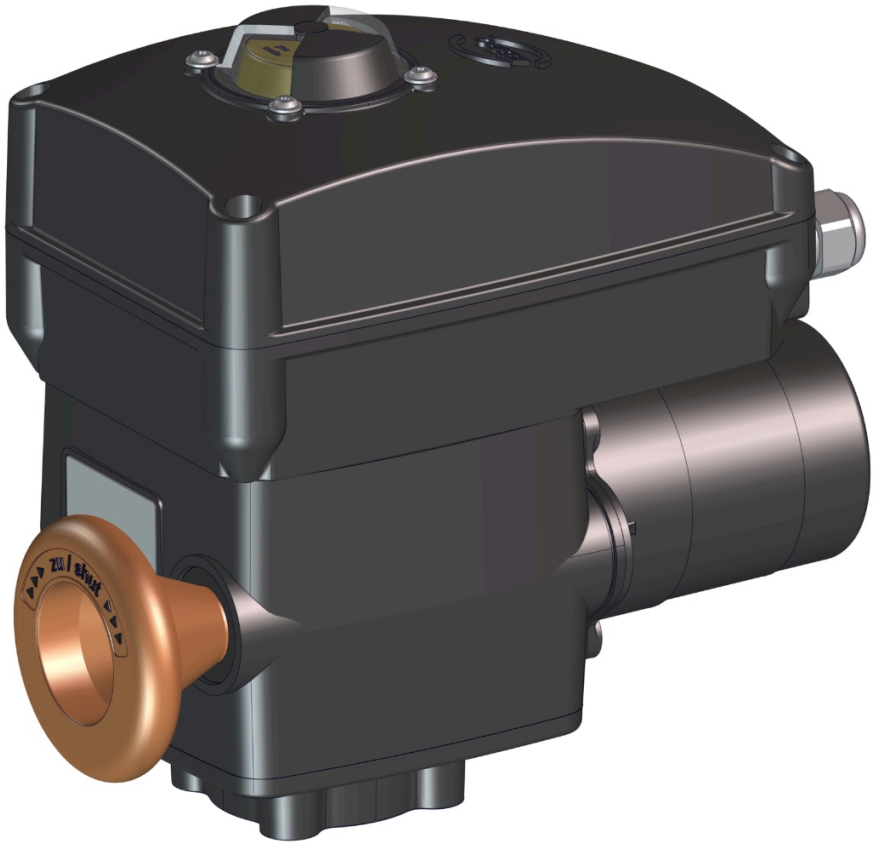
Original
Assembly and Operating Manual

Electrical part-turn actuator E50-E210



EBRO ARMATUREN®

en
Version 1.2 from 04/08/2026

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1 ABOUT THIS OPERATING MANUAL

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

- Electrical part-turn actuator of the type E50-E210

Hereinafter:

- EBRO ARMATUREN Gebrüder Bröer GmbH ► EBRO
- Electrical part-turn actuator of the type E50-E210 ► Part-turn actuator
- 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 part-turn actuator. The operating manual must be passed on if the site of use or the owner changes.

1.1 Copyright

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.

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 part-turn actuator 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 part-turn actuator.

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 suitably qualified and trained specialists must work on the part-turn actuator. Persons who are still being trained or instructed must only work on the part-turn actuator under the constant supervision of a trained or instructed specialist.

Every person who works with the part-turn actuator or who performs work on the part-turn actuator must know and apply the content of the operating manual. The owner of the part-turn actuator 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	Commission-ing personnel	Operating personnel	Maintenance personnel
Transport	●				
Assembly		●			
Commissioning		●	●	●	
Operation				●	
Maintenance					●
Decommission-ing	●	●			

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.

④ ➢ Check the valve for leaks.

➢ Observe the safety data sheet.

⑤

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 part-turn actuator ...	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 part-turn actuator 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 part-turn actuator 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 part-turn actuator is responsible for requesting and, if necessary, carrying out the conformity assessment procedure.

1.7 Contact details

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2 IMPORTANT SAFETY INSTRUCTIONS

2.1 Intended use

The electrical part-turn actuator of typeE50-E210is designed and built to actuate valves with 90° part-turn movement with electrical signals from a superordinate control system to the “OPEN” or “CLOSED” positions or to intermediate positions. The electrical part-turn actuator is intended exclusively for use in industrial applications.

Observe the part-turn actuator limits for intended use. Limits can be found in the technical data and on the identification plate of the part-turn actuator.

2.1.1 Reasonably foreseeable misuse

- The part-turn actuator may be used in potentially explosive areas.
- The part-turn actuator 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.

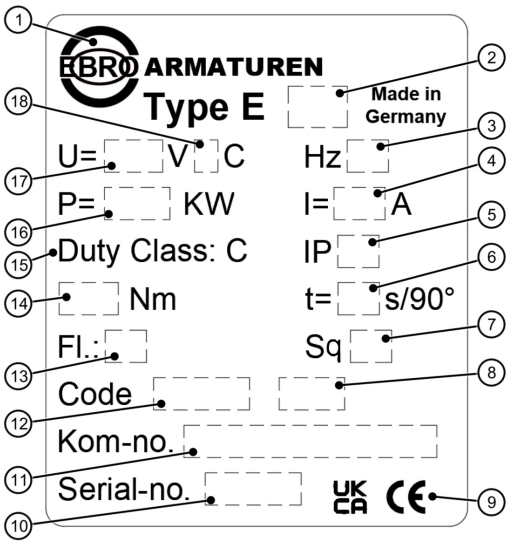


Fig. 1: Identification plateE50-E210

Item	Data item	Example	Comment
1	Manufacturer	EBRO	Logo
2	Type E	110	Actuator type
3	Hz	50	Frequency
4	I=	1.3	Rated current (A)
5	IP	67	Protection class
6	t=	12	Running time 0° - 90° (s/90°)
7	Sq	17	Valve interface (mm)
8	Code (code number options)	010	
9	Conformity	CE	Certifies conformity with at least one relevant EU directive requiring a CE conformity assessment procedure (if applicable). Other conformity markings are possible.
10	Serial-no.	00345	Serial number
11	Com-no.	113-00589823-20	Order number
12	Code (month and year of production)	09 25	
13	FL.	07/10	Flange connection
14	Nm	400	Torque (Nm)
15	Duty Class	C	Classification of duty cycles (1200 c/h)
16	P=	0.26	Power consumption (KW)
17	U=	220-240	Voltage (V)
18	⬚ C	A	Voltage type (AC/DC)

Tab. 7: Markings on the electric actuator

Code

Key for the 7-digit code **MM YY ABC** in the identification plate:

Production month	Production Year	Code number A limit switches/cams		Code number B Functional options		Reader Service Code C Contacts	
MM	**YY**	**0**	S1&S2 for 0°-90°	**0**	-	**0**	-
		1	S1-S4 for 0°-90°	**1**	Torque cut-off	**G**	Gold contact
		2	S1&S2 for 0°-90° S3&S4 freely adjustable	**2**	Potentiometer	**I**	Proximity switch
		3	S1-S4: freely adjustable	**3**	Current feedback	**A**	AS-i bus
		4		**4**	Positioning time extension		
		5		**5**	Torque cut-off and potentiometer		
		6		**6**	Torque cut-off and current feedback		
		7	S1&S2:freely adjustable	**7**	Actuating time extension (WS) and potentiometer		
		8		**8**	Actuating time extension and current feedback		
		9	Customer specification	**9**	Customer specification		

Tab. 8: Type code Option code

2.3 Operationally safe condition

The part-turn actuator may only be operated if it is in perfect technical condition. This includes in particular:

- The part-turn actuator must be fully mounted on a valve and properly commissioned.
- The part-turn actuator 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.

Shut down the part-turn actuator immediately if any damage or faults occur. Do not put the part-turn actuator back into operation until you have eliminated all damage and malfunctions.

Spare parts and accessories not supplied by EBRO may change the characteristics of the part-turn actuator. 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 part-turn actuator must know and apply the relevant contents of the operating manual. The owner of the part-turn actuator 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 part-turn actuator.

The owner must ensure that only sufficiently qualified and experienced persons with the corresponding specialist knowledge work on the part-turn actuator.

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 part-turn actuator
- 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 part-turn actuator is complete and undamaged after delivery.

The owner is responsible for ensuring that the part-turn actuator configuration corresponds to its application.

2.4.2 Risk assessment/hazard assessment

The part-turn actuator is a partly completed machinery within the meaning of Directive 2006/42/EC (Machinery Directive).

After installation in other partly completed machinery or equipment or complete machinery, the integrator must perform a risk assessment. The owner must perform a risk assessment and take protective measures if necessary.

2.4.3 Residual risks

Electrical hazards

Incorrect machining of electrical components or damage to them can result in direct or indirect contact with live parts.

Thermal hazards

The motor can grow up to 40 °C hot. There is a risk of burns if hot surfaces are touched without protective gloves. Structural or spatial protective measures may be required as part of the owner's hazard assessment at the place of use.

Noise emission

The part-turn actuator 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.

3 DESCRIPTION OF THE COMPONENTS

The part-turn actuator comprises several components that are mechanically connected to each other for their intended use.

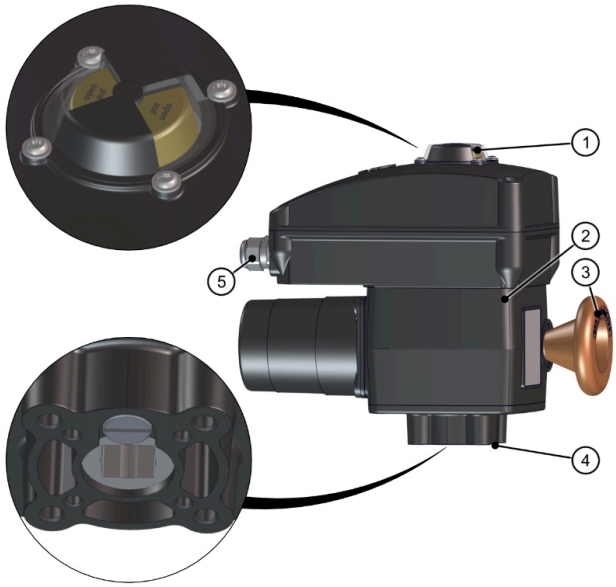


Fig. 2: Components E65-E210

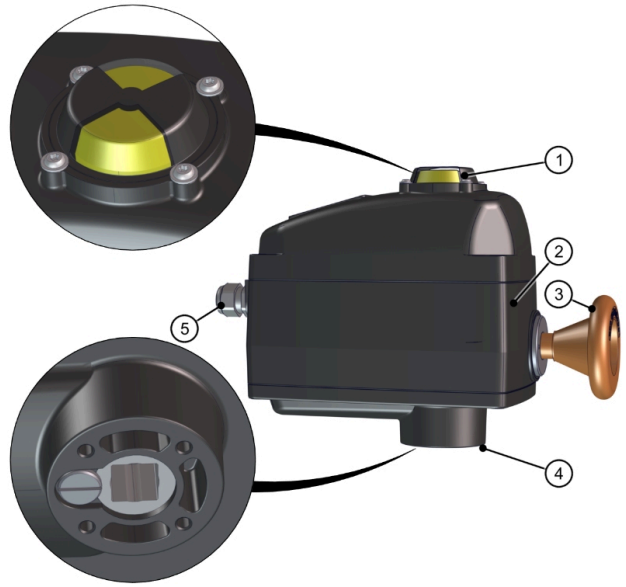


Fig. 3: Components E50

Position	Component
1	Position indicator
2	Part-turn actuator with gearbox
3	Manual emergency override
4	Flange with shaft intake
5	Cable entry

Tab. 9: Designation the components

Part-turn actuator

The electric part-turn actuator operates the valve and can be used as an actuator and control drive. The position indicator shows the current position of the actuator.

Attachment to the valve

The electric part-turn actuators E50 to E210 can be mounted on all valves with part-turn movement (usually 90°) that have a mounting flange according to DIN EN ISO 5211:2024-10 . The actuator is generally switched off (in the end positions of the valve) path-dependently via the integrated limit switches S1 and S2 that need to be used to switch off the power supply of the motor.

Load-dependent deactivation (e.g., for metal-seated valves) can be implemented

- with suitable selection of the switching suggestion in the system control,
- and are implemented via matching adjustment of the (optionally available) torque cut-off in the part-turn actuator

.

Actuator's output torque

The specified output torques of the actuators are nominal torques. They are achieved under any operating condition if the supply voltage is equal to the nominal voltage.

Design of the part-turn actuator

The main factors influencing the required actuating torque are determined by the valve (nominal size), the operating pressure, and the medium. The required actuating torque for the valve is determined by considering these parameters. EBRO recommends adding a safety reserve of 15 % to 20 % to the value specified by the valve manufacturer for the design of the part-turn actuator.

Protection class

The actuator design of the E50 to E210 series fulfills protection class IP67 according to DIN EN 60529:2014-09. Ensure that the installation is performed electrically and mechanically correctly to ensure compliance with this IP67 protection class.

Corrosion protection

According to the standard DIN EN ISO 22153:2021-07 For electric actuators, this corresponds to corrosion category C4. The actuators were type-tested in salt spray in accordance with DIN EN IEC 60068-2-52:2018-08 (based on the requirements of Germanischer Lloyd). The test parameter was severity level 4 with a duration of 14 days. This defines the area of application of the actuators for industrial systems and/or in an ambient atmosphere with an increased salt concentration.

Self-inhibiting at standstill

All part-turn actuators are equipped with a self-inhibiting worm gear. As a result, the part-turn actuator remains in the end positions and also in the intermediate position of the last approached position even when de-energized. The medium cannot influence the position of the valve disc.

Response time of the control unit to control signaling

The system must be set up to ensure that the actuator is switched off no later than 50 ms after reaching the end position to prevent incorrect control of the shut-off device (valve disc, ball) or incorrect signaling.

Rotational direction for electrical operation

According to the design standard DIN EN ISO 22153:2021-07 it is defined that the valve must close when actuated clockwise. The owner must implement this first via the correct mechanical assignment of the valve disc to the handwheel position (OPEN or CLOSED) and then by the correct power supply and control.

Manual emergency override

The manual emergency override is a rotating handwheel with direct action on the gear worm without a clutch. This means that the user can close or open the valve at any time (when the motor is de-energized) without the coupling mechanism with a maximum of approx. 15 turns. The safety regulations in accordance with EC Directive 2006/42/EC for rotating handwheels are met.

Optional additional equipment

for AC actuators

- Additional potential-free limit switches (S3 and S4)
- Freely adjustable limit switches (S1 and S2) to limit the actuating angle
- Freely adjustable intermediate position switches (S3 and S4) for signaling within the actuating range
- Potentiometer
- Current feedback 4-20mA in two-wire technology
- Integrated electronic torque cut-off (at E65)
- Integrated actuating time extension
- Proximity switches for signaling

- Remote thermoswitch
- Special voltages

for three-phase actuators

- Additional potential-free limit switches (S3 and S4)
- Freely adjustable limit switches (S1 and S2) to limit the setting angle (other than 90°)
- Freely adjustable intermediate position switches (S3 and S4) for signaling within the actuating range
- Potentiometer
- Current feedback 4-20mA in two-wire technology
- Integrated electronic torque cut-off (at E65)
- External actuating time extension
- Proximity switches for signaling
- Remote thermoswitch
- Special voltages

for direct current actuators

- Freely adjustable limit switches (S1 to S4) to limit the actuating angle
- Potentiometer
- Current feedback 4-20mA in two-wire technology

for all actuators

- Special colors

Option - additional limit switches

All actuators can be equipped with additional limit switches (S3 and S4). These limit switches are used to signal the end positions to the control unit. They are mainly used when the actuator control and signaling have different voltage potentials. Switches used for signaling must always be set ahead (approx. 1° - 2°) to ensure safe operating states of the control unit. All switches are generally potential-free on the connection terminals.

NOTICE

The limit switches S1 and S2 are used exclusively to control the direction of rotation for DC actuators. Since they are not connected to the terminal strip, the owner has no access to these switches. The additional limit switches S3, S4 must be used if feedback via switches is required.

Option - electronic torque cut-off for E65

Torque cut-off is available as an option for E65 with alternating current and three-phase actuator. The main PCBs for controlling these actuators are all prepared for torque cut-off. It can be quickly and easily retrofitted with the corresponding assembly at need.

Option - freely adjustable position switch (intermediate position switch)

All limit switches can be converted to freely adjustable limit switch deactivation by replacing the standard control cam. The user may assign a switching point of their choice to each switch within the available travel. This conversion does not influence the terminal diagrams in and the electrical specifications for the actuators since it refers to mechanical components only. Applications where valve travel for the closed and/or open position must be limited or intermediate positions must be signaled

within the travel or to define them as stopping points must be implemented with (maximum 4) freely adjustable additional switches. Actuators for applications in which more than 4 signalizations are to be implemented within the travel range must be equipped with a potentiometer.

Option - potentiometer

The actuators can be equipped with a potentiometer for continuous position feedback. It is mechanically coupled to the valve shaft. A 1 kΩ potentiometer is available in the default version, designed for 1W – other values can be provided on request.

