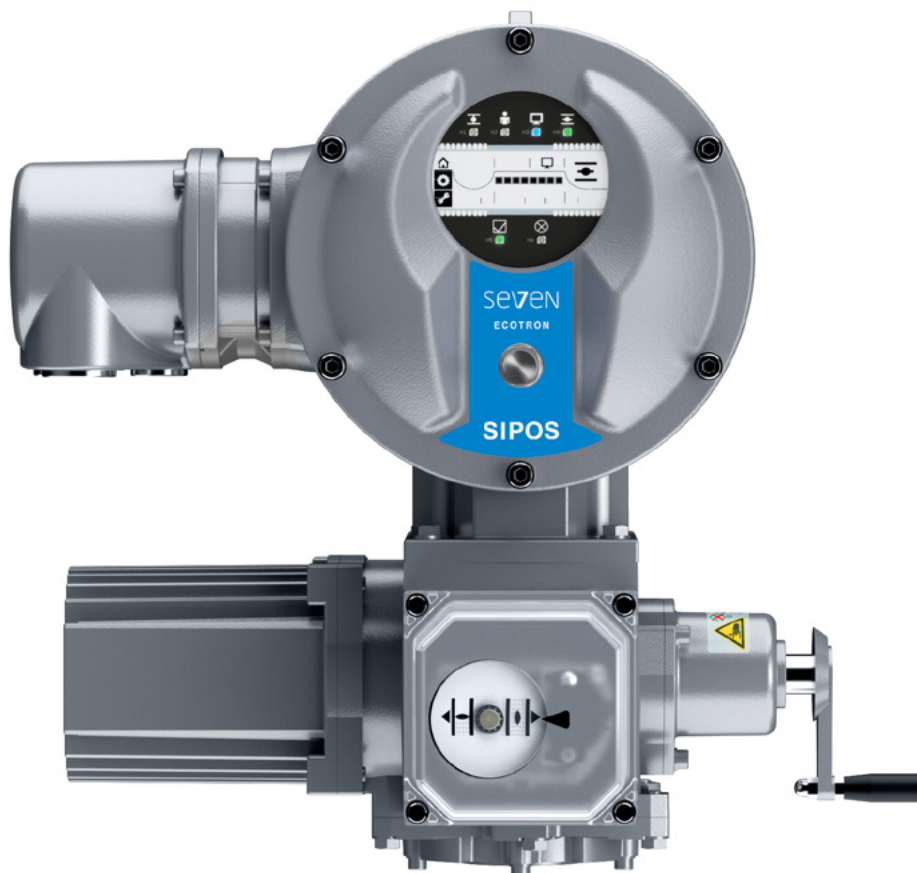


Operation instructions

Electric actuators

2SA7, 2SQ7

ECOTRON



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1 General information

1.1 Safety information

General information

The devices referred to in this document are components of installations conceived for industrial applications. They are designed in accordance with the recognized engineering rules.

All work involved in transport, assembly, installation, commissioning, maintenance and repair has to be performed by qualified personnel.

Qualified personnel within the meaning of the relevant safety instructions of this documentation are all persons authorized to perform the required tasks according to the standards of safety technology and who may recognize and avoid potential hazards. They must be thoroughly familiar with the warnings at the device and the safety instructions of these operation instructions.

For work on power installations, the prohibition of the use of non-qualified persons or similar is stipulated in EN 50110-1 (formerly DIN VDE 0105) or IEC 60364-4-47 (VDE 0100 part 470).



■ Leakage currents

As standard, the leakage current of the actuators exceeds 3.5 mA (in combination with separate installation > 10 m with LC filter operating point dependent above 30 mA). Therefore, fixed installation in accordance with IEC 61800-5-1 is required.

■ Residual current circuit breaker or monitoring devices

The integral frequency converter can be used to generate a direct current within the protective grounding conductor.

Should a residual current-operated protective (RCD) or monitoring (RCM) device be used upstream the network, it must be of type B.

Correct transport, proper storage, mounting and installation, as well as careful commissioning are essential to ensure trouble-free and safe operation.

The distribution of this product is restricted according to IEC 61800-3 and may cause radio interferences in domestic environments. In this case it may be necessary to take additional measures.

The following is of particular importance:

- The technical data and information concerning the permissible use (installation, connection, ambient and operating conditions) provided in the catalog, order documents, operation instructions, rating plate data and in the other product documentation;
- The general installation and safety guidelines;
- The local, plant-specific regulations and requirements;
- The local ambient conditions, in particular the vibration load, which can be caused when mounting an actuator to a vibrating valve
- The proper use of tools and lifting and transport equipment;
- The use of personal protective equipment, especially in high ambient temperatures and with potential high actuator surface temperatures.

Warnings on the device



Danger of crushing. When pressing in the crank handle or the hand wheel ensure that neither the hand nor the fingers are crushed, refer to figure.



Applicable for devices of the 2SA7.5/6/7/8 series:
Indicates the lubricant used. Refer also to chapter „7.2 Lubrication intervals and lubricants“ on page 44



Hot surface. Risk of hot surface temperatures (caused by high ambient temperatures and frequent operation as well as long activation times).

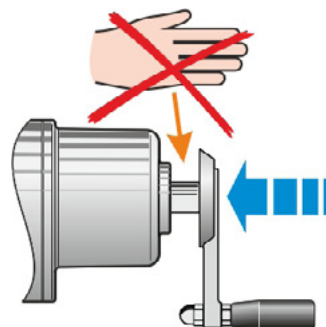


Fig.: Danger of crushing

1.2 Transport and storage

- The device must be supplied in sturdy packaging.
- For transport, loop the rope around the hand wheel housing, refer to illustration. Only use the eyes provided on the electronics unit (fig. item 1) to lift the actuator's own weight.
- Do not attach the ropes and hooks at the crank handle or hand wheel for the purpose of lifting.
- Store in well-ventilated, dry room at -30 °C – +80 °C.
- Protect against damp floors by storing on a shelf or pallet.
- Keep connection hood/cover and cable glands as well as the cover of the electronics unit closed.

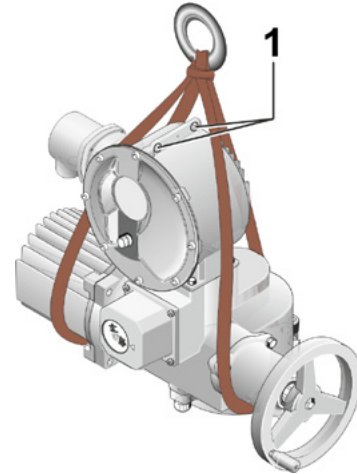


Fig.: Transport



The actuators contain electronic components, in particular large DC capacitors, which are subject to aging and must be pretreated after long-term storage before operation on mains voltage. After eight years of storage without voltage at the latest, the actuator electronics has to be prepared in stages using closed-loop power supply prior to operation at nominal voltage:

- 30 minutes with 25 % of the nominal voltage
- 30 minutes with 50 % of the nominal voltage
- 30 minutes with 75 % of the nominal voltage
- 30 minutes with 100 % of the nominal voltage

1.3 Disposal and recycling

Packaging

The packaging of our products consists of environmentally friendly materials which can easily be separated and recycled. We use the following packaging materials: Wood-based panels (MSB/OSB), cardboard, paper, PE foil. For the disposal of the packaging material, we recommend recycling and collection centers.

Actuator

SEVEN actuators have a modular design and may therefore be easily disassembled, separated and sorted according to materials, i.e.: electronic parts, different metals, plastics, greases and oils.

The following generally applies:

- Collect greases and oils during disassembly. As a rule, these are substances hazardous to water and must not be released into the environment.
- Arrange for controlled waste disposal of the disassembled material or for separate recycling according to materials.
- Observe the national/local regulations for waste disposal.

1.4 Notes to the operation instructions

1.4.1 Safety instructions: Used symbols and their meanings

The following symbols, which have different meanings, are used in the operation instructions. **Non-observance** of safety instructions may lead to serious injuries or damage.



Warning marks activities which, if not carried out correctly, can affect the safety of persons or property.



Notice marks activities which have major influence on the correct operation. Non-observance of these notes may lead to consequential damage.



Electrostatically endangered parts are located on circuit boards which may be damaged or destroyed by electrostatic discharges. If the boards need to be touched during setting, measurement or for exchange, it must be assured that immediately before touching an electrostatic discharge through contact with an earthed metallic surface (e.g. the housing) has taken place.



Procedure may have been performed by valve manufacturer:
If actuators are delivered mounted to a valve, this step has been done in the valve manufacturer's factory. The setting has to be checked during commissioning.

1.4.2 Scope

For the sake of clarity, not all details of all versions of the product are described in these operation instructions, nor can they cover all conceivable cases regarding installation, operation and maintenance. For this reason, the operation instructions only contain instructions for qualified personnel (refer to section 1.1) that are necessary when the equipment is used for the purpose for which it is intended or in industrial applications.

