

Original Assembly and Operating Manual

Positioner EP3



TABLE OF CONTENTS

1	About this operating manual.....	5
1.1	Copyright.....	5
1.2	Warranty and liability.....	5
1.3	Figures.....	5
1.4	Target groups.....	5
1.4.1	Definition of the target groups.....	6
1.4.2	Definition of life phases.....	6
1.4.3	Who-does-what matrix.....	7
1.5	Notices.....	7
1.5.1	Meaning of the requirement and warning signs.....	7
1.5.2	Definitions and structure of warnings.....	8
1.5.3	Definition of general notices.....	9
1.5.4	Symbols.....	10
1.6	Applicable documents.....	10
1.6.1	Declaration of Conformity/Declaration of Incorporation.....	10
1.6.2	Use in potentially explosive atmospheres.....	10
1.7	Contact details.....	10
2	Important safety instructions.....	11
2.1	Intended use.....	11
2.1.1	Reasonably foreseeable misuse.....	11
2.2	Markings.....	11
2.2.1	Type code.....	12
2.3	Operationally safe condition.....	13
2.4	Owner's obligations.....	14
2.4.1	Checking the scope of delivery and configuration.....	14
2.4.2	Risk assessment/hazard assessment.....	14
2.4.3	Residual risks.....	14
2.5	Requirements for the operating personnel.....	14
3	Description of the components.....	15
3.1	Fail-safe behavior.....	16
3.2	Technical data.....	18
3.3	Dimensions and weights.....	19
4	Transport and assembly.....	21
4.1	Transporting components.....	21
4.2	Mounting components.....	22
4.3	Connecting components.....	22

5	Commissioning.....	25
5.1	Settings.....	25
5.2	Checks.....	30
6	Operation.....	31
6.1	EBRO Plus App.....	32
7	Maintenance.....	34
7.1	Bill of materials.....	36
8	Decommissioning/disassembly.....	38
9	Declaration of Conformity/Declaration of Incorporation.....	39

LIST OF FIGURES AND TABLES

List of figures

Fig. 1:	Identification plate EP3.....	11
Fig. 2:	Example type code.....	12
Fig. 3:	Components.....	15
Fig. 4:	Dimensions.....	20
Fig. 5:	Mounting the switch box.....	22
Fig. 6:	Example figure.....	22
Fig. 7:	Connector strip X1.....	23
Fig. 8:	Plug socket X2.....	23
Fig. 9:	Circuit diagram EP3.....	24
Fig. 10:	Double-acting throttle unit.....	25
Fig. 11:	Single-acting throttle unit.....	25
Fig. 12:	DIP switch and push-button.....	27
Fig. 13:	Status LED.....	30
Fig. 14:	Jumper J1.....	33
Fig. 15:	Bill of materials EP3.....	36

List of tables

Tab. 1:	Who-does-what matrix.....	7
Tab. 2:	Mandatory, desired, and optional provisions.....	7
Tab. 3:	Mandatory sign.....	7
Tab. 4:	Warning signs.....	8
Tab. 5:	Structure of warnings.....	9
Tab. 6:	Symbols.....	10
Tab. 7:	Markings on the switch box.....	11
Tab. 8:	Type code EP3.....	12
Tab. 9:	Designation the components.....	15
Tab. 10:	Mounting situation double-acting actuator.....	16
Tab. 11:	Mounting situation single-acting actuator.....	17
Tab. 12:	Fail-safe behavior.....	17
Tab. 13:	Technical data EP3.....	18
Tab. 14:	Main dimensions EP3.....	20
Tab. 15:	Main dimensions EP3.....	20
Tab. 16:	Circuit diagram EP3.....	24
Tab. 17:	Meaning of the LED colors.....	26
Tab. 18:	DIP switch.....	27
Tab. 19:	Push-button.....	28
Tab. 20:	Status LED.....	30
Tab. 21:	Modes.....	31
Tab. 22:	Meaning of the LED colors.....	32
Tab. 23:	Troubleshooting EP3.....	35
Tab. 24:	Bill of materials EP3.....	36

1 ABOUT THIS OPERATING MANUAL

This is the assembly and operating manual of EBRO ARMATUREN Gebrüder Bröer GmbH for:

- Positioner of type EP3 with solenoid valve and throttle unit.

Hereinafter:

- EBRO ARMATUREN Gebrüder Bröer GmbH ► EBRO
- Positioner of the type EP3 with solenoid valve and throttle unit ► positioner
- Assembly and operating manual ► Operating manual

This operating manual provides important safety and warning information. In addition to other useful information, this operating manual provides particular support during the product life cycle phases of transport, installation, operation, maintenance, and decommissioning to ensure efficient and reliable operation.

Read the operating manual with care and keep it in a safe place. EBRO shall not be liable for any damage caused by failure to observe the operating manual.

The operating manual must be available at the site of use of the positioner. The operating manual must be passed on if the site of use or the owner changes.

All rights and technical changes reserved.

1.1 Copyright

No part of this documentation must be reproduced or made accessible to any third parties without the explicit permission of EBRO ARMATUREN Gebr. Bröer GmbH.

This documentation, including all of its parts, is protected by copyright. Reproduction, translation, microfilming, as well as storage and processing in electronic systems require the written consent of EBRO ARMATUREN Gebr. Bröer GmbH.

Violations are punishable by law and shall obligate to compensation for damages. EBRO ARMATUREN Gebr. Bröer GmbH reserves all rights to exercise industrial property rights.

1.2 Warranty and liability

Warranty and liability shall be subject to the contractually agreed terms and conditions (for warranty terms and conditions, see Terms of Sale and Delivery of EBRO ARMATUREN Gebr. Bröer GmbH). Report any guarantee or warranty claims to EBRO ARMATUREN Gebr. Bröer GmbH at post@ebro-armaturen.com immediately after discovering the defect or fault.

Any liability and warranty claim shall lapse in the event of software modifications without the knowledge and approval of EBRO ARMATUREN Gebr. Bröer GmbH.

EBRO ARMATUREN Gebr. Bröer GmbH accepts no liability for damage caused by improper use, improper storage or improper transportation.

1.3 Figures

All figures in this operating manual are schematic diagrams and serve to clarify the text. The figures only show the positioner to the extent necessary for understanding the text.

Figures may show product variants or accessories that are not included in the scope of delivery. Figures never justify any claim for subsequent delivery or modification of the delivered positioner.

1.4 Target groups

The target groups of these operating instructions are specialists who carry out activities on the component in the respective life phases.

A specialist is a person who is able to assess the work assigned to them and recognize potential hazards based on their specialist training, knowledge, and experience. Furthermore, the specialist has knowledge of the relevant regulations.

Only adequately qualified and instructed specialists must work on the positioner. Persons who are still being trained or instructed must only work on the positioner under the constant supervision of a trained or instructed specialist.

Every person who works with the positioner or who performs work on the positioner must know and apply the content of the operating manual. The owner of the positioner is responsible for granting access to the operating manual and conveying its content by way of training and instruction.

1.4.1 Definition of the target groups

Transport personnel

Specialists responsible for the safe and efficient transportation of machines, systems, or components.

Assembly personnel

Specialists responsible for the professional assembly and installation as well as dismantling (decommissioning) of machines, systems, or components.

There may be overlaps with the “commissioning” phase during work of the assembly personnel.

Commissioning personnel

Specialists who are responsible for transferring machines, systems, or components from assembly to operating condition. The tasks of the commissioning personnel include testing, adjusting, and optimizing the systems to ensure safe and efficient operation.

Operating personnel

Specialists who are responsible for the use of machines, systems or components.

The work of operating personnel may overlap with the “commissioning” life phase.

Maintenance personnel

Specialists responsible for extending the service life and maintaining operational safety.

1.4.2 Definition of life phases

Transport

The component is transported to the place of use after production. Suitable transportation methods must be selected at this stage to avoid damage or malfunctions. This shall include packaging, load securing, compliance with transportation regulations, and, if necessary, climatic protection measures.

Assembly

The component is assembled and installed on site. This includes assembling individual parts, connecting them to supply networks (electricity, water, compressed air, etc.), and integrating them into existing production processes. Correct assembly is essential for subsequent functionality and safety of the component.

Commissioning

In this phase, the component is switched on and tested for the first time. This involves making settings, configuring control systems and performing safety checks. Any adjustments or optimizations are made before the component goes into regular operation.

Operation

This phase comprises the actual use of the component for the intended purpose. The focus here is on efficiency, productivity, and safety. Regular monitoring, documentation of operating data, and, if necessary, minor adjustments are required to ensure optimum performance.

Maintenance

Regular maintenance is required to ensure the service life and functionality of the component. This may include inspections, cleaning, lubrication, replacement of wear parts, and preventive maintenance measures.

Decommissioning

If the component is no longer economically or technically viable, it is decommissioned. This includes shutdown, emptying of operating equipment, and possibly temporary storage. We also check whether it makes sense to reuse or sell the product during this phase.