Option - additional thermoswitch for signaling

Digital signaling of the motor temperature can also be implemented for alternating current and three-phase actuators: A second thermoswitch (designed as an NC contact) switches approx. 10 °K earlier than the thermoswitch installed as standard (this automatically switches off the actuator). This ensures that the owner is informed that the critical motor temperature may be reached via this second thermoswitch before the standard thermoswitch interrupts the motor current.

Option - current feedback 4-20 mA

The potentiometer signal that records the valve disc position is converted into a 4-20 mA signal by downstream converter electronics.

This option is recommended if the feedback signal to be transmitted over longer distances, as any line losses do not affect the measurement result. This feedback type is recommended for cable lengths >100m. Otherwise, the same application criteria as for a potentiometer apply.

Option - actuating time extension for AC actuators

The motor is cycled electronically to increase the total actuating time of the actuator. A fixed pulse generates a swivel movement of 1°- 2° at the valve disc. This is followed by a break until the next impulse. This pause can be adjusted using a potentiometer. This way, the total actuating time of the actuator can be varied between 30 s and 180 s. Each main PCB for alternating current actuators is prepared for the use of this positioning time extension and can be plugged into the main PCB instead of the torque cut-off. A combination of positioning time extension and torque cut-off is not possible as standard.

Option - actuating time extension for three-phase actuators

The actuating time extension for three-phase actuators is offered in an additional electrical module. It should not be mounted in the part-turn actuator, but in the control cabinet and wired between the motor and the reversing contactors. The mode of operation corresponds to the actuating time extension for AC actuators.

Option – proximity switches for end position feedback

There is the option of using proximity switches of the same design as the end position switches for bounce-free, electronic end position feedback. These proximity switches are available in two- and three-wire configurations. Further technical details on request.

Option - special voltages or special motors

All actuators can also be designed for other voltages in addition to the standard voltages. Further technical details on request.

Option - plug connection system

All actuators are optionally available with various plug connection systems. The “Phoenix contact” brand will be used unless otherwise specified.

Option - special colors

Any other color is available on customer request in addition to the standard paint finish of the actuators (black, matte). The RAL number is required for this.

3.1 Technical data

E50-E210

Designation	Description
Actuator sizes	E50-E210
Duty cycle	Class C according to DIN EN ISO 22153:2021-07
Interface	DIN EN ISO 5211:2024-10
Actuating times	6 s - 180 s
Corrosion protection class	C4 to DIN EN ISO 22153:2021-07 tested in accordance with DIN EN IEC 60068-2-52:2018-08
Protection class	IP67 to DIN EN 60529:2014-09
Insulation class	F
Path limit switch	max. 250 V AC, 3 A for DS part-turn actuators max. 250 V AC, 3 A for WS part-turn actuators max. 24 V DC, 10 A for GS part-turn actuators
Operating temperature	-20 °C to +70 °C
Cable gland	2 x M20 x 1.5; Ø min = 6 mm, Ø max = 13 mm
Manual emergency override	15 turns for 90°
Actuating force manual emergency override	8 Nm for E50 4 Nm for E65 20 Nm for E110 35 Nm for E160 50 Nm for E210

E50WS

Nominal voltage	V	230	115*	24*
Actuating time from 0° - 90°	s	25	25	25
Nominal torque	Nm	40	40	40
Nominal current	A	0.15	0.31	1.45
Start-up current	A	0.18	0.36	1.8
Absorption capacity	kW	0.035	0.035	0.035
Frequency	Hz	50	50	50
Flange sizes	F04 and F05 after DIN EN ISO 5211:2024-10			
shaft intakes	For square 11 mm, 14 mm			
* Option				

Tab. 10: Technical data E50WS

E65WS

Nominal voltage	V	230	230	230
Actuating time from 0° - 90°	s	6	12*	24*
Nominal torque	Nm	100	80	60
Nominal current	A	0.7	0.55	0.3
Start-up current	A	1.0	0.8	0.4
Absorption capacity	kW	0.16	0.125	0.066
Frequency	Hz	50	50	50
Flange sizes	F04 or combined flange F05 and F07 after DIN EN ISO 5211:2024-10			
shaft intakes	For square 10 mm, 11 mm, 12 mm, 14 mm, 16 mm, 17 mm, and 16 mm with fitting key			
* Option				

Tab. 11: Technical data E65WS

E110WS

Nominal voltage	V	230	230	230
Actuating time from 0° - 90°	s	6*	12	24*
Nominal torque	Nm	400	400	320
Nominal current	A	1.8	1.3	0.65
Start-up current	A	2.6	2	1.5
Absorption capacity	kW	0.4	0.26	0.138
Frequency	Hz	50	50	50
Flange sizes	Combined flange F07 and F10 after DIN EN ISO 5211:2024-10			
shaft intakes	For square 12 mm, 14 mm, 16 mm, 17 mm, 22 mm, 24 mm, and 28 mm with fitting key			
* Option				

Tab. 12: Technical data E110WS

E160WS

Nominal voltage	V	230	230	230
Actuating time from 0° - 90°	s	12*	24	48*
Nominal torque	Nm	1200	1200	800
Nominal current	A	1.8	1.3	0.65
Start-up current	A	2.6	2	2.5
Absorption capacity	kW	0.4	0.26	0.138

Frequency	Hz	50	50	50
Flange sizes	F10, F12, F14, and F16 after DIN EN ISO 5211:2024-10			
shaft intakes	For square 22 mm, 24 mm, 27 mm, 32 mm, and 40/50 mm with fitting key			
* Option				

Tab. 13: Technical data E160WS

E65GS

Nominal voltage	V	24	-	-
Actuating time from 0° - 90°	s	6*	-	-
Nominal torque	Nm	100	-	-
Nominal current	A	5.5	-	-
Start-up current	A	8	-	-
Absorption capacity	kW	0.077	-	-
Frequency	Hz	-	-	-
Flange sizes	F04 or combined flange F05 and F07 after DIN EN ISO 5211:2024-10			
shaft intakes	For square 10 mm, 11 mm, 12 mm, 14 mm, 16 mm, 17 mm, and 16 mm with fitting key			
* Option				

Tab. 14: Technical data E65GS

E110GS

Nominal voltage	V	24	-	-
Actuating time from 0° - 90°	s	6*	-	-
Nominal torque	Nm	360	-	-
Nominal current	A	8.8	-	-
Start-up current	A	12.5	-	-
Absorption capacity	kW	0.4	-	-
Frequency	Hz	-	-	-
Flange sizes	Combined flange F07 and F10 after DIN EN ISO 5211:2024-10			
shaft intakes	For square 12 mm, 14 mm, 16 mm, 17 mm, 22 mm, 24 mm, and 28 mm with fitting key			
* Option				

Tab. 15: Technical data E110GS

E160GS

Nominal voltage	V	24	-	-
Actuating time from 0° - 90°	s	12*	-	-
Nominal torque	Nm	800	-	-
Nominal current	A	8.8	-	-
Start-up current	A	12.5	-	-
Absorption capacity	kW	0.4	-	-
Frequency	Hz	-	-	-
Flange sizes	F10, F12, F14, and F16 after DIN EN ISO 5211:2024-10			
shaft intakes	For square 22 mm, 24 mm, 27 mm, 32 mm, and 40/50 mm with fitting key			
* Option				

Tab. 16: Technical data E160GS

E65DS

Nominal voltage	V	400	400	-
Actuating time from 0° - 90°	s	6	12*	-
Nominal torque	Nm	100	80	-
Nominal current	A	0.3	0.25	-
Start-up current	A	0.5	0.3	-
Absorption capacity	kW	0.085	0.065	-
Frequency	Hz	50	50	-
Flange sizes	F04 or combined flange F05 and F07 after DIN EN ISO 5211:2024-10			
shaft intakes	For square 10 mm, 11 mm, 12 mm, 14 mm, 16 mm, 17 mm, and 16 mm with fitting key			
* Option				

Tab. 17: Technical data E65DS

E110DS

Nominal voltage	V	400	400	400
Actuating time from 0° - 90°	s	6*	12	24*
Nominal torque	Nm	400	400	320
Nominal current	A	1.4	1	0.95
Start-up current	A	2.1	1.8	1.6
Absorption capacity	kW	0.27	0.22	0.2

Frequency	Hz	50	50	50
Flange sizes	Combined flange F07 and F10 after DIN EN ISO 5211:2024-10			
shaft intakes	For square 12 mm, 14 mm, 16 mm, 17 mm, 22 mm, 24 mm, and 28 mm with fitting key			
* Option				

Tab. 18: Technical data E110DS

E160DS

Nominal voltage	V	400	400	400
Actuating time from 0° - 90°	s	12*	24	48*
Nominal torque	Nm	1000	1000	750
Nominal current	A	1.4	1	0.95
Start-up current	A	2.1	1.8	1.6
Absorption capacity	kW	0.27	0.22	0.2
Frequency	Hz	50	50	50
Flange sizes	F10, F12, F14, and F16 after DIN EN ISO 5211:2024-10			
shaft intakes	For square 22 mm, 24 mm, 27 mm, 32 mm, and 40/50 mm with fitting key			
* Option				

Tab. 19: Technical data E160DS

E210DS

Nominal voltage	V	400	400	400
Actuating time from 0° - 90°	s	12*	24	48*
Nominal torque	Nm	4000	4000	3200
Nominal current	A	3.8	3.2	2.8
Start-up current	A	5.6	5.2	3.6
Absorption capacity	kW	1	0.84	0.6
Frequency	Hz	50	50	50
Flange sizes	F12, F14, and F16 after DIN EN ISO 5211:2024-10			
shaft intakes	For square 27 mm, 32 mm, and 30 mm, 40/50 mm with fitting key			
* Option				

Tab. 20: Technical data E210DS

3.2 Dimensions and weights

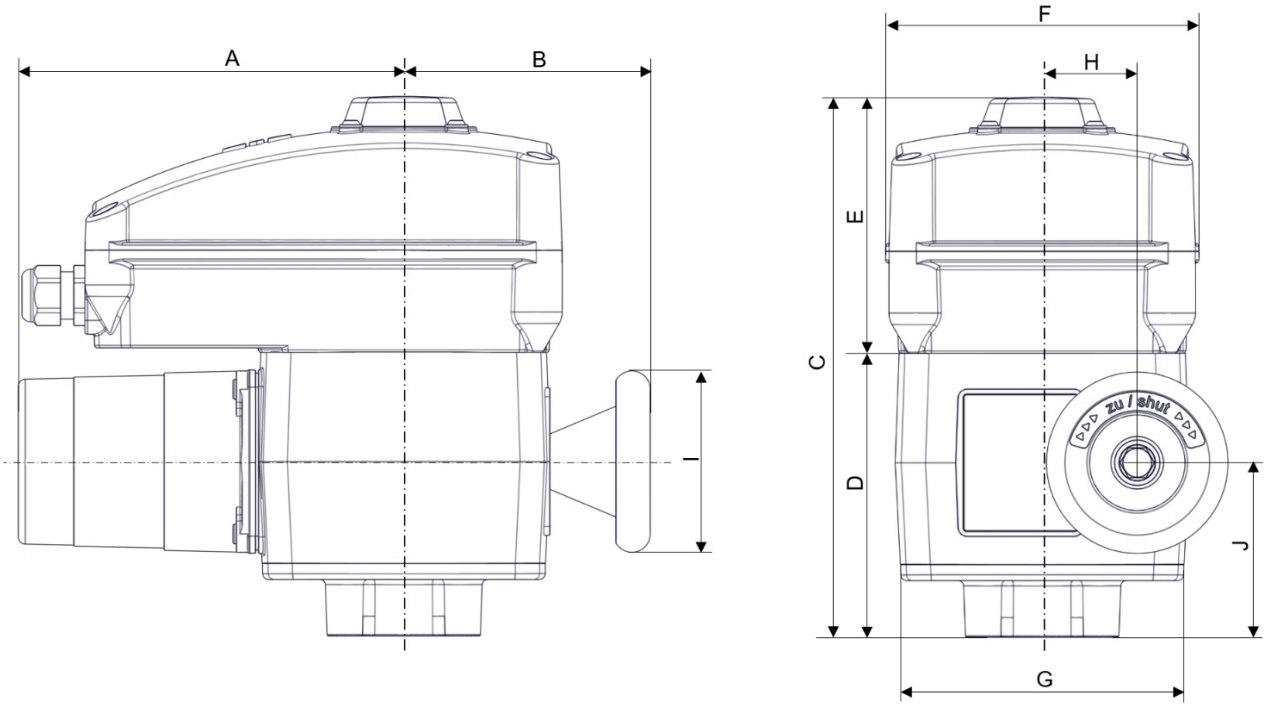


Fig. 4: Main dimensions E65-E210

Type	Main dimensions [mm]										Weight [kg]
	A	B	C	D	E	F	G	H	I	J	
E50	149	110	210	123	87	124	126	42	80	73	5
E65	172	119	235	123	112	139	125	42	80	78	7
E110	247	136	257	145	112	139	150	58	125	88	14
E160	280	157	282	170	112	139	175	89	200	112	25
E210	352	212	274	162	112	139	240	125	315	84	40

Tab. 21: Main dimensions E65-E210

3.3 Conversion tables

Mass m

	kg	lb	cwt	t	sh ton
kg	1	2.205	0.0197	0.001	0.0011
lb	0.454	1	0.0089	$4.54x10^{-4}$	$5.0x10^{-4}$
cwt	50.802	112	1	0.0508	0.056
t	1000	2204.6	19.684	1	1.1023
sh ton	907.2	2000	17.857	0.9072	1

Tab. 22: Conversion table for mass m

Temperature t

°C	°F	°C	°F	°C	°F	°C	°F
-140	-220	-40	-40	60	140	160	320
-135	-211	-35	-31	65	149	165	329
-130	-202	-30	-22	70	158	170	338
-125	-193	-25	-13	75	167	175	347
-120	-184	-20	-4	80	176	180	356
-115	-175	-15	5	85	185	185	365
-110	-166	-10	14	90	194	190	374
-105	-157	-5	23	95	203	195	383
-100	-148	**0**	32	**100**	212	**200**	392
-95	-139	5	41	105	221	205	401
-90	-130	10	50	110	230	210	410
-85	-121	15	59	115	239	215	419
-80	-112	20	68	120	248	220	428
-75	-103	25	77	125	257	225	437
-70	-94	30	86	130	266	230	446
-65	-85	35	95	135	275	235	455
-60	-76	40	104	140	284	240	464
-55	-67	45	113	145	293	245	473
-50	-58	50	122	150	302	250	482
-45	-49	55	131	155	311	255	491

Tab. 23: Conversion table for temperature t

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 device is de-energized.

Wear personal protective equipment!

Moving parts

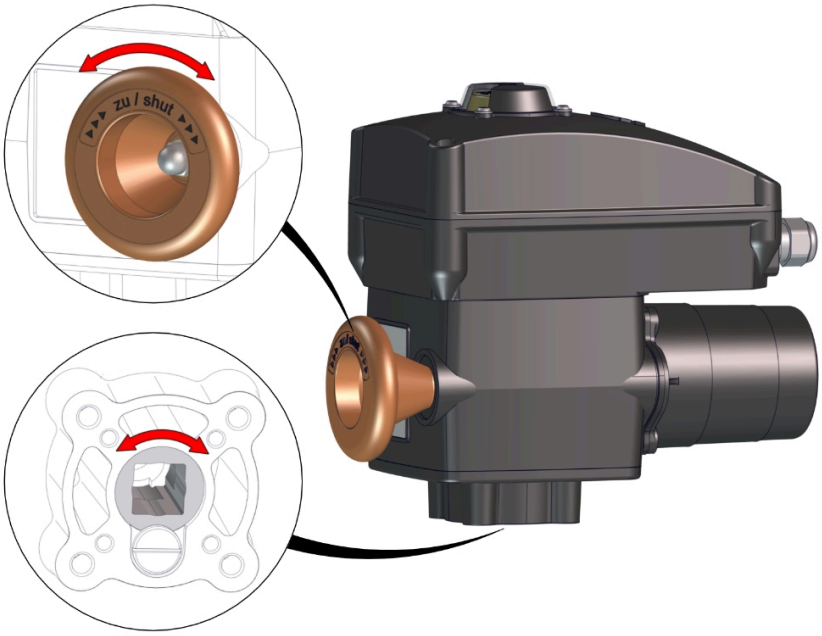


Fig. 5: Moving parts

General rules for storage, transport, and assembly

- Recommended storage conditions:
  Room temperature >5 °C, <25 °C (>41 °F, <77 °F)
  Relative humidity 50-60%
  Avoid condensation
  Protection against direct sunlight
- Leave the components secured in the factory packaging until assembly.
- Actuate components in bearings at regular intervals to ensure that they move freely. Integrate the stored components into the operational maintenance concept.
- Protect any attachments from damage (e.g., solenoid valves or handwheels).
- Protect the components from dirt and moisture.
- Protect flanges and unprotected parts with suitable grease or oil.

