

Type ME44 I/O module

4AI module
4AO module
8DI module
8DO module



Operating instructions

Subject to technical changes.

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Operating Instructions 2407/04_EU-ML_00815355 / Original DE

I/O module Type ME44

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1 OPERATING INSTRUCTIONS

The operating instructions describe the entire life cycle of the device. Keep these instructions ready to hand at the operation site.

Important safety information!

- ▶ Carefully read these instructions.
- ▶ Above all, observe the safety instructions, intended use and usage conditions.
- ▶ Persons who work on the device must read and understand these instructions.

1.1 Symbols



CAUTION!

Warns of a potential danger.

- ▶ Failure to observe may result in moderate or minor injuries.

NOTE!

Warns of damage.

- ▶ Failure to observe may result in damage to the device or the system.



Indicates important additional information, tips and recommendations.



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

- ▶ Designates instructions to avoid a danger.
- Designates a procedure which you must carry out.
- ✓ Designates a result.
- MENU** Symbol for software interface texts.

1.2 Definition of terms

Term	in these instructions stands for
Device, I/O module	I/O module Type ME44
büS	Bürkert system bus; a communication bus developed by Bürkert, based on the CANopen protocol

2 INTENDED USE

The I/O module Type ME44 collects, converts and compares physical measurement data from external sensors or receives switching commands from bÜS participants via the bÜS interface. These measurement data or these switching commands are relayed to external actuators or to bÜS participants via the bÜS interface.

- ▶ Install the device in a suitable control cabinet or housing. The control cabinet or the housing must at least have IP54 degree of protection.
- ▶ Use the device only as intended. Non-intended use of the device may be dangerous to people, nearby equipment and the environment.
- ▶ Use the device only in conjunction with third-party devices and components recommended or approved by Bürkert.
- ▶ Only operate the device when it is in perfect condition.
- ▶ Prerequisites for safe and trouble-free operation are correct transportation, correct storage, installation, start-up, operation and maintenance.
- ▶ To use the device, observe the permitted data, operating conditions and usage conditions. These specifications can be found in the contract documents, the operating instructions and on the type label.

3 BASIC SAFETY INSTRUCTIONS

These safety instructions do not take into account any unforeseen circumstances or events that occur during installation, operation and maintenance. The operator is responsible for observing the location-specific safety regulations, also with reference to personnel.



General hazardous situations.

To prevent injuries, observe the following:

- ▶ Do not modify the device.
- ▶ Do not mechanically load the device.
- ▶ Secure the device or system to prevent unintentional activation.
- ▶ Only trained technicians may perform installation and maintenance work.
- ▶ Install the device according to the regulations applicable in the respective country.
- ▶ After an interruption in the power supply, ensure that the process is restarted in a controlled manner.
- ▶ Observe the general rules of technology.

NOTE!

Electrostatically sensitive components and assemblies.

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

- ▶ Meet the requirements specified by EN 61340-5-1 to minimise or avoid the possibility of damage caused by sudden electrostatic discharge.
- ▶ Do not touch electronic components when the supply voltage is connected.
- ▶ Cap all unused electrical interfaces with covers.

4 GENERAL NOTES

4.1 Contact address

Germany

Bürkert Fluid Control Systems
Sales Centre
Christian-Bürkert-Str. 13–17
D-74653 Ingelfingen
Tel. +49 (0) 7940 - 10-91 111
Fax +49 (0) 7940 - 10-91 448
Email: info@burkert.com

International

On the Internet under: country.burkert.com

4.2 Warranty

A precondition for the warranty is that the device is used as intended in consideration of the specified usage conditions.

4.3 Information on the Internet

Operating instructions and data sheets for the Bürkert products can be found on the Internet at:

country.burkert.com

5 PRODUCT DESCRIPTION

The I/O module type ME44 receives measurement data from external sensors and inputs, converts them, and forwards them to external actuators or bÜS participants and gateways to controllers, and is also capable of issuing data from controllers or bÜS participants.

The I/O module Type ME44 is available in the following variants:

- 4AI module with 4 analog inputs
- 4AO module with 4 analog outputs
- 8DI module with 8 digital inputs
- 8DO module with 8 digital outputs

5.1 Possible combinations

The I/O module Type ME44 can be used as part of a system in combination with other modules. To assemble a system consisting of multiple modules, contact your Bürkert sales department.

Example of a system at the minimum configuration level:

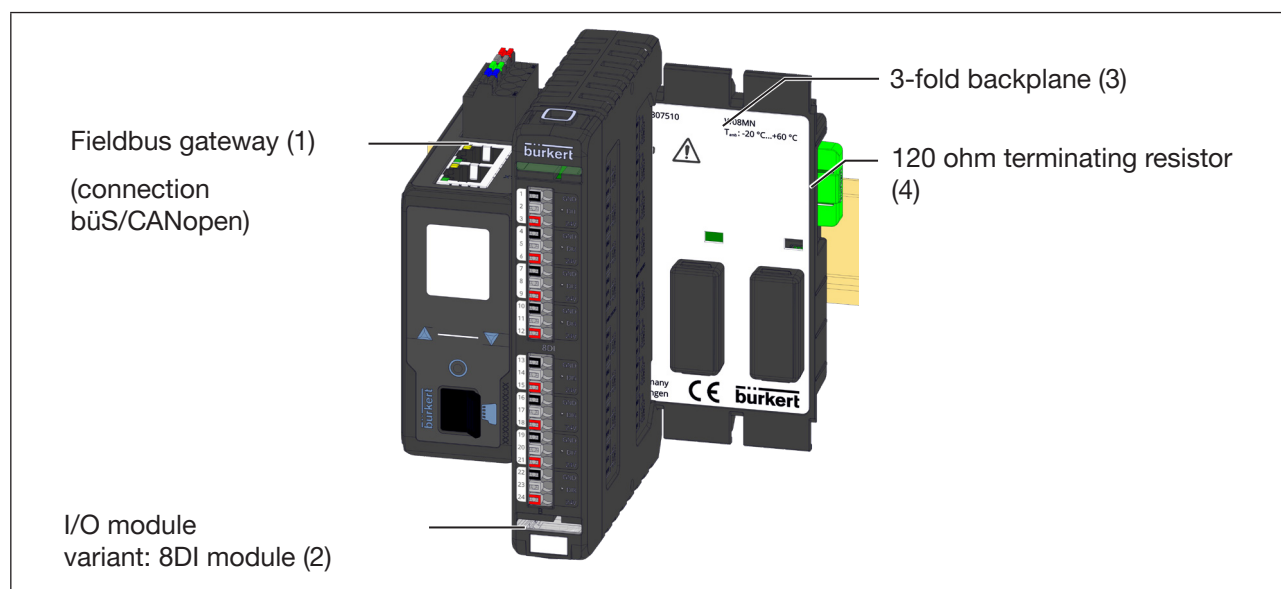


Fig. 1: Example: System with I/O module Type ME44 at minimal configuration level

Module	Designation	Types
1	Fieldbus gateway (connection bÜS/CANopen)	ME43
2	I/O module:8DI module (or 4AI, 4AO, 8DO module)	ME44
3	3-fold backplane	BPX3
4	120 ohm terminating resistor	ME43

Tab. 1: Example: minimum configuration level for a system with I/O module Type ME44

Maximum configuration level for I/O modules Type ME44

Quantity	Modules
3	3 x backplane BPX3, one for each of the 3 Type ME44 I/O modules
9	Type ME44 I/O modules

Tab. 2: Maximum configuration level for a system with I/O module Type ME44

6 TECHNICAL DATA



The following values are indicated on the type label:

- ▶ supply voltage
- ▶ Permitted ambient temperature range

6.1 Conformity

The device conforms to the EU directives as per the EU Declaration of Conformity (if applicable).

6.2 Standards

The applied standards, which are used to demonstrate conformity with the directives, are listed in the EU type examination certificate and/or the EU Declaration of Conformity (if applicable).

6.3 Operating conditions

NOTE!

Malfunction due to heat and heavy frost

- ▶ Do not use the device outside the permitted temperature range.

Permitted ambient temperature: $-20\text{ °C} \dots +60\text{ °C}$
 Relative air humidity: 90% up to 60 °C (non-condensing)
 Operating altitude: Up to 2000 m above sea level

6.4 Mechanical data

Dimensions

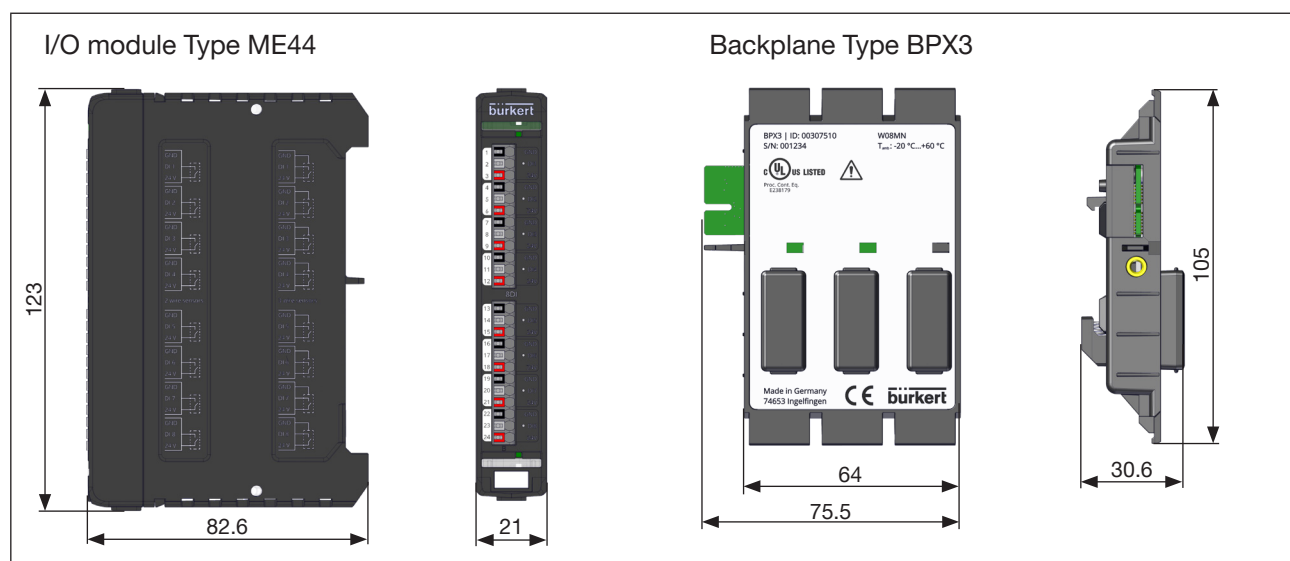


Fig.2: Dimensions of I/O module Type ME44 and backplane Type BPX3

Housing material Type ME44: Polycarbonate

6.5 Description of type label and device labelling

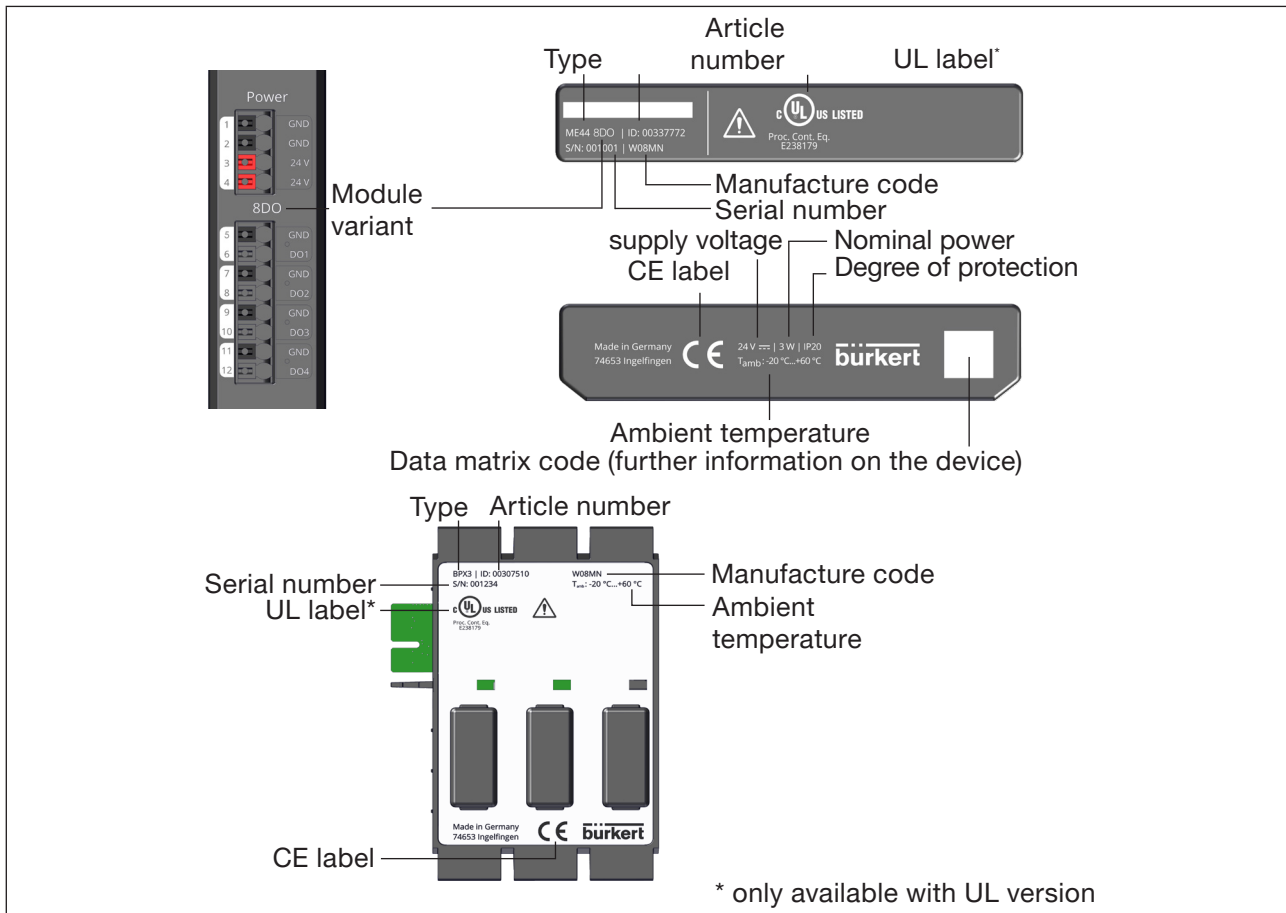


Fig.3: Description of type label and device labelling (example)

6.6 Electrical data

Operating voltage:	24 V \pm 10% via the backplane BPX3
Conductor connection cross-section	0.2...1.5 mm ²
Power consumption	4AI: 3.5 W 4AO: 3.5 W 8DI: 10 W 8DO: 3 W
Degree of protection:	IP20 according to EN 60529/IEC 60529
UL devices:	Limited Energy Circuit (LEC) according to UL/IEC 61010-1 Limited Power Source (LPS) according to UL/IEC 60950 SELV/PELV with UL Recognized Overcurrent Protection, design according to UL/IEC 61010-1 Table 18 NEC Class 2 power source

Protection	The I/O modules' inputs are protected against voltage pulses and excess currents as per IEC 61131-2, Zone B. Voltages over ± 30 V can destroy the module.
Standards	EMV EN 61000 IEC 61131-2 for I/Os

6.6.1 Electrical characteristics of inputs and outputs

4AI module	
Electrical variant	Current input or voltage input Configurable input (AI as DI) AI also usable as DI (configuration via Bürkert Communicator software)
Operating mode	<ul style="list-style-type: none"> • 0...20 mA • 4...20 mA • 0...10 V • 0...5 V • 0...2 V
Accuracy	0.1% FSR Temperature coefficient: <ul style="list-style-type: none"> • Current input: ± 35 ppm/K • Voltage input: ± 40 ppm/K
Input impedance	<ul style="list-style-type: none"> • Current measurement at $25\text{ °C} \leq 110\ \Omega$ • Voltage measurement at $25\text{ °C} \geq 115\text{ k}\Omega$
Electrical isolation	Yes, on backplane for system bus, no separation among the inputs
Max aux. current consumption	4 x 50 mA (sensor supply)
Max. module current consumption	25 mA

Tab. 3: Electrical characteristics 4AI module

4AO module	
Electrical variant	Current output or voltage output
Operating mode	<ul style="list-style-type: none"> • 0...20 mA • 4...20 mA • 0...10 V • 0...5 V • 0...2 V
Accuracy	0.1% FSR
Loop impedance	<ul style="list-style-type: none"> < 900 ohms for current output ≥ 750 ohms for voltage output
Zero-scale error	+ 0.22% FSR
Electrical isolation	Yes, on backplane for system bus, no separation among the outputs

4AO module	
Max. module current consumption	30 mA
Max. current in the output path	4 x 50 mA @ 900 ohm load during current output (current consumption decreases with less resistance)

Tab. 4: Electrical characteristics 4AO module

8DI module	
Electrical variant	2-conductor sensor, 3-conductor sensor, mechanical limit switch (all inputs can be configured as frequency inputs)
Switching threshold	VOFF = 0...5 V VON = 10...30 V
Input current for VON, type. 24 V ===	Max. 5.7 mA
Input type	Type1 and Type3 according to IEC 61131-2
Number of frequency inputs	8
Frequency input	Max. up to 2.5 kHz
Input impedance	> 4 kΩ
Sampling time/sampling frequency	1 ms...4 s / 0.25 Hz...1 kHz
Electrical isolation	No
Sensor supply max.	8 x 30 mA
Max. module current consumption	30 mA (+ 8 x 30 mA sensor supply)

Tab. 5: Electrical characteristics 8DI module

8DO module	
Operating mode	<ul style="list-style-type: none"> • On-Off • PWM (pulse width modulation) • PFM (pulse frequency modulation)
Output current	Max. 750 mA per channel
Clock frequency	20 kHz
Electrical isolation	Yes, on backplane for system bus, no separation among the outputs
Max. module current consumption	30 mA
Max aux. current consumption	8 x 750 mA

Tab. 6: Electrical characteristics 8DO module

6.6.2 Diagnostic characteristics of inputs and outputs

8DI module	
Wire break detection (by channel) for 2-conductor sensors	for internal and external supply
Short circuit detection (by channel) for 3-conductor sensors	for internal and external supply

Tab. 7: Diagnostic characteristics 8DI module, digital input

8DO module: digital output	
Short-circuit detection/overload detection according to IEC 61131- 2_2008-4 (channel-by-channel)	for external supply of a channel

Tab. 8: Diagnostic characteristics 8DO module, digital output

Factory setting for lower and upper electrical limits for 4AI module

Type of input signal	Lower electrical limit	Upper electrical limit
0...20 mA	-0.25 mA	21 mA
4...20 mA	3.6 mA	21 mA
0...10 V	-0.25 V	10.25 V
0...5 V	-0.25 V	5.25 V
0...2 V	-0.25 V	2.25 V

Tab. 9: Factory setting for lower and upper electrical limits for 4AI module



The lower and upper electrical limits can be customised to the user.

6.6.3 Connectable conductors

	Minimum	Maximum
Clamping area	0.13 mm ²	1.5 mm ²
Conductor connection cross-section AWG	AWG 24	AWG 16
Solid-core H05(07) V-U	0.2 mm ²	1.5 mm ²
Fine-wired H05(07) V-K	0.2 mm ²	1.5 mm ²
With wire end ferrule with collar as per DIN 46 228/4	0.25 mm ²	0.75 mm ²
With wire end ferrule as per DIN 46 228/1	0.25 mm ²	1.5 mm ²
Minimum temperature class 105 °C		

Tab. 10: Connectable conductors

7 INSTALLATION

NOTE!

- Installation may only be performed with trained technical personnel with suitable tools.

7.1 Mounting the fieldbus gateway on the backplane

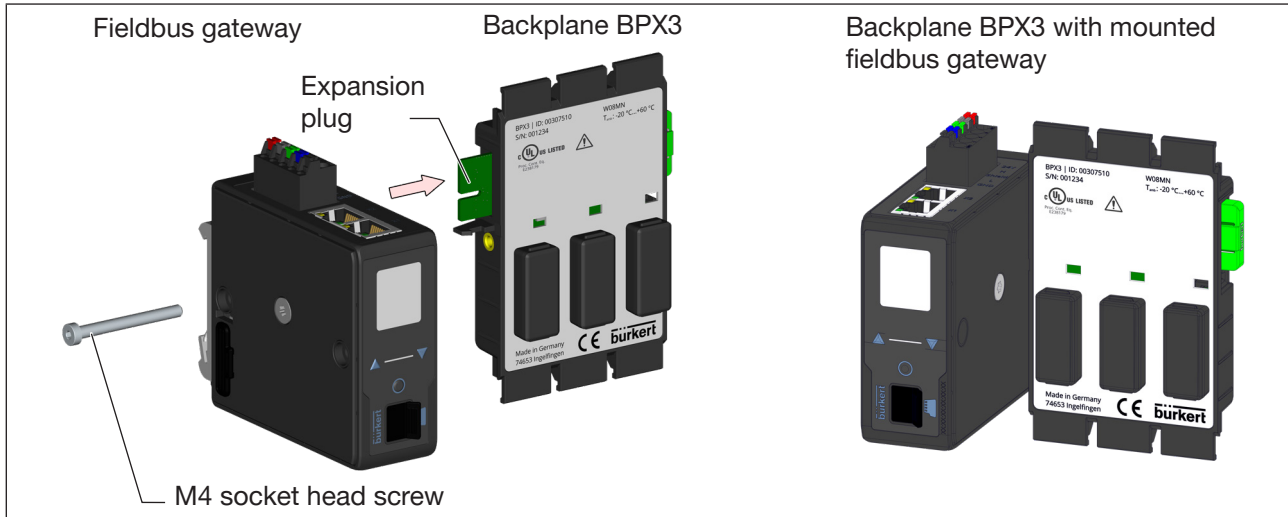


Fig.4: Mounting the fieldbus gateway on the backplane

- Remove any covers from the expansion socket of the fieldbus gateway.
- Align the expansion socket of the fieldbus gateway with the expansion plug of the backplane.
- Connect fieldbus gateway to the backplane.
- Using the M4 socket head screw, screw the fieldbus gateway to the backplane.
⚠ Observe tightening torque of 0.75 Nm.

7.1.1 180°-rotated installation of the fieldbus gateway

There are 2 expansion sockets for connecting the fieldbus gateway with the backplane. As a result, the fieldbus gateway can be installed turned by 180° with the electrical connection upwards or downwards.

The interfaces are sealed with a cover during delivery.

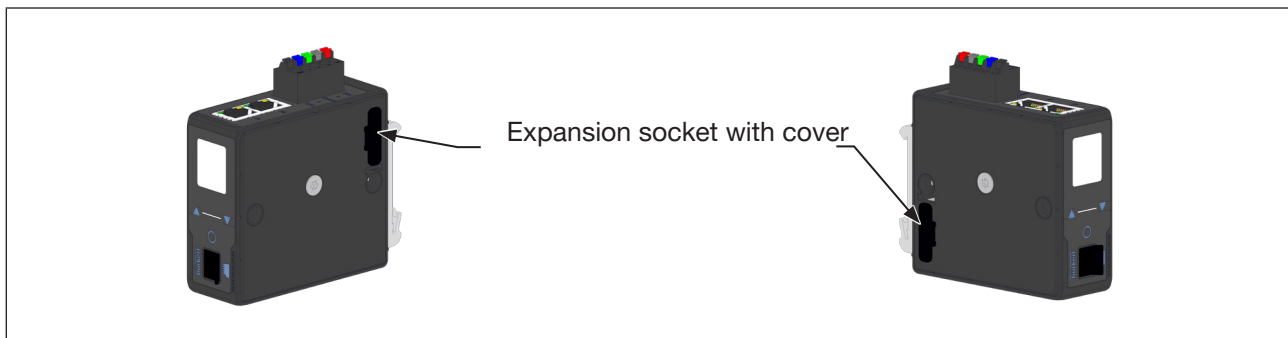
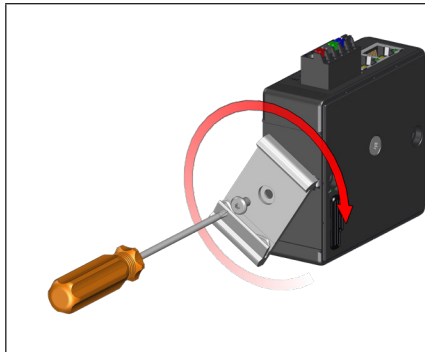


Fig.5: Expansion socket of the fieldbus gateway

- Remove the cover with a screwdriver before installation.

NOTE!

Seal the unused expansion socket with the cover to prevent damage.



- Loosen the screw.
- Turn the standard rail clip by 180°.
- Tighten locking screw with 2 Nm.