1.4.3 Who-does-what matrix

	Transport personnel	Assembly personnel	Commissioning personnel	Operating personnel	Maintenance personnel
Transport	●				
Assembly		●			
Commissioning		●	●	●	
Operation				●	
Maintenance					●
Decommissioning	●	●			

Tab. 1: Who-does-what matrix

1.5 Notices

Warnings serve to raise awareness of a possible hazardous situation, its avoidance and the physical integrity of persons.

General notices are aimed at preventing material damage or provide useful additional information for better understanding.

Use of mandatory, desired, and optional provisions

Expression	Conclusion on compliance
Mandatory	A mandatory provision contains clearly defined instructions that must be followed, i.e., it does not grant any discretionary space.
Desired	A desired provision is a recommendation. Although a desired provision contains instructions for action, there is a certain amount of discretionary space for exceptions or atypical situations.
Optional	A may-provision contains an option for action that the owner can consider, but do not necessarily have to follow.

Tab. 2: Mandatory, desired, and optional provisions

1.5.1 Meaning of the requirement and warning signs

Mandatory sign

Sign	Meaning
	Use head protection Protects from head injuries caused by objects falling on the head or hitting the head against objects

Sign	Meaning
	Use eye protection Protects from eye injuries due to mechanical, optical, chemical, thermal, biological, electrical hazards
	Use hand protection Protects from hand injuries caused by objects or contact with hot materials or chemicals
	Use foot protection Protects from foot injuries caused by objects or contact with hot materials or chemicals

Tab. 3: Mandatory sign

Warning signs

Sign	Meaning
	General warning sign Observe the danger conveyed by the additional sign.
	Warning of electrical voltage Take care not to come into contact with electrical voltage.
	Warning of suspended load Take care not to be hit by or run into a suspended load.
	Warning about hot surfaces Take care not to come into contact with hot surfaces.
	Warning of automatic start-up Be careful around machines with mechanical parts that start moving automatically and unexpectedly.
	Warning against hand injuries Take care to avoid hand injuries caused by closing mechanical parts of a machine/component.
	Warning of falling objects Take care to avoid being hit by falling objects.

Tab. 4: Warning signs

1.5.2 Definitions and structure of warnings

The purpose of warning notices is to inform users of potential dangers, raise their awareness, and provide safety-related information to prevent accidents or injuries.

Definition of warnings

DANGER	
	The signal word "DANGER" designates a hazard with a high degree of risk. The hazard will result in death or serious injury if it is not avoided.

WARNING



The signal word **"WARNING"** designates a hazard with a medium degree of risk. The hazard may result in death or serious injury if it is not avoided.

CAUTION



The signal word **"CAUTION"** designates a hazard with a low degree of risk. The hazard may result in a minor or moderate injury if it is not avoided.

Structure of warnings

①

CAUTION



② **Medium may escape in an uncontrolled manner and be inhaled.**

③ Irritation of the respiratory tract.



➤ Check the valve for leaks.



➤ Observe the safety data sheet.

Position	Explanation
1	Signal word: The corresponding signal word for the degree of danger is used to emphasize the urgency and nature of the danger.
2	Source of the danger: A clear and concise description of the danger in simple and easily comprehensible terms.
3	Consequence of non-compliance: Possible consequences or effects if the security instructions are not complied with.
4	Risk prevention: Instructions on how the user can avoid the consequences of non-compliance.
5	Pictogram: A pictogram is placed next to the source of the danger to reinforce the warning and emphasize the significance of the danger.

Tab. 5: Structure of warnings

1.5.3 Definition of general notices

NOTICE



A notice with the signal word **"NOTICE"** provides important information for the proper handling of the product.

Non-observance of such notices may cause faults in the product or affect its environment.

1.5.4 Symbols

Sign	Meaning
1. Screw ...	Instructions with step sequence
➤ Observe the safety data sheet.	Instructions without step sequence
• The positioner ...	Bullet point
①	Item number in figures for assignment to a list or supplementary information

Tab. 6: Symbols

1.6 Applicable documents

Always also observe the statutory provisions applicable at the site of use of the position controller and the owner's instructions in addition to the documentation provided by EBRO.

Also observe any supplier instructions, in particular their safety and warning notices.

1.6.1 Declaration of Conformity/Declaration of Incorporation

The position controller may be subject to a directive giving rise to a presumption of conformity. In this case, a supplementary EBRO Declaration of Conformity or an EBRO Declaration of Incorporation is also applicable.

The owner of the positioner is responsible for requesting and, if necessary, carrying out the conformity assessment procedure.

1.6.2 Use in potentially explosive atmospheres

The owner must place an explicit order and the manufacturer must take structural precautions and perform tests for use in potentially explosive atmospheres. A supplementary ATEX operating manual is also applicable for the configuration intended for use in potentially explosive atmospheres.

1.7 Contact details

- ✉ EBRO ARMATUREN Gebr. Bröer GmbH
Karlstraße 8
58135 Hagen
Germany
- ☎ +49 2331 904-0
- @ post@ebro-armaturen.com
- 🌐 www.ebro-armaturen.com



2 IMPORTANT SAFETY INSTRUCTIONS

2.1 Intended use

The electropneumatic positioner of type EP3 is used to regulate or control the position of pneumatically actuated valves and gate valves to control the flow of media. The positioner is intended exclusively for use in industrial applications.

Observe the positioner limits. Limits can be found in the technical data and on the identification plate of the positioner.

2.1.1 Reasonably foreseeable misuse

- The positioner may be used in potentially explosive areas.
- The positioner may be operated with a medium other than compressed air.
This is only allowable upon coordination with EBRO.
- The positioner may be used outside of its limits.

2.2 Markings

NOTICE



Ensure that all markings remain preserved and legible at all times.

NOTICE



Not all information and symbols are used at all times, depending on the type and configuration of the component.

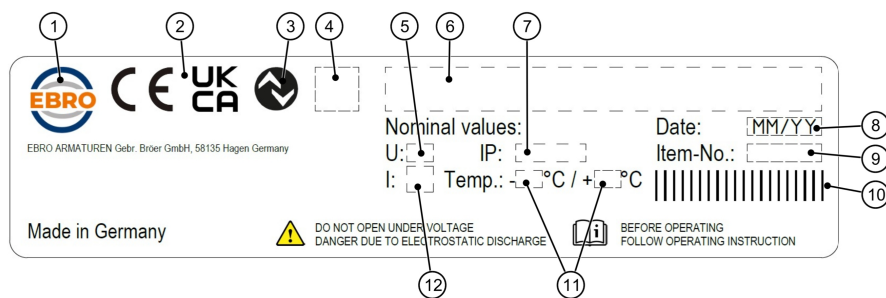


Fig. 1: Identification plate EP3

Item	Data item	Example	Comment
1	Manufacturer with address	EBRO-Armaturen Gebr. Bröer GmbH 58135 Hagen, Germany	

Item	Data item	Example	Comment
2	Conformity	CE	Certifies conformity with at least one relevant EU directive requiring a CE conformity assessment procedure (if applicable). Other conformity markings are possible.
3	IO-Link symbol		
4	Further approvals, if applicable		
5	Voltage (U)	24V DC	U=electrical voltage in volts
6	SBU name and type	EP3-P-SC-A-K202-0000-D0	
7	Protection class (IP)	IP 65/67	"Ingress Protection" Degree of protection against solid foreign bodies (1st digit) and water (2nd digit)
8	Production month and year	02/23	
9	Ident. no.	6175582	EBRO internal identification number for traceability.
10	Bar code		Contains the ID no.
11	Temperature range	-20 °C/+60 °C	The temperature limits refer to the maximum or minimum temperature range in which safe and efficient operation of the switch box is possible.
12	Current (I)	300 mA	I=electrical current in milliamperes

Tab. 7: Markings on the switch box

2.2.1 Type code

EP3-P-DC-A-K202-0000-D-0

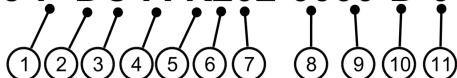


Fig. 2: Example type code

Example	Position	Feature	Characteristic	Abbreviation
P	1	Mode	Positioner	P
			3rd position actuating mode	3
			Open/close Eco mode	D
			Position controller linear	PL
			Open/close Eco mode linear	DL
D	2	Actuator type	double-acting	D
			single-acting	S

Example	Position	Feature	Characteristic	Abbreviation
C	3	Safety position	Fixed last position (only double-acting)	H
			Closing	C
			Opening	O
A	4	Control	4-20 mA	A
			0-10 V	A
			IO-link	I
			24 V	D
K	5	Connection 1-3 material	Plastic	K
			Metal	M
2	6	Connection 1	M12 plug	S
			M20x1.5 6-12 mm	2
0	7	Connection 2	Blind screw connection	0
			M20x1.5 6-12 mm	2
			Diaphragm	B
00	8	Material exhaust air screw connection	open (G¼")	00
			Sintered bronze	S1
			Plastic	K1
00	9	Supply air configuration	open (G¼")	00
			L-push-in fitting, G¼" to 6 mm	E1
			L-push-in fitting, G¼" to 8 mm	E2
			L-push-in fitting, G¼" to 10 mm	E3
D	10	Actuator size	EB5-12	D
			EB14-18	A
			EB20-26	AA
			SC	
0	11	Explosion protection	without	0
			ATEX 3GD	E

Tab. 8: Type code EP3

2.3 Operationally safe condition

The positioner must only be operated when in impeccable technical condition. This includes in particular:

- The positioner must be fully assembled and properly commissioned.
- The positioner must only be operated within its limits.
- All functional tests must have been successfully completed.
- The signage (identification plates, warning stickers, etc.) must be present and recognizable.
- Cable entries must be used that are suitable for the respective cable and line types when connecting cables and lines. They must contain a suitable sealing element. Unused holes for cable entries must be sealed with plugs. The cables must be laid correctly.