- Leave all connections and electrical plug contacts closed until assembly.
- Use suitable round slings to lift the components; avoid chains if necessary.
- Check the part-turn actuator for damage before assembly.
- The part-turn actuator can be installed independently of the medium flow direction. Always ensure that the position indicator functions correctly and is in the correct position.
- Store actuators on their flat sides only.
- Any installation direction is possible. If the part-turn actuator is installed in a lateral position, the owner must decide whether the part-turn actuator must be supported due to bending forces.

For storage exceeding 6 months:

- Check the tightness and function of the part-turn actuator.

If stored for longer than 3 years:

- Replace all seals on the part-turn actuator.

4.1 Transporting components

WARNING

The part-turn actuator may fall if lifting gear and lifting devices with insufficient load-bearing capacity are used.

Injuries and even death may result from crushing, shearing or impacts.

- ➢ Only use lifting gear and lifting devices with sufficient load-bearing capacity.
- ➢ Only use lifting gear and load handling attachments that are in an undamaged condition.
- ➢ Never stand underneath any suspended loads.

NOTICE

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

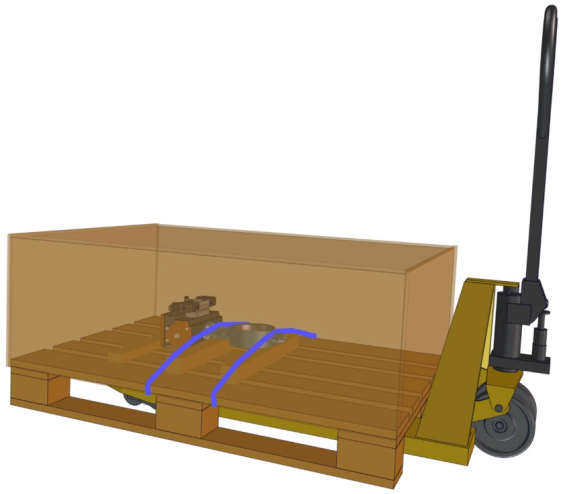


Fig. 6: Example illustration for transporting components

1. Transport the part-turn actuator to its place of use using a suitable means of transport, for example a pallet truck/forklift.

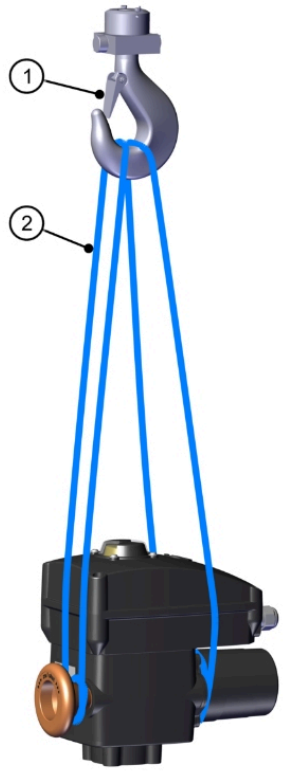
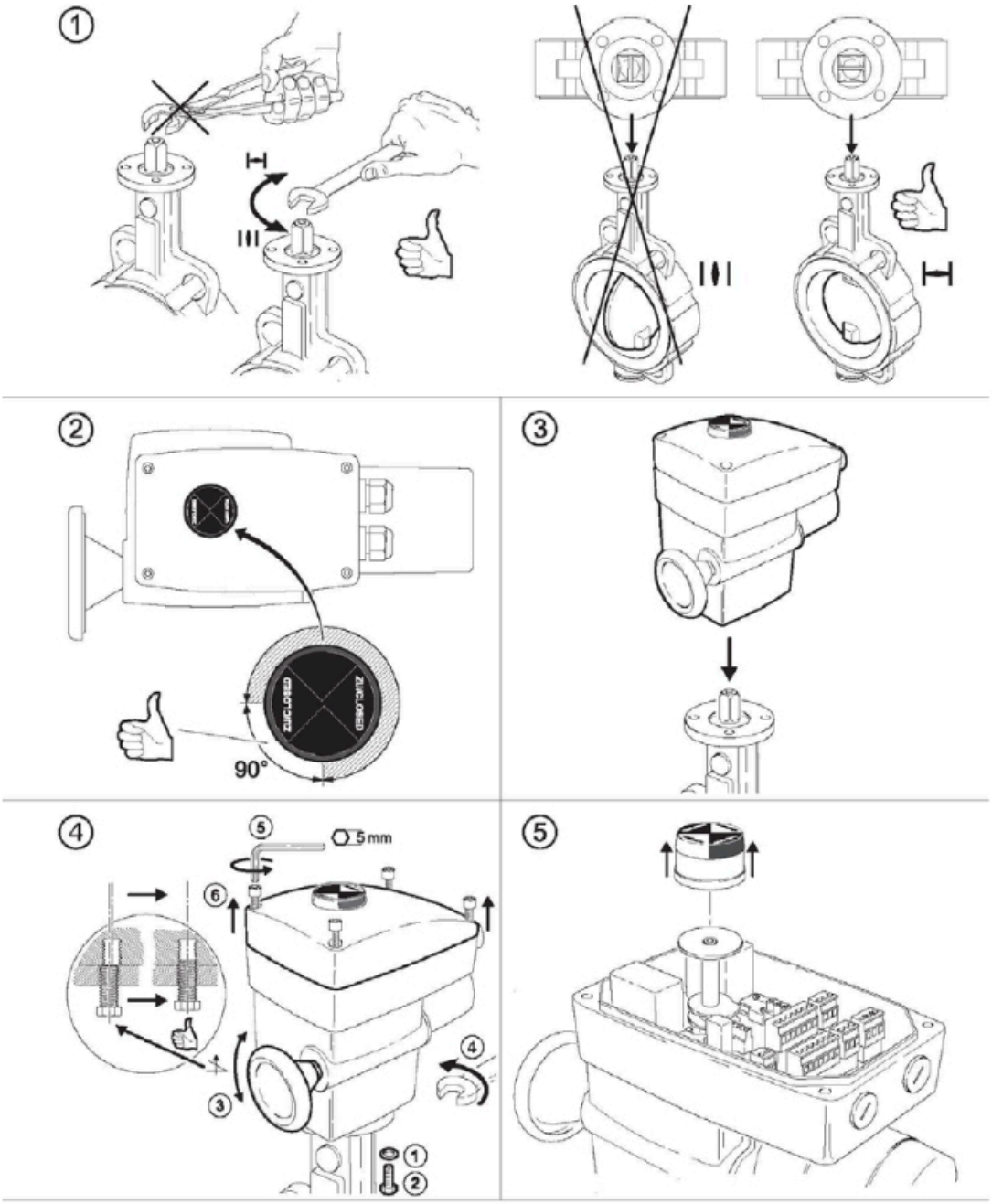


Fig. 7: Lifting part-turn actuator with a crane

2. Guide the round slings (item 2) as a loop around the handwheel and the motor.
3. Suspend the round slings from the crane hook.
   Ensure that the crane hook safety catch (item 1) is closed.

4. Lift the part-turn actuator out of the transport box.
5. Transport the part-turn actuator to its installation site.

4.2 Mounting components



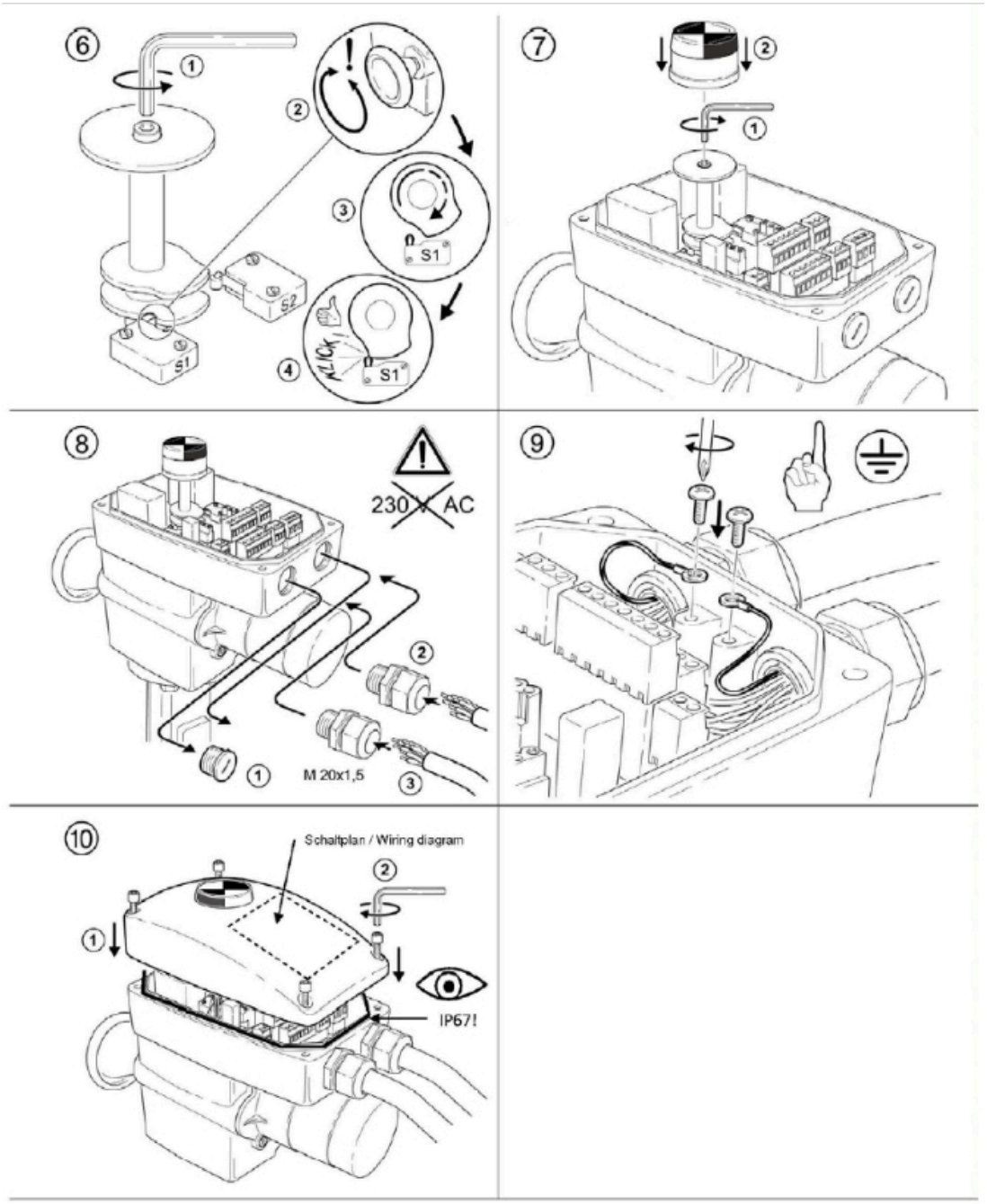


Fig. 8: Assembly

ISO flange size	F03	F04	F05	F07	F10	F12	F14	F16	F25
Thread size	5	M5	M6	M8	M10	M12	M16	M20	M16
Tightening torque in Nm	4.5	4.5	7.7	18.7	37.1	64.7	161.2	314.9	161.2
	A tolerance of up to +10% is allowable for the tightening torques.								

Tab. 24: Tightening torques for the drive flange

4.3 Connecting components

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 electric part-turn actuator against being switched on again.

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 device is de-energized.

NOTICE

Ensure that the system data for control voltage, and frequency for all assemblies match the technical data marked on the identification plates of the actuator and additional assemblies.

NOTICE

The following shows the standard terminal diagram.
For special configurations, contact EBRO with the type designation in order to request the matching terminal diagram.
The type designation of your switch box can be found on the identification plate. The terminal diagram is also included in the cover of the switch box.

NOTICE

The switches are not actuated.
The valve is in the intermediate position.

Special safety instructions for assembly and connection

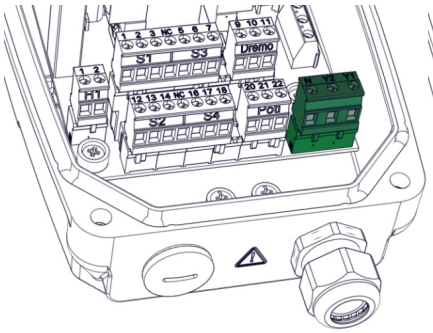


Fig. 9: Connection terminal X1

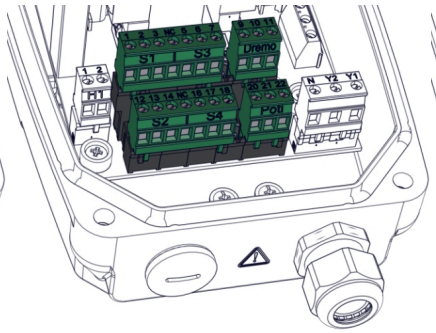


Fig. 10: Connection terminal X2

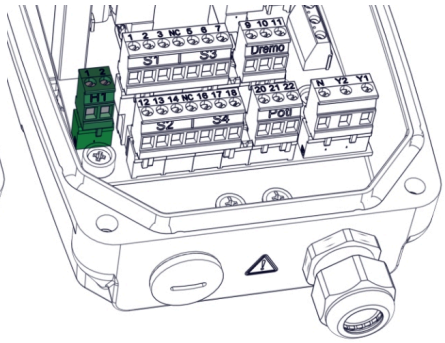
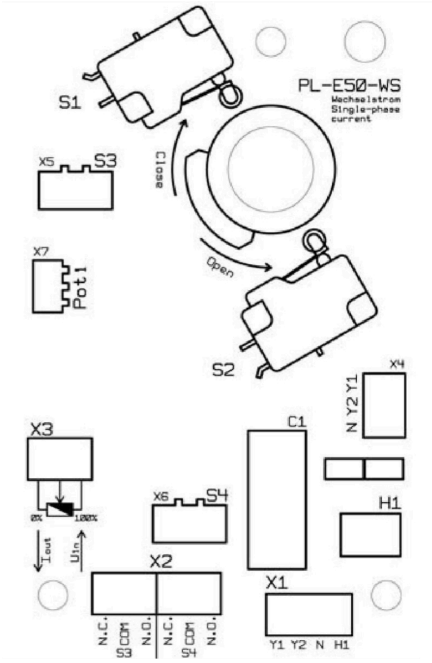


Fig. 11: Connection terminal X3

- Control and feedback contacts are designed for 250 V AC, motor supply contacts for 400 V AC according to DIN EN 61010-1:2020-03. Overvoltage protection must be provided in the electrical system. This should comply with the requirements of overvoltage category II and pollution degree 2.
- Cable cross-sections of 0.2-2.5 mm² can be connected.
- The cables may be installed in a plugged-in state.
- The connection terminals must be connected and disconnected while no voltage is present on them.
- All mains circuits must be equipped with the necessary overcurrent protection devices. For the technical data, see chapter "Technical data"
- Provide a disconnecting device that is marked correspondingly and that is located within the engagement range of the actuator.
- Secure the cables in the connection compartment of the actuator against displacement after installation.
- In accordance with DIN EN 61010-1:2020-03 , the supply cables must comply with the requirements for reinforced core insulation within the cable for the dielectric strength test.
- The earthing/protective conductor connection is made between the two cable entries on the earthing screws (M4). The switch box cover, motor, and gearbox housing are earthed to each other by the manufacturer.
- Design the motor control contactors in accordance with DIN EN 61010-1:2020-03, usage category AC3/AC7, which defines the control requirements for inductive loads.
  Recommendation: ELTAKO ER12 series
- Ensure that the actuator is switched off electrically no later than 50 ms after the limit switch is reached in order to avoid faulty messages in the operating control or incorrect signaling via the torque cut-off.