Fig.6: Rotate standard rail clip

7.2 Mounting the I/O module Type ME44 on the backplane

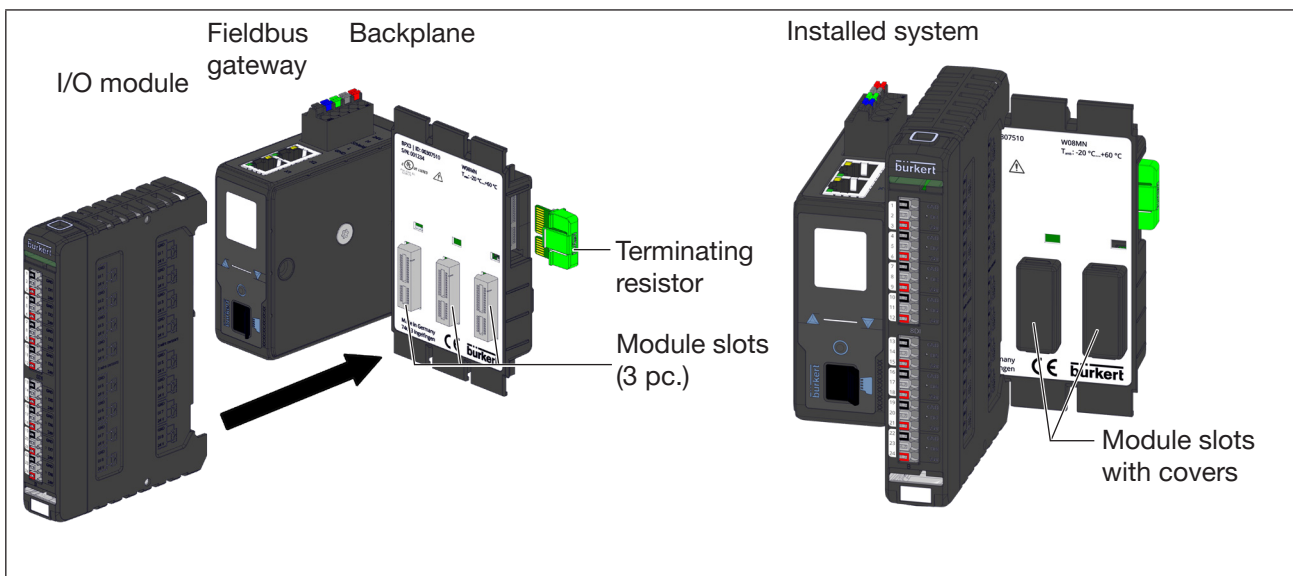


Fig.7: Mounting the I/O module Type ME44 on the backplane

- Remove any covers from the backplane.
 - Align the I/O module with the module slot of the backplane.
 - Press I/O module onto the backplane until it engages.
- The I/O module is now connected to the supply voltage.



Use supply voltage unit with adequate power.

7.3 Electrical installation

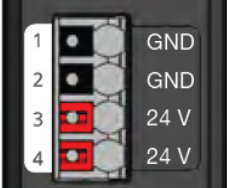




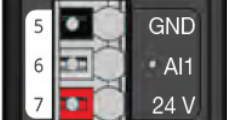



NOTE!

Prerequisite for the fault-free functioning of the device and to avoid interference issues:

- Use only shielded cables with a braided or foil shield.

7.3.1 Electrical configuration and circuit diagram for 4AI module

Electrical configuration:

	Plug configuration AUX Power		External circuit
		GND	Mass
		GND	Mass
		24 V	Aux power supply voltage 24 V $\pm 10\%$
		24 V	Aux power supply voltage 24 V $\pm 10\%$
	Plug configuration analog inputs		External circuit
		GND	Mass
		AI1...AI4	Analog input +
		24 V	Supply voltage 24 V $\pm 10\%$

Tab. 11: Configuration for 4AI module

Circuit diagram:



The circuit diagram is pressed onto the outside of the I/O module.

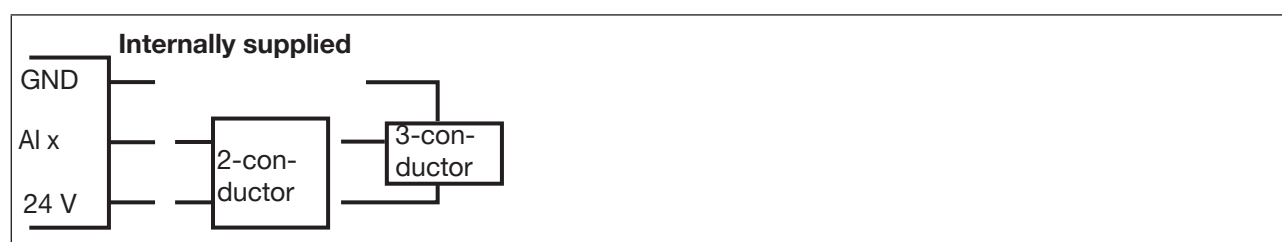


Fig.8: Circuit diagram 4AI module, internally supplied

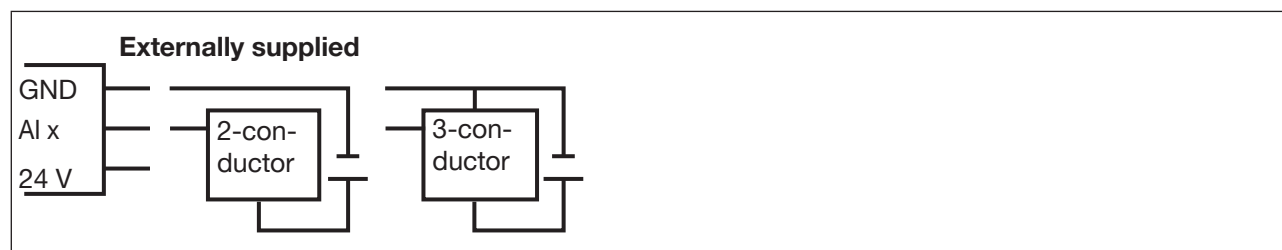
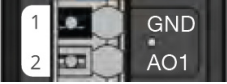




Fig.9: Circuit diagram 4AI module, externally supplied

7.3.2 Electrical configuration and circuit diagram for 4AO module

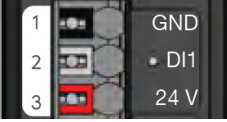



Electrical configuration:

	Plug configuration analog outputs		External circuit
		GND	Mass
		AO1...AO4	Analog output +

Tab. 12: Configuration for 4AO module


7.3.3 Electrical configuration and circuit diagram for 8DI module

Electrical configuration:

	Plug configuration		External circuit
		GND	Mass
		DI1...DI8	Digital input Frequency inputs: DI1...DI8
		24 V	Supply voltage 24 V $\pm 10\%$

Tab. 13: Electrical configuration for 8DI module

Circuit diagram:

 The circuit diagram is pressed onto the outside of the I/O module.

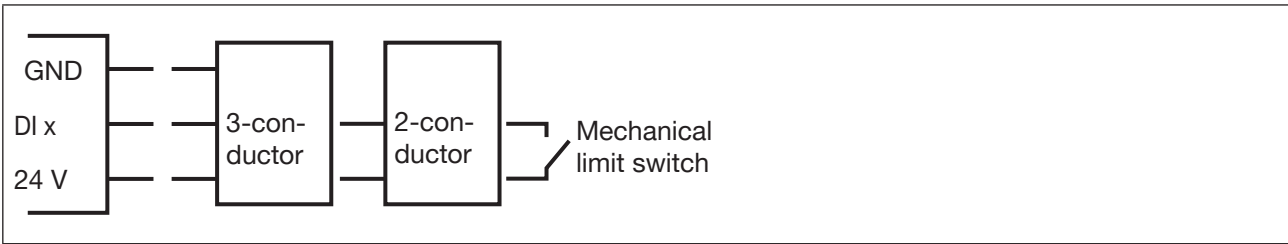
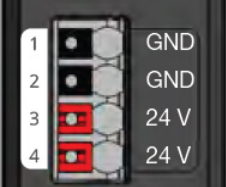




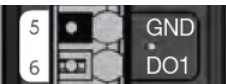




Fig.10: Circuit diagram 8DI module

7.3.4 Electrical configuration and circuit diagram for 8DO module

Electrical configuration:

	Plug configuration AUX Power		External circuit
		GND	Mass
		GND	Mass
		24 V	Aux power supply voltage 24 V $\pm 10\%$
		24 V	Aux power supply voltage 24 V $\pm 10\%$
	Plug configuration digital outputs		External circuit
		GND	Mass
		DO1...DO8	Digital output +

Tab. 14: Configuration for 8DO module

7.3.5 Connecting external sensors and actuators to the power supply

→ Connect the wires of the external sensors and actuators to the respective terminals.

→ Connect cable shielding (see chapter “7.3.6 Connecting the cable shielding”).

If the I/O module is difficult to reach, the connection panel for the electrical connection can be removed.

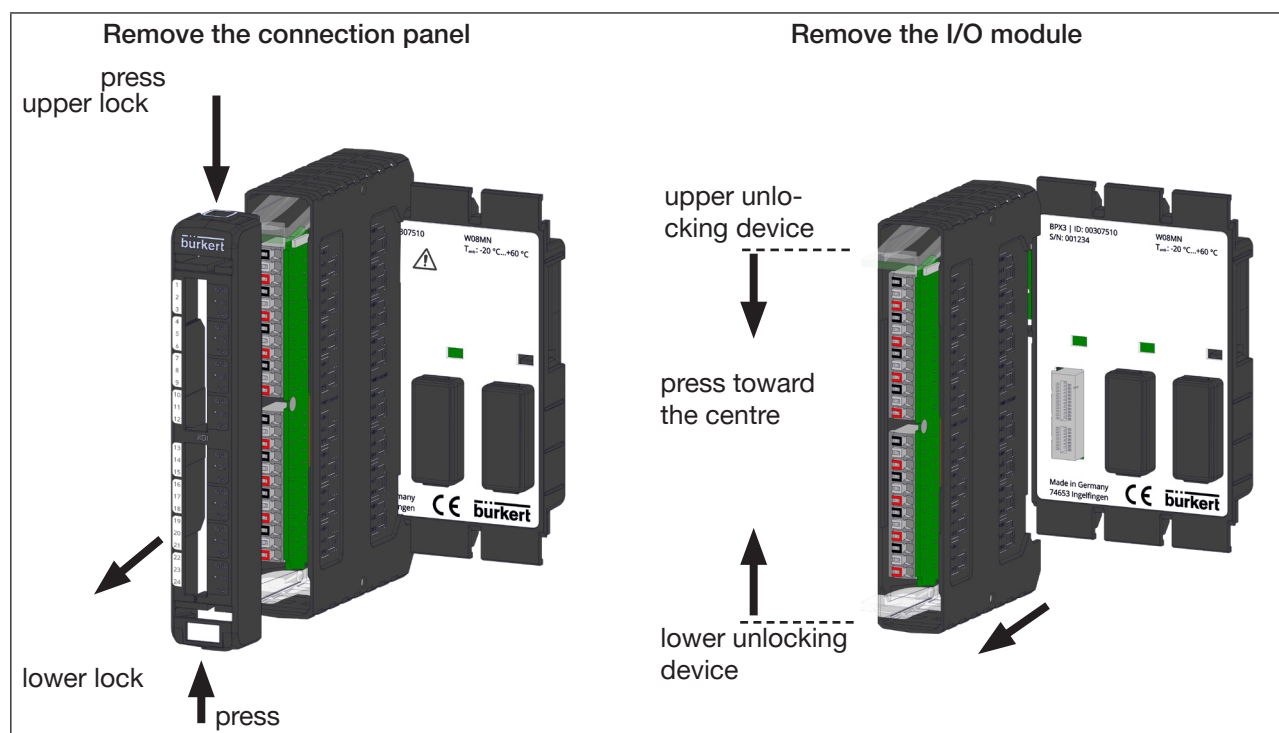


Fig. 11: Removal of backplane from fieldbus gateway

→ Press on the blue squares until the lock is released and remove the connection panel.

- Press the upper and lower unlocking device toward the centre of the device and remove the I/O module from the backplane.
- Align the connection panel with the I/O module and let it lock into place.
- Connect the wires of the external sensors and actuators to the respective terminals.
- Connect cable shielding (see chapter [“7.3.6 Connecting the cable shielding”](#)).
- Press on the connection panel until it clicks into position.

7.3.6 Connecting the cable shielding

NOTE!

Required for impeccable function of the device.

The cable shielding must be placed on the protective earth on both conductor ends.

1. On the I/O module
 - directly at the control cabinet input or
 - on a separate bus bar directly on the module.
2. On the external sensor or actuator.

7.4 Mounting the system onto the standard rail

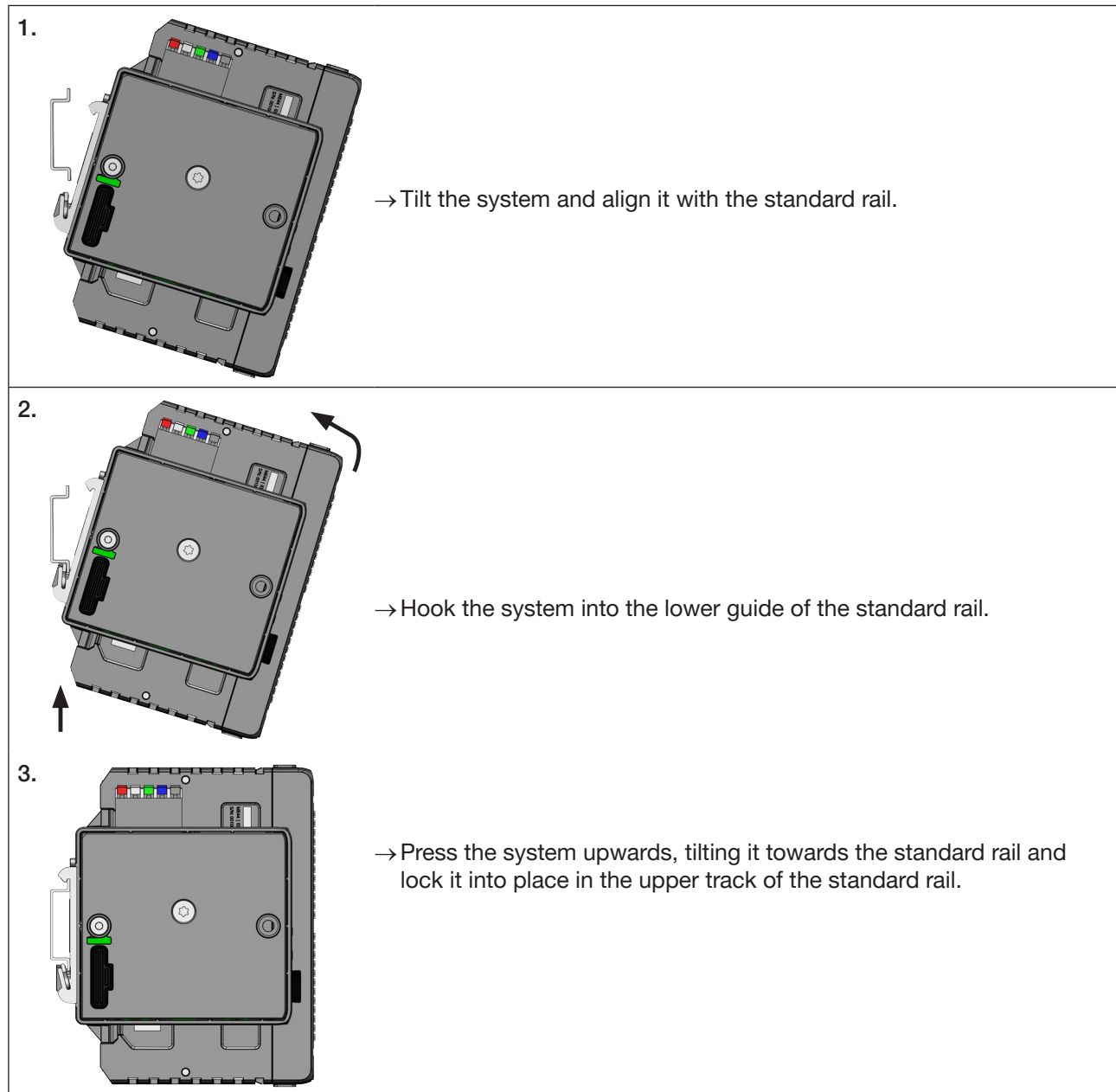


Fig.12: Mounting the system onto the standard rail

Installation recommendation for configuration levels with multiple backplanes.

- First hook the minimum configuration level, consisting of fieldbus gateway and 1 backplane, into the standard rail.
- Hook other backplanes individually in succession into the standard rail and push onto the previous backplane.
- Install I/O modules and connection panels.

8 DISPLAY ELEMENTS OF I/O MODULES

The Type ME44 I/O modules have the following LEDs for indicating the status.

- LED for indicating the device status.
The LED shows the colour based on NAMUR NE 107.
- LEDs for indicating the channel status.
The number of LEDs depends on the available channels (1 LED per channel).

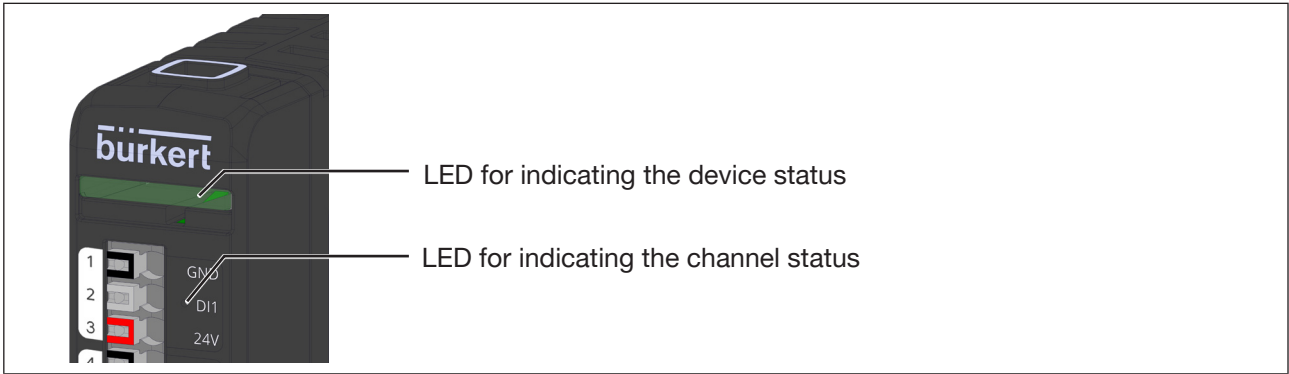


Fig.13: LEDs for indicating the status

8.1 LED for indicating the channel status

The LED for indicating the channel status alternates between the colours green, red and orange.

Description of the status indicator:

Colour	Meaning
Green	Channel active
Red	Error present, channel is inactive
Orange	Error present, channel is active

Tab. 15: LED for indicating the channel status

8.2 LED for indicating the device status

The LED shows the colour based on NAMUR NE 107 by default.

There are 2 other modes in which a solid colour can be selected or the LED is switched off.

The LED flashes to identify the device if it is selected in Bürkert Communicator.

If there are several messages at the same time, the message 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:

Indication based on NE 107		Description	Meaning
Colour code	Colour		
5	Red	Failure, error or fault	Functional fault. Device functionality is not guaranteed.
4	Orange	Function check	The device is searching for a bÜS participant. This status ends after a few seconds.
3	yellow	Out of specification	<p>The environment conditions or process conditions for the device are not within the specified range.</p> <p>Internal device diagnostics indicate problems within the device or with the process properties.</p> <p>Data sheet values cannot be complied with.</p>
2	blue	Maintenance required	<p>The device has detected a deviation during ongoing diagnostics. Device functionality limited.</p> <p>The device is in closed-loop control mode, but function will soon be restricted.</p> <p>→ Perform device maintenance.</p> <p>Device configuration cannot be managed:</p> <ul style="list-style-type: none"> • Updated device configuration cannot be saved. • Not possible to transfer the configuration when swapping devices.
1	Green	Diagnostics active	<p>Device is in error-free operation.</p> <p>Status changes are highlighted in colour.</p> <p>Messages are sent via any fieldbus that may be connected.</p>
0	white	Diagnostics inactive	<p>Device is switched on.</p> <p>Status conditions are not displayed.</p> <p>Messages are not listed in the message list or transmitted via any connected fieldbus.</p> <p>Device is running within its specifications.</p>

Tab. 16: Indication of the device status in NAMUR operation mode

8.3 Diagnostics of the device status

The various I/O module states can be diagnosed from the LED indicators for device status and channel status.

Diagnostics 4AI module:

Colour of device status LED	Colour of channel status LED	Meaning
Green	off	Device is in error-free operation. Channel is inactive.
Green	Green	Device is in error-free operation. Channel is active and has a valid value.
Red	Red	Device faulty. Channel is active. The following errors may occur: <ul style="list-style-type: none"> • Input signal outside the permissible range

Tab. 17: Diagnostics, device state 4AI module

Diagnostics 4AO module:

Colour of device status LED	Colour of channel status LED	Meaning
Green	off	Device is in error-free operation. Channel is inactive.
Green	Green	Device is in error-free operation. Channel is active and has a valid value.
Green	Red	Device is in error-free operation. The channel is active and the mapped value from the producer is invalid (NAMUR stays green if consumer emergency setting (0x2003sub9) = 0 (none))
Red	Red	Device faulty. Channel is active. The following errors may occur: <ul style="list-style-type: none"> • Short circuit (in voltage operation mode, detection only when output > 50 mV) • Open loop (in power operation mode, detection only when output > 40 µA) • Mapped producers not found • Mapped value from the producer is invalid (NAMUR also red when consumer emergency setting (0x2003sub9) != 0 (none))

Tab. 18: Diagnostics, device state 4AO module

Diagnostics 8DI module:

Colour of device status LED	Colour of channel status LED	Meaning
Green	off	Device is in error-free operation. Channel is inactive or input voltage is < 5 V.
Green	Green	Device is in error-free operation. Channel is active with input voltage > 10 V.
Red	Red	Device faulty. Channel is active, but the following errors may occur: <ul style="list-style-type: none"> • Wire break, • Short circuit.

Tab. 19: Diagnostics, device state 8DI module

Diagnostics 8DO module:

Colour of device status LED	Colour of channel status LED	Meaning
Green	off	Device is in error-free operation. Two states may be present: <ul style="list-style-type: none"> • Channel is inactive • Channel is active in state = low
Green	Green	Device is in error-free operation. Channel is active in state: high. In "PWM" and "PFM" operating mode: Channel is processing signals according to the configuration.
Green	Red	Device is in error-free operation. The channel is active and the mapped value from the producer is invalid (NAMUR stays green if consumer emergency setting (0x2003sub9) = 0 (none))
Red	Red in "On-Off" operating mode Red/orange flashing in PWM/PFM operation mode	Device faulty. Channel is active, but the following errors may occur: <ul style="list-style-type: none"> • Short circuit/overload (no short circuit detection in low power operation mode) • Mapped producers not found • Mapped value from the producer is invalid (NAMUR also red when consumer emergency setting (0x2003sub9) != 0 (none))

Tab. 20: Diagnostics, device state 8DO module

9 START-UP WITH BÜRKERT COMMUNICATOR



The Bürkert Communicator software can be downloaded free of charge from the Bürkert website. In addition to the software, the USB-büS-Interface set, available as an accessory, is required.

The USB-büS-Interface set can be ordered from Bürkert as an accessory (see “[21 Replacement parts and accessories](#)”).



This chapter only describes basic use of the Bürkert Communicator. The detailed description of the operation and setting of the Bürkert Communicator software can be found on the website www.burkert.com → Type 8920

9.1 Bürkert Communicator user interface

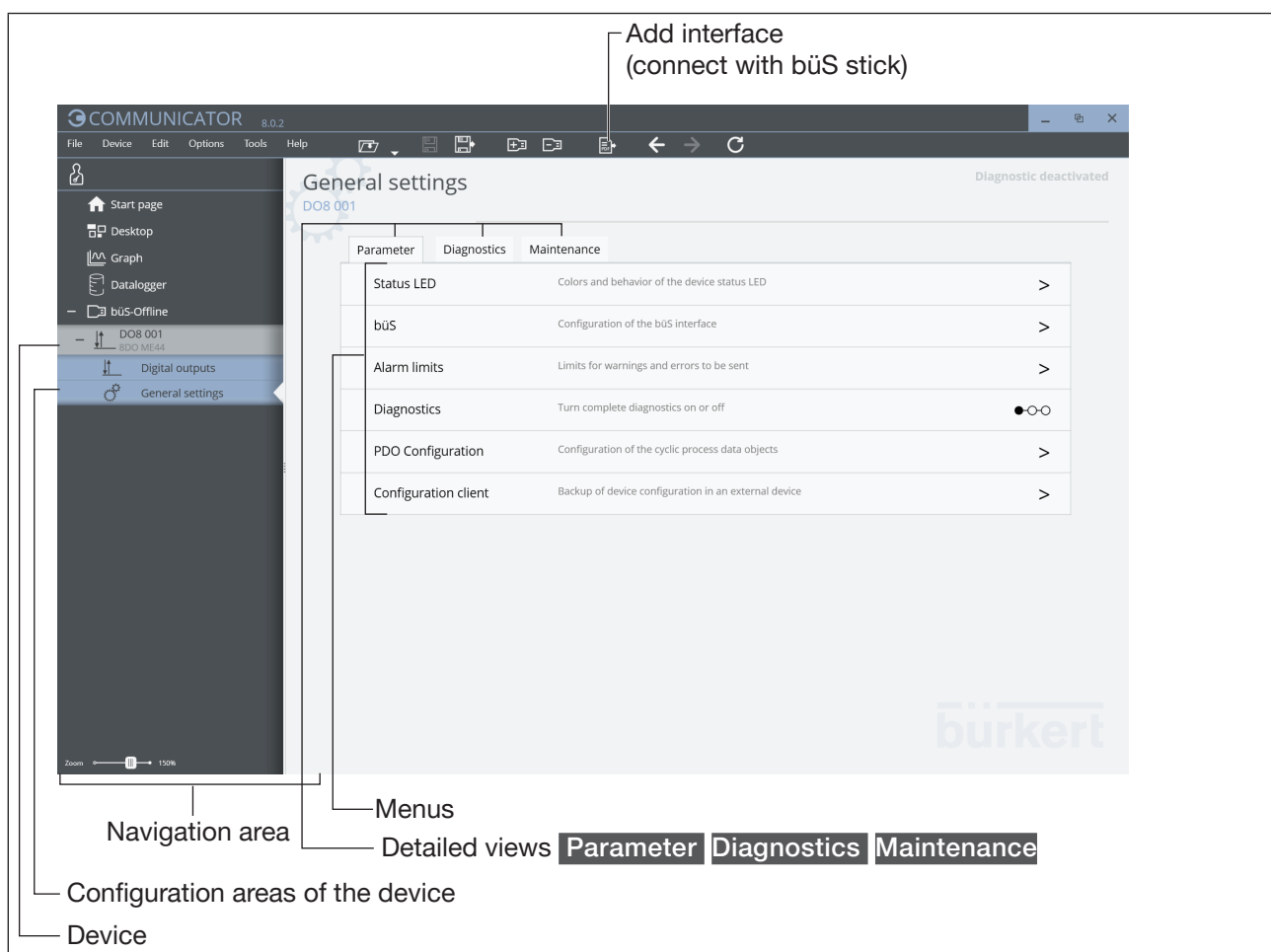



Fig. 14: Example of a Bürkert Communicator user interface

9.2 Connecting the device to the “Bürkert Communicator”




The Bürkert Communicator can be connected to the device via a bÜS network or with the bÜS stick.