- Structural changes are not allowable.
- The functions are only available for reliable operation after successful automatic adjustment (autotune).

Shut down the positioner immediately if any damage or faults are present. Only put the positioner back into operation once you have repaired all damage and malfunctions.

Spare parts and accessories not supplied by EBRO may change the characteristics of the positioner. Use of such parts may lead to hazards and damage. Only use genuine spare parts from EBRO and install them correctly.

2.4 Owner's obligations

Everyone charged with any work on the positioner must know and apply the relevant contents of the operating manual. The owner of the positioner is responsible for permitting access to the operating manual and conveying its content by way of training and instruction.

The owner must ensure that the operating manual is available at the place of use of the positioner.

The owner must ensure that only sufficiently qualified and experienced persons with the corresponding specialist knowledge work on the positioner.

Any hazard for the health and safety of personnel must be avoided. The owner must take appropriate organizational measures or use suitable work equipment.

The owner must perform hazard assessments etc. for the personnel based on national laws and regulations.

The owner must instruct the personnel in particular on the following items:

- Intended use and limits of the positioner
- Danger points
- Function, position, and operation of the protective devices
- Operation and monitoring

2.4.1 Checking the scope of delivery and configuration

The owner must verify that the positioner is complete and undamaged after delivery.

The owner is responsible for ensuring that the positioner configuration corresponds to its application.

2.4.2 Risk assessment/hazard assessment

The position controller as an attachment is a machine component.

The owner must perform a risk assessment and take protective measures if necessary.

2.4.3 Residual risks

Noise emission

The positioner can cause a sound pressure of > 80 dB(A). Structural or spatial protective measures may be required as part of the owner's hazard assessment at the place of use. Persons in the vicinity of the position controller must wear hearing protection if necessary.

2.5 Requirements for the operating personnel

Work on the positioner requires specialist knowledge. Only adequately qualified and instructed persons must work on the positioner. Persons who are still being trained or instructed must only work on the positioner under the constant supervision of a trained or instructed person.

Maintenance, repair, and installation work must be performed by specialists who are able to assess the work assigned to them and recognize potential dangers due to their specialist training, knowledge, and experience. Furthermore, specialists have knowledge of the relevant regulations.

3 DESCRIPTION OF THE COMPONENTS

The positioner comprises several components that are mechanically connected to each other for their intended use.

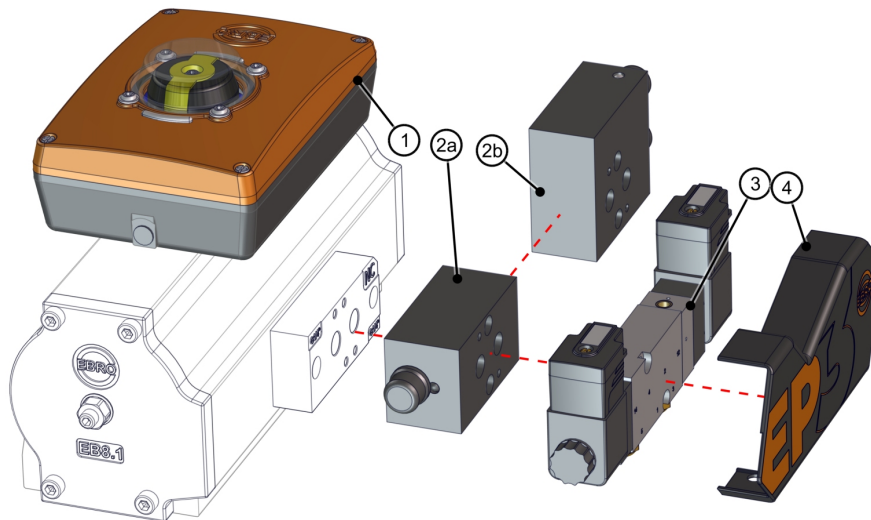


Fig. 3: Components

Position	Component
1	Switch box with mechanical and digital position indicators
2a 2b	Double-acting throttle unit or single-acting throttle unit
3	5/3-way valve with valve plug or 3/3-way valve with valve plug
4	Cover

Tab. 9: Designation the components

Switch box with position indicator

The switch box of the EP3 records the valve disc position 0-90° via an angle sensor. The switch box of the EP3 serves as an electrical interface to the superordinate control system. The terminal point built into the switch box of the EP3 can be used to move the valve disc to the desired intermediate position and simultaneously query the valve position. The position indicator shows these states visually. The yellow fields are parallel to the valve disc.

The EP3 switch box also has an IO-Link communication interface that enables access to process data, switching setup, and diagnostic data. IO-Link makes it possible to parameterize and configure the device during operation. Operation of the EP3 switch box via the IO-Link interface requires a suitable IO-Link master with port class A.

The EP3 has a Bluetooth LE 4.0 radio-based communication channel as an additional communication interface. This provides process and diagnostic parameters in parallel with IO-Link that can be called up using a suitable platform. This interface serves as an additional communication channel and is operated independently. Simultaneous access to the process data is impossible if IO-Link communication is maintained at the same time. IO-Link has a higher priority at this point. However, access to the

acyclic parameters is possible as long as an IO-Link read or write command is not taking place at the same time.

End position monitoring, integrated temperature sensor, and acceleration sensor increase operational reliability and process availability. Service and maintenance management can be optimized and faults and anomalies can be detected directly.

Throttle unit

The throttle unit prevents compressed air from acting on the pneumatic part-turn actuator in an uncontrolled manner. The exhaust air throttles can be individually adjusted for control purposes, which has an influence on the actuating time. A positioning time of more than 6 seconds is recommended.

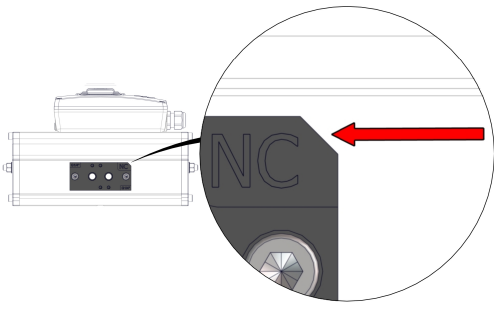
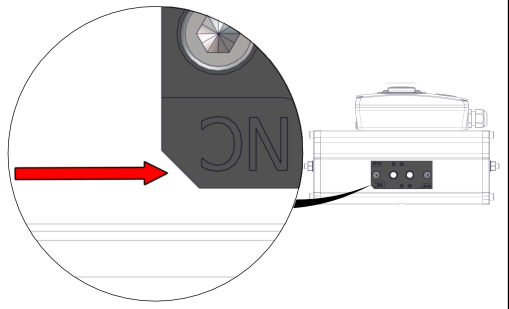
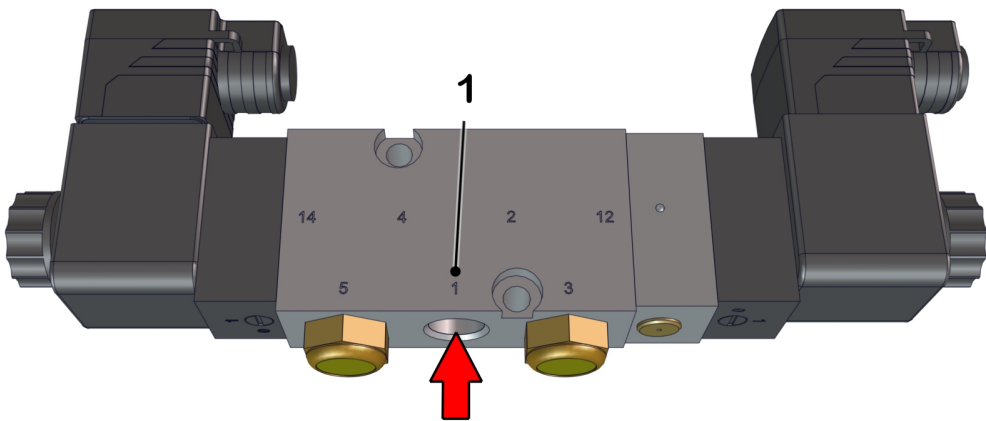
The throttle unit is available in single-acting configurations for a single-acting pneumatic part-turn actuator and double-acting configurations for a double-acting pneumatic part-turn actuator.

Solenoid valve

The solenoid valve uses an electrical signal to open or close the flow of compressed air and to ensure ventilation.