If the devices are used in non-industrial applications with increased safety requirements, they have to be ensured by additional safety measures during assembly.

In case of any questions, and especially where detailed product information is not available, contact the SEVEN sales representative in charge. Always state the type designation and the works number of the respective actuator (see name plate).



It is recommended that the services and support of the factory service are utilized for all planning, installation, commissioning and service tasks.

The contents of these operation instructions and product documentation shall not become part of or modify any prior or existing agreement, commitment or legal relationship. The Purchase Agreement contains the complete and exclusive regulation on material defect liability of SIPOS Aktorik. These contractual regulations are neither amended nor limited by the descriptions contained in these operation instructions and documentation.

1.5 Supplementary operation instructions

2SQ7 small part-turn actuator
COM-SIPOS PC parameterization software
PROFIBUS operation instructions
MODBUS operation instructions
Enclosure protection IP68-8 m "K51"
Increased vibration resistance "K57", "K58"
Increased vibration resistance according to seismic class S2A "K59"
Very high corrosion protection corrosivity category C5 with long protection duration "L38"
SIPOS SEVEN actuator with USP
Binary and analog inputs freely available via bus
and other

Any special installation and operation instructions furnished by the suppliers of subcontracted components, attachments or fixtures are attached to the set of instructions and have to be observed.

2 General information

2.1 Functional principle

Description

The electronics with integral frequency converter **(1)** controls the motor **(2)**. The motor turns the output drive shaft **(4)** via the worm shaft **(3)**. The output drive shaft **(4)** drives a gear or a valve stem **(5)** via a stem nut.

The motion of the worm shaft **(3)** is transferred via the signaling shaft **(6)**, and depending on actuator and configuration (refer to 'Position recording' table*), to

- the signaling gear **(7a)**.
The signaling gear reduces the movement and turns the potentiometer **(8)**.

or for non-intrusive position recording

- the MWG (magnetic position encoder) **(7b)**,
or
- the niP (non-intrusive position encoder) **(7c)**.

The niP/MWG counts the number of rotations and records the position within one rotation.

The position recording is also performed without external power supply.

From the position of the potentiometer or that of the MWG or niP, the electronics recognizes the position of the output shaft **(9)** and therefore the position of the operated valve. The motor is controlled according to the process requirements.

The torque detection (TD) is performed electronically.

*Position recording			
Signaling gear		Non-Intrusive	
without mech. Position indicator	with mech. Position indicator	MWG	niP
Standard	Option	Option	Option

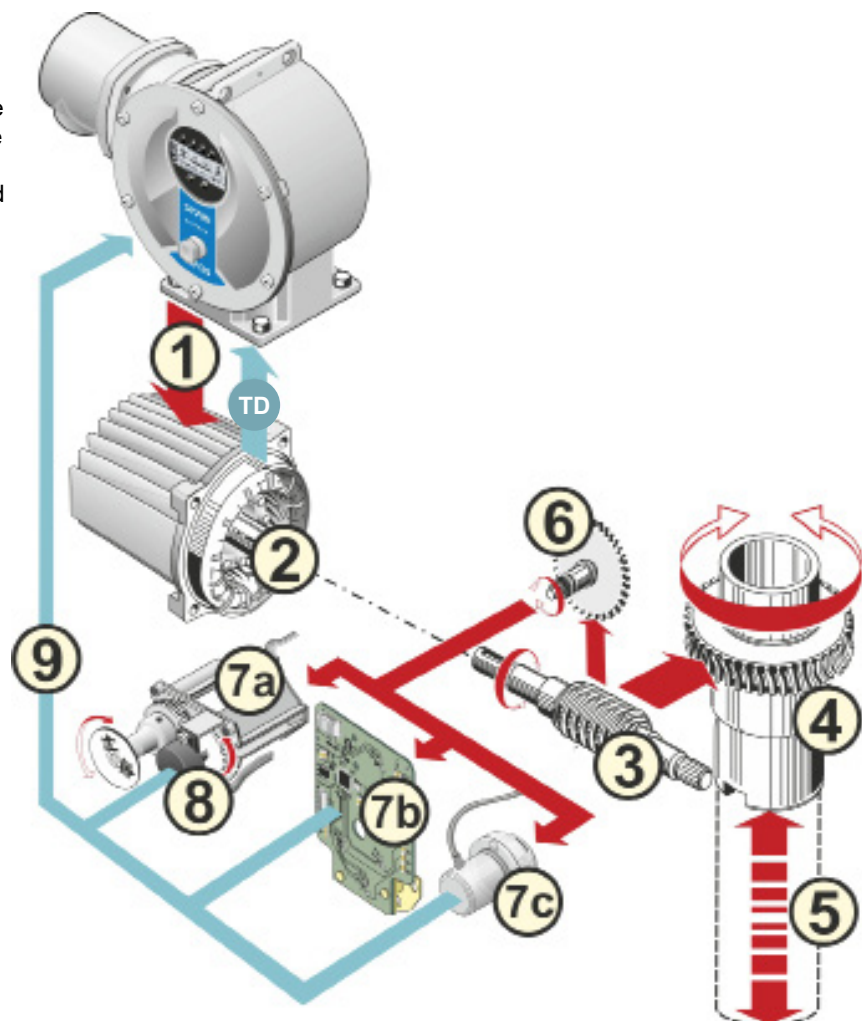


Fig.: Functional principle

2.2 Sub-assemblies

The actuators of the SIPOS SEVEN series comprise two main assemblies: gear unit and electronics unit.

For details, refer to chapter „Spare parts“.

The main sub-assembly gear consists of the sub-assemblies:

- 1 Plug element electronic connection,
- 2 Motor,
- 3 Gear unit,
- 4 Signaling gear or non-intrusive position recording (not for 2SQ7) with cover,
- 5 Manual drive (with crank or hand wheel),
- 6 Possible mechanical extensions, depending on the version.

For the 2SQ7 small part-turn actuator, the signaling gear is omitted; the gear unit has a different shape.

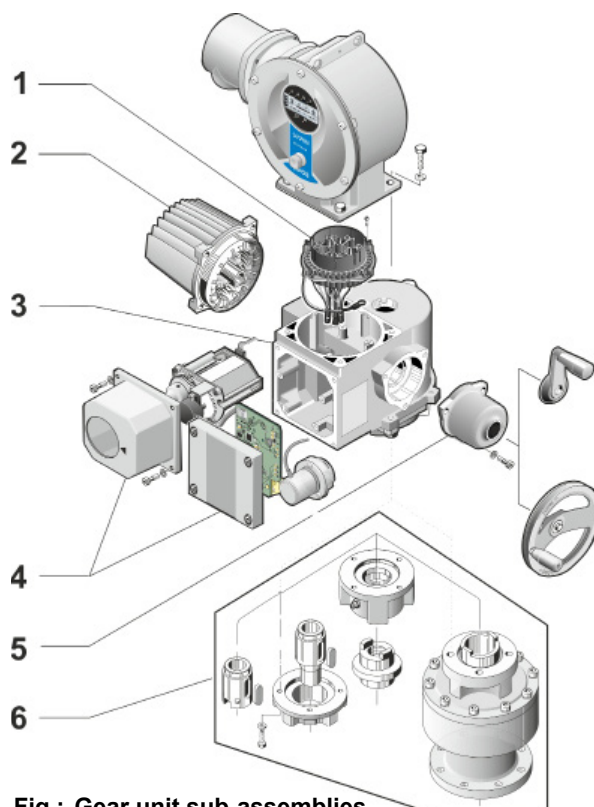


Fig.: Gear unit sub-assemblies

The main sub-assembly electronics unit consists of the sub-assemblies:

- 1 Electrical connection (two versions available),
- 2 Plug element gear connection,
- 3 Electronic housing with cover,
- 4 Power control PCB, including power module,
- 5 Relay board (option),
- 6 Control PCB with display and fieldbus connection (as an option).

