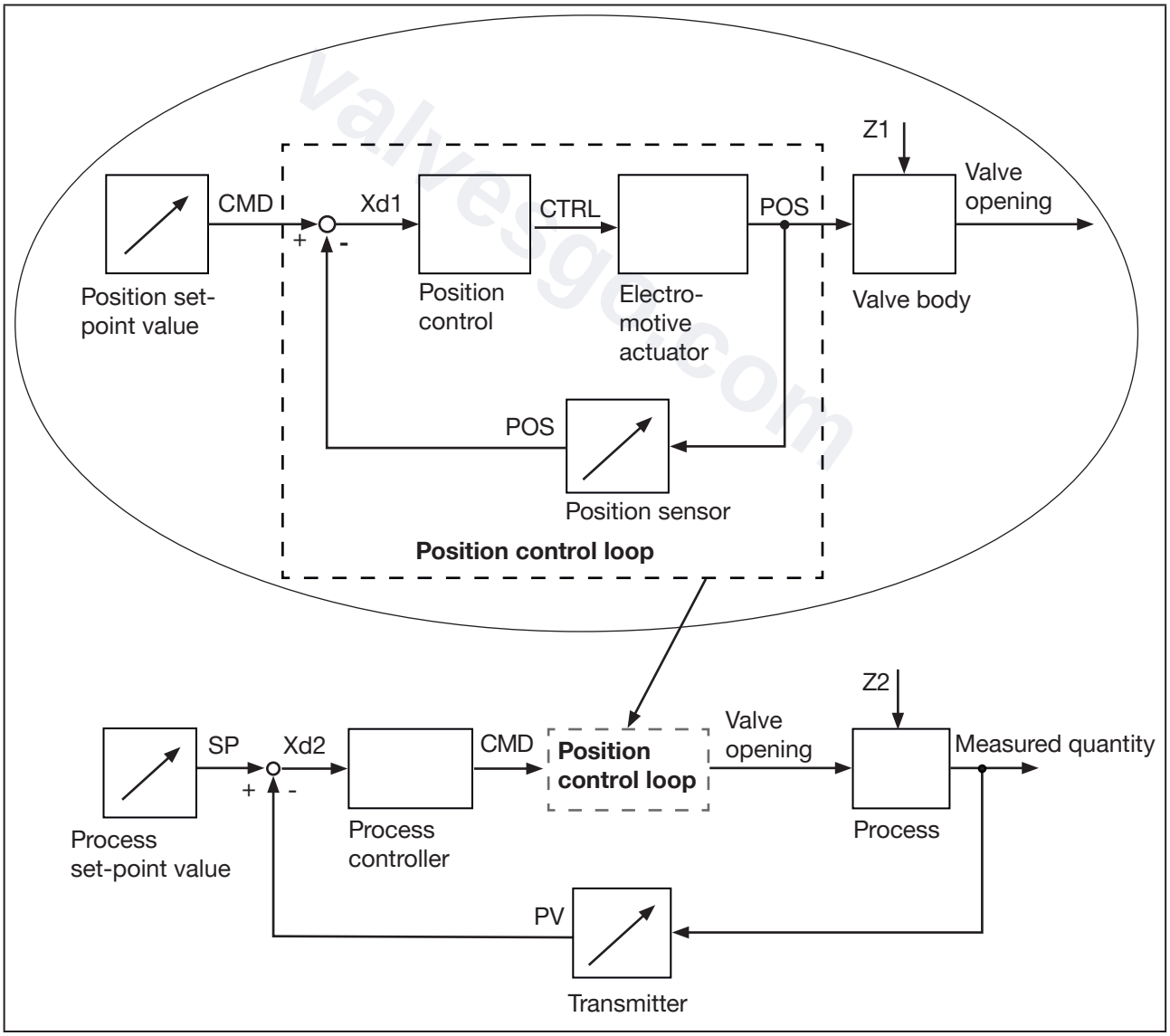

Image 7: Signal flow diagram

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7.3.1 Schematic diagram of the position control

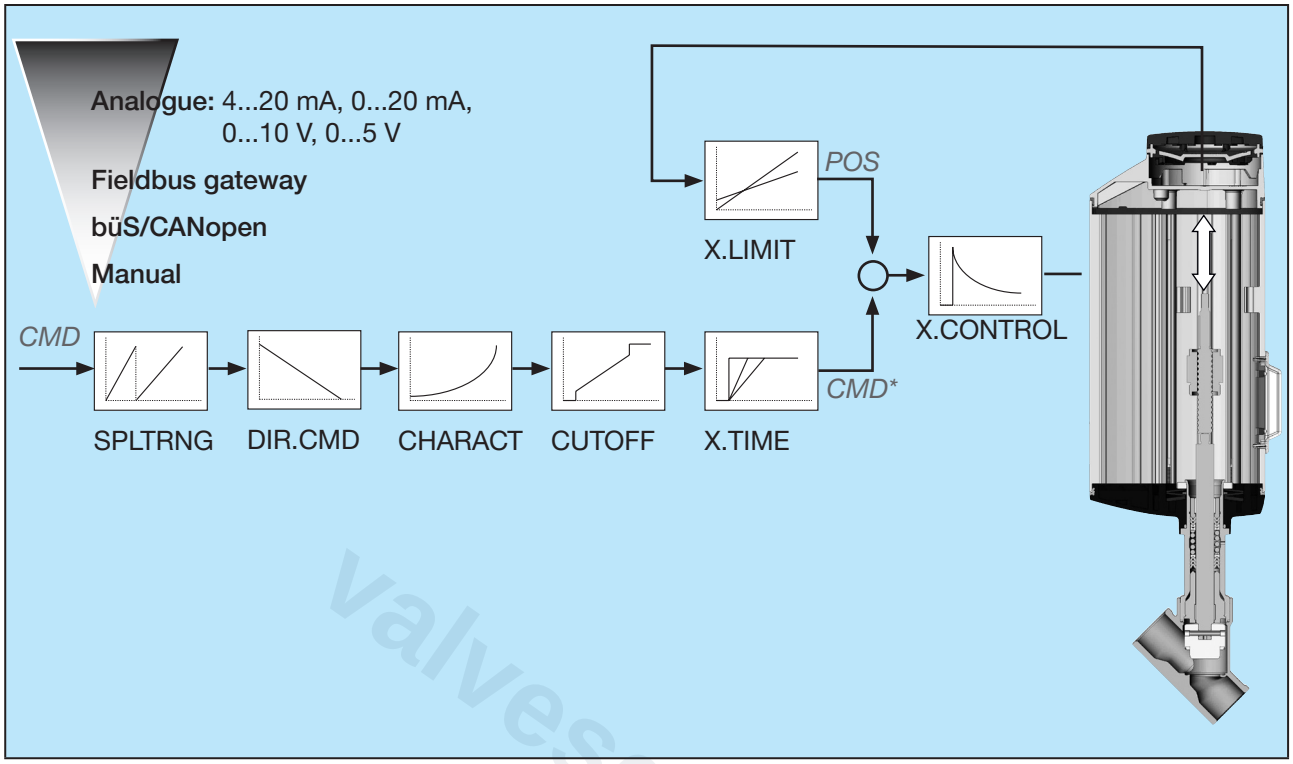

Image 8: Schematic diagram of the position control

Legend for the schematic diagram of position control and process control:

Menu	Description
X.LIMIT	Mechanical stroke range limit
DIR.CMD	Effective direction of position set-point value
SPLTRNG	Signal split range
CHARACT	Transfer characteristic
CUTOFF (type X.CO) (type P.CO)	Sealing function (based on position set-point value) (based on process set-point value)
X.TIME	Limit on position control setting speed
X.CONTROL	Position control parameterisation
SP.scale	Scaling pf process set-point value
SP.SLOPE	Rate of increase per unit of time
SP.FILTER	Process set-point value filter
PV.scale	Scaling of process actual value
PV.FILTER	Process actual value filter
PID.PARAMETER	Process control parameterisation
P.CO. scale	Scaling of process control

Table 9: Legend, position control and process control menu

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Measured quantities	Description	
POS	Actual position	
CMD	Position set-point value	Position controller function: Selection of the source for the input signal of the position set-point value in the menu → Inputs/outputs → CMD → CMD.source.
		Process controller function: the position set-point value is specified by the process controller.
*CMD**	Position set-point value processed by the controller	
PV	Process actual value: Selection of the source for the input signal of the process actual value in the menu → Inputs/outputs → PV → PV.source.	
*PV**	Process actual value processed by the controller	
SP	Process set-point value: Selection of the source for the input signal of the process set-point value in the menu → Inputs/outputs → SP I CMD → SP.source.	
*SP**	Process set-point value processed by the controller	

Table 10: Legend, position control and process control measured variables

7.3.2 Schematic presentation of the process control

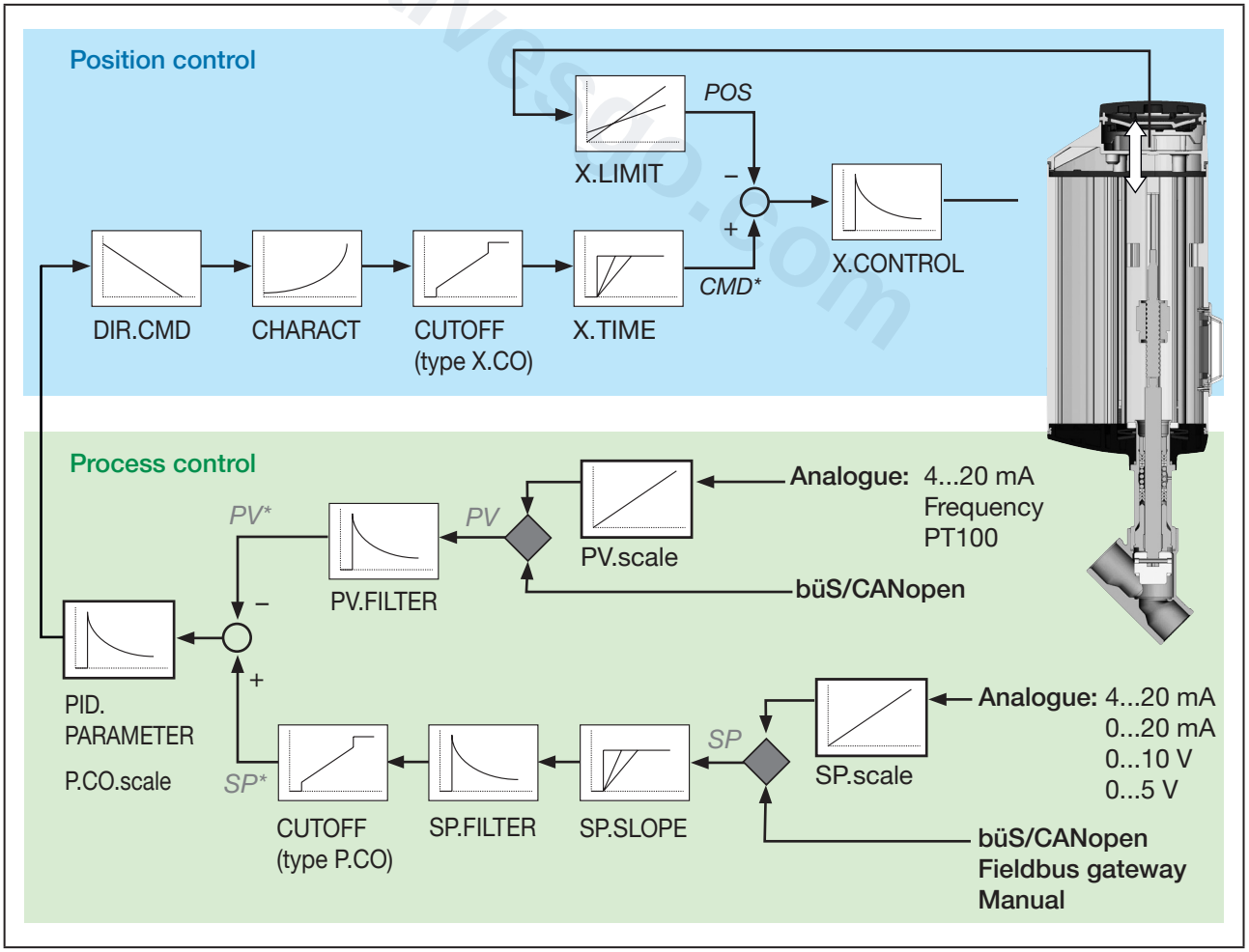

Image 9: Schematic presentation of the process control

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7.4 Energy storage SAFEPOS energy-pack (option)

The device can also be equipped with the energy storage system (SAFEPOS energy-pack). In the event of a supply voltage failure, the energy storage system supplies the actuator with the energy required to move the valve to the safety position.

The safety position is set using the DIP switch or via the display module.

After a maximum of 120 s (depending on usage conditions), the energy storage is fully charged and ready for operation

7.4.1 Service life

Service life: up to 15 years (depending on usage conditions).

The service life of 5 years was calculated based on the following conditions:

Ambient temperature	30 °C (AG2) / 60 °C (AG3)
Medium temperature	165 °C
Duty cycle	100%
Operating pressure	5 bar
Nominal diameter	DN32 (AG2) / DN65 (AG3)

ATTENTION!

The energy storage system SAFEPOS energy-pack is a wearing part. The service life figures are approximate values that cannot be guaranteed.

7.4.2 Notifications on the state of the SAFEPOS energy-pack

The device issues a warning:
The capacity of the energy storage is strongly decreased. The energy storage must be replaced soon.

▸ ⚠ The SAFEPOS energy-pack must be promptly replaced before the end of its service life.

The device issues an error alert and assumes the safety position:
The SAFEPOS energy-pack was not promptly replaced before issuance of the warning. The storage capacity is so low that assumption of the safety position can no longer be guaranteed.

7.4.3 Replace SAFEPOS energy-pack (AG2)

CAUTION!

Risk of injury from electrical voltage.

- ▸ Turn off the supply voltage before removing the SAFEPOS energy pack.
- ▸ Ensure that the SAFEPOS energy-pack is fully discharged. Wait until the LED ring is no longer lit and ensure that the LED status is not in “LED off” mode (see chapter “12.2.1 LED illuminated ring”).

The SAFEPOS energy-pack energy storage system is located in the actuator housing. Remove the following parts from the actuator for replacement:

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Devices with ATEX approval or IECEx approval are secured with a magnetic lock.

The removal of the cover is described in the supplementary instructions for the electromotive control valves with ATEX approval and IECEx approval.

1. Blind cover
2. LED and storage module
3. Actuator cover

The process for removing these parts is described in detail in chapter "10.3.2 Access to connection terminals" on page 66.

Removing SAFEPOS energy-pack:

→ Loosen the safety screw (hexalobular-internal screw T10).

→ Completely pull the SAFEPOS energy-pack out from the clamp.

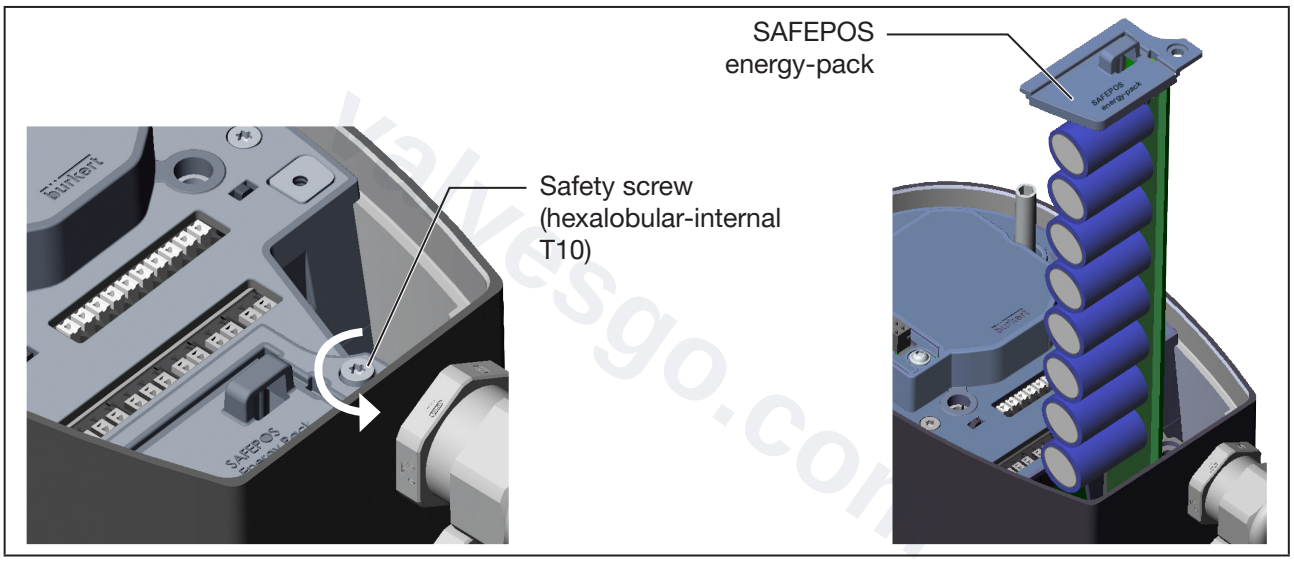

Image 10: Removing SAFEPOS energy-pack

Inserting new SAFEPOS energy-pack:

→ Remove the SAFEPOS energy-pack from the transport packaging.

→ Insert the SAFEPOS energy-pack into the two guide grooves on the side and push it in until it stops.

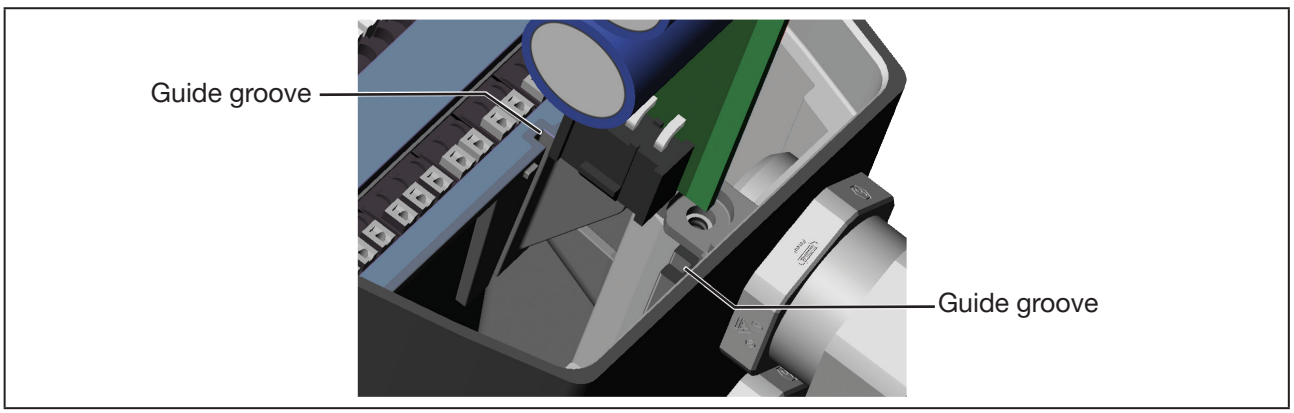

Image 11: Inserting SAFEPOS energy-pack

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→ Apply the safety screw (hexalobular-internal screw T10).

→ Connect supply voltage.

7.4.4 Replace SAFEPOS energy pack (AG3)

CAUTION!

Risk of injury from electrical voltage.

- Turn off the supply voltage before removing the SAFEPOS energy pack.
- Ensure that the SAFEPOS energy-pack is fully discharged. Wait until the LED ring is no longer lit and ensure that the LED status is not in “LED off” mode (see chapter “12.2.1 LED illuminated ring”).

The SAFEPOS energy-pack is located on the actuator housing. Remove the following parts from the actuator for replacement:

Removing SAFEPOS energy-pack cover:

→ Remove 6 fastening screws (hexalobular-internal screws T25).

→ Remove cover.

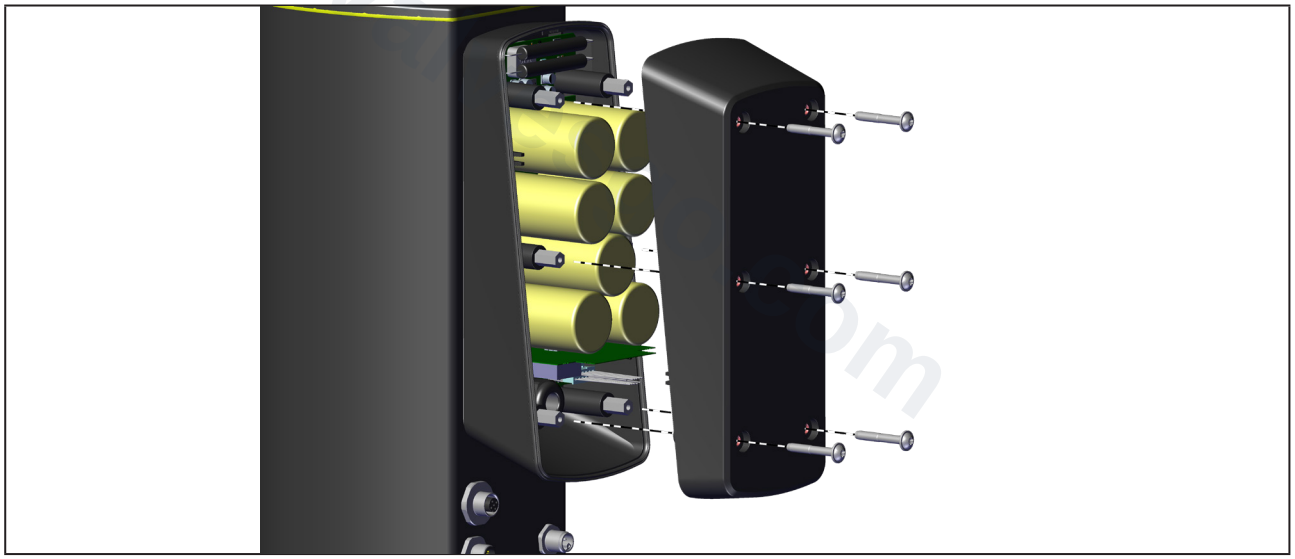

Image 12: Take off SAFEPOS energy pack cover

Removing SAFEPOS energy pack:

CAUTION!

Risk of injury from electrical voltage.

- Ensure that the red LED indicating the residual voltage has gone out before the components are touched.

→ Remove printed circuit board

→ Remove adapter cable.

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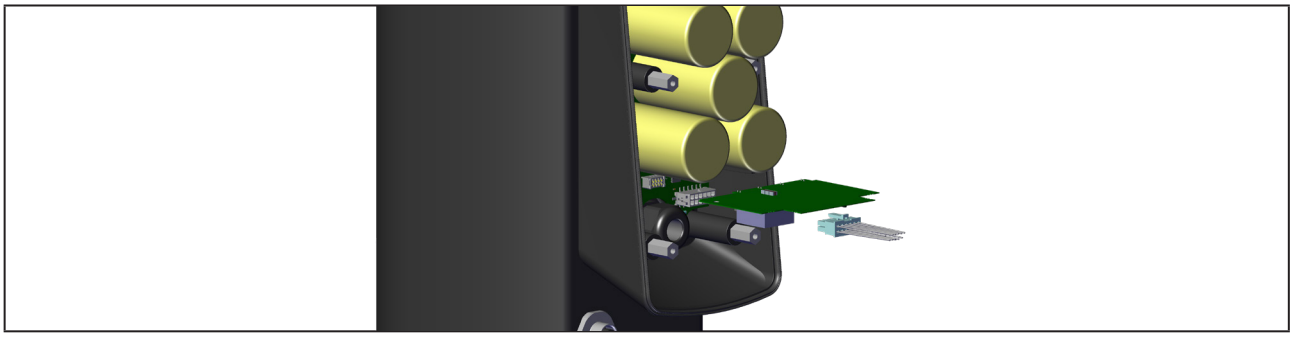

Image 13: Remove printed circuit board and adapter cable

→ Loosen the four cheese head screws (socket head screw AF3).

→ Remove the SAFEPOS energy-pack.

Image 14: Loosen screws on the printed circuit board/remove SAFEPOS energy-pack

Inserting new SAFEPOS energy-pack:

→ Remove the SAFEPOS energy-pack from the transport packaging.

→ Installation in reverse order.

Tighten the four cheese head screws (socket head screw AF3) to 1.1 Nm tightening torque.
Tighten 6 fastening screws (T25 hexalobular-internal screws) to 3 Nm tightening torque.

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8 TECHNICAL DATA

The following product-specific information is provided on the type label:

- Voltage [V] (tolerance ± 10%) and type of current
- Seal material
- Fieldbus standard
- Flow capacity
- Actuator size
- Maximum permitted operating pressure
- Flow direction
- Temperature specifications

8.1 Standards and directives

The device complies with the valid EU harmonisation legislation. In addition, the device also complies with the requirements of the laws of the United Kingdom.

The harmonised standards that have been applied for the conformity assessment procedure are listed in the current version of the EU Declaration of Conformity/UK Declaration of Conformity.

Information on the Pressure Equipment Directive

Bürkert devices are categorised according to the maximum permissible medium pressure indicated on the type label, the nominal diameter DN of the port connection or the included volume, and usually for compressible fluid group 1. Exceptions are documented separately.

On the type label for Bürkert devices, the permissible medium pressure is marked with Pmed, which corresponds to the PS value in the Pressure Equipment Directive. This value can be distinguished from PN or pilot pressure, for example.

In the case of devices marked with PN, the maximum permissible medium pressure can also be restricted through pressure derating based on material or temperature.

Pressure equipment that is not in any category is designed and manufactured in accordance with good engineering practice. These devices do not receive a CE marking or EU Declaration of Conformity under the Pressure Equipment Directive.

→ Ensure that the media used are compatible with the device materials and do not significantly reduce the strength of pressurised components or make the device materials brittle.

→ Assign the system to a pressure equipment category according to specific operating data.

8.2 Approvals

The product is cULus listed. Refer to chapter “8.6 Electrical data” for information on use for UL.

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8.3 Type label

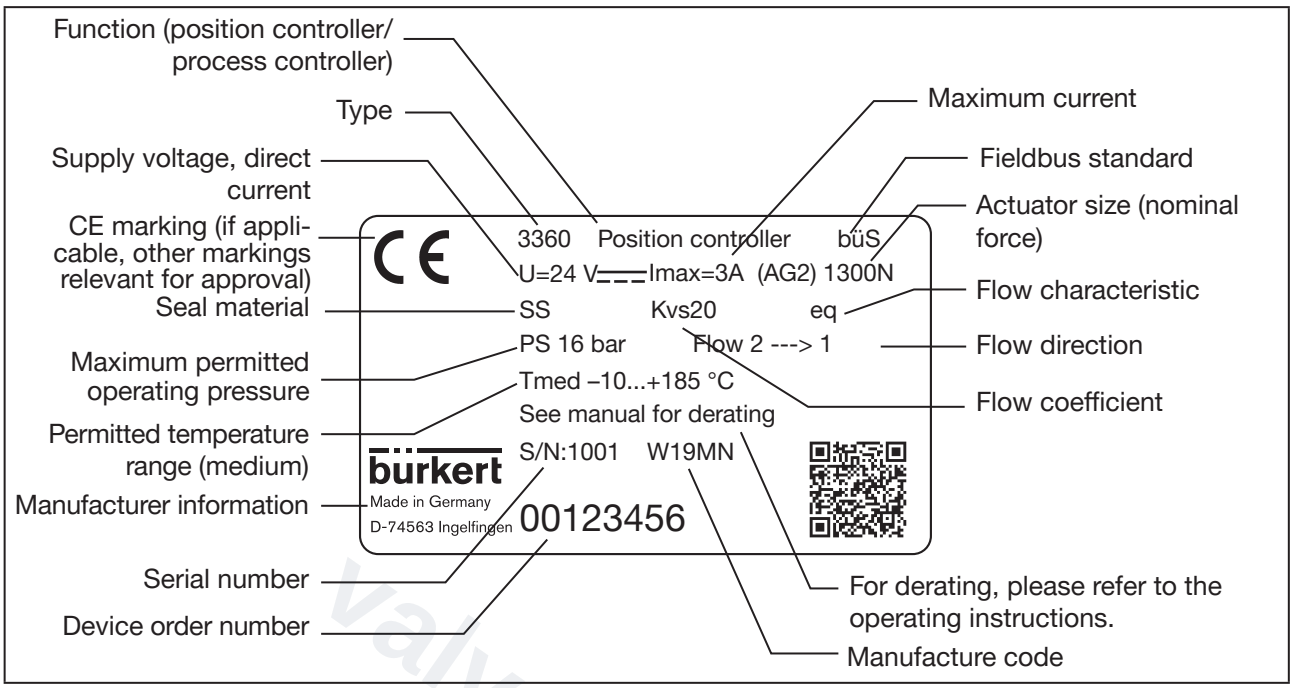

Image 15: Description of the type label (example)

8.3.1 UL additional label (example)

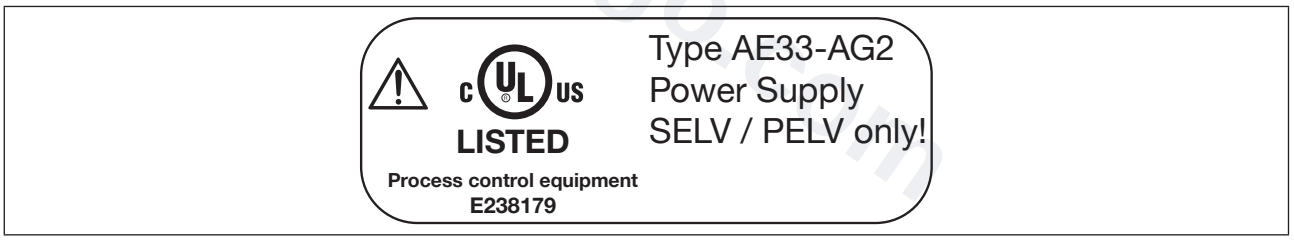

Image 16: UL additional label (example)

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8.4 Operating conditions

Technical specifications and operating conditions may be subject to restrictions for device variants with approvals or declarations of conformity. Observe the data sheet, approval-relevant documents and the type plate of the respective device.

Protect the device from electromagnetic interference, UV radiation and, when used outdoors, from weather influences.

WARNING!

Malfunction if the permissible temperature range is exceeded or undershot.

- Do not expose the device to direct sunlight when used outdoors.
- The permissible ambient temperature range must not be exceeded or undershot.

WARNING!

Reduced sealing function at excessively high operating pressure.

Because the valve seat is closed against the medium flow, an excessive operating pressure may cause the valve seat to not close tightly.

- The operating pressure must not exceed the maximum value specified on the type label.

Maximum permitted operating pressure:	see type label, depending on usage limits of the armature (derating operating pressure)
Media:	neutral gases and steam. Liquid media: water, alcohol, oil, fuel, hydraulic fluid, salt solution, caustic soda, organic solvent.
Degree of protection:	(verified by Bürkert/not evaluated by UL) IP65 and IP67 in accordance with IEC 529, EN 60529 NEMA 250 4x (not guaranteed for installation position: actuator facing downwards).
Flow direction:	indicated on the type label with an arrow and the digits 1 and 2. The 1 and 2 are also on the valve body for identification. The flow direction is below the seat with flow from port 2 to port 1.
Altitude	Up to 2000 m above sea level

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8.4.1 Permitted temperature ranges

Minimum temperatures	Environment:	–25 °C (–10 °C for AG3 and UL)
	Medium:	–10 °C (–40 °C on request)
Maximum temperatures	Environment:	depends on the medium temperature, see subsequent temperature diagram.
	Medium:	depends on the ambient temperature; see temperature diagram below, as well as usage limits of the valve (derating operating pressure). For devices with PTFE valve seat seal max. +130 °C. For devices with stainless steel or PEEK valve seat seal max. +185 °C (+230 °C on request).

Temperature diagram

The maximum permitted temperature for the environment and medium are dependent on one another. The permitted maximum temperatures must be determined using the temperature diagram.

The values are calculated under the following maximum operating conditions:
AG2: Nominal diameter DN32 at 100% duty cycle with 16 bar operating pressure.
AG3: Nominal diameter DN65 at 100% duty cycle with 25 bar operating pressure.

Individual reviews may be performed under different operating conditions. For this, please contact your Bürkert office.

AG2

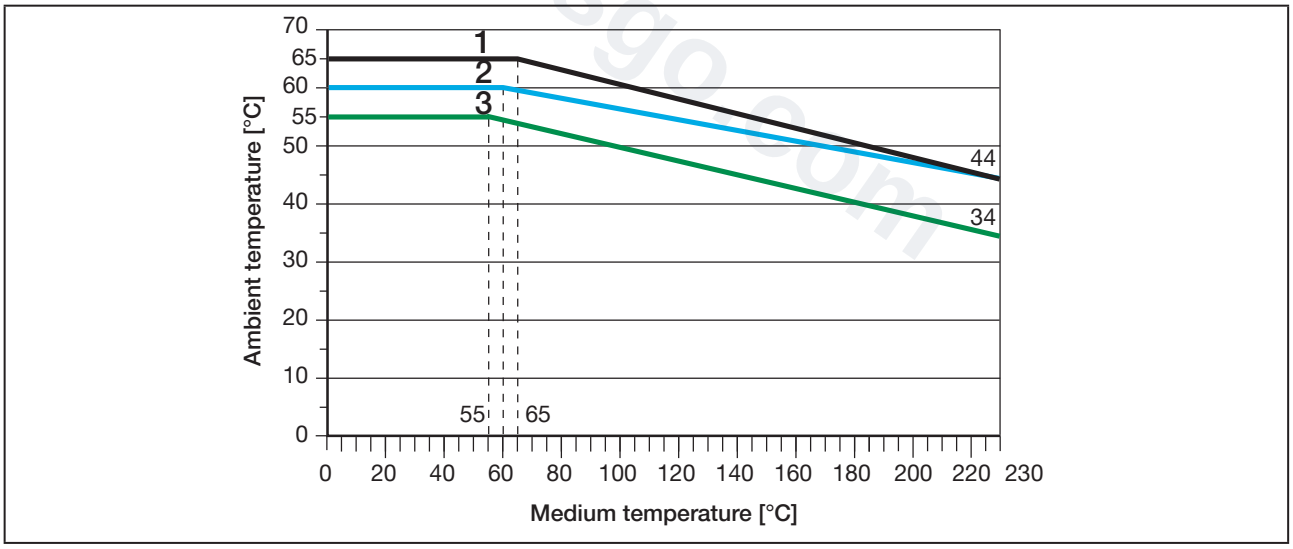

Image 17: Temperature diagram AG2

No.	Description
1	Device without module
2	Devices with display module
3	Devices with SAFEPOS energy-pack* or fieldbus gateway, with or without display module
* The service life of the SAFEPOS energy-pack is dependent on the medium temperature and ambient temperature (see chapter “Electrical data”).	

Table 11: Description of temperature diagram AG2

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AG3

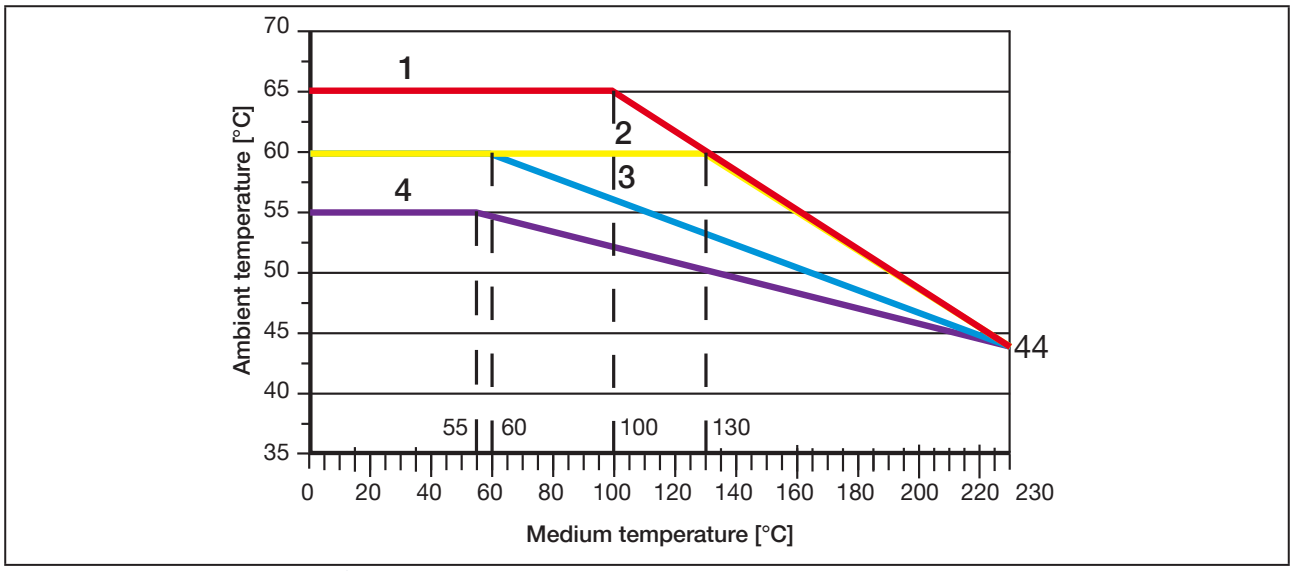

Image 18: Temperature diagram AG3

No.	Description
1	Device without module
2	Devices with SAFEPOS energy-pack*
3	Devices with display module with/without SAFEPOS energy-pack*
4	Devices with fieldbus gateway with/without display module with/without SAFEPOS energy-pack*
* The service life of the SAFEPOS energy-pack is dependent on the medium temperature and ambient temperature (see chapter "Electrical data").	

Table 12: Description of temperature diagram AG3

Derating pressure and temperature range

Usage limits of the valve (derating operating pressure)

Medium temperature	Operating pressure	
	PN25	PN40
–10...+50 °C	25 bar	40 bar
100 °C	24.5 bar	39.2 bar
150 °C	22.4 bar	-
200 °C	20.3 bar	-
230 °C	19 bar	-

Table 13: Derating the operating pressure as per DIN EN 12516-1 / PN25 / PN40

Medium temperature	Operating pressure
–29...+38 °C	19 bar
50 °C	18.4 bar
100 °C	16.2 bar
150 °C	14.8 bar
200 °C	13.7 bar
230 °C	12.7 bar

Table 14: Derating the operating pressure as per ASME B16.5/ASME B16.34 Cl.150

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Medium temperature	Operating pressure
–10...+50 °C	14 bar
100 °C	14 bar
150 °C	13.4 bar
200 °C	12.4 bar
230 °C	11.7 bar

Table 15: Derating the operating pressure as per JIS B 2220 10K

8.5 General technical data

Dimensions:	see data sheet	
Weight:	see data sheet	
Materials:	Actuator base:	PPS (AG2)/1.4308 (AG3)
	Actuator housing:	Aluminium EN AW 6063 powder-coated
	Inspection view:	PC
	Actuator cover:	PPS (AG2)/PC (AG3)
	Valve body:	316L/CF3M
	Body connection:	AG2: 316L / 1.4401 AG3: 1.4401 / 1.4404 / 1.4435 / CF3M
	Spindle:	1.4401 / 1.4404
	spindle guide:	1.4401/1.4404/316L with carbon-filled PTFE
	packing gland	PTFE V-rings with spring compensation (carbon-filled PTFE)
Seal material:	Actuator housing sealing element:	EPDM
	valve seat seal:	see type label
Fluid connection: Possible connection types:	Threaded socket connection G ½...G 4 (NPT, RC on request) Welded connection as per EN ISO 1127 (ISO 4200), DIN 11850 series 2 Clamp connection as per ISO 2852, DIN 32676, ASME BPE, BS 4825 Additionally for Type 3361 globe valve: Flange connection as per DIN 2634, ANSI B16.5 class 150, JIS 10K Other connections on request	
Electrical connection:	With terminal connectors (only AG2) or circular plugs	
Installation position:	any, preferably actuator face up	
Sound pressure level:	<70 dB (A), may be higher depending on the operating conditions.	
Cv value:	See the type label or data sheet	

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8.6 Electrical data

WARNING!

Electric shock.

Protection class III is only guaranteed when using an SELV or PELV power supply unit.

Protection class	3 in accordance with DIN EN 61140
Electrical connections	Devices with position controller function: Terminal strip with cable gland, 2 x M20 (only AG2) or 2 circular plug-in connectors M12, 5-pin and 8-pin Devices with process control function: Terminal strip with cable gland, 3 x M20 (only AG2) or circular plug-in connectors 2 x M12, 5-pin and 1 x M12, 8-pin

ATTENTION!

Consider voltage drop through power supply cable.
Example: With a cable cross-section of 0.34 mm² the copper cable must not exceed 8 metres in length.

Operating voltage	24 V ⎓ ±10%, max. ripple 10%
Supply voltage transmitter	24 V ± 10% only for devices with process control function.
Supply current transmitter	max. 150 mA (AG2) max. 100 mA (AG3) Only available on devices with process control function.
Operating current [A]*:	including actuator at max. load and charging current of the optional SAFEPOS energy-pack (charging current approx. 1 A) for the design of the power supply unit

Actuator size	Typical (without charging current SAFEPOS energy-pack)*	Maximum (to design the power supply)*
AG2	2 A	3 A
AG3	3.5 A	5 A

The operating current can be reduced if necessary:
1. Reduce the control speed X.TIME.
2. Devices with SAFEPOS energy-pack: Set “Control if ready” function.

Standby consumption (electronics assembly without actuator) [W]*	1…5 (depending on the level of disassembly)
Protection class	3 according to DIN EN 61140 (VDE 0140)

* All values relate to a supply voltage of 24 V ⎓ at an ambient and medium temperature of 25 °C.
Caution: At minimum ambient and medium temperature, the operating current can be up to 5 A (AG2) or 11 A (AG3) (incl. 1 A charging current of the optional SAFEPOS energy-pack).

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The operating current can be reduced by the following measures, if necessary

1. For devices with the SAFEPOS energy-pack energy storage:
   Configuring the “Control if ready” reduces the max. operating current.

   Setting in the configuration area Position controller → Parameter → SAFEPOS → ENERGY-PACK → FUNCTION → Control if ready.

2. Reducing the control speed X.TIME.
   Setting: Setting in the configuration area Position controller → Parameter → ADD.FUNCTION → Activate→ X.TIME → X.TIME → Opening time → Closing time.

Service life of energy storage

SAFEPOS energy-pack: Charging time: maximum 120 s (dependent on operating conditions)

Service life: up to 15 years (depending on operating conditions).
The service life of 5 years was calculated based on the following conditions:

ambient temperature	30 °C (AG2)/60 °C (AG3)
Medium temperature	165 °C
Duty cycle	100%
Operating pressure	5 bar
DN	DN32 (AG2) / DN65 (AG3)

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Analogue inputs: (electrically isolated from the supply voltage and analogue output)

Input data for set-point value signal

0/4...20 mA:	Input resistance	<70 Ω
	Resolution	12 bit
0...5/10 V:	Input resistance	22 kΩ
	Resolution	12-bit, resolution relates to 0...10 V

Input data for actual value signal (optional)

4...20 mA:	Input resistance	<70 Ω
	Resolution	12 bit
Frequency:	Measuring range	up to 1000 Hz
	Input resistance	> 30 kΩ
	Resolution	0.1% from measured value
	Input signal	> 300 mVss
	Signal form	Sine wave, square wave, triangle wave
Pt 100:	Measuring range	–20...+220 °C
	Resolution	0.01 °C
	Measuring current	1 mA

Analogue output (optional):

max. current	10 mA (for voltage output 0...5/10 V)
Load	0...800 Ω (for current output 0/4...20 mA)

Digital outputs (optional):

PNP, current limit	100 mA

Digital inputs: NPN, 0...5 V = log “0”, 10...30 V = log “1”
inverted input inverted accordingly (input current < 6 mA)

Communication interface with PC: büS service interface, connection is established using the USB büS interface set

Communication software for PC: “Bürkert Communicator”

The digital input, digital outputs and analogue output are not electrically isolated from the operating voltage. They relate to the GND potential of the operating voltage.