E50WS

Figure	Terminal connection	Function
	X1.Y1	Motor connection, switched phase for direction OPEN
	X1.Y2	Motor connection, switched phase for direction CLOSED
	X1.N	Motor connection; neutral conductor
	X1.H1	Supply voltage for heating; permanent
	X2.S3.nc	Switch S3; additional limit switch CLOSED; normally closed contact; n.c.
	X2.S3.com	Switch S3; additional limit switch CLOSED; foot contact; com
	X2.S3.no	Switch S3; additional limit switch CLOSED; normally open contact; n.o.
	X2.S4.nc	Switch S4; additional limit switch CLOSED; normally closed contact; n.c.
	X2.S4.com	Switch S4; additional limit switch CLOSED; foot contact; com
	X2.S4.no	Switch S4; additional limit switch CLOSED; normally open contact; n.o.
	X3.1	Potentiometer - end contact or current feedback current output
	X3.2	Potentiometer - tap
	X3.3	Potentiometer - end contact or current feedback voltage input

Tab. 25: Connection table for alternating current

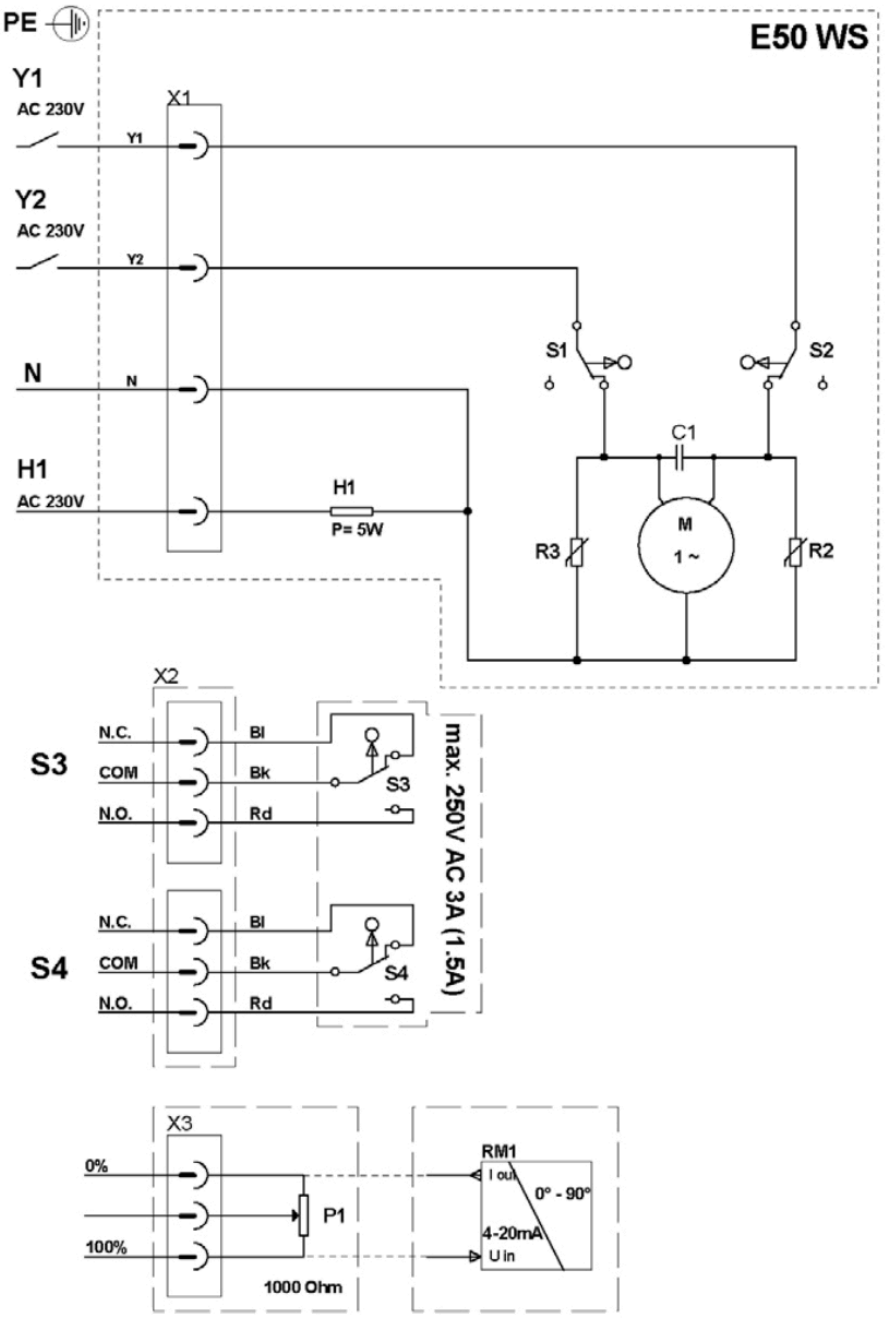
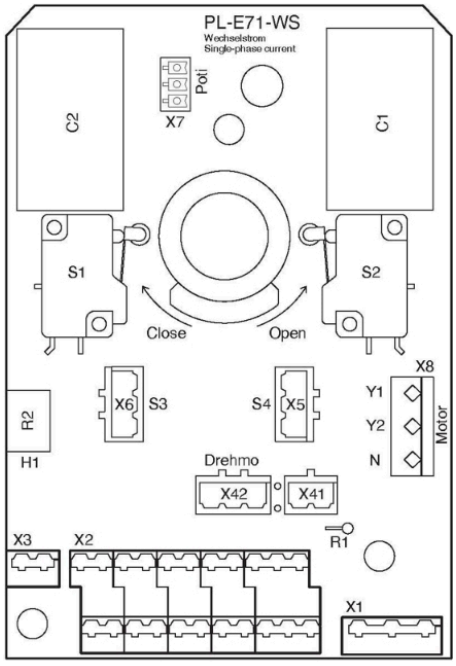
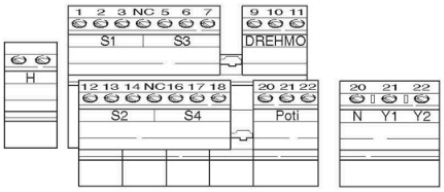


Fig. 12: Terminal diagram E50 alternating current

S1	Limit switch CLOSED	C1	Operating capacitor
S2	Limit switch OPEN	R2, R3	VDR
S3	Add. limit switch CLOSED (option)	P1	Potentiometer (option)
S4	Add. Limit switch OPEN (option)	RM1	Feedback 4-20 mA (option)
H1	Heating 230 V AC / P=5 W	M	Motor

Tab. 26: Legend to terminal diagram E50 alternating current

E65-E210 alternating current

Figure	Terminal connection	Function
	X1.N	Neutral conductor
	X1.Y1	Motor connection, switched phase for the running direction OPEN
	X1.Y2	Motor connection, switched phase for the running direction CLOSED
	X2.1	Switch S1; limit switch CLOSED; normally closed contact; n.c.
	X2.2	Switch S1; limit switch CLOSED; foot contact; com
	X2.3	Switch S1; limit switch CLOSED; normally open contact; n.o.
	X2.4	not used
	X2.5	Switch S3; additional limit switch CLOSED; normally closed contact; n.c.
	X2.6	Switch S3; additional limit switch CLOSED; foot contact; com
	X2.7	Switch S3; additional limit switch CLOSED; normally open contact; n.o.
	X2.8	not used
	X2.9	Torque cut-off normally closed contact; n.c.
	X2.10	Torque cut-off foot contact; com
	X2.11	Torque cut-off normally open contact; n.o.
	X2.12	Switch S2; limit switch OPEN; normally closed contact; n.c.
	X2.13	Switch S2; limit switch OPEN; foot contact; com
	X2.14	Switch S2; limit switch OPEN; normally open contact; n.o.
	X2.15	not used
	X2.16	Switch S4; additional limit switch OPEN; normally closed contact; n.c.
	X2.17	Switch S4; additional limit switch OPEN; foot contact; com
	X2.18	Switch S4; additional limit switch OPEN; normally open contact; n.o.
	X2.19	not used
	X2.20	Potentiometer; end contact or current feedback current output
	X2.21	Potentiometer; tap
	X2.22	Potentiometer; end contact or current feedback voltage input
	X3.1	Control room heating; connection voltage 230V permanent
	X3.2	Control room heating; connection voltage 230V permanent

Tab. 27: Connection table for alternating current

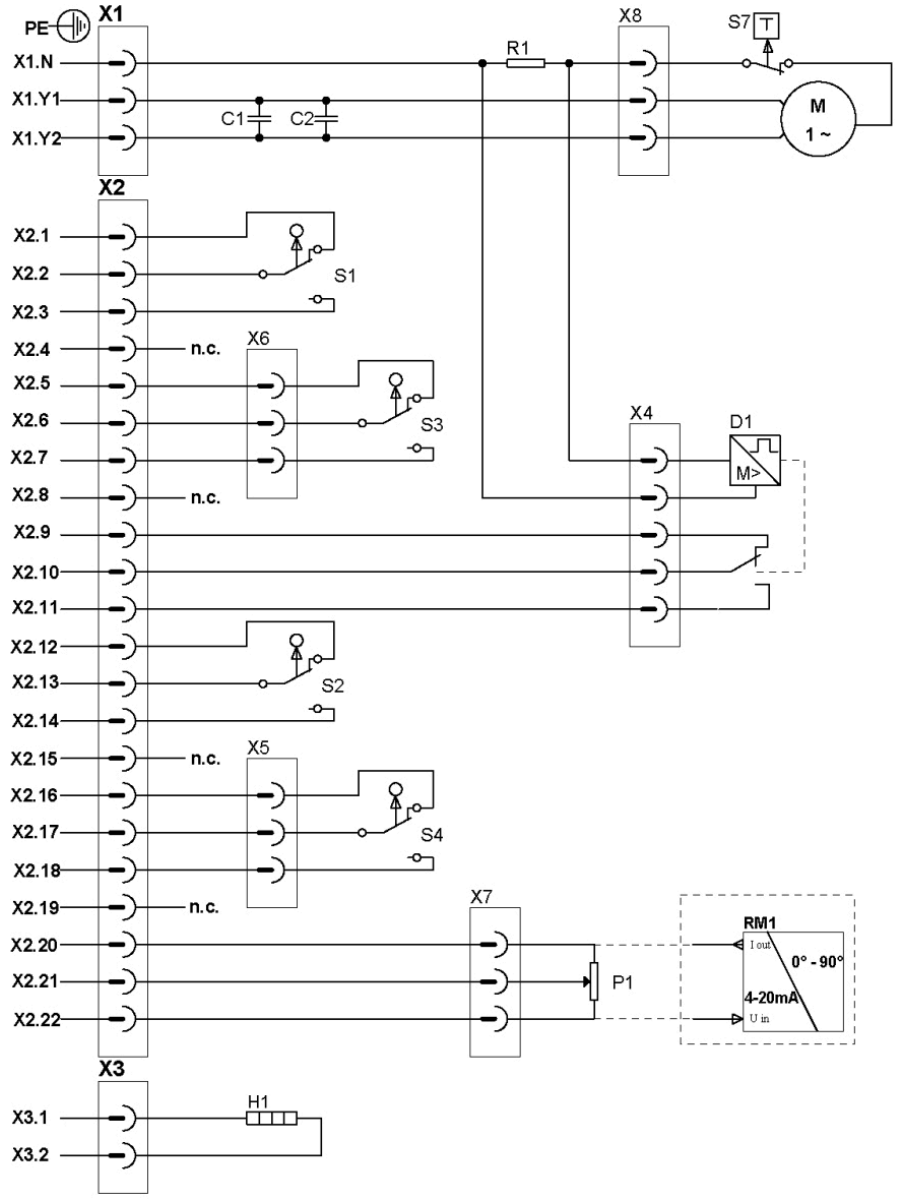
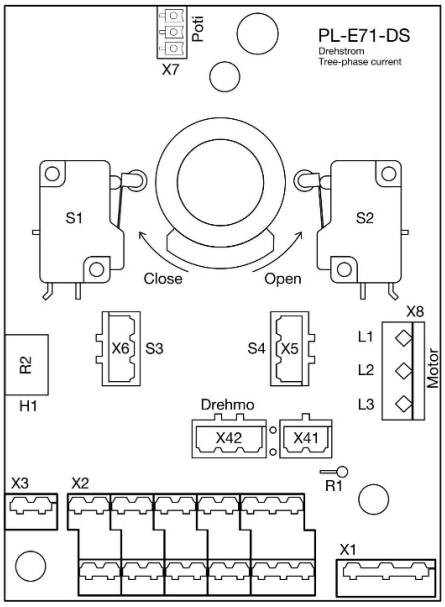
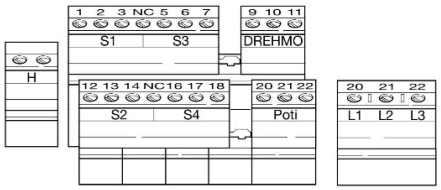


Fig. 13: Terminal diagram E65-E160 alternating current

S1	Limit switch CLOSED	C1, C2	Operating capacitors
S2	Limit switch OPEN	R1	Shunt
S3	Add. limit switch CLOSED (option)	H1	Heating
S4	Add. Limit switch OPEN (option)	P1	Potentiometer (option)
S7	Integrated thermoswitch	RM1	Current feedback 4-20 mA (option)
D1	Torque cut-off (option for E65)		

Tab. 28: Legend to terminal diagram E65-E160 alternating current

E65-E210 three-phase current

Figure	Terminal connection	Function
	X1.L1	Motor connection phase
	X1.L2	Motor connection phase
	X1.L3	Motor connection phase
	X2.1	Switch S1; limit switch CLOSED; normally closed contact; n.c.
	X2.2	Switch S1; limit switch CLOSED; foot contact; com
	X2.3	Switch S1; limit switch CLOSED; normally open contact; n.o.
	X2.4	not used
	X2.5	Switch S3; additional limit switch CLOSED; normally closed contact; n.c.
	X2.6	Switch S3; additional limit switch CLOSED; foot contact; com
	X2.7	Switch S3; additional limit switch CLOSED; normally open contact; n.o.
	X2.8	not used
	X2.9	Torque cut-off normally closed contact; n.c.
	X2.10	Torque cut-off foot contact; com
	X2.11	Torque cut-off normally open contact; n.o.
	X2.12	Switch S2; limit switch OPEN; normally closed contact; n.c.
	X2.13	Switch S2; limit switch OPEN; foot contact; com
	X2.14	Switch S2; limit switch OPEN; normally open contact; n.o.
	X2.15	not used
	X2.16	Switch S4; additional limit switch OPEN; normally closed contact; n.c.
	X2.17	Switch S4; additional limit switch OPEN; foot contact; com
	X2.18	Switch S4; additional limit switch OPEN; normally open contact; n.o.
	X2.19	not used
	X2.20	Potentiometer; end contact or current feedback current output
	X2.21	Potentiometer; tap
	X2.22	Potentiometer; end contact or current feedback voltage input
	X3.1	Control room heating; connection voltage 230V permanent
	X3.2	Control room heating; connection voltage 230V permanent

Tab. 29: Connection table for three-phase current

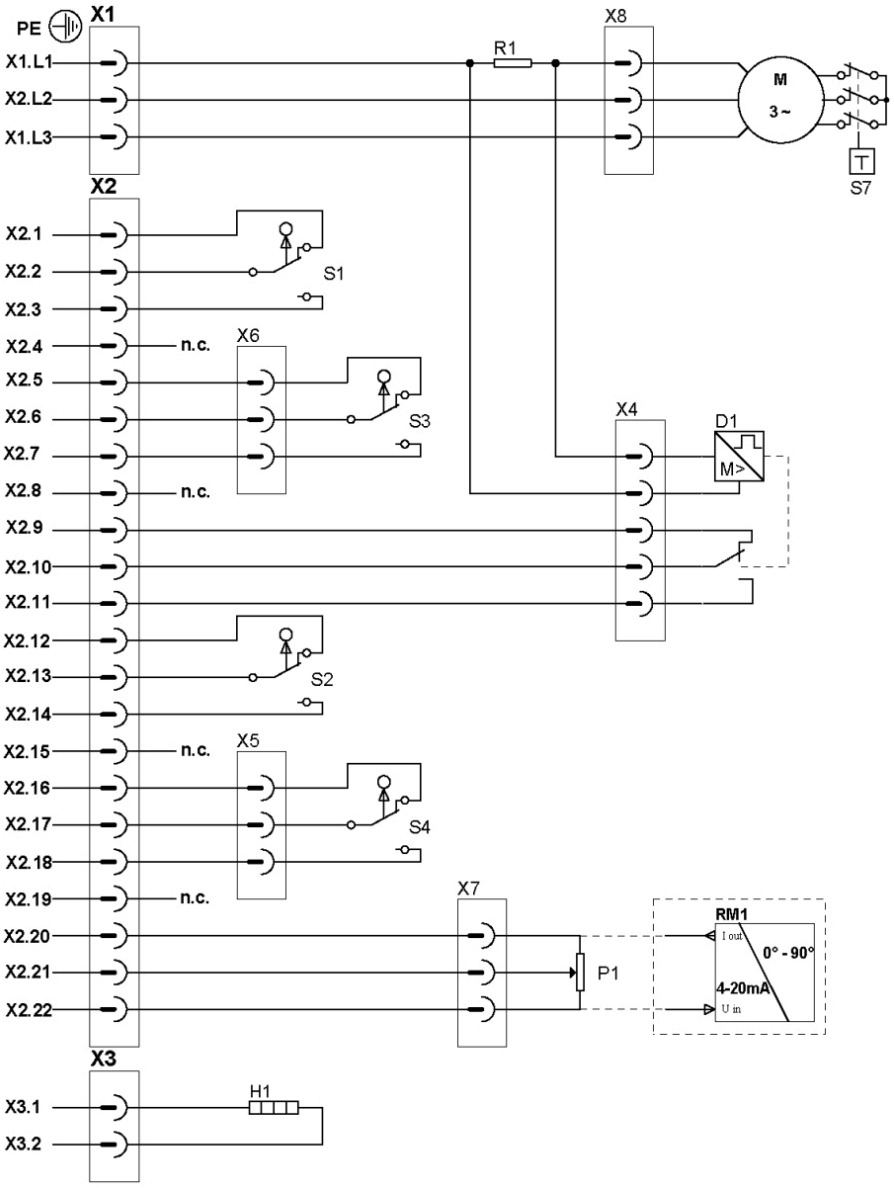
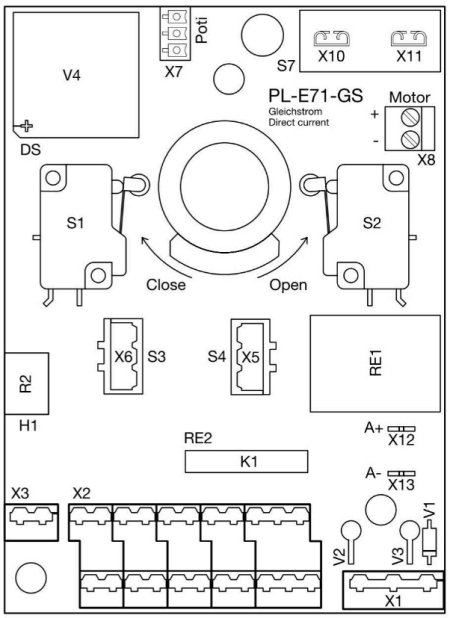
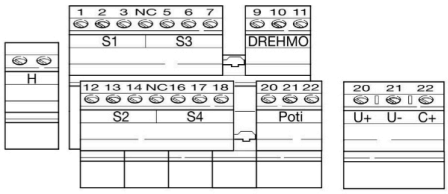