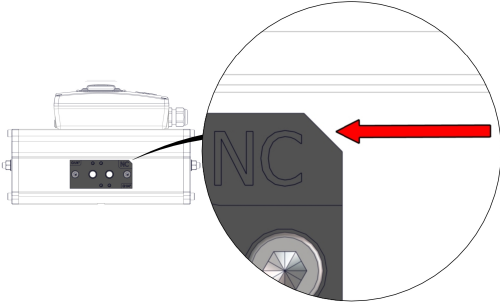
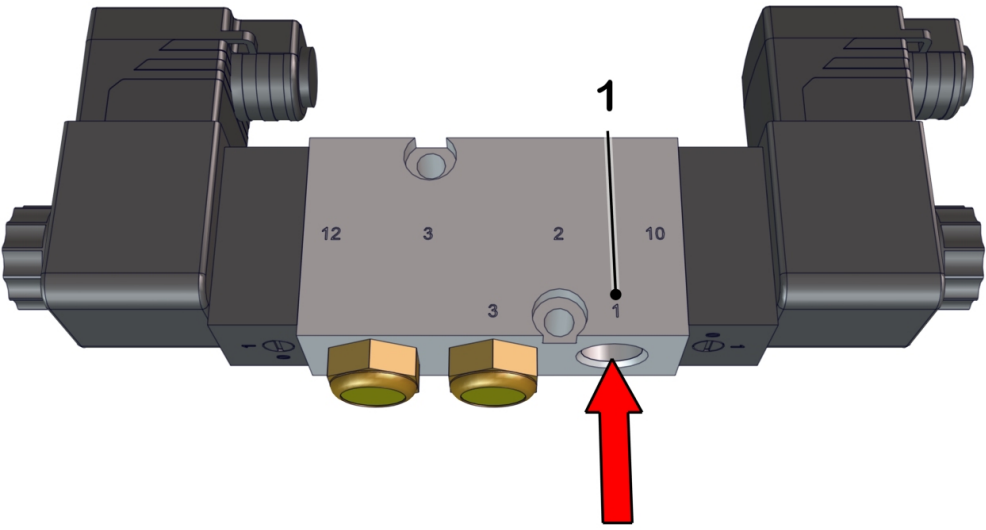
3.1 Fail-safe behavior

Mounting situation double-acting actuator

Fail-safe behavior Failure of electrical supply	fixed last position	closing	opening
Attachment situation NAMUR connection block			
	Standard		Rotate NAMUR connection block
Pneumatic connection			
	Central compressed air connection		

Tab. 10: Mounting situation double-acting actuator

Mounting situation single-acting actuator

Fail-safe behavior Failure of electrical supply + pneumatic auxiliary energy	closes and opens
Attachment situation NAMUR connection block	
Pneumatic connection	
	Compressed air connection right

Tab. 11: Mounting situation single-acting actuator

Level	1. Failure Reference variable	1b. Failure Io-link Communication ¹	2. Failure electrical supply	3. Failure pneumatic auxiliary energy
Execution				
EP3-X-DH...	Adjustable (safety position)	Adjustable (persisting, closes, opens, safety position)	Fixed last position	Fixed last position

Level	1. Failure Reference vari- able	1b. Failure Io-link Communication ¹	2. Failure electrical supply	3. Failure pneumatic auxiliary energy
Execution				
EP3-X-DC...	Adjustable (safety position)	Adjustable (persisting, closes, opens, safety position)	Closing	Position not defined
EP3-X-DO...	Adjustable (safety position)	Adjustable (persisting, closes, opens, safety position)	opening	Position not defined
EP3-X-SC...	Adjustable (safety position)	Adjustable (closes, opens, safety position)	closing	closing
EP3-X-SO...	Adjustable (safety position)	Adjustable (closes, opens, safety position)	opening	opening
¹ Only after successful automatic tuning (Autotune)				

Tab. 12: Fail-safe behavior

NOTICE



“Reference variable/ IO-Link communication failure”:
Failure can only be recorded when using the 4-20 mA control
or IO-Link operation. No failure can be detected if the EP3 is
controlled by 24 V signals.

NOTICE



“Fixed last position”:
Dependent on the self-inhibiting of the valve unit. This depends
on the frictional torque of the pneumatic actuator used and the
valve itself. If process-related forces act on the valve, this can
lead to a change in position.

NOTICE



“Safety position”:
Any safety position can be defined on the software side. The
default setting is 0%.

3.2 Technical data

EP3

Designation	Description
Valve body	Powder-coated aluminum
Operating elements / HMI	Pushbutton / IO-Link / Bluetooth / RGB light element

Designation	Description
Temperature range	-20 °C to +60 °C (-4 °F to +140 °F) ATEX: -10 °C to +40 °C (14 °F to +104 °F)
Connection type	Screw terminal connection 26-16 AWG / 0.129-1.31mm ² (16 AWG), optional M12 panel connector
Recording range	100°
Dead zone	1-10% (factory setting 3%)
Safety position	Holding, closing or opening
Electrical data	
Power supply	24 V DC ±10%
Current consumption	Max. 380 mA
Sensor type position detection	Angle sensor, non-contact
Additional sensors	Acceleration sensor, temperature sensor
Analog input/setpoint specification	4-20 mA / 0-10 V
Additional analog inputs	4-20 mA / 0-10 V
Analog output	4-20 mA / 0-10 V
Digital input signals	3 (on/off, intermediate position, external process sensor)
Digital output signals	3 (feedback: on, off, fault/intermediate position)
Reverse polarity protection	Yes (power supply)
Pneumatic data	
Control medium	Neutral gases, air
Supply pressure	3-8 bar (43.5 – 116.0 psi)
Pilot air connection	G1/4"
Air output	1250 NI/min (44.125 ft ³ /min), adjustable

Tab. 13: Technical data EP3

3.3 Dimensions and weights

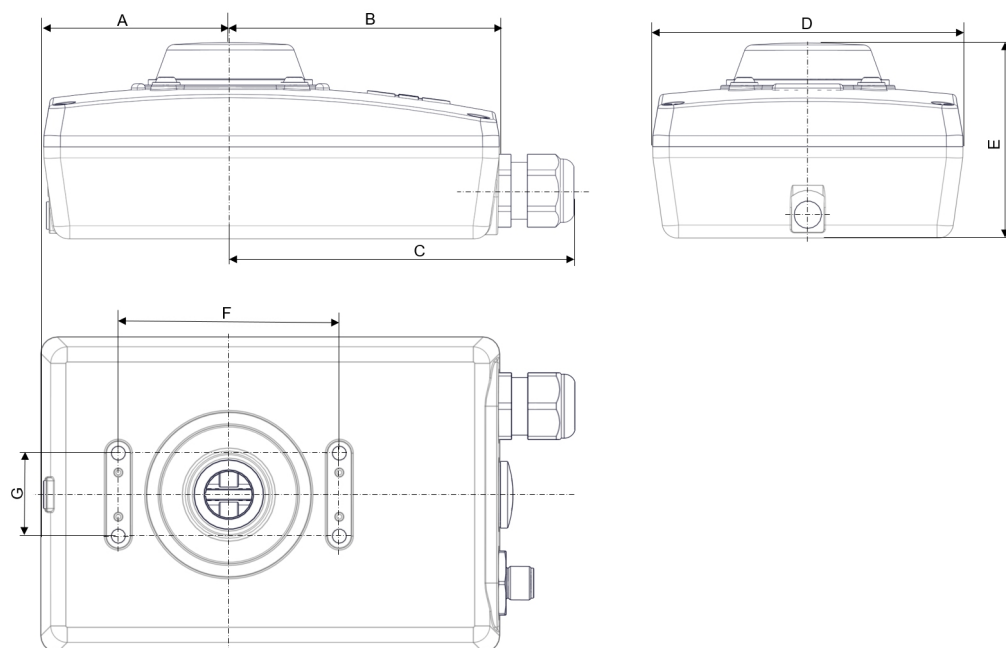
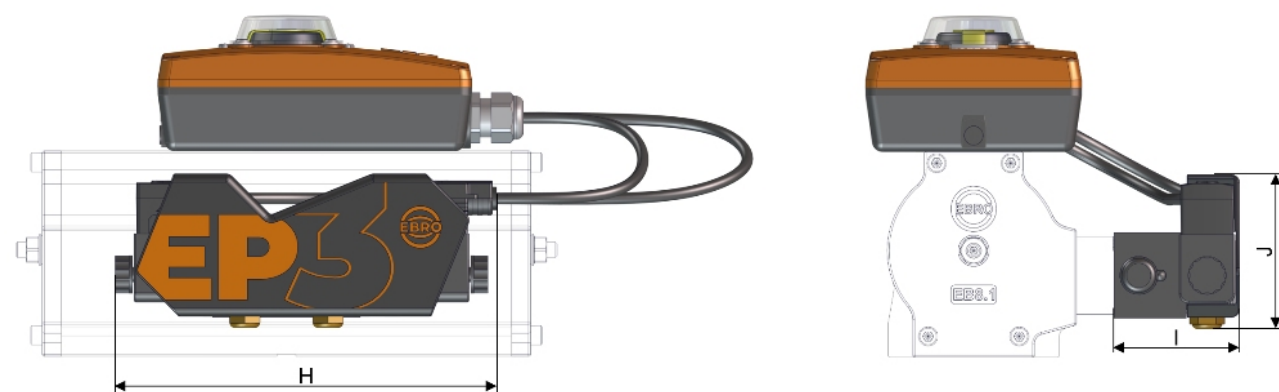


Fig. 4: Dimensions

Type	Main dimensions [mm]							Weight [kg]
	A	B	C	D	E	F	G	
EP3	68	98	125	114	70	80	30	2.0

Weight including solenoid valve and throttle unit

Tab. 14: Main dimensions EP3



Type	Main dimensions [mm]		
	H	I	J
EP3	202	66	81

Tab. 15: Main dimensions EP3

4 TRANSPORT AND ASSEMBLY

WARNING



Parts may start moving unexpectedly.