Current limit: output voltage is reduced in the event of overload.

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8.7 Flow rate values and flow rate characteristics for angle seat control valve (Type 3360)

8.7.1 Flow rate characteristics

The flow rate values and resulting characteristic depend on the valve seat size.

- Flow characteristic curve in accordance with DIN EN 60534-2-4
- Modified equal percentage flow characteristic.
- Theoretical rangeability: KVS/KV0 = 50:1

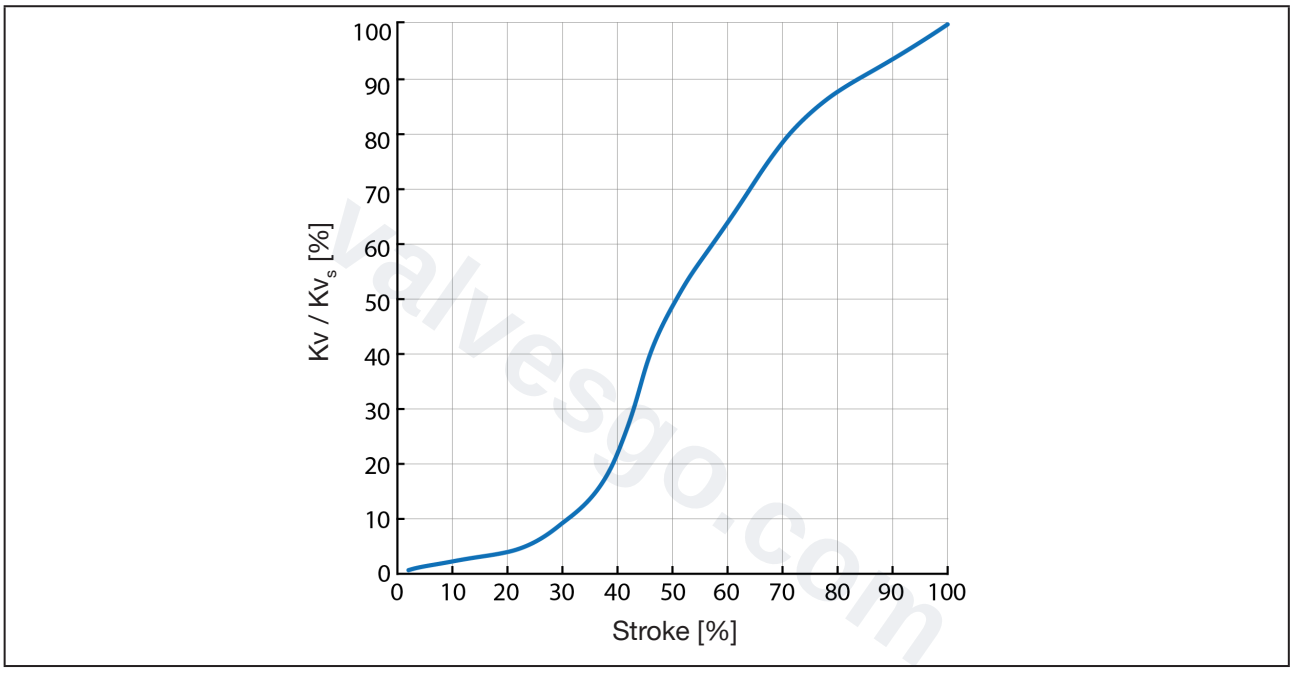

Image 19: Flow rate characteristic, globe control valves

8.7.2 Volume flow rates

Below is an overview of flow rates for the angle-seated control valve. Additional Kvs values and complete characteristic curves with stroke-dependent Kv values can be found in the data sheet for Type 3360 (Data Sheet 3360).

Nominal diameter (port connection)		Cv_s values [m^3/h]
DN	NPS	
15	1/2	5 (1.5)
20	3/4	10
25	1	16
32	1 1/4	25
40	1 1/2	36
50	2	53
65	2 1/2	90

Table 16: Cv_s values, angle seat control valves

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8.8 Flow rate values and flow rate characteristics for globe control valve (Type 3361)

8.8.1 Flow rate characteristics

The globe control valve exhibits various characteristics depending on the valve seat size.

- Flow characteristic curve as per DIN EN 60534-2-4
- Standard equal-percentage parabolic cone
- On request: linear cone for valves with seat size 3...6
- Theoretical rangeability (Kv_S: Kv_0) up to 50:1
- Kv_R value* at 5% of the stroke for seat size > 10
  Kv value at 10% of the stroke for seat size ≤ 10

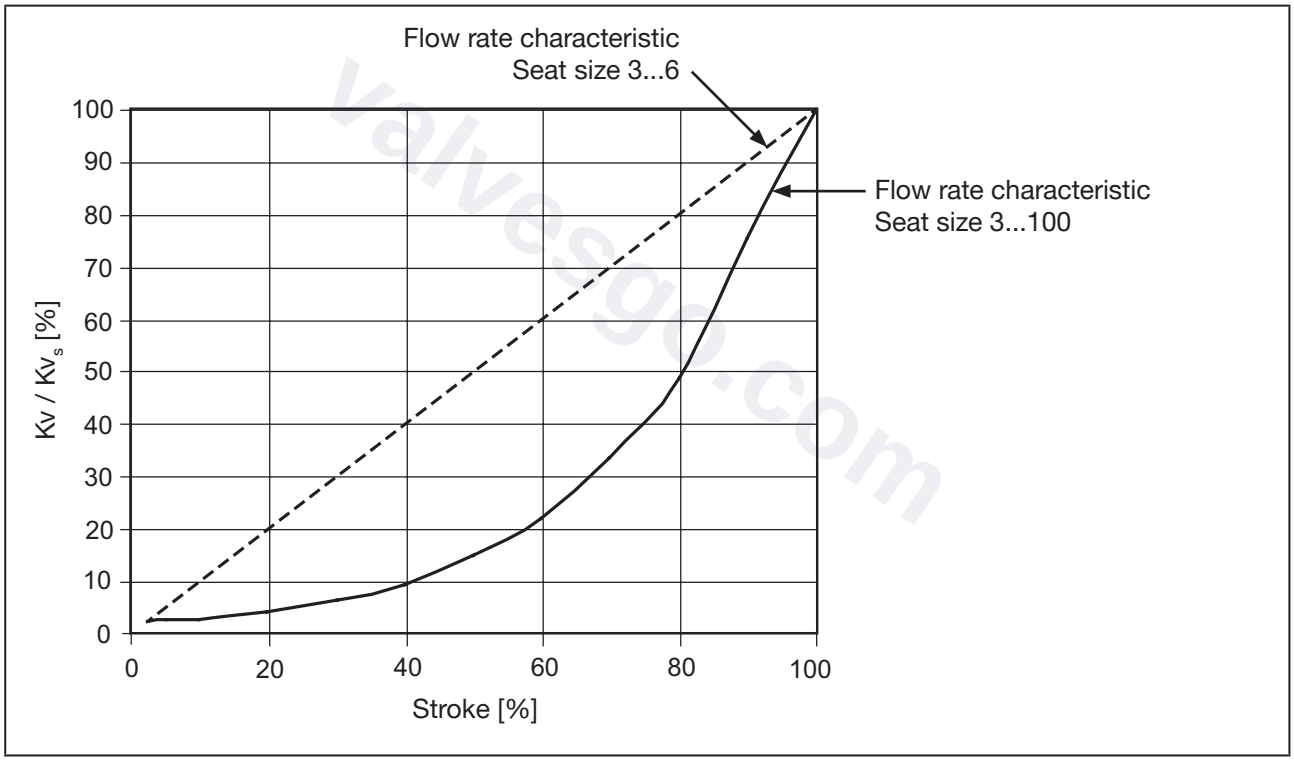

Image 20: Flow rate characteristic, globe control valves

* Kv_R value = lowest Kv value at which the tilt tolerance as per DIN EN 60534-2-4 can still be observed.

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8.8.2 Volume flow rates

Below is an overview of flow rates for the globe control valve. Additional Kv_s value$_s$ and complete characteristic curves with stroke-dependent Kv values can be found in the data sheet for Type 3361 (Data Sheet 3361).

DN connection (valve body)		Kv_S values [m³/h]													
		Valve seat size													
DN	[NPS]	3	4	6	8	10	15	20	25	32	40	50	65	80	100
10	3/8	0.1	0.5	1.25	2	2.7	-	-	-	-	-	-	-	-	-
15	1/2	0.1	0.5	1.25	2.1	3.1	4.3	-	-	-	-	-	-	-	-
20	3/4	-	-	-	-	3.2	5.2	7.1	-	-	-	-	-	-	-
25	1	0.1	0.5	1.25	2.1	3.2	5.3	7.2	12	-	-	-	-	-	-
32	1 1/4	-	-	-	-	-	-	8	13	17.8	-	-	-	-	-
40	1 1/2	-	-	-	-	-	-	-	13.6	20	24	-	-	-	-
50	2	-	-	-	-	-	-	-	-	21	24.5	37	-	-	-
65	2 1/2	-	-	-	-	-	-	-	-	-	25.5	39.5	62	-	-
80	3	-	-	-	-	-	-	-	-	-	-	42	70	100	-
100	4	-	-	-	-	-	-	-	-	-	-	-	75	115	140

Table 17: Kv_S values, globe control valves

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9 INSTALLING THE VALVE

9.1 Safety instructions

WARNING!

Risk of injury due to improper installation.

- Installation must always be carried out by trained technicians using the appropriate tools.
- Secure the system against unintentional activation.
- After installation, ensure that the process is restarted in a controlled manner. Observe the sequence!
  1. Connect supply voltage.
  2. Pressurise the device with medium.

CAUTION!

Risk of injury due to a heavy device.

During transportation or installation work, the device may fall down and cause injuries.

- Transport, install and remove heavy device with the aid of a second person only.
- Use suitable tools.

ATTENTION!

Loose screw connection on the body connection under high mechanical stress or in applications involving elevated temperatures.

Where the pipework is subject to high mechanical stress (vibration) or in applications where temperatures exceed 140 °C, the screw connection at the body connection must be checked before installation and at regular intervals during operation. (For tightening torques, see “Table 18” on page 54).

Protect the device from electromagnetic interference, UV radiation and, when used outdoors, from weather influences.

9.2 Installation of devices with threaded connection, flange connection or clamp connection

ATTENTION!

Damage to valve body, valve seat seal or diaphragm.

- To prevent damage, the device must be in MANUAL operating state during installation.

Devices in their factory default state already have their operating state set to MANUAL.

9.2.1 Required work steps

1. If not already preset, set MANUAL operating state, chapter “14.1” on page 102.
2. If the device is already electrically connected, shut off supply voltage. Wait until LED illuminated ring goes out.
3. Install device in pipeline, chapter “9.2.3” on page 48.
4. Electrical installation, chapter “10” on page 59.
5. Connect supply voltage.
6. To set AUTOMATIC mode, see chapter “14.1” on page 102.

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9.2.2 Installation conditions

Installation position: any, ideally with actuator facing upwards.

Flow direction: indicated on the type label with an arrow and the digits 1 and 2.
The 1 and 2 are also on the valve body for identification.
The flow direction is below the seat with flow from port 2 to port 1.

Pipelines: ensure that pipelines are in alignment.

Filter: required for devices with approval as per EN 161.
According to EN 161 “Automatic shut-off valves for gas burners and gas appliances”, a dirt trap, which prevents the penetration of a 1 mm test pin, must be installed upstream of the valve in the pipeline.

Preparation: Clear impurities from pipelines (seal material, metal chips, etc.).

9.2.3 Install device in the pipeline

Prerequisite: MANUAL operating state.

ATTENTION!

The following must be heeded when installing the device in the system.

The device and relief bore must be accessible for inspections and maintenance work.

DANGER!

Risk of injury from high pressure.

▸ Before working on the system, switch off the pressure and vent or empty the lines.

WARNING!

Risk of crushing by mechanically powered parts.

▸ Do not reach into the openings of the valve body.

→ Connect valve body to pipeline.
⚠ Ensure that there is no voltage present and minimal vibration during installation.

Holding device
To protect the valve actuator from damage resulting from forces and vibrations, a holding device is recommended. This is available as an accessory. See chapter “24 Accessories, wearing parts”.

Next steps:

- Electrical installation, chapter “10” on page 59.
- Connect supply voltage.
- To set AUTOMATIC mode, see chapter “14.1” on page 102.

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9.3 Installation of devices with welded connections

ATTENTION!

Damage to valve body, valve seat seal or diaphragm.

- To avoid damage, the valve should only be mounted in the opened valve position and in the MANUAL operating state.

Devices in their factory default state already have their operating state set to MANUAL.

ATTENTION!

The following must be heeded when installing the device in the system.

The device and relief bore must be accessible for inspections and maintenance work.

9.3.1 Required work steps

The device must not be welded into the pipeline while the actuator is still installed. The installation is divided into the following steps:

1. If not already preset, set MANUAL operating state, chapter “14.1” on page 102.
2. If the valve is in the closed position, switch the valve to the open position, chapter “15” on page 113.
3. If the device is already electrically connected, shut off supply voltage. Wait until LED illuminated ring goes out.
4. Remove actuator from the valve body, chapter “9.4” on page 51.
5. Weld the valve body into the pipeline, chapter “9.3.4” on page 50.
6. Mount actuator on the valve body, chapter “9.5” on page 53.
7. Electrical connection of the device, chapter “10” on page 59.
8. Connect supply voltage.
9. To adjust the position control, execute the X.TUNE function, chapter “11.6” on page 76.
10. To set AUTOMATIC mode, see chapter “14.1” on page 102.

9.3.2 Required tool

- Allen key, width across flats 3 mm (AG2) / 5 mm (AG3)
  Required when no supply voltage is applied to the device in order to move the valve into the open position.
- Open-end wrench

9.3.3 Installation conditions

Installation position: any

Flow direction: indicated on the type label with an arrow and the digits 1 and 2.
The 1 and 2 are also on the valve body for identification.
The flow direction is below the seat with flow from port 2 to port 1.

Pipelines: ensure that pipelines are in alignment.

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Filter:	required for devices with approval as per EN 161. According to EN 161 “Automatic shut-off valves for gas burners and gas appliances”, a dirt trap, which prevents the penetration of a 1 mm test pin, must be installed upstream of the valve in the pipeline.
Preparation:	Clear impurities from pipelines (seal material, metal chips, etc.).

9.3.4 Weld the valve body into the pipeline

DANGER!

Risk of injury from high pressure.

▸ Before working on the system, switch off the pressure and vent or empty the lines.

ATTENTION!

The electronics assembly in the actuator will be damaged by the effects of heat.

• The actuator must be removed before the valve body is welded in.

→ Weld the valve body into the pipeline.
⚠Ensure that there is no voltage present and minimal vibration during installation!

Holding device
To protect the valve actuator from damage resulting from forces and vibrations, a holding device is recommended. This is available as an accessory. See chapter “24 Accessories, wearing parts”.

Next steps:

• Mount actuator on the valve body, chapter “9.5” on page 53.

• Electrical connection of the device, chapter “10” on page 59.

• Connect supply voltage.

• To adjust the position control, execute the X.TUNE function, chapter “11.6” on page 76.

ATTENTION!

Damage to valve body, valve seat seal or diaphragm.

▸ To avoid damage, execute the X.TUNE function first after establishing the electrical connection. Only then should the operating state be set to AUTOMATIC.

• Set AUTOMATIC mode, chapter “14.1” on page 102.

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9.4 Disassembly of the actuator from the valve body

DANGER!

Risk of injury from high pressure.

▸ Before working on the system or device, switch off the pressure and ventilate or empty the lines.

WARNING!

Risk of injury due to improper installation work.

▸ The actuator may be removed only by trained technicians and with the appropriate tools.

9.4.1 Required work steps

1. Set MANUAL operating state, chapter “14.1” on page 102.
2. Move valve into open position, chapter “15” on page 113.
3. Switch off the supply voltage. Wait until LED illuminated ring goes out.
4. Remove actuator from the valve body, chapter “9.4.3” on page 51.

9.4.2 Required tool

- Allen key, width across flats 3 mm (AG2) / 5 mm (AG3)
  Only required when no supply voltage is applied to the device in order to move the valve into the open position.
- Open-end wrench

9.4.3 Removing actuator from the valve body

Prerequisites:
MANUAL operating state, valve position at least 1/3 open, supply voltage switched off.

WARNING!

Risk of injury from electric shock.
Risk of crushing by mechanically powered parts.

▸ Switch off the supply voltage.

▸ For devices with SAFEPOS energy-pack: completely remove the SAFEPOS energy-pack. Wait until the LED ring is no longer illuminated and ensure that the LED status indicator is not in LED off mode.

ATTENTION!

Damage to valve body or valve seat seal.

To avoid damage, the valve must be open when the actuator is disassembled.

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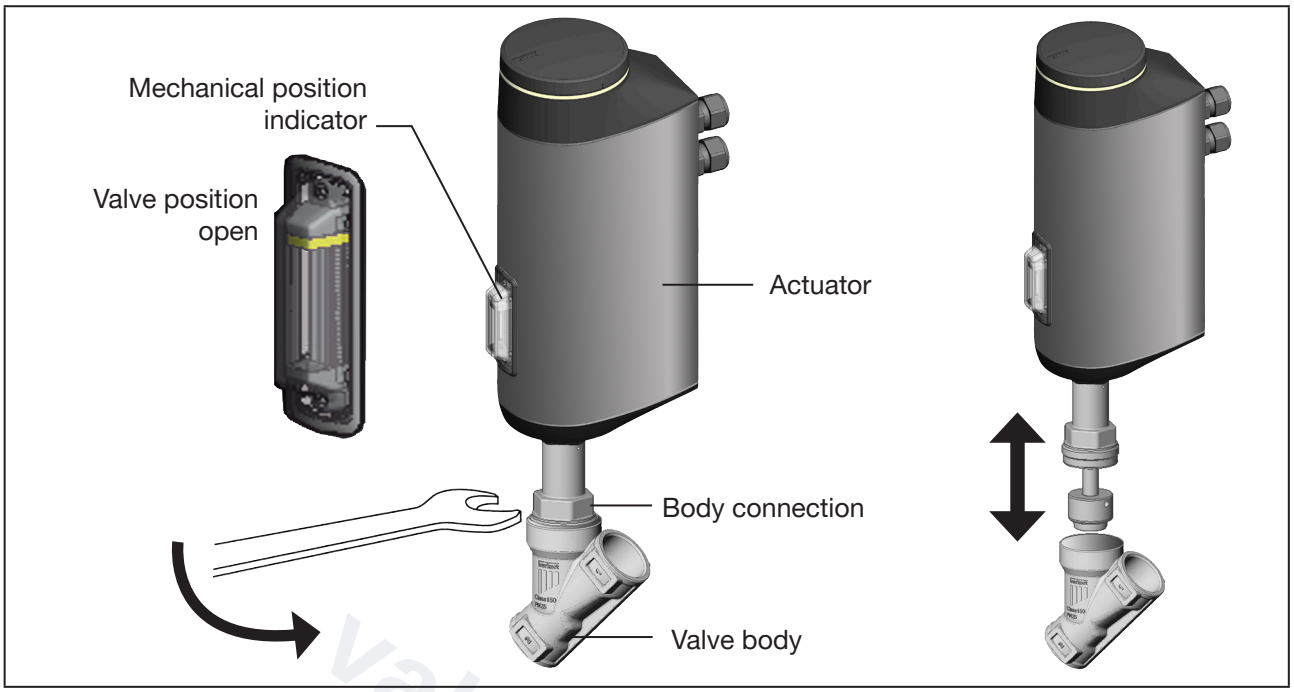

Image 21: Actuator disassembly (with angle seat control valve as an example)

→ Clamp valve body into a holding device.

→ Place on the body connection with a suitable open-end wrench.
⚠ Do not use any tools for unscrewing which could damage the body connection.

→ Unscrew actuator from the valve body.

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9.5 Installing actuator on valve body

Prerequisites:
MANUAL operating state, valve position at least 1/3 open, supply voltage switched off.

→ ⚠ Before installing the actuator, check whether the seal for the valve body is present and undamaged.

→ Replace seal.

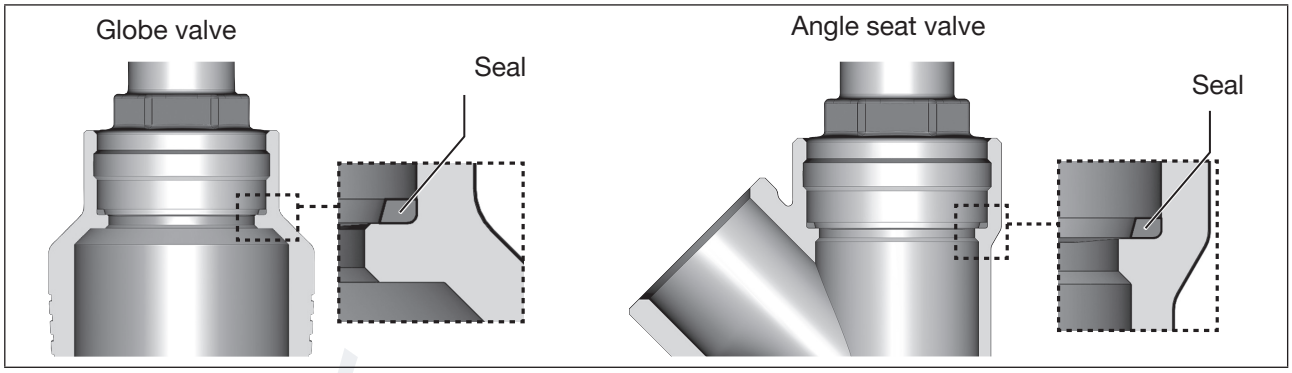

Image 22: Seal

ATTENTION!

Damage to valve body or valve seat seal.

To avoid damage, the valve must be in an open position when the actuator is disassembled.

⚠ **WARNING!**

Danger due to unsuitable lubricants.

Unsuitable lubricants may contaminate the medium. There is a risk of explosion in oxygen applications.

▸ For specific applications, e.g. oxygen or analysis applications, use approved lubricants only.

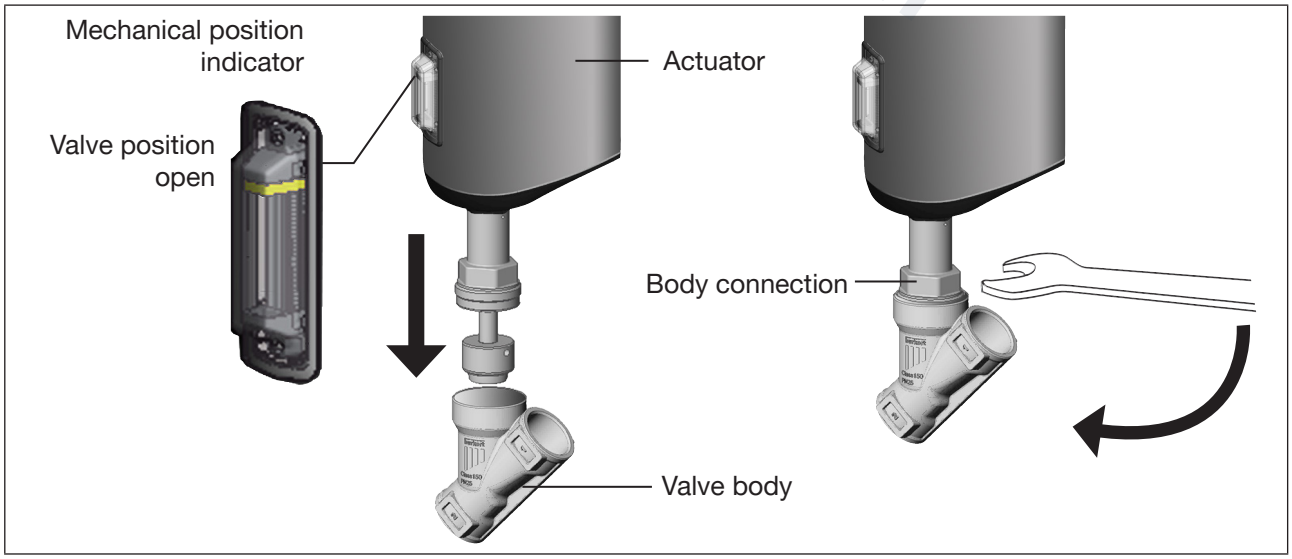

Image 23: Installing actuator on valve body

→ Before re-installation, grease the external thread of the body connection (e.g. with Klüberpaste UH1 96-402 from Klüber).

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→ Position the external thread of the valve body on the internal thread of the body connection.

→ Place on the body connection with a suitable open-end wrench.
⚠Do not use any tools for unscrewing, which could damage the body connection.

WARNING!

Risk of injury when failing to observe tightening torque value!

Failure to observe the tightening torque value is dangerous due to the risk of damage to the device.

▸ Observe the tightening torque value.

→ Screw actuator onto valve body.
⚠ Observe tightening torque (see "Table 18").

DN connection (valve body) [DN]	Tightening torque for body connection [Nm]
10/15	45 ± 3
20	50 ± 3
25	60 ± 3
32	65 ± 3
40	
50	70 ± 3
65	100 ± 3
80	120 ± 5
100	150 ±5

Table 18: Tightening torque for body connection

Next steps:

- Electrical connection of the device, chapter "10" on page 59.
  The position of the ports can be changed by turning the actuator through 360°. For a description see chapter "9.6 Rotating the actuator".
- Connect supply voltage.
- To adjust the position control, execute the X.TUNE function, chapter "11.6" on page 76.

ATTENTION!

Damage to valve body, valve seat seal or diaphragm.

▸ To avoid damage, execute the X.TUNE function first after establishing the electrical connection. Only then should the operating state be set to AUTOMATIC.

- Set AUTOMATIC mode, chapter "14.1" on page 102.

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9.6 Rotating the actuator

The position of the ports can be changed by turning the actuator through 360°.

ATTENTION!

Damage to the valve seat seal and valve seat contour when valve closed.

If the valve is closed when the actuator is turned, the valve seat seal and the valve seat contour can be damaged.

- If the valve is closed: before turning the actuator, open the valve with the mechanical manual override. For a description see "15.4 Actuating the valve mechanically".

→ For devices that have not been installed, clamp the valve body in a holding device.

→ Place a suitable open-end wrench (width across flats M41) on the hexagon head of the actuator.

→ Move the actuator into the desired position preferably by turning it clockwise.

If only turning counterclockwise is technically possible for installation, observe the following safety warning:

WARNING!

Risk of injury from discharge of pressure and escaping medium.

If the actuator is turned counterclockwise, the body connection can loosen.

▸ When turning counterclockwise, hold the hexagon of the body connection with a 2nd open-ended wrench.

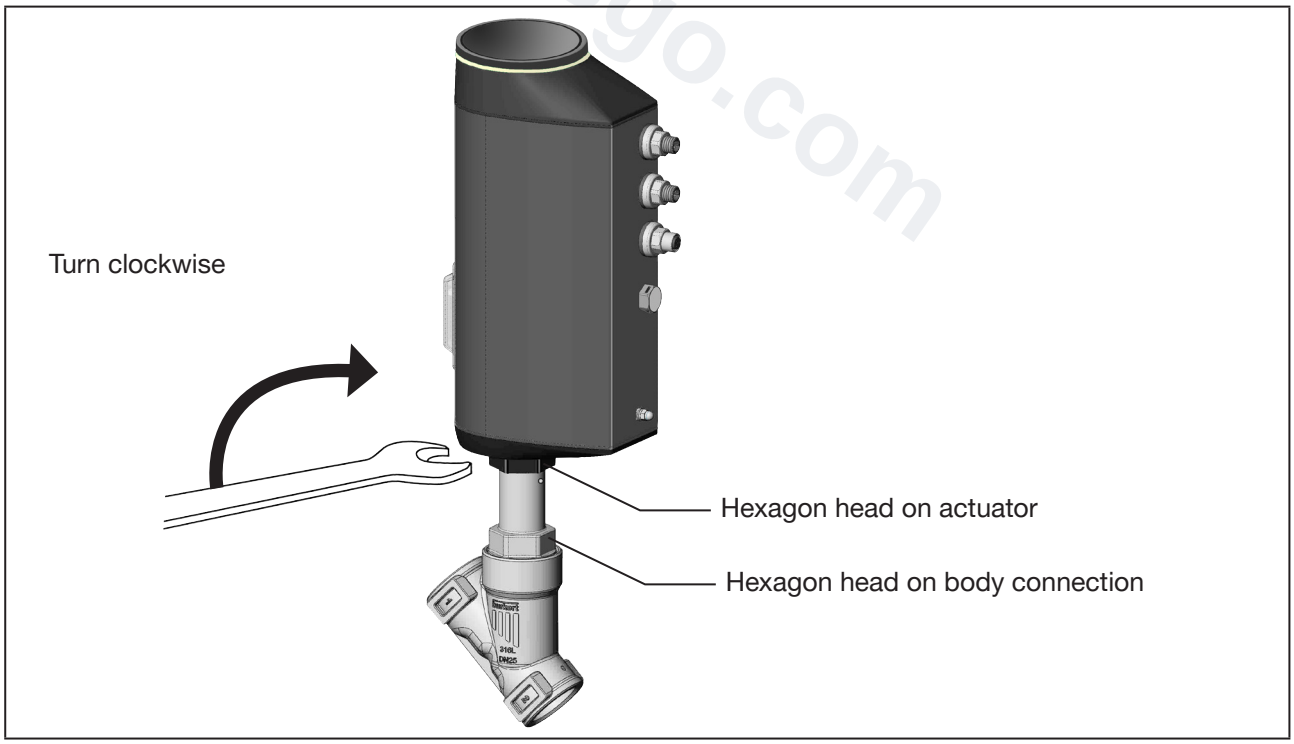

Image 24: Turn actuator

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9.7 Holding device

The holding device protects the valve actuator from damage resulting from forces and vibrations. The holding device is available as an accessory in 2 sizes. See chapter “24 Accessories, wearing parts” on page 164.

9.7.1 Mounting the holding device

→ Attach the holding device to the pipe between the valve body and the actuator as shown in the picture.

In case of existing relief bore:

ATTENTION!

Make sure that the relief bore, which is used to detect leaks, is not covered.

→ Fix the holding device in place by suitable means.

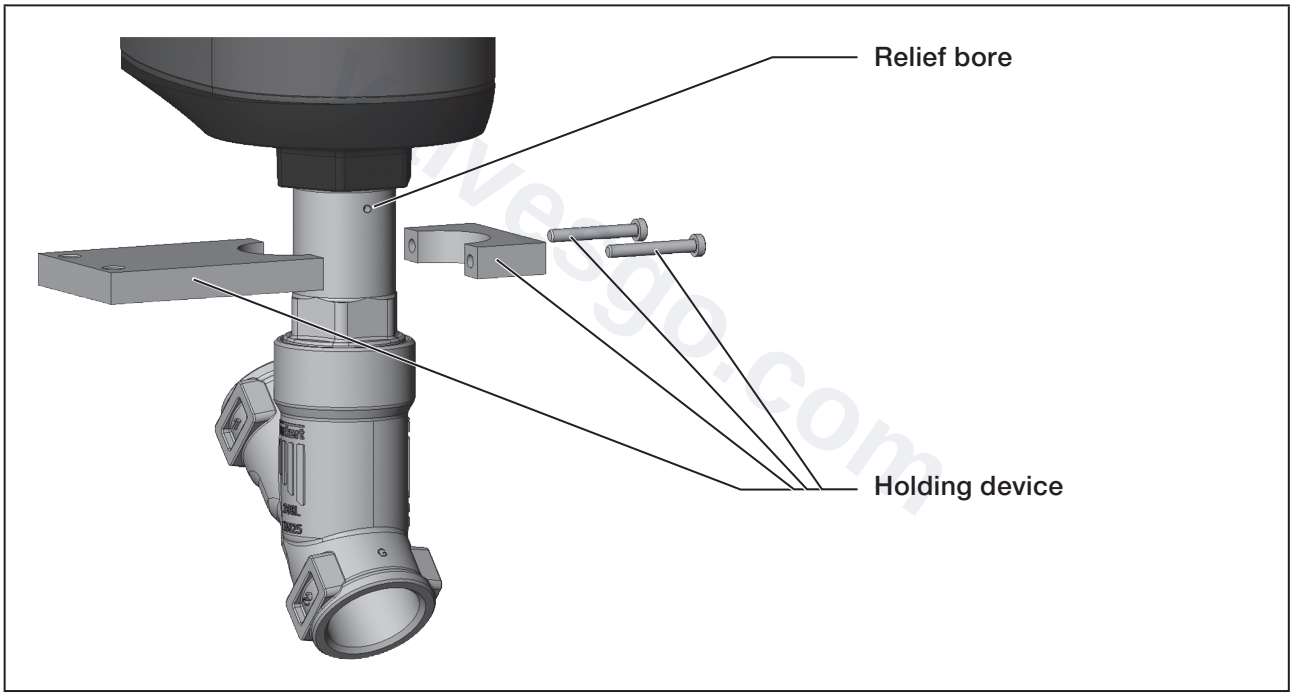

Image 25: Mounting the holding device

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9.8 Attaching a sensor or fitting to the relief bore

The optional variant (V code NA99) for detecting and draining leaks allows a sensor or a fitting to be fitted to the relief port.

CAUTION!

Damage caused by operating medium in the actuator.
Do not attach any closed vessels to the relief bore.

When attaching anything to the relief bore, ensure that there is no back pressure that could hinder the flow of the leakage. Otherwise there is a risk of operating medium entering the actuator and causing permanent damage to it.

Sensors and fittings with M5 threads can be used with the M4 variant with the help of the included adapter.
The circlip serves as a stop to prevent the item being screwed in too far.

Take note of the wall thickness.

If no adapter is used, ensure that the threaded stud on the design does not exceed the following dimensions:

M4 version: 2.3 mm
M5 version: 3.5 mm

Always seal the thread when screwing in, e.g. with PTFE tape or thread sealant.

Type	Actuator size	DN	Thread of relief bore	Includes adapter
3361	AG2	20	M4 x 0.35	M5 x 0.8
3361	AG2	25	M5 x 0.8	-

Table 19: Variant NA99

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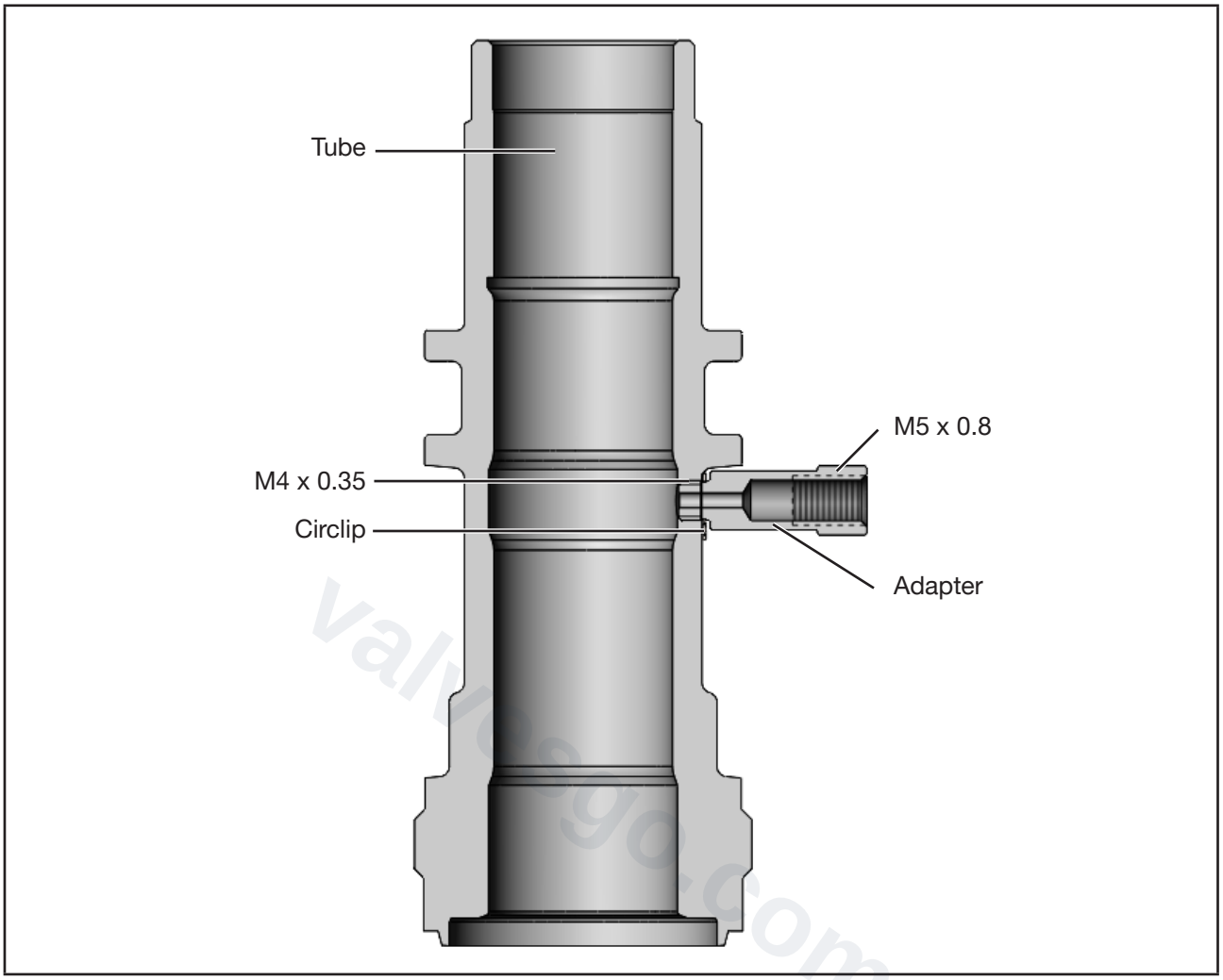

Image 26: Adapter for relief bore

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10 ELECTRICAL INSTALLATION

The electromotive control valve is available with two connector options:

- With a circular plug-in connector (multi-pin variant)
- Cable gland with connection terminals (only AG2)

Signal values

Operating voltage:	24 V ⎓
Set-point value:	0–20 mA; 4–20 mA 0–5 V; 0–10 V

10.1 Electrical installation with circular plug-in connector

10.1.1 Safety instructions

WARNING!

Risk of injury from improper installation.

- ▸ Installation may be carried out by authorised technicians only and with the appropriate tools.
- ▸ Observe general engineering standards & rules during installation.

Risk of injury due to unintentional activation of the system and uncontrolled restart.

- ▸ Secure the system against unintentional activation.
- ▸ Following installation, ensure a controlled restart.

ATTENTION!

To ensure electromagnetic compatibility (EMC) the functional earth must be connected to earth with a short line (max. 1 m). Functional earth must have a cross-section of at least 1.5 mm².

Use of set-point input 4–20 mA

If several Type 3360 or 3361 devices are connected in series and the electrical power supply for a device in this connected series fails, the input of the failed device becomes highly resistive.
As a result, the 4...20 mA standard signal fails.

Choice of connection line:
When choosing the length and cross-section of the individual wires, take into account the voltage drop in relation to the maximum supply current.

→ Connect the device in accordance with the tables.

→ Perform the necessary basic configuration and adjustments for the electromotive control valve after the operating voltage has been established. For a description see chapter “11 Start-up”.

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10.1.2 Description of circular plug-in connectors AG2 and AG3

AG2 variant

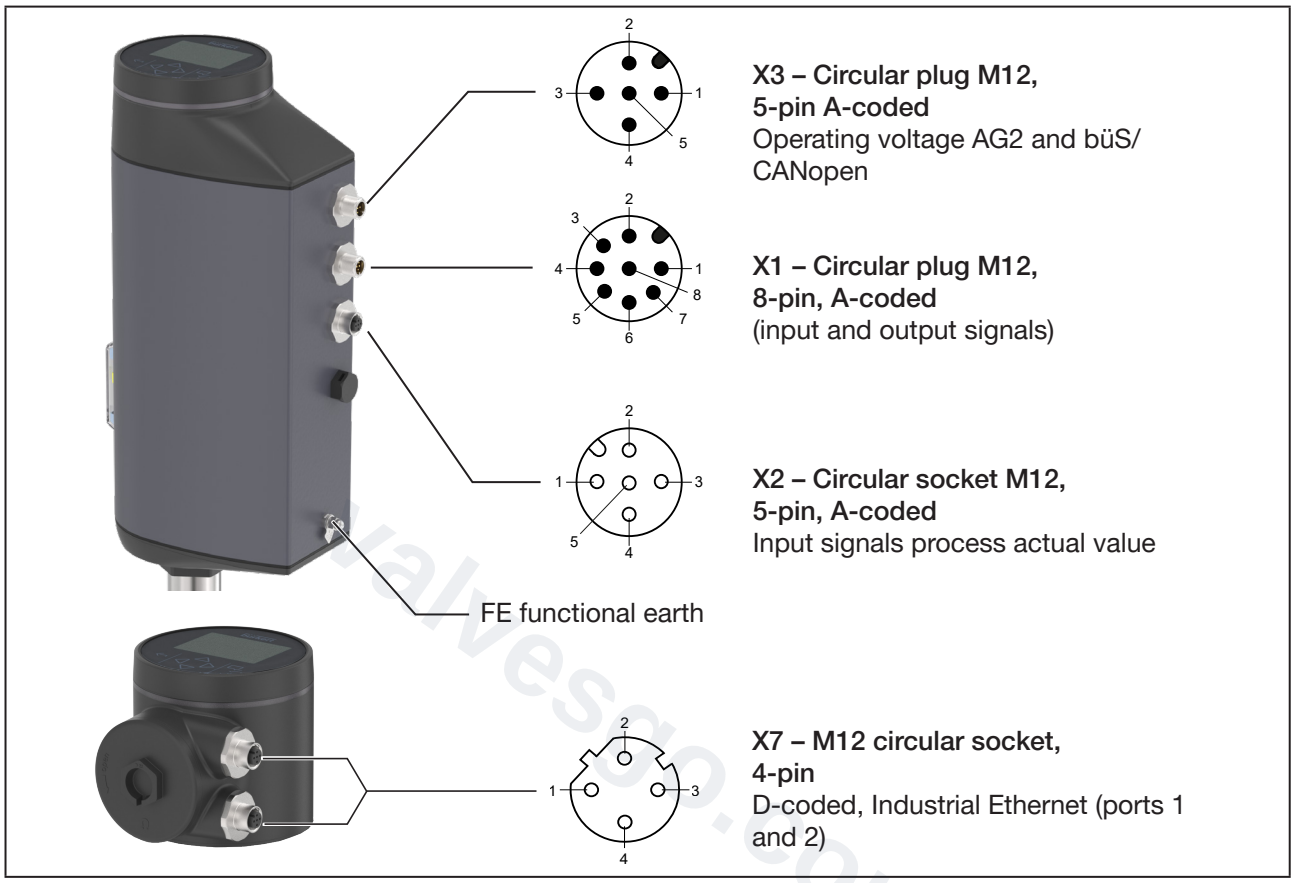

Image 27: Description of circular plug-in connector AG2

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AG3 Variant

Image 28: Description of circular plug-in connector AG3

Circular plug-in connector	AG2			AG3		
	Electric variant			Electric variant		
	Analogue (Service-büS)	with fieldbus gateway	büS/ CANopen	Analogue (Service-büS)	with fieldbus gateway	büS/ CANopen
	0...10 V 0...5 V 4...20 mA 0...20 mA adjustable	for PROFINET, EtherNet/IP, Modbus TCP, EtherCAT com-munication protocols		0...10 V 0...5 V 4...20 mA 0...20 mA adjustable	for PROFINET, EtherNet/IP, Modbus TCP, EtherCAT com-munication protocols	
X1	X	-	-	X	-	-
X2	optional for devices with process control function					
X3	X	X	X	-	X	X
X4	-	-	-	X	X	X
X7	-	X	-	-	X	-

Table 20: Use of circular plug-in connector AG2/AG3

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→ Connect the device in accordance with the tables.