- Install the Bürkert Communicator on the PC.
- Use the USB-bÜS-Interface set to establish the connection between the device and the PC.
Not required for the devices in a bÜS network.
- Start the Bürkert Communicator.
- In the menu bar, click the icon  for **Add interface**.
- Select **bÜS stick** or **bÜS via the network**.
- **Complete**.
- ✓ The device is connected to Bürkert Communicator and is displayed in the navigation area.

9.3 User levels in the Communicator

Bürkert Communicator is operated within user levels. There are 3 user levels, and each one has certain reading rights and writing rights.

The active user level is indicated by an icon on the upper left margin of the program window.

Icon	User level	Description	Standard password
	User	<ul style="list-style-type: none"> • Standard user • often only reading right, can change a few values • not all menus/values are displayed 	no password
	Advanced user	<ul style="list-style-type: none"> • can change certain values • can perform simple calibrations • not all menus/values are displayed 	5678
	Installer	<ul style="list-style-type: none"> • has all rights to operate the Communicator • all menus/values are displayed 	1946

Tab. 21: User levels in ascending order from top to bottom

9.3.1 Change user level

- Click on the user levels icon on the upper left margin of the program window.
The **User password** window appears.
- Enter the password for the desired user level in the input field.
The standard passwords are listed in [“Tab. 21”](#).

9.3.2 Changing user password

Required user level: “Installer”

Options > **Password manager ...**

- If necessary, enter the installer password.
The **Change user password** window appears.
- Enter desired password.

With the **Password manager**, passwords can also be reset to the standard settings.

9.3.3 Set active user level

Required user level: "Installer"

Options > **Password manager ...**

→ If necessary, enter the installer password.

The **Change user password** window appears.

→ Disable **the password at the** desired user level.

User password	Active user level during program start
No user password deactivated	User
"Advanced user" deactivated	Advanced user
"Installer" deactivated	Installer

10 4AI MODULE START-UP

10.1 Base setting of the analog inputs



The Bürkert Communicator software is required for the base setting.

The Bürkert Communicator software can be downloaded for free from the Bürkert website. <https://country.burkert.com/> → Type ME44.

In addition to the software, the USB-büS-Interface set, available as an accessory, is required.

In the menu option “General settings”, a quick base setting for all modules can be performed simultaneously using a wizard. These settings can then be individually adjusted for each channel afterwards. The general base setting is also optional, and can be ignored.



Base setting of the analog inputs channel 1 to channel 4 (observe sequence)		Factory default setting	Requirement
1.	Select input signal.	not configured	mandatory
2.	Select physical size for the process variables.	No unit (classification ID 0)	optional
3.	Adjust the process variable of the analog input:		mandatory
	• Lower value	0	
	• Upper value	100	
4.	Set filter response time.	3.00 s	optional
5.	Enable and parameterise warning alerts for deviations in the process set-point value:	not enabled	optional
	• Lower limit	–	
	• Upper limit	–	
6.	Enable and parameterise error alerts for deviations in the process set-point value:	not enabled	optional
	• Lower limit	–	
	• Upper limit	–	
7.	Enable and parameterise error alert for input errors (supply voltage or current strength):	For defined upper and lower limits see chapter “ 10.1.7 Enable and parameterise error alerts for input errors ”.	optional
	• Lower electrical limit	enabled	
	• Upper electrical limit	enabled	
8.	Use analog input as digital input.	not enabled	optional
9.	Enter name for the output value.	no name provided	
10.	Set sampling time.	100 ms	

Tab. 22: Base setting of the analog inputs of the 4AI module

10.1.1 Open menu for setting the analog inputs in Bürkert Communicator

Required access rights: installer

Open menu:

-  Select **4AI** in the navigation area.
Click  to open the configuration areas.
- Select **Analog inputs** in the configuration area.

The detailed view **Parameter** with the 4 channels is displayed.



The complete menu tree for setting the analog input is displayed after the input signal is selected.

10.1.2 Select input signal for analog input

Required access rights: installer

- Select **Analog inputs** in the configuration area.
- Select the desired channel in the **Parameters** detailed view.

- Select **operating mode**.
- Select input signal.

 You have selected the input signal for the analog input.

10.1.3 Select physical size for the process variables of the analog input

Required access rights: installer

- Select **Analog inputs** in the configuration area.
- Select the desired channel in the **Parameters** detailed view.

- Select **Configure unit**.
- Select physical size.
- **Complete**.

 You have selected the physical size for the analog input.

10.1.4 Adjust the process variable of the analog input

The process variable of the analog input can be adjusted in various ways:

- In the “Maintenance” detailed view: 2-point hardware adjustment with the help of a wizard, for which the lower and upper process variables are calculated with an equation.
- In the “Parameters” detailed view: Adjustment by entering the lower and upper process values.



Recommendation for initial start-up:

2-point calibration with the wizard is recommended for proper scaling of the process variables.
Detailed view **Maintenance** → **Channel 1** to **Channel 4** → Menu **Hardware Adjustment** → Menu **2-Point Hardware Adjustment**.

Required access rights: installer

Adjustment in “Maintenance” detailed view: 2-point hardware adjustment of the process value using the wizard:

The 2-point hardware adjustment is performed via a linear equation calculated with the specified values for points 1 and 2.

Procedure:

- Select **Analog inputs** in the configuration area.
- Switch to **“Maintenance”** detailed view.
- Select the appropriate channel.
- Select **hardware adjustment**.
- Select **2-point hardware adjustment**.

A wizard guides users through the menu.

The following values are displayed during adjustment:

- The raw values of the analog input for adjustment point 1.
- Offset and slope of the linear equation.
- **Complete.**

✓ You have adjusted the process variable of the analog input.

Adjustment in the “Parameters” detailed view: Adjustment by entering the lower and upper process values.

- Select **Analog inputs** in the configuration area.

Select the desired channel in the **Parameters** detailed view.

Adjust the lower process variable of the analog input:

- Select **Value at xxx**. The display (0 mA, 4 mA or 0 V) depends on the selected input signal.
- Enter value.

Adjust the upper process variable of the analog input:

- Select **Value at xxx**. The display (20 mA, 2 V, 5 V or 10 V) depends on the selected input signal.
- Enter value.

✓ You have adjusted the process variable of the analog input.

10.1.5 Set filter response time for the analog input

The filter response time determines the damping ratio for current or voltage fluctuations in the analog input.

Required access rights: installer

- Select **Analog inputs** in the configuration area.

Select the desired channel in the **Parameters** detailed view.

- Select **Filter response time**.
- Enter value.

✓ You have set the filter response time for the analog input.

10.1.6 Enable and parameterise warning alerts and error alerts

Warning and error alerts for deviations from the process set-point value can be enabled. Define the lower and upper limits that will trigger an alert when entered.

Required access rights: installer

→ Select **Analog inputs** in the configuration area.

Select the desired channel in the **Parameters** detailed view.

Enable warning alerts and/or error alerts:

→ Select **warnings and errors**.

→ Select **Process warnings** or **Process errors**.

→ Select **Activation flag**.

→ Enable **Lower limit** and/or **Upper limit**.

Set the limits for warning or error alerts based on the selected activation flag:

→ Select **Lower limit**.

→ Enter value.

→ Select **Upper limit**.

→ Enter value.

✓ You have enabled the warning alerts and error alerts for deviations from the process set-point value.

10.1.7 Enable and parameterise error alerts for input errors

An error alert for deviations in the input signal can be enabled. Define the lower and upper electrical limits that trigger an error alert when entered.

Factory setting:

The error alerts are enabled by the manufacturer. The following table shows the upper and lower electrical limits set for issuing error alerts.

Type of input signal	Lower electrical limit	Upper electrical limit
0...20 mA	-0.25 mA	21 mA
4...20 mA	3.6 mA	21 mA
0...10 V	-0.25 V	10.25 V
0...5 V	-0.25 V	5.25 V
0...2 V	-0.25 V	2.25 V

Tab. 23: Factory setting: Error alerts for input errors

Required access rights: installer

→ Select **Analog inputs** in the configuration area.

Select the desired channel in the **Parameters** detailed view.

Enable error alerts:

→ Select **Warnings and Errors**.

→ Select **Input error**.

→ Select **Activation flag**.

→ Select parameters for the error alert. Multiple selections are possible.

- **Lower electrical limit**
- **Upper electrical limit**

Set the limits for error alerts according to the selected activation flag:

→ Select **Lower electrical limit**.

→ Enter value.

→ Select **Upper electrical limit**.

→ Enter value.

✓ You have activated the error messages for deviations from the input signal.

10.1.8 Use analog input as digital input

Each analog input of the 4AI module can also be used as a digital input.

Enabling use as digital input

Required access rights: installer

→ Select **Analog inputs** in the configuration area.

Select the desired channel in the **Parameters** detailed view.

→ Select **AI as DI**.

→ Set **On**.

The analog input is enabled for use as digital input and the configuration area **AI as DI** is integrated for parametrisation.

Parametrisation for use as digital input:

→ Select **AI as DI** in the configuration area.

The detailed view **Parameter** is displayed with the menus for setting the analog input.

→ Select the appropriate channel.

→ Select **Lower threshold value** and enter the limit.

→ Select **Upper threshold value** and enter the limit.

✓ You have enabled and parameterised analog input for use as digital input.

10.1.9 Enter name for the output value of the analog input

If required, a name can be entered for the output value of each analog input.

Required access rights: installer

→ Select **Analog inputs** in the configuration area.

Select the desired channel in the **Parameters** detailed view.

→ **Enter Output value name.**

→ Enter name.

✓ You have given the output value of the analog input a name.

10.1.10 Set sampling time for the analog input

The sampling time sets the time frame in which the data from the input are read.

Factory setting: 100 ms



With a shorter sampling time, the bus load on the CAN bus increases.

Setting sampling time:

Required access rights: installer

→ Select **Analog inputs** in the configuration area.

Select the desired channel in the **Parameters** detailed view.

→ **Sampling time.**

→ Select value.

✓ You have set the sampling time.

11 ADDITIONAL 4AI MODULE SETTINGS

11.1 Menus in the configuration area AI1 to AI4

The following overview and brief description of the menus contains the device-specific settings for the I/O module and not the description of the Bürkert Communicator software.

11.1.1 “Parameters” detailed view



The “Parameters” detailed view menu for the analog inputs AI1 to AI4 is extensively described in the chapter 4AI module start-up.

11.1.2 “Diagnostics” detailed view

Open menu:

- Select **4AI** in the navigation area.
Click to open the configuration areas.
- Select **Analog inputs** in the configuration area.
- Select **“Diagnostics”** detailed view.



Overview of the menus:

Diagnostics for Channel 1 to Channel 4 (Analog inputs 1...4)	
Levels 1	Description
Type	Indicates type of analog input.
Operating mode	Indicates the operating mode set for the analog input.
Input value	<p>Indicates the voltage or current strength applied to the analog input. The electrical quantity displayed depends on the selected input signal.</p> <p> The modules are generally correctly calibrated by the manufacturer. If it is determined that the displayed input value deviates from the actual value, recalibration is required. The recalibration is performed in the “Maintenance” detailed view → Hardware calibration.</p>
Output value	Indicates the process value issued on the fieldbus.

Tab. 24: Menus of the 4AI module, configuration area channel 1 to channel 4, “Diagnostics” detailed view

11.1.3 “Maintenance” detailed view

Open menu:

-  Select **4AI** in the navigation area. Click  to open the configuration areas.
- Select **Analog inputs** in the configuration area.
- Select **“Maintenance”** detailed view.

Overview of the menus:

Maintenance for channel 1 to channel 4 (analog inputs 1...4)	
Levels 1 and 2	Description
Hardware adjustment	Scaling the input signal
2-point hardware adjustment	<p>Wizard for adjusting the input signal</p> <p>The 2-point hardware adjustment is performed via a linear equation calculated with the specified values for points 1 and 2.</p> <p>Menu points:</p> <ul style="list-style-type: none"> • Input value for point 1 • Raw value: Indicates the raw value (value of the unscaled input signal). • Input value for point 2 • Raw value: Indicates the raw value (value of the unscaled input signal). • Recalculated offset: Indicates the offset recalculated for the input signal via the linear equation. • Recalculated slope: Indicates the slope recalculated for the input signal via the linear equation.
Offset	Setting the offset for the input signal
Slope	Setting the slope for the input signal
Reset to factory settings	Reset hardware adjustment of the corresponding channel to the factory setting.
Process value scaling	Scaling based on real process variables.
Factory reset	Reset all settings of the corresponding channel to the factory setting, except for the hardware adjustment.



Tab. 25: Menus of the 4AI module, configuration area channel 1 to channel 4, “Maintenance” detailed view

11.2 Menus in the configuration area “General settings”




The following overview and brief description of the menus contains the device-specific settings for the I/O module and not the description of the Bürkert Communicator software.



11.2.1 “Parameters” detailed view

Open menu:

-  Select **4AI** in the navigation area.
Click  to open the configuration areas.
- In configuration area select **General settings**.
- Select **“Parameter”** detailed view.

Overview of the menus:

Parameters for General settings	
Levels 1, 2 and 3	Description
Status LED	Setting the LED to display the device status.
Operating mode	Set LED operation mode for displaying device states. The following LED modes can be selected: <ul style="list-style-type: none"> • NAMUR operation mode, for description see “8.2 LED for indicating the device status” on page 24. • LED off.
büS	Parameterisation of the device as a büS participant.
Displayed name	Issue name under which the device is displayed.  No entry required.
Location	Indicates location of device
Description	The input window can be used to describe the device or for additional information on the device.  No entry required.
Advanced	Further settings for the device as participant of a network.
Unique device name	Assign communication ID for communication in the network.  If the communication ID is changed, the assigned partnership with another participant is lost.
Baud rate	Set transmission speed for the device as a büS participant or CANopen participant.
büS address	Assign address under which the device is operated as a büS participant or CANopen participant.



Parameters for General settings	
Levels 1, 2 and 3	Description
Bus operating mode	<p>Select communication:</p> <ul style="list-style-type: none"> • Protocol CANopen • Protocol bÜS • Single device
CANopen status	<p>Define the communication status for the device:</p> <p>The participant can be communicated with via SDOs. PDO communication is not possible.</p> <p>Operationally: the participant can independently send and receive process data.</p> <p> The menu is only available when selecting the protocol CANopen.</p>
Deallocation delay	Time from the loss of a consumer to deletion of its configuration.
Alarm limits	Display and setting of the limits that, when exceeded or not reached, cause the device to trigger an error alert or warning.
supply voltage	Indicates the limit values for the supply voltage.
Error below	Indicates the limit for supply voltage, the failure to meet which triggers an error alert from the device. Note hysteresis!
Error above	Indicates the limit for supply voltage, the exceedance of which triggers an error alert from the device. Note hysteresis!
Hysteresis	<p>Display of the hysteresis for the limit values of the supply voltage.</p> <p> The hysteresis is centrally assigned to the limit.</p> <p>Example:</p> <p>Error above 26.4 V</p> <p>Hysteresis 0.5% V</p> <p>The error is output at a supply voltage > 26.9 V and cancelled again at a supply voltage < 25.9 V.</p>
Device temperature	Indicates and sets the limits for device temperature.
Error above	Indicates the limit for device temperature, the exceedance of which triggers an error alert from the device. Note hysteresis!
Error below	Indicates the limit for device temperature, the failure to meet which triggers a warning from the device. Note hysteresis!
Warning above	Setting the limit for device temperature, the exceedance of which triggers a warning from the device. Note hysteresis!
Warning below	Setting the limit for device temperature, the failure to meet which triggers a warning from the device. Note hysteresis!

Parameters for General settings	
Levels 1, 2 and 3	Description
Hysteresis	<p>Indicates the hysteresis for the device temperature limits.</p> <p>! The hysteresis is centrally assigned to the limit.</p> <p>Example:</p> <p>Warning above 80 °C</p> <p>Hysteresis 4 °C</p> <p>The warning is issued for a device temperature > 82 °C and is resolved with a device temperature < 78 °C.</p>
Diagnostics	Menu for enabling and deactivating the diagnostics function.
Active	<p>Diagnostics function enabled:</p> <ul style="list-style-type: none"> • The LED for the device status display shows the device status depending on the operation mode that has been set. • Alerts are entered in the logbook.
Inactive	<p>Diagnostics function deactivated:</p> <ul style="list-style-type: none"> • The LED for the device status display does not show the device status. • There is no entry of errors in the logbook.
PDO configuration	Configuration of the cyclic process data objects:
PDO 1 PDO 2 PDO 3 Multiplexed PDO	<p>! The cyclical process data objects are configured with a wizard that guides the user through the necessary operating steps.</p>
Reset to default values	Reset the PDO configuration to the default values
Output module PDOs	For a description see “11.1 Menus in the configuration area AI1 to AI4” on page 36.

Tab. 26: Menus of the 4AI module, configuration area “General settings”, “Parameters” detailed view.

11.2.2 “Diagnostics” detailed view

Open menu:

-  Select **4AI** in the navigation area.
Click  to open the configuration areas.
- In configuration area select **General settings**.
- Select **“Diagnostics”** detailed view.



Overview of the menus:

Diagnostics for General settings	
Levels 1 and 2	Description
Device status	Information on the device status.
Operating duration	Indicates the operating duration over the entire life cycle of the device.
Device temperature	Indicates device temperature
Voltage drops	Display: Number of voltage drops since last reboot.
Min./max. Values	Indicates minimum and maximum measured device temperature.
Device boot counter	Indicates device reboot throughout the entire device life cycle.
Transferable memory status	Storage and management of configuration settings possible. For settings see instructions “Central configuration management – transferring configuration data when replacing device”. The instructions can be found on the Bürkert website → Type ME43.
Current system time	Indicates date and time.
büS status	Information on the büS network.
Receive errors	Indicates current receive errors.
Receive errors max.	Indicates all receive errors since last reboot.
Transmission errors	Indicates current transmission errors.
Transmission errors max.	Indicates all transmission errors since last reboot.
Reset error counter.	Reset the error counter for receive and transmission errors to 0.
CANopen status	Information on device’s state of communication as büS network participant. Pre-operational or operational.
Logbook	Menu for displaying and managing logbook entries.
Configuration client	Settings for the backup of device configuration in an external device
Transferable memory status	Storage and management of configuration settings possible. For settings see instructions “Central configuration management – transferring configuration data when replacing device”. The instructions can be found on the Bürkert website → Type ME43.
Status	Current status of the configuration.
Reconfiguration counter	Number of reconfigurations made.


Tab. 27: Menus of the 4AI module, configuration area “General settings”, “Diagnostics” detailed view

11.2.3 “Maintenance” detailed view

Open menu:

-  Select **4AI** in the navigation area.
Click  to open the configuration areas.
- In configuration area select **General settings**.
- Select **“Maintenance”** detailed view.

Overview of the menus:

Maintenance for General settings	
Levels 1 and 2	Description
Device information	Indicates device-specific data.
Displayed name	Indicates the name entered for the device.  The name is entered in the configuration area General settings → Parameter in the menu büS → Displayed name .
Identification number	Indicates the identification number of the device.
Serial number	Indicates the serial number of the device.
Firmware identification number	Indicates the identification number of the software used in the device.
Firmware version	Indicates the version of the software used in the device.
büS version	Indicates the büS version of the device.
Hardware version	Indicates the hardware version of the device.
Product type	Indicates the type designation of the device.
Manufacture date	Indicates the date on which the device was manufactured.
EDS version	Indicates the EDS version.
Device driver	Information on the device driver. This menu is only available in the Bürkert Communicator PC software.
Reset device	Menu for resetting and restarting the device.
Restart	Restart the device. A software reset is performed during the device reboot. The configuration and parameterisation settings for the device remain after the reboot.
Factory reset	Reset device to factory setting. When performing a factory reset, the corresponding settings defined for the device are overwritten by the factory settings.

Tab. 28: Menu of the 4AI module, configuration area “General settings”, “Maintenance” detailed view

12 4AO MODULE START-UP

12.1 Base setting of the analog outputs



The Bürkert Communicator software is required for the base setting.

The Bürkert Communicator software can be downloaded for free from the Bürkert website. <https://country.burkert.com/> → Type ME44.

In addition to the software, the USB-büS-Interface set, available as an accessory, is required.

In the menu option “General settings”, a quick base setting for all modules can be performed simultaneously using a wizard. These settings can then be individually adjusted for each channel afterwards. The general base setting is also optional, and can be ignored.

Base setting of the analog outputs channel 1 to channel 4 (observe sequence)		Factory default setting	Requirement
1.	Select operating mode.	not configured	mandatory
2.	Adjust the process variable of the analog output:		mandatory
	• Lower value	0	
	• Upper value	100	
3.	Set filter response time.	3.00 s	optional
4.	Configure error handling	Last valid value	optional
5.	Enter name for the input value.	no name provided	
6.	Set diagnostics.	Short circuit detection, open loop detection	

Tab. 29: Overview: Base settings of the analog outputs of the 4AO module

12.1.1 Open menu for setting the analog outputs in Bürkert Communicator

Required access rights: installer

Open menu:

→ Select **4AO** in the navigation area.
Click to open the configuration areas.

→ Select **Analog outputs** in the configuration area.

Select the desired channel in the **Parameters** detailed view.



The complete menu tree for setting the analog input is displayed after the output signal has been selected.

12.1.2 Select operating mode for analog output

Required access rights: installer

→ Select **Analog outputs** in the configuration area.

Select the desired channel in the **Parameters** detailed view.

→ Select **operating mode**.

→ Select output signal.

✓ You have selected the output signal for the analog output.

12.1.3 Adjust the process variable of the analog output

Calibration in the “Parameters” detailed view: Calibration by entering the lower and upper process values

→ Select **Analog outputs** in the configuration area.

Select the desired channel in the **Parameters** detailed view.

Adjust the lower process variable of the analog output:

→ Select **Value at xxx**. The display (0 mA, 4 mA or 0 V) depends on the selected output signal.

→ Enter value.

Adjust the upper process variable of the analog input:

→ Select **Value at xxx**. The display (20 mA, 2 V, 5 V or 10 V) depends on the selected output signal.

→ Enter value.

✓ You have adjusted the process variable of the analog output.

12.1.4 Set filter response time for the analog input

The filter response time determines the damping ratio for current or voltage fluctuations in the analog input.

Required access rights: installer

→ Select **Analog outputs** in the configuration area.

Select the desired channel in the **Parameters** detailed view.

→ Select **Filter response time**.

→ Enter value.

✓ You have set the filter response time for the analog input.

12.1.5 Set error handling for the analog input

Determines which value is output in the error state.

Required access rights: installer

→ Select **Analog outputs** in the configuration area.

Select the desired channel in the **Parameters** detailed view.

→ Select **Error handling**.

→ Select **last valid value** or **error value**.

✓ You have set the error handling for the analog input.

12.1.6 Enter name for the output value of the analog input

If required, a name can be entered for the output value of each analog input.

Required access rights: installer

→ Select **Analog outputs** in the configuration area.

Select the desired channel in the **Parameters** detailed view.

→ Enter **Input value name**.

→ Enter name.

✔ You have given the output value of the analog input a name.

12.1.7 Set diagnostics for analog output

The diagnostics can be used to configure the error detection.

Factory setting: Short-circuit detection

Required access rights: installer

→ Select **Analog outputs** in the configuration area.

Select the desired channel in the **Parameters** detailed view.

→ Select **Diagnostics**.

→ Select **Open loop** and/or **Short circuit detection**.