Fig. 14: Terminal diagram E65-E210 three-phase current

S1	Limit switch CLOSED	D1	Torque cut-off (option for E65)
S2	Limit switch OPEN	R1	Shunt
S3	Add. limit switch CLOSED (option)	H1	Heating
S4	Add. Limit switch OPEN (option)	P1	Potentiometer (option)
S7	Integrated thermoswitch	RM1	Current feedback 4-20 mA (option)

Tab. 30: Legend to terminal diagram E65-E210 three-phase current

E65-E210 direct current

Figure	Terminal connection	Function
	X1.U+	Supply voltage 24V DC plus, permanent
	X1.U-	Supply voltage 24V DC minus, permanent
	X1.C+	Control input for reversing relay +24V DC
	X2.1	not used
	X2.2	not used
	X2.3	not used
	X2.4	not used
	X2.5	Switch S3; additional limit switch CLOSED; normally closed contact; n.c.
	X2.6	Switch S3; additional limit switch CLOSED; foot contact; com
	X2.7	Switch S3; additional limit switch CLOSED; normally open contact; n.o.
	X2.8	not used
	X2.9	Signal relay overcurrent solution normally closed contact; n.c.
	X2.10	Signal relay overcurrent solution foot contact; com
	X2.11	Signal relay overcurrent solution normally open contact; n.o.
	X2.12	not used
	X2.13	not used
	X2.14	not used
	X2.15	not used
	X2.16	Switch S4; additional limit switch OPEN; normally closed contact; n.c.
	X2.17	Switch S4; additional limit switch OPEN; foot contact; com
	X2.18	Switch S4; additional limit switch OPEN; normally open contact; n.o.
	X2.19	not used
	X2.20	Potentiometer; end contact or current feedback current output
	X2.21	Potentiometer; tap
	X2.22	Potentiometer; end contact or current feedback voltage input
	X3.1	Control room heating; connection voltage 24V permanent
	X3.2	Control room heating; connection voltage 24V permanent

Tab. 31: Connection table for direct current

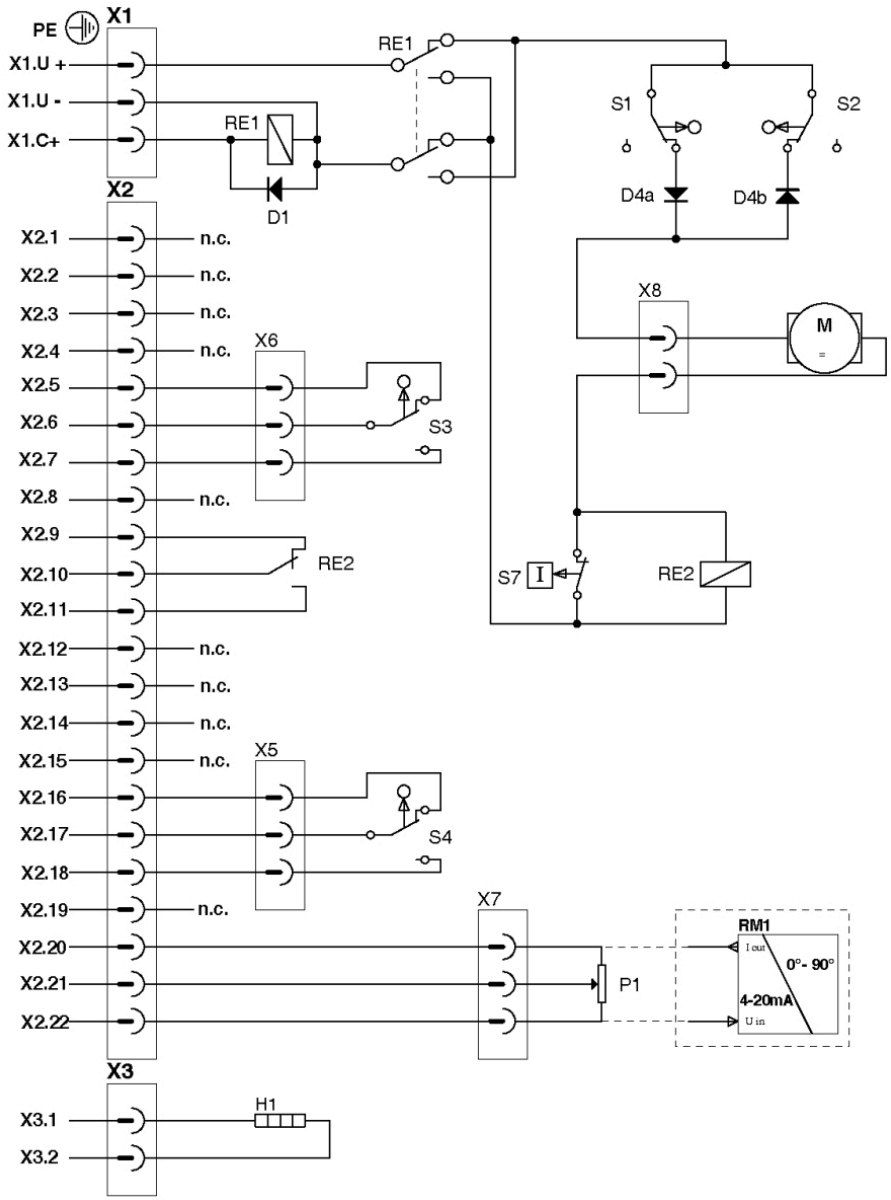


Fig. 15: Terminal diagram E65-E160 direct current

S1	Limit switch CLOSED	D4a,b	Diode
S2	Limit switch OPEN	RE1	Reversing relay
S3	Add. Limit switch CLOSED	RE2	Signal relay
S4	Add. Limit switch OPEN	H1	Heating
S7	Thermal overcurrent protection	P1	Potentiometer (option)
D1	Diode	RM1	Current feedback 4-20 mA (option)

Tab. 32: Legend to terminal diagram E65-E160 direct current

4.3.1 Switching suggestion

Alternating current actuator E50WS

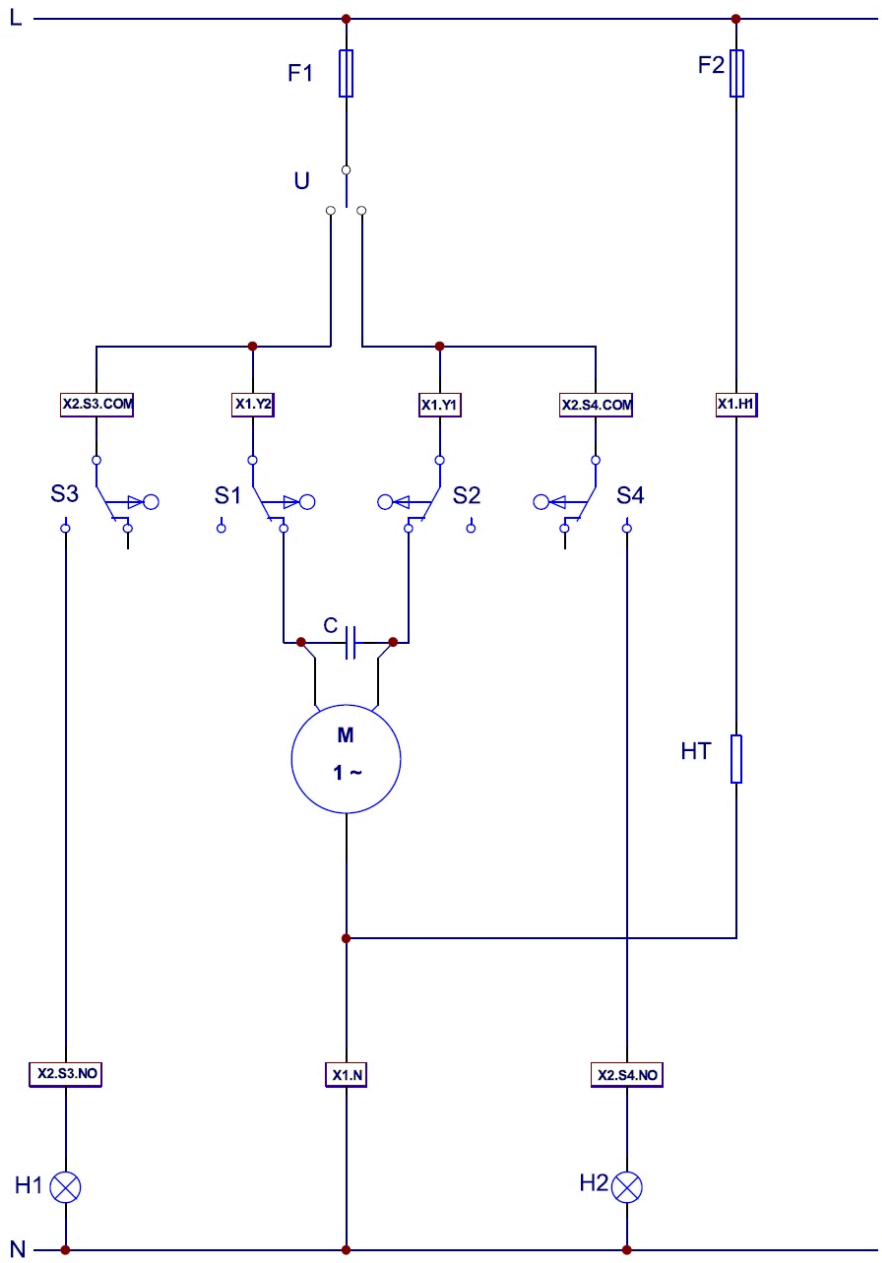


Fig. 16: Alternating current actuator E50WS

S1	Limit switch CLOSED	H1	Indicator lamp CLOSED
S2	Limit switch OPEN	H2	Indicator lamp OPEN
S3	Add. limit switch CLOSED (option)	C	Operating capacitor
S4	Add. Limit switch OPEN (option)	U	Changeover switch
F1	Fuse	HT	Heating
F2	Fuse		

Tab. 33: Alternating current actuator E50WS

Alternating current actuator without electronic torque cut-off

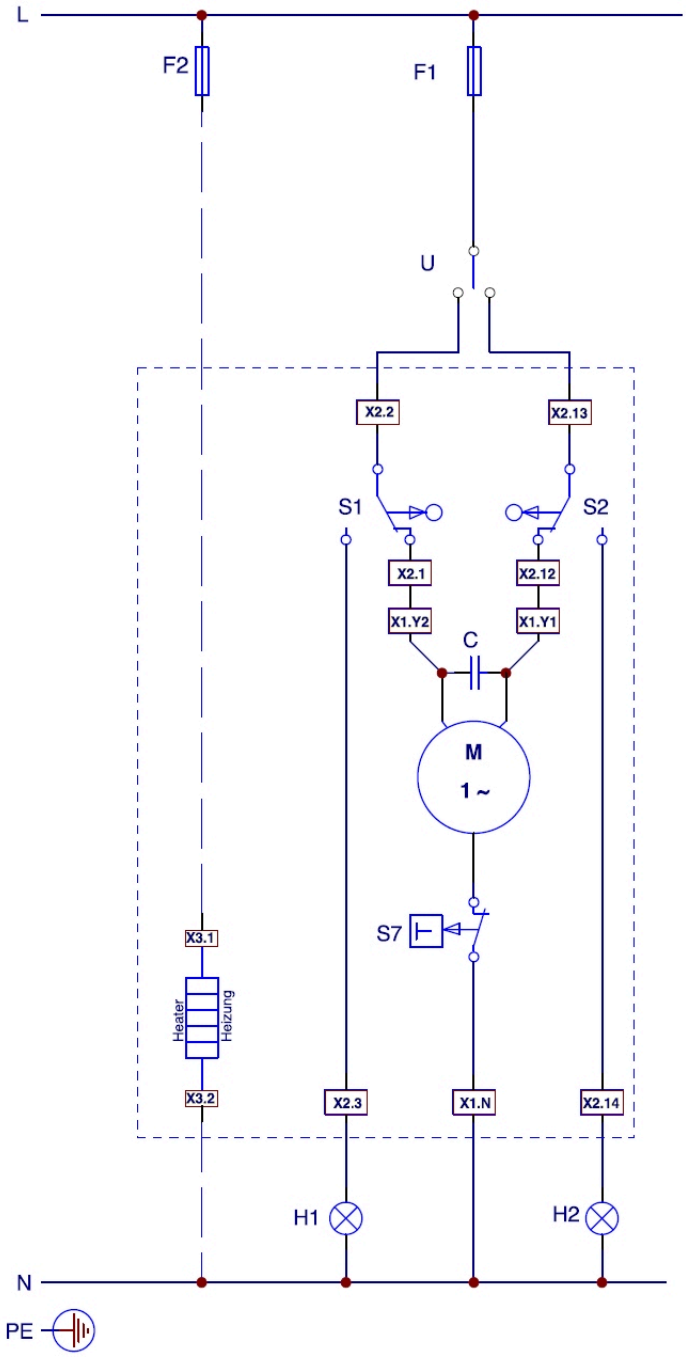


Fig. 17: Alternating current actuator without electronic torque cut-off

S1	Limit switch CLOSED	H1	Indicator lamp CLOSED
S2	Limit switch OPEN	H2	Indicator lamp OPEN
S7	Integrated thermoswitch	U	Changeover switch
F1	Fuse	C	Operating capacitor

Tab. 34: Alternating current actuator without electronic torque cut-off

Alternating current actuator with electronic torque cut-off

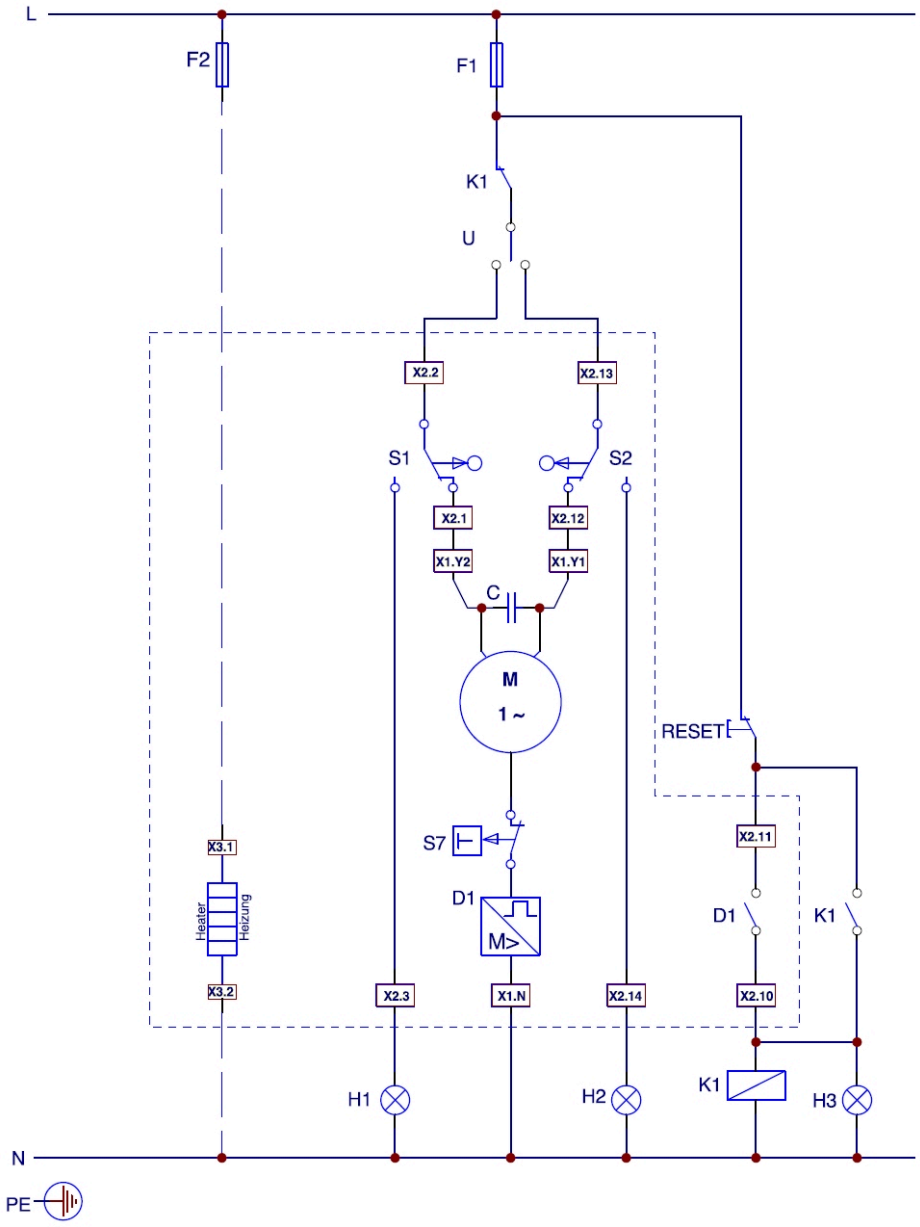


Fig. 18: Alternating current actuators with electronic torque cut-off

S1	Limit switch CLOSED	H1	Indicator lamp CLOSED
S2	Limit switch OPEN	H2	Indicator lamp OPEN
S7	Integrated thermoswitch	H3	Fault indicator
F1	Fuse	K1	Control contactor
C	Operating capacitor	U	Changeover switch
D1	Torque cut-off		