→ Perform the necessary basic configuration and adjustments for the electromotive valve after the operating voltage has been established. See chapter “11 Start-up”

10.1.3 X1 – Circular plug M12, 8-pin A-coded Input and output signals

Pin	Wire colour*	Assignment
Input signals from control centre (e.g. PLC)		
8	red	Set-point value + (0/4–20 mA or 0–5/10 V) for operating voltage electrically isolated
7	blue	Set-point value –
1	white	Digital input + 0...5 V (log. 0) 10...30 V (log. 1)
Output signals to control centre (e.g. PLC) – (only required with analogue output and/or digital output option)		
6	pink	Analogue output+ (0/4...20 mA or 0...5/10 V)
5	grey	Analogue output –
4	yellow	Digital output 1 (24 V/0 V)
3	green	Digital output 2 (24 V/0 V)
2	brown	Digital inputs and digital outputs GND
* The specified wire colours refer to the connection cable, which is available as an accessory with ID no. 919061.		

Table 21: X1 – Circular plug M12, 8-pin

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10.1.4 X2 – M12 circular socket, 5-pin, A-coded input signals process actual value (only with process control function)

Signal type*	Pin	Wire colour	Assignment	Device end	External circuit
4...20 mA – internally supplied	1	brown	+24 V supply transmitter	1	
	2	white	PV1: not assigned	2	Transmitter
	3	blue	GND (identical to GND operating voltage)	3	GND
	4	black	PV2: output from transmitter	4	I
	5	grey	PV3: Bridge to GND (GND from 3-wire transmitter)**	5	
4...20 mA – externally supplied	1	brown	not assigned		
	2	white	not assigned		
	3	blue	not assigned		
	4	black	PV2: process actual +	4	4...20 mA
	5	grey	PV3: process actual –	5	GND 4...20 mA
Frequency – internally supplied	1	brown	+24 V supply sensor	1	+24 V
	2	white	PV1: Cycle input +	2	Cycle +
	3	blue	GND	3	GND (identical to GND operating voltage)
	4	black	PV2: not assigned		
	5	grey	PV3: Bridge to GND (GND from 3-wire transmitter)	5	Cycle –
Frequency - externally supplied	1	brown	not assigned		
	2	white	PV1: Cycle input +	2	Cycle +
	3	blue	not assigned		
	4	black	PV2: not assigned		
	5	grey	PV3: Cycle input –	5	Cycle –
Pt 100 (see note below)	1	brown	not assigned		
	2	white	PV1: Process actual 1 (power supply)	2	Pt 100
	3	blue	not assigned		
	4	black	PV2: Process actual 2 (compensation)	4	
	5	grey	PV3: Process actual 3 GND	5	

* Configurable in the software:
Inputs/outputs → PV → ANALOG.type (Signal source: PV.source → Analog).

** For AG2, with a 2-wire transmitter, pins 3 and 5 must be jumpered on the device.

Table 22: X2 – M12 socket, 5-pin, input signals process actual value (only on devices with process control function)

NOTE!

The Pt 100 sensor must be connected via three lines to compensate for line resistance.
Pin 4 and Pin 5 must be bridged at the sensor.
Connection cables must not exceed 20 m in length.

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10.1.5 X3 – Circular plug M12, 5-pin A-coded, operating voltage AG2 and büS/CANopen network

Electrical installation with or without büS network:
In order to be able to use the büS network (CAN interface), a 5-pin circular plug and a shielded 5-wire cable must be used.

If the büS network is not assigned, a 4-pin circular plug can be used as a counterpart.

Pin	Wire colour		Assignment (from device perspective)
	without büS network 4-pin connection*	with büS network**	
1	-	CAN shield / shielding	
2	white	red	+24 V ⎓ ±10%, max. residual ripple 10%
3	blue	black	GND/CAN_GND
4	-	white	CAN_H
5	-	blue	CAN_L

* The specified wire colours relate to the 4-pin M12 connection cable, which is available as an accessory with ID No. 918038.

** The specified wire colours relate to the büS cable, which is available as an accessory. See cabling guideline on our website burkert.co.uk/en.

Table 23: X3 – Circular plug M12, 5-pin A-coded, operating voltage AG2 and büS/CANopen network

10.1.6 X3 – Circular plug M12, 5-pin, büS/CANopen network AG3

For variants with fieldbus gateway, using this connection is optional for service büS or a büS-capable externally supplied sensor.

Pin	Wire colour with büS network*	Assignment (from device perspective)
1	CAN shield / shielding	
2**	red	24 V ⎓ ± 10% max. residual ripple 10%
3**	black	GND/CAN_GND
4	white	CAN_H
5	blue	CAN_L

**The specified wire colours relate to the büS cable, which is available as an accessory. See* cabling guideline on our website burkert.co.uk/en.

*** This system supply must be galvanically isolated from the actuator supply.*

Table 24: X3 – Circular plug M12, 5-pin, büS/CANopen network AG3

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10.1.7 X4 – Circular plug M12, L-coded, 5-pin, actuator supply AG3

Pin	Wire colour*	Assignment (from device perspective)
1	brown	+24 V ⎓ ±10%, max. residual ripple 10%
2	white	Do not connect
3	blue	GND
4	black	Do not connect
5	grey	FE connected to housing

* The specified wire colours relate to the 5-pin M12 connection cable, which is available as an accessory with ID no. 20010840.

Table 25: X4 – Circular plug M12, L-coded, actuator supply AG3

10.2 Electrical connection fieldbus gateway

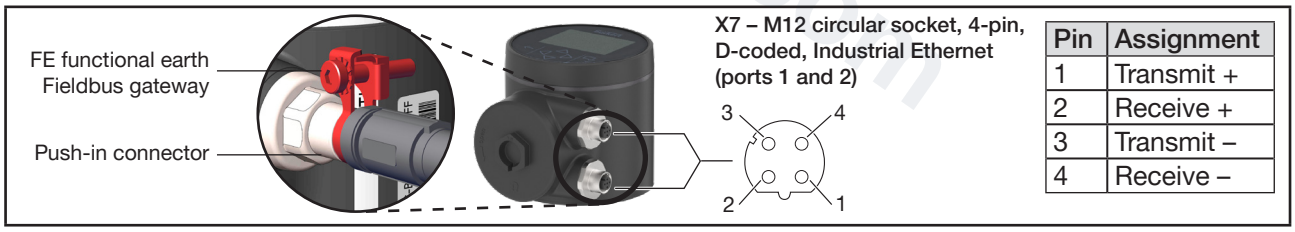
The fieldbus gateway for Industrial Ethernet is connected using two 4-pin D-coded M12 circular plug-in connectors.

ATTENTION!

To ensure electromagnetic compatibility (EMC), a shielded Ethernet cable must be used. Connect the cable shielding on both sides to earth (i.e. on each of the connected devices).

Use a short line (max. 1 m) with a cross-section of at least 1.5 mm² for connecting to earth.

For versions with Fieldbus gateway, the Fieldbus gateway must also be connected to earth along with the actuator. This connection to earth is made with the ground terminal supplied, to the circular plug-in connector of the connected Ethernet cable.



Pin	Assignment
1	Transmit +
2	Receive +
3	Transmit –
4	Receive –

Image 29: Electrical connection, pin assignment and FE functional earth at fieldbus gateway

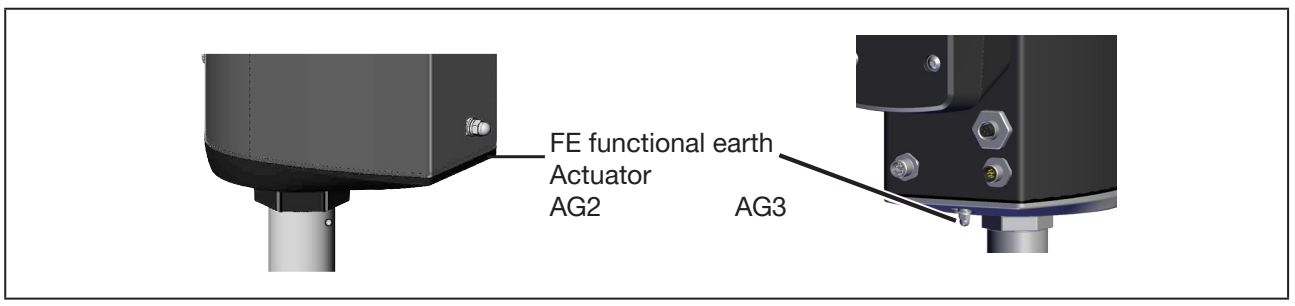


Image 30: FE functional earth at actuator

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10.3 Electrical installation with cable gland (only AG2)

10.3.1 Safety instructions

WARNING!

Risk of injury from improper installation.

- Installation may be carried out by authorised technicians only and with the appropriate tools.
- Observe general engineering standards and rules during installation.

Risk of injury due to unintentional activation of the system and uncontrolled restart.

- Secure the system against unintentional activation.
- Following installation, ensure a controlled restart.

Use of set-point input 4...20 mA

If several Type 3360 or 3361 devices are connected in series and the electrical power supply for a device in this connected series fails, the input of the failed device becomes highly resistive.
As a result, the 4...20 mA standard signal fails.

ATTENTION!

To ensure electromagnetic compatibility (EMC) the functional earth must be connected to earth with a short line (max. 1 m). Functional earth must have a cross-section of at least 1.5 mm².

10.3.2 Access to connection terminals

Devices with ATEX approval or IECEx approval are secured with a magnetic lock.

The removal of the cover is described in the supplementary instructions for the electromotive control valves with ATEX approval and IECEx approval.

To access the terminals, open the actuator housing as described below.

1. Remove display module or blind cover:

ATTENTION!

Carefully remove the display module so that the connection cable and HMI interface are not damaged.

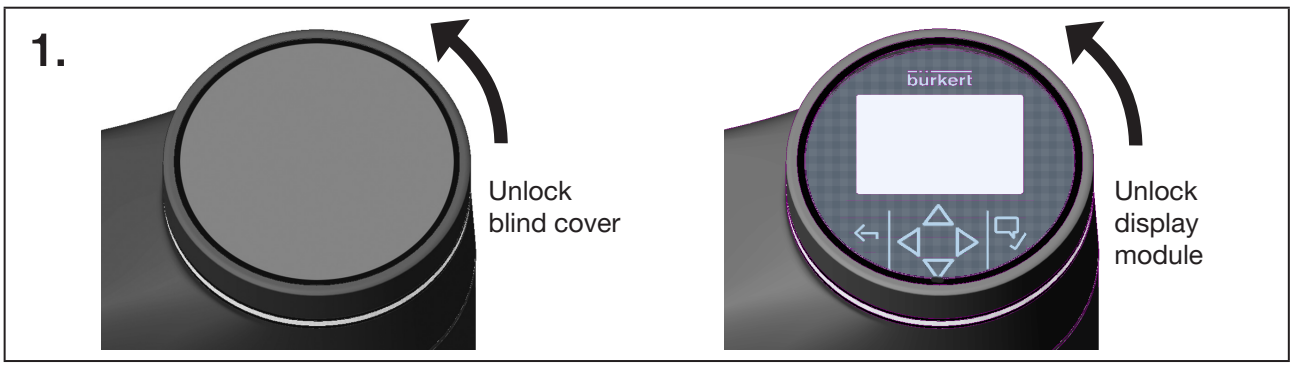

Image 31: Remove blind cover or display module

→ To unlock, turn the display module or the blind cover anticlockwise and remove.
ATTENTION! For devices with display module, take note of the connection cable to the HMI interface.

→ For devices with display module, disconnect the connection cable from the HMI interface.

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2. Remove the LED and storage module:

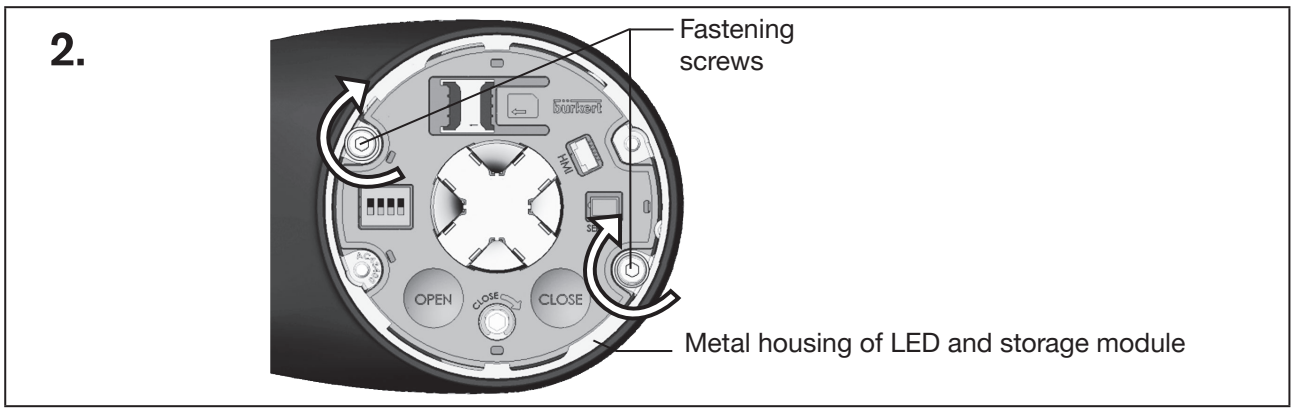

Image 32: Remove the LED and storage module

→ Remove the two fastening screws (hexalobular-internal screws T20).

→ Grab the LED and storage module by both sides of the metal housing and lift it out.

3. Remove the actuator cover:

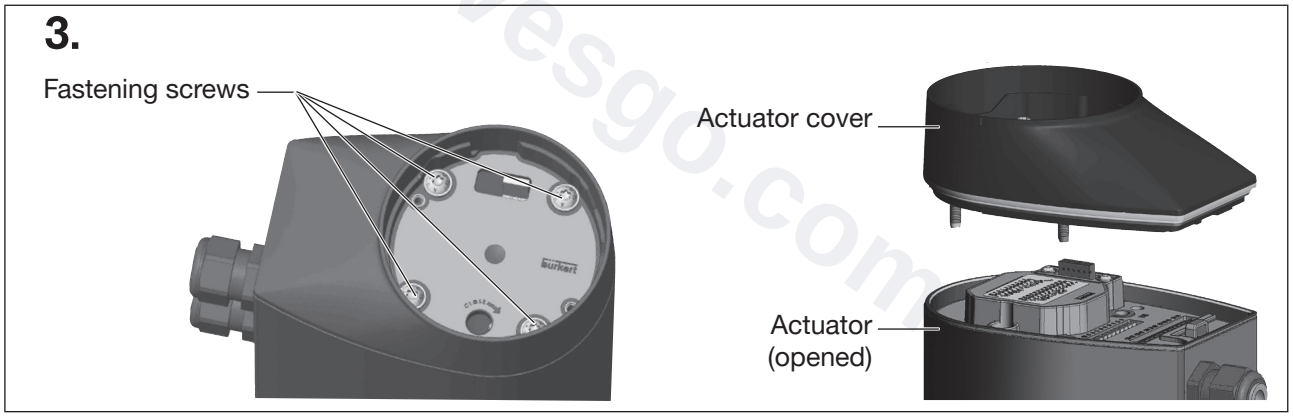

Image 33: Removing actuator cover

→ Loosen the four fastening screws (hexalobular-internal screws T25).
The screws are integrated securely in the actuator cover.

→ Remove the actuator cover.

The connection terminals are now accessible.

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10.3.3 Connecting the cable

→ Push the cable through the cable gland.

ATTENTION!

Take note for connection to spring-loaded terminals.

- Minimum length of wire ferrules: 8 mm
- Maximum cross-section of the wire ferrule: 1.5 mm² (without collar), 0.75 mm² (with collar)

→ Strip at least 8 mm of insulation from the wires and crimp ferrules on.

→ Attach the wires to the terminals. The terminal layout is provided in the tables below from Page 69.

→ Tighten union nut of cable gland (tightening torque approx. 1.5 Nm).

ATTENTION!

The ingress of dirt or moisture may cause damage or malfunction.

To preserve IP65 and IP67 protection, ensure the following:

- Unused cable glands must be sealed using dummy plugs.
- The union nuts of cable glands must be tightened. Tightening torque, dependent on the cable size or dummy plugs, approx. 1.5 Nm.

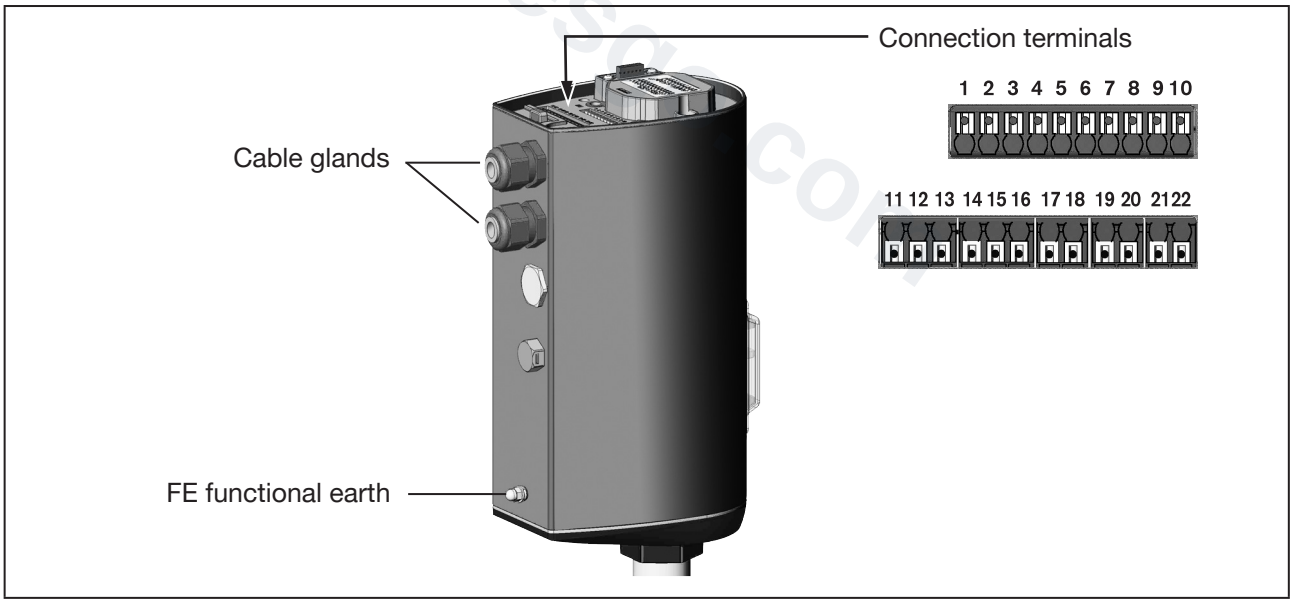

Image 34: Connecting the cable

→ Connect the device in accordance with the tables.

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10.3.4 Terminal layout – input signal from control centre (e.g. PLC)

Terminal	Assignment
8	Set-point value + (0/4–20 mA or 0–5/10 V) for operating voltage electrically isolated
7	Set-point value –
5	Digital input + 0...5 V (log. 0) 10...30 V (log. 1)
4	Digital input GND relates to GND operating voltage (GND terminal)

Table 26: Terminal layout – input signal from control centre (e.g. PLC)

10.3.5 Terminal layout – output signals to control centre (e.g. PLC) – only required with analogue output and/or digital output option

Terminal	Assignment
19	Analogue output + (0/4...20 mA or 0...5/10 V)
20	Analogue output –
18	Digital output 1 (24 V/0 V)
17	Digital output 2 (24 V/0 V)
16	Digital output GND

Table 27: Terminal layout – output signal to control centre (e.g. PLC)

10.3.6 Terminal layout – operating voltage and büS network

Terminal	Assignment
	CAN shield / shielding
10	24 V ⎓ ± 10% max. residual ripple 10%
9	GND
1*	CAN_GND ⚠ Only connect when a separate line is used for CAN.
2*	CAN_H
3*	CAN_L

Table 28: Terminal layout – operating voltage and büS network

*Electrical installation of büS network:
Terminals 1, 2 and 3 (CAN interface) are for the büS network connection.
Terminal 1 is bridged internally with terminal 9, however it is not designed for the operating voltage.

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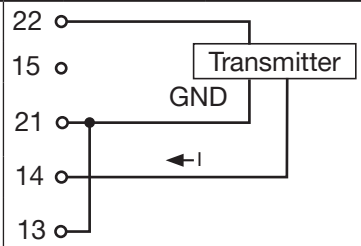
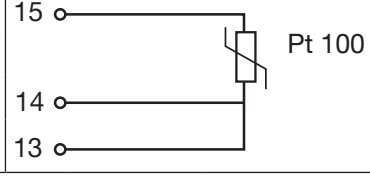
10.3.7 Terminal layout – process actual value input (only with process control function)

Signal type*	Terminal	Assignment	Device end	External circuit
4...20 mA – internally supplied	22	+24 V supply transmitter		
	15	PV1: not assigned		
	21	GND (identical to GND operating voltage)**		
	14	PV2: output from transmitter		
	13	PV3: Bridge to GND (GND from 3-wire transmitter)**		
4...20 mA – externally supplied	22	not assigned		
	15	not assigned		
	21	not assigned		
	14	PV2: process actual +	14	4...20 mA
	13	PV3: process actual –	13	GND 4...20 mA
Frequency – internally supplied	22	+24 V supply sensor	22	+24 V
	15	PV1: Cycle input +	15	Cycle +
	21	GND	21	GND (identical to GND operating voltage)
	14	PV2: not assigned		
	13	PV3: Bridge to GND (GND from 3-wire transmitter)	13	Cycle –
Frequency - externally supplied	22	not assigned		
	15	PV1: Cycle input +	15	Cycle +
	21	not assigned		
	14	PV2: not assigned		
	13	PV3: Cycle input –	13	Cycle –
Pt 100 (see note below)	22	not assigned		
	15	PV1: Process actual 1 (power supply)		
	21	not assigned		
	14	PV2: Process actual 2 (compensation)		
	13	PV3: Process actual 3 GND		

* Configurable in the software:
Inputs/outputs → PV → ANALOG.type (Signal source: PV.source → Analog).

** For AG2, with a 2-wire transmitter, clips 13 and 21 must be jumpered on the device.

Table 29: Terminal layout – process actual value input (only on devices with process control function)

NOTE!

The Pt 100 sensor must be connected via three lines to compensate for line resistance.
Clip 14 and clip 13 must be jumpered at the sensor.

Connection cables must not exceed 20 m in length.

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10.3.8 Close device

ATTENTION!

The ingress of dirt or moisture may cause damage or malfunction.

To preserve IP65 and IP67 protection, ensure the following before closing the device:

- The seal in the actuator housing/actuator cover must be inserted and undamaged.
- The seal surfaces must be clean and dry.

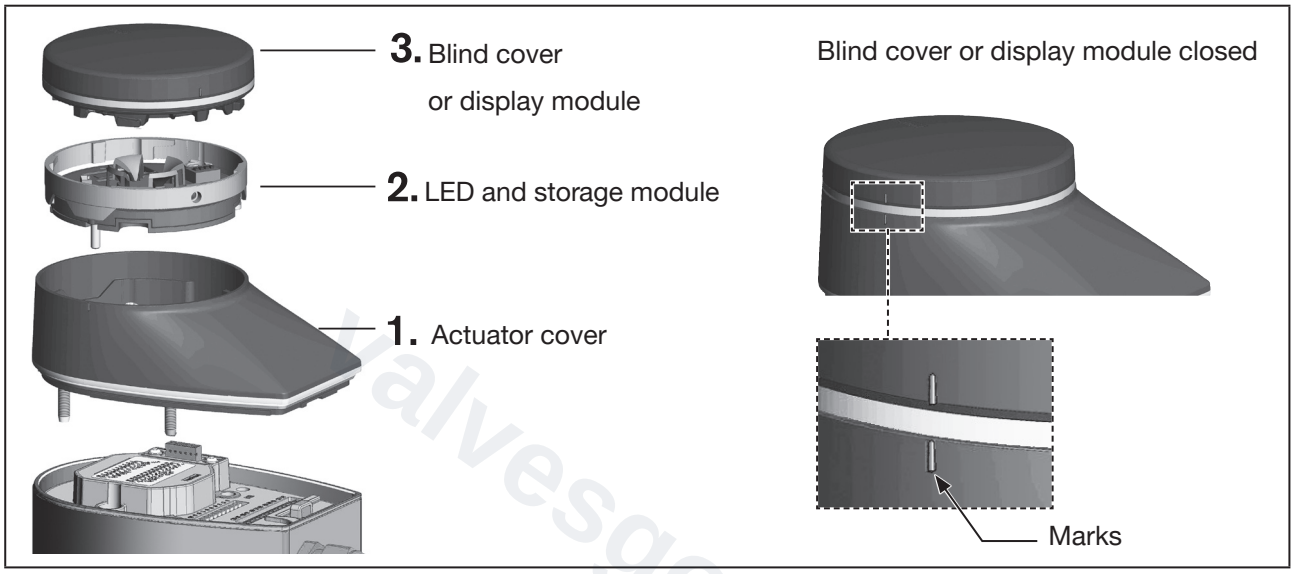

Image 35: Close device

1. Install actuator cover

→ Place actuator cover on the actuator housing.

→ First screw in the four fastening screws (hexalobular-internal screws T25) by hand lightly, then tighten them (tightening torque: 5.0 Nm).

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2. Mount LED and storage module:

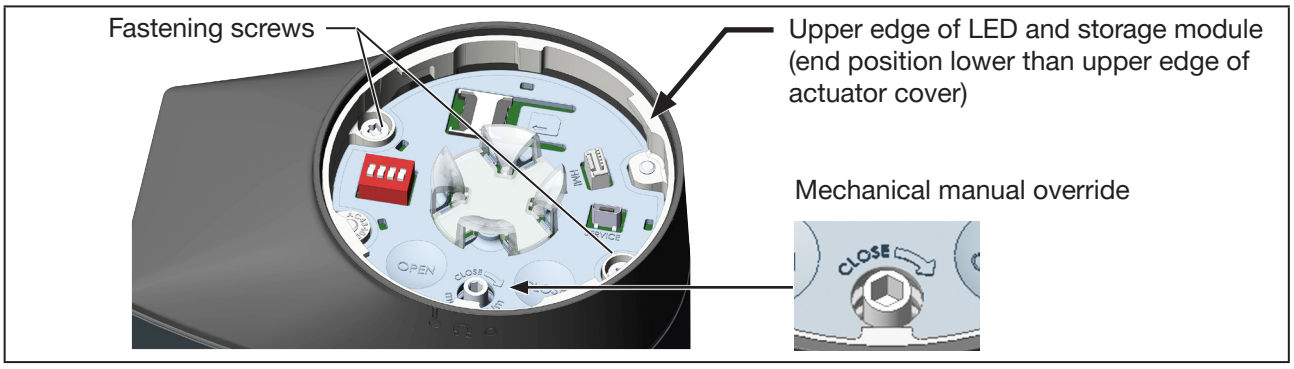

Image 36: Mount LED and storage module:

→ Place the LED and storage module onto the actuator cover.
Align the recess for the manual override in the centre, paying attention to the correct alignment of the electrical plug connection.

→ Carefully press down the LED and storage module by hand.
The end position is reached if the upper edge of the module is fully and evenly recessed in the actuator cover.

ATTENTION!

The plug connection will be damaged if the LED and storage module is not correctly inserted.

- Before the fastening screws are tightened, the LED and storage module must be fully recessed in the actuator cover.

→ Tighten 2 fastening screws (hexalobular-internal screws T20).
Observe the tightening torque of 1.1 Nm!

3. Close device with blind cover or display module

For devices with display module:

→ Connect the connection cable to the HMI interface.

→ Fit the display module and turn clockwise until the marking at the edge is directly over the marking for the actuator cover.

For devices with blind covers:

Fit the blind cover and turn clockwise until the marking at the edge is directly over the marking for the actuator cover.

Perform the necessary basic configuration and adjustments for the electromotive control valve after the operating voltage has been established. For a description see chapter “11.4 Base settings”.

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11 START-UP

11.1 Safety instructions

WARNING!

Risk of injury due to improper operation.

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

- The operating personnel must know and understand the contents of the operating instructions.
- The safety instructions and the intended use must be observed.
- Only adequately trained personnel may start up the system/device.

11.2 Before start-up

ATTENTION!

Take note for devices requiring disassembly for installation.

If the actuator is disassembled, X.TUNE function must be carried out again before start-up. See chapter "11.6 Adjustment of position controller – execute X.TUNE".

11.3 Configuration options for start-up

- **Configuration with the Bürkert Communicator software on PC**
  This type of configuration is possible for all device types and device variants.

The Bürkert Communicator software can be downloaded free of charge from the Bürkert website.

It requires the USB-büS-Interface set available as an accessory.
Communication is performed via the device's büS service interface.

- **Configuration on display of device (optional)**
  Only possible on devices with display module.

- **Use two capacitive buttons in device to adjust position control (X.TUNE function)**
  Only possible on devices without display module.

11.4 Base settings

A start-up wizard that provides step-by-step guidance through the base settings is available for Bürkert Communicator and the display.
(Configuration area → **Position controller** or
Process controller → START-UP)

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11.4.1 Base settings for position control

Before delivery, the base settings for the position control have already been input by the manufacturer. See diagrams below.

Type of base setting (observe sequence)		Factory default setting
1.	Set safety position	Close/open (dependent on device variant)
2.	Adjustment of position control (Function X.TUNE)	Factory setting **NOTE:** If the actuator is disassembled, X.TUNE function must be carried out again before start-up.
3.	Set standard signal for position set-point value	Signal type analogue: 4...20 mA
		Gateway: Specified by fieldbus
4.	Set AUTOMATIC operating state	MANUAL

Table 30: Overview: base settings for position control

11.4.2 Base settings for process control

Before delivery, important base settings for the process control have already been input by the manufacturer. See diagrams below.

Type of base setting (observe sequence)			Factory default setting
1.	Set safety position		Close/open (dependent on device variant)
2.	Adjustment of position control (Function X.TUNE)		Factory setting **NOTE:** If the actuator is disassembled, X.TUNE function must be carried out again before start-up.
3	Select physical unit for process control		Per cent
4	Configure process values		
	a)	Select standard signal for process set-point value	Signal type analogue: 4...20 mA
			Gateway: Specified by fieldbus
	b)	Scale process set-point value	Minimum 0%, maximum 100%
	c)	Select standard signal for process actual value	4...20 mA
	d)	Scale process actual value	Minimum 0%, maximum 100%
5.	Scaling the process control		Minimum 0%, maximum 100%
6.	Set dead band for process control		1%
7.	Set up process control		
	a)	Linearising process characteristic* (function P.LIN) Additionally for devices without display: Set DIP switch 2 to ON to activate the correction characteristic.	-
	b)	Adjust process control ** (P.TUNE function)	-
8.	Set AUTOMATIC operating state		MANUAL

Table 31: Overview: base settings for position control

* Only necessary if process characteristic varies substantially from linearity. Linearisation using the function P.LIN can take a lot of time with slow processes.

**The P.TUNE function supports process control set-up by independently optimising process parameters. The process of fine-tuning process parameters is described in the Type 3360, 3361 software description.

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11.5 Set safety position

Setting option:
Using the Bürkert Communicator software or the display of the device (optional).

Settings are created on the PC using the büS service interface and the Bürkert Communicator software. It requires the USB büS interface set available as an accessory.

Display operation: button functions

Select, activate	Confirm	Back

To adjust the safety position, switch to the “Parameters” detailed view for position controllers.

How to switch to the detailed view:

→ When using Bürkert Communicator for the configuration, select **Position Controller** in the navigation area.

→ When using the display for the configuration, switch to CONFIGURATION on the home screen and select **Position Controller**.

✔ You are now in the “Parameters” detailed view.

How to configure the safety position:

→ Select SAFEPOS.

→ Select FUNCTION.

The following safety positions are available to choose from:

Close	Valve tightly closed.
Open	Valve open.
User-defined	User-defined safety position. The entry of the position in this menu is described below.
Inactive	Valve remains in an undefined position.

→ Set safety position.

Entry of user-defined safety setting (only if user-defined safety position is selected).

→ Select position.

→ Enter safety position
(0% = closed, 100% = open).

✔ The safety position is now configured.

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11.6 Adjustment of position controller – execute X.TUNE

When executing the X.TUNE function, the position control is adjusted at the physical stroke of the actuator in use.

Devices come with the X.TUNE function performed by the manufacturer.

ATTENTION!

Only perform X.TUNE if required!

The X.TUNE function only has to be executed again if the actuator has been dismantled or the valve body has been replaced.

WARNING!

Danger due to uncontrolled process after executing the X.TUNE function.

Executing X.TUNE under operating pressure will cause a controller error. The result is an uncontrolled process.

- Never perform X.TUNE under operating pressure.
- Secure the system against unintentional activation!

11.6.1 Adjustment of position controller with buttons in device

The two buttons for triggering X.TUNE are located beneath the blind cover.

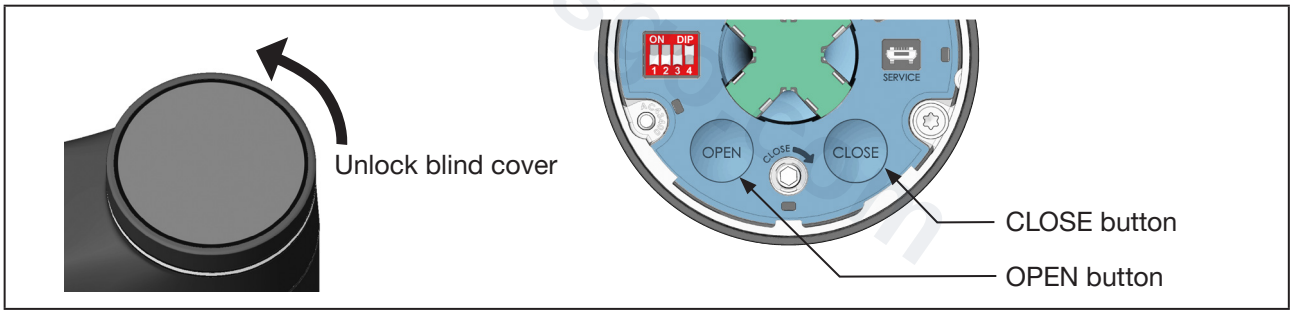

Image 37: Adjustment of position controller with buttons in device

Remove the blind cover:

Devices with ATEX approval or IECEx approval are secured with a magnetic lock.
The removal of the cover is described in the supplementary instructions for the electromotive control valves with ATEX approval and IECEx approval.

→ To unlock the blind cover, turn it counterclockwise and remove

Trigger the X.TUNE function:

⚠ Make sure that there is no operating pressure!
Only perform X.TUNE when necessary.

→ Hold down the OPEN and CLOSE buttons together at the same time for 5 s.

The LED illuminated ring will light up orange while the X.TUNE is executed.
When X.TUNE is finished, the LED illuminated ring returns to its previous status.

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11.6.2 Adjustment of position control on PC or device display

Settings are created on the PC using the büS service interface and the Bürkert Communicator software. It requires the USB-büS-Interface set available as an accessory.

Display operation: button functions

Select, activate	Confirm	Back

To trigger the X.TUNE function, you must switch to the “Maintenance” detailed view for position controllers.

How to switch to the detailed view:

→ When using Bürkert Communicator for the configuration, select **Position Controller** in the navigation area and switch to MAINTENANCE.

→ When using the display for the configuration, switch to CONFIGURATION on the home screen, select **Position Controller** and switch to MAINTENANCE.

✓ You are now in the “Maintenance” detailed view.

How to trigger the X.TUNE function:

⚠ Make sure that there is no operating pressure!

→ Select CALIBRATION.

→ Select X.TUNE.

The following text appears: “Select seal material (see type label)!”

→ Select seal material.

The following question appears: “Do you really want to start X.TUNE?”

⚠ Only start X.TUNE if absolutely necessary.

→ Start X.TUNE.

✓ This will execute the X.TUNE function.

If X.TUNE is aborted due to an error, a message will appear (see subsequent table).

Possible messages when X.TUNE is aborted	Description
Device error present.	There is an error present that makes it impossible to execute X.TUNE.
Timeout.	X.TUNE could not be executed within the time limit due to an error.
The motor current is too great.	The motor current is too great to perform the X.TUNE function.
The lower end position of the valve is not recognised.	The lower end position of the valve cannot be recognised by the position sensor.

Table 32: Possible error messages after abort of the X.TUNE function

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11.7 Set standard signal for position set-point value

Setting option:
Using the Bürkert Communicator software or the display of the device (optional).

Settings are created on the PC using the büS service interface and the Bürkert Communicator software. It requires the USB büS interface set available as an accessory.

Display operation: button functions

Select, activate	Confirm	Back

To set the standard signal, switch to the “Parameters” detailed view for inputs/outputs.

How to switch to the detailed view:

→ When using Bürkert Communicator for the configuration, select **Inputs/Outputs** in the navigation area.

→ When using the display for the configuration, switch to **CONFIGURATION** on the home screen and select **Inputs/Outputs**.

✓ You are now in the “Parameters” detailed view.

How to configure the standard signal:

→ **Select CMD**.

→ Select **ANALOG.type**.

→ Select standard signal.

✓ The standard signal is now configured.

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11.8 Select physical unit for process control

Setting option:
Using the Bürkert Communicator software or the display of the device (optional).

Settings are created on the PC using the büS service interface and the Bürkert Communicator software. It requires the USB büS interface set available as an accessory.

Display operation: button functions

Select, activate	Confirm	Back

To select the physical unit, switch to the “Parameters” detailed view for process controllers.

How to switch to the detailed view:

→ When using Bürkert Communicator for the configuration, select **Process Controller** in the navigation area.

→ When using the display for the configuration, switch to **CONFIGURATION** on the home screen and select **Process Controller**.

✓ You are now in the “Parameters” detailed view.

How to select the physical unit for process control:

→ **Select UNIT**.

→ Select physical unit.

✓ The physical unit is now selected.

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11.9 Configure process values

Setting option:
Using the Bürkert Communicator software or the display of the device (optional).

Settings are created on the PC using the büS service interface and the Bürkert Communicator software. It requires the USB büS interface set available as an accessory.

Display operation: button functions

Select, activate	Confirm	Back

To configure process values, you must go to the “Parameters” detailed view for inputs/outputs.

How to switch to the detailed view:

→ When using Bürkert Communicator for the configuration, select **Inputs/Outputs** in the navigation area.

→ When using the display for the configuration, switch to **CONFIGURATION** on the home screen and select **Inputs/Outputs**.

✓ You are now in the “Parameters” detailed view.

11.9.1 Selecting and scaling standard signal for process set-point value

How to select the standard signal for the process set-point value:

→ **Select SP/CMD**.

→ Select **ANALOG.type**.

→ Select standard signal.

→ ✓ The standard signal for the process set-point value is now selected.

How to scale the process set-point value:

→ **Select SP.scale**.

→ Enter the minimum and maximum values.

✓ The process set-point value is now configured.

11.9.2 Selecting and scaling standard signal for process actual value

How to select the standard signal for the process actual value:

→ **Select PV**.

→ Select **ANALOG.type**.

→ Select standard signal.

✓ The standard signal for the process actual value is now selected.

How to scale the process actual value:

→ **Select PV.scale**.

→ Enter the minimum and maximum values.

✓ The process actual value is now configured.

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11.10 Scaling the process control

Scaling process control affects the following functions:

- Dead band for process control
- Sealing function (CUTOFF), if process control (P.CO) is selected in menu CUTOFF → CUTOFF.type.

Setting option:
Using the Bürkert Communicator software or the display of the device (optional).

Settings are created on the PC using the büS service interface and the Bürkert Communicator software. It requires the USB büS interface set available as an accessory.

Display operation: button functions

Select, activate	Confirm	Back

To scale process control, switch to the “Parameters” detailed view for process controllers.

How to switch to the detailed view:

→ When using Bürkert Communicator for the configuration, select **Process Controller** in the navigation area.

→ When using the display for the configuration, switch to **CONFIGURATION** on the home screen and select **Process Controller**.

✓ You are now in the “Parameters” detailed view.

How to scale process control:

→ **Select P.CO.scale**.

→ Enter the minimum and maximum values.

✓ The process control is now scaled.

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11.11 Set dead band for process control

Setting option:
Using the Bürkert Communicator software or the display of the device (optional).

Settings are created on the PC using the büS service interface and the Bürkert Communicator software. It requires the USB büS interface set available as an accessory.

Display operation: button functions

Select, activate	Confirm	Back

To set the dead band, switch to the “Parameters” detailed view for process controllers.

How to switch to the detailed view:

→ When using Bürkert Communicator for the configuration, select **Process Controller** in the navigation area.

→ When using the display for the configuration, switch to CONFIGURATION on the home screen and select **Process Controller**.

✓ You are now in the “Parameters” detailed view.

How to configure the dead band:

→ Select PID.PARAMETER.

→ Select DBND.

→ Enter percentage value.

✓ The dead band is now configured.

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11.12 Setting up process control and executing P.LIN, P.TUNE

Setting option:
Using the Bürkert Communicator software or the display of the device (optional).

Settings are created on the PC using the büS service interface and the Bürkert Communicator software. It requires the USB büS interface set available as an accessory.

Display operation: button functions

Select, activate	Confirm	Back

To set up process control, switch to the “Maintenance” detailed view for process controllers.

How to switch to the detailed view:

→ When using Bürkert Communicator for the configuration, select **Process Controller** in the navigation area and switch to MAINTENANCE.

→ When using the display for the configuration, switch to CONFIGURATION on the home screen, select **Process Controller** and switch to MAINTENANCE.

✓ You are now in the “Maintenance” detailed view.

11.12.1 Linearising process characteristic (P.LIN)

How to linearise the process characteristic:

→ Select CALIBRATION.

→ Select P.LIN.

→ The following text appears: “Do you really want to start P.LIN?”

→ Start P.LIN.

✓ This will execute the P.LIN function.

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11.12.2 For devices without a display – activate the correction characteristic

DIP switch 2, which is located under the blind cover, is used to activate the correction characteristic.

→ To unlock the blind cover, turn it anticlockwise and remove.

Devices with ATEX approval or IECEx approval are secured with a magnetic lock.

The removal of the cover is described in the supplementary instructions for the electromotive control valves with ATEX approval and IECEx approval.

→ Set DIP switch 2 to ON. The correction characteristic is now enabled.