✔ You have set the diagnostics.

13 ADDITIONAL 4AO MODULE SETTINGS

13.1 Menus in the configuration area AO1 to AO4

The following overview and brief description of the menus contains the device-specific settings for the I/O module and not the description of the Bürkert Communicator software.

13.1.1 “Parameters” detailed view



The “Parameters” detailed view menu for the analog outputs AO1 to AO4 is extensively described in the chapter 4AO module start-up.

13.1.2 “Diagnostics” detailed view

Open menu:

- Select **4AO** in the navigation area.
Click **+** to open the configuration areas.
- Select **Analog outputs** in the configuration area.
- Select the desired channel in the detailed view **Diagnostics**.

Overview of the menus:



Diagnostics for Channel 1 to Channel 4 (Analog outputs 1...4)	
Levels 1	Description
Type	Indicates type of analog input.
Operating mode	Indicates the operating mode set for the analog input.
Input value	Indicates the voltage or current strength applied to the analog output. The displayed electrical size depends on the selected output signal. The modules are generally correctly calibrated by the manufacturer. If it is determined that the displayed output value deviates from the actual value, recalibration is required.
Output value	Indicates the process value issued on the fieldbus.

Tab. 30: Menus of the 4AO module, configuration area AO1 to AO4, “Diagnostics” detailed view




13.2 Menus in the configuration area “General settings”


13.2.1 “Parameters” detailed view

Open menu:

-  Select 4AO in the navigation area.
Click  to open the configuration areas.
- In configuration area select **General settings**.
- Select **“Parameter”** detailed view.

Overview of the menus:



Parameters for General settings	
Levels 1, 2 and 3	Description
Status LED	Colours and behaviour of the device status LED
Operating mode	Setting the various operating modes: NAMUR, fixed colour and LED off.
büS	Parameterisation of the device as a büS participant.
Displayed name	Issue name under which the device is displayed.
Location	Specify location to be shown for the device.
Description	The input window can be used to describe the device or for additional information on the device.  No entry required.
Advanced	Further settings for the device as participant of a network.
Unique device name	Assign communication ID for communication in the network.  If the communication ID is changed, the assigned partnership with another participant is lost.
Baud rate	Set transmission speed for the device as a büS participant or CANopen participant.
Fixed CANopen address	Assign address under which the device is operated as a büS participant or CANopen participant.
CANopen address	Address that is actually used.
CANopen status	Define the communication status for the device: The participant can be communicated with via SDOs. PDO communication is not possible. Operationally: the participant can independently send and receive process data.  The menu is only available when selecting the protocol CANopen.

Parameters for General settings	
Levels 1, 2 and 3	Description
Bus operating mode	Select communication: <ul style="list-style-type: none"> • Protocol CANopen • Protocol bÜS • Single device
Errors made by bÜS partners	• Device displays errors of the consumers (producer and/or consumer).
Deallocation delay	Time from the loss of a consumer to deletion of its configuration.
Alarm limits	Display and setting of the limits that, when exceeded or not reached, cause the device to trigger an error alert or warning.
Device temperature	
Error below	
Error above	
PDO configuration	Configuration of the cyclic process data objects:
PDO 1	 The cyclical process data objects are configured with a wizard that guides the user through the necessary operating steps. Inhibit time: Minimal time between two transfers before being resent. Event timer: Longest time between two transfers. Does not depend on whether the value has changed.
Reset to default values	Reset the PDO configuration to the default values
Configuration client	Serves to store a device configuration on another device.
Operating mode	Automatic switch-on: Another provider is awaited and then set to "Active".
Change operation mode	The set-up wizard launches.

Tab. 31: Menus of the 4AO module, configuration area "General settings", "Parameters" detailed view

13.2.2 “Diagnostics” detailed view

Open menu:

-  **Select** 4AO in the navigation area.
Click  to open the configuration areas.
- In configuration area select **General settings**.
- Select **“Diagnostics”** detailed view.

Overview of the menus:



Diagnostics for General settings	
Levels 1 and 2	Description
Device status	Information on the device status.
Operating duration	Indicates the operating duration over the entire life cycle of the device.
Operating duration since last boot	Indicates operating duration since the device's last start-up
Device temperature	Indicates device temperature applied to the device.
Min./max. Values	Minimum and maximum temperature values
Min. temperature	Minimum temperature
Max temperature	Maximum temperature
Device boot counter	Indicates the number of all reboots that the device has performed.
Transferable memory status	Storage and management of configuration settings possible. For settings see instructions “Central configuration management – transferring device configuration when replacing device”. The instructions can be found on the Bürkert website → Type ME43
büS status	Information on the büS network.
Receive errors	Indicates present receive errors.
Receive errors max.	Indicates all past and current receive errors.
Transmission errors	Indicates present transmission errors.
Transmission errors max.	Indicates all past and current transmission errors.
Reset error counter	Resets the two maximum values of the error counters.
CANopen status	Information on device's state of communication as büS network participant. Pre-operational or operational.
Logbook	Indicates system notifications
Configuration client	Settings for the backup of device configuration in an external device
Transferable memory status	Storage and management of configuration settings possible. For settings see instructions “Central configuration management – transferring device configuration when replacing device”. The instructions can be found on the Bürkert website → Type ME43
Status	Current device status

Diagnostics for General settings	
Levels 1 and 2	Description
Number of reconfigurations	Number of device reconfigurations


Tab. 32: Menus of the 4AO module, configuration area "General settings", "Diagnostics" detailed view

13.2.3 "Maintenance" detailed view

Open menu:

-  Select **4AO** in the navigation area.
Click  to open the configuration areas.
- In configuration area select **General settings**.
- Select **"Maintenance"** detailed view.

Overview of the menus:

Maintenance for General settings	
Levels 1 and 2	Description
Device information	Indicates device-specific data.
Displayed name	Indicates the name entered for the device.  The name is entered in the configuration area General settings → Parameter in the menu büS → Displayed name .
Identification number	Indicates the identification number of the device.
Serial number	Indicates the serial number of the device.
Firmware identification number	Indicates the identification number of the software used in the device.
Firmware version	Indicates the version of the software used in the device.
büS version	Indicates the büS version of the device.
Hardware version	Indicates the hardware version of the device.
Product type	Indicates the type designation of the device.
Manufacture date	Indicates the date on which the device was manufactured.
eds version	Indicates the EDS version.
Device driver	Information on the device driver. This menu is only available in the Bürkert Communicator PC software.
Reset device	Menu for resetting and restarting the device.
Restart	Restart the device. A voltage reset is performed during the device reboot. The configuration and parameterisation settings for the device remain after the reboot.
Factory reset	Reset device to factory setting. When performing a factory reset, the corresponding settings defined for the device are overwritten by the default values.

Tab. 33: Menu of the 4AO module, configuration area "General settings", "Maintenance" detailed view

14 8DI MODULE START-UP



The Bürkert Communicator software is required for the base setting.

The Bürkert Communicator software can be downloaded for free from the Bürkert website. <https://country.burkert.com/> → Type ME44.

In addition to the software, the USB-büS-Interface set, available as an accessory, is required.

In the menu option “General settings”, a quick base setting for all modules can be performed simultaneously using a wizard. These settings can then be individually adjusted for each channel afterwards. The general base setting is also optional, and can be ignored.

14.1 Base setting of digital inputs



Base setting of the digital inputs channel 1 to channel 8 (observe sequence)		Factory default setting	Requirement
1	Select operating mode	Digital	mandatory
2	Change channel name	–	optional
3	Input inversion	deactivated	optional
4	Wire break detection	deactivated	optional
5	Filter response time	0s	optional
6	• K factor	0	
7	• Lower flow rate	0	
8	• Lower frequency	0	
9	• Upper volume flow rate	0	
10	• Upper frequency	0	

Tab. 34: Base setting of digital inputs of the 8DI module

14.1.1 Open menu for setting the digital inputs in Bürkert Communicator

Required access rights: installer

Open menu

→  Select **8DI** in the navigation area. Click  to open the configuration areas.

→ Select **Digital inputs** > **Parameter** > **Setup**.

✓ A wizard guides you through the base device settings.

14.1.2 Sampling time configuration



The shorter the sample time, the faster a signal change is detected.

The longer the sampling time, the more accurate the frequency measurement.

The longer the sampling time, the lower the bus load.

→ Enter the sampling time.

14.1.3 Configuration of nominal operating mode

Operating mode	Function
Pulse counter	Counting of the incoming pulses over the entire operating period. The counter can be reset to 0 at: Digital Inputs > Maintenance > Reset totaliser > Pulse counter
Frequency	Frequency measurement at input in [Hz].
Flow	Calculated flow rate in [l/min].
Flow totaliser	Counting of the flow rate in [l] over the entire operating period. The counter can be reset to 0 at: Digital Inputs > Maintenance > Reset totaliser > Flow totaliser

Tab. 35: Configuration of multi-function inputs

14.1.4 Configuration of input filter

For “Frequency”, “Flow” or “Flow totaliser” operating mode.

To reduce signal fluctuations, one input filter with PT1 behaviour can be enabled per channel. The filter response time can be set from 1 to 10,000 ms, but must be greater than the set sampling time. Inputting 0 ms deactivates the filter.

14.1.5 Configuration of flow input

For “Flow” or “Flow Totaliser” operating mode.

→ Enter K factor in [Pulses/Litre].

A 2-point calibration is subsequently possible under:

Digital inputs > Maintenance > Flow input calibration.

14.1.6 Configuration of channel name

A user-specific name can be entered here for each channel.

14.1.7 Configuration of inversion

For inverting sensor signals in “Digital” operating mode.

14.1.8 Configuration of wire break detection

For activating or deactivating a wire break detection in “Digital” operating mode.


15 ADDITIONAL 8DI MODULE SETTINGS

15.1 Menus in size configuration inputs

The following overview and brief description of the menus contains the device-specific settings for the I/O module and not the description of the Bürkert Communicator software.

15.1.1 “Parameters” detailed view

Open menu:

-  Select **8DI** in the navigation area.
Click **+** to open the configuration areas.
- Select **Inputs** in the configuration area.
- Select **“Parameter”** detailed view.

Overview of the menus:


Menu	Description
Setup	Execute the base settings of the input module using a wizard.
Sampling time	The shorter the sample time, the faster a signal change is detected. The longer the sampling time, the more accurate the frequency measurement. The longer the sampling time, the lower the bus load.
Mark bus-outputs as invalid	To detect faulty bus output values, the faulty values can be marked as invalid. All other (correct) bus output values are not marked.
Channels 1 to 8	
Operating mode	The following operating modes are possible for these channels: Digital, Pulse counter, Frequency, Volume flow or Flow totaliser.
Channel name	A user-specific name can be entered here for each channel. The name then appears on the overview page of the Communicator.
Inversion	Menu only available for “Digital” operating mode. The digital input is inverted if the operating mode is “Active”.
Wire break detection	Menu only available for “Digital” operating mode. Activate or deactivate wire break detection for this channel. Wire break detection activated: In the case of a wire break, the device status “Error” is displayed depending on the LED mode set. The channel status LED is glowing red. An error message is entered in the logbook.
Filter response time	Menu only available for nominal operating modes “Frequency”, “Flow” and “Flow totaliser”. The filter response time can be set from 1 to 10,000 ms, but must be greater than the set sampling time. Inputting 0 ms deactivates the filter.

Menu	Description
K factor	Menu only available for nominal operating modes “Flow” and “Flow totaliser”. The K factor is a value [pulses/litre] by which the signal value of the sensor is multiplied to convert it to the real process variable [l/min]. If a value ≠ 0 is entered, the values of the 2-point calibration (following 4 menu options) are ignored.
Lower flow rate Lower frequency Upper volume flow rate Upper frequency	Menus only available for nominal operating modes “Flow” and “Flow totaliser”. 2-point calibration Input of the value in [l/min] or [Hz] The value can also be recorded in the calibration assistant under Digital inputs > Maintenance > Flow input calibration . If the K factor contains a value ≠ 0 in the menu, the inputs of the 2-point calibration are ignored!

Tab. 36: 8DI module menus, configuration area “Inputs”, “Parameters” detailed view

15.1.2 “Diagnostics” detailed view

Open menu:

-  Select **8DI** in the navigation area.
Click **+** to open the configuration areas.
- Select **Inputs** in the configuration area.
- Select **“Diagnostics”** detailed view.



Overview of the menus:

Menu	Description
Short circuit	Indicates whether a short circuit is present.
Wire break	Menu only available for “Digital” operating mode, and only if wire break detection has been enabled for at least 1 channel under Digital inputs > Parameters . A wire break is displayed when wire break detection is enabled.
Multifunction input status	Menu only available for nominal operating modes “Frequency”, “Flow” and “Flow totaliser”. Shows the current multifunction input status.
Out of specification	Indicates whether the input frequency is outside the specified range (> 4.5 kHz).
Error	If the input frequency is too high, the input is deactivated and an error is displayed (> 6 kHz). Restart the device to resolve the error.

Tab. 37: 8DI module menus, configuration area “Inputs”, “Diagnostics” detailed view

15.1.3 “Maintenance” detailed view

Open menu:

-  Select **8DI** in the navigation area.
Click  to open the configuration areas.
- Select **Inputs** in the configuration area.
- Select **“Diagnostic Select s”** detailed view.

Overview of the menus:



Menu	Description
Flow input calibration	2-point calibration of flow inputs. Calibration data will not be applied if the K factor is valid (not 0). A wizard guides users through the menu.
Reset pulse counters	It is only possible to reset the pulse counters when the “Pulse counter” operating mode has been configured. Configuration is carried out in Digital inputs > Parameter > Setup
Reset totaliser	Reset counters to 0 for “Flow totalizer input” and “Pulse counter” operating mode.

Tab. 38: 8DI module menus, configuration area “Inputs”, “Maintenance” detailed view

15.2 Menus in the configuration area “General settings”

15.2.1 “Parameters” detailed view

Open menu:

-  Select **8DI** in the navigation area.
Click  to open the configuration areas.
- In configuration area select **General settings**.
- Select **“Parameter”** detailed view.

Overview of the menus:



Menu	Description
Status LED	
Operating mode	Setting the various operating modes: NAMUR, fixed colour and LED off.
büS	Parameterisation of the device as a büS participant.
Displayed name	Device name under which the device is displayed in Bürkert Communicator.
Location	Device location. Shown in Bürkert Communicator beneath the device name.
Description	The input window can be used to describe the device or for additional information on the device. No entry required.
Advanced	Further device settings as a participant in a network.
Unique device name	Communication ID for communication in the network. Should not be changed. In case of changes, the assigned partnership to another participant is lost.
Baud rate	Transmission speed for the device as a büS participant or a CANopen participant. Must be identical for all the devices in a network.
(Fixed) CANopen address (node ID)	Manually selected device address.
CANopen address (Node ID)	Currently applied device address.
Bus operating mode	Configuring the various bus modes: büS, CANopen or single device. Single device: If the device is not operated in a network.

Menu	Description
CANopen status	<p>Communication state of the device.</p> <p>Pre-operational: Only acyclic (SDO) communication is possible with the fieldbus participant. Cyclic (PDO) communication is inactive.</p> <p>Operational: Acyclic (SDO) and cyclic (PDO) communication are possible with the participant.</p> <p>(Menu is only available for bus operation mode "CANopen".)</p>
Deallocation delay	Time from the loss of a consumer to deletion of its configuration.
Alarm limits	Setting the threshold values at which the device generates an error message or a warning if they are exceeded or undercut.
PDO configuration	Configuration of the cyclic process data objects:
PDO1	The information of channels 1 to 8 is transmitted as bit fields in the PDO 1 object.
PDO2	<p>When the multifunction inputs are assigned another input function (e.g. Frequency), the information from these channels is transmitted in other PDO objects: PDO2 for channels 1 and 2, and PDO3 for channels 3 and 4.</p> <p>The corresponding bit values in the PDO 1 object are invalid in this case and are to be ignored.</p> <p>PDO 2 and PDO 3 are then only generated by the device if the multifunction inputs are not configured as digital inputs.</p> <p>The values for "inhibit time" shown here are linked to the setting of the sampling time in their default state, are automatically adjusted when the sampling time is changed, and should thus not be changed manually.</p> <p>However, if the user is required to perform manual adjustment, the link to the sampling time is suspended.</p>
PDO3	
Multiplexed PDO	<p>Combination of PDO (cyclical data) and SDO (acyclical data)</p> <p>Inhibit time: Minimal time between two transfers before being resent.</p>
Configuration client	<p>Backup of device configuration in an external device.</p> <p>(Menu is only available for bus mode "bÜS".)</p>
Operating mode	Indicates the current operation mode.
Change operation mode	<p>Active: The configuration client is active and expects that a provider is also available. If this is not the case, a message appears.</p> <p>Automatically switch on: The configuration client is in standby mode until a provider is available. The device then switches automatically to "Active".</p>

Tab. 39: 8DI module menus, configuration area "General settings", "Diagnostics" detailed view

15.2.2 “Diagnostics” detailed view

Open menu:

-  Select **8DI** in the navigation area.
Click  to open the configuration areas.
- In configuration area select **General settings**.
- Select **“Diagnostics”** detailed view.



Overview of the menus:

Menu	Description
Device status	Information on the device status.
Operating duration	Indicates the operating duration over the entire life cycle of the device.
Operating duration since last boot	Indicates the operating duration since the last boot.
Device temperature	Current device temperature (<u>not</u> the ambient temperature!).
Voltage drops	Indicates the number of voltage drops since the last reboot.
Min./max. Values	
Min. temperature	Minimum temperature
Max temperature	Maximum temperature
Device boot counter	Indicates the number of device reboots over the entire life cycle.
Transferable memory status	Indicates whether an active provider is available.
büS status	Information on the büS network.
Receive errors	Indicates the number of current receive errors.
Receive errors max.	Maximum number of reception errors since device start-up.
Transmission errors	Indicates the number of current transmission errors.
Transmission errors max.	Maximum number of transmission errors since device start-up.
Reset error counter	Resets both maximum values.
CANopen status	Current device operating state.
Logbook	List of all error messages, including the time of occurrence in operating hours. Up to 20 messages can be saved.
Configuration client	Current state of the configuration client.
Transferable memory status	Indicates whether an active provider is available.
Status	Current device status
Reconfiguration counter	Number of device reconfigurations

Tab. 40: 8DI module menus, configuration area “General settings”, “Diagnostics” detailed view

15.2.3 “Maintenance” detailed view

Open menu:

-  Select **8DI** in the navigation area.
Click  to open the configuration areas.
- In configuration area select **General settings**.
- Select **“Maintenance”** detailed view.

Overview of the menus:

Menu	Description
Device information	Indicates device-specific data.
Displayed name	Indicates the name entered for the device. The name is entered under General settings > Parameter > büS > Displayed name .
Identification number	Indicates the identification number of the device.
Serial number	Indicates the serial number of the device.
Firmware identification number	Indicates the firmware identification number.
Firmware version	Indicates firmware version.
büS version	Indicates the büS version.
Hardware version	Indicates hardware version.
Product type	Indicates the product type.
Manufacture date	Indicates the date on which the device was manufactured.
EDS version	Indicates the EDS version.
Device driver	Information on the device driver. This menu is only available in the Bürkert Communicator software.
Reset device	Menu for resetting and restarting the device.
Restart	Restart the device. A voltage reset is performed during the device reboot. The configuration and parameterisation settings for the device remain after the reboot.
Factory reset	Reset device to factory setting.

Tab. 41: Menus of the 8DI module, configuration area “General settings”, “Maintenance” detailed view

16 8DO MODULE START-UP

16.1 Settings of the digital outputs



The Bürkert Communicator software is required for the base setting.

The Bürkert Communicator software can be downloaded for free from the Bürkert website. <https://country.burkert.com/> → Type ME44.

In addition to the software, the USB-büS-Interface set, available as an accessory, is required.

Base settings for the digital outputs channel 1 to 8	Factory default setting	Requirement
Select operating mode. • On-Off • Threshold value • PWM • PFM	not configured	mandatory
Parameterising the digital output according to the selected operating mode.	–	mandatory
Inverting the digital output.	Off	optional
Enter name for the input value of the digital output.	no name provided	optional
Set short circuit detection.	enabled	optional

Tab. 42: Overview: Base settings of the digital outputs of the 8DO module

16.1.1 Open menu for setting the digital outputs in Bürkert Communicator

Required access rights: installer

Open menu:

- Select **8DO** in the navigation area.
Click to open the configuration areas.
- Select **Digital outputs** in the configuration area.

The detailed view **Parameter** is displayed with the channels for setting the digital output.



The complete menu tree for setting the digital output is displayed after the operating mode has been selected.

16.1.2 Select operating mode for digital output

Required access rights: installer

- Select **Digital outputs** in the configuration area.
- Select the desired channel in the detailed view **Parameters**.
- Select **Operating mode**.

Possible selection:

- **On-Off**: Operating mode for 2 states, on or off.
- **Threshold value**: Threshold values are defined for the state switch of the output.
- **PWM**: Output with pulse-width modulation.
Fast: for controlling a proportional solenoid valve.
Slow: for controlling an on-off effector.
- **PFM**: Output with frequency modulation, e.g. for controlling a pump.

→ Select operating mode.

✓ You have selected the operating mode for the digital output.



Parameterisation of the digital output according to the selected operating mode is described in the following chapters [“16.2”](#) to [“16.5”](#).

16.2 Parametrising the digital output for the “On-Off” operating mode

There are only 2 states for the digital output in “On-Off” operating mode, namely on or off.

16.2.1 Set independent input

Required access rights: installer

→ Select **Digital outputs** in the configuration area.

Select the desired channel in the detailed view **Parameters**.

Select **operating mode**.

→ Select **independent input**.

→ Set **On**.

✓ You have activated the independent input.

16.2.2 Enter name for the input value of the digital output.

Required access rights: installer

→ Select **Digital outputs** in the configuration area.

Select the desired channel in the detailed view **Parameters**.

Select **Operating mode**.

→ Enter **Input value name**.

→ Enter name.

✓ You have given the input value of the digital output a name.

16.2.3 Set error handling

The error handling determines which state the digital output will take on in the event of an error.

Required access rights: installer

→ Select **Digital outputs** in the configuration area.

Select the desired channel in the detailed view **Parameters**.

Select **operating mode**.

→ Select **Error handling**.

→ Set error value.

Possible selection:

- **Last valid value**: Output of the last valid value.
- **Off**: The digital output remains off or is deactivated.
- **On**: The digital output remains on or is enabled.

→ Select state for error handling.

✓ You have set error handling for the digital output.

→ Select **Short circuit detection**.

→ Set **On**.

✓ You have enabled short circuit detection.

16.2.4 Inverting the digital output

The inversion reverses the circuit function of the digital output.

Required access rights: installer

→ Select **Digital outputs** in the configuration area.

Select the desired channel in the detailed view **Parameters**.

Select **operating mode**.

→ Select **Inversion**.

→ Set **On**.

✓ You have inverted the digital output.

16.2.5 Setting delay for the digital output

The delay sets the time between receiving a signal and switching the output.



If the delay lasts longer than the applied signal, the output is unchanged.

Required access rights: installer

→ Select **Digital outputs** in the configuration area.

Select the desired channel in the detailed view **Parameters**.

Select **operating mode**.

→ Select **Delay**.

→ Enter value.

✓ You have set the delay for the digital output.

16.2.6 Set power reduction

The power reduction saves energy, because a parametrisable PWM signal is activated instead of a permanent "on" signal.

2 parameters are set for the power reduction:

- The time frame until the power reduction becomes active [T_d].
- The duty cycle of the PWM signal.

The principle of power reduction:

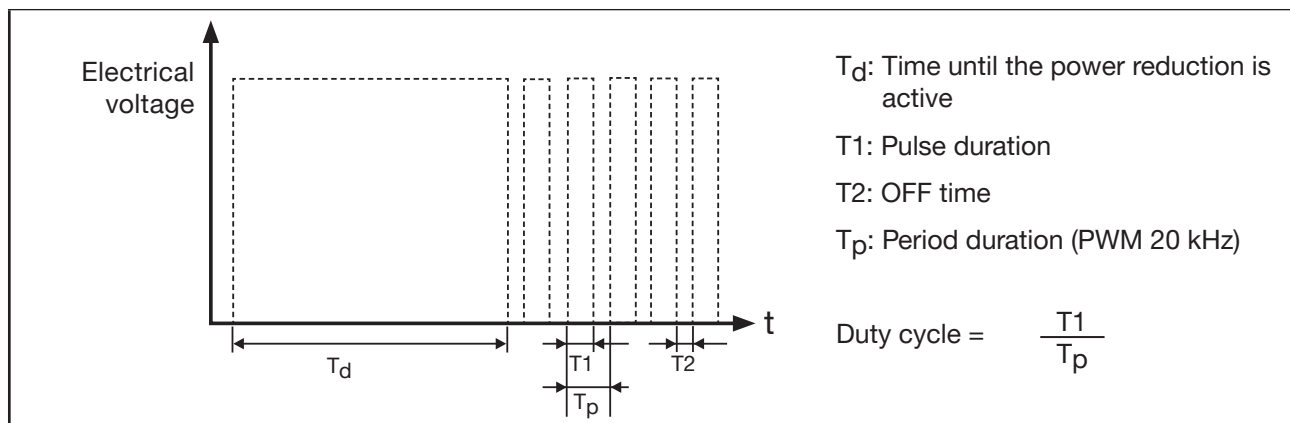


Fig. 15: The principle of power reduction

Set power reduction:

Required access rights: installer

→ Select **Digital Outputs** in the configuration area.