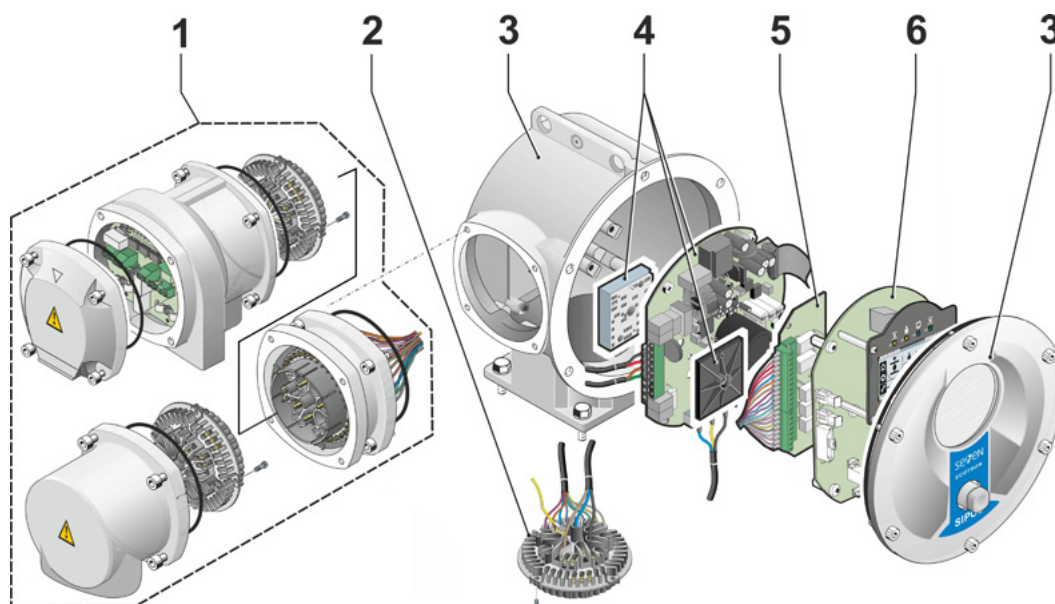


Fig.: Electronics unit sub-assemblies

2.3 Block diagram (electrical connections)

The block diagram shows the electronic sub-assemblies and the inputs and outputs for possible customer-specific connections.

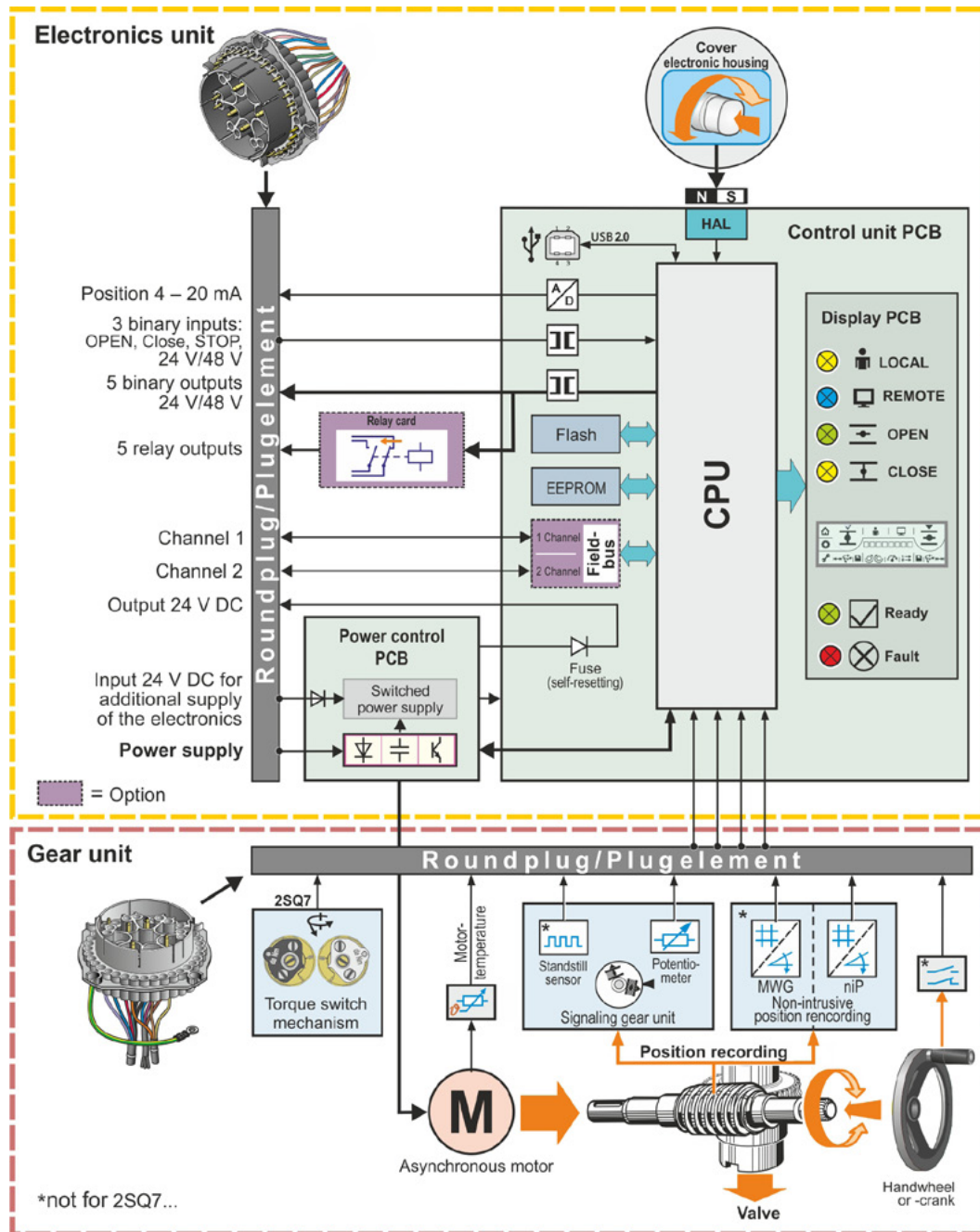


Fig.: Block diagram

3 Assembly and connection

3.1 Mount to valve/gear



If actuators are delivered mounted to a valve, this step has been done in the valve manufacturer's factory. However, the setting has to be checked during commissioning.



- Heed safety information (refer to chapter 1.1)!
- Prior to starting the assembly
 - Make sure that the intended measures (possible operation of the valve, etc.) are not likely to cause any injuries to persons or to interfere with the equipment.
 - Heed the local ambient conditions, in particular the vibration load, which can be caused when mounting an actuator to a vibrating valve
- During assembly, the output shaft insert may fall out of the output drive shaft.
- When disassembling the electronics cover, make sure the insert does not fall down.



It is recommended that the services and support of the responsible SIPOS Aktorik service centers are utilized for all planning, installation, commissioning and service tasks.

3.1.1 General assembly instructions for all output shaft types

- Mounting and operation is possible in any position. Heed the local ambient conditions, in particular the vibration load, which can be caused when mounting an actuator to a vibrating valve.
- Do not apply force and avoid shocks!
- Check that the end connection flange and the output shaft type match the valve/gear.
- Thoroughly clean mounting faces of output mounting flanges at actuator and valve/gear.
- Slightly grease the connection points.
- Place the actuator on the valve/gear, making sure it is properly centered.
- Use bolts with at least 8.8 quality. If similar stainless steel bolts are used, they should be greased slightly using petroleum jelly.
The depth of engagement should be at least 1.25 x the thread diameter.
- Position the actuator on the valve/gear and tighten the bolts evenly in diagonally opposite sequence.
- The housing of the actuator consists of an aluminum alloy which is corrosion resistant under normal environmental conditions. If the paint was damaged during assembly, it can be touched up with original paint supplied in small quantity units by SIPOS Aktorik.

3.1.2 Output shaft type A

Assembly instruction

The stem nut is screwed onto the valve stem by turning the crank handle or the hand wheel.



Spring-loaded A end shafts are subject to high pre-tension. Fitting and removal of the stem nut for thread cutting must be performed in accordance with assembly instructions!

Fitting and removing the stem nut

If the stem nut was not ordered with a trapezoidal thread (suffix "Y18" to ordering number), or if the stem nut is worn and has to be replaced, proceed as follows:

Output flange (fig. item 1) does not have to be removed from the rotary actuator!

1. Unscrew centering ring (fig. item 5) from output flange.
2. Take off stem nut (4) together with axial needle-roller assembly and axial bearing washers (3).
3. Remove the axial needle-roller assembly and the axial bearing washers (3) from the stem nut.
4. Only if the stem nut was delivered without thread: Cut a thread in the stem nut (4) (check the concentricity and the axial run-out when clamping the stem nut) and clean it.
5. Lubricate axial needle-roller assembly and axial bearing washers (3) with ball bearing grease and fit them on the new or machined stem nut (4).
6. Insert stem nut (4) with axial needle-roller assembly into output flange (claws have to engage properly into the groove of the output shaft of the actuator).
7. Screw in the centering ring (5) and tighten it to the stop. Make sure that the radial shaft seal (6) is inserted correctly.
8. Using a grease gun, press ball bearing grease into the nipple until lubricant is discharged between the centering ring (5) and the stem nut (4).