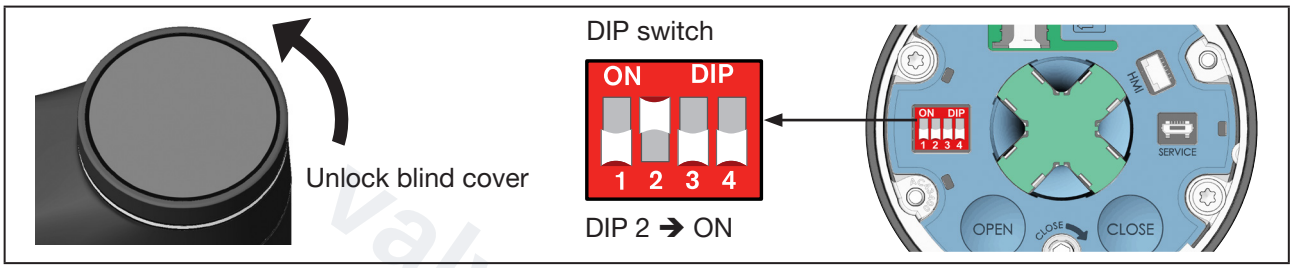

Image 38: Activate the correction characteristic

→ Close the blind cover.

11.12.3 Adjusting process control (P.TUNE)

How to trigger the P.TUNE function:

→ Select CALIBRATION.

→ Select P.TUNE.

The following text appears: “Do you really want to start P.TUNE?”

→ Start P.TUNE.

✓ This will execute the P.TUNE function.

The LED illuminated ring will light up orange while the functions P.LIN and P.TUNE are executed. If it is aborted due to an error, a message will appear.

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11.13 Set AUTOMATIC operating state

Factory setting: Devices in their factory default state have their operating state preset to MANUAL.

11.13.1 Setting AUTOMATIC operating state for devices without a display module

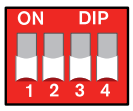
DIP switch 4, which is located under the blind cover, is used to set the operating state.

Devices with ATEX approval or IECEx approval are secured with a magnetic lock.

The removal of the cover is described in the supplementary instructions for the electromotive control valves with ATEX approval and IECEx approval.

→ To unlock the blind cover, turn it anticlockwise and remove.

→ Set AUTOMATIC operating state with DIP switch 4.

	Operating state	
	AUTOMATIC: DIP 4 ➔ down	MANUAL: DIP 4 ➔ up (ON)

→ Close the blind cover.

11.13.2 Setting AUTOMATIC operating state for devices with a display module

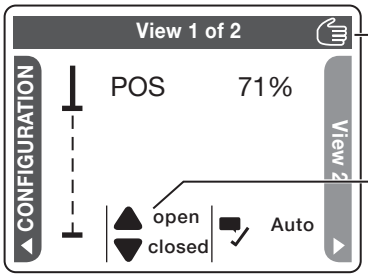
This setting is configured in the Process Control layout.

The Process Control layout is pre-defined in factory settings for the home screen (factory designation: View 1...).
To access the home screen, hold down the ← backspace key.
See also chapter "13.3.1 Home screen and user-specific views" on page 94).

→ To change the operating mode, briefly press the Menu button.

AUTOMATIC operating state: The MANUAL icon and the two arrow icons labelled "open" and "close" are hidden.

Home screen (factory designation: View 1...)
Layout: Process Control
Display: in MANUAL operating state.



Icon for
MANUAL operating state: MANUAL icon is displayed
AUTOMATIC: MANUAL icon is hidden

Arrow icons labelled "open" and "closed"
MANUAL: Arrow icons are displayed
AUTOMATIC: Arrow icons are hidden

Image 39: Icons for operating state

→ Set AUTOMATIC operating state.

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12 OPERATION

WARNING!

Risk of injury from improper operation!

Improper operation may result in injuries as well as damage to the device and its surroundings.

- ▸ The operating personnel must know and understand the contents of the operating instructions.
- ▸ The safety instructions and the intended use must be observed.
- ▸ Only adequately trained personnel may operate the system/device.

Different operating elements are available for operating the device, depending on the variant.

- **Standard devices without display module**
  Operation is performed with 2 capacitative buttons and 4 DIP switches.
- **Option – devices with display module**
  Operation and configuration are performed on the display with buttons for touch operation.
- **Additional operating options**
  Alternatively, the device can be configured using a PC. Settings are created using the büS service interface and the Bürkert Communicator software.
  It requires the USB-büS-Interface set available as an accessory.

12.1 Overview: availability of the operating elements

Operating element	Function	Availability	
		Devices without display module	Devices with display module
4 DIP switches	Set effective direction	yes	no (available, but non-functional. Configuration via display)
	Enabling, disabling correction characteristic		
	Enable, disable sealing function		
	Switch to AUTOMATIC, MANUAL operating state		
OPEN button	Opening the valve	yes	
CLOSE button	Closing the valve		
OPEN button and CLOSE button	Adjustment of position control, perform X.TUNE function	yes	
Mechanical manual override	Mechanically opening or closing the valve	yes	yes
SIM card holder	Holder for using the SIM card available as an accessory	yes	yes
büS service interface (only for analogue)	For connecting a CAN adapter or the USB büS interface set available as an accessory	yes	yes
Bürkert Communicator software	Software for configuration and setting the device on a PC	yes	yes
Display with buttons for touch operation	Configuring, setting and operating the device	no	yes

Table 33: Operating possibilities

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12.2 Display elements

Description of the display elements:

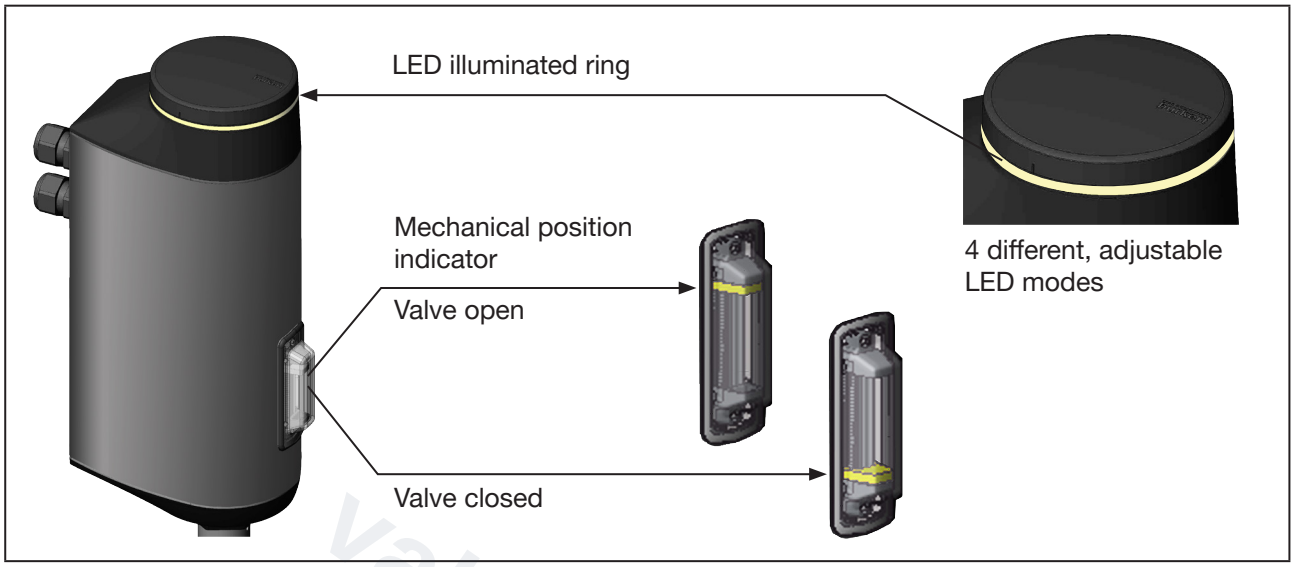

Image 40: Display elements

12.2.1 LED illuminated ring

The transparent LED light ring that transmits the light of the LEDs to the outside is fitted to the blind cover or display module.

The LED illuminated ring lights up or flashes slowly or quickly in one or several alternating colours to indicate the device's state.

4 different LED modes can be set for the LED light ring:

- NAMUR operation mode*
- Valve mode*
- Valve mode + warnings* – factory pre-set operation mode
- LED off

* The complete description of the device states, errors and warnings that are displayed in LED mode can be found in chapter "6.5 Display of the device status".

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12.2.2 Set LED operation mode

Setting option:
Using the Bürkert Communicator software or the display of the device (optional).

Settings are created on the PC using the büS service interface and the Bürkert Communicator software. It requires the USB büS interface set available as an accessory.

Display operation: button functions

Select, activate	Confirm	Back

To configure, you must switch to the “General setting parameters” detailed view.

How to switch to the detailed view:

→ When using Bürkert Communicator for the configuration, select **General settings** in the navigation area.

→ When using the display for the configuration, switch to **CONFIGURATION** on the home screen and select **General settings**.

✓ You are now in the “Parameters” detailed view.

How to set LED operation mode:

→ Select **Status LED**.

→ Select **Operation mode**.

The following LED modes are available:

NAMUR operation mode

Valve mode

Valve mode + warnings

LED off

→ Select LED operation mode.

✓ You have set the LED operation mode.

12.2.3 Mechanical position indicator

The valve position is read from the mechanical position indicator even if the supply voltage fails (see “Image 40: Display elements”)

12.2.4 Display elements of the display module (optional)

For a description see “13 Display operation (option)”

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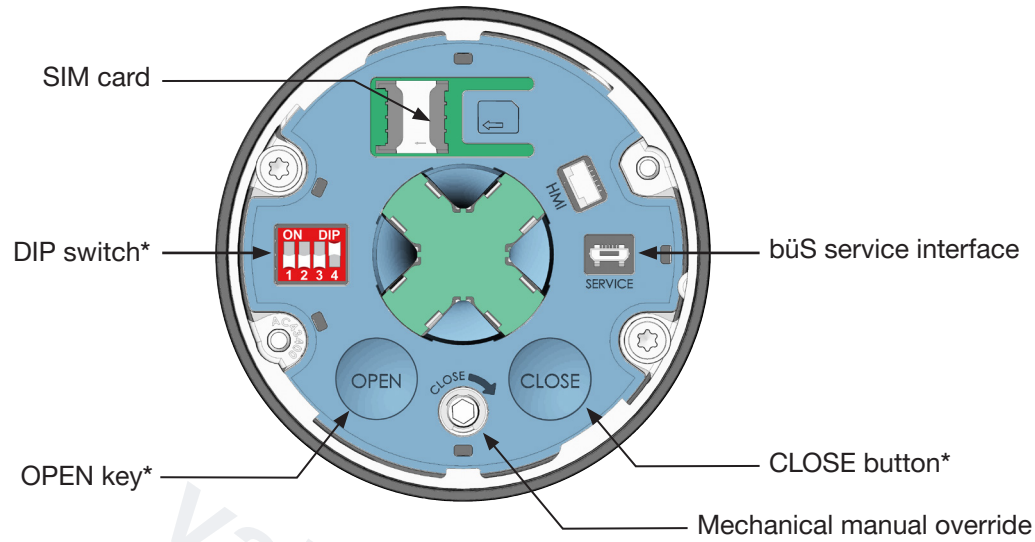
12.3 Operating elements

Presentation of the operating elements:



* *Non-functional in devices with display module. The display must be used for operation.*

Image 41: Operating elements

12.3.1 DIP switch

Settings

Switch 1: Sets the effective direction between input signal and position set-point value. See chapter “14.4” on page 110.

Switch 2: Enables or disables the correction characteristic (for adjusting the operating characteristic) (see chapter “14.3” on page 107).

Switch 3: Enables or disables sealing function. See chapter “14.2” on page 105.

Switch 4: Switch between AUTOMATIC and MANUAL operating state. See chapter “14.1” on page 102.

The DIP switches are non-functional in devices with a display module. The configuration can only be performed on the display.

12.3.2 OPEN button and CLOSE button

Electrical manual override: Open valve: to open, press OPEN key
Close valve: press CLOSE button. See chapter “15.1”.

Trigger X.TUNE: For a description see chapter “11.6 Adjustment of position controller – execute X.TUNE”.

If the device has a display module, the OPEN and CLOSE buttons will have no function. The configuration can be performed on the display.

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12.3.3 Mechanical manual override

If there is no supply voltage, e.g. during installation or in the event of a power failure, the valve can be opened or closed using the mechanical manual override.

For a description see chapter “15.4 Actuating the valve mechanically”

12.4 büS service interface

For AG3 with büS, CANopen and fieldbus gateway, the büS service interface is inactive.
Only use circular plug X3 as a büS interface for these devices.

The büS service interface can be used for quick service.

- Configuration of the device, e.g. the base setting for start-up with the software Bürkert Communicator. It requires the USB-büS-Interface set available as an accessory.
- Configuration of the büS network.
- Parameterising of operation parameters
- Error diagnostics
- Software update

Only connect the matching CAN adapter to the büS service interface. This CAN adapter is part of the USB büS interface set available as an accessory (see “Table 47: Accessories” on page 164).

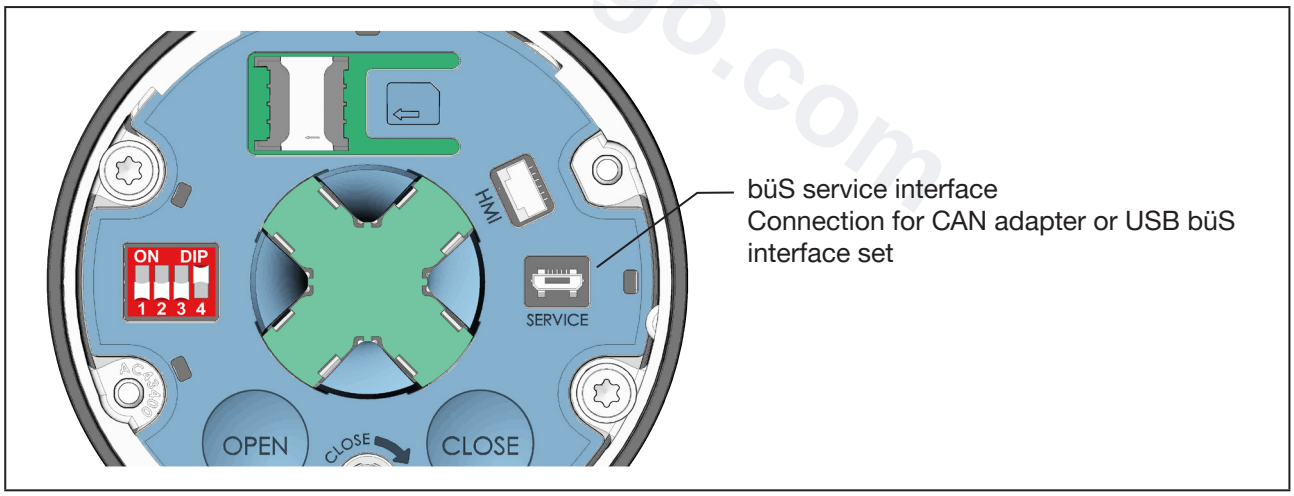

Image 42: büS service interface

For devices with a fieldbus gateway, the büS service interface is inside the fieldbus gateway (see chapter “18.1 Fieldbus gateway description” on page 145).

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12.5 SIM card – acquire and save data (option)

The optional SIM card can be used to store device-specific values and user settings and transfer them to another device.

The configuration client (for BüS devices) is disabled when the SIM card is inserted.
Further information can be found by searching for “central configuration management” on our website country.burkert.com

The SIM card is detected when the device starts and is checked for available data. This data will be transferred or overwritten accordingly:

- The SIM card does not contain any data.
  The existing device-specific values and user settings are saved to the SIM card.
- The SIM card contains data compatible with the device.
  The data on the SIM card are transferred by the device. The existing device-specific values and user settings are overwritten.
- The SIM card contains data that are not compatible with the device.
  The device overwrites the data on the SIM card with its own device-specific values and user settings.

ATTENTION!

Do not use a standard SIM card for the device.
The SIM card used is a special industrial version that offers additional durability and temperature-resistance.
Only purchase the SIM card for the electromotive control valves from your Bürkert sales department. See chapter “24 Accessories, wearing parts”.

Do not remove the SIM card during operation.
During operation, parameter changes are immediately saved to the SIM card.
If the SIM card is removed during operation, data may be lost and the SIM card damaged.

The SIM card can be inserted during operation.
A restart is required to ensure that the device detects the SIM card.

Inserting the SIM card:

→ Place the SIM card on the surface with the SIM card icon. The position must correspond to that shown on the icon.

→ Gently push the SIM card to the left into the holder until it stops.

→ Restart the device. The new data are transmitted.

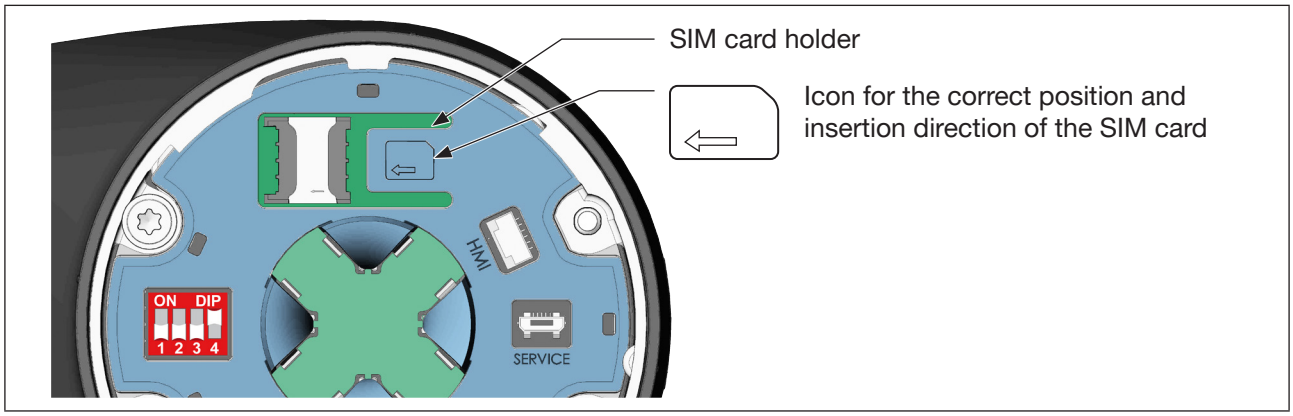

Image 43: Using the SIM card

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13 DISPLAY OPERATION (OPTION)

The device is operated and configured using buttons on a touchscreen display.

13.1 User interface

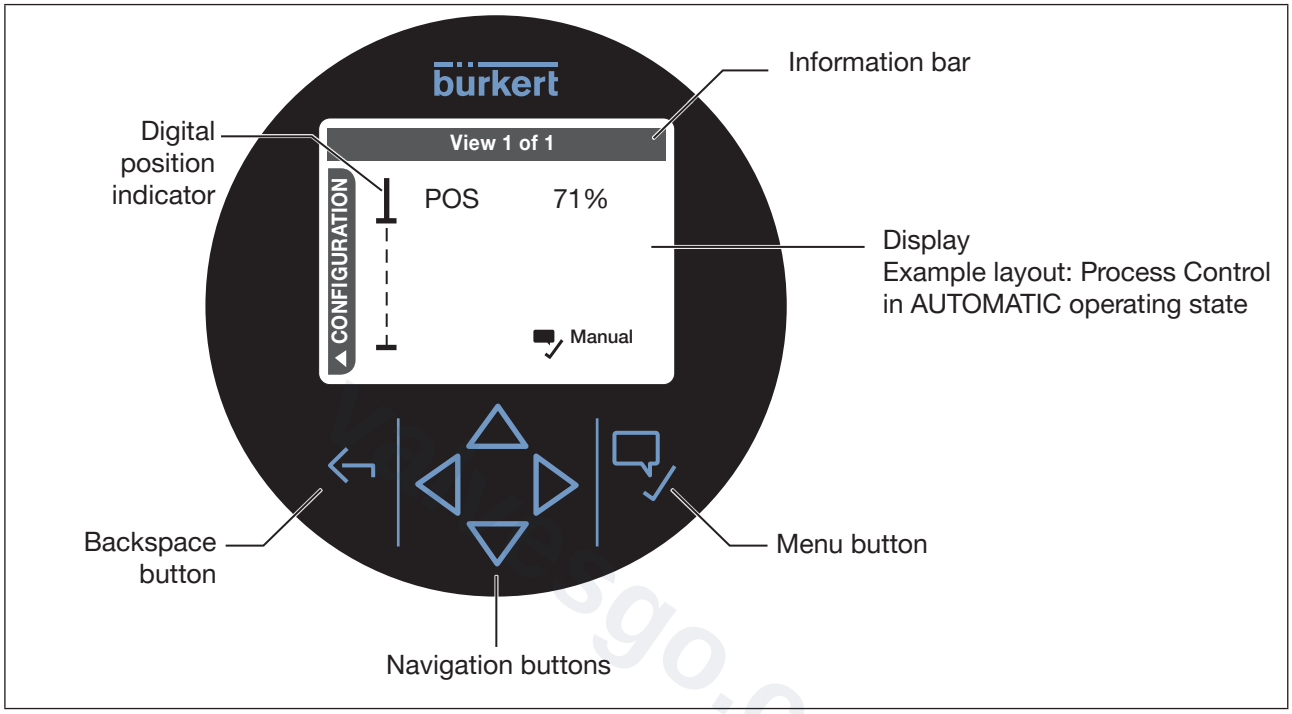

Image 44: User interface

13.2 Description of buttons

Button		Functions	
Backspace button		Press briefly:	Back
		Hold down:	Return to home screen (View 1...)
Navigation buttons		Change view	
		Accept selection (e.g. with option fields)	
		When entering values: change decimal place	
		Select menu	
		Configuration, select setting	
		When entering values: change value (figure)	
		Open valve (in MANUAL operating state)	
		Close valve (in MANUAL operating state)	

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Button		Functions	
Menu button		Press briefly:	Confirm selection
			Save selection
			Next (in wizard)
		Hold down:	Open context menu

Image 45: Description of button function

13.3 Display views

The following views can be accessed from the home screen:

- **Configuration view,** using the left navigation button 
- **From user-created view 2–4,** using the right navigation button 
  See also "13.3.1 Home screen and user-specific views" on page 94.

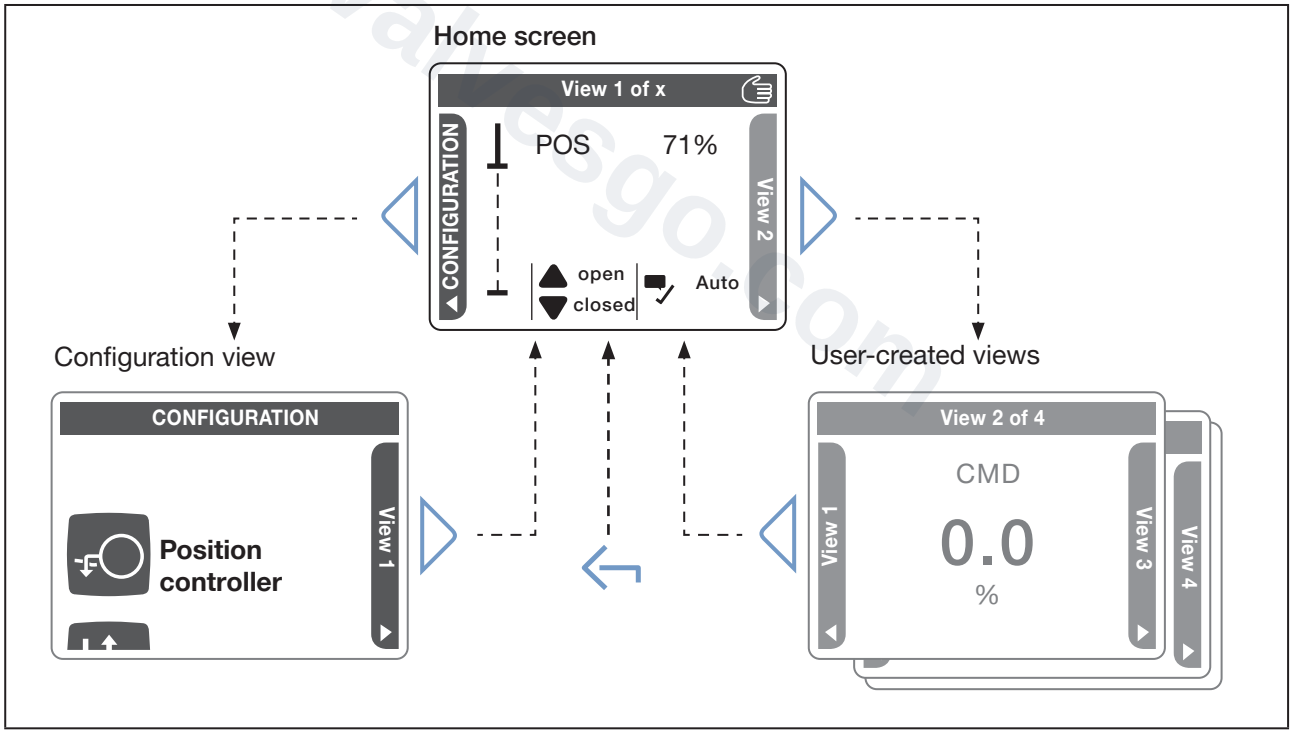

Image 46: Home screen, configuration view, user-specific views

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13.3.1 Home screen and user-specific views

In addition to the home screen, other user-specific views can be created. The title of the view is displayed in the information bar.

The home screen title preset at the factory (View 1...) and the other views can be changed in the context menu.

Five different layouts are available for each view:

1 value	1 process value is displayed in the view.
2 values	2 process values are displayed in the view.
4 values	4 process values are displayed in the view.
Trend	The process sequence is depicted as a curve in the view.
Trend with 2 values	The process sequence is depicted as a curve and with 2 process values in the view.
Process control	Preset at the factory for the home screen (see “Image 46”). The position of the valve is depicted as a value and in a position indicator in the view. The icons for AUTOMATIC and MANUAL operating state, and for closing and opening the valve, are displayed.
Setting:	You can create views, change their title and assign the layout either in the context menu on the home screen or from a user-specific view. To open the context menu, hold down the menu key .

The comprehensive, detailed description for the display module can be found on our homepage https://country.burkert.com/ under: Type ME31 → Software ME31.

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13.3.2 Configuration view

The configuration view is divided in various areas.

Icon	Configuration area
	Position controller
	Inputs / outputs
	Process controller
	Industrial communication
	Displays
	General settings

Table 34: Configuration areas

You can switch between the areas with the navigation buttons ▽ and △.

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13.3.3 Detailed views

From the configuration view you can access the following detailed views:

Detailed view	How to access the detailed view from the configuration view
Parameters	Select Configuration area* and confirm selection.
Maintenance	Select Configuration area* and confirm selection. Switch to the **"MAINTENANCE"** detailed view.
* See "Table 34: Configuration areas" on page 95.	

Table 35: Detailed views

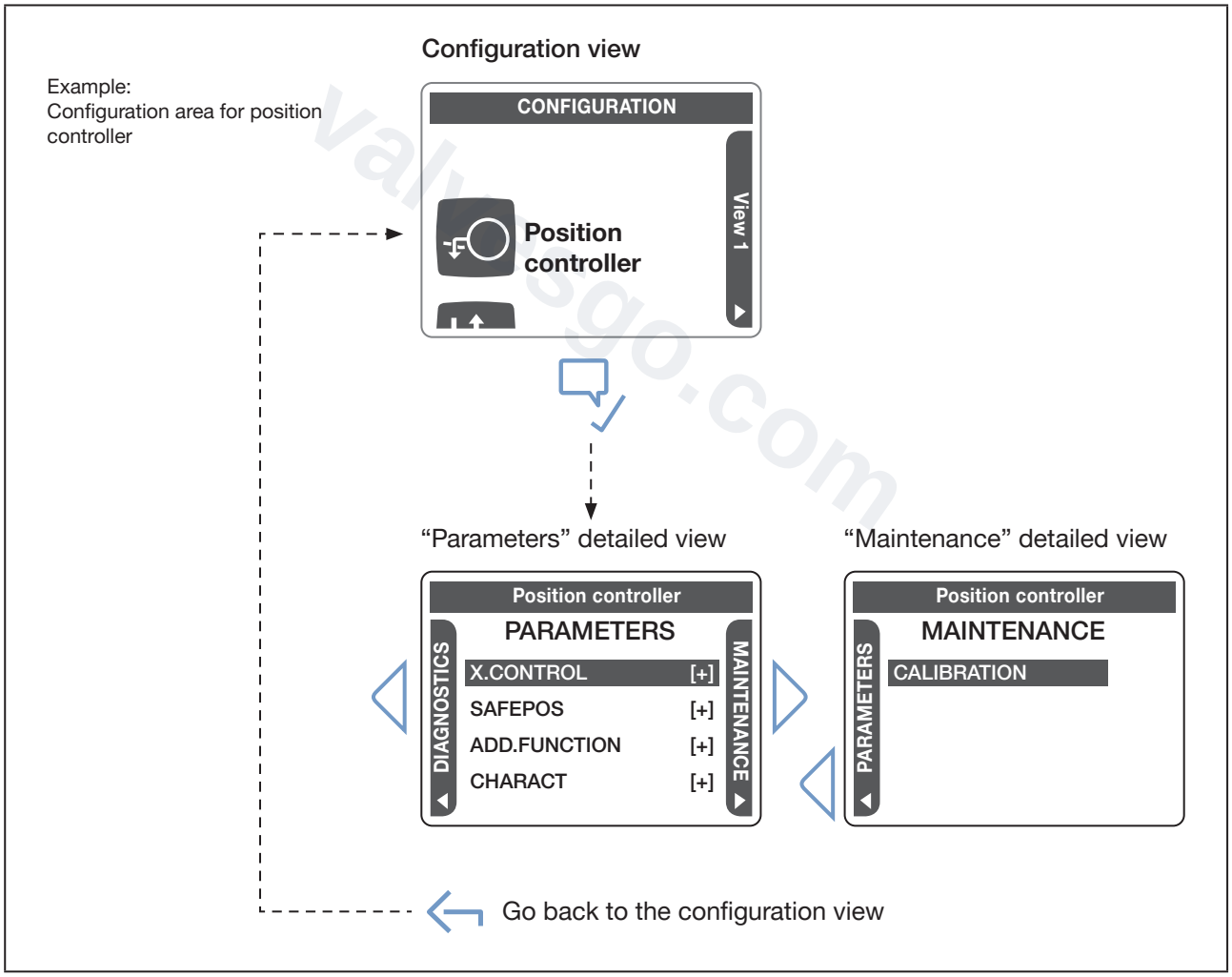

Image 47: "Parameters", "Maintenance", and "Diagnostics" detailed views

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13.4 Description of icons

Icons for access rights

Icon	Description
	This setting is write-protected and can only be modified with the appropriate access rights/ user code.
	User
	Advanced user is logged on to the device.
	Installer is logged on to the device.
	Bürkert service employee is logged on to the device.

Table 36: Icons for access rights

The rights to read, configure or alter data depend on the set access right and password protection.
See chapter “13.5 Access rights and password protection” on page 99.

Icons for indicating device status in accordance with NAMUR NE 107

If several device statuses exist simultaneously, the device status with the highest priority is displayed.

Priority	Icon	Description
1		Failure, error or fault! Due to a malfunction in the device or its peripherals, closed-loop control mode is not possible. → Review the messages in the message list.
2		Function check! Work is being carried out on the device, which means that closed-loop control mode is temporarily not possible.
3		Out of specification! The ambient or process conditions for the device are not within the specified range. Internal device diagnostics indicate problems within the device or with the process properties.
4		Maintenance required! The device is in closed-loop control mode, but function will soon be restricted. → Carry out the required maintenance.

Table 37: Icons in accordance with NAMUR NE 107

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Icons for displaying operating states

Priority	Icon	Description
1		Device is no longer in closed-loop control mode due to a serious error. The valve is stuck in its position.
2		Energy-pack active: The supply voltage has been interrupted. The device is supplied with power via the energy pack. In AUTOMATIC operating state the actuator moves to the safety position (see icon “safety position”) In MANUAL operating state the actuator is stuck in the last assumed position.
3		Device is in MANUAL operating state.
4		Device is in SIMULATION operating state. The signal for the set-point value setting default is simulated.
5		Process control active
6		Position control active

Table 38: Icons for displaying operating states

Icons for indicating specific valve positions

Priority	Icon	Description
1		Valve is in the safety setting.
2		Valve is in the sealed position.

Table 39: Icons for indicating specific valve positions

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13.5 Access rights and password protection

There are three user levels for assigning access rights.

If password protection is enabled, the information bar of the display displays the enabled user level with the corresponding icon.

User level	Icon	Description
Advanced user		PIN required: factory-set code 005678 Rights: Reading values, limited right to change values.
Installer		PIN required. Manufacturer-set code 001946 Rights: Reading values, expanded right to change values.
Bürkert		PIN required. Only for Bürkert employees

Table 40: User levels

13.5.1 Factory setting

Password protection is not enabled on delivery. Settings in the software can be made at any time and without entering a password.

A password is only required for settings that only Bürkert employees are permitted to make.

13.5.2 Enabling password protection

You must switch to the “General setting parameters” detailed view to enable or disable password protection.

How to switch from the home screen to the detailed view:

→ Switch to CONFIGURATION.

→  Select General settings and confirm selection.

✔ You are now in the “Parameters” detailed view.

How to enable password protection and change passwords:

→ Select Passwords and confirm.

→ Select Password protection and confirm.

→ Select On and confirm.

✔ You have enabled password protection.
Effect: Software settings that require a specific user level can only be made upon entering the corresponding user level code.

→ Go back with ↩.

After password protection is enabled, you can change the passwords for the user levels.

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→ Select Change passwords and confirm.

→ Select user level and confirm.

→ Enter code: add with decimal point; change value of the decimal point with .

→ Confirm the set code.

✓ You have changed the user level password.

→ Go back with .

Attention! Document passwords such that they are always accessible to authorised persons.

Once the screen saver is active, settings that require a certain user level are only possible with input of a password.

When password protection is enabled, the user level Installer is required to change the password protection.

13.5.3 Disabling password protection

The user level Installer is required to disable password protection.

→ In the "General settings" detailed view, select Passwords and confirm.

→ Select Password protection and confirm.

→ Select Off and confirm.

✓ You have disabled password protection.

→ Go back with .

13.5.4 Changing user level

To change the user level you must switch to the context menu. Hold down the menu button .

How to switch user levels:

→ Select Switch user levels.

→ Select user level.

→ Set password (PIN).

✓ You have switched the user level.

Logging out of the user level:

→ Select Log out and confirm.

✓ You have disabled the user level.

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13.6 Screen saver

The display user interface is protected by a screen saver. Removing the screen saver:

→ Press any button and follow the instructions on the display.

Factory setting: The waiting time between operation and enabling of the screen saver is one minute.

ATTENTION!

Faulty operation as a result of EMC disruptions, cleaning work or unintended physical contact.

▸ To prevent faulty operation, set the shortest possible waiting time for the screen saver, e.g. one minute.

13.6.1 Set screen saver

The setting is set in the “Display parameters” detailed view.

How to switch from the home screen to the detailed view:

→ Switch to CONFIGURATION.

→ Select Displays and Confirm selection.

✓ You are now in the “Parameters” detailed view.

How to set the screen saver:

→ Select Screen saver and confirm.

→ Select Waiting time and confirm.

→ Select desired waiting time in minutes and enable.

→ Select Brightness and confirm.

→ Set desired brightness in % and confirm.

✓ You have set the screen saver.

→ Go back with ⮌.

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14 BASIC FUNCTIONS

14.1 Changing the operating state, AUTOMATIC, MANUAL

Factory setting: Devices in their factory default state have their operating state preset to MANUAL.

14.1.1 Changing operating state in devices without a display module

DIP switch 4, which is located under the blind cover, is used to change operating state.

→ To unlock the blind cover, turn it counterclockwise and remove

Devices with ATEX approval or IECEx approval are secured with a magnetic lock.

The removal of the cover is described in the supplementary instructions for the electromotive control valves with ATEX approval and IECEx approval.

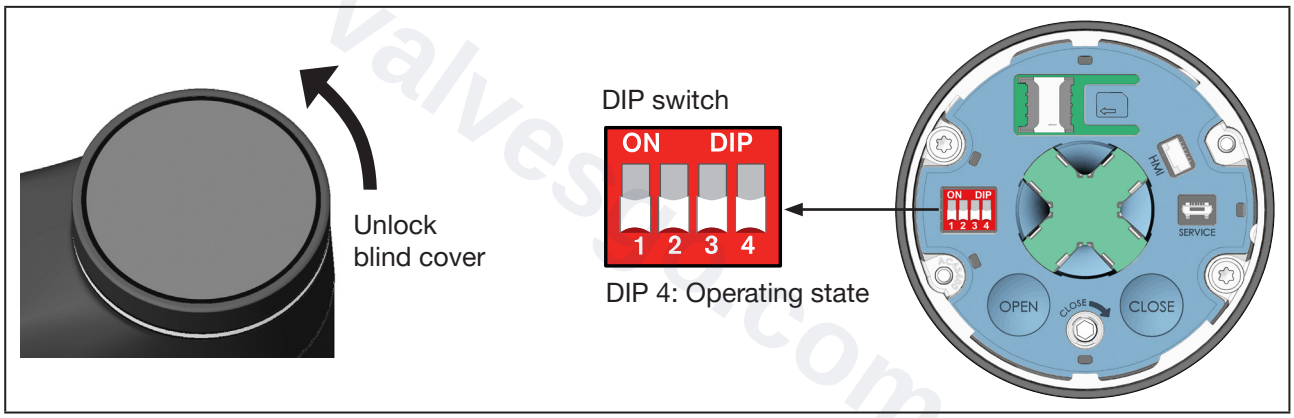
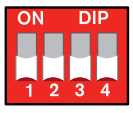


Image 48: Setting the operating state

→ Set the operating state with DIP switch 4.

	Operating state	
	AUTOMATIC: DIP 4 ➔ down	MANUAL: DIP 4 ➔ up (ON)

→ Close the blind cover.

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14.1.2 Changing operating state in devices with a display module

The operating state can be set in 2 ways:

- **using the menu key in the Process Control layout**
  on the home screen or in a user-specific view.
- **in the menu** AUTO I MANU,
  located in the **General settings** configuration area.

Setting using the menu button

You can change the operating state in the home screen or in a view.

If you want to change the operating state using the menu key, the view of the display must be in the Process Control layout. See “Image 49”.

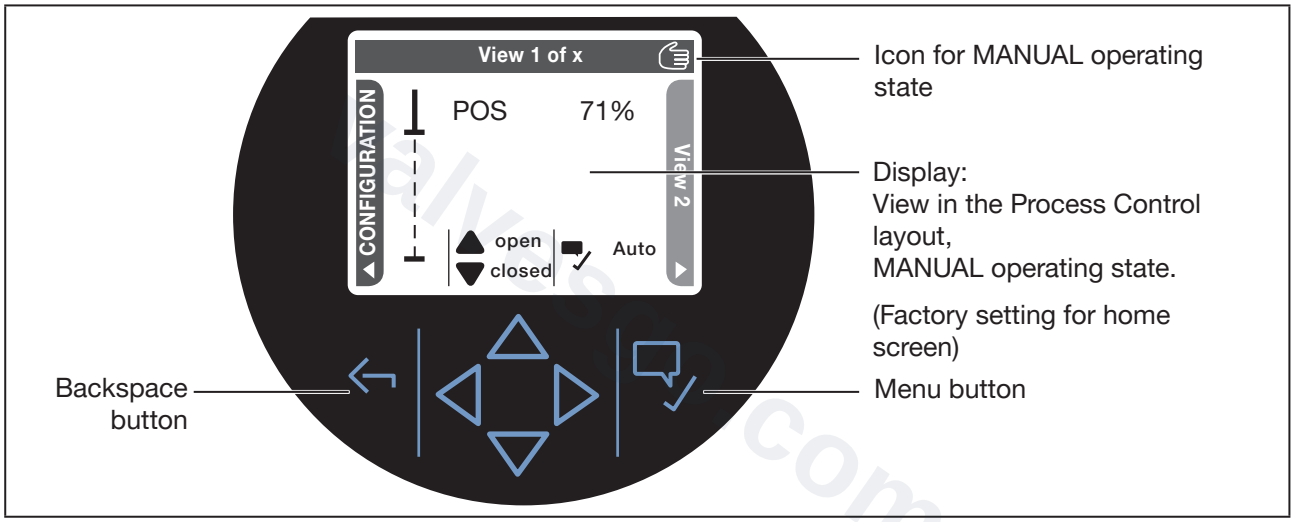

Image 49: Changing the operating state, MANUAL – AUTOMATIC

→ To change the operating mode, briefly press the Menu button.

MANUAL: The MANUAL icon appears in the information bar at the top. The 2 arrow icons labelled “open” and “close” are displayed.

AUTOMATIC: The MANUAL icon and the two arrow icons labelled “open” and “closed” are hidden.

Setting the layout:

The layout is set in the context menu: To open the context menu, hold down the menu button.

Factory setting in Process Control layout:
The Process Control layout is predefined in factory settings for the home screen (factory setting designation: View 1...).
To access the home screen, hold down the backspace button.

See also chapter “13.3 Display views” on page 93.

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Setting in the AUTO | MANU menu

Setting option:
Using the Bürkert Communicator software or the display of the device (optional).

Settings are created on the PC using the büS service interface and the Bürkert Communicator software. It requires the USB büS interface set available as an accessory.

Display operation: button functions

Select, activate	Confirm	Back

To configure the settings, you must switch to the “General settings maintenance” detailed view.

How to switch to the detailed view:

→ When using Bürkert Communicator for the configuration, select **General settings** in the navigation area and switch to **MAINTENANCE**.

→ When using the display for the configuration, switch to **CONFIGURATION** on the home screen, select **General settings** and switch to **MAINTENANCE**.

✓ You are now in the “Maintenance” detailed view.

How to set the operating state:

→ **Select AUTO | MANU**.

→ Select **Automatic mode** or **Manual mode**.

✓ You have set the operating state.

The MANUAL operating state includes the menu **AUTO | MANU** and the menu **Manual mode** for manual override of the valve.

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14.2 Enable/disable sealing function

Factory setting: The sealing function is disabled in devices upon delivery.

This function causes the valve to seal or open completely within the set range.

The parameters for the sealing or opening of the valve (CMD) is stated in per cent. The transfer from sealing or opening to closed-loop control mode occurs with a hysteresis of 1%.

If the process valve is in the sealing range, an icon appears on the display.

14.2.1 Enabling or disabling sealing function in devices without a display module

The sealing function must be configured before it can be enabled.
Configuration is performed on a PC via the büS service interface and with the Bürkert Communicator software. It requires the USB-büS-Interface set available as an accessory.

The process for configuration on a PC is the same as on the device display. Configuration is described in chapter “14.2.3 Configuring the sealing function”.

DIP switch 3, which is located under the blind cover, is used to enable the sealing function.

Devices with ATEX approval or IECEx approval are secured with a magnetic lock.

The removal of the cover is described in the supplementary instructions for the electromotive control valves with ATEX approval and IECEx approval.