Select the desired channel in the detailed view **Parameters**.

Select **operating mode**.

→ Select **Power** reduction.

→ Select **Status**.

→ Select **Power reduction after** in order to set the time frame [T_d] until the power reduction becomes active.

→ Enter value.

→ Select **Duty cycle** to enter the duty cycle.

→ Enter the per cent value for the reduced output power.

✓ You have set the power reduction for the digital output.

16.3 Parameterising the digital output for “Threshold value” operating mode

In “Threshold value” operating mode, threshold values are selected for the state change of the output.

16.3.1 Overview: Parametrisation of the digital output for “Threshold value” operating mode

Parametrisation for the analog outputs 1 to 8 in “Threshold value” operating mode	Factory default setting	Requirement
Set threshold mode. Setting operation mode for toggling the output. • Hysteresis • Window	Hysteresis	mandatory
Set lower and upper threshold value.	lower threshold value 0 upper threshold value 100	mandatory
Set delay.	0 s (no delay)	optional
Set error handling.	Off	optional
Set power reduction.	Off	optional

Tab. 43: Overview: Parametrisation of the digital output for “Threshold value” operating mode

16.3.2 Set threshold mode

The threshold mode is used to define how the output reacts to pulses/signals that exceed the threshold values.

Selection:

- Hysteresis: The toggle function monitors whether a threshold value is not reached or is exceeded.
- Window: The toggle function monitors whether the monitored process is within the defined set-point range, or is outside of the defined upper and lower limits.

Effect of the threshold mode on the toggling behaviour of the digital output:

Threshold mode	Not inverted	Inverted
Hysteresis	<p>Contact</p> <p>ON</p> <p>OFF</p> <p>Lower Threshold value</p> <p>Upper Threshold value</p> <p>Process variable</p>	<p>Contact</p> <p>ON</p> <p>OFF</p> <p>Lower Threshold value</p> <p>Upper Threshold value</p> <p>Process variable</p>

Threshold mode	Not inverted	Inverted
Window	<p>Contact</p> <p>ON</p> <p>OFF</p> <p>Lower Upper</p> <p>Threshold value</p> <p>Process variable</p>	<p>Contact</p> <p>ON</p> <p>OFF</p> <p>Lower Upper</p> <p>Threshold value</p> <p>Process variable</p>

Tab. 44: Effect of the threshold mode on the toggling behaviour of the digital output

Set threshold mode:

Required access rights: installer

- Select **Digital Outputs** in the configuration area.
- Select the desired channel in the detailed view **Parameters**.
- Select **operating mode**.
- Select **Threshold mode**.
- Select **Window** or **Hysteresis**.

✓ You have set threshold mode.

16.3.3 Enter name for the input value of the digital output.

Required access rights: installer

- Select **Digital outputs** in the configuration area.
- Select the desired channel in the detailed view **Parameters**.
- Select **operating mode**.
- Enter **Input value name**.
- Enter name.

✓ You have given the input value of the digital output a name.

16.3.4 Set error handling

The error handling determines which state the digital output will take on in the event of an error.

Required access rights: installer

- Select **Digital outputs** in the configuration area.
- Select the desired channel in the detailed view **Parameters**.
- Select **operating mode**.
- Select **Error handling**.
- Set error value.

Possible selection:

- **Last valid value:** Output of the last valid value.
- **Off:** The digital output remains off or is deactivated.
- **On:** The digital output remains on or is enabled.

→ Select state for error handling.

✓ You have set error handling for the digital output.

→ Select **Short circuit detection**.

→ Set **On**.

✓ You have enabled short circuit detection.

16.3.5 Inverting the digital output

The inversion reverses the circuit function of the digital output.

Required access rights: installer

→ Select **Digital outputs** in the configuration area.

Select the desired channel in the detailed view **Parameters**.

Select **operating mode**.

→ Select **Inversion**.

→ Set **On**.

✓ You have inverted the digital output.

16.3.6 Setting delay for the digital output

The delay sets the time between receiving a signal and switching the output.



If the delay lasts longer than the applied signal, the output is unchanged.

Required access rights: installer

→ Select **Digital outputs** in the configuration area.

Select the desired channel in the detailed view **Parameters**.

Select **operating mode**.

→ Select **Delay**.

→ Enter value.

✓ You have set the delay for the digital output.

16.3.7 Set power reduction

The power reduction saves energy, because a parametrisable PWM signal is activated instead of a permanent “on” signal.

2 parameters are set for the power reduction:

- The time frame until the power reduction becomes active $[T_d]$.

- The duty cycle of the PWM signal.

The principle of power reduction:

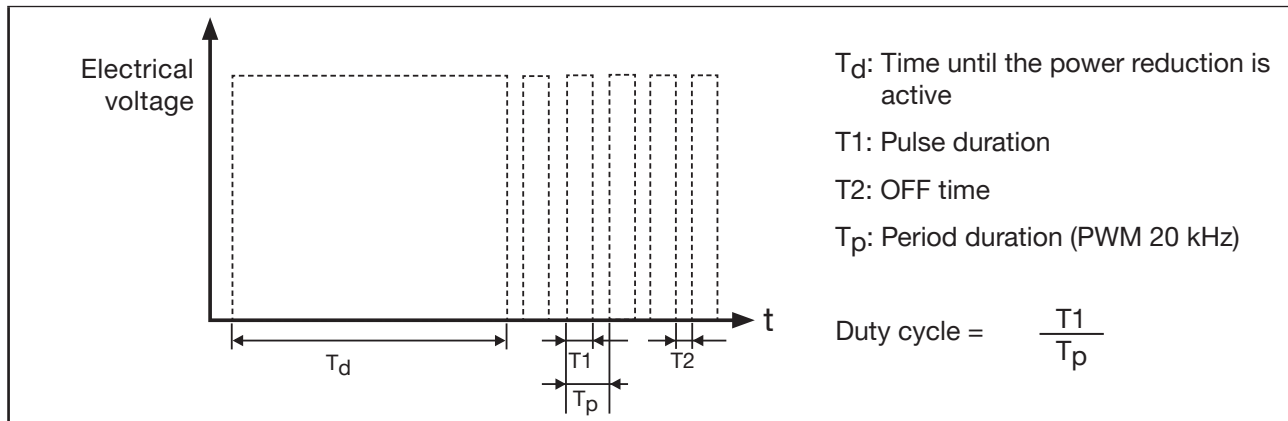


Fig. 16: The principle of power reduction

Set power reduction:

Required access rights: installer

→ Select **Digital outputs** in the configuration area.

Select the desired channel in the detailed view **Parameters**.

Select **operating mode**.

→ Select **Power** reduction.

→ Select **Status**.

→ Select **Power reduction after** in order to set the time frame [T_d] until the power reduction becomes active.

→ Enter value.

→ Select **Duty cycle** to enter the duty cycle.

→ Enter the per cent value for the reduced output power.

✓ You have set the power reduction for the digital output.

16.3.8 Set lower and upper threshold value

The lower and upper threshold values define the limits for the state change of the digital output.

Required access rights: installer

→ Select **Digital outputs** in the configuration area.

Select the desired channel in the detailed view **Parameters**.

Select **operating mode**.

→ Select **Lower threshold value**.

→ Enter value.

→ Select **Upper threshold value**.

→ Enter value.

✓ You have set the threshold values for the state change of the digital output.

16.4 Parameterising the digital output for “PWM” operating mode

In “PWM” operating mode, toggling of the digital output is controlled by a pulse-width-modulated signal. The ON time is based on the frequency (period duration) and the duty cycle.

16.4.1 Overview: Parametrising the digital output for “PWM” operating mode

Parametrisation for the analog outputs DO1 to DO8 in “PWM” operating mode (note the order)		Factory default setting	Requirement
1.	Setting operation mode for pulse-width modulation: <ul style="list-style-type: none"> • Fast PWM • Slow PWM 	Fast PWM	mandatory
2.	If Fast PWM is selected: Set frequency (number of toggle processes per period).	2 kHz	mandatory
	If Slow PWM is selected: <ul style="list-style-type: none"> • Set period duration. • Set minimum ON time. 	1.00000 min 125 ms	mandatory
3.	Set scaling: <ul style="list-style-type: none"> • Set the value for the process input that equates to a duty cycle of 0%. • Set the value for the process input that equates to a duty cycle of 100%. 	0 100	mandatory
	Set error handling.	Error value	optional

Tab. 45: Overview: Parametrisation of the digital output for “Threshold value” operating mode

Principle of “PWM” operating mode:

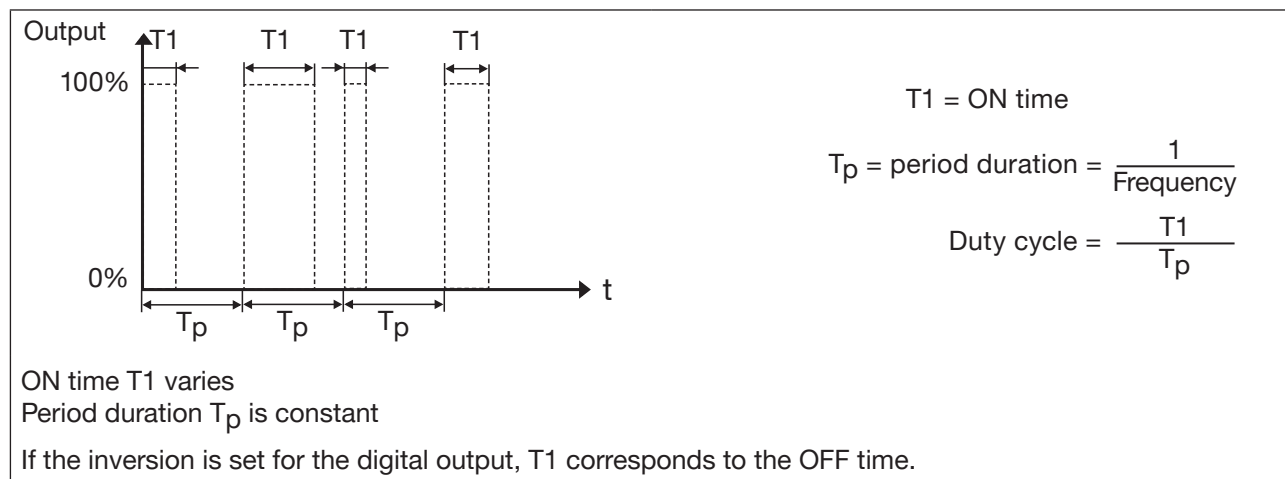


Fig.17: Principle of “PWM” operating mode

16.4.2 Setting operation mode for pulse-width modulation

With regard to pulse-width modulation of the digital output, there are 2 operation modes to choose from for the following criteria:

- **Slow PWM**

Suitable for: Period duration: 0.5 s...1 day

- **Fast PWM**

Suitable for: Frequency: 1 Hz...20 kHz

Required access rights: installer

→ Select **Digital outputs** in the configuration area.

Select the desired channel in the detailed view **Parameters**.

→ Select **operating mode**.

→ Select **Slow PWM** or **Fast PWM**.

✓ You have set the operation mode for pulse-width modulation of the digital output.

16.4.3 Enter name for the input value of the digital output.

Required access rights: installer

→ Select **Digital outputs** in the configuration area.

Select the desired channel in the detailed view **Parameters**.

Select **operating mode**.

→ Enter **Input value name**.

→ Enter name.

✓ You have given the input value of the digital output a name.

16.4.4 Set error handling

The error handling determines which state the digital output will take on in the event of an error.

Required access rights: installer

→ Select **Digital outputs** in the configuration area.

Select the desired channel in the detailed view **Parameters**.

Select **operating mode**.

→ **Select Error handling**.

→ Set error value.

Possible selection:

- **Last valid value**: Output of the last valid value.
- **Off**: The digital output remains off or is deactivated.
- **On**: The digital output remains on or is enabled.

→ Select state for error handling.

✓ You have set error handling for the digital output.

→ Select **Short circuit detection**.

→ Set **On**.

✓ You have enabled short circuit detection.

16.4.5 Inverting the digital output

The inversion reverses the circuit function of the digital output.

Required access rights: installer

→ Select **Digital outputs** in the configuration area.

Select the desired channel in the detailed view **Parameters**.

Select **operating mode**.

→ Select **Inversion**.

→ Set **On**.

✓ You have inverted the digital output.

16.4.6 Set frequency for fast PWM



This setting is only possible in operation mode **Fast PWM**.

Required access rights: installer

→ Select **Digital outputs** in the configuration area.

Select the desired channel in the detailed view **Parameters**.

Select **operating mode**.

→ Select **Frequency**.

→ Enter value.

✓ You have set the pulse-width modulation frequency of the digital output.

16.4.7 Setting period duration and minimum ON time for slow PWM



These settings are only possible in operation mode **Slow PWM**.

Required access rights: installer

→ Select **Digital outputs** in the configuration area.

Select the desired channel in the detailed view **Parameters**.

Select **operating mode**.

Setting period duration [T_p]:

→ Select **Period duration**.

→ Enter value.

✓ You have set the period duration for the pulse-width modulation of the digital output.

Setting the minimum ON time [T₁]:

→ Select **Minimum ON time**.

→ Enter value.

✓ You have set the minimum switch.on time for the pulse-width modulation of the digital output.

16.4.8 Setting “PWM – scaling” operating mode

Required access rights: installer

→ Select **Digital outputs** in the configuration area.

Select the desired channel in the detailed view **Parameters**.

Select **operating mode**.

Set the value for the process input that equates to a duty cycle of 0%:

→ Select **value at 0%**.

→ Enter value.

Set the value for the process input that equates to a duty cycle of 100%:

→ Select **value at 100%**.

→ Enter value.

✓ You have set the scaling for the pulse-width modulation of the digital output.

16.5 Parameterising the digital output for “PFM” operating mode

In “PFM” operating mode, the toggling of the digital output is controlled by a pulse frequency-modulated signal. The number of switch pulses (frequency) varies depending on the input value and the maximum frequency. The ON time corresponds to pulse width.

16.5.1 Overview: Parametrisation of the digital output for “PFM” operating mode

Parametrisation for the analog outputs DO1 to DO8 in “PFM” operating mode	Factory default setting	Requirement
Set maximum frequency (maximum number of pulses per unit of time).	180 1/min (180 pro Minute)	mandatory
Set pulse width (ON time).	200 ms	mandatory
Set scaling: <ul style="list-style-type: none"> Set the value for the process input for which no pulse is issued (0% of maximum frequency). Set the value for the process input for which the maximum number of pulses is issued (100% of maximum frequency). 	0 100	mandatory
Set error handling.	Error value	optional

Tab. 46: Overview: Parametrisation of the digital output for “Threshold value” operating mode

Principle of “PFM” operating mode:

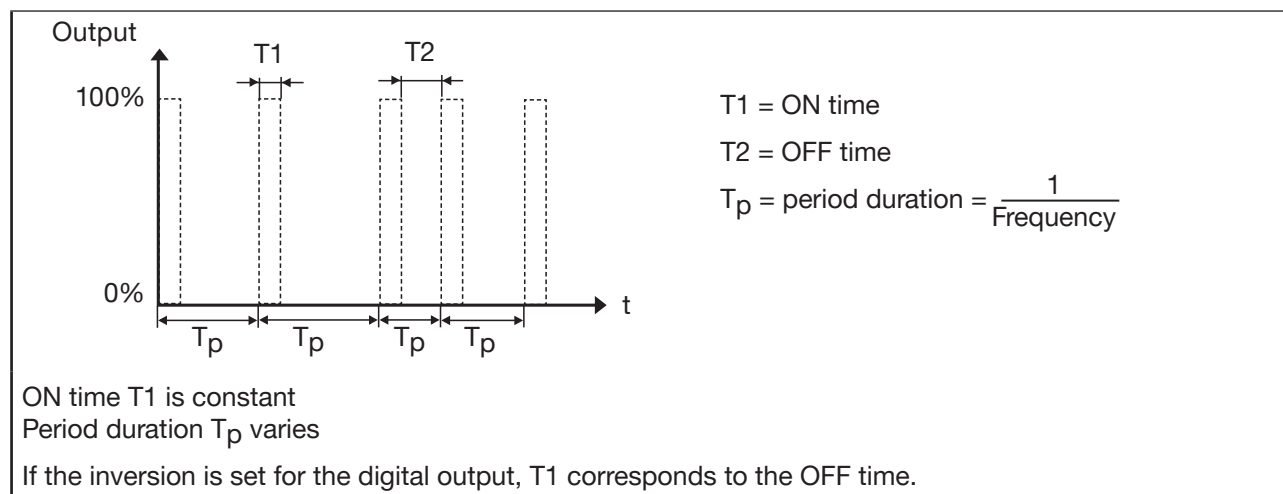


Fig.18: Principle of “PWM” operating mode

16.5.2 Enter name for the input value of the digital output.

Required access rights: installer

→ Select **Digital outputs** in the configuration area.

Select the desired channel in the detailed view **Parameters**.

Select **operating mode**.

→ Enter **Input value name**.

→ Enter name.

✓ You have given the input value of the digital output a name.

16.5.3 Set error handling

The error handling determines which state the digital output will take on in the event of an error.

Required access rights: installer

→ Select **Digital outputs** in the configuration area.

Select the desired channel in the detailed view **Parameters**.

Select **operating mode**.

→ Select **Error handling**.

→ Set error value.

Possible selection:

- **Last valid value**: Output of the last valid value.
- **Off**: The digital output remains off or is deactivated.
- **On**: The digital output remains on or is enabled.

→ Select state for error handling.

✓ You have set error handling for the digital output.

→ Select **Short circuit detection**.

→ Set **On**.

✓ You have enabled short circuit detection.

16.5.4 Inverting the digital output

The inversion reverses the circuit function of the digital output.

Required access rights: installer

→ Select **Digital outputs** in the configuration area.

Select the desired channel in the detailed view **Parameters**.

Select **operating mode**.

→ Select **Inversion**.

→ Set **On**.

✓ You have inverted the digital output.

16.5.5 Setting maximum frequency for the digital output

The maximum frequency defines the maximum number of pulses per unit of time for the digital output.

Required access rights: installer

→ Select **Digital outputs** in the configuration area.

Select the desired channel in the detailed view **Parameters**.

Select **operating mode**.

→ Select **Maximum frequency**.

→ Enter the value for the maximum frequency.

✓ You have set the maximum frequency for the digital output.

16.5.6 Setting pulse width

The pulse width is used to set the ON time per pulse for the digital output.

Required access rights: installer

→ Select **Digital outputs** in the configuration area.

Select the desired channel in the detailed view **Parameters**.

Select **operating mode**.

→ Select **Pulse width**.

→ Enter the value for the pulse width (ON time per pulse).

✓ You have set the pulse width for the digital output.

16.5.7 Set scaling

Required access rights: installer

→ Select **DO1** (or corresponding output) in the configuration area.

The **"Parameters"** detailed view is displayed with the menus for setting the digital output.

Set the value for the process input for which no pulse is issued (0% of maximum frequency):

→ Select **value at 0%**.

→ Enter value.

Set the value for the process input for which the maximum number of pulses is issued (100% of maximum frequency):

→ Select **value at 100%**.

→ Enter value.

✓ You have set the scaling for the pulse-frequency modulation of the digital output.



17 ADDITIONAL 8DO MODULE SETTINGS

17.1 Menus in the configuration area “General settings”




The following overview and brief description of the menus contains the device-specific settings for the I/O module and not the description of the Bürkert Communicator software.



17.1.1 “Parameters” detailed view



Open menu:

-  Select **8DO** in the navigation area.
Click  to open the configuration areas.
- In configuration area select **General settings**.
- Select **“Parameter”** detailed view.

Overview of the menus:

Parameters for General settings	
Levels 1, 2 and 3	Description
Status LED	Setting the LED to display the device status.
Operating mode	Set LED operation mode for displaying device states. The following LED modes can be selected: <ul style="list-style-type: none"> • NAMUR operation mode, for description see “8.2 LED for indicating the device status” on page 24. • LED off.
büS	Parameterisation of the device as a büS participant.
Displayed name	Issue name under which the device is displayed.  No entry required.
Location	Indicates location of device
Description	The input window can be used to describe the device or for additional information on the device.  No entry required.
Advanced	Further settings for the device as participant of a network.
Unique device name	Assign communication ID for communication in the network.  If the communication ID is changed, the assigned partnership with another participant is lost.
Baud rate	Set transmission speed for the device as a büS participant or CANopen participant.
büS address	Assign address under which the device is operated as a büS participant or CANopen participant.



Parameters for General settings	
Levels 1, 2 and 3	Description
Bus operating mode	Select communication: <ul style="list-style-type: none"> • Protocol CANopen • Protocol bÜS • Single device
CANopen status	Define the communication status for the device: The participant can be communicated with via SDOs. PDO communication is not possible. Operationally: the participant can independently send and receive process data.  The menu is only available when selecting the protocol CANopen.
Show errors from bÜS consumers	The unit will also display errors if one of its consumers (producer and/or consumer) has an error.
Deallocation delay	Time from the loss of a consumer to deletion of its configuration.
Alarm limits	Display and setting of the limits that, when exceeded or not reached, cause the device to trigger an error alert or warning.
supply voltage	Indicates the limit values for the supply voltage.
Error below	Indicates the limit for supply voltage, the failure to meet which triggers an error alert from the device. Note hysteresis!
Error above	Indicates the limit for supply voltage, the exceedance of which triggers an error alert from the device. Note hysteresis!
Error above	Indicates the limit for device temperature, the exceedance of which triggers an error alert from the device. Note hysteresis!
Error below	Indicates the limit for device temperature, the failure to meet which triggers a warning from the device. Note hysteresis!
Hysteresis	Display of the hysteresis for the limit values of the supply voltage.  The hysteresis is centrally assigned to the limit. Example: Error above 26.4 V Hysteresis 0.5% V The error is output at a supply voltage > 26.9 V and cancelled again at a supply voltage < 25.9 V.
Device temperature	Indicates and sets the limits for device temperature.
Error above	Indicates the limit for device temperature, the exceedance of which triggers an error alert from the device. Note hysteresis!
Error below	Indicates the limit for device temperature, the failure to meet which triggers a warning from the device. Note hysteresis!

Parameters for General settings	
Levels 1, 2 and 3	Description
Warning above	Setting the limit for device temperature, the exceedance of which triggers a warning from the device. Note hysteresis!
Warning below	Setting the limit for device temperature, the failure to meet which triggers a warning from the device. Note hysteresis!
Hysteresis	<p>Indicates the hysteresis for the device temperature limits.</p> <p> The hysteresis is centrally assigned to the limit.</p> <p>Example:</p> <p>Warning above 80 °C</p> <p>Hysteresis 4 °C</p> <p>The warning is issued for a device temperature > 82 °C and is resolved with a device temperature < 78 °C.</p>
Diagnostics	Menu for enabling and deactivating the diagnostics function.
Active	<p>Diagnostics function enabled:</p> <ul style="list-style-type: none"> • The LED for the device status display shows the device status depending on the operation mode that has been set. • Alerts are entered in the logbook.
Inactive	<p>Diagnostics function deactivated:</p> <ul style="list-style-type: none"> • The LED for the device status display does not show the device status. • There is no entry of errors in the logbook.
PDO configuration	Configuration of the cyclic process data objects:
PDO 1	 The cyclical process data objects are configured with a wizard that guides the user through the necessary operating steps.
Reset to default values	Reset the PDO configuration to the default values
Configuration client	Serves to store a device configuration on another device.
Operating mode	<p>Active: Configuration is managed by a unit.</p> <p>Inactive: Configuration is not managed by a unit.</p> <p>Automatic switch-on: Another provider is awaited and then set to "Active".</p>
Change operation mode	The set-up wizard launches.

Tab. 47: Menus of the 8DO module, configuration area "General settings", "Parameters" detailed view

17.1.2 “Diagnostics” detailed view

Open menu:

-  Select **8DO** in the navigation area.
Click  to open the configuration areas.
- In configuration area select **General settings**.
- Select **“Diagnostics”** detailed view.



Overview of the menus:

Diagnostics for General settings	
Levels 1 and 2	Description
Device status	Information on the device status.
Operating duration	Indicates the operating duration over the entire life cycle of the device.
Device temperature	Indicates device temperature
Min./max. Values	Indicates minimum and maximum measured device temperature.
Device boot counter	Indicates device reboot throughout the entire device life cycle.
Transferable memory status	Storage and management of configuration settings possible. For settings see instructions “Central configuration management – transferring configuration data when replacing device”. The instructions can be found on the Bürkert website → Type ME43.
Current system time	Indicates date and time.
büS status	Information on the büS network.
Receive errors	Indicates current receive errors.
Receive errors max.	Indicates all receive errors since last reboot.
Transmission errors	Indicates current transmission errors.
Transmission errors max.	Indicates all transmission errors since last reboot.
Reset error counter.	Reset the error counter for receive and transmission errors to 0.
CANopen status	Information on device’s state of communication as büS network participant. Pre-operational or operational.
Logbook	Menu for displaying and managing logbook entries.
Configuration client	
Transferable memory status	Storage and management of configuration settings possible.
Status	Current device status
Number of reconfigurations	Number of device reconfigurations
Dosing function	Indicates whether the dosing function is activated.