Injuries caused by crushing, pulling in, catching, grabbing, or rubbing and scraping as well as cutting.

- Only perform assembly work while the system is depressurized.
- Only perform assembly work while the device is de-energized.

Wear personal protective equipment!



General rules for storage, transport, and assembly

- Recommended storage conditions:
 - Room temperature $>5\text{ °C}$, $<25\text{ °C}$ ($>41\text{ °F}$, $<77\text{ °F}$)
 - Relative humidity 50-60%
 - Avoid condensation
 - Protection against direct sunlight
- Leave the components secured in the factory packaging until assembly.
- Protect any attachments from damage (e.g. solenoid valves).
- Protect the components from dirt and moisture.
- Leave all connections and electrical plug contacts closed until assembly.
- Check the positioner for damage before assembly.

4.1 Transporting components

NOTICE



You can find the weight of your assembly in chapter "Dimensions and weights".

1. Carry the positioner to its place of use.

4.2 Mounting components

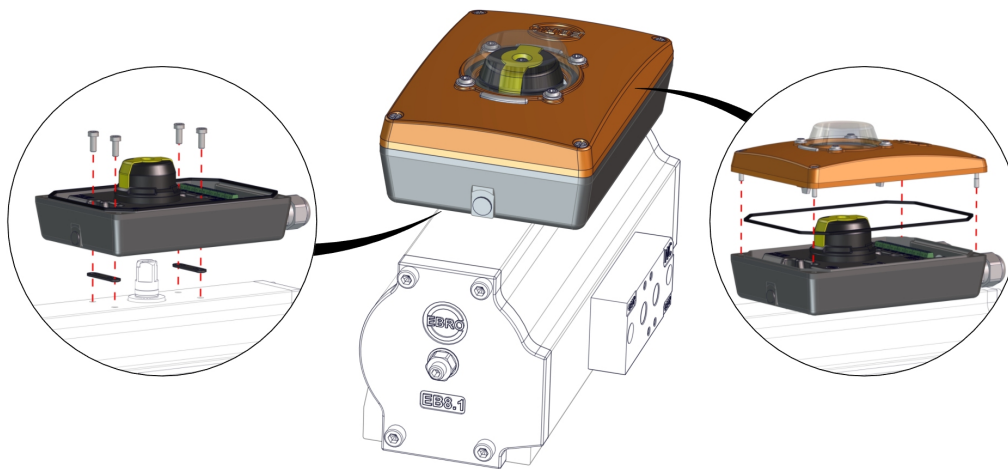


Fig. 5: Mounting the switch box

1. Open the switch box cover.
2. Screw the switch box to the actuator from above with 4 hexagon socket screws ($3.7 \text{ Nm} \pm 0.2 \text{ Nm}$).
Ensure correct seat of the two gaskets between the switch box and the part-turn actuator.
3. Close the cover of the switch box and screw it down ($2 \text{ Nm} \pm 0.2 \text{ Nm}$).
Ensure correct a seat of the seal between the switch box bottom and the switch box top.

4.3 Connecting components

WARNING



Parts may start moving unexpectedly.

Injuries caused by crushing, pulling in, catching, grabbing, or rubbing and scraping as well as cutting.

- Only perform assembly work while the system is depressurized.
- Only perform assembly work while the device is de-energized.

Pneumatic connection of the positioner

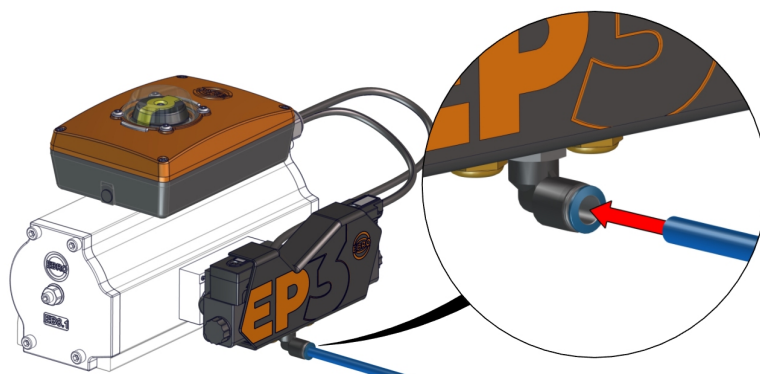


Fig. 6: Example figure

1. Install a compressed air connection at the solenoid valve inlet.
2. Connect a suitable compressed air hose to the compressed air connection.

Electric connection of the position controller

DANGER



Danger to life due to electrical voltage!

Burns, unconsciousness, muscle cramps, cardiac arrhythmia, and even cardiac arrest.

- Ensure that there is no voltage pending.
- Ensure that the protective earth is properly connected.
- Secure the switch box against reactivation.

NOTICE



The electrical connection can be made via X1 or X2 depending on the switch box version.

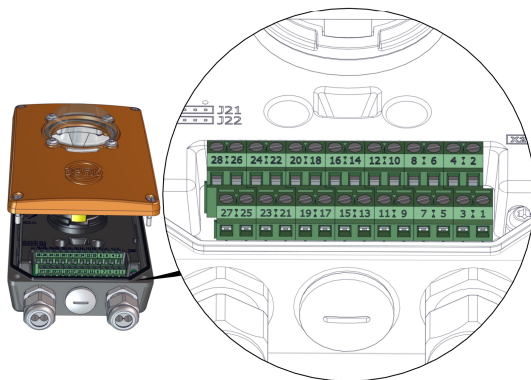


Fig. 7: Connector strip X1

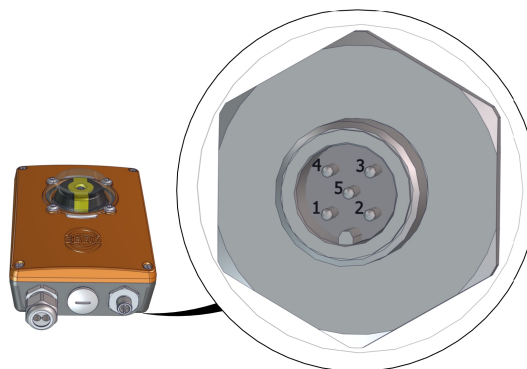


Fig. 8: Plug socket X2

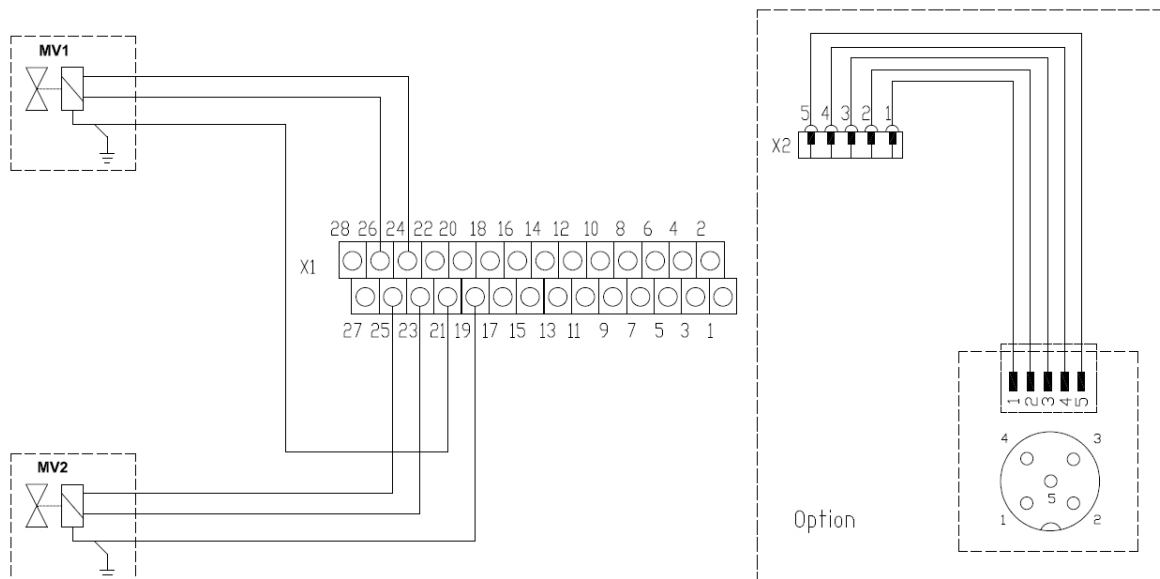


Fig. 9: Circuit diagram EP3

X1		X1		X2	
Termi- nal	Assignment	Termi- nal	Assignment	Termi- nal	Assignment
1	PE	15	GND	1	+24 V (conventional / IO-Link Master)
2	+24 V (for external sensors)	16	Digital input 3	2	
3	0 V (conventional / IO-Link master)	17	Analog input 2 GND (-)	3	0 V (conventional / IO-Link Master)
4	+24 V (for external sensors)	18	Digital input 2	4	Feedback position CLOSED / IO-Link
5	+24 V (conventional / IO-Link master)	19	PE	5	
6	Analog input 2 (+)	20	Digital input 1		
7	Feedback 3. Position / collec- tive fault	21	PE		
8	Analog input 1 (setpoint (+))	22	Analog input 1 GND (-)		
9	Feedback Position OPEN	23	2U+ control via IO-Link		
10	Analog feedback GND (-)	24	U-		
11	Feedback position CLOSED / IO-Link	25	U-		
12	Analog feedback 0-10 V (+)	26	1U+ control via IO-Link		
13	0 V (for external sensors)	27	2M IO-Link master ¹		
14	Analog feedback 4-20 mA	28	2+24 V IO-Link master ¹		