Tab. 35: Alternating current actuator with electronic torque cut-off

Three-phase actuator with electronic torque cut-off

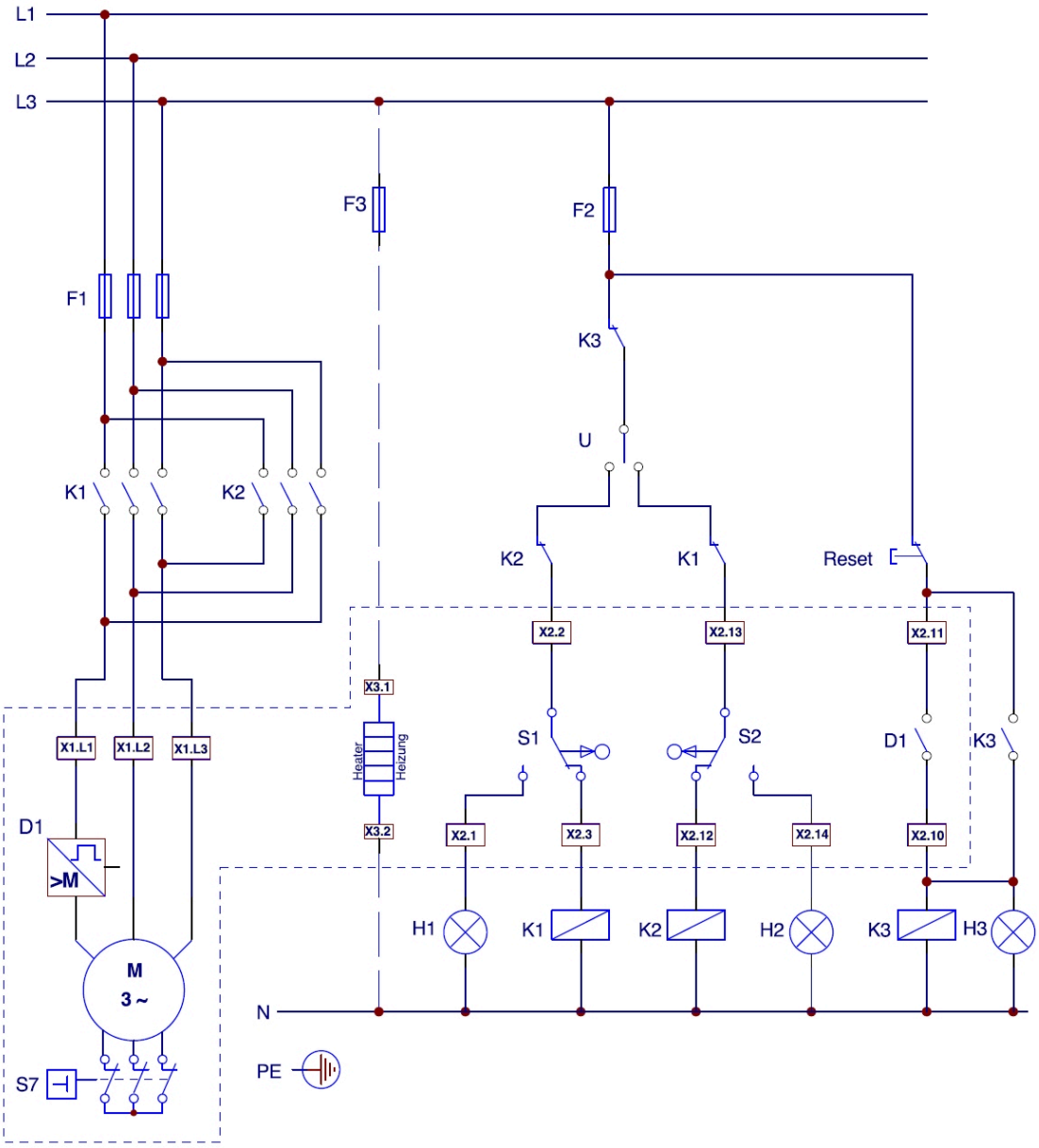


Fig. 19: Three-phase actuator with electronic torque cut-off

S1	Limit switch CLOSED	H1	Indicator lamp CLOSED
S2	Limit switch OPEN	H2	Indicator lamp OPEN
S7	Integrated thermoswitch	H3	Fault indicator
F1	Motor fuse	K1	Control contactor CLOSED
F2	Control fuse	K2	Control contactor OPEN
F3	Heating fuse	K3	Auxiliary contactor
D1	Torque cut-off	U	Changeover switch

Tab. 36: Three-phase actuator with electronic torque cut-off

Three-phase actuator without electronic torque cut-off

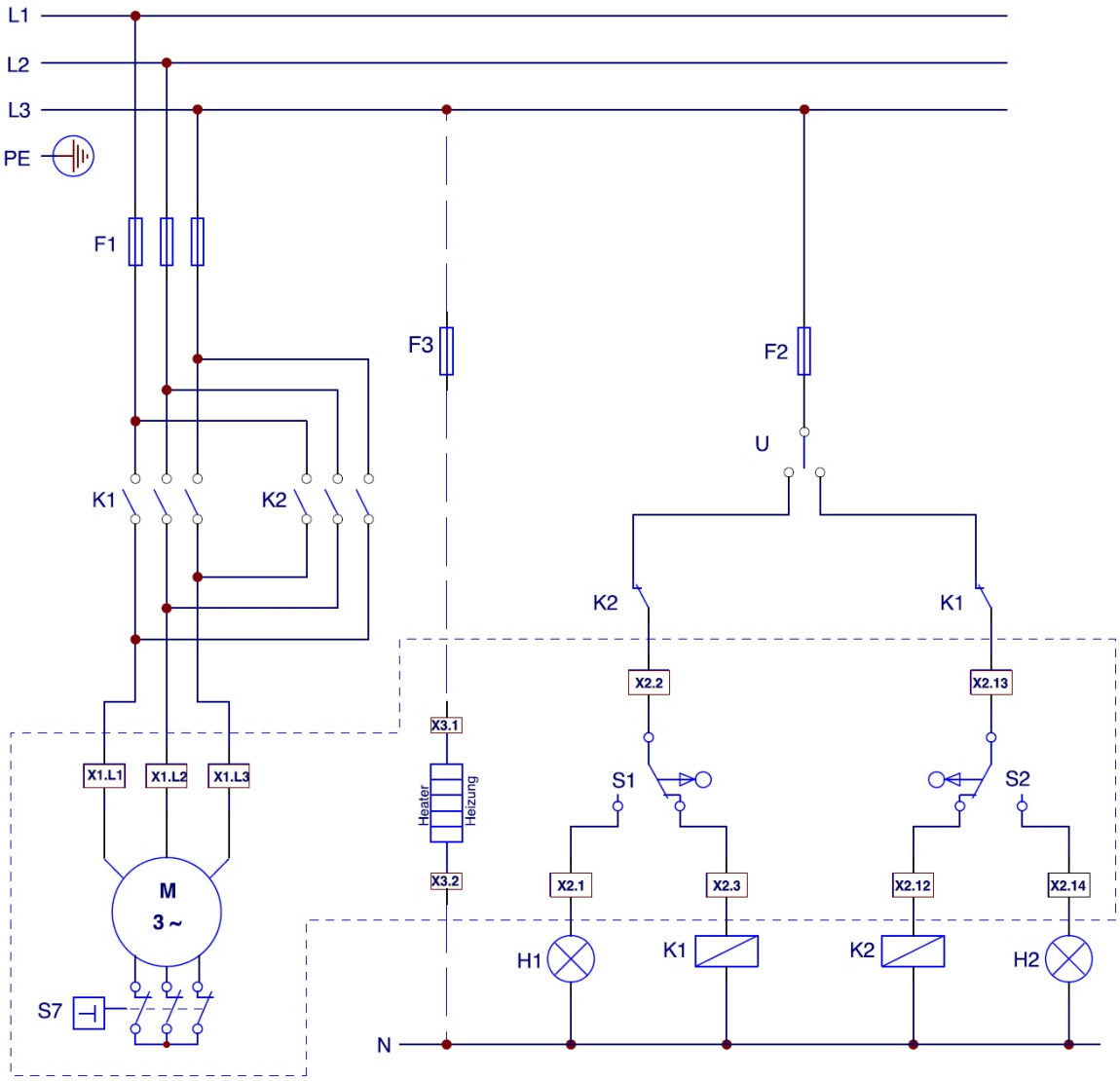


Fig. 20: Three-phase actuator without electronic torque cut-off

S1	Limit switch CLOSED	H1	Indicator lamp CLOSED
S2	Limit switch OPEN	H2	Indicator lamp OPEN
S7	Integrated thermoswitch	U	Changeover switch
F1	Motor fuse	K1	Control contactor CLOSED
F2	Control fuse	K2	Control contactor OPEN

Tab. 37: Three-phase actuator without electronic torque cut-off

Direct current actuator

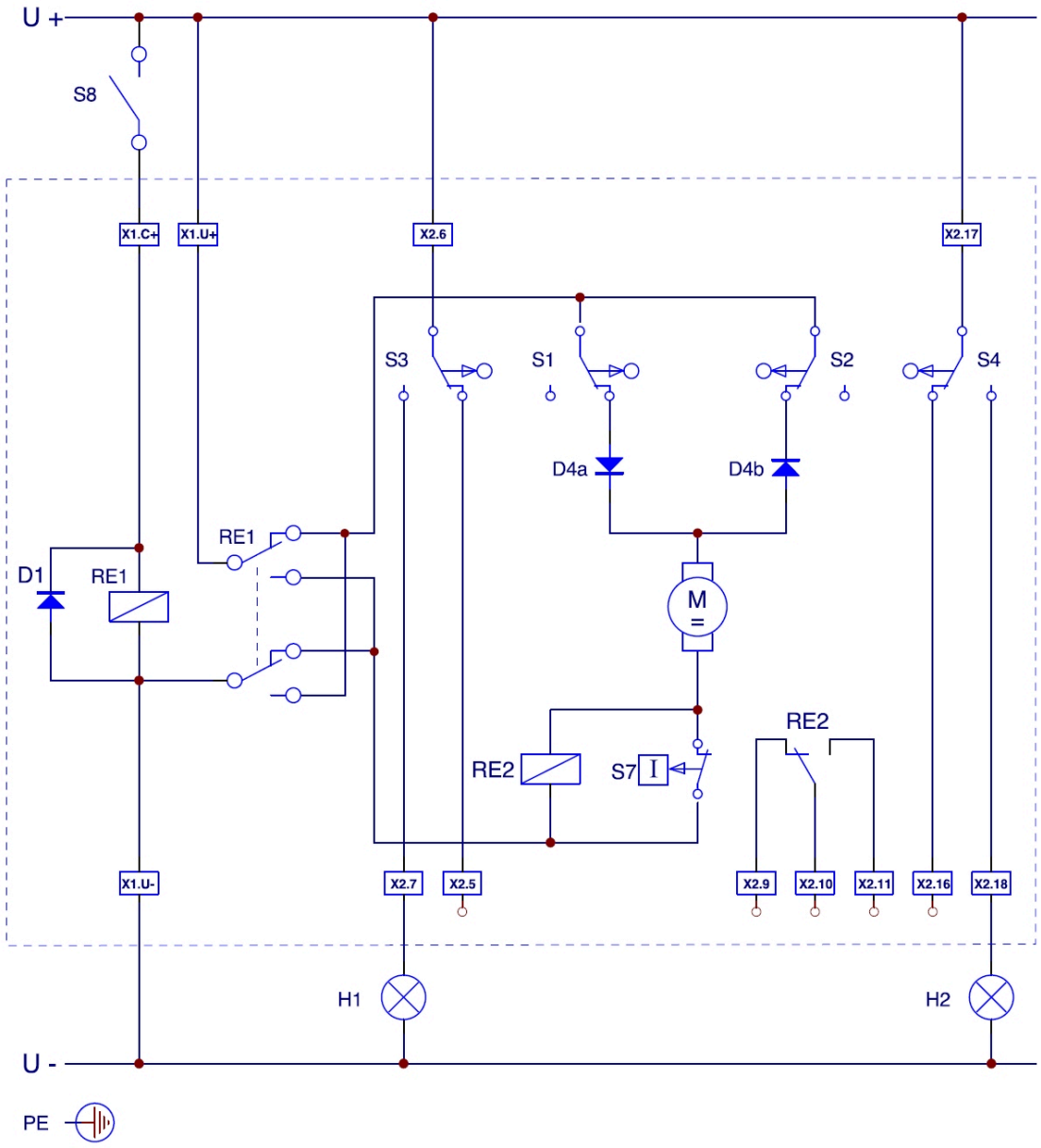


Fig. 21: Direct current actuators

S1	Limit switch CLOSED	H1	Indicator lamp CLOSED
S2	Limit switch OPEN	H2	Indicator lamp OPEN
S3	Add. Limit switch CLOSED	D1	Freewheeling diodes
S4	Add. Limit switch OPEN	D4a, b	Control diode
S7	Thermal overcurrent protection	RE1	Reversing relay
S8	Control switch	RE2	Overcurrent signal relay

Tab. 38: Direct current actuator

Alternating current actuator with potentiometer

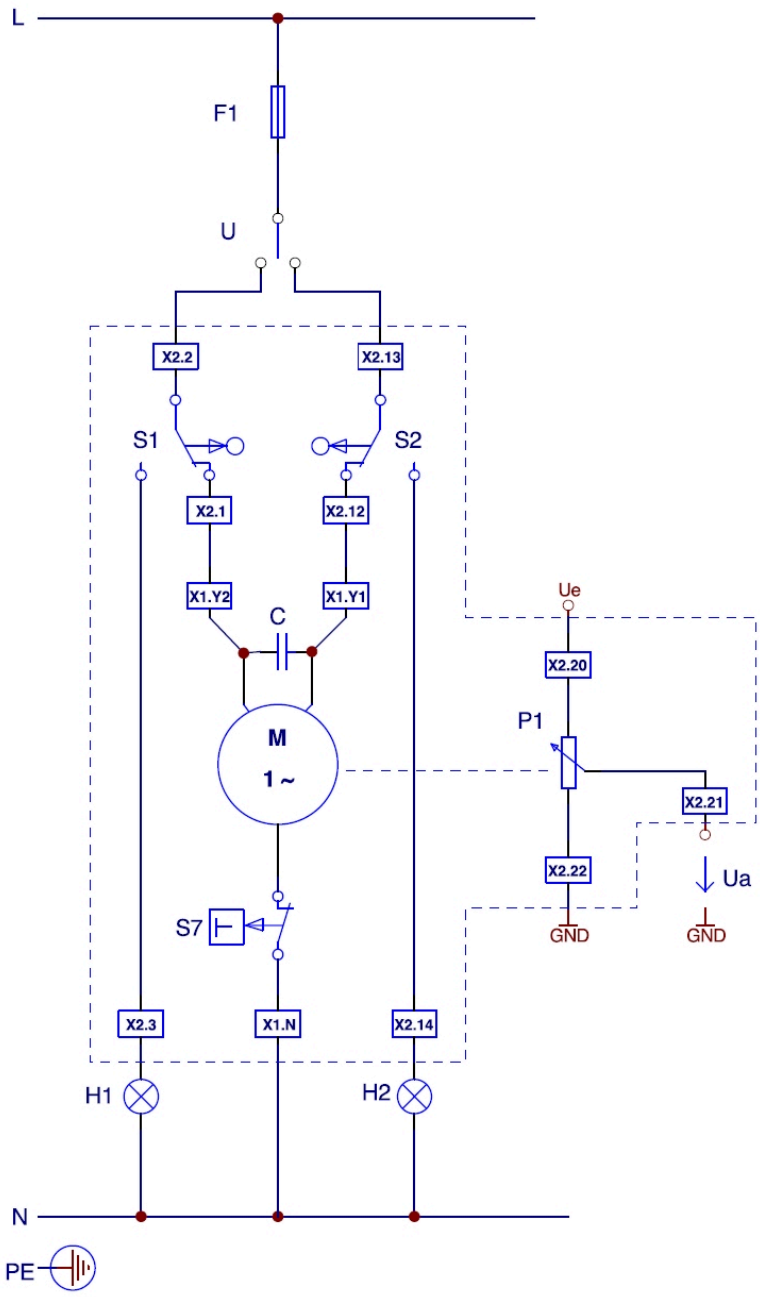


Fig. 22: Alternating current actuator with potentiometer

S1	Limit switch CLOSED	H1	Indicator lamp CLOSED
S2	Limit switch OPEN	H2	Indicator lamp OPEN
S7	Integrated thermoswitch	U	Changeover switch
F1	Fuse	P1	Potentiometer
C	Operating capacitor		