Tab. 48: 8DO module menus, configuration area “General settings”, “Diagnostics” detailed view

17.1.3 “Maintenance” detailed view

Open menu:

-  Select **8DO** in the navigation area.
Click  to open the configuration areas.
- In configuration area select **General settings**.
- Select **“Maintenance”** detailed view.

Overview of the menus:

Maintenance for General settings	
Levels 1 and 2	Description
Device information	Indicates device-specific data.
Displayed name	Indicates the name entered for the device.  The name is entered in the configuration area General settings → Parameter in the menu büS → Displayed name .
Identification number	Indicates the identification number of the device.
Serial number	Indicates the serial number of the device.
Firmware identification number	Indicates the identification number of the firmware used in the device.
Firmware version	Indicates the version of the firmware used in the device.
büS version	Indicates the büS version of the device.
Hardware version	Indicates the hardware version of the device.
Product type	Indicates the type designation of the device.
Manufacture date	Indicates the date on which the device was manufactured.
eds version	Indicates the EDS version.
Device driver	Information on the device driver. This menu is only available in the Bürkert Communicator PC software.
Reset device	Menu for resetting and restarting the device.
Restart	Restart the device. A software reset is performed during the device reboot. The configuration and parameterisation settings for the device remain after the reboot.
Factory reset	Reset device to factory setting. When performing a factory reset, the corresponding settings defined for the device are overwritten by the factory settings.

Tab. 49: Menus of the 8DO module, configuration area “General settings”, “Maintenance” detailed view

18 COMMISSIONING OF 8-DO MODULE - LIQUID DOSING OPEN LOOP (LDO)



Functional description:

Liquid Dosing Open Loop (LDO) represents an addition to the existing modes of the 8-DO module version, Type ME44. The sub-functions described in chapter 16 remain unchanged. LDO allows for time-based switching of outputs with higher resolution compared to existing operating modes, making it particularly suitable, for example, for highly precise dosing applications. The Pulse and Dosing modes are new.

18.1 Base settings of the digital outputs



The Bürkert Communicator software is required for the base setting.

The Bürkert Communicator software can be downloaded free of charge from the Bürkert website. <https://country.burkert.com/> Type ME44.

In addition to the software, the USB-büS-Interface set, available as an accessory, is required.

Base settings for the digital outputs DO1 to DO8	Factory default setting	Requirement
Select operating mode. • On-Off • Threshold value • PWM • PFM • Pulse • Dosing	not configured	mandatory
Parameterising the digital output according to the selected operating mode.	–	mandatory
Inverting the digital output.	Off	optional
Enter name for the input value of the digital output.	no name provided	optional
Set short circuit detection.	enabled	optional
Power reduction	enabled	optional

18.1.1 Menu for the settings for the digital outputs

Required access rights: installer

Open menu:

→ Select **8DO** in the navigation area.

Click to open the configuration areas.

→ Select **Digital outputs** in the configuration area.

The **"Parameters"** detailed view is displayed with the menus for setting the digital output.



The complete menu tree for setting the digital output is displayed after the operating mode has been selected.

18.1.2 Select operating mode for digital output

Required access rights: installer

→ Select **Digital outputs** in the configuration area.

The **"Parameters"** detailed view is displayed with the menus for setting the digital output.

→ Select **channel x**.

→ Select **operating mode**.

Possible selection:

- **On-Off**: Operating mode for 2 states, on or off.
 - **Threshold value**: Threshold values are defined for the state switch of the output.
 - **PWM**: Output with pulse-width modulation.
 - Fast: for controlling a proportional solenoid valve.
 - Slow: for controlling an on-off effector.
 - **PFM**: Output with frequency modulation, e.g. for controlling a pump.
- Select operating mode.
- **Pulse**: Determination of a fixed pulse time at the output
 - **Dosing**: Determination of a desired dosing quantity (requires adjustment)

✓ You have selected the operating mode for the digital output.



Parametrisation of the digital output according to the selected operating mode is described in the following chapters ["18.3"](#) to ["18.4"](#).

18.1.3 Inverting the digital output

The inversion reverses the circuit function of the digital output.

Required access rights: installer

→ Select **Digital outputs** in the configuration area.

The **"Parameters"** detailed view is displayed with the menus for setting the digital output.

→ Select **channel x**.

→ Select **Inversion**.

→ Set **On**.

✓ You have inverted the digital output.

18.1.4 Enter name for the input value of the digital output.

Required access rights: installer

→ Select **Digital outputs** in the configuration area.

The **"Parameters"** detailed view is displayed with the menus for setting the digital output.

→ Select **channel x**.

→ Select **channel name**.

→ Enter name.

✓ You have given the input value of the digital output a name.

18.2 Behaviour of outputs under the “Pulse” and “Dosing” operating modes

“Fig.19” shows the relationship between the behaviour of the output and the rising edge of the trigger, whose signal starts the pulse time. Other triggers are ignored for as long as the output is active.

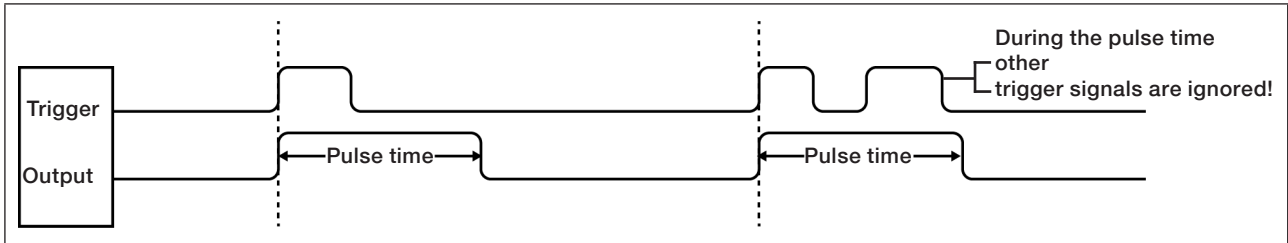


Fig.19: Behaviour of the output in relation to the trigger

By pressing the **Manual override** button, you can activate the respective output. “Fig.20” shows the behaviour. Manual override allows an output to be kept active for a longer period than the predefined pulse time. This allows, for example, the execution of flushing processes; its use is optional. Active dosing is cancelled by manual override, causing the output to deactivate as well. During the active pulse time, other transmitted triggers are ignored.

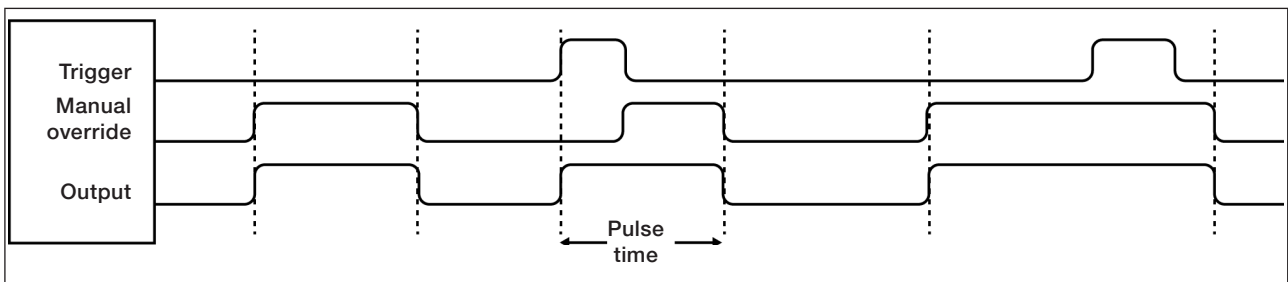


Fig.20: Behaviour of the output during manual override (Man. Set)

By pressing the **Cancel Dosing** button, the respective output can be deactivated, thereby allowing, for example, an impulse to be aborted. “Fig.21” demonstrates its reset-dominant behaviour.

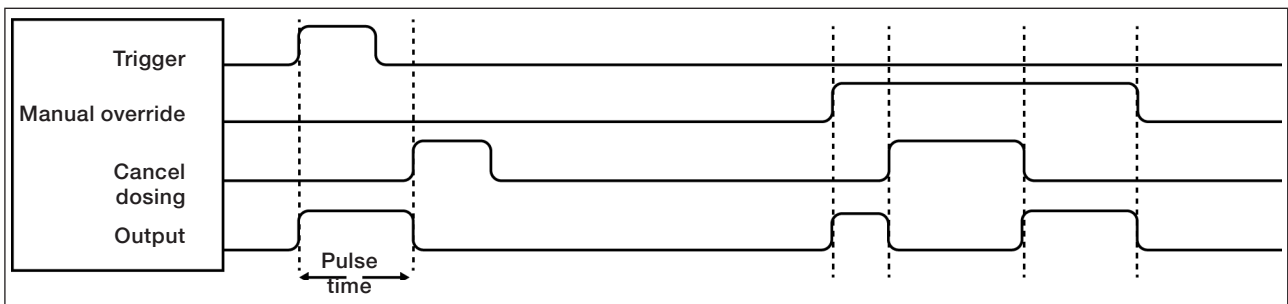


Fig.21: Behaviour of the output during dosing cancellation (Man. Reset)

“Fig.22” Shows the timing of the individual output signals in relation to each other. When the trigger is activated, the time delay until the respective output is activated can be up to 10 ms. This time difference varies between different channels.

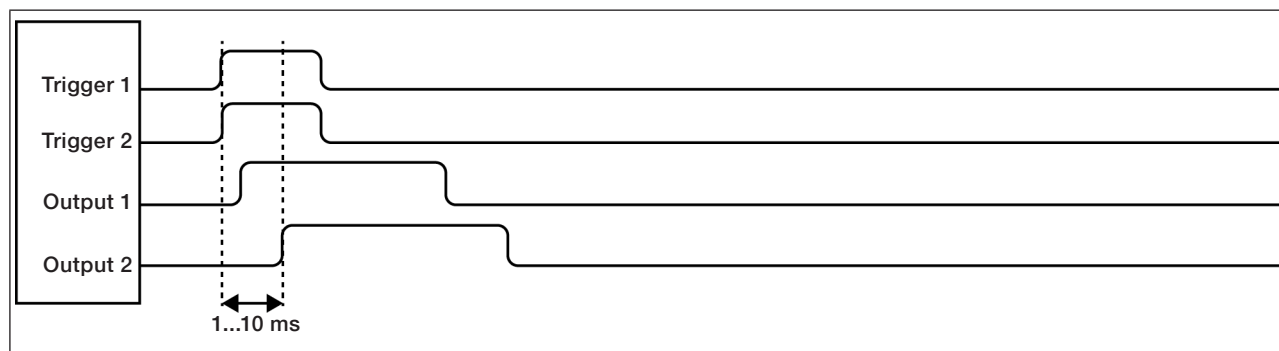


Fig.22: Timing of the output signal of individual channels based on the trigger signal

18.3 Parametrising the digital output for the “Pulse” operating mode

In “Pulse” operating mode, a fixed time is predetermined as the pulse at the output of the channel and is activated by the rising edge of a trigger signal. In contrast to the “On/Off” operating mode, an internal timer is used, thereby avoiding inaccuracies caused by communication and internal cycles. This allows for the output of a highly precise signal ($\pm 10 \mu\text{s}$).

In “Pulse” operating mode, this is achieved through a pre-defined pulse time and activation of the corresponding output by a trigger.

18.3.1 Overview: Parametrisation of the digital output for “Pulse” operating mode



Parametrisation for the analog outputs DO1 to DO8 in “Pulse” operating mode	Factory default setting	Requirement
Set-point value source	fixed	optional
Pulse duration	1.0 s	optional
Independent input	Off	optional
Channel name	Channel No.	optional
Troubleshooting	Off	optional
Inversion	Off	optional
Power reduction	On	optional

Tab. 50: Overview: Parametrisation of the digital output for “Pulse” operating mode

18.3.2 Open menu for setting the digital outputs in Bürkert Communicator

Required access rights: installer

Open menu:

→  Select **8DO** in the navigation area.
Click  to open the configuration areas.

→ Select **Digital outputs** in the configuration area.

The “Parameters” detailed view is displayed with the menus for setting the digital output.

18.3.3 “Pulse” operating mode - Set-point value source for digital output

Gives the set-point value source for the pulse time source.

Required access rights: installer

→ Select **Digital outputs** in the configuration area.

The **"Parameters"** detailed view is displayed with the menus for setting the digital output.

→ Select **channel x**.

→ Select **set-point value** source.

→ **Fixed**: Fixed pulse duration

→ **Pulse duration**: provide the time

→ **büS**: Pulse duration is taken from the büS network

✓ You have set the set-point value source for the digital output.

18.3.4 "Pulse" operating mode - independent input

Indicates whether a separate input value is used for this channel or a bit from the bit field.

Required access rights: installer

→ Select **Digital outputs** in the configuration area.

The **"Parameters"** detailed view is displayed with the menus for setting the digital output.

→ Select **channel x**.

→ **Independent input** Select Off or On

✓ You have set independent output for the digital output.

18.3.5 "Pulse" operating mode - set error handling

The error handling determines which state the digital output will take on in the event of an error.

Required access rights: installer

→ Select **Digital outputs** in the configuration area.

The **"Parameters"** detailed view is displayed with the menus for setting the digital output.

→ Select **channel x**.

→ Select **Error handling**

Possible selection:

- **Off**: The digital output remains off or is deactivated
- **On**: The digital output remains on or is enabled.

→ Select state for error handling.

✓ You have set error handling for the digital output.

Enable short circuit detection. (A short circuit interrupts an active pulse).

→ Select **Short circuit detection**.

→ Set **On**.

✓ You have enabled short circuit detection.

18.3.6 "Pulse" operating mode - set power reduction

The power reduction saves energy, because a parametrisable PWM signal is activated instead of a permanent "on" signal.

2 parameters are set for the power reduction:

- The time frame until the power reduction becomes active [Td].
- The duty cycle of the PWM signal.

The principle of power reduction:



With rapidly successive short pulses smaller than $[T_d]$, the absorbed energy can be higher.

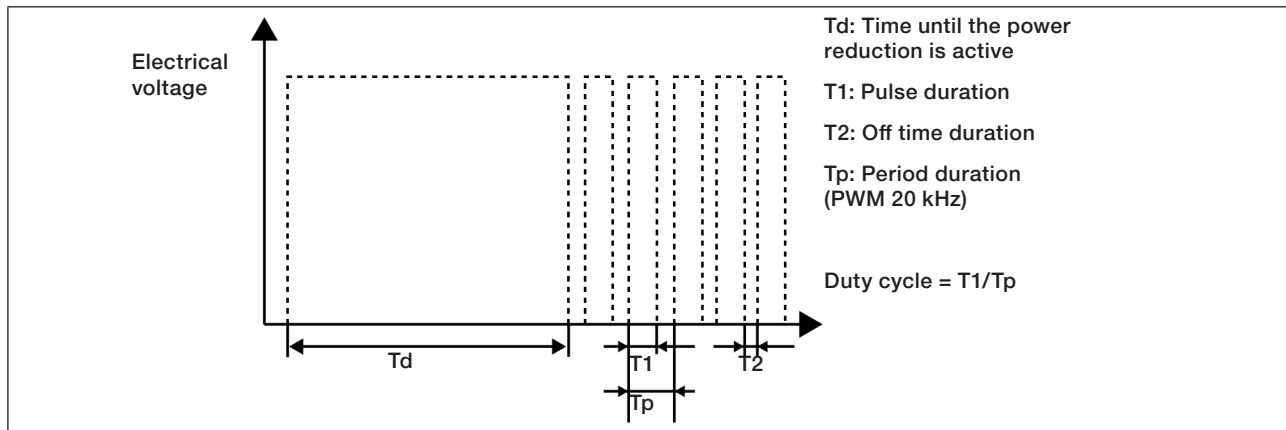


Fig.23: Timing of the output signal of individual channels based on the trigger signal

Set power reduction:

Required access rights: installer

→ Select **Digital outputs** in the configuration area.

The **"Parameters"** detailed view is displayed with the menus for setting the digital output.

→ Select **channel x**.

→ Select **Power reduction**.

→ Select **Status**.

→ Set **Active** to enable the power reduction.

→ Select **Power reduction after** in order to set the time frame $[T_d]$ until the power reduction becomes active.

→ Enter value.

→ Select **Duty cycle** to enter the duty cycle.

→ Enter the per cent value for the reduced output power.

✓ You have set the power reduction for the digital output.

18.4 Parametrising the digital output for "Dosing" operating mode

In the "Dosing" operating mode, a desired dosing quantity is dispensed. This operating mode is based on the pulse output (for further information see chapter "18.3"). The output is switched based on a pre-determined dosing quantity for a pulse duration determined during a previous adjustment. The previous adjustment is mandatory for this (see chapter "18.4.7"). The pulse duration is controlled, and changes to system parameters (e.g. pressure, properties of the dosing medium) affect the dosing quantity, thus necessitating an adjustment.

18.4.1 Overview: Parametrisation of the digital output for “Dosing” operating mode

Parametrisation for the analog outputs DO1 to DO8 in the “Dosing” operating mode	Factory default setting	Requirement
Set-point value source	fixed	optional
Dosing quantity	1.0 ml	optional
Adjustment	–	optional
Independent input	Off	optional
Channel name	Channel No.	optional
Troubleshooting	Off	optional
Inversion	Off	optional
Power reduction	On	optional

Tab. 51: Overview: Parametrisation of the digital output for “Dosing” operating mode

18.4.2 Open menu for setting the digital outputs in Bürkert Communicator

Required access rights: installer

Open menu:

- Select **8DO** in the navigation area.
Click **+** to open the configuration areas.
- Select **Digital outputs** in the configuration area.

The “**Parameters**” detailed view is displayed with the menus for setting the digital output.



The complete menu tree for setting the digital output is displayed after the operating mode has been selected.

18.4.3 “Dosing” operating mode - Set the set-point value source for digital output

This sets the set-point value source for the dosing quantity.

Required access rights: installer

- Select **Digital outputs** in the configuration area.

The “**Parameters**” detailed view is displayed with the menus for setting the digital output.

- Select **channel x**.
- Select **set-point value** source.
 - **Fixed**: Fixed dosing quantity
 - **Dosing quantity**: set the quantity
 - **büS**: Dosing quantity is taken from the büS network

You have set the set-point value source for the digital output.

18.4.4 “Dosing” operating mode - adjustment

! The “Dosing” operating mode requires adjustment before use. To carry out the adjustment, the dosing quantity must be measured. For this purpose, a sufficiently accurate scale can be used. The entire calibration process is carried out in the Communicator. Once the adjustment has been initiated, the user will be guided step by step through the process with instructions displayed on the screen. Based on the correlation between pulse duration and the resulting dosing quantity determined during adjustment, extrapolation can be performed. For optimal results, the adjustment should be as close as possible to the desired dosing quantity in the application.

Wizard for adjusting the quantity or volume for a dosing process.

Required access rights: installer

→ Select **Digital outputs** in the configuration area.

The **“Parameters”** detailed view is displayed with the menus for setting the digital input.

→ Select **channel x**.

→ Select **adjustment**.

→ Select **Adjust dosing**.

The wizard starts.

! The adjustment is an iterative process. The accuracy of the dosing can be improved by repetition.

→ Select **Dosing dimension** (volume or mass).

→ Set the target dosing quantity and duration.

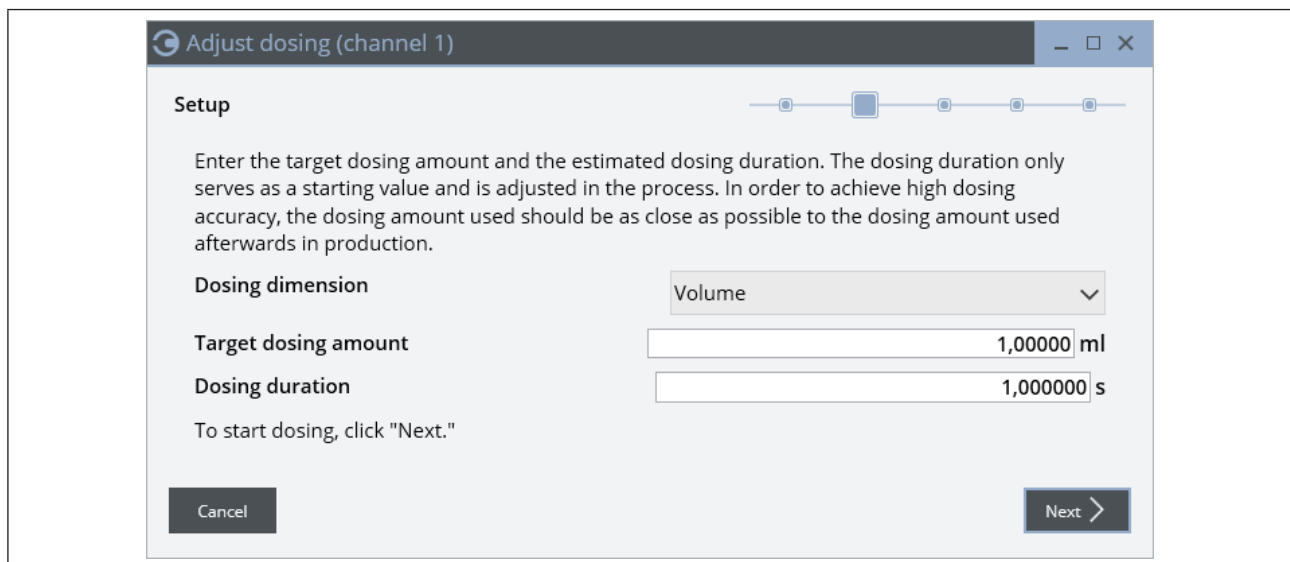


Fig.24: Adjust dosing

→ **Save adjustment**, if the measured dosing quantity matches the target dosing quantity.

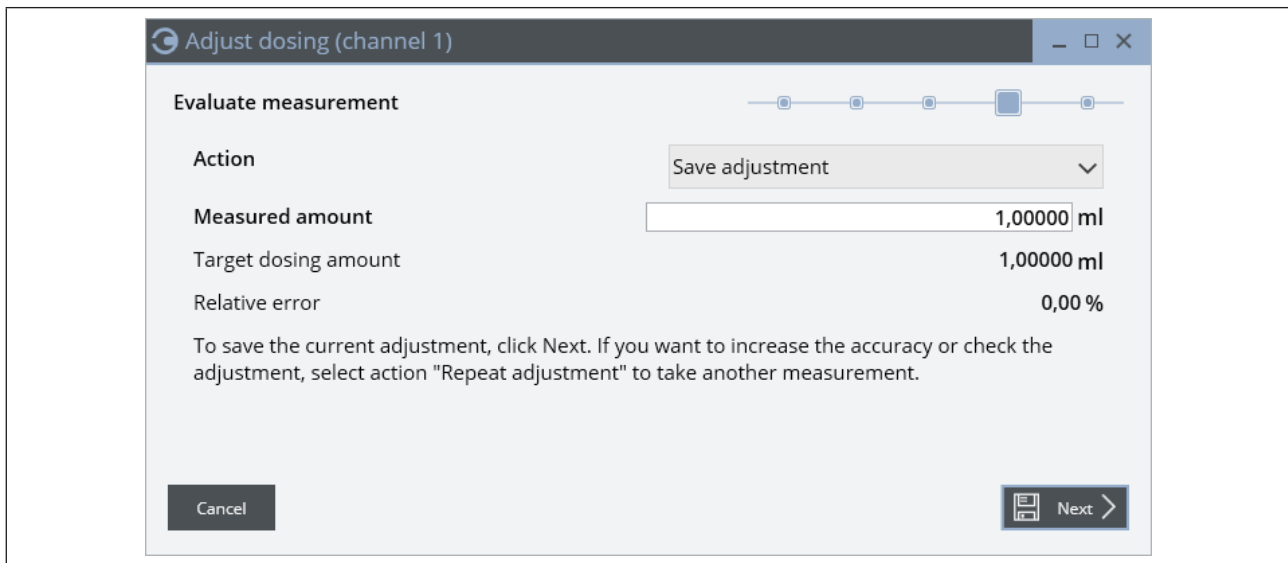


Fig.25: Save adjustment

→ **Repeat adjustment** if the measured dosing quantity does not match the target dosing quantity.
Input the measured value under **Measured amount**.

The relative error and the next pulse duration are automatically calculated.

→ The next dosing process is then triggered.