¹ Optional auxiliary voltage for MV control

Tab. 16: Circuit diagram EP3

5 COMMISSIONING

Wear personal protective equipment!



NOTICE



Also observe chapter "Target groups".

5.1 Settings

Adjust throttle unit

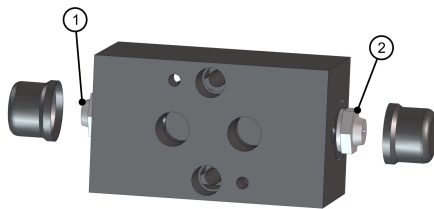


Fig. 10: Double-acting throttle unit

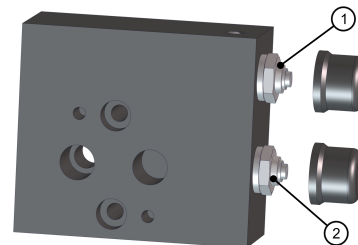


Fig. 11: Single-acting throttle unit

1. Remove both protective caps.
2. Screw the throttle (item 1) in clockwise to slow down **opening** or out counterclockwise to speed up opening. Do not screw the throttle all the way in, otherwise opening will be blocked.
3. Screw the throttle (item 2) in clockwise to slow down **closing** or out counterclockwise to speed up closing. Do not screw the throttle all the way in, otherwise closing will be blocked.
4. Attach both protective caps.

Functions

NOTICE



Parameterization may be performed while the process is running with IO-Link.

NOTICE



A detailed description of the parameters and process data of the IODD is available at www.ebro-armaturen.com.

Process inputs

The position controller has 5 process inputs. 3 digital inputs and 2 analog inputs (4-20mA / 0-10V). This interface can be used to wire, for example, nearby sensors in the position controller, put them into operation, and retrieve the states (high/low (digital) or 4-20mA (analogue)) via the IO-Link. An analog input is intended for the setpoint control variable (see circuit diagram).

Advanced sensor technology

The position controller has a built-in acceleration sensor in addition to position sensors and temperature sensors. This sensor is used to detect the installation position of the valve in addition to providing the acceleration value. Installation recognition and sensor value calibration will be run automatically when the switch box starts up.

Meaning of the LED display

The colors can be freely adjusted via IO-Link.

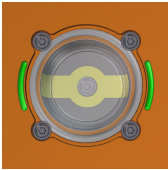
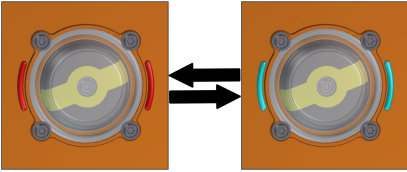
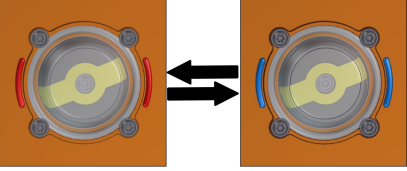
Figure	LED color (factory setting)	Description
	Green permanently lit	Status feedback "Position CLOSED"
	Yellow permanently lit	Status feedback "Position OPEN"
	Blue permanently lit	Status feedback "Intermediate position reached"
	Red 1 Hz flashing	Status feedback "Fault"
	Cyan 1 Hz flashing	Automatic tuning process (Autotune) running

Figure	LED color (factory setting)	Description
	Red/cyan 1 Hz alternating	Automatic tuning process (Autotune) → Error
	Red/blue 1 Hz alternating	Control errors

Tab. 17: Meaning of the LED colors

DIP switch and push-button

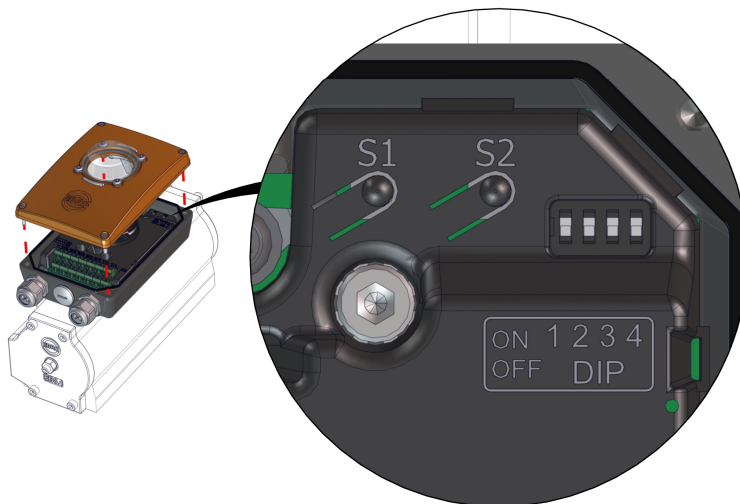


Fig. 12: DIP switch and push-button

DIP switches 1-4 are used to configure the following functions (default=OFF):

DIP	Function	OFF (default)	ON
1	Automatic / Manual	Automatic mode In automatic mode, buttons S1 + S2 have no function.	Manual mode Manual mode also activates the use of buttons S1 + S2. The S1 + S2 buttons only have a function in this mode.
2	Inversion of setpoint input	Rising current/voltage input equivalent to the valve position 4 mA = 0% (closed) 20 mA = 100% (open)	Inverted 4 mA = 100% (open) 20 mA = 0% (closed)

DIP	Function	OFF (default)	ON
3	Rotation direction closing	Right-wards closing The "OPEN" and "CLOSE" positions are defined in accordance with this setting during automatic adjustment (auto-tune).	Left-wards closing The "OPEN" and "CLOSE" positions are defined in accordance with this setting during automatic adjustment (auto-tune).
4	Selection of signal type 4-20mA / 0-10 V	4-20 mA This applies to both the input signal (setpoint) and the output signal (feedback).	0-10 V This applies to both the input signal (setpoint) and the output signal (feedback).

Tab. 18: DIP switch

The button elements S1 and S2 are used to manually actuate the valve and start the automatic setting function (Autotune). DIP switch 1 must be set to "ON" (manual mode).

Button	Function	Description
S1	Valve disc closes	Actuation (holding down) the button activates the solenoid valve output for closing. This function is available after a successful automatic setting (autotune).
S2	Valve opens	Actuation (holding down) the button activates the solenoid valve output for opening. This function is available after a successful automatic setting (autotune).
S1 + S2 >5 s	Start Automatic tuning (autotune)	Successive actuation of button S1 and within <1 s of button S2 with an actuation time of >5 s starts the automatic setting function (autotune) and serves to tune the position controller with the valve unit.

Tab. 19: Push-button

Automatic tuning (autotune)

WARNING



The actuator, the valve disc and the position indicator are moved several times in both directions during automatic adjustment (autotune)!

Injuries caused by crushing, pulling in, catching, grabbing, or rubbing and scraping as well as cutting.

- Do not touch any moving parts.
- Do not reach between the valve body and the valve disc.
- Wait until the parameterization is complete. The LED display is no longer lit in cyan.

WARNING

All (safety) functions are immediately available after a successful automatic setting (autotune) and switching the mode from "Manual" to "Automatic". This may lead to immediate activation of the actuator.

Injuries caused by crushing, pulling in, catching, grabbing, or rubbing and scraping as well as cutting.

- Do not touch any moving parts.
- Do not reach between the valve body and the valve disc.

NOTICE

The EP3 is ready for operation at assembly at the factory with actuator and valve. The EP3 must be parameterized for assembly by the owner.

NOTICE

Ensure that the valve disc can move freely in the piping.

The valve disc moves several times to the CLOSED position (0%) and to the OPEN position (100%) during automatic adjustment (autotune). The LED display lights up in cyan during automatic tuning (autotune); the LED display lights up in green once automatic tuning (Autotune) has been successfully completed.