Tab. 39: Alternating current actuator with potentiometer

Alternating current actuator with current feedback 4-20 mA

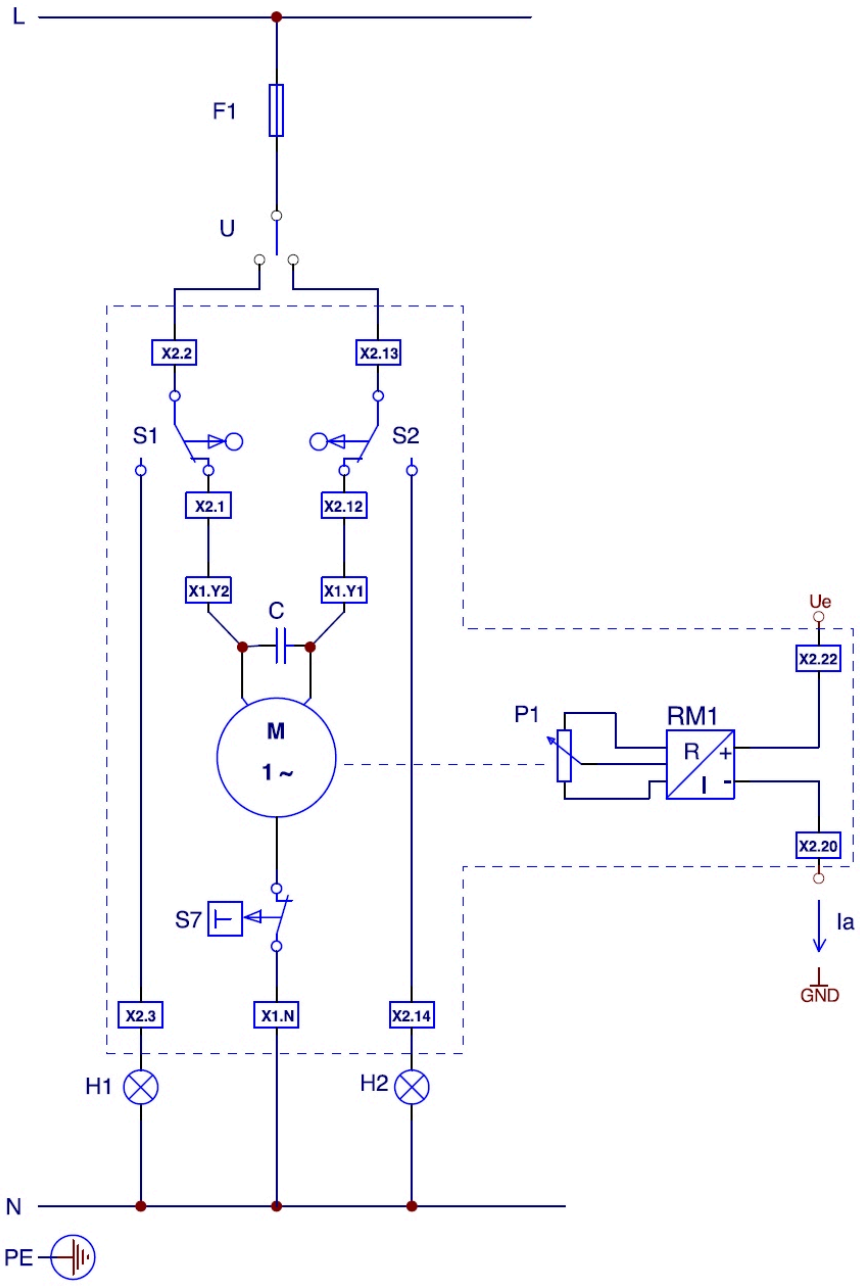


Fig. 23: Alternating current actuators with current feedback 4-20 mA

S1	Limit switch CLOSED	H1	Indicator lamp CLOSED
S2	Limit switch OPEN	H2	Indicator lamp OPEN
S7	Integrated thermoswitch	U	Changeover switch
F1	Fuse	P1	Potentiometer
C	Operating capacitor	RM1	Current feedback 4-20 mA

Tab. 40: Alternating current actuator with current feedback 4-20 mA

Alternating current actuator with positioning time extension module

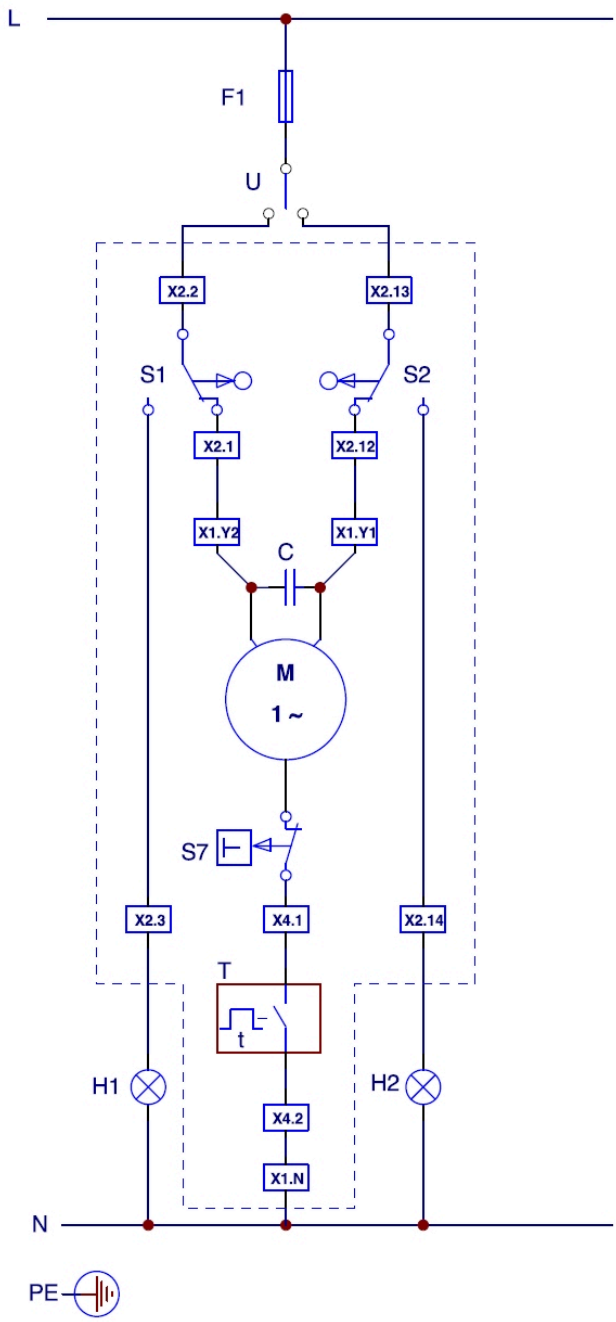


Fig. 24: Alternating current actuator with positioning time extension module

S1	Limit switch CLOSED	H1	Indicator lamp CLOSED
S2	Limit switch OPEN	H2	Indicator lamp OPEN
S7	Integrated thermoswitch	U	Changeover switch
F1	Fuse	C	Operating capacitor
T	Positioning time extension		

Tab. 41: Alternating current actuator with positioning time extension module

Three-phase actuator with positioning time extension module

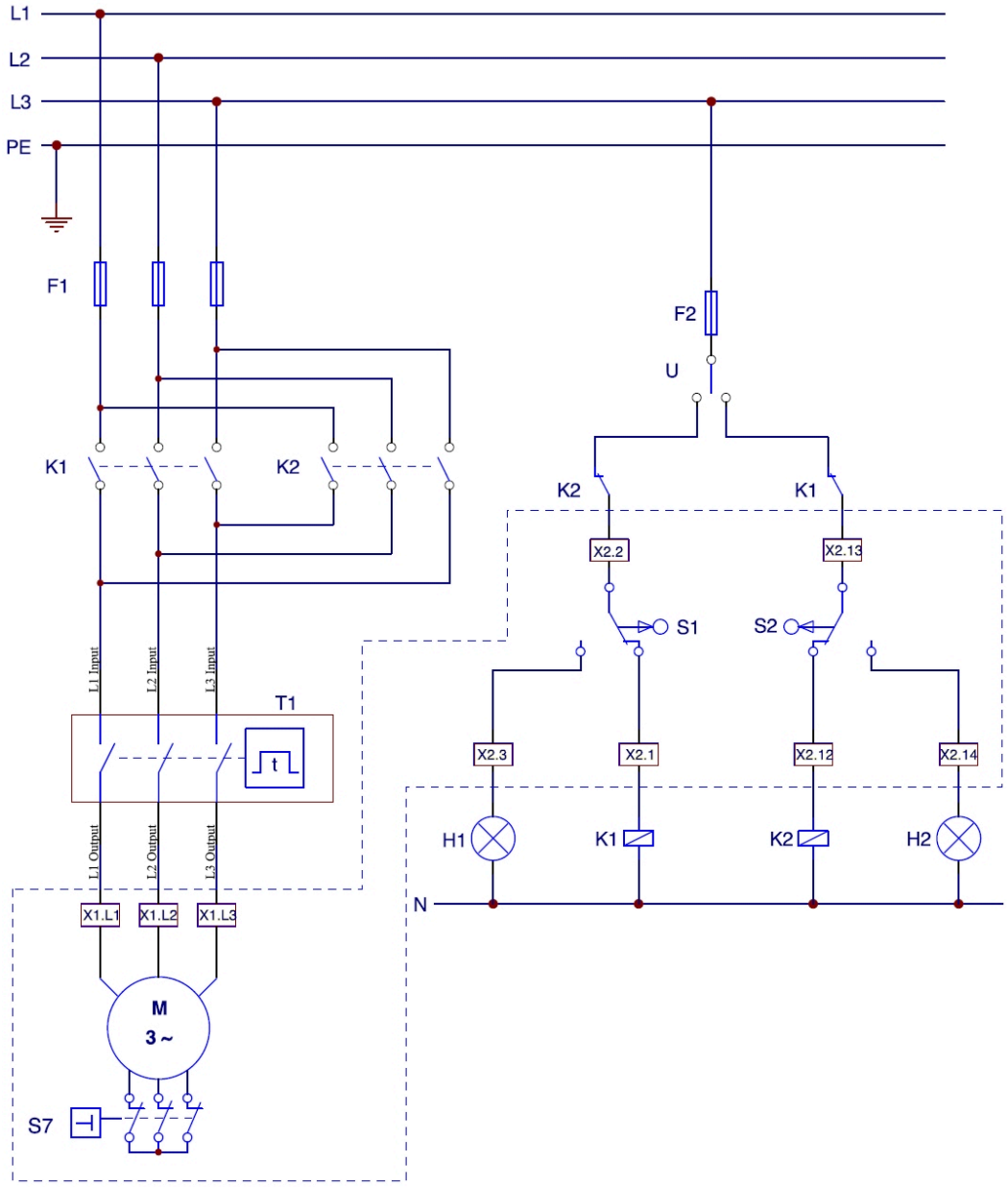


Fig. 25: Three-phase actuator with positioning time extension module

S1	Limit switch CLOSED	H1	Indicator lamp CLOSED
S2	Limit switch OPEN	H2	Indicator lamp OPEN
S7	Integrated thermoswitch	K1	Control contactor CLOSED
F1	Motor fuse	K2	Control contactor OPEN
F2	Control fuse	U	Changeover switch
T1	Positioning time extension		

Tab. 42: Three-phase actuator with positioning time extension module

Parallel connection of single-phase actuator

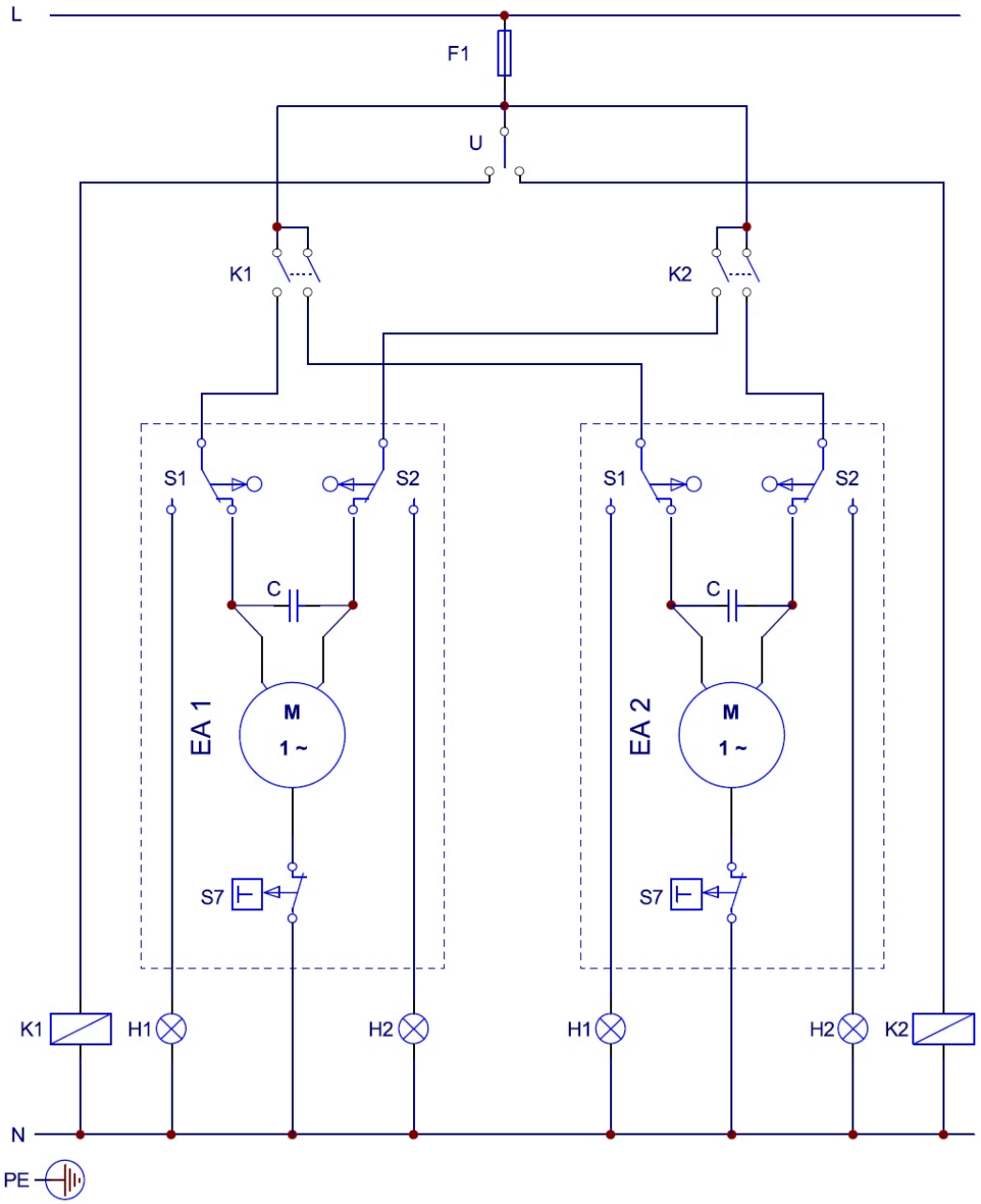


Fig. 26: Parallel connection of single-phase actuator

S1	Limit switch CLOSED	H2	Indicator lamp OPEN
S2	Limit switch OPEN	C	Operating capacitor
S7	Integrated thermoswitch	U	Changeover switch
F1	Fuse	K1	Control contactor
H1	Indicator lamp CLOSED	K2	Control contactor

Tab. 43: Parallel connection of single-phase actuator

5 COMMISSIONING

CAUTION

The motor can grow up to 40 °C hot.

There is a risk of burns if hot surfaces are touched without protective gloves.

➢ Wear your personal protective equipment.

Wear personal protective equipment!

NOTICE

Also observe chapter "Target groups".

Put the control room heating (connection to the nominal voltage in accordance with the identification plate) into operation immediately after installing the actuator

- at high humidity and/or
- changing temperatures

.

Commissioning of the actuator mounted on a valve is only permitted if the valve is enclosed on both sides by a pipe or apparatus section. Any actuation before this means a risk of crushing and is the sole responsibility of the owner.