→ To unlock the blind cover, turn it counterclockwise and remove

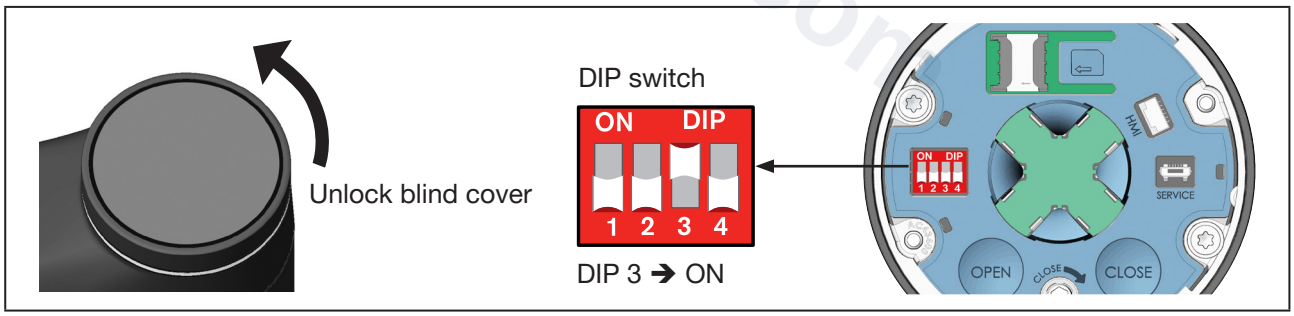

Image 50: Enable sealing function

→ Set DIP switch 3 to ON. The sealing function is enabled.

→ Close the blind cover.

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14.2.2 Enable or disable sealing function in devices with a display module

To enable or disable the sealing function, you must switch to the “Position controller parameters” detailed view.

How to switch from the home screen to the detailed view:

→ Switch to CONFIGURATION

→ Select **Position controller** and Confirm selection.

✓ You are now in the “Parameters” detailed view.

How to enable the sealing function:

→ Select ADD.FUNCTION and confirm.

→ Select CUTOFF, enable with the navigation buttons on the side and confirm.

The device returns to the “Parameters” detailed view.

The sealing function is enabled and the CUTOFF menu for configuration is now available in the “Parameters” detailed view.

→ Go back with .

14.2.3 Configuring the sealing function

Setting option:
Using the Bürkert Communicator software or the display of the device (optional).

Settings are created on the PC using the büS service interface and the Bürkert Communicator software. It requires the USB büS interface set available as an accessory.

Display operation: button functions

Select, activate	Confirm	Back

To configure the sealing function, you must switch to the “Position controller parameters” detailed view.

How to switch to the detailed view:

→ When using Bürkert Communicator for the configuration, select **Position Controller** in the navigation area.

→ When using the display for the configuration, switch to **“CONFIGURATION”** on the home screen and select **“Position Controllers”**.

How to configure the sealing function:

→ Select **“CUTOFF”** in the “Parameters” detailed view.

→ Select **“Lower Limit”**.

→ Enter lower limit.

→ Select **“Upper Limit”**.

→ Enter upper limit.

✓ You have configured the sealing function

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14.3 Enabling/disabling correction characteristic

Factory setting: The correction characteristic is disabled in devices on delivery.

When the correction characteristic is enabled, the flow characteristic or operating characteristic is corrected depending on the position set-point value (CMD) and valve stroke (POS).

Flow characteristic:
The flow characteristic $k_V = f(s)$ indicates the flow rate of a valve, expressed by the k_V value, as a function of the stroke s of the actuator spindle. The flow characteristic is determined by the shape of the valve seat and the valve seat seal. Two types of flow characteristics are generally realised: the linear and the equipercentile.

With linear characteristics, equal stroke changes are apportioned the same k_V value changes dk_V.

$$(dk_V = n_{lin} \cdot ds).$$

With equipercentile characteristics, a change in stroke ds corresponds to an equipercentile change in the k_V value.

$$(dk_V/k_V = n_{equiper} \cdot ds).$$

Operating characteristic:
The operating characteristic Q = f(s) shows the relationship between the volume flow Q in the installed valve and the stroke s. The properties of the pipelines, pumps and consumers are included in this characteristic. The operating characteristic therefore has a different shape than the flow characteristic.

For control applications, special requirements are often placed on the progression of the operating characteristic, such as linearity. For this reason, it is sometimes necessary to correct the progression of the operating characteristic in a suitable manner. The Type 3360 and 3361 control valves therefore have a transfer element that implements different characteristics. These characteristics are used to correct the operating characteristic.

The following characteristics can be set: equal-percentage characteristics of 1:25, 1:33, 1:50, 25:1, 33:1 and 50:1, as well as a linear characteristic. In addition, it is possible to program a user-defined characteristic by entering supporting points.

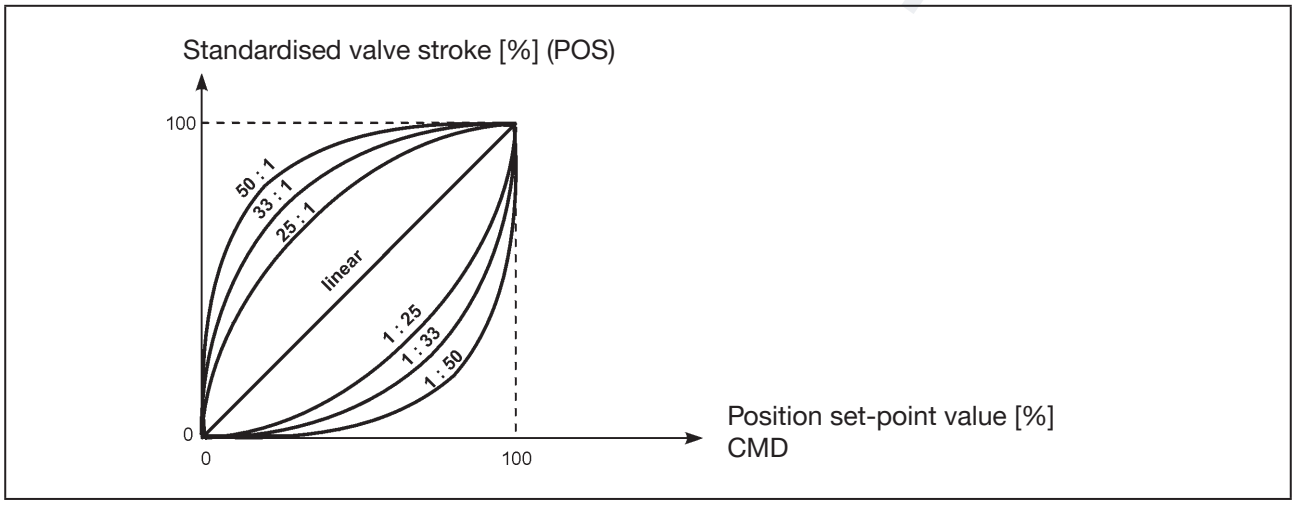

Image 51: Characteristics

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14.3.1 Enabling or disabling correction characteristic in devices without a display module

To enable it, the correction characteristic must be selected. For a description, see chapter “14.3.3 Select correction characteristic or program to be user-specific”.

DIP switch 2, which is located under the blind cover, is used to activate the correction characteristic.

Devices with ATEX approval or IECEx approval are secured with a magnetic lock.
The removal of the cover is described in the supplementary instructions for the electromotive control valves with ATEX approval and IECEx approval.

→ To unlock the blind cover, turn it counterclockwise and remove

→ Set DIP switch 2 to ON. The correction characteristic is now enabled.

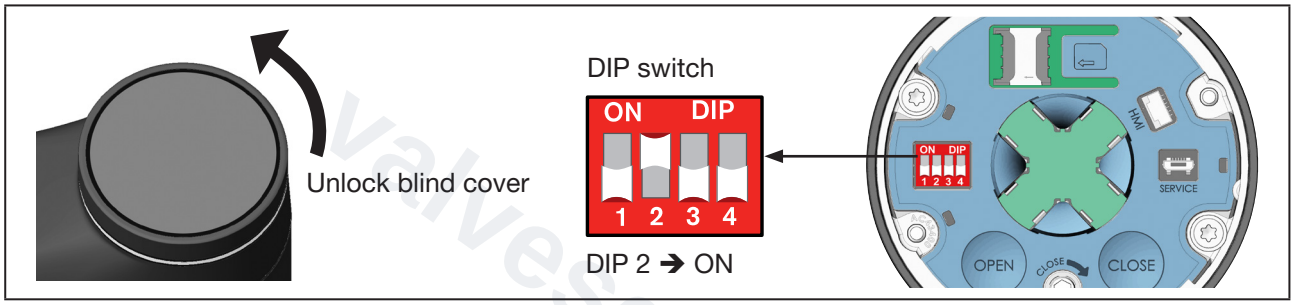

Image 52: Activate the correction characteristic

→ Close the blind cover.

14.3.2 Enabling or disabling the correction characteristic in devices with a display module

To enable or disable the correction characteristic you must switch to the “Position controller parameters” detailed view.

How to switch from the home screen to the detailed view:

→ Switch to **“CONFIGURATION”**

→ Select **“Position controller”** and confirm selection.

You are now in the “Parameters” detailed view.

How to enable the correction characteristic:

→ **Select ADD.FUNCTION** and confirm.

→ Select **CHARACT**, enable with the side navigation buttons and confirm.

The device returns to the “Parameters” detailed view.

The correction characteristic is enabled and the **CHARACT** menu for configuration is now available in the “Parameters” detailed view.

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14.3.3 Select correction characteristic or program to be user-specific

Setting option:
Using the Bürkert Communicator software or the display of the device (optional).

Settings are created on the PC using the büS service interface and the Bürkert Communicator software. It requires the USB büS interface set available as an accessory.

Display operation: button functions

Select, activate	Confirm	Back

To program the correction characteristic you must switch to the “Position controller parameters” detailed view.

How to switch to the detailed view:

→ When using Bürkert Communicator for the configuration, select **Position Controller** in the navigation area.

→ When using the display for the configuration, switch to **“CONFIGURATION”** on the home screen and select **“Position Controllers”**.

How to select the correction characteristic:

→ Select **“CHARACT”** in the “Parameters” detailed view.

→ Confirm **TYPE**.

→ Select correction characteristic.

✓ You have selected the correction characteristic.

How to configure the user-defined correction characteristic:

If the **“User-defined”** correction characteristic was selected in the **TYPE** menu, the **TABLE DATA** menu appears. The correction characteristic can be programmed here as described below:

→ **Select TABLE DATA**.

→ Select desired reference point **y 0** – **y 100**.

→ Enter desired per cent value.

→ Enter the per cent in succession for all reference points.

→ Leave the **TABLE DATA** menu.

✓ You have programmed the correction characteristic.

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14.4 Changing the effective direction

Factory setting: On delivery, the effective direction in a device is set to “Rise”.

Meaning:

- Rise: The position 0% (valve closed) is actuated with the standard signal 0 V, 0 mA or 4 mA.
- Fall: The position 0% (valve closed) is actuated with the standard signal 5 V, 10 V or 20 mA.

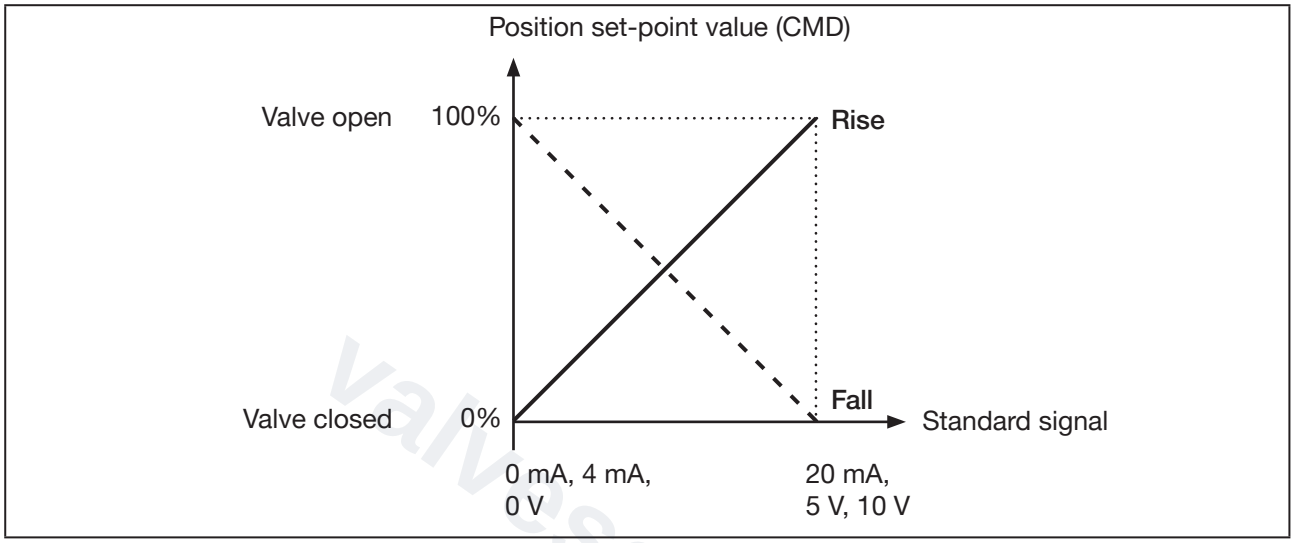

Image 53: Effective direction diagram

14.4.1 Changing the effective direction in devices without a display module

The effective direction is changed with DIP switch 1, located below the blind cover.

Devices with ATEX approval or IECEx approval are secured with a magnetic lock.

The removal of the cover is described in the supplementary instructions for the electromotive control valves with ATEX approval and IECEx approval.

→ To unlock the blind cover, turn it anticlockwise and remove.

→ Set DIP switch 1 to ON. The effective direction is switched to “Fall”.

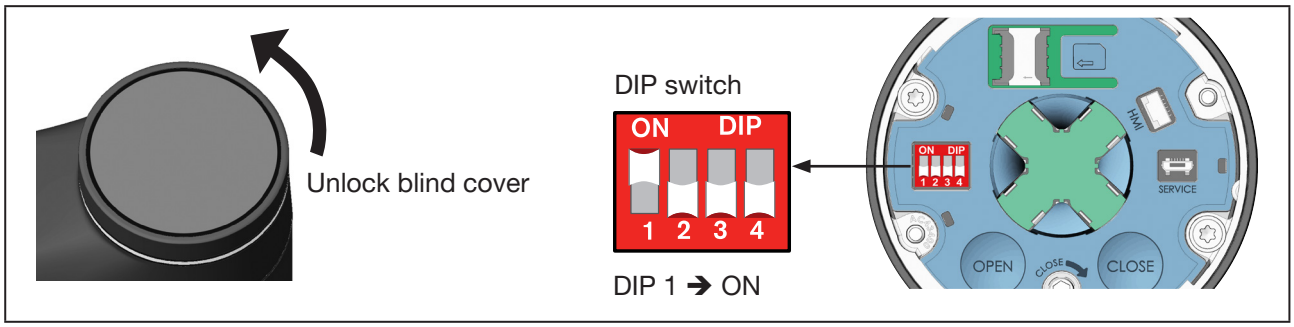

Image 54: Changing the effective direction

→ Close the blind cover.

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14.4.2 Changing effective direction in devices with a display module

To change the effective direction, you must switch to the “Position controller parameters” detailed view.

How to switch from the home screen to the detailed view:

→ Switch to “CONFIGURATION”

→ Select **Position controller** and Confirm selection.

✓ You are now in the “Parameters” detailed view.

How to change the effective direction:

→ Select ADD.FUNCTION and confirm.

→ Select DIR.DMD, enable with the side navigation buttons and confirm.

The device returns to the “Parameters” detailed view.

The menu for changing effective direction DIR.DMD is now enabled and available in the “Parameters” detailed view.

→ In the “Parameters” detailed view, select DIR.CMD and confirm.

→ Select effective direction Rise or Fall and confirm.

→ Go back with .

✓ You have changed the effective direction.

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14.5 Disabling process control

For devices with a process control function, the process control can be disabled in order to operate the device with the position controller function. The menus that are solely relevant to process control remain visible after disabling, but cannot be used.

Required configuration after disabling process control.
The source for the position set-point value must be configured for the position controller function.
Configuration in menu → Inputs/outputs → SP I CMD → CMD.source.

14.5.1 Disabling process control in the device operating menu

The process control is generally disabled in the device operating menu, or via the digital input, büS/CANopen or fieldbus.

Setting option:
Using the Bürkert Communicator software or the display of the device (optional).

Settings are created on the PC using the büS service interface and the Bürkert Communicator software. It requires the USB büS interface set available as an accessory.

Display operation: button functions

Select, activate	Confirm	Back

To disable process control, switch to the “Parameters” detailed view for process controllers.

How to switch to the detailed view:

→ When using Bürkert Communicator for the configuration, select **Process Controller** in the navigation area.

→ When using the display for the configuration, switch to **CONFIGURATION** on the home screen and select **Process Controller**.

✔ You are now in the “Parameters” detailed view.

How to disable process control:

→ Select **“P.CO. inactive”**.

→ Select **“P.CONTROL inactive”**.

✔ The process control is now disabled. The device is now operating with position controller function.

14.5.2 Alternative disabling of process control

Alternatively, the process control can be disabled via the digital input, büS/CANopen or fieldbus. The source must be configured accordingly.

To configure the source, you must switch to the “Input/Output parameters” detailed view.

Configuration in menu → ADDITIONAL IOs → DIGITAL IN → X.CO I P.CO.source,

Selection:

→ Digital (digital input)

→ büS

→ Fieldbus (fieldbus)

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15 MANUAL OVERRIDE OF VALVE

The valve can be manually actuated in various ways:

- Electrically with the OPEN and CLOSE buttons which are located under the blind cover (only on devices without display module) – see chapter “15.1” on page 113.
- Electrically using the display on the home screen (only on devices with a display module) – see chapter “15.2.1” on page 115.
- Electrically in the AUTO | MANU menu.
  Setting on the display or using the Bürkert Communicator software – see chapter “15.3” on page 116.
- Mechanically with the manual override – see chapter “15.4” on page 117.

15.1 Electrical override of valve on devices without a display module

The valve can be electrically actuated in various ways:

- Using buttons in the device – see chapter “15.1.1” on page 113.
- Using the Bürkert Communicator software in the AUTO I MANU menu.
  For a description see chapter “15.3” on page 116.

15.1.1 Electrically actuating the valve using keys in the device

ATTENTION!

Valve seat seal may be damaged by using electrical manual override.

▸ Do not press the CLOSE button while the valve is closed or else the valve seat seal may be damaged.

To actuate the valve, the device must be in MANUAL operating state.

The two buttons for actuating the valve and for setting the operating state are located under the blind cover.

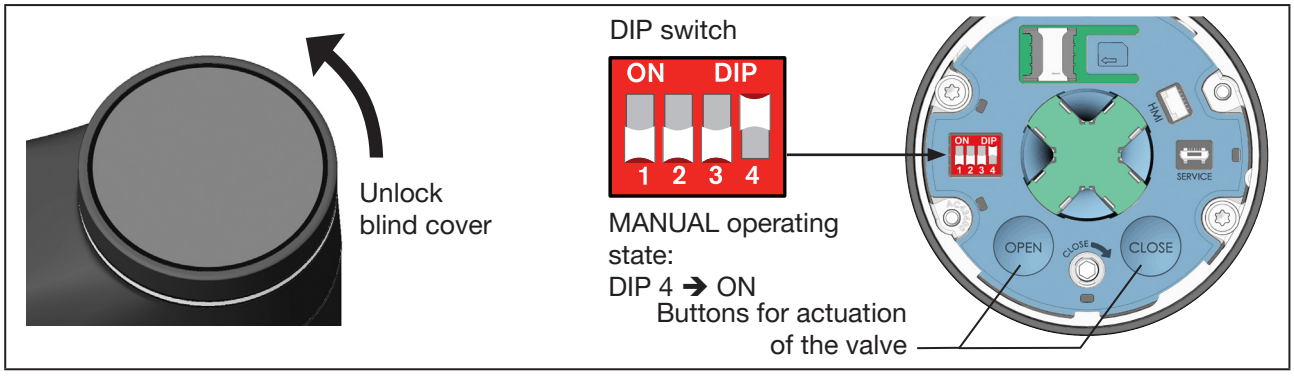

Image 55: Setting MANUAL operating state and actuate valve

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Remove the blind cover:

Devices with ATEX approval or IECEx approval are secured with a magnetic lock.
The removal of the cover is described in the supplementary instructions for the electromotive control valves with ATEX approval and IECEx approval.

→ To unlock the blind cover, turn it anticlockwise and remove.

Switch to MANUAL operating state:

→ Set DIP switch 4 to ON.
The device is in MANUAL operating state.

Change valve position:

→ To open, press the OPEN button

→ To close, press the CLOSE button.
ATTENTION!
Do not press the CLOSE button again while the valve is closed or else the valve seat seal may be damaged.

The valve position can be seen on the mechanical position indicator.

Image 56: Mechanical position indicator

Switch to AUTOMATIC operating state:

→ Push DIP switch 4 down.
The device is back in AUTOMATIC operating state.

Close blind cover:

→ Mount blind cover and turn clockwise until the two marks (one vertical line on the blind cover and one on the actuator) are vertically aligned.

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15.2 Electrical override of valve on devices with a display module

The valve can be electrically actuated in various ways:

- Using the navigation keys on the display (see chapter “15.2.1” on page 115).
- On the display or using the Bürkert Communicator software in the AUTO I MANU menu.
  For a description see chapter “15.3” on page 116.

15.2.1 Actuating the valve using the navigation keys on the display

ATTENTION!

Valve seat seal may be damaged by using electrical manual override.

▸ Do not press the CLOSE button while the valve is closed or else the valve seat seal may be damaged.

The navigation keys for actuating the valve are available in the home screen or in a view. Requirements for actuation of the valve: (see “Image 57”):

- View of the display in the “Process Control” layout,
- MANUAL operating state.

Setting the layout:

The layout is set in the context menu: To open the context menu, hold down the menu button.

Factory setting in Process Control layout:
The Process Control layout is predefined in factory settings for the home screen (factory setting designation: View 1...).
To access the home screen, hold down the backspace button.

See also chapter “13.3 Display views” on page 93.

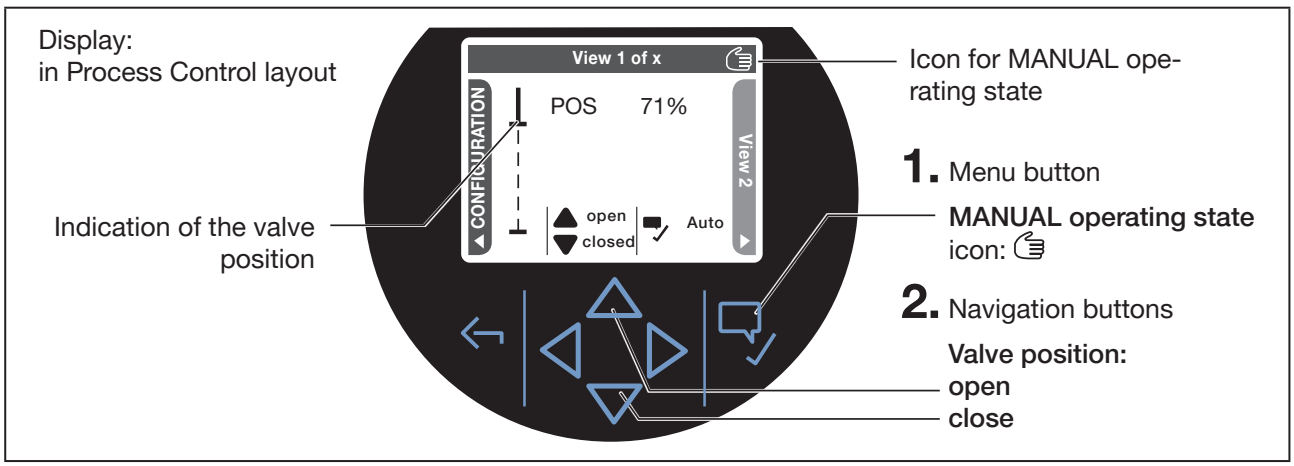

Image 57: On the display set the operating state and actuate the valve

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Switch to MANUAL operating state:

→ Press the menu button.
In MANUAL operating state, the MANUAL icon is visible in the information bar.
The two arrow icons labelled “open” and “closed” are displayed. The device’s LED light ring flashes.

Change valve position:

→ To open the valve, press the top navigation key.

→ To close the valve, press the bottom navigation key.
ATTENTION! Do not press the CLOSE button again while the valve is closed or else the valve seat seal may be damaged.

The valve position is shown on the display (see “Image 57”).

Switch to AUTOMATIC operating state:

→ To switch to AUTOMATIC operating state, briefly press the menu button.

15.3 Electrically actuating the valve using the Bürkert Communicator or display

ATTENTION!

Valve seat seal may be damaged by using electrical manual override.

▸ Do not press the CLOSE button while the valve is closed or else the valve seat seal may be damaged.

Both the Bürkert Communicator software as well as the device software provide the additional option to actuate the valve using the AUTO | MANU menu.

To set using the Bürkert Communicator software, the device must be connected to the PC using the büS service interface. It requires the USB-büS-Interface set available as an accessory.

Display operation: button functions

Select, activate	Confirm	Back

Actuate the valve using the AUTO | MANU menu:

To configure the settings, you must switch to the “General settings maintenance” detailed view.

How to switch to the detailed view:

→ When using Bürkert Communicator for the configuration, select **General settings** in the navigation area and switch to MAINTENANCE.

→ When using the display for the configuration, switch to CONFIGURATION on the home screen, select **General settings** and switch to MAINTENANCE.

✔ You are now in the “Maintenance” detailed view.

How to open or close the valve:

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→ Select AUTO | MANU.

If the device is in AUTOMATIC operating state:

→ Select Manual mode to set MANUAL operating state.
The Manual mode menu for manual actuation of the valve is now available.

→ In the Manual mode menu, open and close the valve with the arrow buttons.
CAUTION!
Do not press the CLOSE button again while the valve is closed or else the valve seat seal may be damaged.

15.4 Actuating the valve mechanically

If there is no supply voltage, e.g. during installation or in the event of a power failure, the valve can be opened or closed using the mechanical manual override.

ATTENTION!

The mechanical manual override may be used only when it is de-energised, otherwise the device may be damaged.

Devices with ATEX approval or IECEx approval are secured with a magnetic lock.

The removal of the cover is described in the supplementary instructions for the electromotive control valves with ATEX approval and IECEx approval.

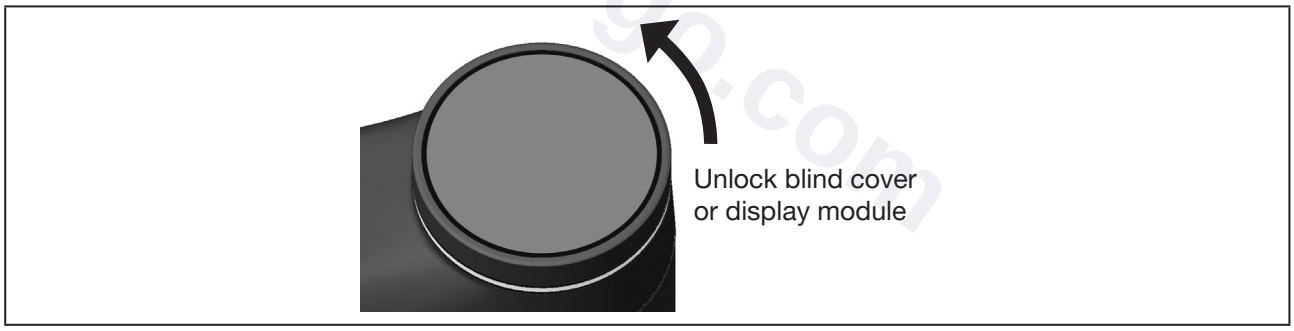

Image 58: Remove the blind cover from the actuator housing

15.4.1 Required work steps

1. Switch off the supply voltage. Wait until LED illuminated ring goes out.
2. AG2: Remove blind cover or display module.
   AG3: Unscrew the pressure compensation element (AF 17).
   2a. Only for devices with fieldbus gateway: Remove fieldbus gateway from the actuator (see Chapter “15.4.2”).
3. Actuate valve mechanically.
4. AG2: Close the blind cover or display module.
   AG3: Screw on the pressure compensation element (AF17) to 1.25 Nm.
   4a. Only for devices with fieldbus gateway: first install fieldbus gateway on the actuator (see Chapter“15.4.5”), then seal blind cover or display module (see Chapter “15.4.6”).
5. Connect supply voltage.

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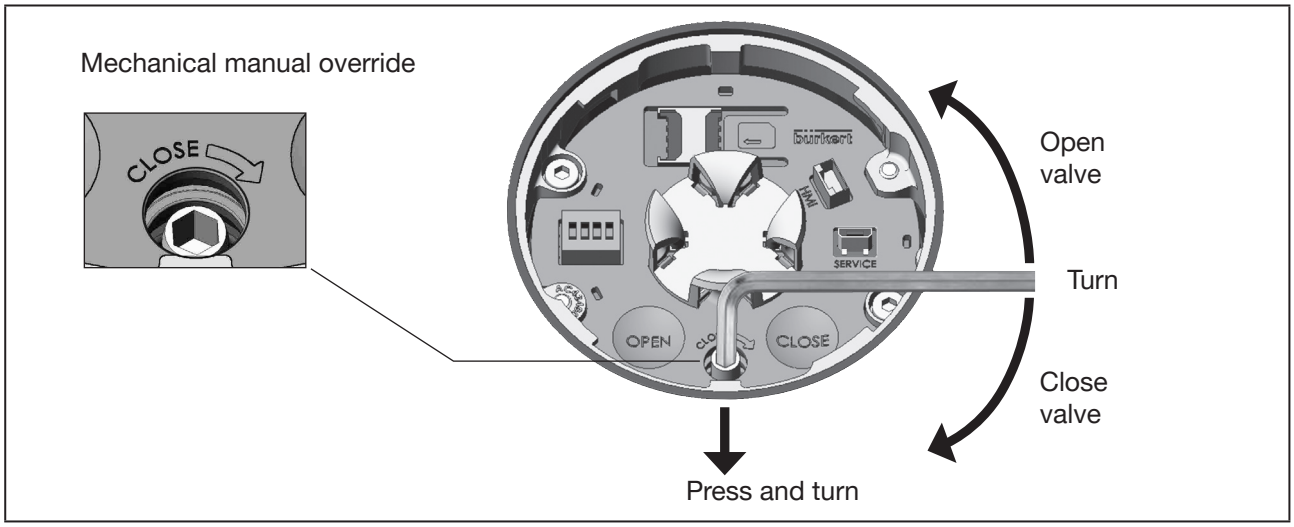

Image 59: Mechanical manual override AG2

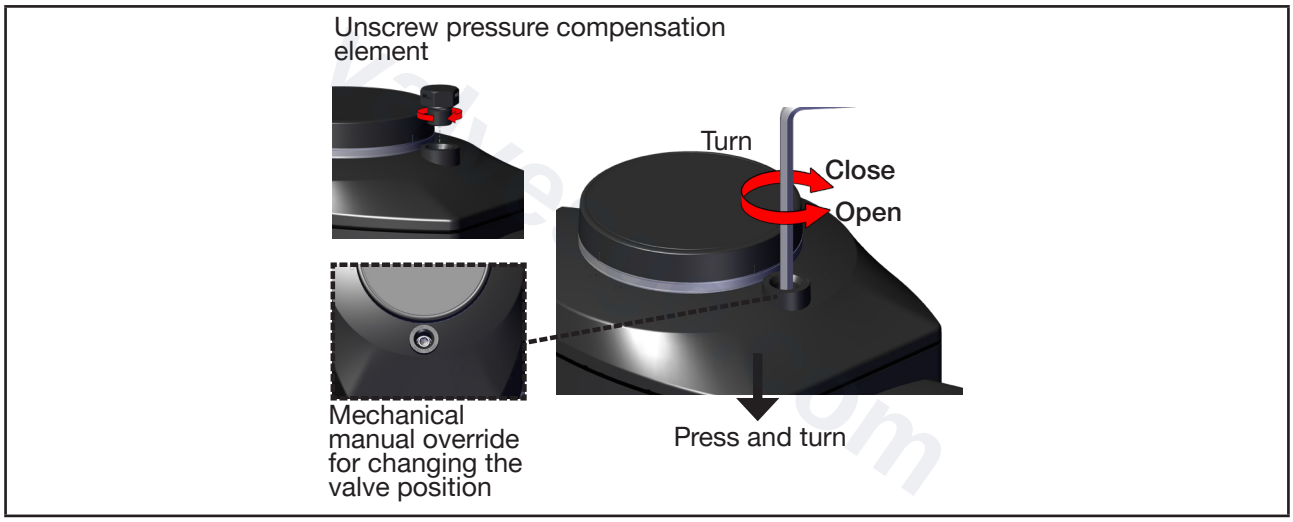

Image 60: Mechanical manual override AG3

Remove blind cover or display module:

Devices with ATEX approval or IECEx approval are secured with a magnetic lock.
The removal of the cover is described in the supplementary instructions for the electromotive control valves with ATEX approval and IECEx approval.

ATTENTION!

Carefully remove the display module so that the connection cable and HMI interface are not damaged.

→ To unlock, turn the display module or the blind cover anticlockwise and remove.
⚠For devices with display module, take note of the connection cable to the HMI interface.

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Actuating valve mechanically:

→ To operate the valve mechanically, use an Allen key with width across flats of 3 mm (AG2) / 5 mm (AG3).

ATTENTION!

Maximum torque 2 Nm (AG2) / 10 Nm (AG3). Exceeding the torque when the valve end position is reached will damage the mechanical manual override or the device.

→ Apply light pressure to lock the mechanical manual override mechanism into place while turning the Allen key at the same time (see "Image 59"and "Image 60").
⚠ Maximum tightening torque 2 Nm (AG2)/10 Nm (AG3)!
- Turn counterclockwise to open.
- Turn clockwise to close.

The position indicator shows that the valve end positions have been reached (see "Image 61").

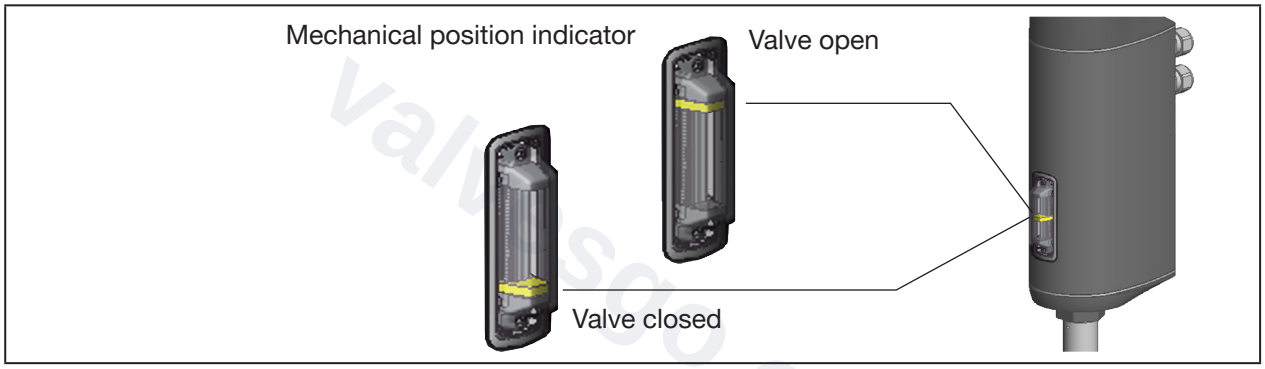

Image 61: Mechanical position indicator

→ Once the desired valve position is achieved, remove the Allen key.
The mechanical manual override mechanism will disengage automatically.

Close the blind cover or display module:

CAUTION!

For devices with display module
Before mounting the display, check whether the cable is correctly connected to the HMI interface.

→ Mount blind cover or display module and turn clockwise until the 2 marks (one vertical line on the blind cover and on the actuator) are vertically aligned.

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15.4.2 Removing the fieldbus gateway from the actuator (AG2)

Prerequisites:
Supply voltage switched off, blind cover or display module removed.

CAUTION!

The fieldbus gateway must only be removed when it is deenergised, otherwise the device may be damaged. Wait until LED illuminated ring goes out.

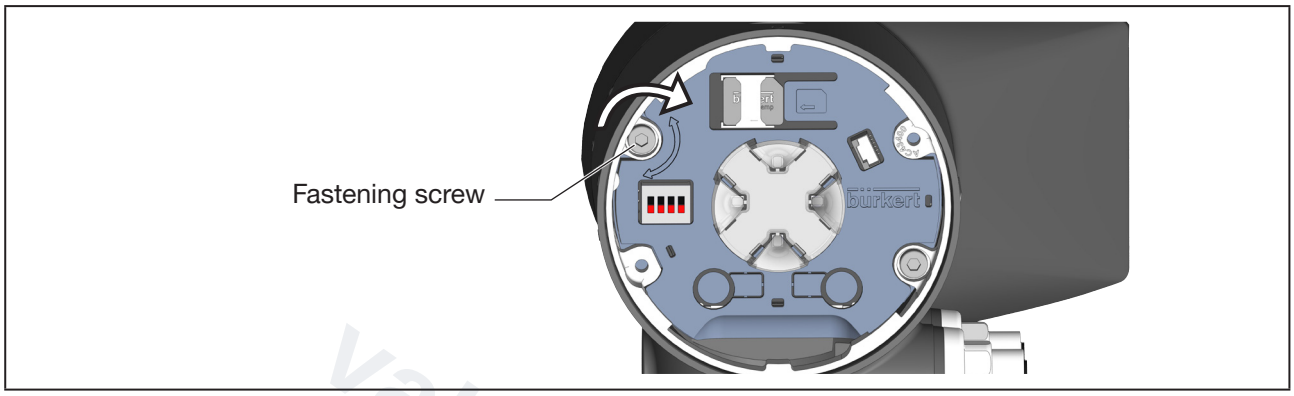

Image 62: Remove fieldbus gateway

→ Remove fastening screw (socket head screw, width across flats 3 mm).

CAUTION!

Caution when removing the fieldbus gateway. Fieldbus gateway and actuator are connected to each other by a cable.

→ To release the fieldbus gateway, turn it counterclockwise and carefully remove it.

→ Disconnect connection cable from the fieldbus gateway.

15.4.3 Actuating valve mechanically AG2

Prerequisites:
Supply voltage switched off, blind cover or display module removed. Also for device variant with fieldbus gateway: Fieldbus gateway removed.

CAUTION!

The mechanical manual override may be used only when it is de-energised, otherwise the device may be damaged. Wait until LED illuminated ring goes out.

→ To mechanically override the valve, use an Allen key with 3 mm AF.

ATTENTION!

Maximum torque 2 Nm.
Exceeding this torque value upon reaching the end position of the valve may damage the mechanical manual override mechanism.

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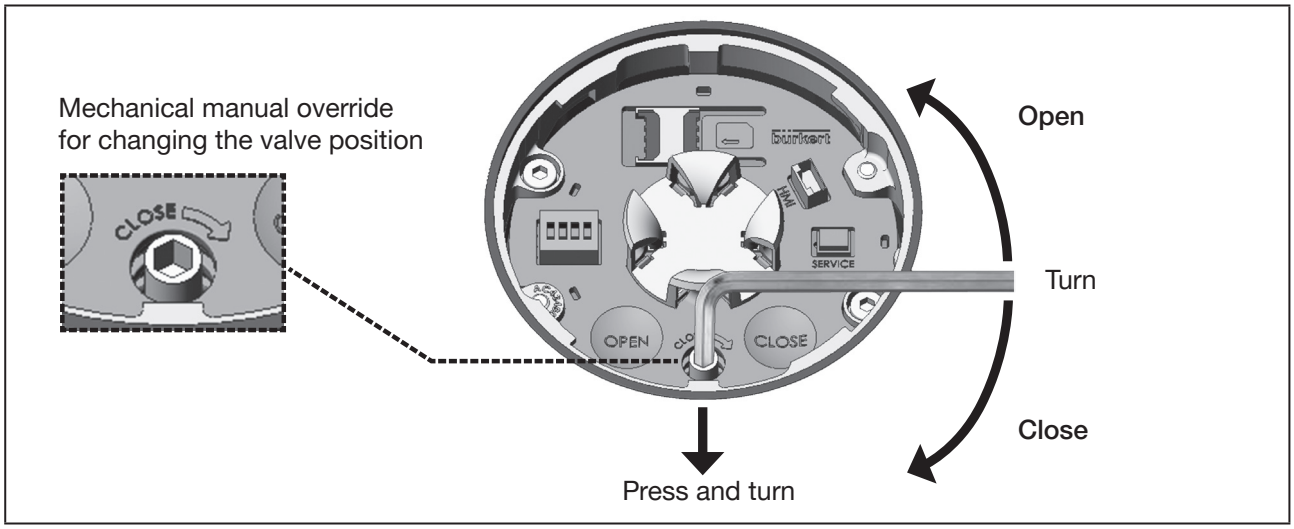

Image 63: Mechanical manual override

→ Apply light pressure to lock the mechanical manual override mechanism into place while turning the Allen key (see "Image 63").

⚠ Maximum tightening torque 2 Nm
– Turn anticlockwise to open.
– Turn clockwise to close.

The valve position can be seen on the mechanical position indicator.

Image 64: Mechanical position indicator

→ Once the desired valve position is achieved, remove the Allen key.
The mechanical manual override mechanism will disengage automatically.

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15.4.4 Actuating valve mechanically AG3

Prerequisites:
Supply voltage switched off, pressure compensation element unscrewed.

CAUTION!

The mechanical manual override may be used only when it is de-energised, otherwise the device may be damaged. Wait until LED illuminated ring goes out.

→ To mechanically override the valve, use an Allen key with 5 mm width across flats.

ATTENTION!

Maximum torque 10 Nm.
Exceeding this torque value upon reaching the end position of the valve may damage the mechanical manual override mechanism.

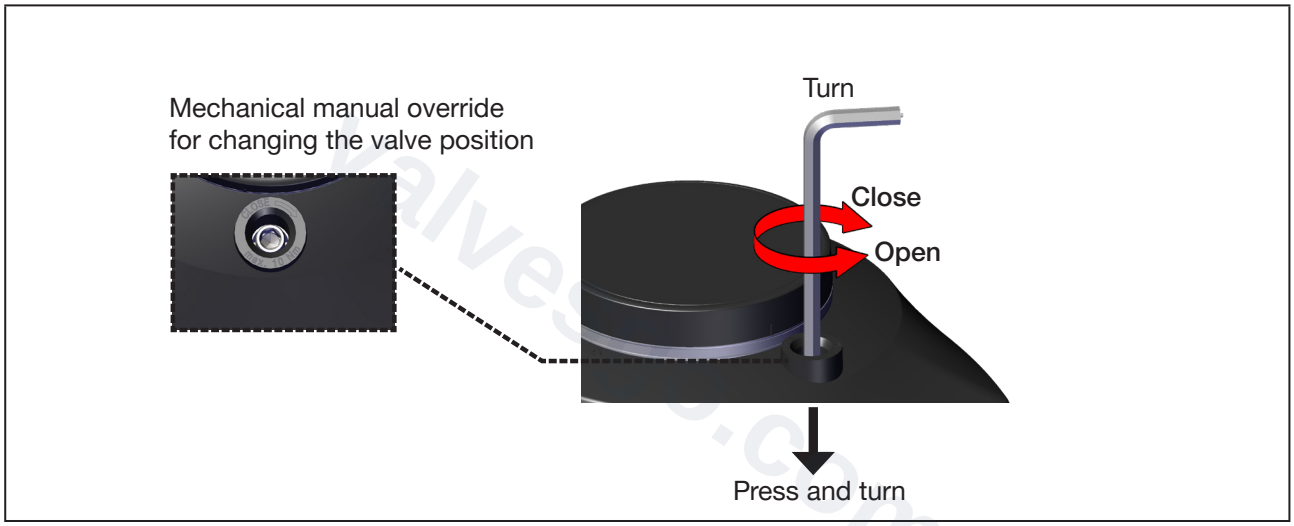

Image 65: Mechanical manual override

→ Apply light pressure to lock the mechanical manual override mechanism into place while turning the Allen key (see "Image 65").
⚠Maximum tightening torque 10 Nm!
- Turn anticlockwise to open.
- Turn clockwise to close.