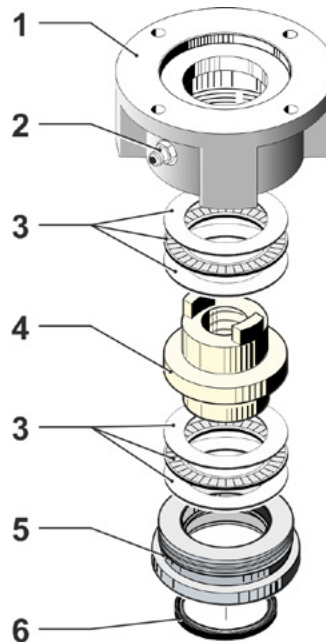


Fig.: Output shaft type A assembly

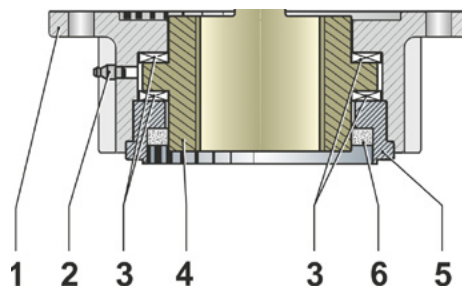


Fig.: Output shaft type A installed



For output shaft form A, ensure that the valve stem is greased separately!

3.1.3 Mount stem protection tube

1. Remove fastener (fig. item 1).
2. Check that the extended stem does not exceed the length of the protective tube.
3. Apply sealing compound to the thread and the sealing faces (e.g. 732 RTV from Dow Corning, Munich, Germany).
4. Screw in the stem protection tube (2).

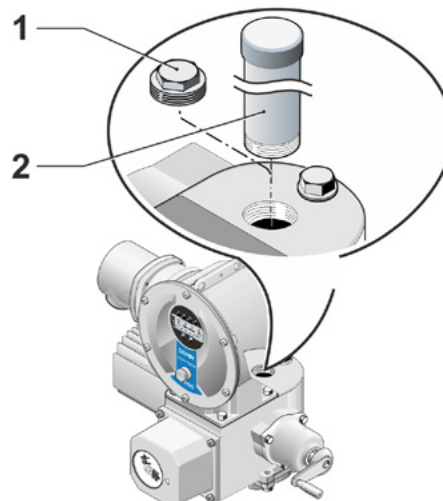


Fig.: Mounting the stem protection tube

3.2 Electrical connection

The components are designed as to ensure that once connected correctly, uninsulated, live parts cannot be touched directly; i.e. protection against electric shock is provided in accordance with IP2X or IPXXB.



Dangerous voltages are also applied when the motor is at standstill. Before opening the terminal cover or the connection hood, disconnect the supply voltage from the actuator. Allow **at least 1 minute** for the capacitors to discharge and do not touch any contacts.



- The supply voltage must always lie within the voltage range specified on the name plate.
- For short-circuit protection and for disconnecting the actuator from the mains, fuses and disconnect switches have to be provided by the customer.
- **Mains cable:** Use metal cable glands for mains connection.
- **Signal cable:** Use metal cable glands with cable shielding for the connection of the signal cable to avoid the occurrence of electronic faults. The signal cable must be shielded and the shield must be fixed or grounded on both sides. Ensure careful connection of the screen within the cable gland!
- It must be ensured that the **cable glands and seals** (O-rings) are fitted carefully and correctly in order to guarantee the enclosure protection. For details of the permissible conductor cross-sections, see wiring diagram.
- Cable glands and cables are not included in the scope of delivery.

3.2.1 Connection with round plug

1. Unscrew connection hood (fig. item 2) with plug element (1).
2. Unscrew screw plugs from the required cable entries in the connection hood.
3. Unscrew plug element (1) from connection hood (2).
4. Screw in the cable gland (3) only slightly and insert the connecting cables (4).
5. Connect the connecting cables in accordance with the circuit diagram enclosed in the connection hood, connecting the earth lead to the provided terminal in the connection box.
6. Screw plug element (1) into the connection hood (2) and then fix connection hood.
7. Tighten cable glands (3).

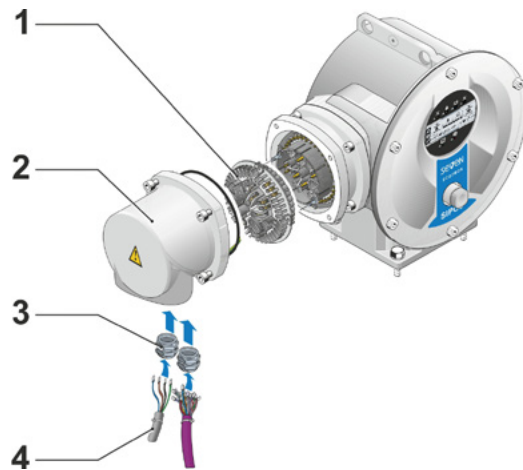


Fig.: Connection with round plug

3.2.2 Fieldbus connection

1. Dismantle fieldbus connection housing (fig. item 2) and connection cover (4).
2. Unscrew plug element (1) from fieldbus connection housing (2).
3. Unscrew screw plugs from the required cable glands in the fieldbus connection housing.
4. Screw in the cable glands (5) only slightly and insert the connecting cables (6).
For fieldbus cables, cable glands without shield are sufficient, refer to point 7 below.
5. Connect the mains cables and, if required, signal cables in accordance with the circuit diagram enclosed in the connection housing, connecting the earth lead conductor to the provided terminal in the connection box.
6. Fit plug element (1) into fieldbus connection housing (2) again.
7. Connect fieldbus connecting cables to the bus termination PCB (3). Lead shielding (7) under metal clamp (8).
8. Fit connection cover (4) and fieldbus connection housing (2) again.
9. Tighten cable glands (5).

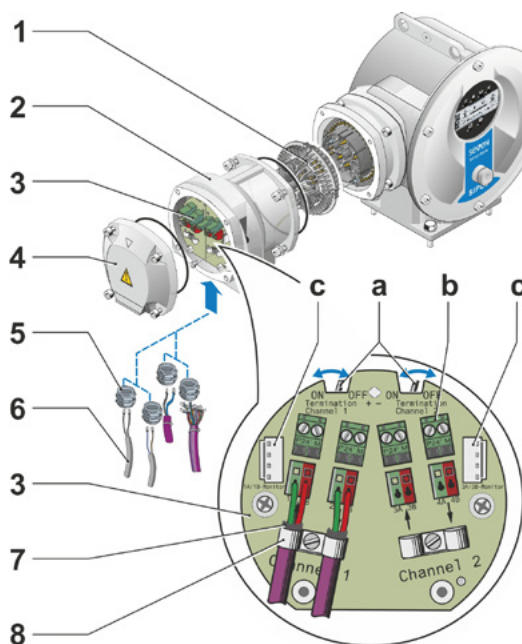


Fig.: Fieldbus connection

- a** = If the actuator is the last device of the bus segment, the termination resistor must be set to ON or a termination must be done externally.
- b** = Connection for external 24 V power supply. Enables communication even if the mains are disconnected.
- c** = Connection for PROFIBUS DP bus monitor (Protocol Analyzer).

3.2.3 External potential conductor connection

The external potential conductor connection can be used for functional grounding and not for protective grounding.

1. Remove plastic fastener (1) from the electronics housing.
2. Fit potential conductor (4) and gripping disc (5) (shims point in direction of the housing!) with M5 screw (2) and washer (3).

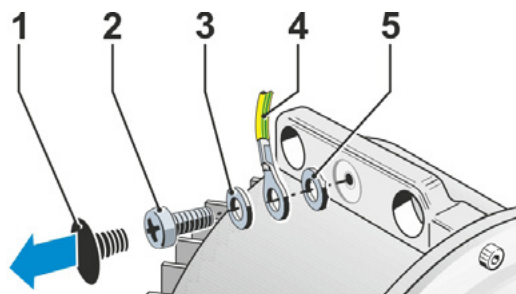


Fig.: Fit potential conductor

3.3 Separate mounting

If the ambient conditions such as extreme vibration, high temperature and/or if access is difficult, the electronics unit is to be mounted separately from the gear unit.

The assembly kit for mounting the gear unit and electronics unit separately can be ordered directly with the actuator or separately as an accessory (2SX7300-...). The assembly kit is pre-assembled. If the assembly kit is ordered directly with the actuator, it is included separately with the actuator.



Before starting the work, disconnect actuator from the mains!

Procedure

1. Install mounting bracket (fig. item 3) at the mounting location of the electronics unit.
2. Remove electronics housing (1) from the gear unit (6) and mount it on the mounting bracket (3) with the O-ring (2).
3. **Standard assembly, refer to A**
Fit "Separate mounting" assembly kit: Plug cover with contact pins (4) on lower side of wall bracket (3) and plug cover with contact sockets (5) on the gear unit (6).
4. **Assembly with stem protection tube, refer to B**
Turn connection hood by 90° or 180° to ensure that cables are not impaired by the stem protection tube:
Remove screws (7) from round plug, turn round plug by 90° to 180° and fix screws again. Continue as described in section 3.