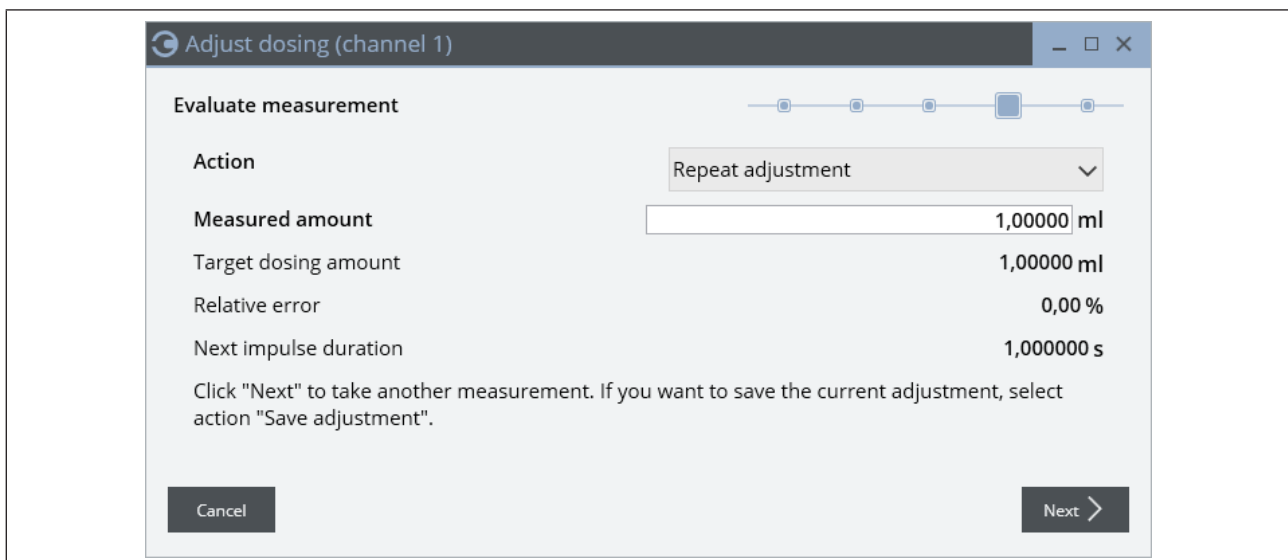


Fig.26: Repeat adjustment

Repeat the process and enter the measured quantity until the desired target dosing quantity is reached.

→ Action: switch to **Save adjustment**.

The dosing quantity is set.

18.4.5 Dosing operating mode - set independent input

Gives the set-point value source for the pulse time.

Indicates whether an input value is used for this channel or a bit from the bit field.

Required access rights: installer

→ Select **Digital outputs** in the configuration area.

The **"Parameters"** detailed view is displayed with the menus for setting the digital output.

→ Select **channel x**.

→ **Independent input** Select On or Off.

✓ You have set an independent output for the digital output.

18.4.6 "Dosing" operating mode - set error handling

The error handling determines which state the digital output will take on in the event of an error.

Required access rights: installer

→ Select **Digital outputs** in the configuration area.

The **"Parameters"** detailed view is displayed with the menus for setting the digital output.

→ Select **channel x**.

→ Select **Error handling**

Possible selection:

- **Off**: The digital output remains off or is deactivated
- **On**: The digital output remains on or is enabled.

→ Select state for error handling.

✓ You have set error handling for the digital output.

Enable short circuit detection. (A short circuit interrupts an active pulse).

→ Select **Short circuit detection**.

→ Set **On**.

✓ You have enabled short circuit detection.

18.4.7 "Dosing" operating mode - set power reduction

The power reduction saves energy, because a parametrisable PWM signal is activated instead of a permanent "on" signal.

2 parameters are set for the power reduction:

- The time frame until the power reduction becomes active [Td].
- The duty cycle of the PWM signal.

The principle of power reduction:

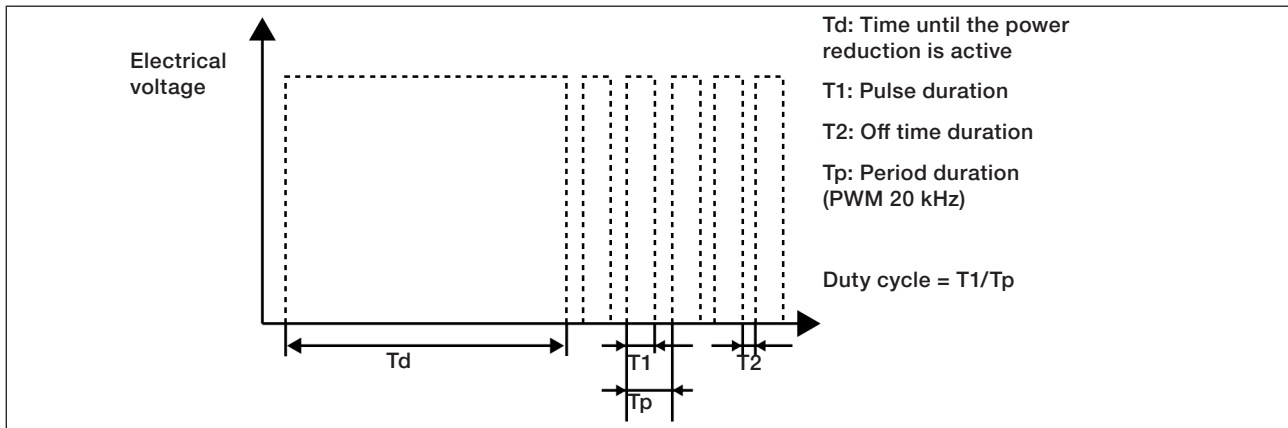


Fig.27: Timing of the output signal of individual channels based on the trigger signal

Set power reduction:

Required access rights: installer

→ Select **DO1** (or corresponding output) in the configuration area.

The **"Parameters"** detailed view is displayed with the menus for setting the digital output.

→ Select **Power reduction**.

→ Select **Status**.

→ Set **ON** to enable the power reduction (preset factory setting).

→ Select **Power reduction after** in order to set the time frame [Td] until the power reduction becomes active.

→ Enter value.

→ Select **Duty cycle** to enter the duty cycle.

→ Enter the per cent value for the reduced output power.

✓ You have set the power reduction for the digital output.

19 OTHER LDO SETTINGS



19.1 Menus in the configuration area “General settings”

The remaining settings options are for ME44 8DO (see chapter “17”).




The following overview and brief description of the menus contains the device-specific settings for the I/O module and not the description of the Bürkert Communicator software.


19.1.1 “Parameters” detailed view



Open menu:

-  Select **8DO** in the navigation area.
Click  to open the configuration areas.
- In configuration area select **General settings**.
- Select **“Parameter”** detailed view.

Overview of the menus:

Parameters for General settings	
Levels 1, 2 and 3	Description
Status LED	Setting the LED to display the device status.
Operating mode	Set LED operation mode for displaying device states. The following LED modes can be selected: <ul style="list-style-type: none"> • NAMUR operation mode, for description see “8.2 LED for indicating the device status” on page 24. • LED off.
büS	Parameterisation of the device as a büS participant.
Displayed name	Issue name under which the device is displayed.  No entry required.
Location	Indicates location of device
Description	The input window can be used to describe the device or for additional information on the device.  No entry required.
Advanced	Further settings for the device as participant of a network.
Unique device name	Assign communication ID for communication in the network.  If the communication ID is changed, the assigned partnership with another participant is lost.
Baud rate	Set transmission speed for the device as a büS participant or CANopen participant.
(Fixed) CANopen address (node ID)	Assign address under which the device is operated as a büS participant or CANopen participant.



Parameters for General settings	
Levels 1, 2 and 3	Description
CANopen address (Node ID)	Currently applied device address
Bus operating mode	Select communication: <ul style="list-style-type: none"> • Protocol CANopen • Protocol bÜS • Single device
Show errors from bÜS consumers	The unit will also display errors if one of its consumers (producer and/or consumer) has an error.
Deallocation delay	Time from the loss of a consumer to deletion of its configuration.
Alarm limits	Display and setting of the limits that, when exceeded or not reached, cause the device to trigger an error alert or warning.
supply voltage	Indicates the limit values for the supply voltage.
Error below	Indicates the limit for supply voltage, the failure to meet which triggers an error alert from the device. Note hysteresis!
Error above	Indicates the limit for supply voltage, the exceedance of which triggers an error alert from the device. Note hysteresis!
Hysteresis	<p>Display of the hysteresis for the limit values of the supply voltage.</p> <p> The hysteresis is centrally assigned to the limit.</p> <p>Example:</p> <p>Error above 26.4 V</p> <p>Hysteresis 0.5% V</p> <p>The error is output at a supply voltage > 26.9 V and cancelled again at a supply voltage < 25.9 V.</p>
Device temperature	Indicates and sets the limits for device temperature.
Error above	Indicates the limit for device temperature, the exceedance of which triggers an error alert from the device. Note hysteresis!
Error below	Indicates the limit for device temperature, the failure to meet which triggers a warning from the device. Note hysteresis!
Warning above	Setting the limit for device temperature, the exceedance of which triggers a warning from the device. Note hysteresis!
Warning below	Setting the limit for device temperature, the failure to meet which triggers a warning from the device. Note hysteresis!

Parameters for General settings	
Levels 1, 2 and 3	Description
Hysteresis	<p>Indicates the hysteresis for the device temperature limits.</p> <p> The hysteresis is centrally assigned to the limit.</p> <p>Example:</p> <p>Warning above 80 °C</p> <p>Hysteresis 4 °C</p> <p>The warning is issued for a device temperature > 82 °C and is resolved with a device temperature < 78 °C.</p>
Diagnostics	Menu for enabling and deactivating the diagnostics function.
Active	<p>Diagnostics function enabled:</p> <ul style="list-style-type: none"> • The LED for the device status display shows the device status depending on the operation mode that has been set. • Alerts are entered in the logbook.
Inactive	<p>Diagnostics function deactivated:</p> <ul style="list-style-type: none"> • The LED for the device status display does not show the device status. • There is no entry of errors in the logbook.
PDO configuration	Configuration of the cyclic process data objects:
PDO 1	<p> The cyclical process data objects are configured with a wizard that guides the user through the necessary operating steps.</p>
Reset to default values	Reset the PDO configuration to the default values
Configuration client	Serves to store a device configuration on another device.
Operating mode	<p>Active: Configuration is managed by a unit.</p> <p>Inactive: Configuration is not managed by a unit.</p> <p>Automatic switch-on: Another provider is awaited and then set to "Active".</p>
Change operation mode	The set-up wizard launches.

Tab. 52: Menus of the 8DO module, configuration area "General settings", "Parameters" detailed view

19.1.2 “Diagnostics” detailed view

Open menu:

-  Select **8DO** in the navigation area.
Click  to open the configuration areas.
- In configuration area select **General settings**.
- Select **“Diagnostics”** detailed view.


Overview of the menus:

Diagnostics for General settings	
Levels 1 and 2	Description
Device status	Information on the device status.
Operating duration	Indicates the operating duration over the entire life cycle of the device.
Device temperature	Indicates device temperature
Min./max. Values	Indicates minimum and maximum measured device temperature.
Device boot counter	Indicates device reboot throughout the entire device life cycle.
Transferable memory status	Storage and management of configuration settings possible. For settings see instructions “Central configuration management – transferring configuration data when replacing device”. The instructions can be found on the Bürkert website → Type ME43.
Current system time	Indicates date and time.
büS status	Information on the büS network.
Receive errors	Indicates current receive errors.
Receive errors max.	Indicates all receive errors since last reboot.
Transmission errors	Indicates current transmission errors.
Transmission errors max.	Indicates all transmission errors since last reboot.
Reset error counter.	Reset the error counter for receive and transmission errors to 0.
CANopen status	Information on device’s state of communication as büS network participant. Pre-operational or operational.
Logbook	Menu for displaying and managing logbook entries.
Configuration client	
Transferable memory status	Storage and management of configuration settings possible.
Status	Current device status
Number of reconfigurations	Number of device reconfigurations
Dosing function	Indicates whether the dosing function is activated.


Tab. 53: 8DO module menus, configuration area “General settings”, “Diagnostics” detailed view

19.1.3 “Maintenance” detailed view

Open menu:

-  Select **8DO** in the navigation area.
Click **+** to open the configuration areas.
- In configuration area select **General settings**.
- Select **“Maintenance”** detailed view.

Overview of the menus:

Maintenance for General settings	
Levels 1 and 2	Description
Device information	Indicates device-specific data.
Displayed name	Indicates the name entered for the device.  The name is entered in the configuration area General settings → Parameter in the menu büS → Displayed name .
Identification number	Indicates the identification number of the device.
Serial number	Indicates the serial number of the device.
Firmware identification number	Indicates the identification number of the firmware used in the device.
Firmware version	Indicates the version of the firmware used in the device.
büS version	Indicates the büS version of the device.
Hardware version	Indicates the hardware version of the device.
Product type	Indicates the type designation of the device.
Manufacture date	Indicates the date on which the device was manufactured.
eds version	Indicates the EDS version.
Device driver	Information on the device driver. This menu is only available in the Bürkert Communicator PC software.
Reset device	Menu for resetting and restarting the device.
Restart	Restart the device. A software reset is performed during the device reboot. The configuration and parameterisation settings for the device remain after the reboot.
Factory reset	Reset device to factory setting. When performing a factory reset, the corresponding settings defined for the device are overwritten by the factory settings.

Tab. 54: Menus of the 8DO module, configuration area “General settings”, “Maintenance” detailed view

20 MAINTENANCE

20.1 Replacing the I/O module Type ME44

- ! I/O modules can be replaced during operation (hot plug).
 - ! Follow the software instructions for central configuration management when replacing the I/O modules.
- Available online at <https://country.burkert.com/> > ME44 > Operating instructions.

NOTE!

- Maintenance may be carried out only by trained specialist technicians and with the appropriate tools.

1. Remove sensor and actuator cables.

→ Press push-in contacts of the connection terminal and pull out the wires.

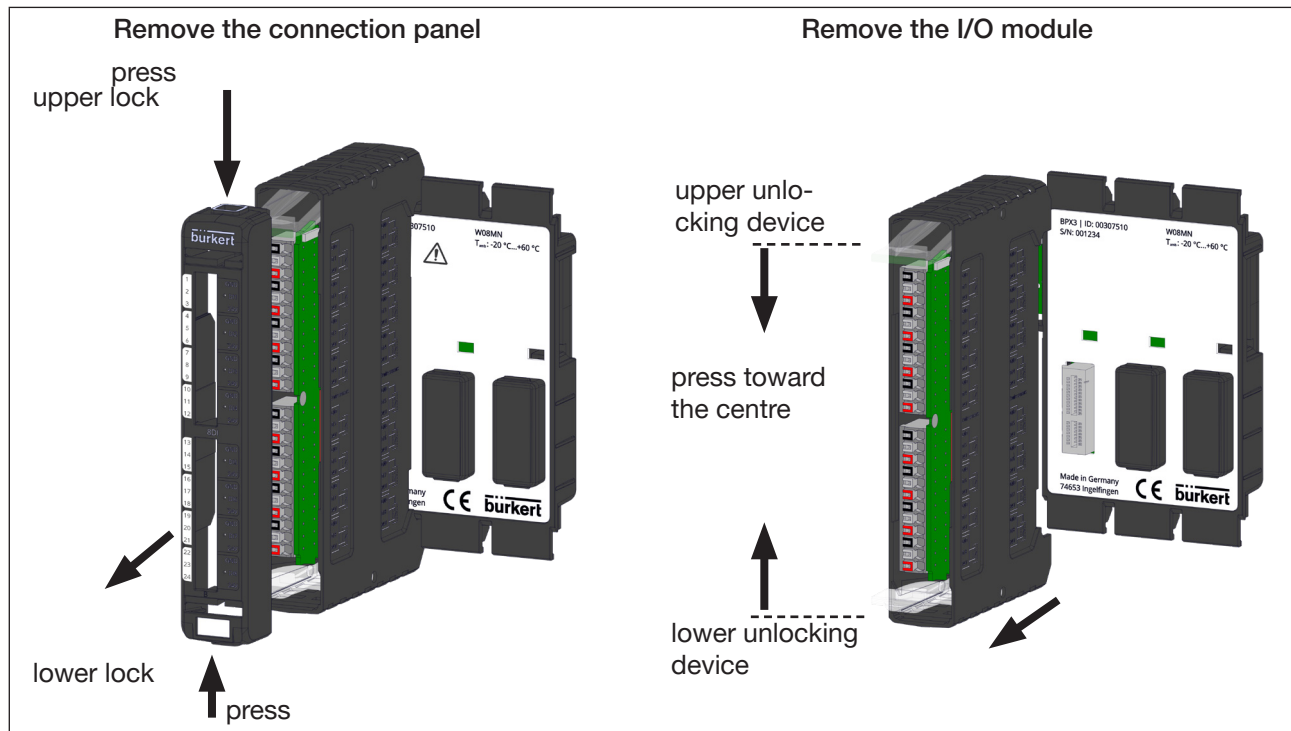


Fig.28: Replacing the I/O module Type ME44

2. Remove I/O module from the backplane.

- Press on the blue squares until the lock is released and remove the connection panel.
- Press the upper and lower unlocking device toward the centre of the device and remove the I/O module from the backplane.

3. Installing the replacement device.

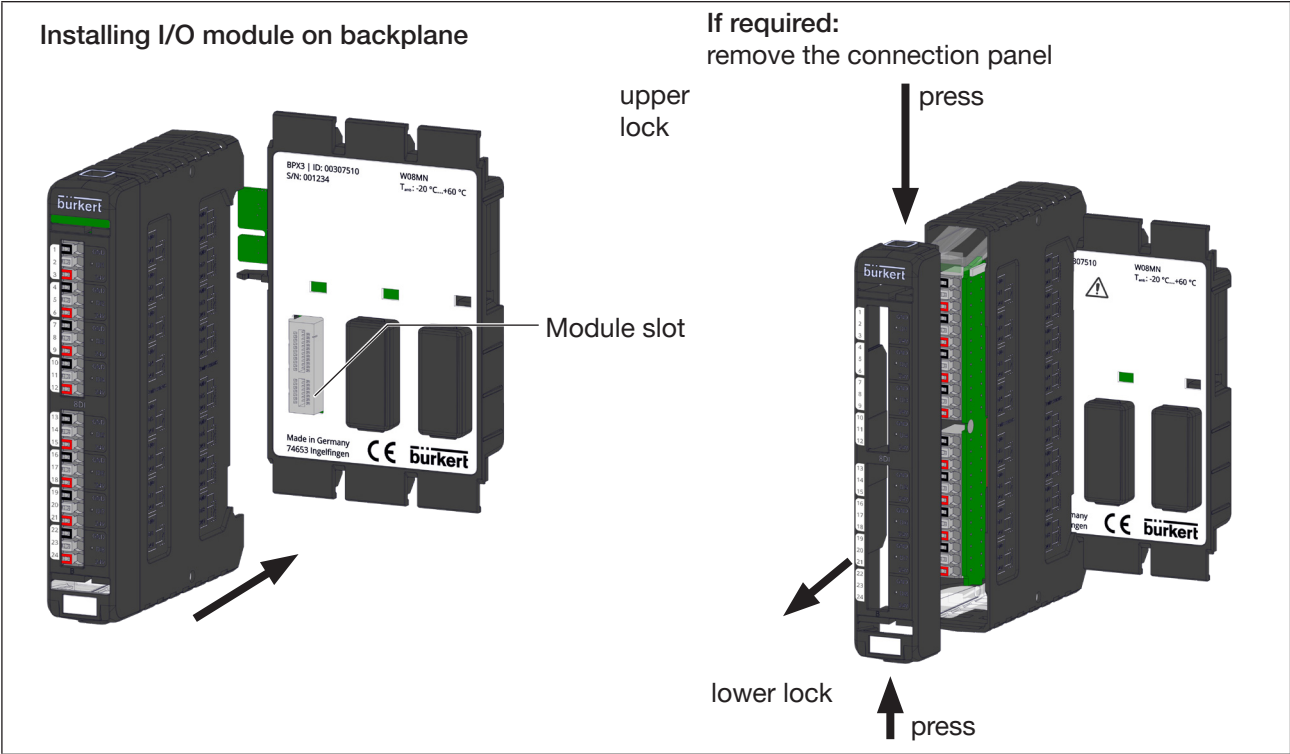



Fig.29: Mounting the I/O module Type ME44 on the backplane

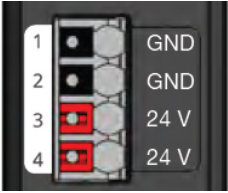




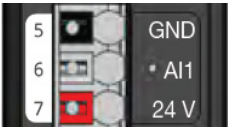



- Align the I/O module with the module slot of the backplane.
 - Press I/O module onto the backplane until it engages.
- The I/O module is now connected to the supply voltage.



Use supply voltage unit with adequate power.

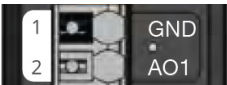


Connecting external sensors and actuators to the power supply:

Electrical configuration for 4AI module:

	Plug configuration AUX Power		External circuit
		GND	Mass
		GND	Mass
		24 V	Aux power supply voltage 24 V $\pm 10\%$
		24 V	Aux power supply voltage 24 V $\pm 10\%$
	Plug configuration analog inputs		External circuit
		GND	Mass
		AI1...AI4	Analog input +
		24 V	Supply voltage 24 V $\pm 10\%$

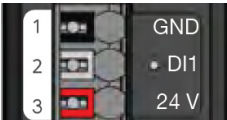





Tab. 55: Configuration for 4AI module

Electrical configuration for 4AO module:

	Plug configuration analog outputs		External circuit
		GND	Mass
		AO1...AO4	Analog output +

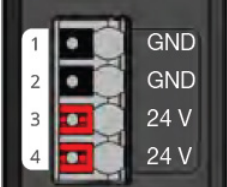




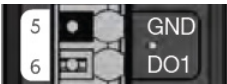


Tab. 56: Configuration for 4AO module

Electrical configuration for 8DI module:

	Plug configuration		External circuit
		GND	Mass
		DI1...DI8	Digital input Frequency inputs: DI1...DI8
		24 V	Supply voltage 24 V $\pm 20\%$ / $- 15\%$
		24 V	

Tab. 57: Electrical configuration for 8DI module

Electrical configuration for 8DO module:

	Plug configuration AUX Power		External circuit
		GND	Mass
		GND	Mass
		24 V	Aux power supply voltage 24 V $\pm 10\%$
		24 V	Aux power supply voltage 24 V $\pm 10\%$
	Plug configuration digital outputs		External circuit
		GND	Mass
		DO1...DO8	Digital output +

Tab. 58: Configuration for 8DO module

→ Connect wires of the external sensors and actuators to the terminals on the respective connection panels.

If the connection panel has been removed:

→ Align connection panel with the I/O module.

→ Press on the connection panel until it clicks into position.

20.2 Replacing the backplane

⚠ CAUTION!

Electrical voltage.

- Before working on the device or system, switch off the power supply. Secure against reactivation.

NOTE!

- Maintenance may be carried out only by trained specialist technicians and with the appropriate tools.

20.2.1 Disassembly of adjacently arranged backplanes

1. → ⚠ Switch off the supply voltage.
2. Remove all I/O modules from the backplane in the same way.

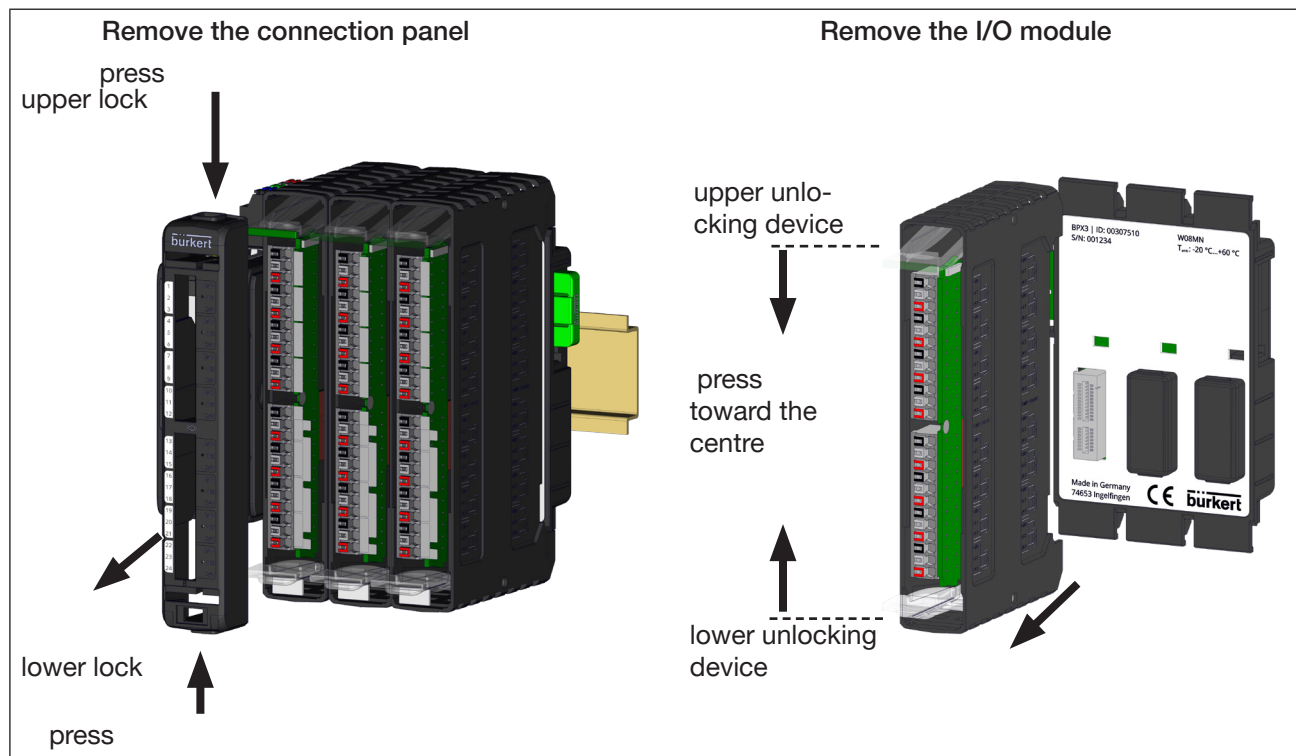


Fig.30: Remove I/O modules from the backplane.