The valve position can be seen on the mechanical position indicator.

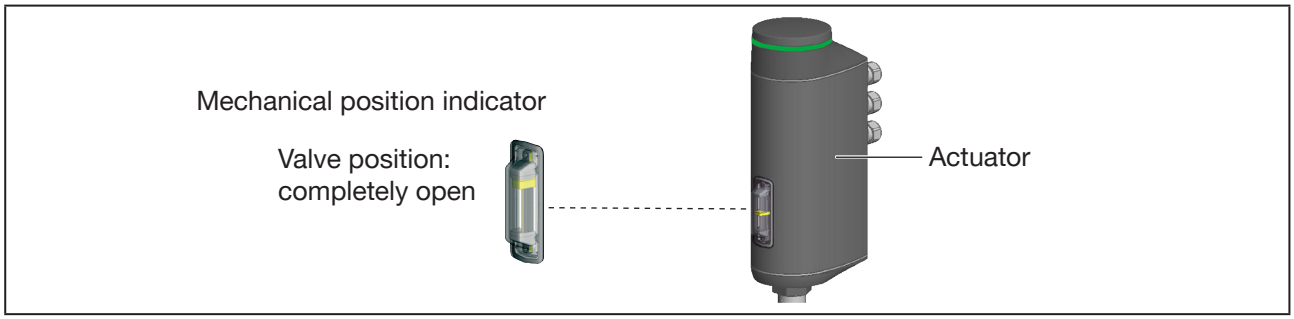

Image 66: Mechanical position indicator

→ Once the desired valve position is achieved, remove the Allen key.
The mechanical manual override mechanism will disengage automatically.

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15.4.5 Mount fieldbus gateway on the actuator (only AG2)

Prerequisites: supply voltage switched off.

CAUTION!

The fieldbus gateway must only be mounted when it is deenergised, otherwise the device may be damaged. Wait until LED illuminated ring goes out.

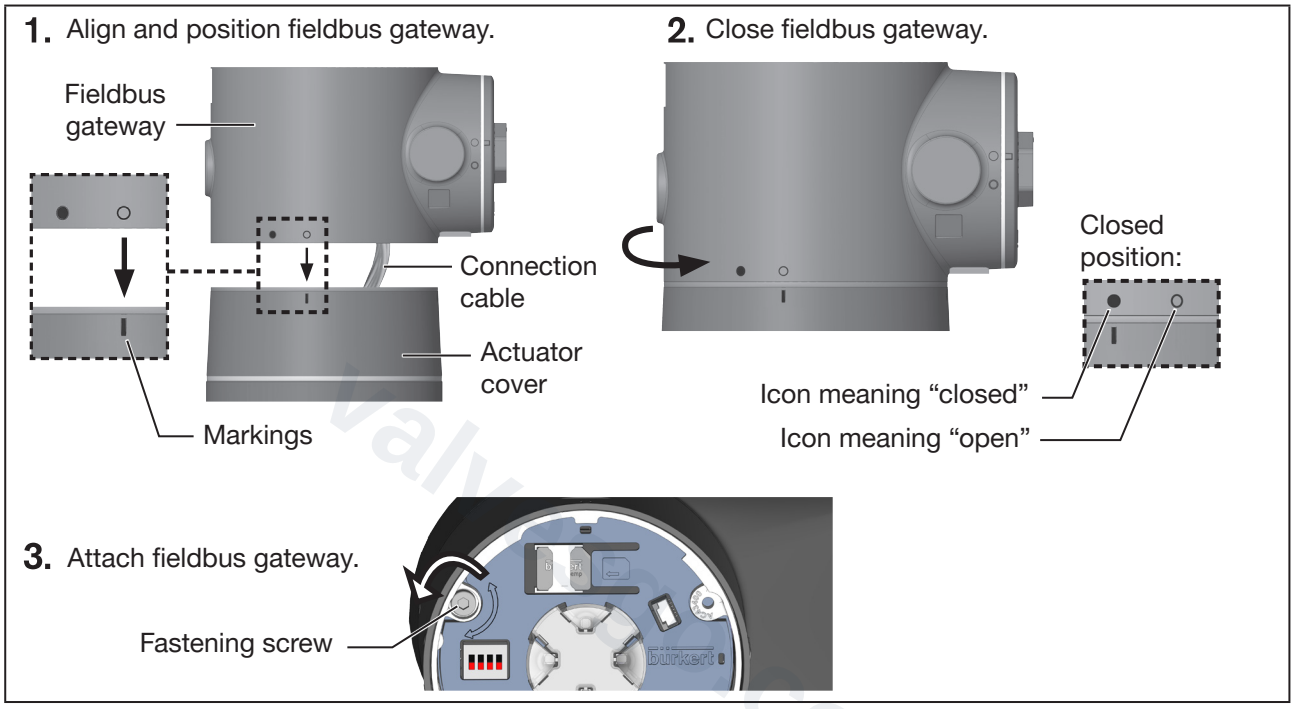

Image 67: Mounting fieldbus gateway

→ Insert connection cable into the actuator on the fieldbus gateway.

→ Align and position fieldbus gateway on the actuator cover.
Centre the “open” icon over the mark on the actuator.

→ Manually turn fieldbus gateway clockwise until the “closed” icon is positioned over the mark.

→ Tighten fastening screw (socket head screw, width across flats 3 mm).
Observe the tightening torque of 1.1 Nm!

15.4.6 Close blind cover or display module (only AG2)

Devices with ATEX approval or IECEx approval are secured with a magnetic lock.

Closing the cover is described in the supplementary instructions for the electromotive control valves with ATEX approval and IECEx approval.

CAUTION!

For devices with display module
Before mounting the display, check whether the cable is correctly connected to the HMI interface.

→ Mount display module or the blind cover and turn it clockwise until the two marks are vertically aligned.
Vertical lines are affixed as marks to the display module, blind cover and actuator.

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16 ADVANCED FUNCTIONS

The functions for special control tasks and their configuration are described in a separate software description. These can be found, with specification on our homepage: country.burkert.com

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17 OPERATING STRUCTURE AND FACTORY SETTING

The factory default settings are depicted in blue in the operating structure to the right of the menu.

Examples: ◉ / ☒ Factory-enabled or selected menu options
○ / ☐ Factory-disabled or unselected menu options
2%, *10 sec*, ... Factory-set values

17.1 Operating structure of the configuration area

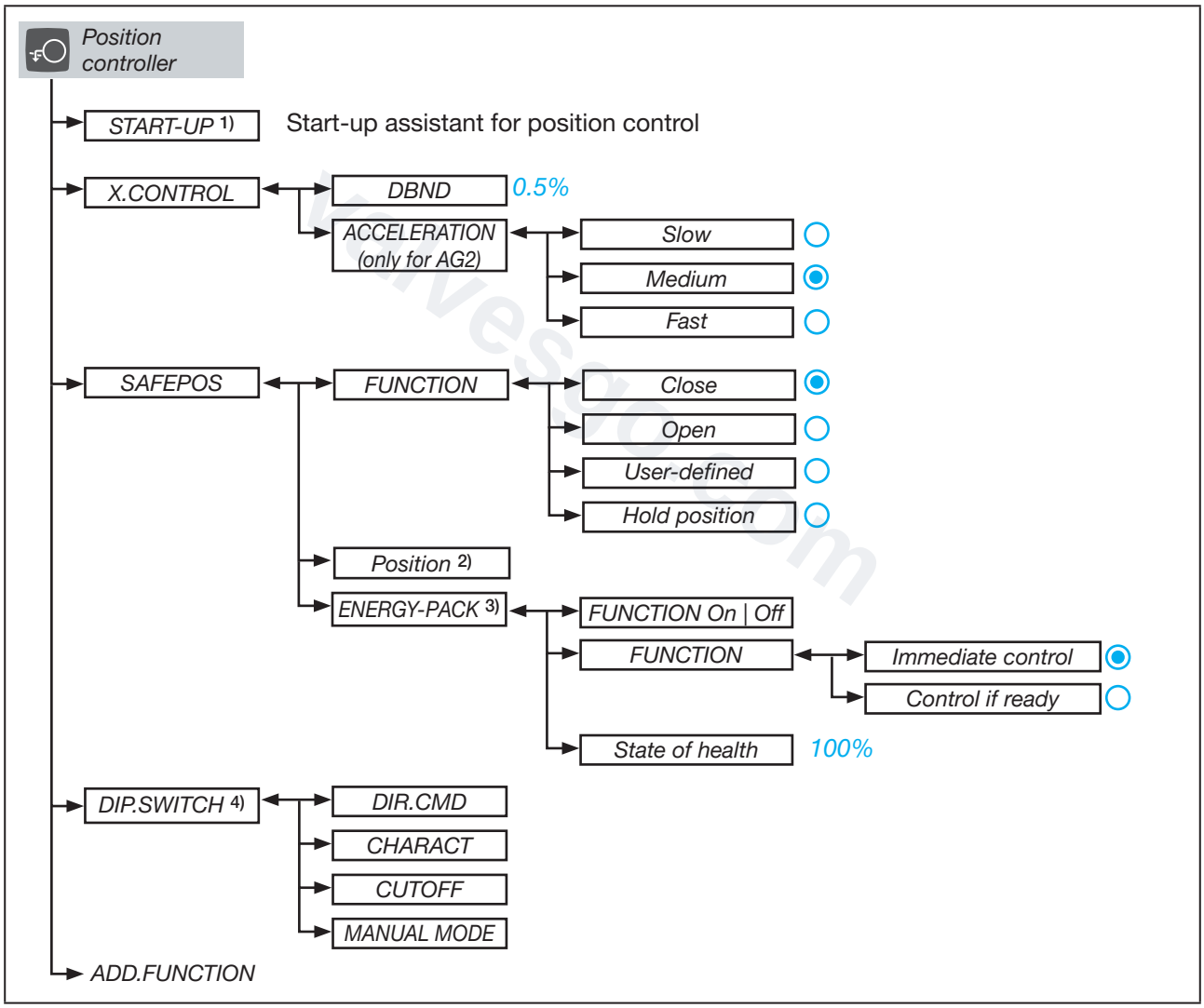

Image 68: Operating structure – 1-a, "Position controller" configuration area

1) Only available in devices without process controller function

2) Only available if selected in the menu SAFEPOS → FUNCTION → User-Defined.

3) Only available in devices with energy storage system SAFEPOS energy-pack (option).

4) Only available in the Bürkert Communicator software for devices without a display module.

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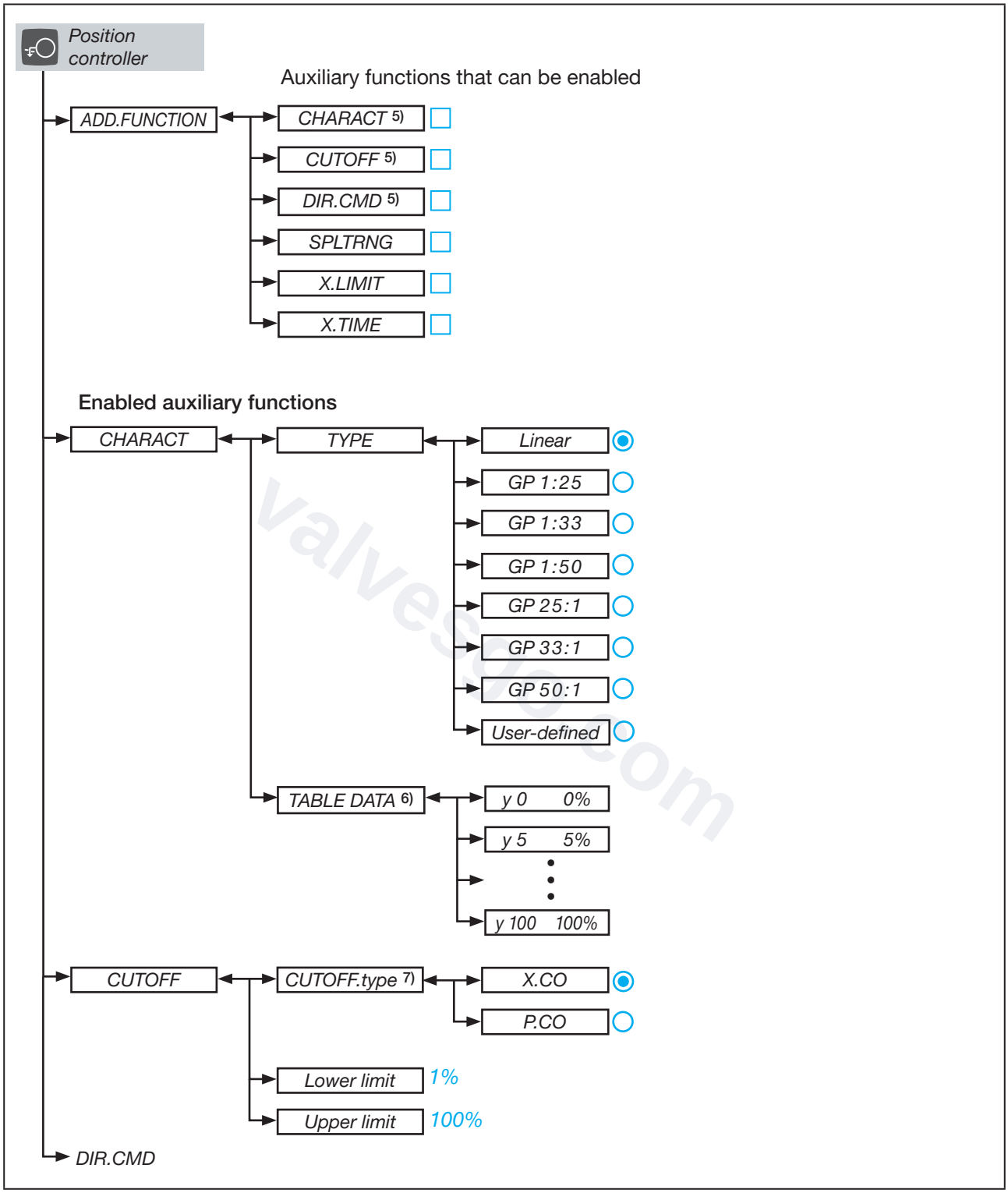

Image 69: Operating structure – 1-b, "Position controller" configuration area

5) For devices without a display, the menu is not enabled with ADD.FUNCTION but rather on the DIP switch of the device

6) Only available if selected in the menu CHARACT → TYPE → User-Defined.

7) Only available in devices with process control function.

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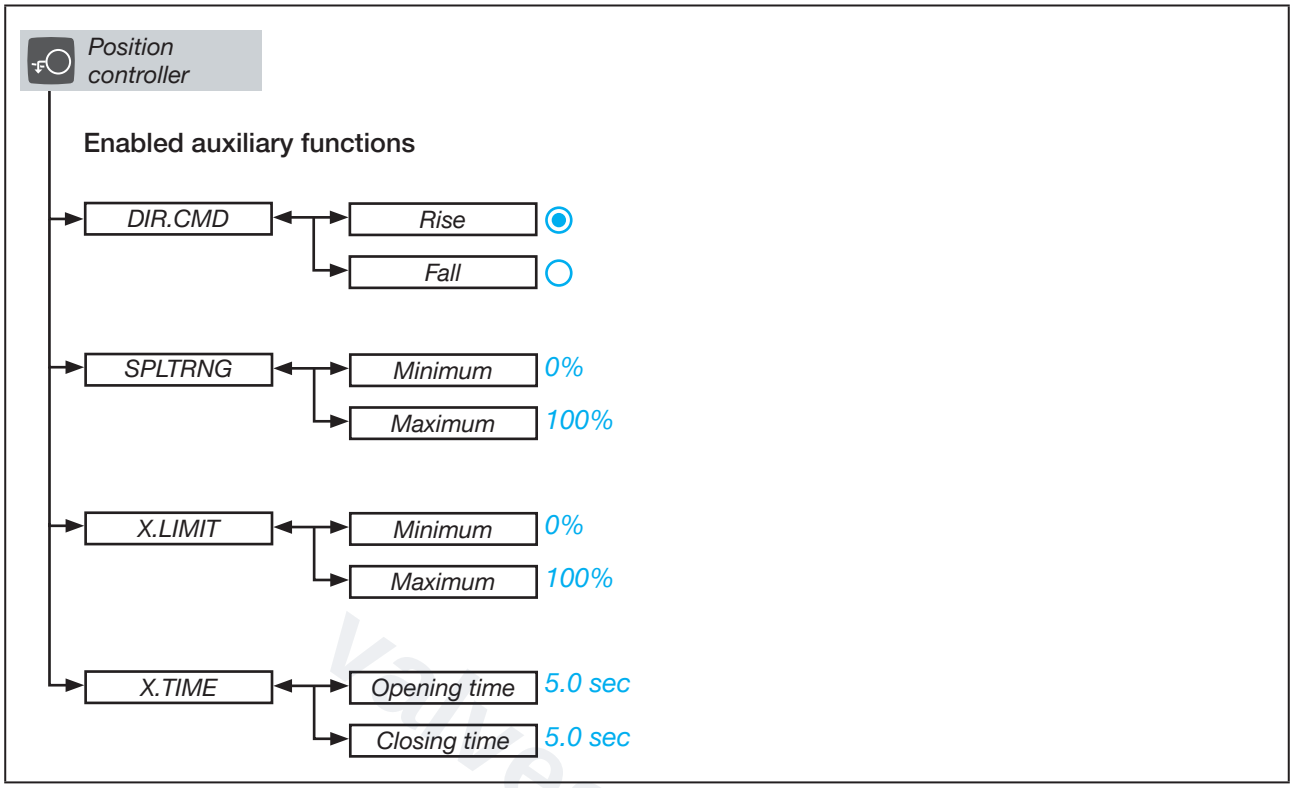

Image 70: Operating structure – 1-c, “Position controller” configuration area

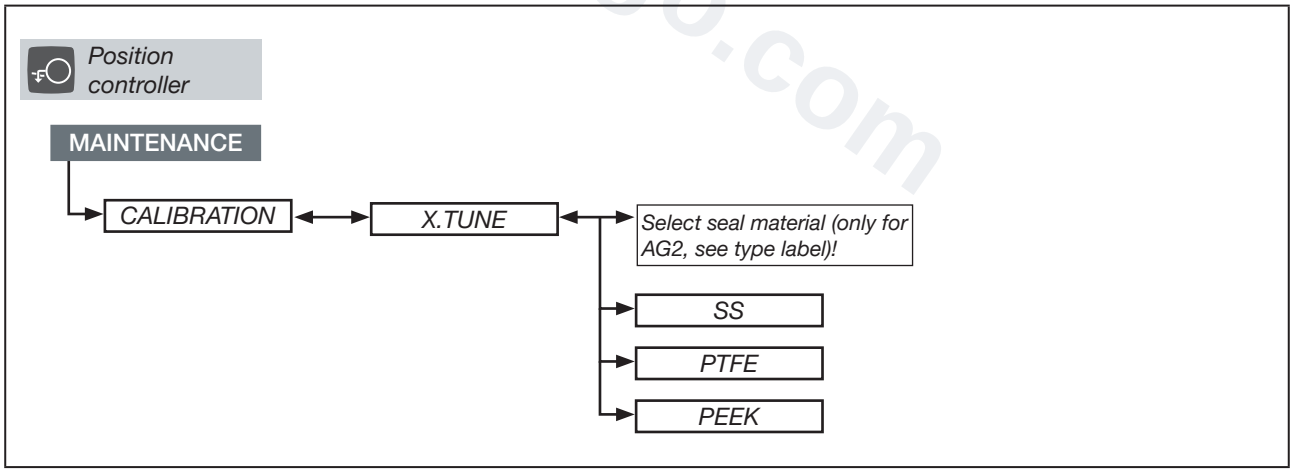

Image 71: Operating structure – 1-d, position controller maintenance

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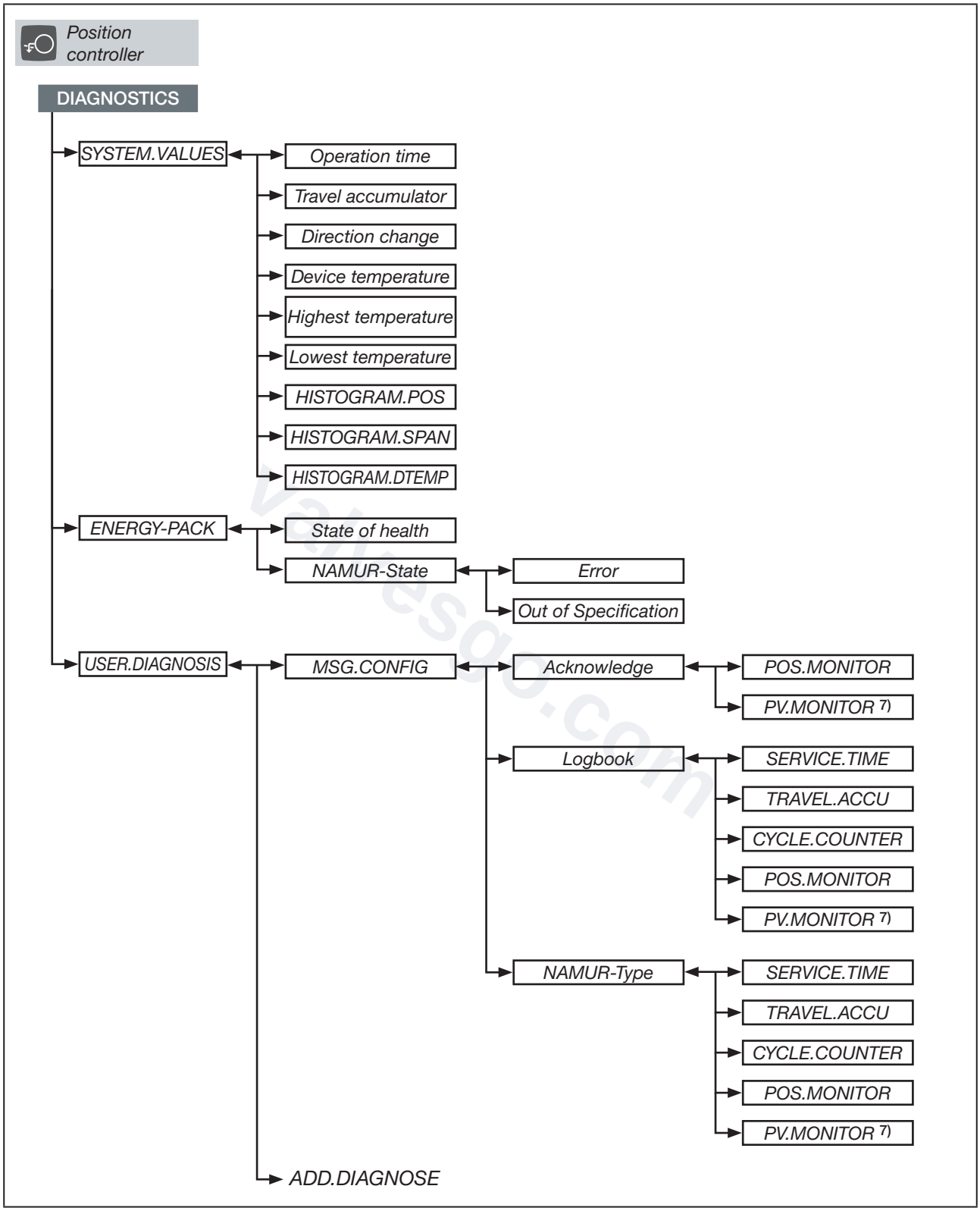

Image 72: Operating structure – 1-e, position controller diagnostics

7) Only available in devices with process control function.

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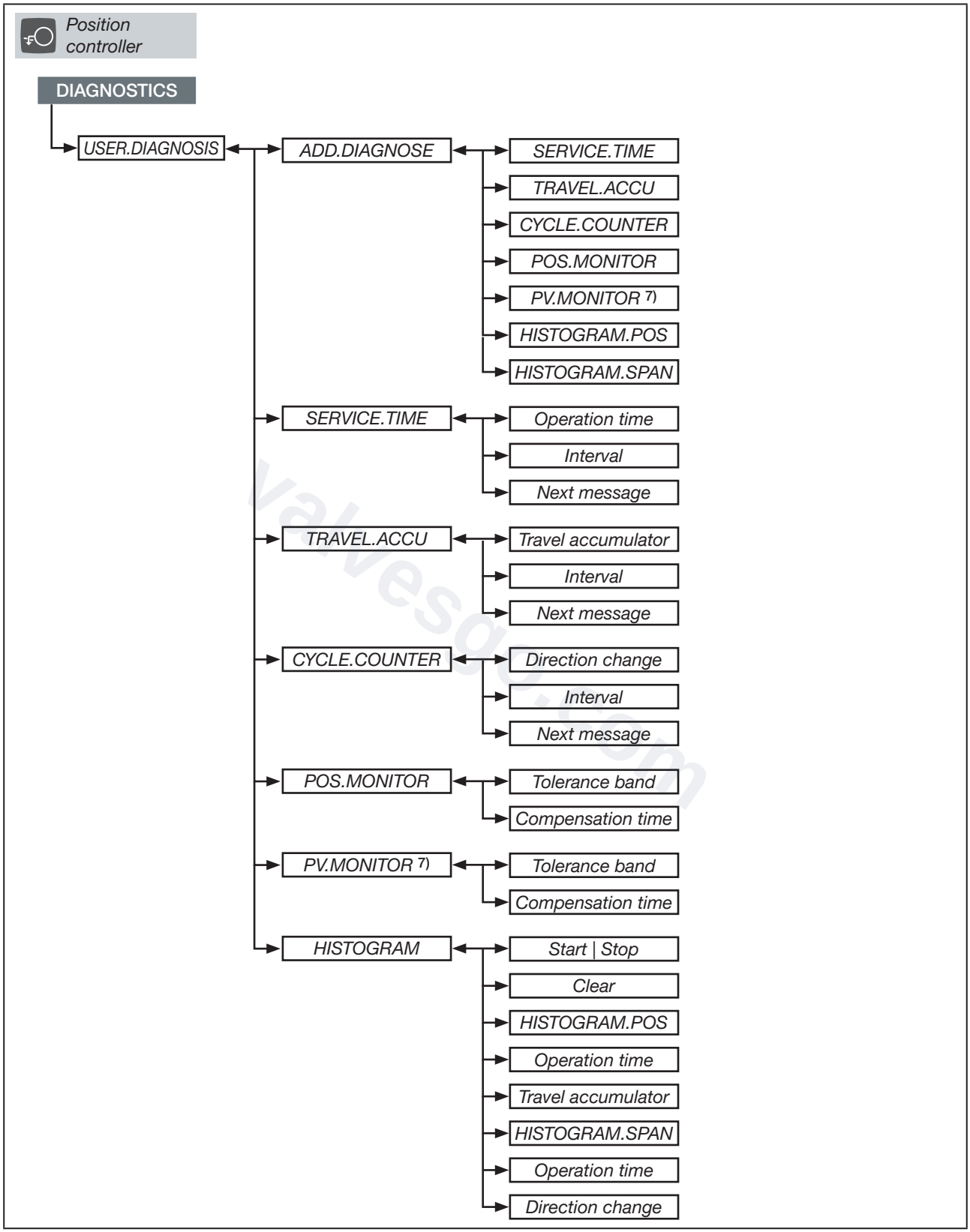

Image 73: Operating structure – 1-f, position controller diagnostics

7) Only available in devices with process control function.

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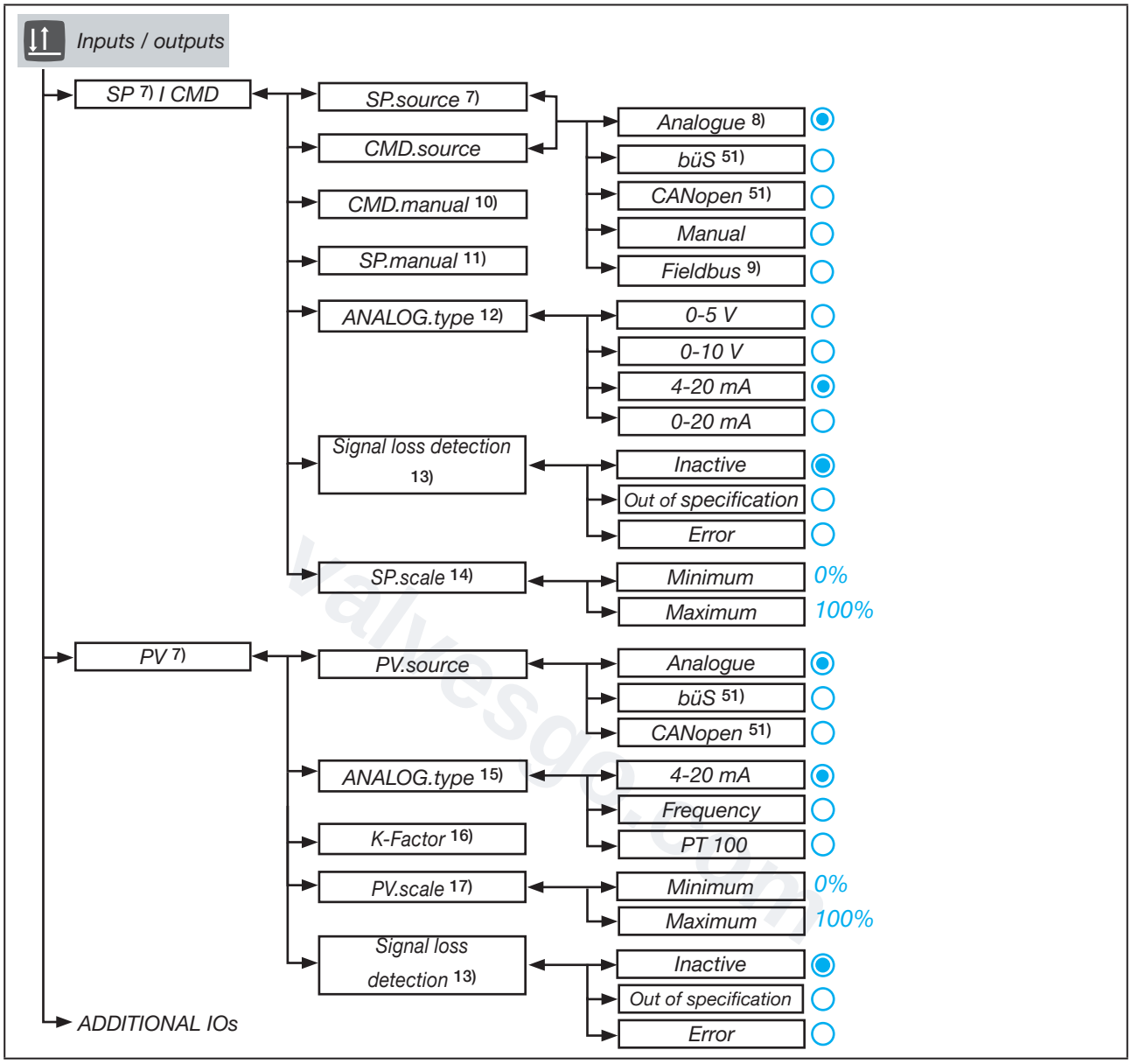

Image 74: Operating structure – 2-a, "Inputs/outputs" configuration area

7) Only available in devices with process control function.

8) Only available for corresponding device variant.

9) Only available for corresponding device variant.

10) Only available if selected in the menu CMD.source → Manual.

11) Only available in devices with process control function if selected in menu SP I CMD → SP.source → Manual.

12) Only available if selected in the menu CMD.source or in menu SP.source → Analog.

13) Only available if selected in submenu → ANALOG.type → 4–20 mA.

14) Only available in devices with process control function if selected in menu SP I CMD → SP.source → Analog.

15) Only available if selected in the menu PV.source → Analog.

16) Only available if selected in the menu PV → Analog.type → Frequency.

17) Only available if selected in the menu PV → Analog.type → 4–20 mA.

51) Only available for corresponding device variant.

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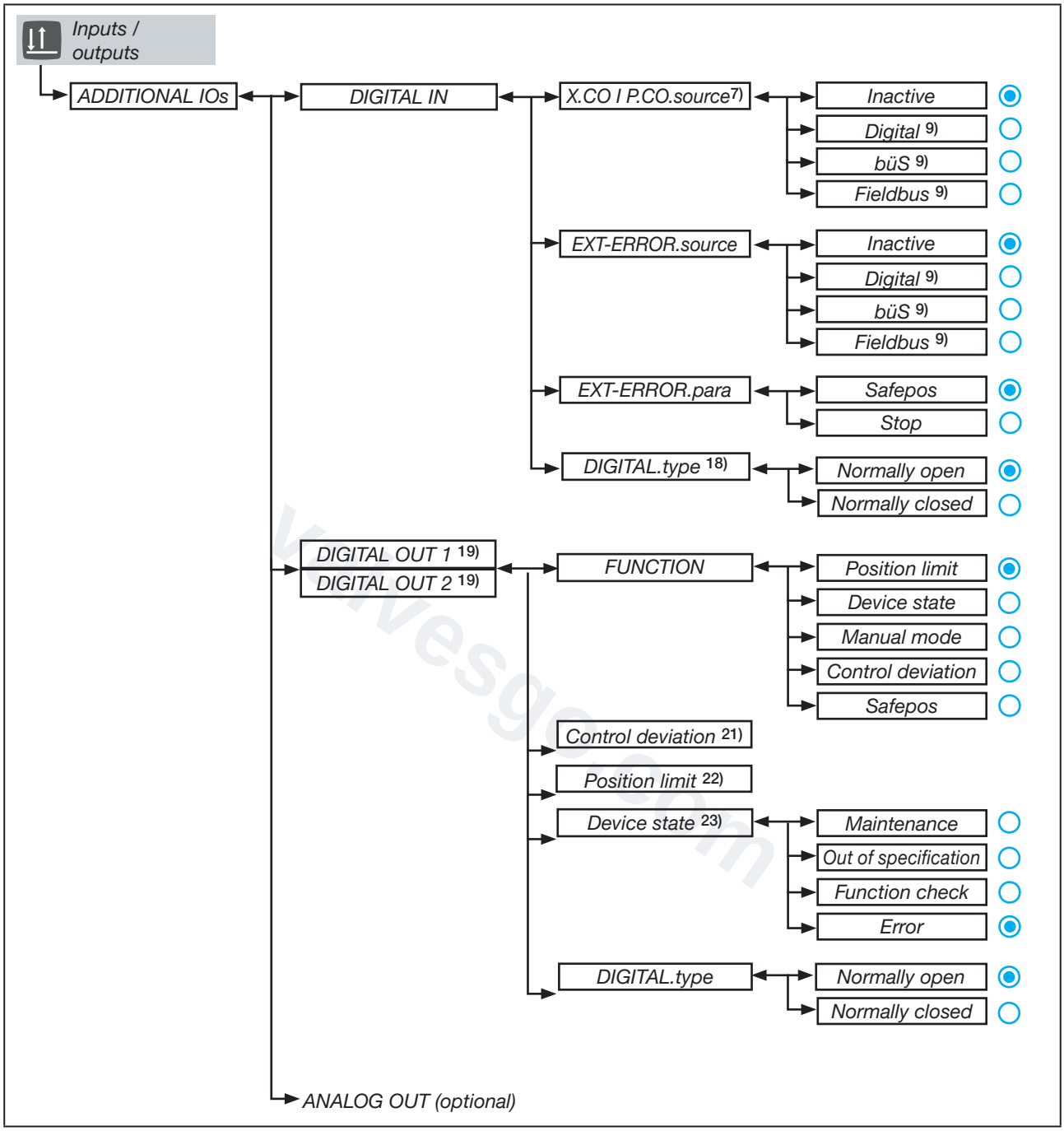

Image 75: Operating structure – 2-b, "Inputs/outputs" configuration area

7) Only available in devices with process control function

9) Only available for corresponding device variant.

18) Only available if selected in the menu ADDITIONAL IO's → DIGITAL IN → X.CO I P.CO.source or EXT-ERROR.source → Digital .

19) Only available in devices with digital output option.

21) Only available if selected in submenu FUNCTION → Control Deviation.

22) Only available if selected in submenu FUNCTION → Position Limit.

23) Only available if selected in submenu FUNCTION → Device State.

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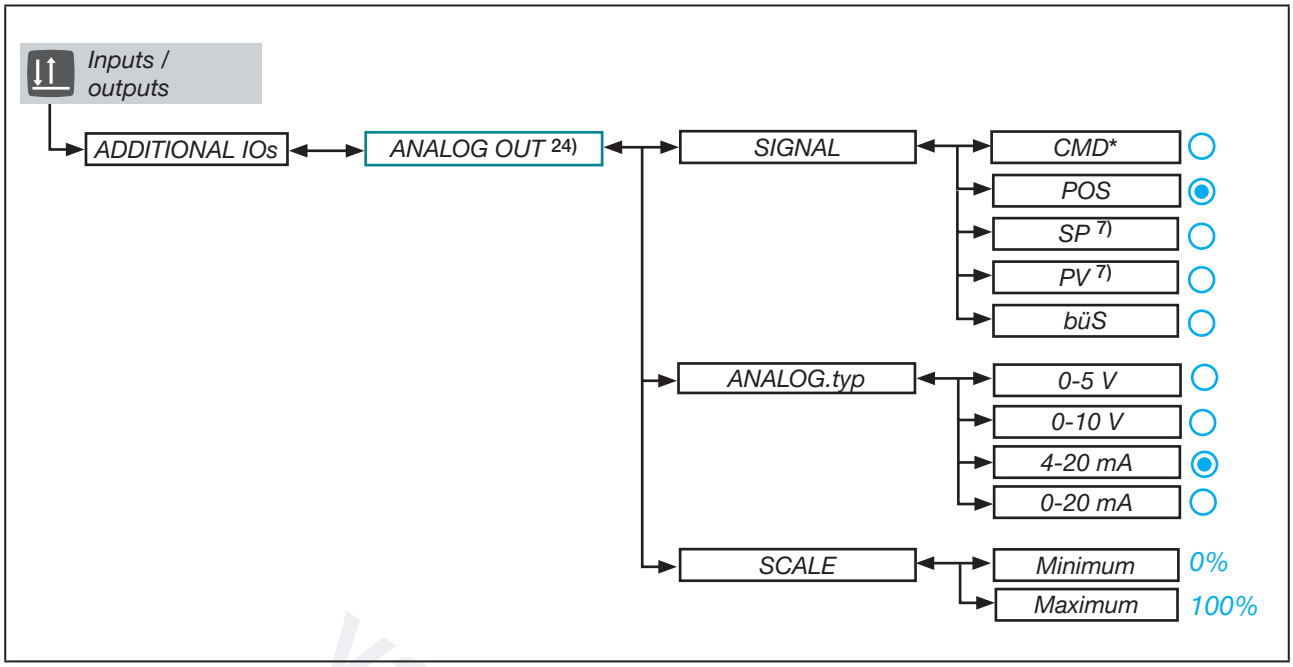

Image 76: Operating structure – 2-c, "Inputs/outputs" configuration area

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7) Only available in devices with process control function

24) Only available in devices with analogue output option.

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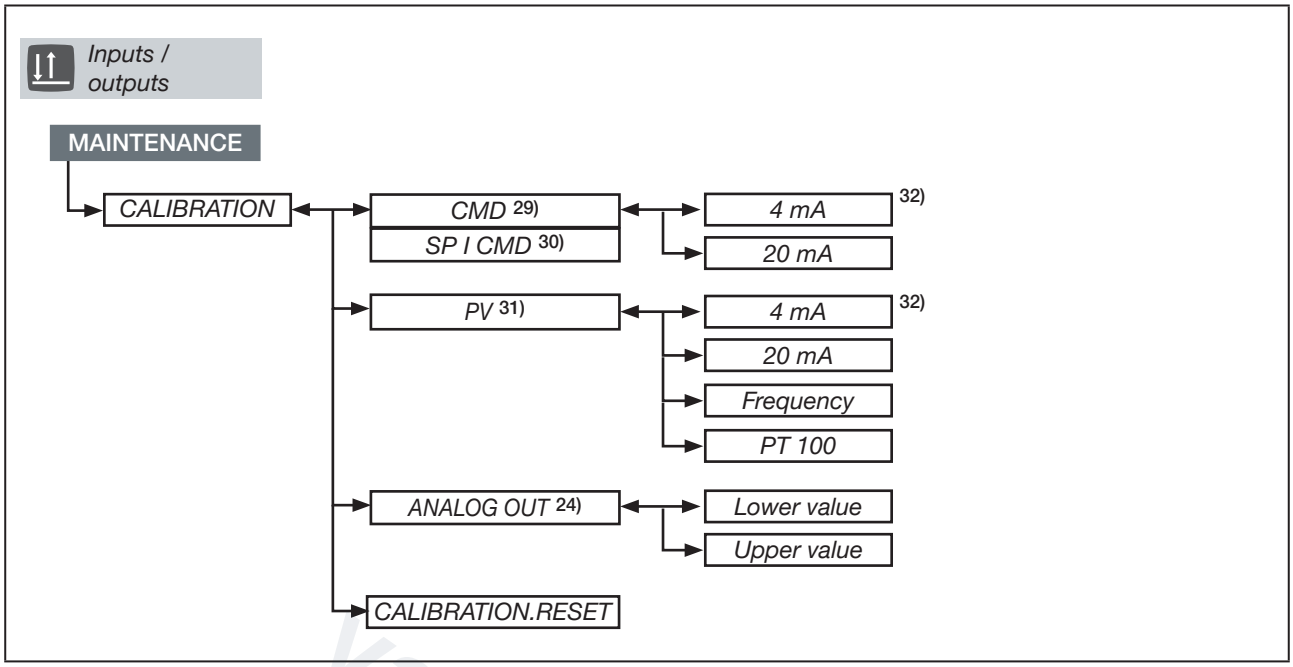

Image 77: Operating structure – 2-d, inputs/outputs maintenance

Industrial communication	The “Industrial Communication” configuration area is only available in devices equipped with a fieldbus gateway. The Industrial Communication menu is described in the separate software manual. **Download at:** www.burkert.com / Type 3360, 3361 / Downloads “Operating instructions” / Software manual Type 3360.

Image 78: Operating structure – 3, Industrial communication

24) Only available in devices with analogue output option.

29) Only available in devices with position controller function if selected in menu CMD → CMD.source → Analog.

30) Only available in devices with process control function if selected in menu SP I CMD → CMD.source or SP.source → Analog.

31) Only available in devices with process control function if selected in menu PV → PV.source → Analog.

32) The display depends on the set input signal → Inputs/outputs → Menu ANALOG.type or TYPE.