5.1 Settings

The matching terminal diagram is glued into the inside of the control room cover.

- Ensure that the system data nominal voltage, control voltage (and frequency) match the data entered on the actuator’s identification plate.
- Selection of a circuit suggestion (terminal diagram) must match the function of the valve and the actuator.
  The owner is responsible for selecting the matching terminal diagram. This must be implemented in the owner’s control unit.
- The actuator motor always must be powered down when it teaches its end position. This may be done immediately via the limit switches (see "Alternating current actuator with electronic torque cut-off" or via the customer’s control unit. Three-phase actuators must be connected to the power supply with a clockwise rotating field in order to ensure the correct running direction of the actuator.

Adjustment of the "OPEN” and “CLOSED” positions

The switching cam in the actuator is adjusted for the position “CLOSED” ex works.
The handwheel must not be actuated for adjustment.

1. Open the control room cover.
2. Remove the position indicator.
3. Loosen the hexagon socket screw.

The closed valve is the reference point for the reconciliation.

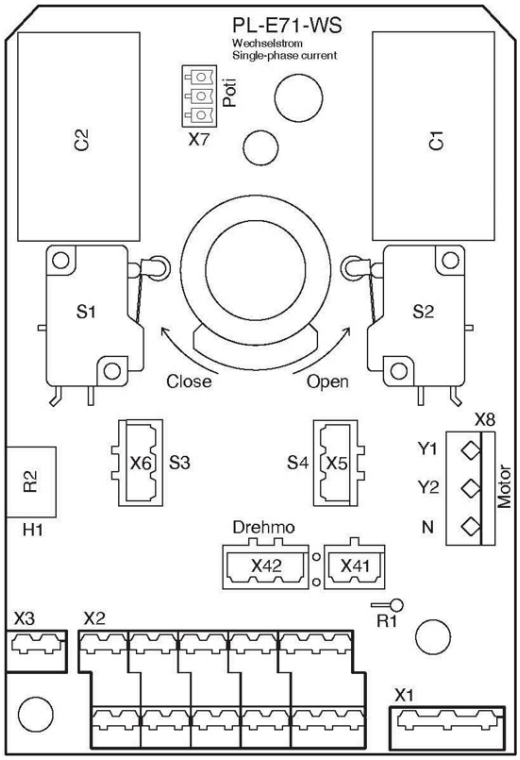
4. Set the switching cam so that the limit switch S1 is actuated.
5. Screw on the hexagon socket screw.

The position “OPEN” occurs automatically in the default configuration.

Ensure that the electrical deactivation via the limit switches takes place before a fixed or adjustable travel stop of the valve or the actuator has been reached.

There should be at least one ½ handwheel turn worth of play between the electrical deactivation point and the fixed stop.

The running path (rotating range) of the switching cam must be as shown on the PCB.



6. Put on the position indicator.
   Ensure correct position of the display towards the valve disc.
7. Check the electric function of the actuator.
8. Close the control room cover.
   Ensure that the gasket is seated correctly.

For actuators with special equipment, additional limit switches always must be set ahead to ensure signaling at all times before the motor switches off.

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.

Perform the following test steps on each valve/part-turn actuator unit after assembly to ensure that the part-turn actuator functions properly for automated operation:

- Do the position indicator on the part-turn actuator and the position of the valve disc match? Adjust the position indicator.
- Has the correct terminal diagram been used?
  The valve must move to the tightly “CLOSED” position at the “Close” control signals. This must be done by the limit switch (typically for ball valves and butterfly valves with a liner) or via the load-dependent shut-off (typically for butterfly valves with a metal seal) depending on the type of valve.
- Actuation and display function
  When the nominal voltage is applied, the valve must move to the corresponding end positions with the “OPEN” and “CLOSE” control commands. The visual display on the part-turn actuator or on the valve must indicate this correctly. If this is not correct, the control of the rotary actuator and/or the position of the position indicator must be corrected accordingly.
- Are all position signals correct?
  Electrical feedback signals for the “OPEN” and “CLOSED” display must be compared with the visual display of the valve. Signals and display must match. Otherwise, the control unit and/or the adjustment of the position transmitter must be checked.

6 OPERATION

CAUTION

The motor can grow up to 40 °C hot.

There is a risk of burns if hot surfaces are touched without protective gloves.

➢ Wear your personal protective equipment.

Wear personal protective equipment!

NOTICE

Also observe chapter "Target groups".

The part-turn actuator E50-E210 is actuated via electrical signals from the superordinate control system.

The position indicator visually shows the position of the valve disc. The position indicator shows the current position of the actuator.

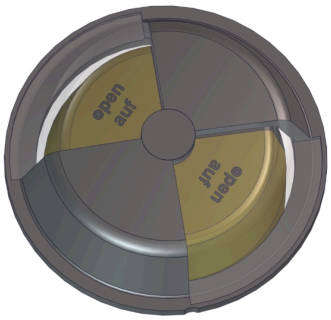


Fig. 27: Position indicator

NOTICE

The windings of all motors are thermally protected and are automatically switched off in the event of overheating. The thermal overcurrent switch resets automatically after cooling down with three-phase (type ExxDS) and alternating current (type ExxWS) actuators. The thermal overcurrent switch must be reset manually for DC actuators (type ExxGS).

AC and three-phase actuators have an integrated thermoswitch in the winding, which triggers when the maximum allowable temperature is reached and interrupts the power supply to the motor. The motor stops, cools down, and the thermoswitch resets automatically.

DC actuators have a thermal overcurrent switch that disconnects the voltage from the motor in the event of an inadmissibly high current. This overcurrent switch is not reset automatically. It must be reset manually in the control room of the actuator. Motor protection switches should only be provided on the system side if this is necessary for technical reasons.

Manually reset overcurrent switch

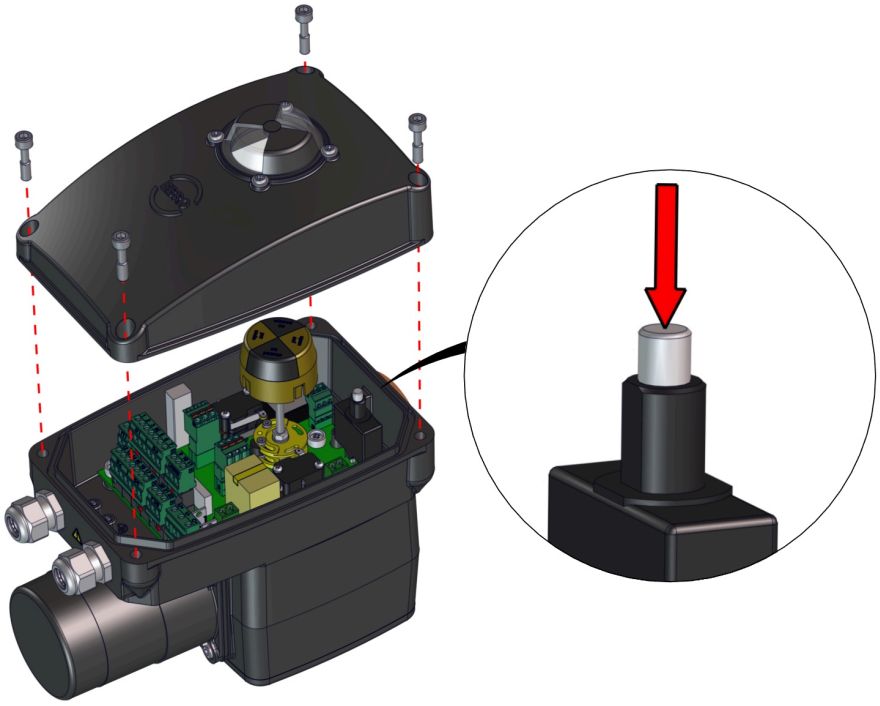


Fig. 28: Reset the overcurrent switch

1. Release the cover.
2. Press the button on the overcurrent switch.
3. Mount the cover. Ensure that the cover seal is correctly seated.

7 MAINTENANCE

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 electric part-turn actuator against being switched on again.

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 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.

CAUTION

The motor can grow up to 40 °C hot.

There is a risk of burns if hot surfaces are touched without protective gloves.

- ➢ Wear your personal protective equipment.

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 part-turn actuator:

- Keep the part-turn actuator free of deposits.
- Check the part-turn actuator for leaks.
- Check the part-turn actuator for smooth movement.
- Check that the signage (identification plate / warning and mandatory stickers, if applicable) is complete and intact.

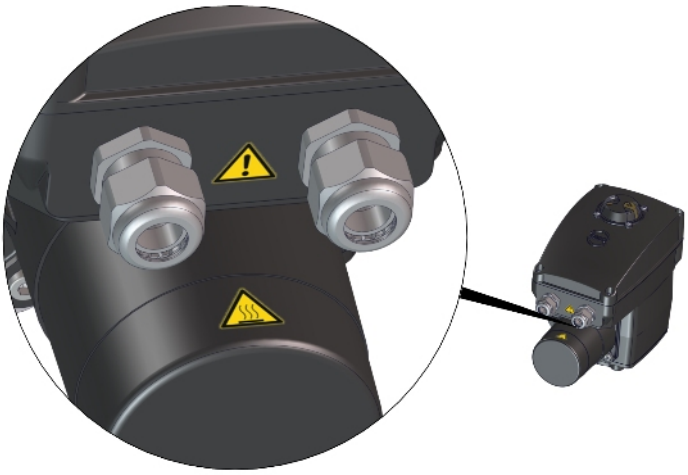


Fig. 29: E65-E210 signage

Troubleshooting E50-E210

Type of fault	Cause	Measure
Actuator does not start	Thermal overcurrent switch has tripped	Only applies to direct current actuators
	Thermoswitch has tripped	For WS and DS actuators: Resets automatically after cooling down
Motor grows very hot	Duty cycle too long	Check cycle times
	Faulty wiring	Compare existing circuit to circuit suggestions if necessary
	Wrong rotating field	Establish clockwise rotating field
	Mechanical stop is reached before the limit switch is activated	Adjust the shifting cam
	Valve torque too high	Check the torque of the valve and compare it with the manufacturer's specifications.

Type of fault	Cause	Measure
Torque cut-off responds	Valve torque too high	Compare to manufacturer's specifications.
	Selected setting too low	Adjust torque cut-off
	Actuator hits the mechanical stop	Adjust the switching cam
	Blockage in the piping	Check valve and piping
Actuators oscillate	Impermissible parallel connection	Electrically decouple actuator controls from each other
Bond/fuse control contacts	Relay of the load circuit too weak	Use control contactor with switching category AC3
Condensation in the actuator	Heating not connected	Supply heating permanently with voltage
	Sealing seat or cable gland faulty	Check and rework if necessary

Tab. 44: Troubleshooting E50-E210

Contact

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

7.1 Bill of materials

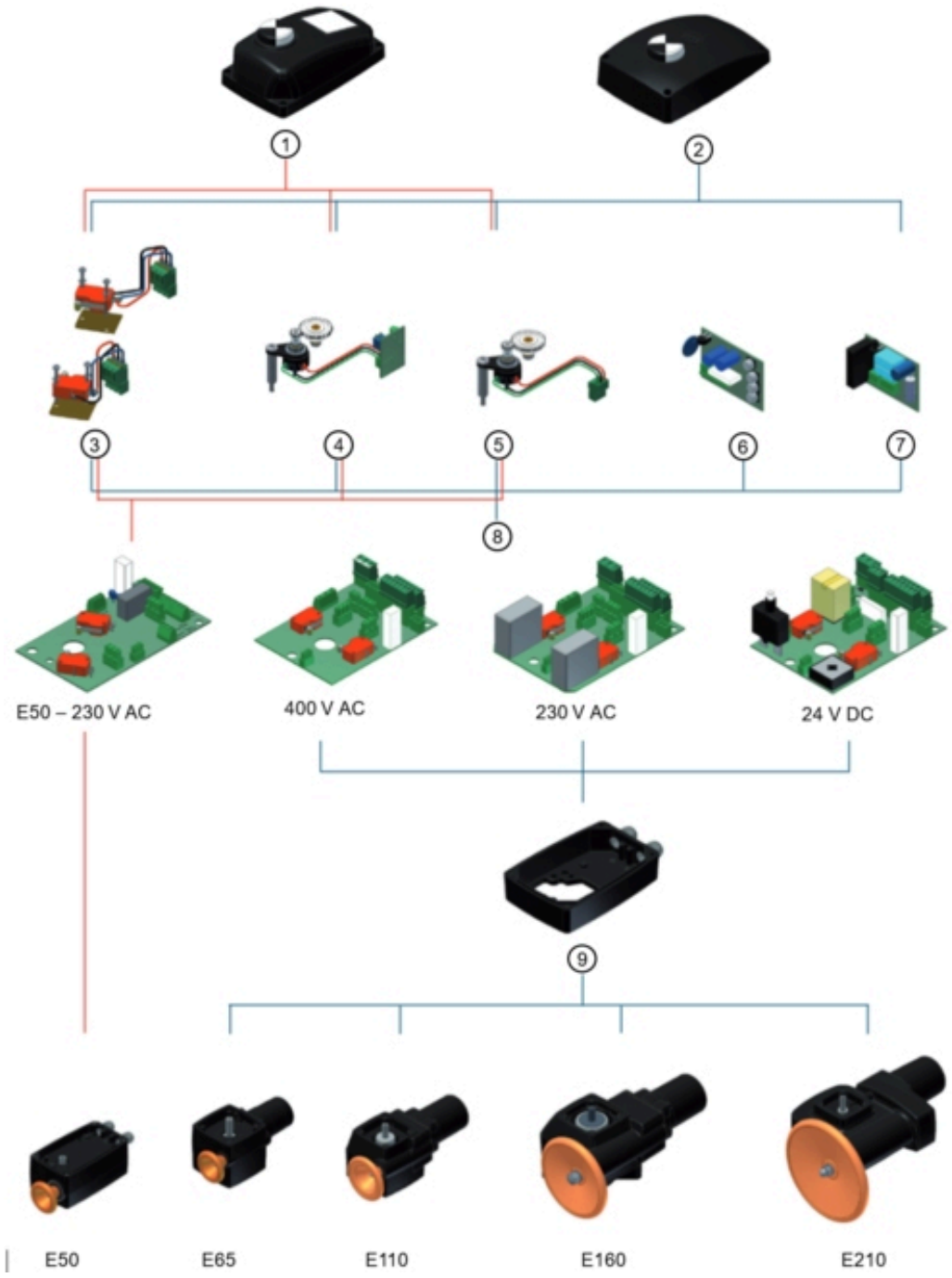


Fig. 30: Options

Item	Naming	Item	Naming
1	Cover with position indicator (E50)	6	Torque cut-off
2	Cover with position indicator (E65 - E210)	7	Positioning time extension
3	Additional limit switches	8	Main PCBs
4	Current feedback 4-20 mA	9	Switch box with cable entries
5	Potentiometer 1000 Ω	10	

8 DECOMMISSIONING/DISASSEMBLY

WARNING

The part-turn actuator may fall if lifting gear and lifting devices with insufficient load-bearing capacity are used.

Injuries and even death may result from crushing, shearing or impacts.

- ➢ Only use lifting gear and lifting devices with sufficient load-bearing capacity.
- ➢ Only use lifting gear and load handling attachments that are in an undamaged condition.
- ➢ Never stand underneath any suspended loads.

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.

CAUTION

The motor can grow up to 40 °C hot.

There is a risk of burns if hot surfaces are touched without protective gloves.

- ➢ Wear your personal protective equipment.

Wear personal protective equipment!

NOTICE

Also observe chapter "Target groups".

For extended deactivation:

- Protect the part-turn actuator from soiling and dust.
  Also observe the general rules for storage, transport, and assembly in the chapter "Transport and assembly".
- Check the part-turn actuator 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.

For disposal of the individual parts in accordance with type, refer to chapter "Bill of materials".

The manufacturer

EBRO ARMATUREN
Gebr. Bröer GmbH
Karlstraße 8
58135 Hagen
Germany

declares that the electric part-turn actuators of the series

E 50 WS	E 65 WS	E 110 WS	E 160 WS	
	E 65 DS	E 110 DS	E 160 DS	E 210 DS
	E 65 GS	E 110 GS	E 160 GS	

and their attachment modules

M71-WS-XXX-40	M71-DS-XXX-40	M71-GS-XXX-40

to which this declaration refers comply with the requirements of the following Council Directives on the approximation of the laws of the Member States:
Directive - 2014/35/EU - Low Voltage Directive
Directive - 2014/30/EU - Electromagnetic compatibility

As the manufacturer of these products, we also declare that the following harmonized standards have been used for assessment in accordance with the above directives.

EN 61010-1:2010 + A1:2019 + AC:2019-04	for the Low Voltage Directive (LVD)
EN 61000-3-2:2014	for electromagnetic compatibility (EMC)
EN 61000-3-3:2013	
EN 55011:2016 + A1:2017	
EN 61326-1:2013	

The employee responsible for the documented and required analyses is Mr. V. Pütz at EBRO ARMATUREN.

Hagen, 03/06/2023

Lydia Bröer
Managing director

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

- Subsidiaries
- Representative offices

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.

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