- Press on the blue squares until the lock is released and remove the connection panel.
- Press the upper and lower unlocking device toward the centre of the device and remove the I/O module from the backplane.

3. Remove backplane.

! Contiguous backplanes are unlocked by removing the outer, right I/O module of the left adjacent backplane.

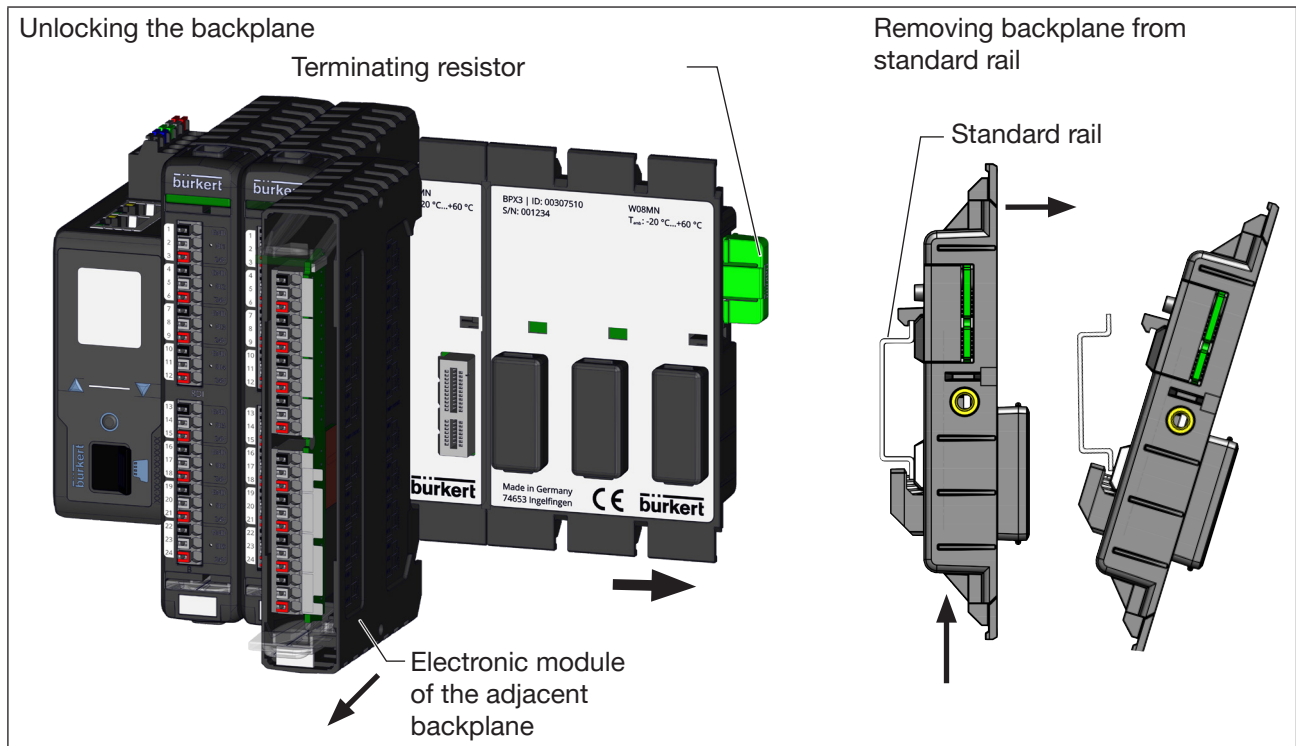


Fig.31: Disassembly of adjacently arranged backplanes

- Remove the outer, right I/O module from the left adjacent backplane.
The backplane is unlocked.
- Disconnect from the adjacent backplane by pulling to the right, and remove the backplane from the standard rail.

Removing the backplane from the standard rail:

- Press the backplane upwards and detach it from the upper guide of the standard rail.
- If the terminating resistor is on the backplane, remove the terminating resistor from the backplane.

! Keep the removed terminating resistor at hand, as it must be plugged into the outermost backplane of the system after replacement.

20.2.2 Uninstalling the backplane from the fieldbus gateway

1. → ⚠ Switch off the supply voltage.
2. Remove sensor and actuator cables.
→ Press push-in contacts of the connection terminal and pull out the wires.

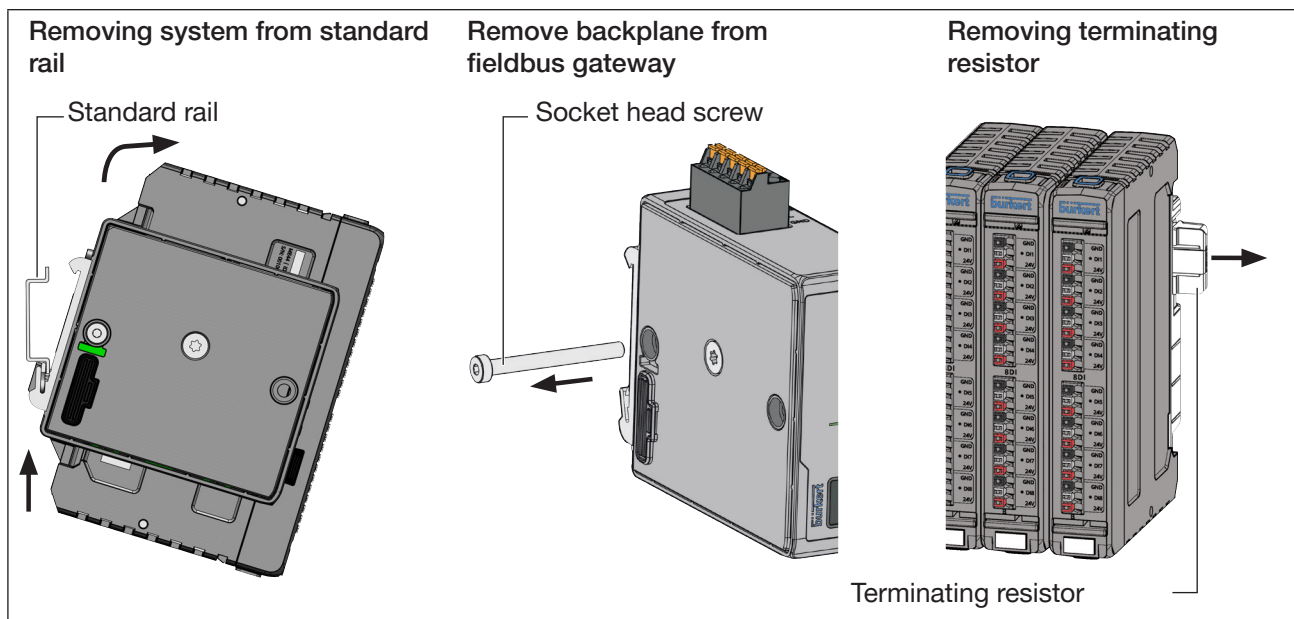


Fig.32: Removal of backplane from fieldbus gateway

3. Remove system consisting of fieldbus gateway and backplane, with mounted I/O modules, from the standard rail:
→ Press the system upwards and detach it from the upper guide of the standard rail.
4. Remove backplane from fieldbus gateway.
→ Loosen socket head screw on fieldbus gateway.
→ Remove backplane.
→ If the terminating resistor is on the backplane, remove the terminating resistor from the backplane.



Keep the removed terminating resistor at hand, as it must be plugged into the outermost backplane of the system after replacement.

5. Remove all I/O modules from the backplane in the same way.

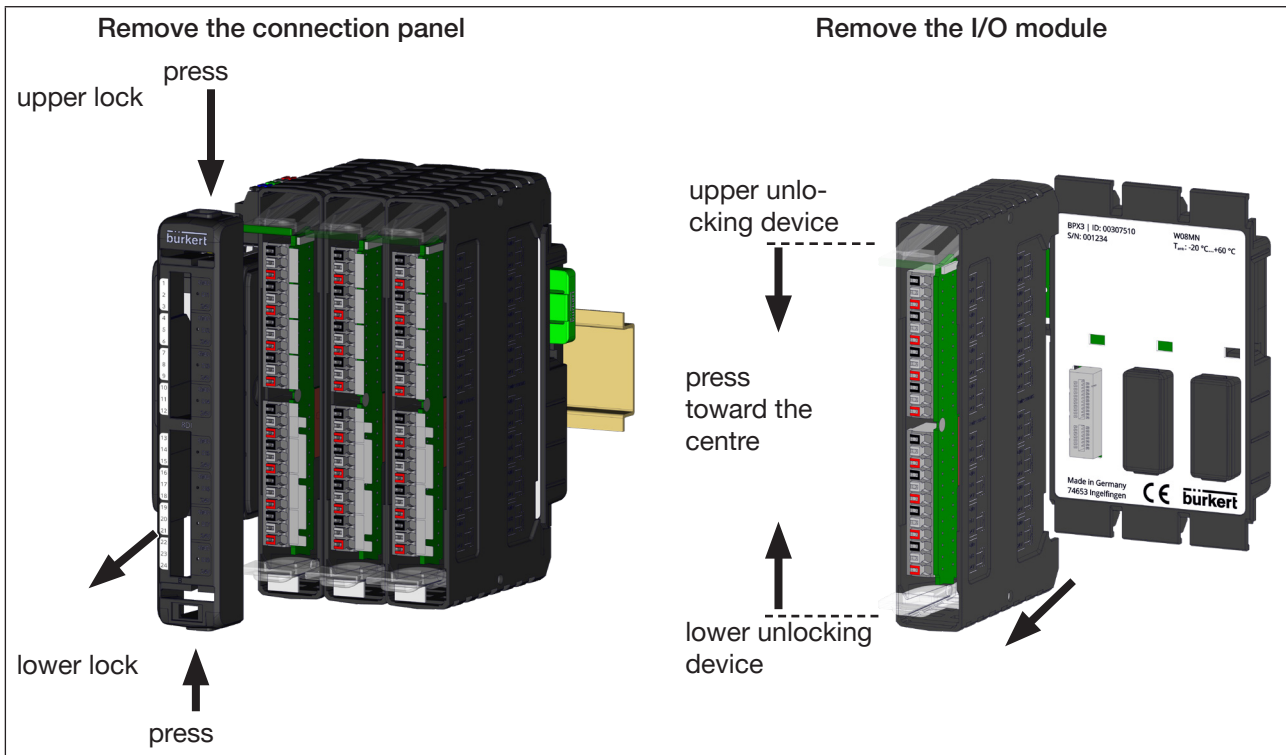


Fig.33: Removal of backplane from fieldbus gateway

- Press on the blue squares until the lock is released and remove the connection panel.
- Press the upper and lower unlocking device toward the centre of the device and remove the I/O module from the backplane.

20.2.3 Installing successively adjacent backplanes:

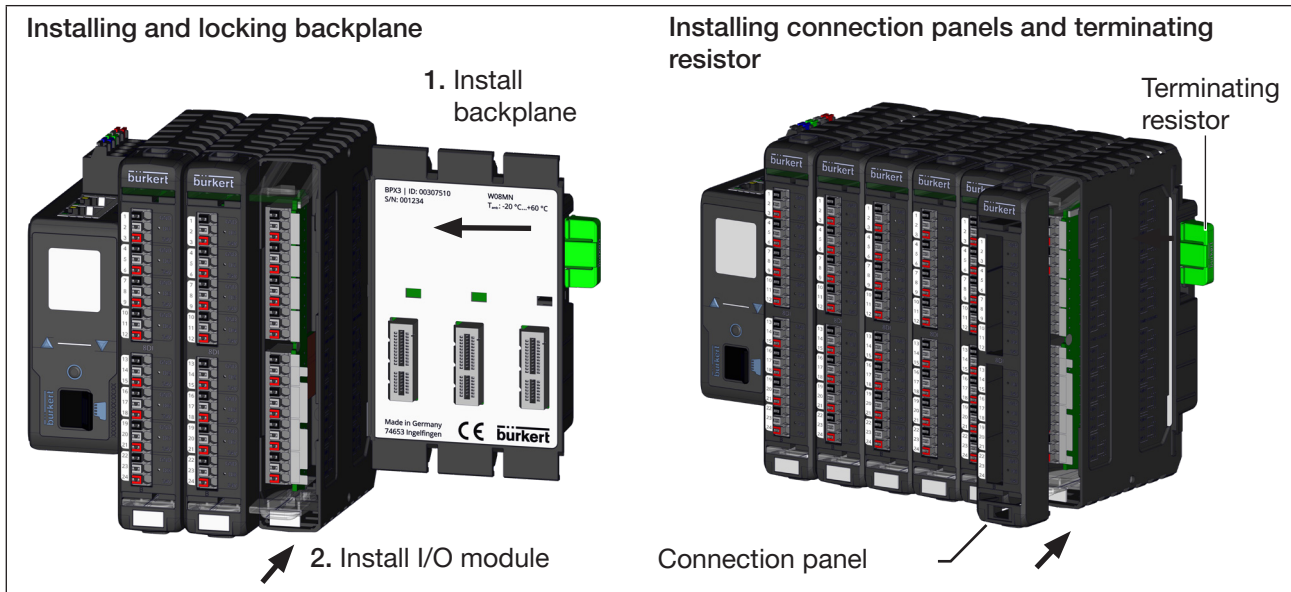


Fig.34: Installing successively adjacent backplanes

1. Installing the backplane on the standard rail:

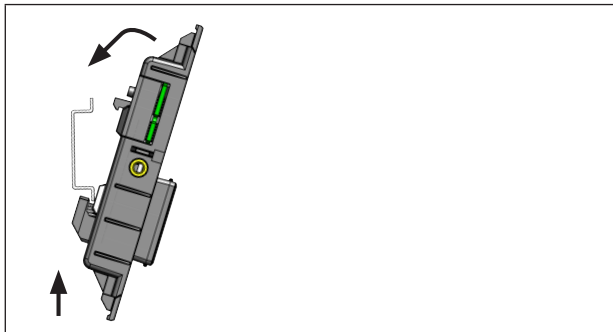


Fig.35: Installing the backplane on the standard rail

- Tilt the backplane and align it with the standard rail.
- Hook backplane into the lower guide of the standard rail.
- Press the backplane upwards, tilting it towards the standard rail and lock it into place in the upper guide of the standard rail.

2. Lining up the backplane and installing the I/O module:

- Slide the backplane to the left onto the adjacent backplane.
- Reinstall the uninstalled I/O module of the left adjacent backplane that was uninstalled for unlocking.



Installation of an additional backplane is also possible if all I/O modules of the adjacent backplane are installed.

- Remove any covers from the backplane.
- Reinstall the remaining I/O modules.
- Press the respective I/O module onto the backplane until it engages.
- Place the uninstalled connection panels back onto the I/O modules.
- If the terminating resistor was removed, reattach it.

20.2.4 Installing the backplane on a fieldbus gateway:

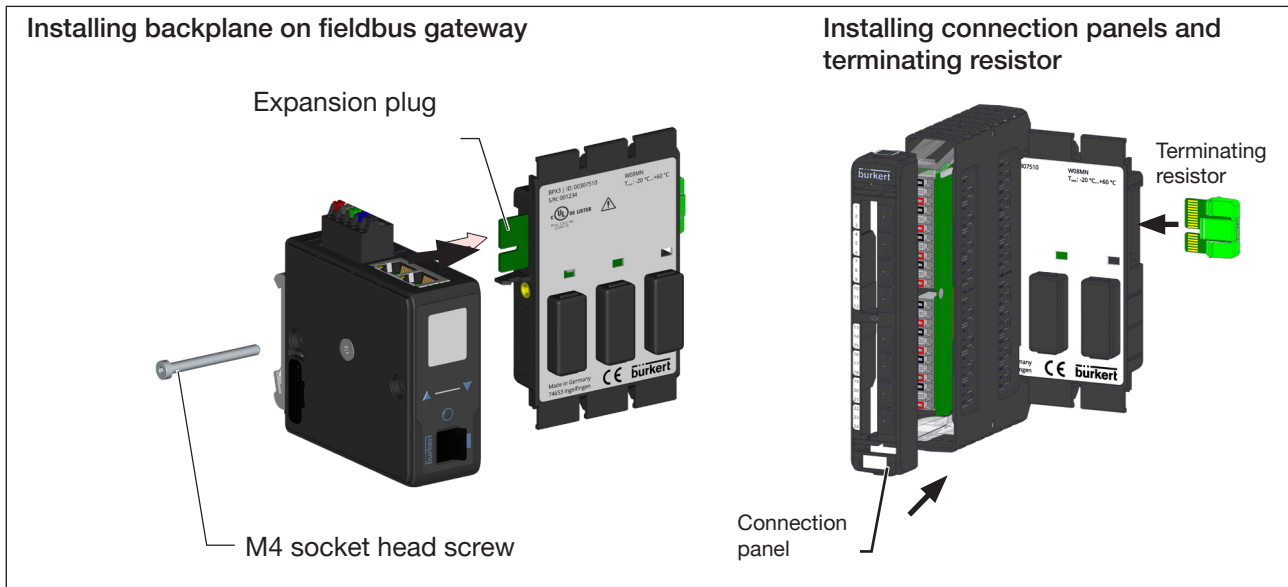


Fig.36: Mounting the fieldbus gateway on the backplane.

1. Installing backplane on fieldbus gateway:

- Align the expansion socket of the fieldbus gateway with the expansion plug of the backplane.
- Connect fieldbus gateway to the backplane.
- Using the M4 socket head screw, screw the fieldbus gateway to the backplane.
⚠ Observe tightening torque of 0.75 Nm.
- Remove any covers from the backplane.

2. Reinstalling uninstalled I/O modules:

- Press the respective I/O module onto the backplane until it engages.
- Place the uninstalled connection panels back onto the I/O modules.
- If the terminating resistor was removed, reattach it.

3. Mounting the system onto the standard rail:

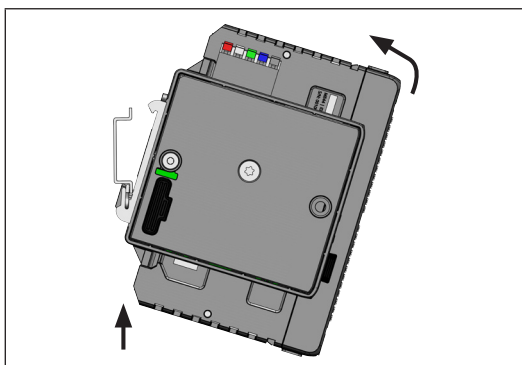


Fig.37: Mounting the system onto the standard rail

- Tilt the system and align it with the standard rail.
- Hook the system into the lower guide of the standard rail.
- Press the system upwards, tilting it towards the standard rail and lock it into place in the upper track of the standard rail.

20.2.5 Installation recommendation for configuration levels with multiple backplanes

- First hook the minimum configuration level, consisting of fieldbus gateway and 1 backplane, into the standard rail.
- Hook other backplanes individually in succession into the standard rail and push onto the previous backplane.
- If the terminating resistor was removed, reattach it.

21 REPLACEMENT PARTS AND ACCESSORIES

NOTE!

Property damage due to incorrect parts.

Incorrect accessories and unsuitable spare parts may cause damage to the device.

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

Accessories	Article number
8 x digital inputs 8DI module (ME44)	354316
8 x digital outputs 8DO module (ME44)	354317
4 x analog inputs 4AI module (ME44)	354321
4 x analog outputs 4AO module (ME44)	354325
Module slot triple backplane (BPX3)	307510
Terminating resistor (can be connected directly)	303833
Power supply unit type 1573 for standard rail, 100...240 V AC/24 V ===, 1.25 A, NEC Class 2 (UL 1310)	772438
Power supply unit type 1573 for standard rail, 100...240 V AC/24 V ===, 1 A, NEC Class 2 (UL 1310)	772361
Power supply unit type 1573 for standard rail, 100...240 V AC/24 V ===, 2 A, NEC Class 2 (UL 1310)	772362
Power supply unit Type 1573 for standard rail, 100...240 V AC/24 V ===, 4 A	772363
Micro SD card	on request
büS stick set 1 (incl. cable (M12), stick with integrated terminating resistor, power supply and software)	772426
büS stick set 2 (incl. cable (M12)), stick with integrated terminating resistor	772551
Bürkert Communicator software	https://www.burkert.com/en/type/8920

Tab. 59: Accessories

22 DISASSEMBLY



CAUTION!

Electrical voltage.

- Before working on the device or system, switch off the power supply. Secure against reactivation.

NOTE!

- Disassembly may only be performed by trained technicians and with the appropriate tools.

1. Switch off the supply voltage.
2. Remove 5-pin spring-loaded terminal.
3. Remove sensor and actuator cables.

→ Press push-in contacts of the connection terminal and pull out the wires.

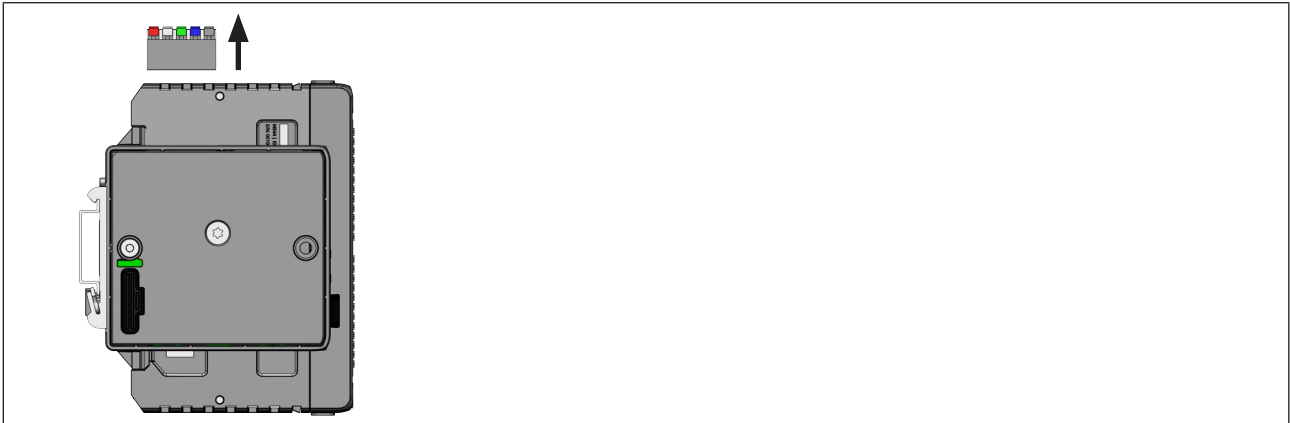


Fig.38: Remove 5-pin spring-loaded terminal

4. Remove Ethernet cable from the X1 and X2 interfaces.
For the PROFIBUS and CC-Link variants: remove push-in connector D-Sub, 9-pole.
5. Remove system from standard rail

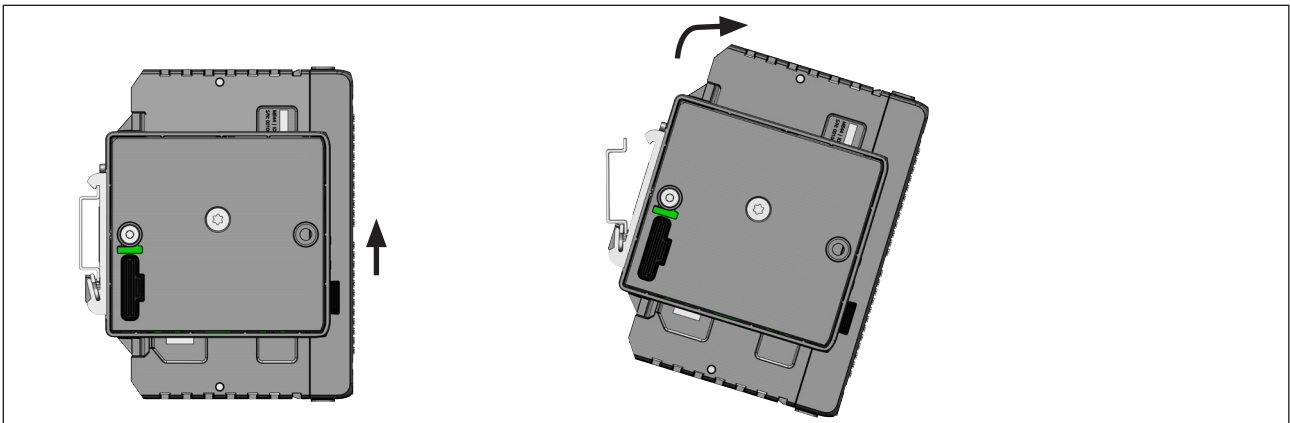


Fig.39: Removing system from standard rail

→ Press the system upwards and detach it from the upper guide of the standard rail.

23 PACKAGING, TRANSPORT

NOTE!

Damage in transit due to inadequately protected devices.

- ▶ Protect the device against moisture and dirt in shock-resistant packaging during transportation.
- ▶ Observe permitted storage temperature.

24 STORAGE

NOTE!

Incorrect storage may damage the device.

- ▶ Store the device in a dry and dust-free location!
- ▶ Storage temperature: -30...+80 °C.

25 DISPOSAL

NOTE!

Damage to the environment caused by device parts contaminated with media.

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



Adhere to the national waste disposal regulations.