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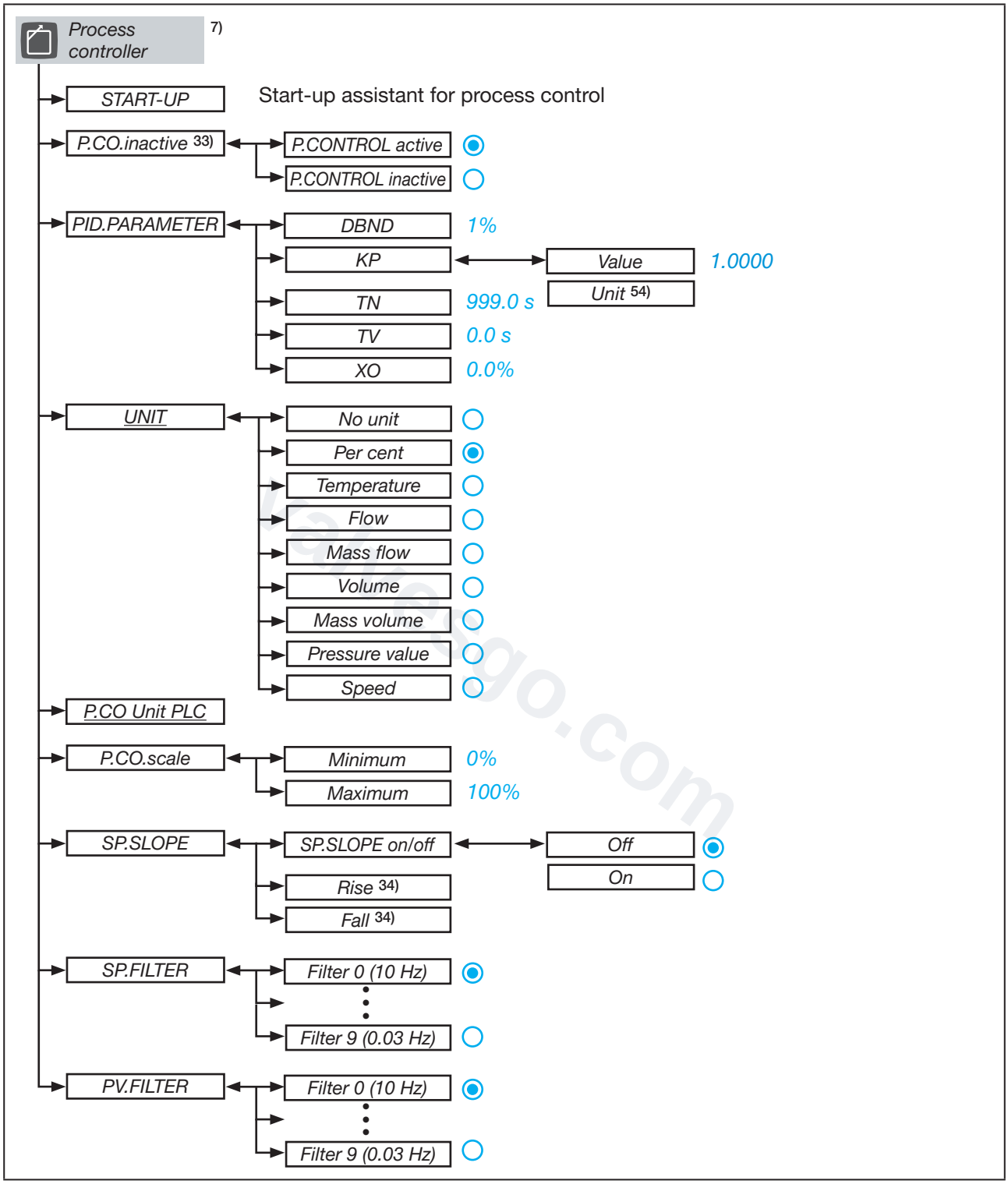

Image 79: Operating structure – 3-a, "Process controller" configuration area

7) Only available in devices with process control function.

33) Not available if the setting is made via the digital input, büS/CANopen or fieldbus. Setting: Inputs/outputs → DIGITAL IN → X.CO I P.CO.source.

34) Only available if selected in the menu SP.SLOPE → SP.SLOPE on/off → On.

54) Not available if selected in menu UNIT → No unit or per cent.

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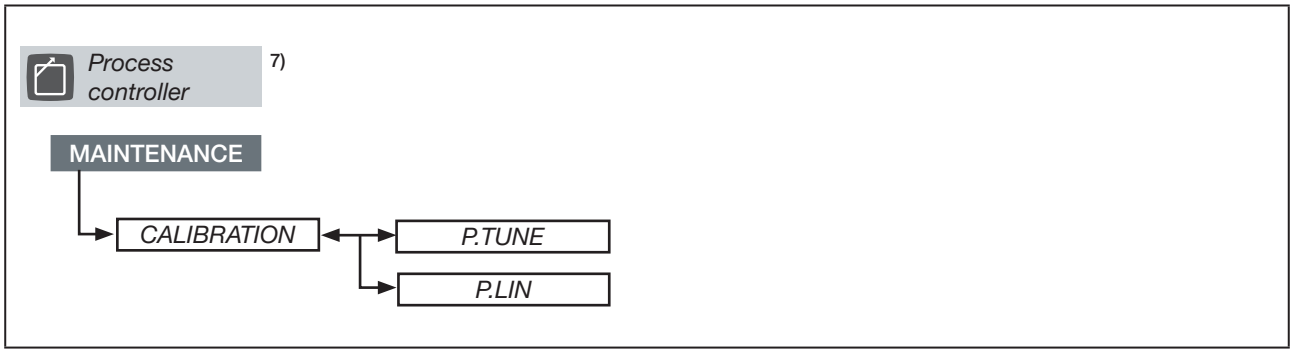

Image 80: Operating structure – 3-b, process controller maintenance

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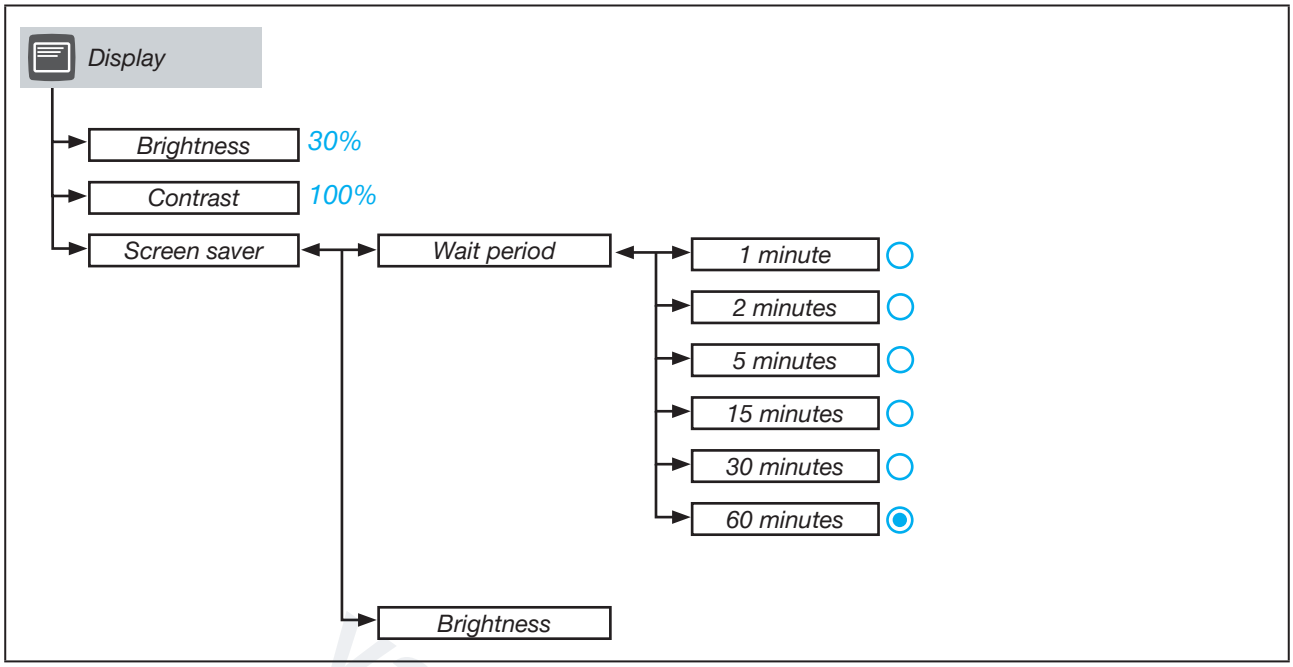

Image 81: Operating structure – 4-a, “Display” configuration area

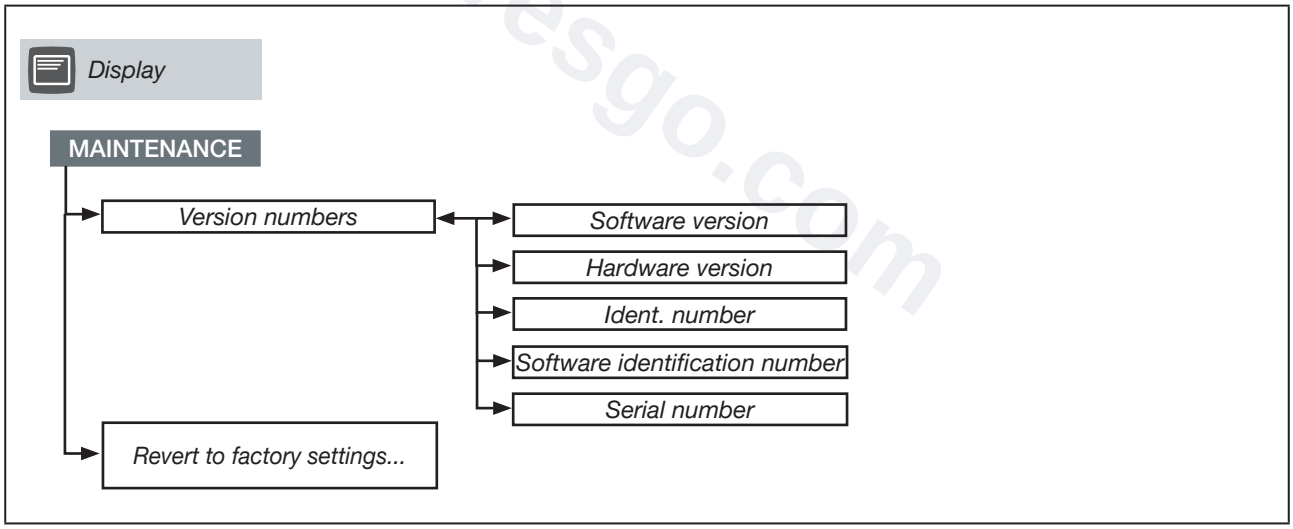

Image 82: Operating structure – 4-c, maintenance display

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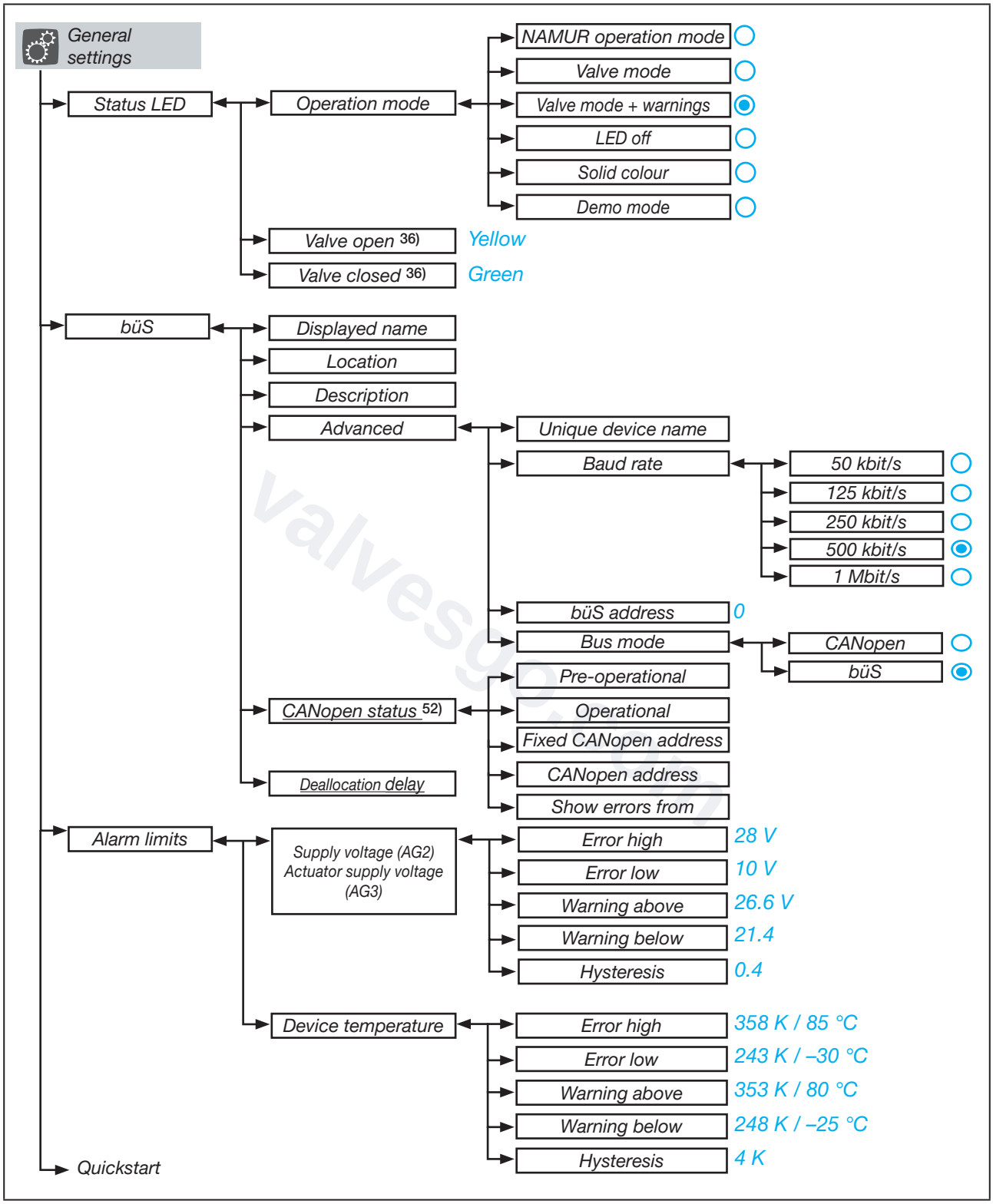

Image 83: Operating structure – 5-a, "General settings" configuration area

36) Only available if selected in the menu Operation mode → Valve mode or Valve mode+warnings.

52) Only available if selected in the menu Bus operation mode → CANopen.

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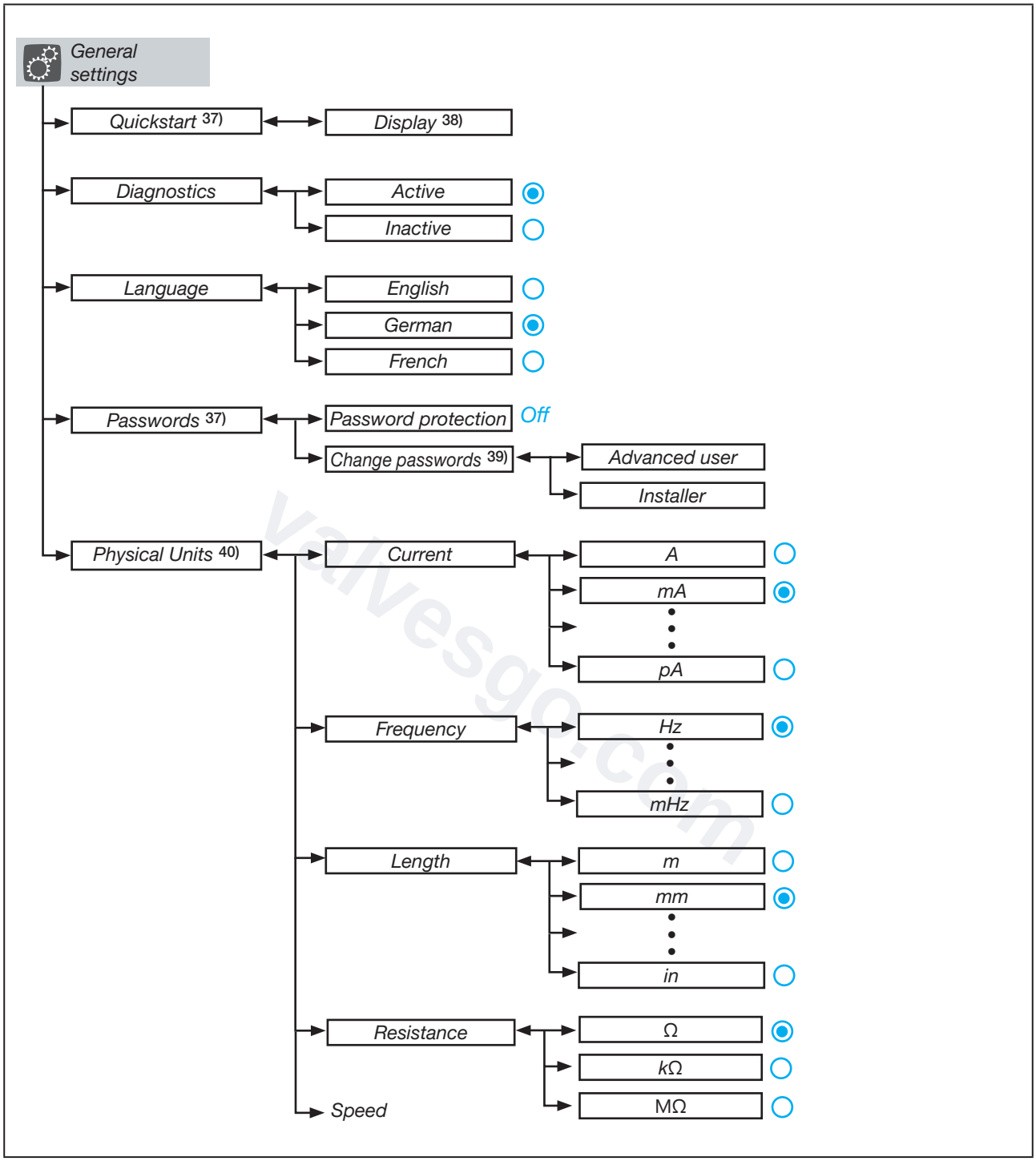

Image 84: Operating structure – 5-b, "General settings" configuration area

37) Only available on display.

38) The menu name depends on the selected language.

39) Only available if selected in the menu **Password protection** → **On**.

40) Only available on display.
The setting in the Communicator software is made in the menu bar **View** → **Unit system**.

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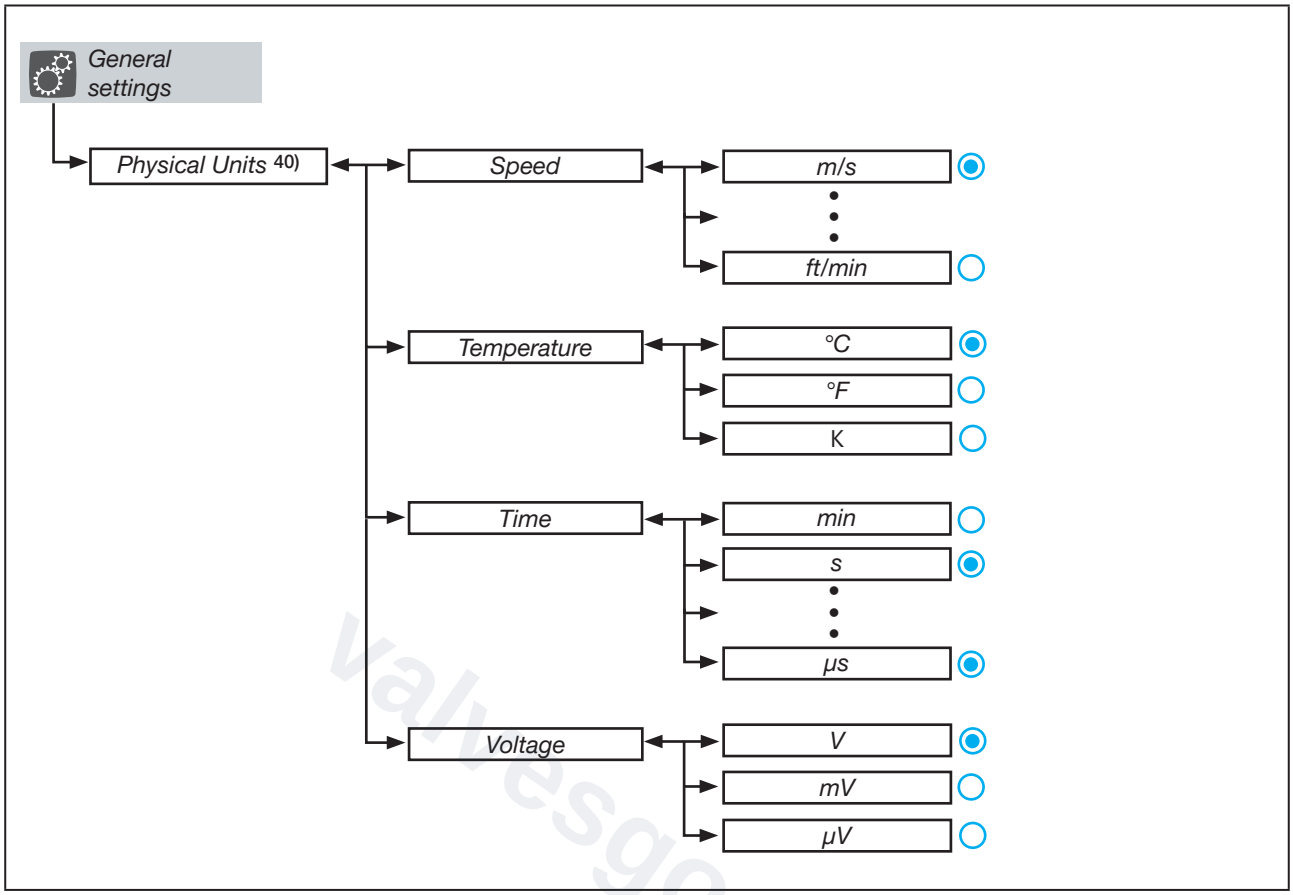

Image 85: Operating structure – 5-c, "General settings" configuration area

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40) Only available on display.
The setting in the Communicator software is made in the menu bar View → Unit system.

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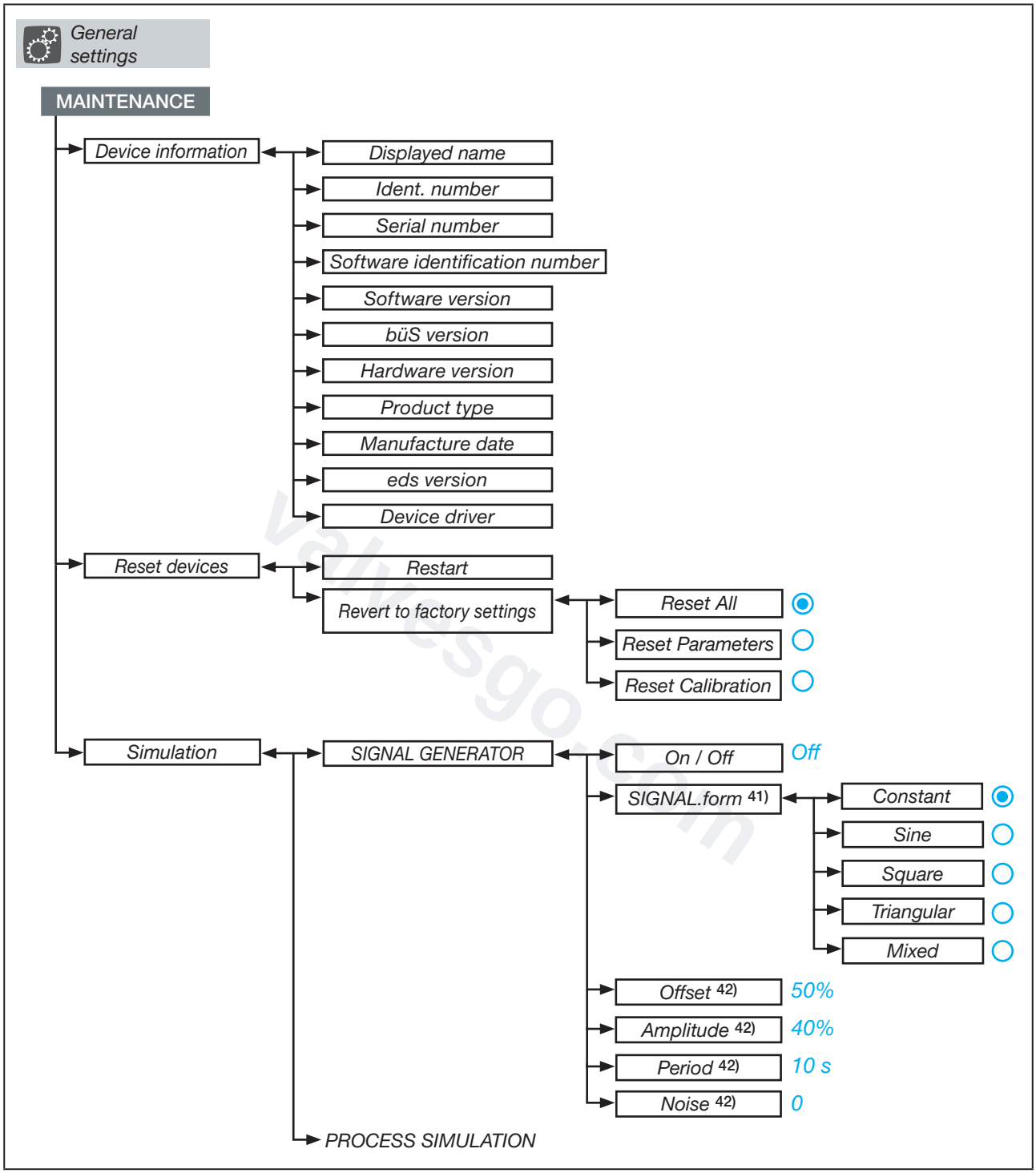

Image 86: Operating structure – 5-d, General Settings Maintenance

41) Only available if selected in the SIGNAL GENERATOR menu → on I off → On.

42) The display depends on the selection in the SIGNAL.form menu.

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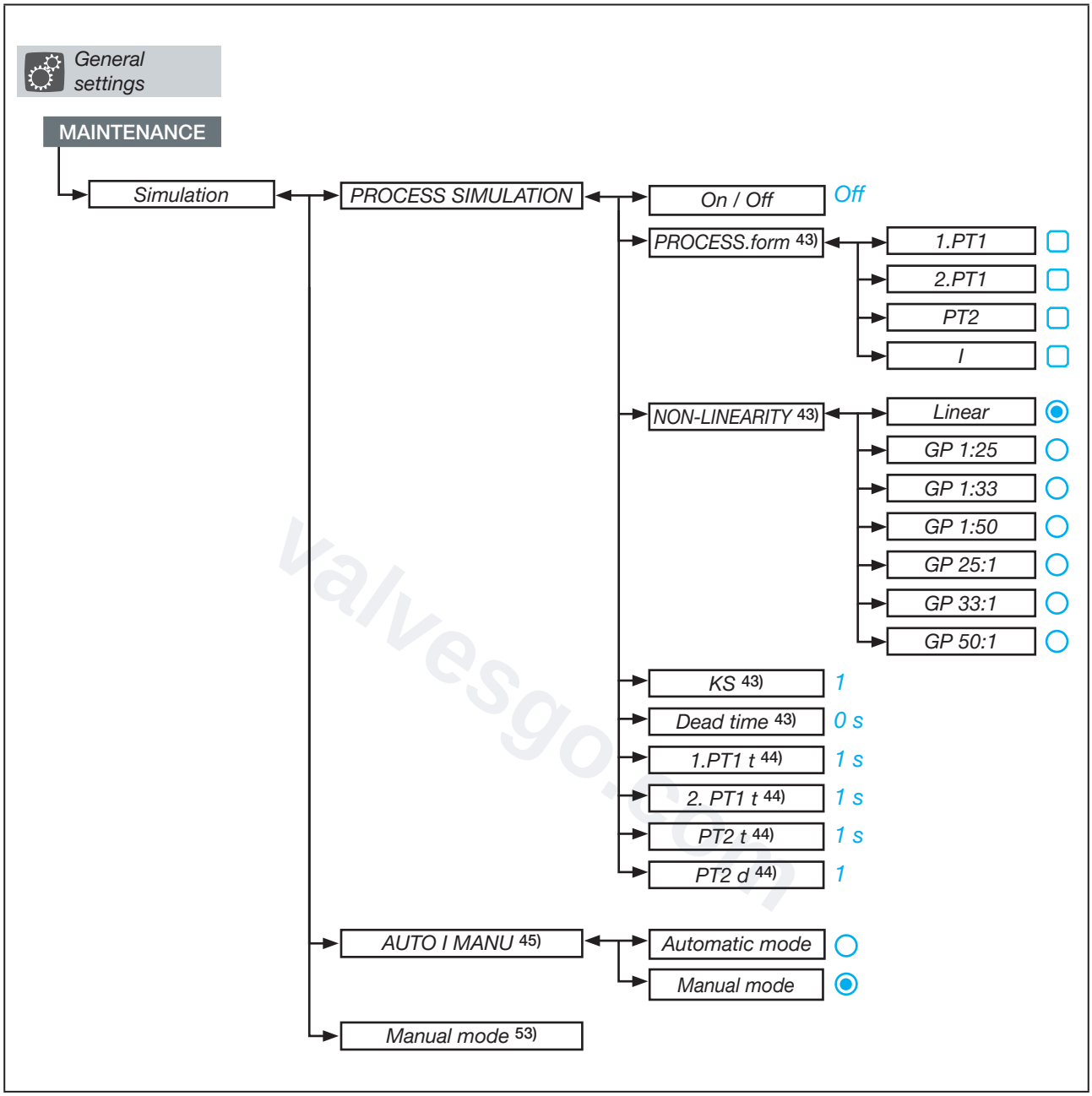

Image 87: Operating structure – 5-d, General Settings Maintenance

43) Only available if selected in the PROCESS SIMULATION menu → on I off → On.

44) Display depends on selection in PROCESS.form menu.

45) Only available in devices with display module.

53) Only available in devices with display module and if selected in the AUTO I MANU menu → Manual mode.

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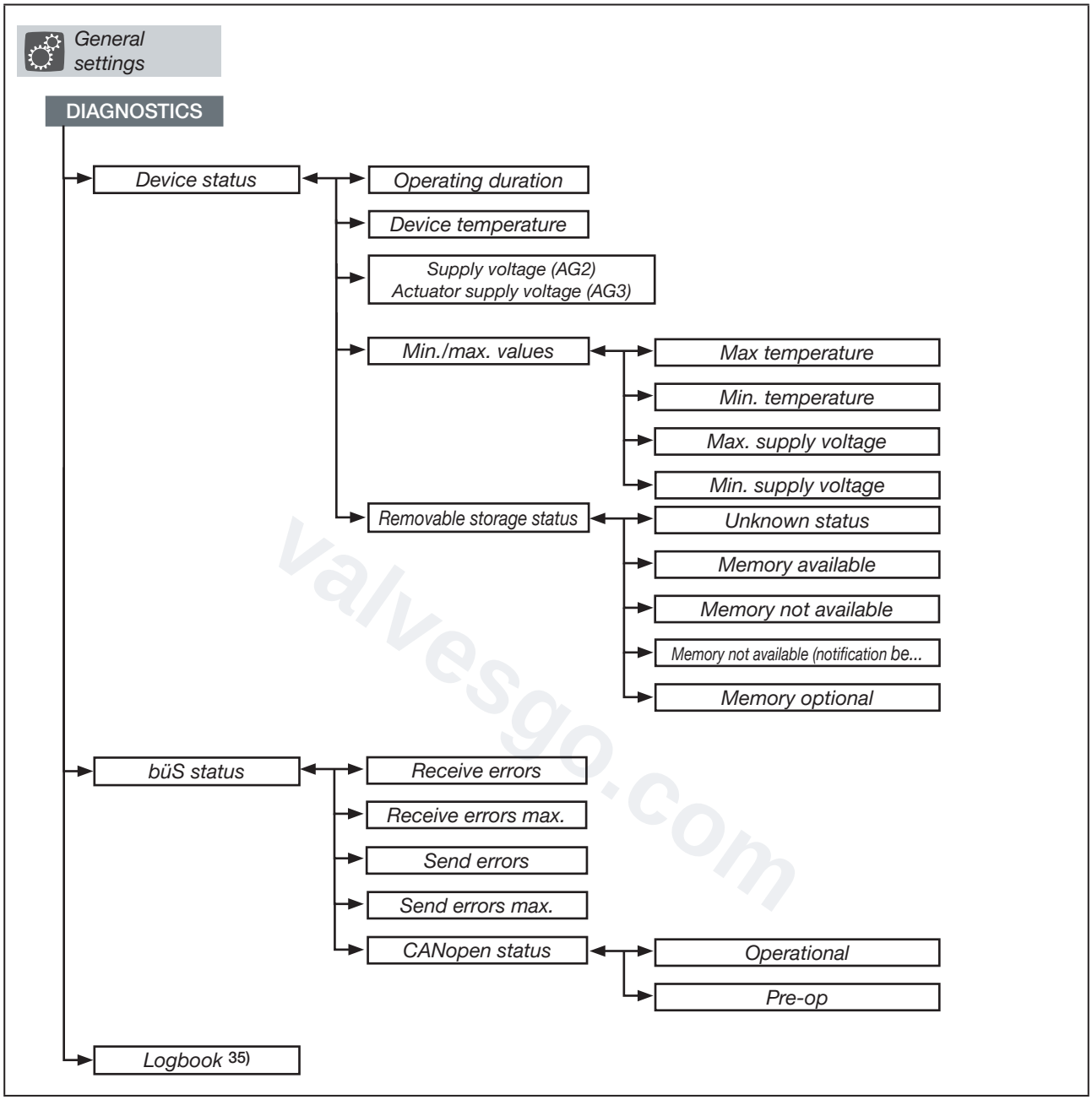

Image 88: Operating structure – 5-f, General Settings Diagnostics

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35) Only available in the Bürkert Communicator software.

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17.2 Context menu for operation on display

The context menu is only available on the display in the operating structure shown.

In the Bürkert Communicator software, the partially identical menus are integrated differently into the operating structure.

A detailed description of the Bürkert Communicator software can be found in the respective operating instructions. **Download at:** www.burkert.com / Communicator

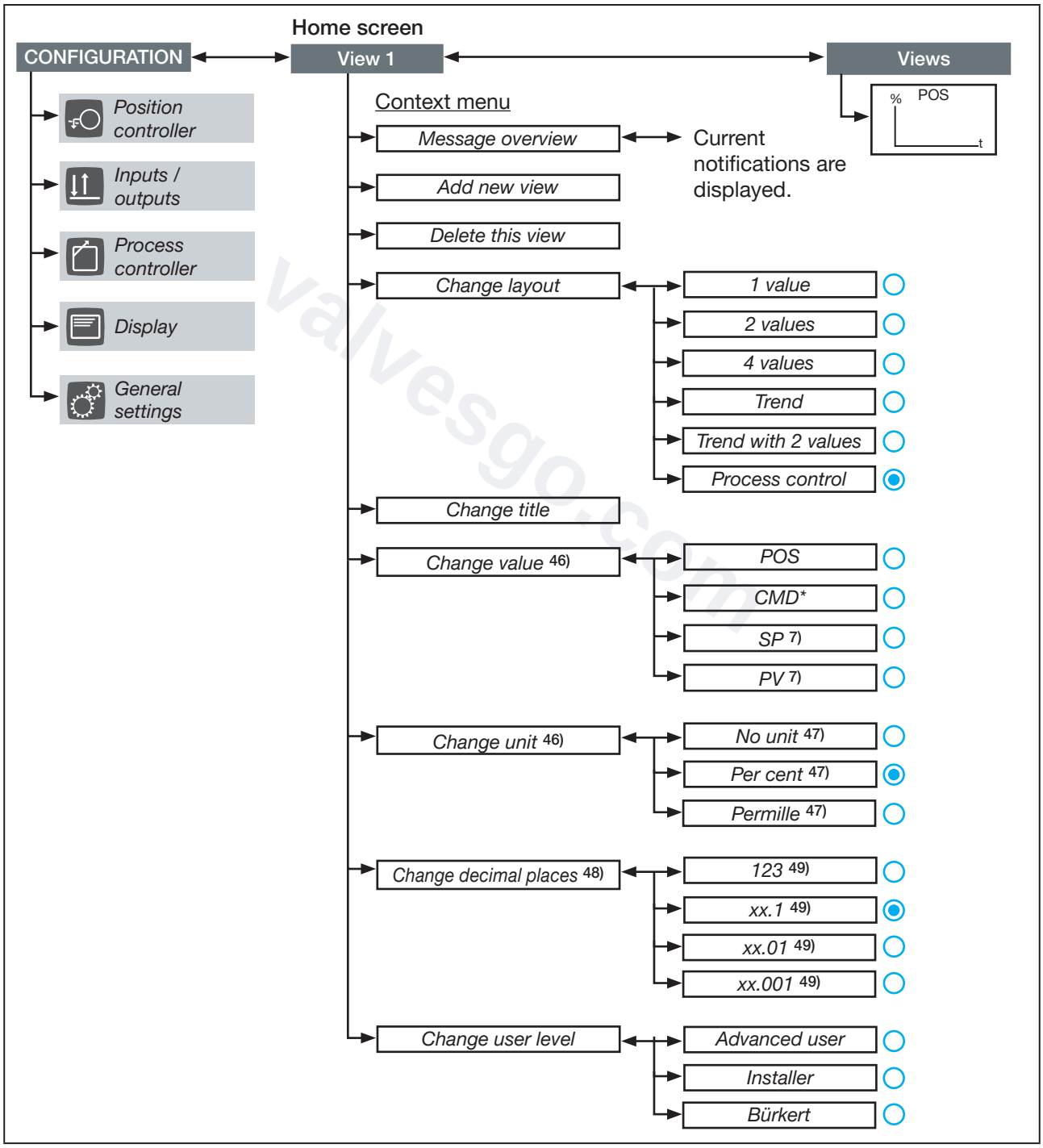

Image 89: Operating structure – 6, context menu for views

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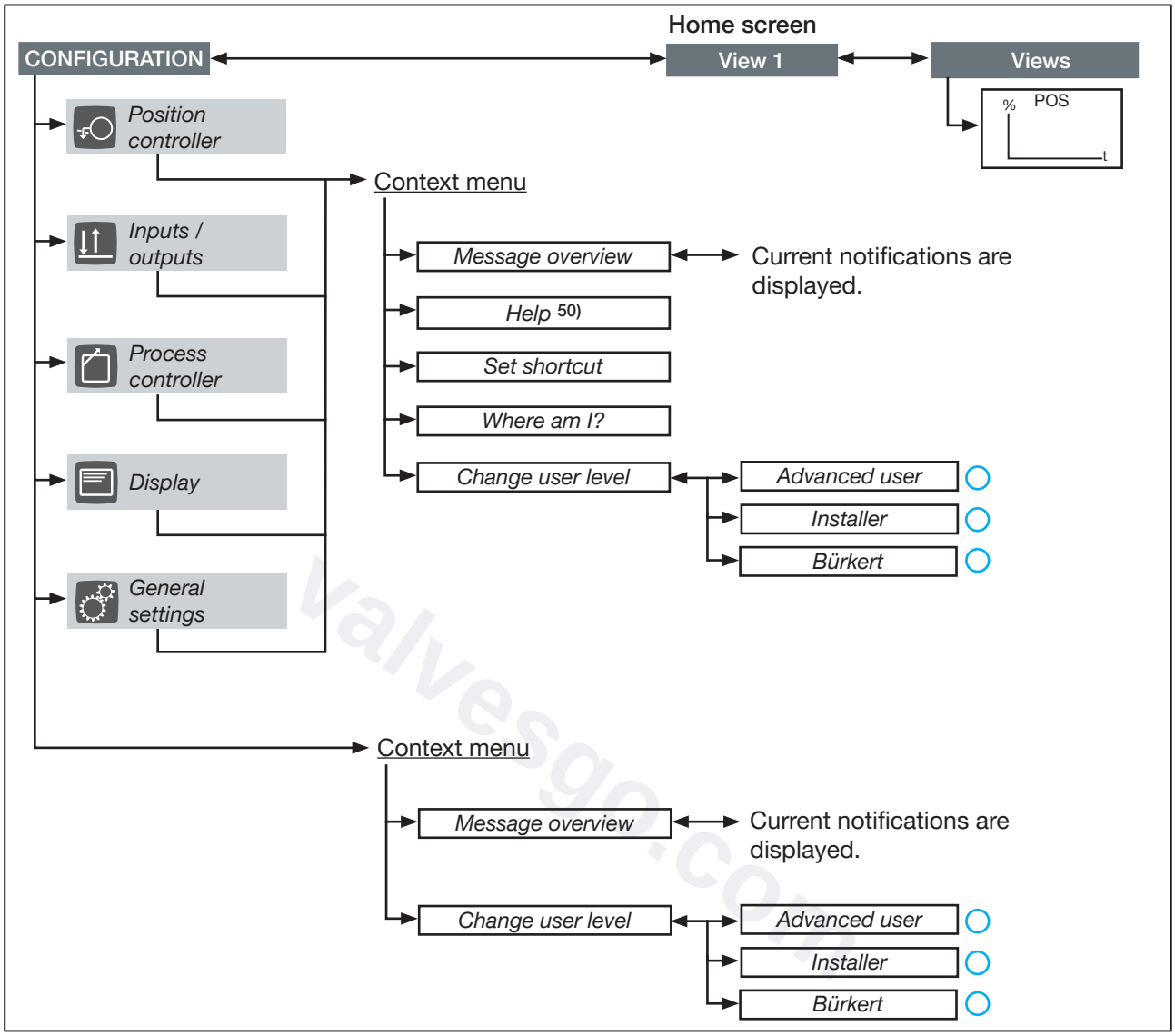

Image 90: Operating structure – 7, context menu in configuration area

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7) Only available in devices with process control function

46) Not available for the layout **process control**. With set layout **2 values** or **4 values**, a submenu for assigning the value to be changed is displayed.

47) During process control, the selection depends on the physical unit of the process control (**Process controller** → **UNIT**) and the value selected to be shown on the display (Context menu → **Change value**).

48) Not available for layout **Trend**, **Trend with 2 values** or **Process Control**. With set layout **2 values** or **4 values**, a submenu for assigning the value to be changed is displayed.

49) Not constantly available.

50) Only available in configuration area **Position controller**, **Inputs/outputs** and **Process controller**.

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18 INDUSTRIAL ETHERNET

To allow connection to an Ethernet network, an electromotive valve with integrated fieldbus gateway is optionally available.

Supported fieldbus protocols: EtherNet/IP, PROFINET, Modbus TCP, EtherCAT.