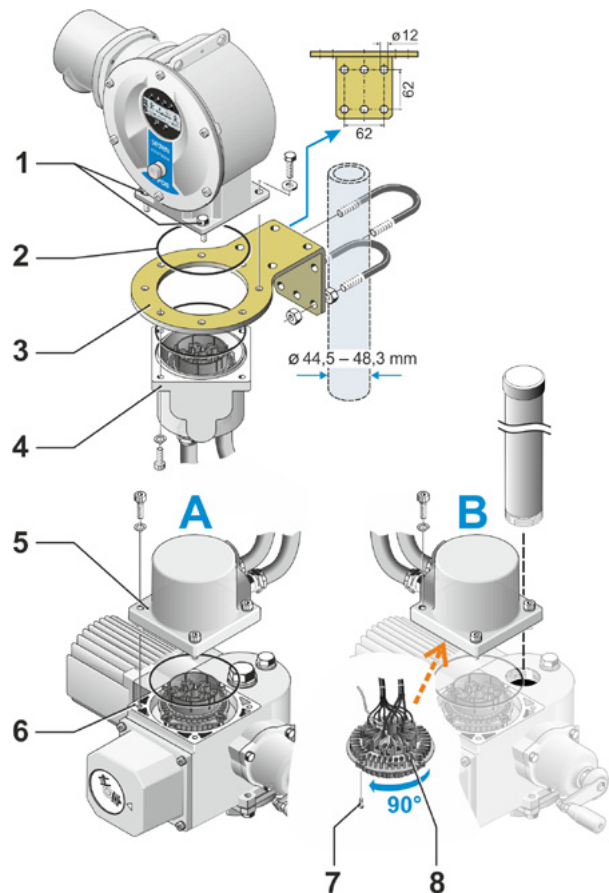


Fig.: Separate mounting
A = Standard,
B = with stem protection tube



- During installation, it is important to ensure that the O-rings are fitted correctly in order to guarantee the degree of protection.
- Generally, it has to be ensured that movable parts, e.g. those of the swing lever of the part-turn actuator, are not impaired by the cables.
- In exceptional cases, the motor might become very hot. Therefore the cables should not touch the motor.

Specification of the connecting cable between the electronics unit and the gear unit

Mains connection: shielded and UV resistant, e.g. TOPFLEX®-611-C-PUR-4G1,5/11,3 cable. TOPFLEX® is a trademark of HELUKABEL.

Control connection: Shielded and UV resistant, e.g. L IY11Y-7x2x0,5/11,4-S.

The connecting cables are available in different lengths:

- Standard lengths: 3 m; 5 m; 10 m,
- With additional equipment (filter) up to 150 m.
For separate mounting exceeding 10 m including filter, the value "Cable length exceeding 10 m and connection via LC filter" has to be activated for the "Separate mounting" parameter. Refer to COM-SIPOS tab "Other"

4

Instructions on operator control and operation



The COM-SIPOS PC programming software provides for comfortable programming and reading of the actuator data, refer to „4.8 COM-SIPOS PC programming software“ on page 24.

4.1 Crank handle, hand wheel



- Motor driven operation of the crank handle/hand wheel is not permitted.
- After commissioning, the actuator must not be operated beyond the parameterized end positions using the crank handle/hand wheel.
- When pressing in the crank handle/the hand wheel, make sure that the hand is removed between crank handle/ hand wheel and housing: Danger of crushing! See the following operation step 3.

The crank handle/handwheel does not rotate during motor operation

Operation

Operation of all actuators except for 2SQ7:

1. The actuator must be at standstill (1).
2. Remove the clamp (option) (2). The clamp is used as protection against accidental engaging of the crank handle/hand wheel, if the actuator is exposed to heavy vibration or water pressure (enclosure protection IP68-8).
3. Press crank handle/hand wheel in direction of the gear housing against spring force (3) and turn (4). (Caution: Danger of crushing when engaging!)

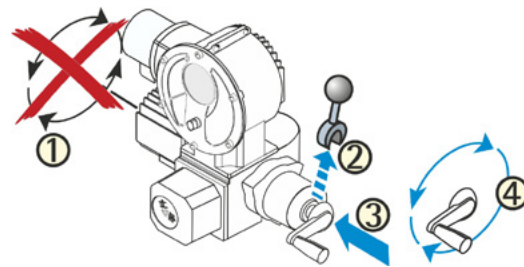


Fig.: Operate crank handle

If crank handle/hand wheel is pressed in, the motor stops. The actuator can only be operated electrically once the crank handle/hand wheel is released.



If the actuator is operated manually in "REMOTE" state and an operation command is present, the actuator is immediately operated after releasing the crank handle/hand wheel.

For 2SQ7 only:

Only engage manual drive while motor is at standstill. Manual operation is automatically disengaged when switching on the motor.

Direction of rotation

Clockwise turning of crank handle/hand wheel leads to

- 2SA7 rotary actuator: Clockwise rotation of the output drive shaft (exception: 2SA7.7. and 2SA7.8.)
- 2SQ7 part-turn actuator: With view on the mechanical position indicator: clockwise rotation at the coupling or at the swing lever.

Depending on the potentially installed gear unit, the direction of rotation may vary.

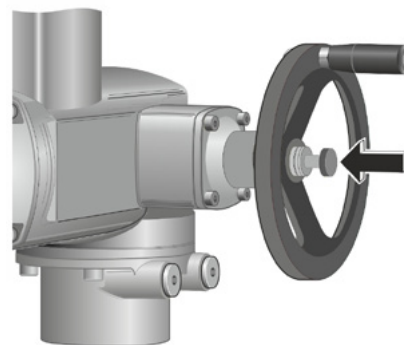


Fig.: Engage manual operation for 2SQ7

4.2 Light emitting diodes (status and fault signals)

The actuator informs the user via

- Light emitting diodes (LEDs)
- Display (refer to chapter „4.3 Display“ on page 19).

This chapter contains an overview of light emitting diodes and the information they provide for the user.

4.2.1 Overview of light emitting diodes

The LEDs indicate the state of the actuator:

1. Light emitting diode  (CLOSE, yellow).
The CLOSE LED is flashing if the actuator moves in CLOSE direction and is continuously illuminated if the actuator is in end position CLOSED.
2. Light emitting diode  (LOCAL, yellow).
The LOCAL LED is illuminated if "local operation" is selected.
3. Light emitting diode  (REMOTE, blue).
The LOCAL LED is illuminated if "REMOTE mode" is selected.
4. Light emitting diode  (OPEN, green).
The OPEN LED is flashing if the actuator moves in CLOSE direction and is continuously illuminated if the actuator is in end position OPEN.
5. LED  (red) indicates a fault signal during operation, refer to "Status and fault signals" overview below. During end position adjustment, it will be illuminated until the end position adjustment is OK.
6. LED  (green) is illuminated if the actuator is ready for operation. During end position adjustment and when the crank handle/hand wheel is operated as well as during faults of the change over from REMOTE to LOCAL, the green LED will be flashing. Refer also to "Status and fault signals" overview below.

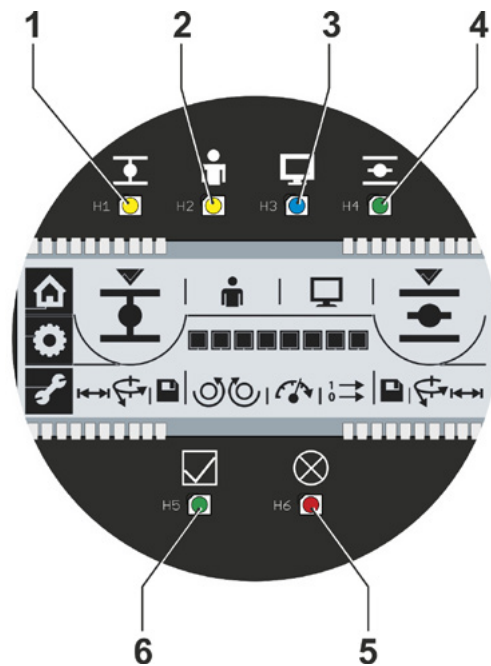


Fig.: LEDs

4.2.2 Indication of control, operation direction, end position

When illuminated or by flashing, the light emitting diodes (LEDs) indicate

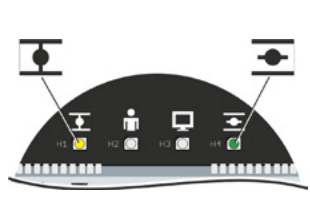
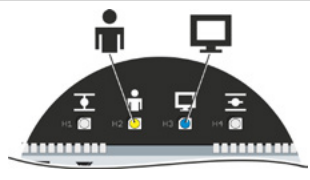
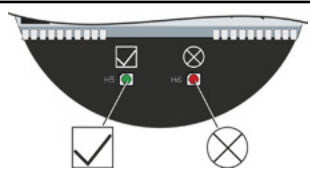
- the control type: LOCAL mode or REMOTE mode,
- the direction (OPEN or CLOSE) during operation,
- the end position if the actuator is in one of the end positions (OPEN or CLOSED).