1. Release the compressed air to the solenoid valve.
2. Apply voltage to the EP3.
3. Open the cover of the switch box.
4. Set DIP switch 1 to "ON" (manual mode).
5. Start parameterization by actuating the S1 and S2 buttons within 1 second in succession and hold them for 5 seconds. The LED display changes to cyan.
6. Wait until the parameterization is complete. The LED display no longer lights up cyan. If the automatic setting (autotune) was not successful, the LED display flashes alternately in red and cyan. Further notices can be found in "Troubleshooting" in the chapter Maintenance.
7. Set DIP switch 1 to "OFF" (automatic mode).

NOTICE

Please note that all (safety) functions are available immediately after a successful automatic setting (autotune) and switching the mode from "Manual" to "Automatic". This may lead to immediate activation of the actuator!

Status LED

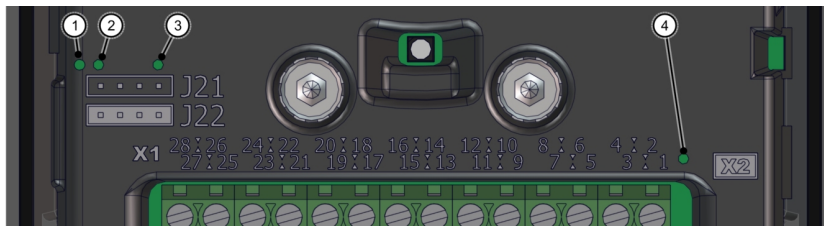


Fig. 13: Status LED

Position	Function
1	MV2 activated (green)
2	Power supply for Solenoid valve control is pending
3	MV1 activated (green)
4	Power supply is connected correctly (green)

Tab. 20: Status LED

5.2 Checks

Protective earth

- This device has a protective earth connection. Ensure that the protective earth is properly connected. An improperly connected protective earth may lead to dangerous contact voltages in case of error.

The positioner supplied was produced, factory-set, and tested for the technical data specified in the order. Nevertheless, you must ensure that the positioner functions properly after it has been fully installed.

- Check that all control drive components are assembled correctly.
- Check that the switch box is correctly assembled on the pneumatic part turn actuator.

Release the electrical connection and the compressed air.

- Perform a test run.
Check that the valve moves to the intended end position or intermediate position with the corresponding control commands and that the corresponding feedback signals from the control box are present.

6 OPERATION

Wear personal protective equipment!



NOTICE



Also observe chapter "Target groups".

The positioner is preset to modes at the factory. This simplifies and speeds up commissioning. Changeover is possible via IO-Link, please refer to the IODD.

NOTICE



The factory mode can be found in the type code on the identification plate. If the mode is changed, we recommend that the owner attaches a corresponding notice to the positioner.

Type code Mode	EP3-P-XX-... Positioner	EP3-PL-XX-... Positioner linear	EP3-3-XX-... 3 position actuator	EP3-D-XX-... On/off Eco Mode	EP3-DL-XX-... On/off Eco Mode linear
Analog input 1 – function	(1) Setpoint speci- fication	(1) Setpoint speci- fication	(0) Inactive	(0) Inactive	(0) Inactive
Analog input 2 – function	(0) Inactive	(1) Knife gate valve path detection	(0) Inactive	(0) Inactive	(0) Inactive
Analogue output function	(1) Actual position	(1) Actual position	(0) Inactive	(0) Inactive	(0) Inactive
Digital process input 1 – function	(0) Inactive	(0) Inactive	(0) Inactive	(0) Inactive	(1) Knife gate valve closed
Digital process input 2 – function	(0) Inactive	(0) Inactive	(1) Mode on/off	(1) Mode on/off	(1) Mode on/off
Digital process input 3 – function	(0) Inactive	(0) Inactive	(1) 3. Position of positioning mode	(0) Inactive	(2) Knife gate valve open
Digital output 3 function	(0) Inactive	(0) Inactive	(1) Feedback closed	(1) Feedback closed	(1) Feedback closed
Digital output 4 function	(0) Inactive	(0) Inactive	(1) Feedback open	(1) Feedback open	(1) Feedback open
Digital output 5 function	(1) Collective fault	(1) Collective fault	(2) Feedback 3. Position	(1) Collective fault	(1) Collective fault
Tightly closing	(255) active	(255) active	(255) active	(255) active	(255) active

Tab. 21: Modes

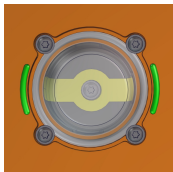
NOTICE



The tight-closing function ensures that the valve is completely closed if the setpoint is undercut by 5% (default, adjustable). This prevents damaging movements in the area of the valve sealing seat.

Meaning of the LED colors

The colors can be freely adjusted via IO-Link.

Figure	LED color (factory setting)	Description
	Green permanently lit	Status feedback "Position CLOSED"
	Yellow permanently lit	Status feedback "Position OPEN"
	Blue permanently lit	Status feedback "Intermediate position reached"
	Red 1Hz flashing	Status feedback "Fault"

Tab. 22: Meaning of the LED colors

6.1 EBRO Plus App

NOTICE



Attention

Operation of the EP3 in an unprotected network environment:
Possible unauthorized read or write access to data.
Possible unauthorized influence on device function.

- ▶ Limit access to authorized users.
- ▶ Assign new password for the Bluetooth access.

The EP3 contains digital communication interfaces. The range of the Bluetooth interface is limited. The spatial restriction serves as the first level of access protection. The owner must ensure that nobody gains unauthorized access to the installed systems. Security measures have been taken on the product side to restrict access to the device. The owner of the device must ensure that unauthorized persons

have no physical access to the device. An individual risk assessment of the safety requirements must be performed and documented. If necessary, additional protective measures are required to ensure the safety of the appliance.

The first time the EP3 is accessed via Bluetooth, a password query is started with a default password. The user will be prompted to change the password after entering the password. The data interface is only activated and access enabled once the password has been changed. Access is only possible again by entering the changed password. The password must be changed by connecting to the EBRO Plus app when commissioning the EP3. The connection must be interrupted using the "Disconnect device" symbol before closing the application.

As long as a mobile end device is connected to the EP3, the EP3 remains invisible to other mobile end devices. Further access is then not possible. Bluetooth communication is secured and encrypted via standards in the protocol. Access via Bluetooth can be completely disabled by removing jumper J1 on the EP3. This interrupts the power supply to the interface module and access is not possible.

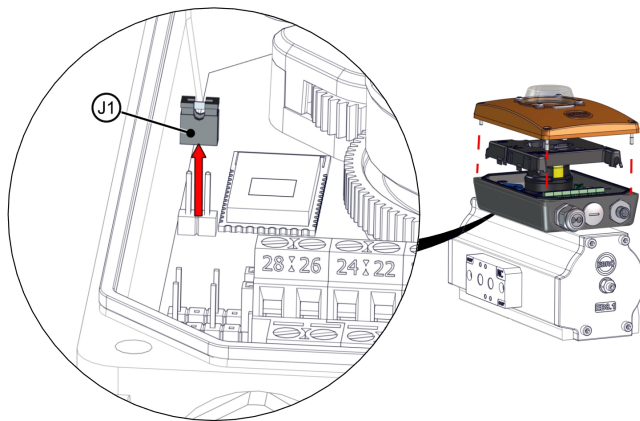


Fig. 14: Jumper J1

7 MAINTENANCE

WARNING



Parts may start moving unexpectedly.

Injuries caused by crushing, pulling in, catching, grabbing, or rubbing and scraping as well as cutting.

- Only perform assembly work while the system is depressurized.
- Only perform assembly work while the device is de-energized.

CAUTION



Assembly and disassembly of actuators when the valve is under pressure.

Parts may be accelerated in an uncontrolled manner.

- Only perform assembly and disassembly work when the valve is depressurized.

NOTICE



Maintenance depends on various factors, such as the local environment, medium, temperature, and actuation. The owner will determine maintenance intervals in accordance with operational conditions and requirements.

Wear personal protective equipment!



NOTICE



Also observe chapter "Target groups".

Maintenance work is limited to an external inspection of the positioner:

- Keep the positioner free from deposits.
- Check the positioner for leaks.
- Check that the signage (identification plate / warning and mandatory stickers, if applicable) is complete and intact.

Troubleshooting EP3
NOTICE


A detailed description of the parameters and process data of the IODD is available at www.ebro-armaturen.com.

Type of fault	Cause	Measure
Collective fault	Runtime monitoring: Exceeding the set runtime (default value: 0 s ► deactivated)	Check the following components: • Fitting valve actuated • Actuator function • Compressed air supply • Position of the cam disc • Jamming in the piping Fault is automatically reset as soon as the repeated trip is within the time tolerance.
	Max. duty cycles: Reach the maximum set duty cycles. (default value: 0 n ► deactivated)	Check the duty cycles performed. Reset or increase the counter.
	Temperature exceeded / Temperature undercut	Check the environment of the EP3.
Automatic self-tuning (AutoTune) aborts	Essential parameters could not be defined by the AutoTune algorithm	Check: • Compressed air available • Check if the solenoid valve used fits the pneumatic actuator • Reducing the actuating speed using throttles (see chapter "Commissioning")
Position controller oscillates around setpoint	Dead zone too small	Increasing the dead zone
	Actuating speed too high	Reducing the actuating speed using throttles (see chapter "Commissioning")

Type of fault	Cause	Measure
Position controller does not respond to setpoint	DIP 1 still active (manual operation)	Switching to automatic mode
	Setpoint specification not configured correctly	The operating mode is pre-parameterized at the factory (for an explanation of the operating mode, see chapter "Operation"). The mode can be found in the type code on the identification plate A different mode can be parameterized via Io-link if required.