18.1 Fieldbus gateway description

The fieldbus gateway for Industrial Ethernet is connected using 4-pin M12 circular plug-in connectors. “10.2 Electrical connection fieldbus gateway”

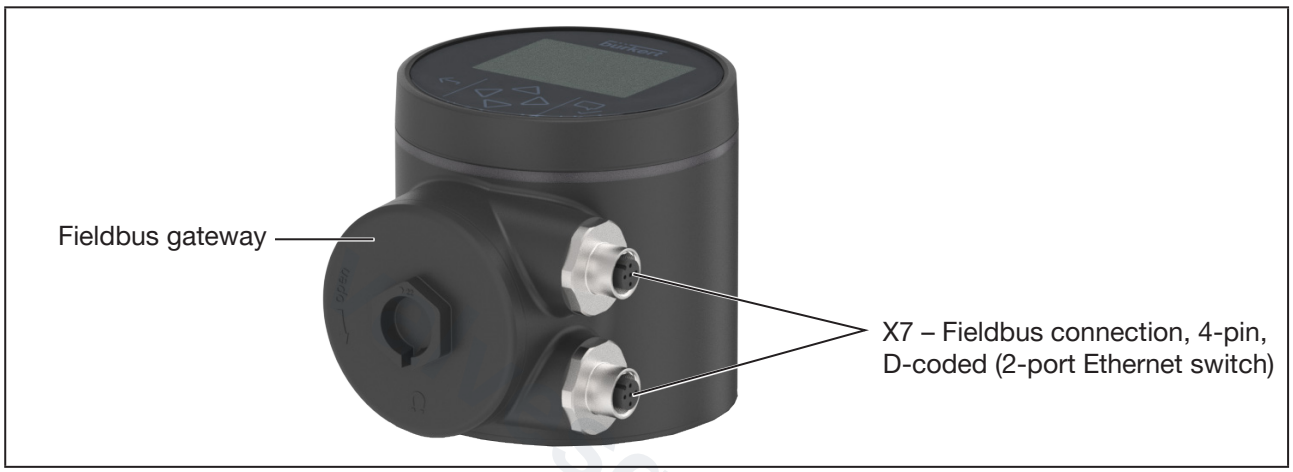

Image 91: Fieldbus gateway with display module

18.1.1 LEDs for indicating network connection status

The LEDs for indicating network connection status are located inside the fieldbus gateway.
To access it, turn the cover counterclockwise.

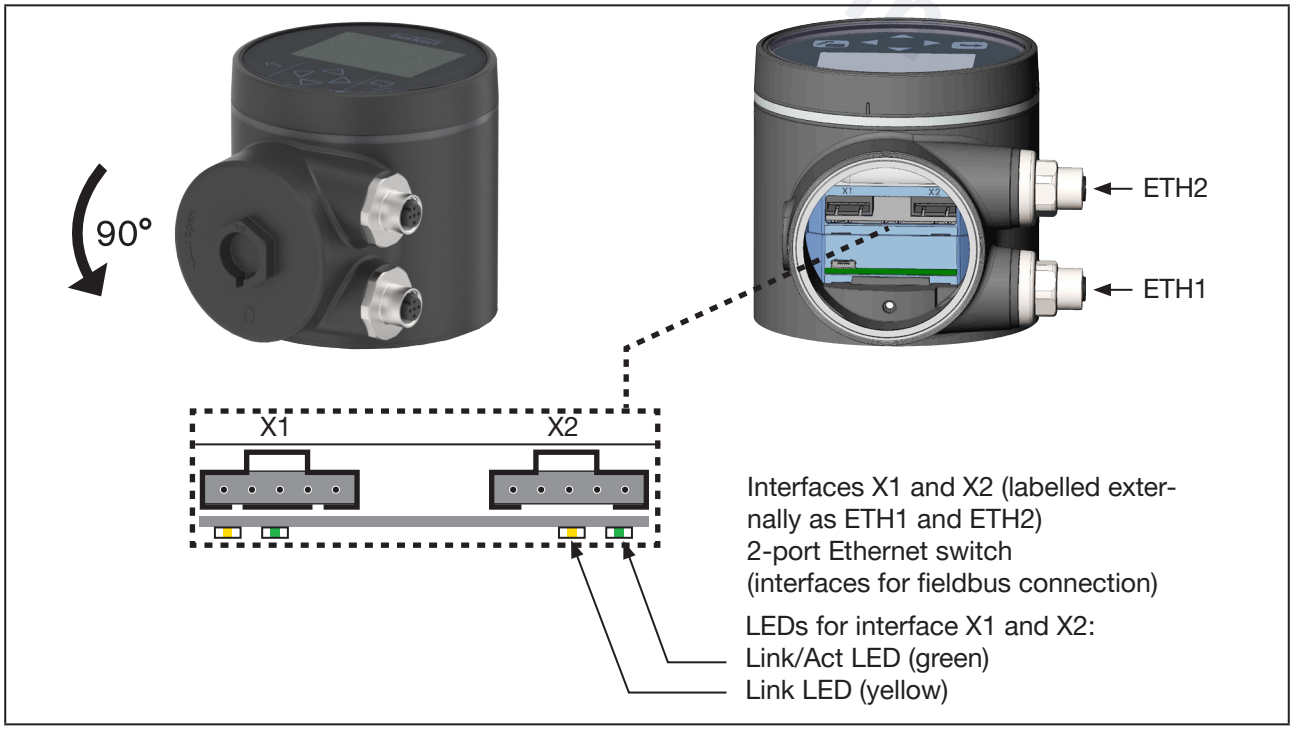

Image 92: LEDs for indicating network connection status

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LED	Colour	State	Description
Link	**LED green**		
	green	on	The device has an Ethernet connection
	off	off	The device has no Ethernet connection
Act	**LED yellow**		
	yellow	flickering	The device is sending/receiving Ethernet frames
	off	off	The device is not sending/receiving any Ethernet frames

Table 41: LED status indicators for EtherNet/IP, PROFINET and Modbus TCP

LED	Colour	State	Description
Link	**LED green**		
	green	on	The device has a connection to the Ethernet, and is not sending or receiving any Ethernet frames
	green	flickering	The device has a connection to the Ethernet, and is sending or receiving Ethernet frames
	off	off	The device has no Ethernet connection
Act	**LED yellow**		
	off	off	LED is not used

Table 42: LED status indicators for EtherCAT

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18.2 Technical data for Industrial Ethernet

18.2.1 PROFINET IO specifications

Topology recognition	LLDP, SNMP V1, MIB2, Physical Device
Minimum cycle time	10 ms
IRT	not supported
MRP media redundancy	MRP client is supported
Additional supported features	DCP, VLAN Priority Tagging, Shared Device
Transmission speed	100 MBit/s
Data transport layer	Ethernet II, IEEE 802.3
PROFINET IO specification	V2.45
(AR) Application Relations	The device can simultaneously process up to 2 IO ARs, 1 Supervisor AR, and 1 Supervisor DA AR.

18.2.2 EtherNet/IP specifications

Pre-defined standard objects	Identity Object (0x01)
	Message Router Object (0x02)
	Assembly Object (0x04)
	Connection Manager (0x06)
	DLR Object (0x47)
	QoS Object (0x48)
	TCP/IP Interface Object (0xF5)
	Ethernet Link Object (0xF6)
DHCP	supported
BOOTP	supported
Transmission speed	10 and 100 MBit/s
Duplex modes	Half duplex, full duplex, auto-negotiation
MDI modes	MDI, MDI-X, Auto-MDIX
Data transport layer	Ethernet II, IEEE 802.3
Address Conflict Detection (ACD)	supported
DLR (ring topology)	supported
Integrated switch	supported
CIP reset service	Identity Object Reset Service types 0 and 1

18.2.3 Modbus TCP specifications

Modbus function codes	1, 2, 3, 4, 6, 15, 16, 23
Operation mode	Message mode: Server
Transmission speed	10 and 100 MBit/s
Data transport layer	Ethernet II, IEEE 802.3

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18.2.4 EtherCAT Specifications

Acyclic communication (CoE)	SDO SDO Master-Slave SDO Slave-Slave (depending on master capacity)
FMMUs	8
Sync managers	4
Transmission speed	100 MBit/s
Data transport layer	Ethernet II, IEEE 802.3
Station alias	supported

18.3 Projecting via fieldbus

For project planning, you need the suitable start-up file for the respective fieldbus protocol.

Fieldbus	Start-up file
EtherNet/IP	EDS file
PROFINET	GSDML file
Modbus TCP	not required
EtherCAT	ESI file

The start-up files required for the respective project planning software and their description are available on the Internet.

Download at:
www.burkert.com / Type 3360, 3361 / Downloads “Software” / Device Description Files

Please refer to the documentation of your project design software for instructions regarding the installation of the start-up files.

18.3.1 Setting the Ethernet parameters for EtherNet/IP, PROFINET, Modbus TCP

With Modbus TCP, it is essential to configure all Ethernet parameters, including the default gateway.

Setting option:
Using the Bürkert Communicator software, using the web server or on the display of the device (option).

Settings are created on the PC using the büS service interface and the Bürkert Communicator software. It requires the USB büS interface set available as an accessory.

Display operation: button functions

Select, activate	Confirm	Back

To set the Ethernet parameters, you must switch to the “Parameters for Industrial Communication” detailed view.

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How to switch to the detailed view:

→ For setting with Bürkert Communicator, select **Industrial Communication** in the navigation area.

→ When using the display for the configuration, switch to **CONFIGURATION** on the home screen and select **Industrial Communication**.

✔ You are now in the “Parameters” detailed view.

The Ethernet parameters can only be set when the corresponding fieldbus protocol has been selected. **Parameter** → **Protocol settings**→ **Protocol** → Select protocol.

Setting the Ethernet parameters:

→ **Select Protocol settings**.

→ Select **Protocol** and set the desired fieldbus protocol.

Settings:

→ **Select IP settings** and create settings.

- **DNS compatible name** can only be set with PROFINET. Factory default setting: do not discard
- **Fixed IP address** Factory default setting: 192.168.0.100
- **Network mask** Factory default setting: 255.255.255.0
- **Standard gateway** Factory default setting: 192.168.0.1.

With PROFINET, the factory default settings for the IP address, subnet mask and default gateway are 0.0.0.0.
These settings can normally be assigned by the relevant PROFINET programmable logic controller.

Setting for EtherNet/IP fieldbus protocol:

→ **Select IP settings**.

→ Select **IP operation mode** and set the desired operation mode. Factory default setting: **Fixed IP address**.

The EtherCAT addressing runs by default via the physical connection to the EtherCAT port. If required, and if set on the controller, the station alias of the gateway can also be set. The station alias can be set via the relevant EtherCAT master or via the Bürkert Communicator.

(Protocol name) > **Parameters** > **EtherCAT settings** > **Station Alias** or Wizard

→ Enter address. Valid addresses: 0 to 65536.

If an address outside the valid range has been set, the device will issue an error message.

✔ You have set the Ethernet parameters to connect the device to the PLC network.

The complete Industrial Communication menu is described in the separate software manual.

Download at: www.burkert.com / Type 3360, 3361 / Downloads “Operating instructions” / Software manual Type 3360...

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18.4 Web server

The configuration of the Ethernet participant, required to connect to the network, can be run with a web server, with the exception of EtherCAT.
The IP address of the device is used for access via the web server.

NOTE

Unauthorised access to the web server.

► To prevent unauthorised access by third parties, operate the device only within a protected network.

18.4.1 Function of the web server

The web server can be used to specify a number of settings (such as the IP address).

The web server displays basic device information such as the identification number, serial number, device type, etc. It also displays all of the device's cyclical process data.

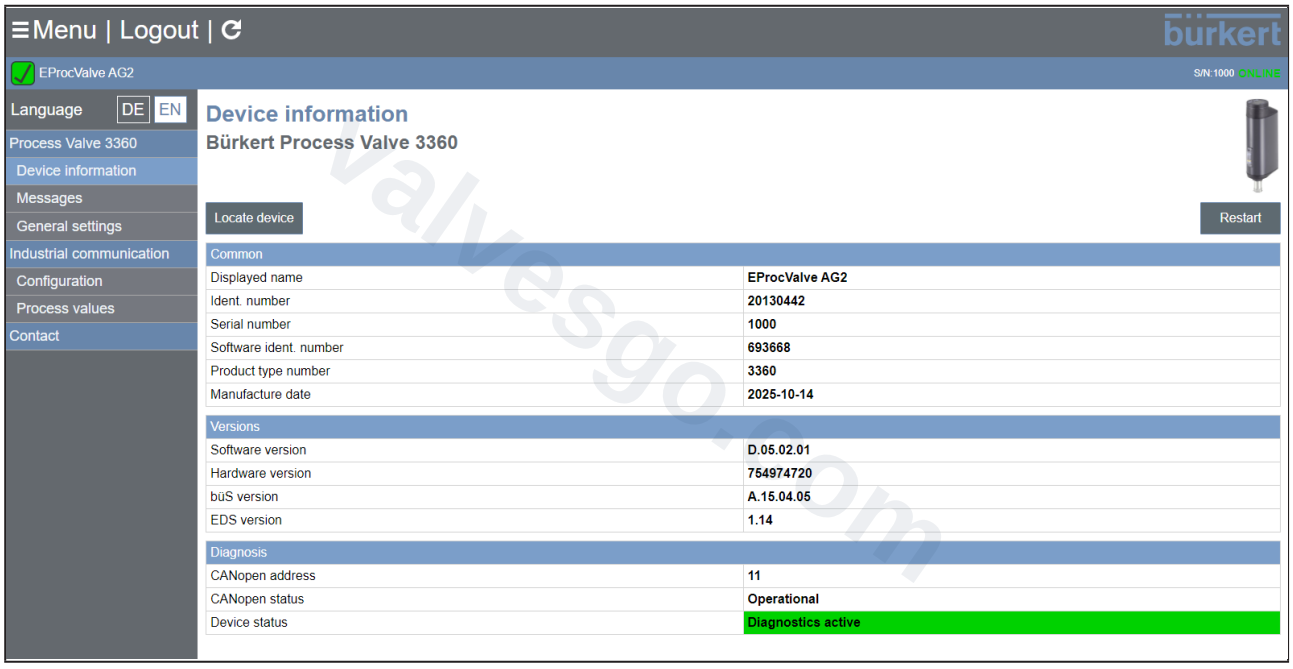

Image 93: Web server device information view (example: 3360)

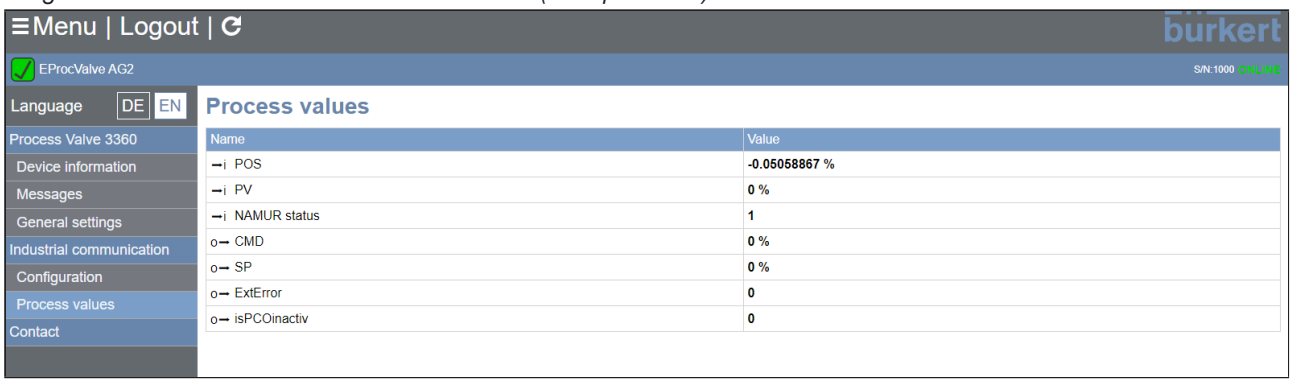

Image 94: View web server process values (example 3360)

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18.4.2 Connecting to the web server

→ The web server can be enabled or disabled via Bürkert Communicator.

→ Only for PROFINET: Assign IP addresses and DNS-compatible name with a suitable start-up tool for PROFINET attachments.

→ Set IP address in the PC network card.
IP address: **192.168.0.xxx**
For xxx, enter any numerical value other than 100
(100 is occupied by the IP address of the Ethernet participant by default).

→ Connect the PC with a network cable to the Ethernet participant.

18.4.3 Access to the web server

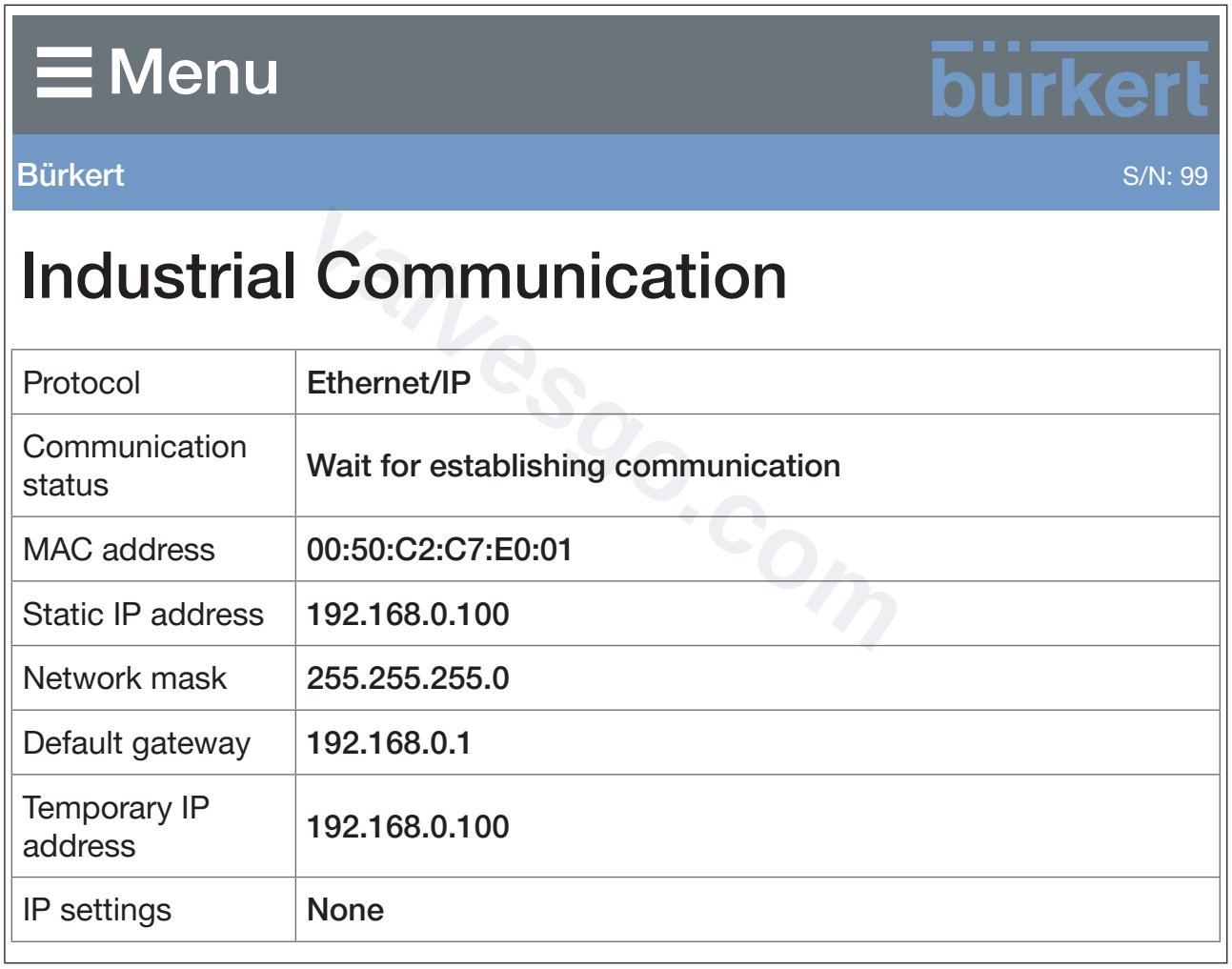

Image 95: Access to the web server via the default IP

With EtherNet/IP, DHCP or BOOTP can also be set (NOT by default).
In this process, the IP address is acquired from a DHCP server.

→ Open an internet browser.

→ Enter default IP **192.168.0.100**.
(On EtherNet/IP devices, the IP address is assigned by a DHCP server. If no address is assigned via DHCP within 1 minute, the device uses the default IP 192.168.0.100.)

The software for configuring the Ethernet participant is now available on the PC.

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Configuration of multiple devices:

On delivery, all devices have the same IP address (192.168.0.100 or 0.0.0.0 for PROFINET). So that the device can be identified for configuration, only 1 unconfigured device may be on the network.

- Successively connect the devices (Ethernet participants) to the network individually and configure them.

18.4.4 Configuring Ethernet participants

Logging onto the web server:

→ Enter your user name and password .

Username: **admin**
Password: **admin**

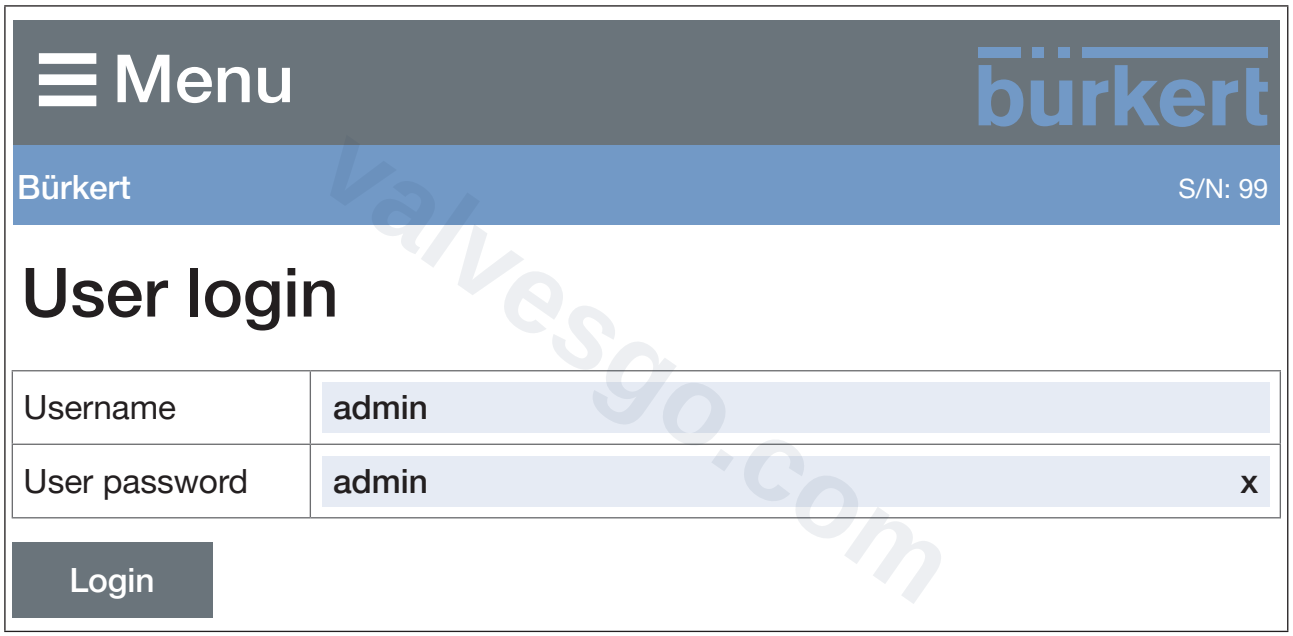

Image 96: Logging onto the system

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Configuration:

→ Enter the device name and IP address for the Ethernet participant.
The device name assigned here is used later during project planning (e.g. under STEP 7).

→ Confirm with Commit changes.

→ Conduct a power reset of the Ethernet participant to incorporate the changed parameters.

→ Restart the device with Restart device.

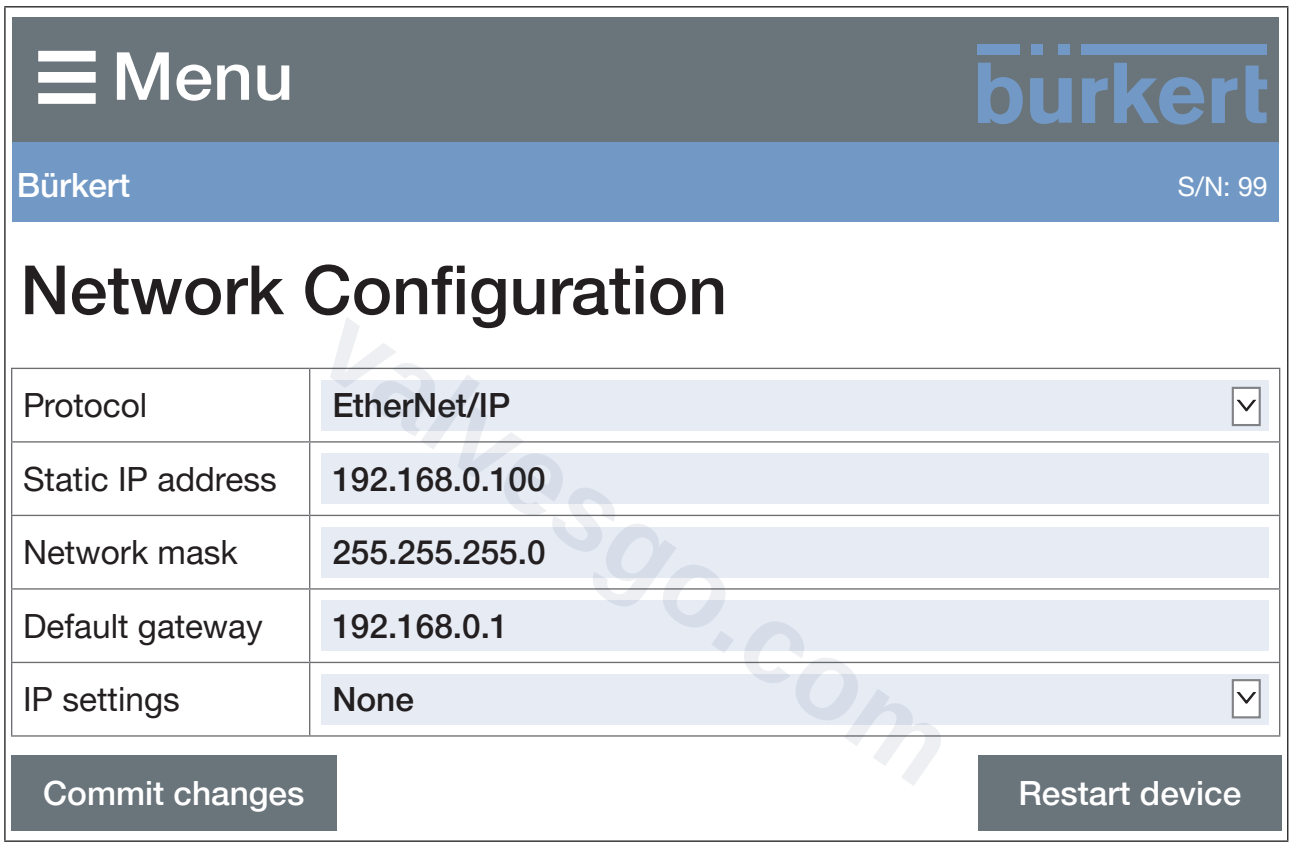

Image 97: Configuring Ethernet participants

18.5 Passwords

NOTE

Security risk due to standard passwords.

Unauthorised persons can log in to the web server and make changes to the system.

- Please change standard passwords.
- If the web server is not needed, disable access via Bürkert Communicator:
  Web Server > Parameters > Disable web server.

The username and password are set to **admin** at the factory. These settings are reset to the default values when the passwords are reset.

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18.5.1 Change password

→ Logging onto the web server.

→ Enter and confirm the new password in the menu General settings.

18.5.2 Factory reset of password

→ Click on Login.

→ On the bottom right of the login window, click on Reset passwords.

The device must be rebooted within 3 minutes in order for the passwords to be reset. A restart can be triggered via the fieldbus gateway display, the Bürkert Communicator software or via a voltage reset.

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19 CANopen

For electrical installation of devices with CANopen network:
refer to chapter “10.1 Electrical installation with circular plug-in connector” for description.

19.1 Projecting via fieldbus

For project planning, you need an EDS file as a start-up file for CANopen.

The EDS file and the associated description are available on the Internet.

Download at:
www.burkert.com / Type 3360, 3361 / Downloads “Software” / Device Description Files

Please refer to the documentation of your project design software for instructions regarding the installation of the start-up files.

19.2 CANopen network configuration

Instructions for the network configuration based on the CANopen protocol are available on the Internet.

Download at:
www.burkert.com / Type 3360, 3361 / Downloads “Operating instructions” /
“Software instructions | CANopen network configuration”

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20 büS

Definition: the term “büS” (Bürkert System buS) refers to the communication buS developed by Bürkert, based on the CANopen protocol.

For electrical installation of devices with büS network:
refer to chapter “10.1 Electrical installation with circular plug-in connector” for description.

20.1 Cabling of büS networks

Further information on cabling for büS networks can be found by searching for “cable guidelines” on our website: country.burkert.com

20.2 Configuration of büS networks

Additional information about the configuration of büS networks can be found on the Internet.

Download at:
www.burkert.com / Type 8922 / Downloads / User Manuals / Software instructions Type 8922, MExx | Software of f(x) configuration

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21 MAINTENANCE

The maintenance work is described in the separate service instructions. These instructions can be found on our homepage at: https://country.burkert.com/ → Type 3360, 3361.

21.1 Safety instructions

DANGER!

Risk of injury due to high pressure in the system or device.

- Switch off the pressure before working on the system or device. Vent or empty the lines.

Risk of injury from electric shock.

- Switch off the power supply before working on the device or system. Secure against reactivation.
- Observe the applicable accident prevention and safety regulations for electrical devices!

WARNING!

Risk of injury due to improper maintenance work.

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

21.2 Actuator

When used in accordance with these operating instructions, the electromotive actuator is maintenance-free.

21.3 Wearing parts of the valve

Parts which are subject to natural wear are:

- Seals
- Control cone

→ If there is a leak, replace the respective wearing part with a corresponding spare part. (For spare part sets and assembly tools see chapter "24 Accessories, wearing parts").

Replacement of the wearing parts is described in the separate service instructions.

These instructions can be found on our website at: country.burkert.com → Type 3360, 3361.

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21.4 Visual inspection

According to the usage conditions, perform regular visual inspections:

→ Check medium ports for tightness.

→ Check relief bore on the pipe for leaks.

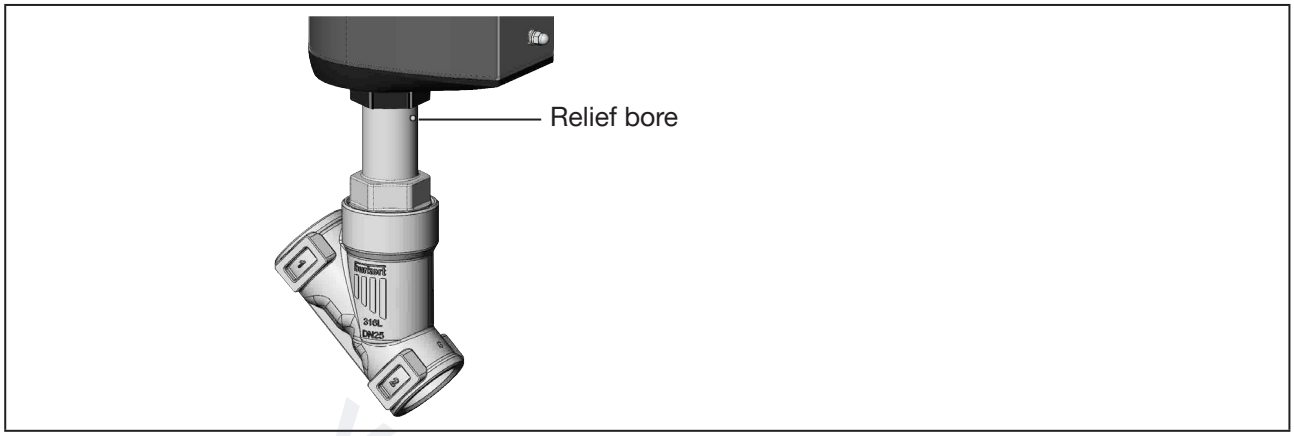

Image 98: Relief bore

21.5 Maintenance notifications

Maintenance notifications are displayed in the following LED operation modes:

- Valve mode + warnings (factory pre-set).
  The LED light ring alternatingly flashes blue and the colour indicating the valve position.
- NAMUR operation mode.
  The LED light ring is glowing blue.

If the LED mode is set to “valve mode”, maintenance notifications are not displayed.

Message	Device behaviour	Action
The capacity of the energy storage is strongly decreased. The energy storage must be replaced soon.	Maintenance notification.	The SAFEPOS energy-pack must be promptly replaced before the end of its service life.

Table 43: Maintenance notifications

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22 TROUBLESHOOTING AND MESSAGES

22.1 Error notifications

Device error notifications are displayed as follows:

- Valve mode
  The LED light ring alternatingly flashes red and the colour indicating the valve position.
- Valve mode + warnings (factory pre-set).
  The LED light ring alternatingly flashes red and the colour indicating the valve position.
- NAMUR operation mode.
  The LED light ring is glowing red.

Message	Description	Device behaviour	Action
Motor temperature is too high. Motor is moving to the safety position.	Too much friction in the actuator train for operation.	Error notification. Actuator is moving to the safety position.	Contact Bürkert service.
Motor temperature is too high. Motor is idling to prevent thermal damage.	Too much friction in the actuator train for operation.	Error notification. Motor switches off. Actuator remains in place. MANUAL operating state not possible.	Contact Bürkert service.
Excess temperature detected.	Device temperature too high for operation.	Error notification. Actuator is moving to the safety position. MANUAL operating state possible.	Reduce ambient temperature. Contact Bürkert Service if problem persists.
Low temperature detected.	Device temperature too low for operation.	Error notification. Actuator is moving to the safety position. MANUAL operating state possible.	Increase ambient temperature.
Overvoltage detected. (AG2) Overvoltage in actuator supply detected (AG3)	Supply voltage too high for device operation.	Error notification. Actuator is moving to the safety position. MANUAL operating state possible.	Check supply voltage.
Undervoltage detected. (AG2) Undervoltage actuator supply detected (AG3)	Supply voltage failure, or supply voltage too low for device operation.	Error notification. Actuator is moving to the safety position. MANUAL operating state not possible.	Check supply voltage. Contact Bürkert Service if problem persists.
Motor current too high.	Increased friction in the actuator train or incorrect detection of the end positions.	Error notification. Motor switches off. Actuator remains in place. MANUAL operating state not possible.	Carry out the X.TUNE function. Contact Bürkert Service if problem persists.
Motor peak current too high.	Increased friction in the actuator train or incorrect detection of the end positions.		

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Message	Description	Device behaviour	Action
Internal error: Hall sensor signal error.	Signal failure of the position sensor.	Error notification. Actuator is moving to safety position. MANUAL operating state not possible.	Contact Bürkert service.
Internal error: …	Internal error in the device.	Error notification. Actuator is moving to the safety position.	Contact Bürkert service.
CMD/SP cable break.	Cable break in the set-point value signal.	If device is configured accordingly: error notification. Actuator is moving to the safety position.	Check signal line of set-point value.
PV cable break.	Cable break of the process actual value signal.	If device is configured accordingly: error notification. Actuator is moving to the safety position.	Check signal line of process actual value.
Persistent memory unusable: defective or not available.	Reading or writing error of internal data storage EEPROM.	Error notification. Actuator is moving to the safety position	Restart the device. Contact Bürkert Service if problem persists.
BüS event: producer(s) not found.	Assigned external büS/CANopen producer cannot be found.	Error notification. Actuator is moving to the safety position.	Check signal to büS/CANopen partner.
BüS event: bus connection lost/not available.	büS/CANopen network cannot be found.	Error notification. Actuator is moving to the safety position.	Check büS/CANopen network.
BüS event: producer is not operational.	Producer not operational in this state.	Error notification. Actuator is moving to the safety position.	Check büS/CANopen producer.
BüS event: a device is using the same address.	Another büS/CANopen participant is using the same address.	Error notification. Actuator is moving to the safety position.	Assign a unique address to the device and büS/CANopen participant.
No correct connection to the process control system.	No connection to the process control system.	Error notification. Actuator is moving to the safety position.	Check connection to the process control system.
Energy storage must be replaced.	Storage capacity of the energy storage system is too low. Assumption of the safety position cannot be guaranteed.	Error notification. Actuator is moving to the safety position.	Replace energy storage SAFEPOS energy-pack.
No energy storage available.	Energy storage SAFEPOS energy-pack not detected.	Error notification. Actuator is moving to the safety position.	Check whether the SAFEPOS energy-pack is correctly installed.

Table 44: Error notifications

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22.2 Notifications on device status “Out of specification”

Notifications on device status “Out of specification” are displayed in the following LED operation modes:

- Valve mode + warnings (factory pre-set).
  The LED light ring alternatingly flashes yellow and the colour indicating the valve position.
- NAMUR operation mode.
  The LED light ring is glowing yellow.

In LED mode “valve mode”, notifications on the device status “Out of specification” are not displayed.

Message	Description	Device behaviour	Action
Motor temperature is high.	Increased friction in the actuator train.	Notification “Out of specification”	Contact Bürkert Service if problem persists.
Temperature warning limit exceeded.	Ambient temperature too high or increased friction in actuator train.	Notification “Out of specification”	Reduce ambient temperature. Contact Bürkert Service if problem persists.
Temperature warning limit undershot.	Ambient temperature is too low.	Notification “Out of specification”	Increase ambient temperature
Voltage warning limit exceeded. (AG2) Voltage of actuator supply is above the warning limit (AG3)	Supply voltage is too high.	Notification “Out of specification”	Check supply voltage.
Voltage warning limit undershot. (AG2) Voltage of actuator supply is below the warning limit (AG3)	Supply voltage is too low.		
CMD/SP cable break.	Cable break in the set-point value signal.	If device is configured accordingly: message on “Out of specification” status.	Check signal line of set-point value.
PV cable break	Cable break of the process actual value signal.	If device is configured accordingly: message on “Out of specification” status.	Check signal line of process actual value.

Table 45: Notifications on device status “Out of specification”

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22.3 Notifications on device status “Function check”

Notifications on device status “Function check” are displayed in the following LED operation modes:

- Valve mode + warnings (factory pre-set).
  The LED light ring alternatingly flashes orange and the colour indicating the valve position.
- NAMUR operation mode.
  The LED light ring is glowing orange.

In LED mode “valve mode”, notifications on the device status “Function check” are not displayed.

Message	Description	Device behaviour	Action
MANUAL operating state active.	Device is in the MANUAL operating state.	Notification “Function check”.	Switch to AUTOMATIC operating state.
Process simulation active	Device is in simulation mode: process values are simulated.	Notification “Function check”.	Switch off process simulation.
Signal generator active	Devices is in simulation mode: input signals are simulated.	Notification “Function check”.	Switch off signal generator.
X.TUNE active	X.TUNE function is running (adaption of position control).	Notification “Function check”.	Wait until the X.TUNE function is exited.
P.TUNE active	P.TUNE function is running (adjustment of process control).	Notification “Function check”.	Wait until the P.TUNE function is exited.
P.LIN active	P.LIN function is running (linearisation of process characteristic).	Notification “Function check”.	Wait until the P.LIN function is exited.
External CMD not assigned.	“büS” is set as the source of the input signal. Missing assignment of the external büS/ CANopen partner.	Notification “Function check”.	Assign an external büS/ CANopen fieldbus consumer or set a different source. Setting the input signal: In the “inputs/outputs” configuration area.
External SP not assigned.			
External PV not assigned.			
External isPCOextern not assigned.			
External ExtError not assigned.			

Table 46: Notifications on device status “Function check”

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23 CLEANING

ATTENTION!

Do not use alkaline cleaning agents to clean the surfaces of the device.

The resistance to cleaning agents and material compatibility of the external components with standard Ecolab products have been tested and certified in accordance with Ecolab test method:
F&E/P3-E No. 40 – 1.

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24 ACCESSORIES, WEARING PARTS

CAUTION!

Risk of injury and/or damage due to incorrect parts.

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

▸ Use only original accessories and original wearing parts from Bürkert.

You can find wearing parts and assembly tools under the following link (device identification number required):
Wearing parts and assembly tools

Further information on cabling for büS networks can be found by searching on “cable guidelines” on our website: country.burkert.com

To ensure that your device complies with regulatory requirements, special accessories may be required. You can find further information on this in the regulatory documentation.

Accessories	Order number
Connection cable with M12 socket, 4-pin, (length 5 m) for operating voltage AG2 (without communication) for X3	00918038
Connection cable with M12 socket, 8-pin, (length 2 m) for input and output signals for X1	00919061
Connection cable with M12 plug, 5-pin, (length 2 m) for input signals for the process actual value (only for variant with process controller) for X2	00559177
Connection cable with M12 socket, 5-pin, (length 5 m) for operating voltage AG3 (without communication) for X4	20010840
M12 circular plug with cable, 4-pin. D-coded to straight M12 connector, cable length: 5 m, for X7, fieldbus connection	00775043
M12 circular plug with cable, 4-pin. D-coded RJ45 connector, cable length: 5 m, for X7, fieldbus connection	00775053
USB-büS interface set:	
USB büS interface set 1 (includes power supply unit, büS stick, terminating resistor, Y-distributor, 0.7 m cable with M12 plug)	00772426
USB büS interface set 2 (includes büS stick, terminating resistor, Y-distributor, 0.7 m cable with M12 plug)	00772551
büS adapter for büS service interface (M12 to micro-USB büS service interface)	00774931
büS cable extensions from M12 plug to M12 socket	
Connection line, length 1 m	00772404
Connection line, length 3 m	00772405
Connection line, length 5 m	00772406
Connection line, length 10 m	00772407
Bürkert Communicator Type 8920	Info at country.burkert.com
SIM card	00291773
Holding device for port connection DN15–DN20	00693770
Holding device for port connection DN25–DN50	00693771

Table 47: Accessories

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24.1 Communication software

The Bürkert Communicator software is designed for communication with Bürkert devices.

A detailed description of the installation and operation of the software can be found in the associated operating instructions.

Download the software from: country.burkert.com

24.1.1 büS service interface

The device is equipped with the büS service interface for communicating with the PC. Communication takes place via a USB interface on the PC and the USB büS interface, which is available as an accessory (see "Table 47: Accessories").

25 DISASSEMBLY

25.1 Safety instructions

DANGER!

Risk of injury due to high pressure and escaping medium.

If the device is pressurised while being disassembled, there is a risk of injury due to sudden depressurisation and medium discharge.

- Turn off the pressure before dismantling the device. Vent or empty the lines.

CAUTION!

Risk of injury due to a heavy device.

During transportation or installation work, the device may fall down and cause injuries.

- Transport, install and remove heavy device with the aid of a second person only.
- Use suitable tools.

ATTENTION!

Installing in the AUTOMATIC operating state will damage the device.

Devices that are installed while they are in the AUTOMATIC operating state may be irreparably damaged.

- If devices are to be re-used, set the MANUAL operating state before they are removed.

→ If the device is to be re-used, set the MANUAL operating state.

→ Disconnect the electrical connection.

→ Dismantle the device.

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26 PACKAGING AND TRANSPORT

ATTENTION!

Damage due to transport.

Inadequately protected devices may be damaged in transit.

- Use shock-resistant packaging to protect the device against moisture and dirt during transport.
- Avoid storage above or below the permitted storage temperature.

CAUTION!

Risk of injury due to a heavy device.

During transportation or installation work, the device may fall down and cause injuries.

- ▸ Transport, install and remove heavy device with the aid of a second person only.
- ▸ Use suitable tools.

27 STORAGE

ATTENTION!

Incorrect storage may damage the device.

- Protect the device against moisture and dirt in the original packaging during transportation and storage.
- Avoid UV radiation and direct sunlight.
- Protect connections, if present, from damage with protective caps.
- Observe the permitted storage temperature -40…+70 °C.

28 DISPOSAL

Environmentally friendly disposal

- ▸ Follow national regulations regarding disposal and the environment.
- ▸ Collect electrical and electronic devices separately and dispose of them as special waste.

Further information can be found online at
country.burkert.com

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