The states of the LEDs (off – illuminated – flashing) are represented in the operation instructions as follows:

 LED is not illuminated (off)

 LED is illuminated

 LED is flashing

Arrangement of the LEDs	State of the LEDs		Explanation
	 (yellow)	 (green)	Both LEDs are not illuminated: Actuator is at standstill and in mid-travel.
			The CLOSE LED is flashing: The actuator operates in CLOSE direction.
			The OPEN LED is flashing: The actuator operates in OPEN direction.
			The CLOSE LED is illuminated: The actuator is in end position CLOSED.
			The OPEN LED is illuminated: The actuator is in end position OPEN.
	 (yellow)	 (blue)	
			The actuator is in "LOCAL mode".
			
			The actuator is in "REMOTE mode".
	 (green)	 (red)	The LEDs indicate: "Ready" or "Fault" and the states during commissioning. Refer to "Status and fault signals" chapter below.

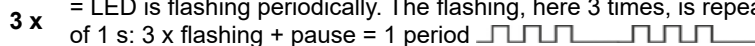
4.2.3 Status and fault signals

LEDs "Ready" (fig. item A) and the "Fault" (Pos. B) indicate the device state and the signals during faults. This enables an analysis of the faults. Some of the "Fault signals" can be reset, refer to right column "Fault type" in the following table.

The symbols have the following meaning:

- S – automatically resetting fault signals
Once the cause of the fault is eliminated, the fault signal is automatically reset.
- N – Non-resettable fault signals.
The cause of the fault must be eliminated.

The table below lists possible states of the "Ready" and "Fault" LEDs and the respective significations as well as corrective actions. The states of the LEDs (off – illuminated – flashing) are represented in the operation instructions as follows:

-  = LED is not illuminated (off)
-  = LED is illuminated
-  = LED is continuously flashing 
-  **3 x** = LED is flashing periodically. The flashing, here 3 times, is repeated after a pause of 1 s: 3 x flashing + pause = 1 period 

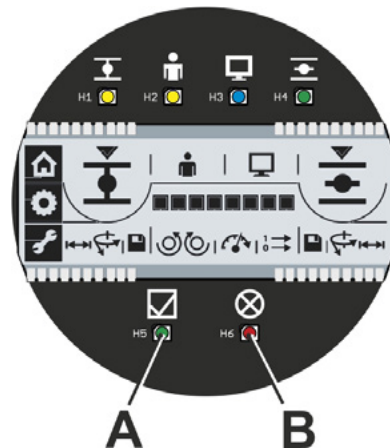
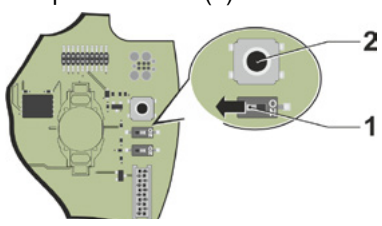


Fig.: A = LED "Ready" and
B = LED "Fault"

LED		Signification	Corrective actions	Fault type
 (green)	 (red)			
		The actuator is ready for operation.		
		Fault: commissioning is invalid	Perform commissioning. Refer to „5 Commissioning“ on page 25.	N
		Fault: Motor temperature too high	■ Check valve for sluggishness. ■ Reduce number of starts. ■ Ambient temperature impermissibly high ■ Check "Separate mounting" parameter using COM-SIPOS.	S
		Fault: Mains failure or excessive mains voltage fluctuations.	Check supply voltages.	S
		Fault: Open-circuit behavior of ■ Travel position recording or temperature sensor; ■ feed cables from REMOTE.	■ Check cables for separate installation. ■ Check cables (fieldbus, if applicable)	S
		Fault: Travel is blocked, i.e. tripping torque reached within travel. Actuator can still be operated into the opposite direction (leaving the block)	■ Check valve for sluggishness. ■ Increase torque values. ■ Check "Separate mounting" parameter using COM-SIPOS.	S

LED		Signification	Corrective actions	Fault type
 (green)	 (red)			
	 6x	Fault: ■ End positions were passed ■ Fault during runtime monitoring	■ Recommissioning. ■ Check signaling gear and travel potentiometer. ■ Check valve for sluggishness. ■ Increase torque values. ■ Check "Separate mounting" parameter using COM-SIPOS.	N
		Fault: Device failure.	Service, repair necessary.	
		Actuator does neither respond to remote control nor to Drive Controller.	Slide BOOT switch (1) on control PCB and press RESET (2). 	
 1x		Commissioning (IBS) active: End position adjustment OK	---	---
 1x		Commissioning active: End position adjustment <u>not</u> OK	Perform commissioning.	N
 1x	 2x	Commissioning active: Commissioning not possible.	Abort commissioning and evaluate flash pattern.	N
 2x		Crank handle/hand wheel operated.	■ Release crank handle/hand wheel. ■ Check cables for separate installation.	S
 2x		Commissioning active: Crank handle/hand wheel operated during commissioning.	Release crank handle/hand wheel.	S
 3x		Commissioning active: Commissioning via USB or fieldbus active, i.e. on-site commissioning and operation via local control unit not possible.,	---	---
 4x		Change-over from REMOTE to LOCAL blocked.	Enable via fieldbus.	S

4.3 Display

The graphic segment display utilizes different symbols to indicate the actuator state during operation, commissioning and parameterization. Clear representation and unambiguous symbols enable simple operation. The Drive Controller (rotary push button) enables operation directly at the actuator.

This chapter provides an overview of symbols in the display and the information they provide for the user. Once acquainted with the signification of the symbols, actuator operation is quick and easy.

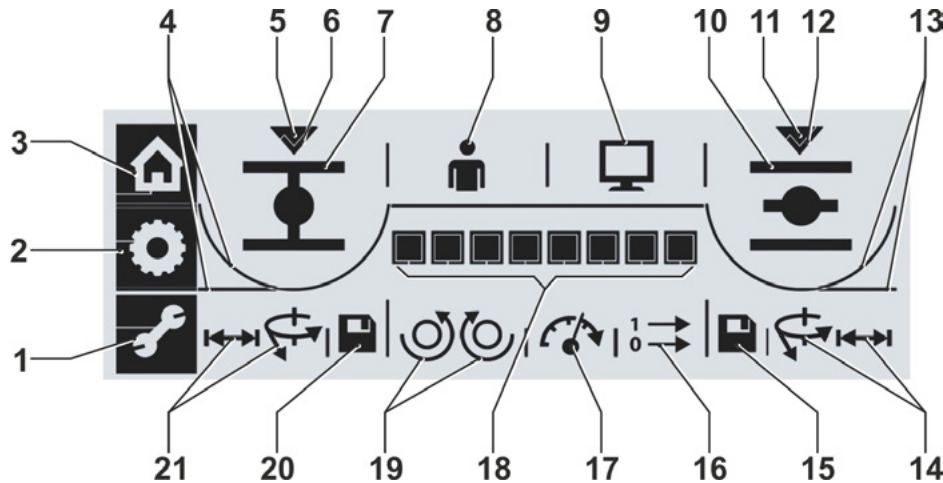


Fig.: Segment display

Item	Description on page ▼	Item	Description on page ▼
1	Parameterization menu 28	14	Setting of the cut-off mode in end position OPEN: 37
2	End position adjustment menu 37		Travel dependent cut-off mode or 37
3	Local operation menu 22		Torque dependent cut-off mode 37
4	Indicates the cut-off mode in CLOSE direction: — Travel dependent or 38 — Torque dependent 38	15	Save settings for end position OPEN 37
5	Indicates that end position CLOSED is selected 37	16	Output signal set for binary outputs and control mode 31
6	Tick confirms correct end position adjustment 37	17	Speed 30
7	Symbol for end position CLOSED 37	18	Scale shows ■ depending on the preselected function; the setting for – tripping torque 28 – output speed 30 – output signal set 31 – control mode 32 ■ the position during travel 21
8	LOCAL mode 22	19	Closing direction adjustment: clockwise or 37 counterclockwise 37
9	REMOTE mode 22	20	Save settings for end position CLOSED 37
10	Symbol for end position OPEN 37	21	Setting of the cut-off mode in end position CLOSED: Torque dependent cut-off mode 28 Travel dependent cut-off mode 37
11	Indicates that end position OPEN is selected 37		
12	Tick confirms correct end position adjustment 37		
13	Indicates the cut-off mode in OPEN direction: — Torque dependent or 37 — Travel dependent 37		

4.4 Navigation in the display

4.4.1 Operation of the "Drive Controller" rotary push button.

 = Turn Drive Controller:
Select menu item,
end position, setting

 = Press Drive Controller:
Confirm selection.