Tab. 23: Troubleshooting EP3

Contact

☎ +49 2331 904-0
 @ service@ebro-armaturen.com



7.1 Bill of materials

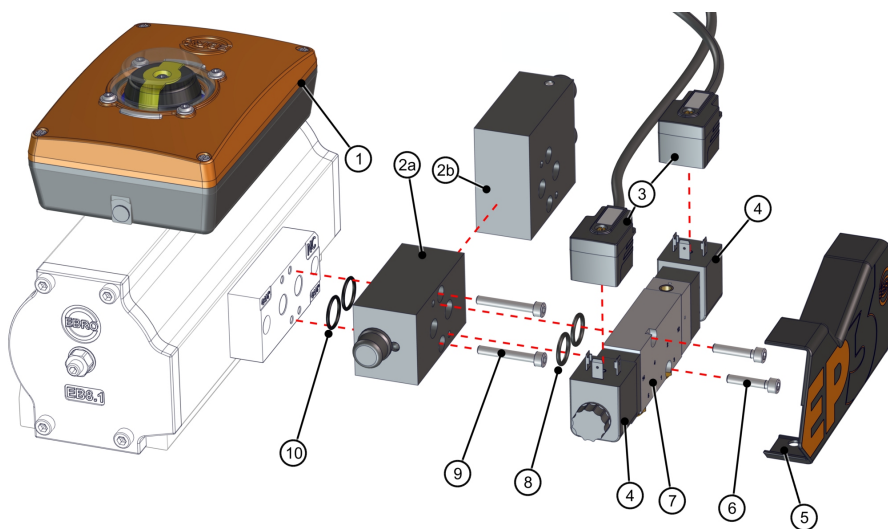


Fig. 15: Bill of materials EP3

Item	Naming	Piece	Material group	Material no.
1	Switch box	1		
2a	Double-acting throttle unit	1		
2b	Single-acting throttle unit			
3	Plug with cable	2		
4	Solenoid coil	2		
5	Cover	1		
6	Hexagon socket screw (solenoid valve)	2		

Item	Naming	Piece	Material group	Material no.
7	5/3-way solenoid valve or 3/3-way solenoid valve	1		
8	O-ring	2	NBR	
9	Hexagon socket screw (throttle unit)	2		
10	O-ring	2	NBR	

Tab. 24: Bill of materials EP3

8 DECOMMISSIONING/DISASSEMBLY

DANGER



Danger to life due to electrical voltage!

Burns, unconsciousness, muscle cramps, cardiac arrhythmia, and even cardiac arrest.

- Ensure that there is no voltage pending.
- Ensure that the protective earth is properly connected.
- Secure the switch box against reactivation.

WARNING



Parts may start moving unexpectedly.

Injuries caused by crushing, pulling in, catching, grabbing, or rubbing and scraping as well as cutting.

- Only perform disassembly work while the system is depressurized.
- Only perform disassembly work while the device is de-energized.
- Do not reach between the valve body and the valve disc.

Wear personal protective equipment!



NOTICE



Also observe chapter "Target groups".

For extended deactivation:

- Protect the position controller from soiling and dust.
Also observe the general rules for storage, transport, and assembly in the chapter "Transport and assembly".
- Check the position controller for damage and function at recommissioning.

For permanent decommissioning:

- Dispose of the components in an environmentally friendly and professional manner in accordance with local regulations.
- Look out for oily residues in actuators and bearings.

For disassembly, refer to chapter "Transport and assembly" et seq.

EU Declaration of Conformity

The manufacturer

**EBRO ARMATUREN
Gebr. Bröer GmbH
Karlstraße 8
58135 Hagen
Germany**



declares that the products of the series
EBRO EP3
Type EP3-X-XX-X-XXXX-XXXX-XX-XX

are manufactured in accordance with the requirements of the following standards:

DIN EN 301489-1:2020-06
DIN EN 55032:2022-08
DIN EN 300328:2019-10
DIN EN ISO 12100:2011-03

The following product documentation is available:

Planning documents, technical data sheets, catalog sheets

These products comply with the following directives:

Radio Equipment Directive 2014/53/EU

The following applies to compliance with the above directives:

1. The user must comply with the "Original assembly and operating manual" enclosed with the delivery and must observe all instructions in this manual.
Failure to comply with this instruction may – in important cases – release the manufacturer from their product liability.
2. Commissioning of the product is prohibited until the system in which the switch box is installed has been declared compliant with all applicable EU directives mentioned above by the person responsible for it.
3. The manufacturer EBRO ARMATUREN Gebr. Bröer GmbH has performed and documented the necessary risk analyses.
The employee responsible for this available documentation is Mr. Matthias Jortzik, EBRO ARMATUREN Gebr. Bröer GmbH, Karlstraße 8, 58135 Hagen, Germany.

Hagen, October 2024

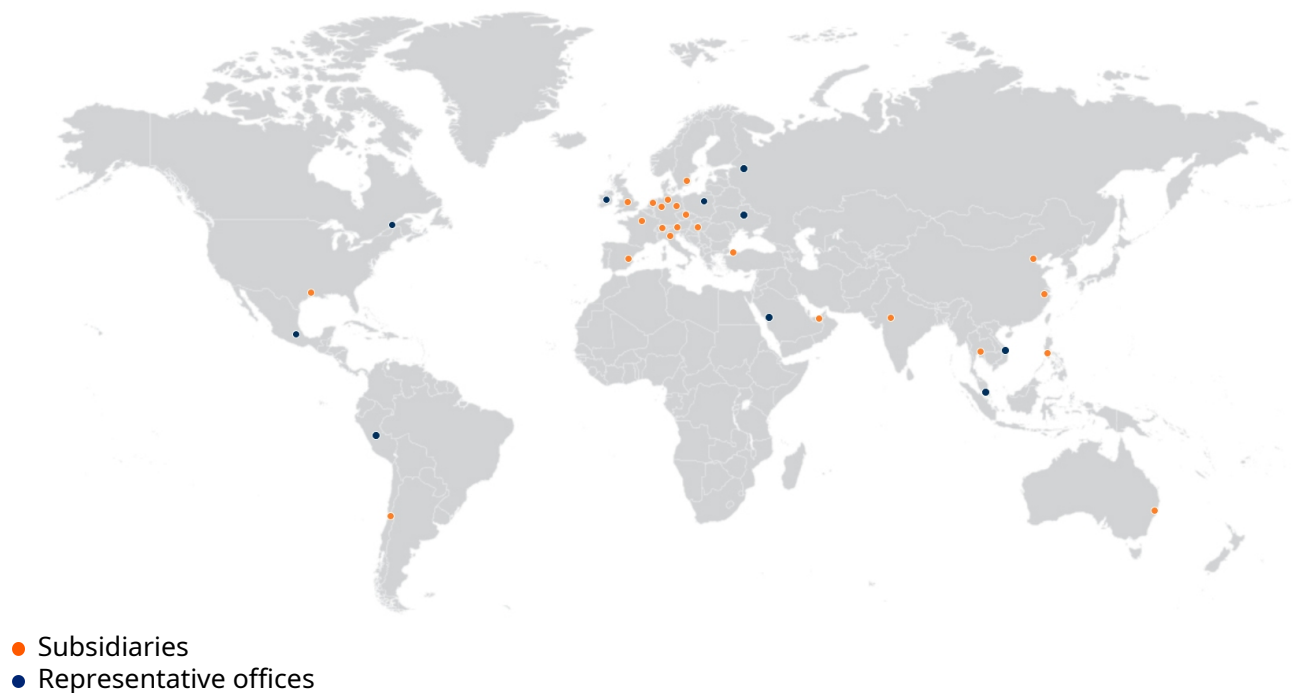
.....
Lydia Bröer, management

Notice:

This is a translated version of the original document. Only the signed original document in German is legally binding.

THE WORLD OF EBRO ARMATUREN

Our international network



Since the company was founded in 1972, EBRO ARMATUREN has been developing, producing and selling shut-off and control valves as well as automation technology for industrial applications. More than 1,000 employees at two domestic and 30+ international subsidiaries ensure that EBRO products are available in over 100 countries worldwide. Within the global network, production takes place at the headquarters in Germany and in Italy, Sweden, China and Thailand with uniformly high manufacturing and quality standards.

In 2005, the Swedish manufacturer Stafsjö Valves AB was acquired and the product range was extended by an extensive portfolio of knife gate valves.

EBRO ARMATUREN
Gebr. Bröer GmbH

Karlstraße 8
D-58135 Hagen

☎ +49 (0)2331 / 904 - 0
✉ post@ebro-armaturen.com

A company of the Bröer Group



You can find current addresses at
www.ebro-armaturen.com