If the Drive Controller is not operated for more than 10 minutes, the display illumination changes to standby mode. Hold down Drive Controller for 2 s or turn by 3 latching positions to reactivate display.

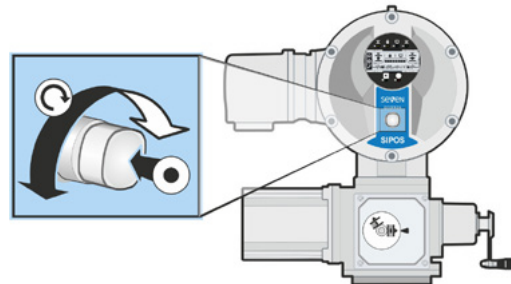


Fig.: Operate the Drive Controller

4.4.2 Navigation through the menus

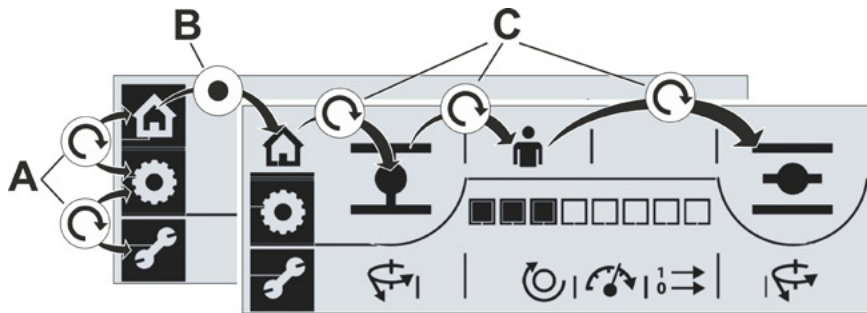


Fig.: Navigation in the display

A = Turn Drive Controller:
Selection between menus.
Selected menu is flashing.

B = Press Drive Controller:
Confirm selected menu. Actuator
changes to selected menu and
the menu symbol is no longer
presented inversely.

C = Turn Drive Controller:
Change between menu
items within a menu.

4.5 Menu structure

The display provides three menus:

- 1 Local operation
- 2 End positions
- 3 Parameter

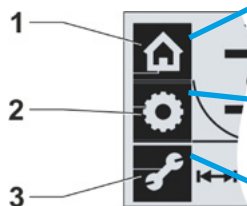
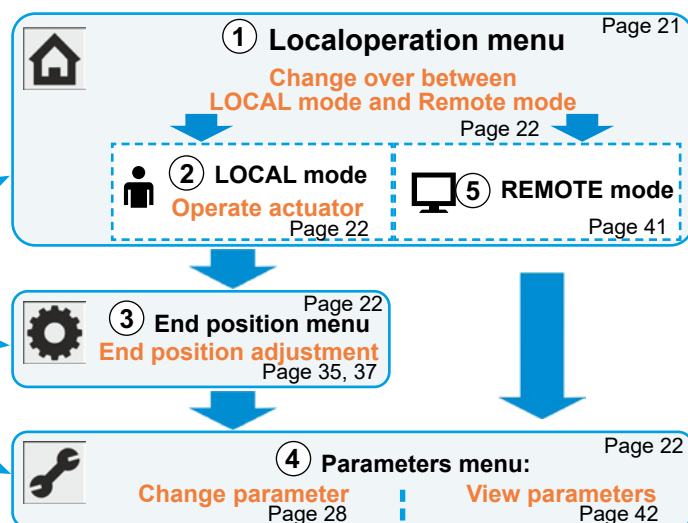


Fig.: Menus



The overview shows the menu structure. The encircled digits refer to the explanation below, the page numbers to the detailed description.

Explanation

- ① Use the 'Local operation' menu to change over between 'LOCAL mode' and 'REMOTE mode'.
- ② The actuator can be operated manually in local operation.
- ③ The 'End position' menu is used to set the closing direction, end positions OPEN and CLOSED and the respective cut-off mode.
- ④ If the 'Parameter' menu is selected in 'LOCAL mode', the parameter values can be modified.
- ⑤ If the 'Parameter' menu is selected in 'REMOTE mode', the set parameter values may be viewed but cannot be modified.

4.6 Menu overview

The following descriptions show the display indications and functions available for the individual menus.

4.6.1 Local operation menu

- 1 'Local operation' menu is active.
- 2 Cut-off mode in end position CLOSED is travel dependent (straight line),
or
- 3 Cut-off mode in end position CLOSED is torque dependent (bent line),
- 4 CLOSE symbol for selection of CLOSE direction into which the actuator is operated.
- 5 Control performed locally (LOCAL mode),
or
- 6 Control performed by DCS/control room (REMOTE mode).
- 7 OPEN symbol for selection of OPEN direction into which the actuator is operated.
- 8 Cut-off mode in end position OPEN is travel dependent (straight line),
or
- 9 Cut-off mode in end position OPEN is torque dependent (bent line),
- 10 Position indicator; the black rectangles (segments) indicate how far the actuator has moved in position OPEN. Each segment corresponds to approx. 11 % of the entire travel. Refer to figure 2 on the right
Example:
■■■■□□□□ = position OPEN 44.3 – 55.5 %.
If there is no segment active, the actuator is between CLOSED and 11 % OPEN.

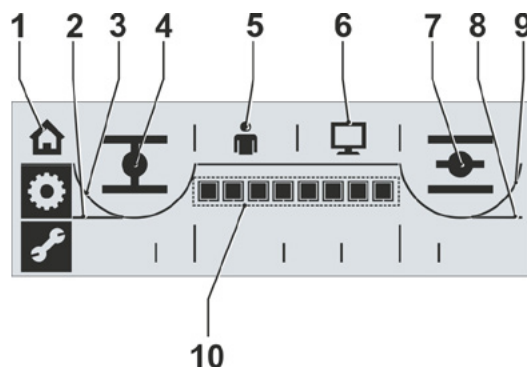


Fig. 1: Local operation menu overview

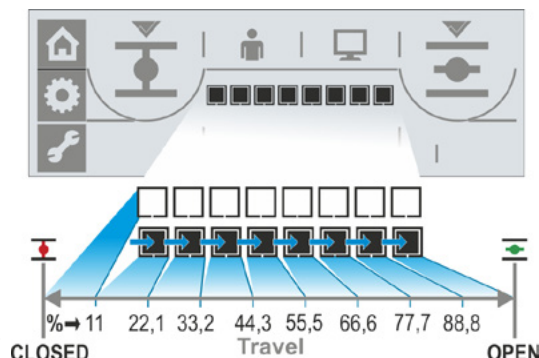


Fig. 2: Position indicator

4.6.2 End position menu

- 1 'End position' menu is active.
- 2 Indicates that end position CLOSED is selected.
- 3 Cut-off mode in end position CLOSED:
a = travel dependent;
b = torque dependent
- 4 Save position for end position CLOSED.
- 5 Tick indicates that end position CLOSED has been correctly saved.
- 6 Closing direction
a = counterclockwise;
b = clockwise.
- 7 Tick indicates that end position OPEN has been correctly saved.
- 8 Save position for end position OPEN.
- 9 Cut-off mode in end position OPEN:
a = torque dependent;
b = travel dependent
- 10 Indicates that end position OPEN is selected.

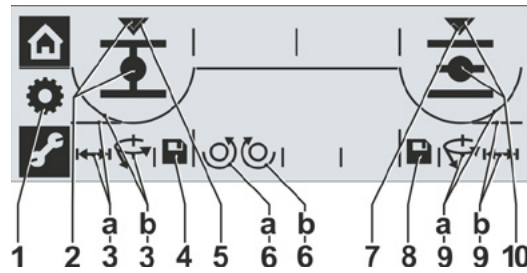


Fig.: End position menu overview

4.6.3 Parameter menu

- 1 'Parameter' menu is active.
- 2 Tripping torque in CLOSE direction,
- 3 Scale; indicates the setting of the respective parameters.
- 4 Speed.
- 5 Output signal set selection for signaling outputs and control modes.
- 6 Tripping torque in OPEN direction.

If the 'Parameter' menu is accessed in "REMOTE" mode, the parameter values may only be viewed.

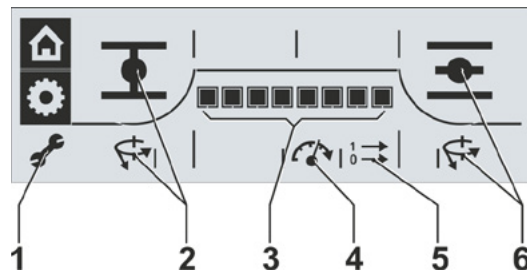


Fig.: Parameter menu overview

4.7 'Local' actuator operation

The actuator can only be operated for valid end position setting! For local actuator operation, 'LOCAL mode' must be active and the 'Local operation' menu selected. The menu can be accessed from "REMOTE mode" or one of the two other menus.

Change from 'REMOTE mode' to 'LOCAL mode' and operate the actuator.

The actuator is in the "REMOTE mode" state. REMOTE LED is illuminated and the symbol for REMOTE mode  is indicated (fig. 1).

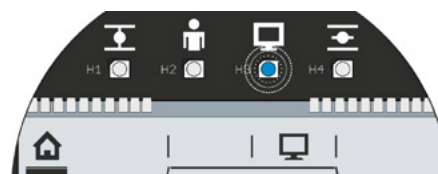


Fig. 1: Display indicates REMOTE mode active

1. Select LOCAL mode: Turn Drive Controller counterclockwise.
'LOCAL mode' symbol  appears and is flashing (fig. 2).
2. Confirm selection: Press Drive Controller. LOCAL mode is active, the symbol for LOCAL mode is continuously displayed and the yellow Local LED is illuminated. The symbol for REMOTE mode and the REMOTE LED are not illuminated (fig. 3).
3. Select operation direction:
 - CLOSE > Turn Drive Controller counterclockwise, until CLOSED symbol is displayed.
 - OPEN > Turn Drive Controller clockwise until OPEN symbol is displayed.
4. Operate actuator: Press Drive Controller. The actuator is operated in direction of the selected end position¹ and the position indicator is changing accordingly, see also previous chapter 4.6.1.

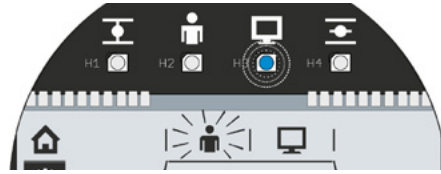


Fig. 2: Change over to local operation mode is selected

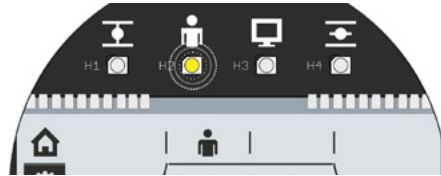


Fig. 3: Local operation mode is active



If you hold down the Drive Controller for more than 3 sec., self-retaining starts. Pressing the Drive Controller once again will stop the actuator.

Changing from one of the menus to the 'Local operation' menu.

1. Complete end position adjustment or parameterization and select 'Local operation' (house symbol).
The house symbol is flashing inversely (fig. 4).
2. Confirm selection. Press Drive Controller. The symbol is flashing normally (fig. 5) and the local operation menu is active.
3. Continue as described above from step 4.

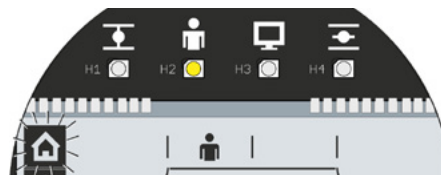


Fig. 4: Local operation menu selected

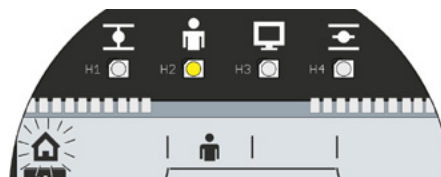


Fig. 5: Local operation menu active

¹ If the actuator has switched off automatically before reaching the end position, two causes are possible:

- Sluggish final closing element or unfavorable torque curve. In this case, cancel procedure or
- Valve has reached mechanical stop, in this case readjust end positions (chapter 5)

4.8 COM-SIPOS PC programming software

The COM-SIPOS PC parameterization program is a software tool for

- Observe: Reading the actuator parameters and the device state;
- Diagnosis: Trouble shooting;
- Loading new firmware: Software update to the state-of-the-art;
- Archiving: Saving of the actuator parameters on a PC/laptop;
- Operation: Operation of the actuator in LOCAL mode;
- Parameterization: Settings which can be changed in LOCAL mode in the display can also be changed using COM-SIPOS. Furthermore, the following control types can be set for REMOTE mode:
 - Binary: Pulse contact
 - Fieldbus: Permanent contact
 - Binary: Permanent contact
- For further settings via COM-SIPOS, refer to chapter „5.4 Further settings via COM-SIPOS“ on page 32.

The connection between computer and actuator is established via a USB cable A/B. The USB port is located on the control PCB, refer to fig. item 1.

COM-SIPOS is available incl. USB cable and user manual (on flash drive); order number: **2SX7100-3PC02**.



When disassembling the electronics cover, make sure the insert does not fall down.

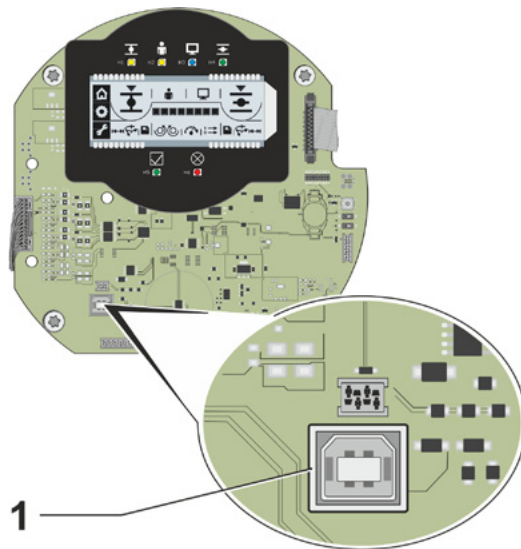


Fig.: USB connection on control PCB

5 Commissioning

5.1 General information

5.1.1 Observe the following notes



- Before performing any work on the installed actuator, check with the plant personnel in charge that the commissioning may not cause any fault of the plant or hazards to persons.
- If a cut-off mode is selected that is not appropriate for the valve, the valve may be damaged!
- There are hazardous voltage levels within the actuator.
- When changing to 'REMOTE' mode, the actuator moves once an operation command from the DCS is present!



It is recommended that the services and support of the responsible SIPOS Aktorik service centers are utilized for all planning, installation, commissioning and service tasks.

5.1.2 Ensuring prerequisites for commissioning

Check and ensure the following points after assembly or during revision and inspection:

- The actuator is correctly assembled.
- All fixing screws and connecting elements are firmly tightened.
- The grounding and equipotential bonding has been correctly implemented.
- The electrical connections have been correctly implemented.
- All protection against accidental contact has been implemented for moving or live parts.
- Neither the actuator nor the valve is damaged.
- The permitted temperature range for the actuator is maintained and heat dissipation from the final control element is also taken into account.

Further checks are also necessary in accordance with the plant-specific conditions.

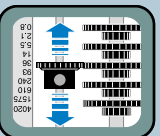
5.2 Procedure for commissioning

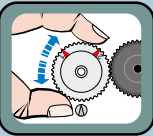
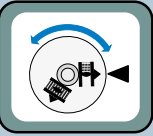
Commissioning is divided into 4 main steps:

1. Change actuator to LOCAL mode
2. Check/set parameters
3. For version with signaling gear: Check/adjust signaling gear ratio.
4. Adjust end positions including closing direction and cut-off mode

The following overview shows the individual steps of commissioning.

The numbering of the pages indicate the detailed description.

Action	Explanation	For a description, refer to:
Switch actuator to LOCAL mode		
	Change to 'Local operation' menu and	
select local operation. 	Select local operation	Page 22
Check/set valve parameters		
	Change to 'Parameter' menu	Page 28
Program tripping torque 	■ Program in end position CLOSED and end position OPEN. ■ For 2SQ7, set at torque switch mechanism	Page 28 Supp. instr. Page 5
Program speed or positioning time 	Check/program speed or positioning time.	Page 30
Select output signal set and control mode 	■ Select one of the 4 output signal sets and determine the assignment at the 5 signal outputs. (Determine predefined signals). ■ Select control mode: – binary: pulse contact – binary: permanent contact – fieldbus: permanent contact	Page 31 Page 32
For version with signaling gear: Adjust signaling gear ratio		
Adjust signaling gear 	Check/adjust signaling gear ratio.	Page 36
Adjust end positions including closing direction and cut-off mode		
	Change to 'End position' menu	Page 37
Select closing direction 	Check/adjust closing direction: counterclockwise or clockwise Cannot be selected for 2SQ7.	Page 38
Select first end position 	Select symbol for end position OPEN or CLOSED. (In our example end position OPEN. It is not relevant which end position is set first.)	Page 38
Cut-off mode 1. Program end position 	Check/program cut-off mode in the first end position; travel-dependent or torque dependent.	Page 38

Action	Explanation	For a description, refer to:
Turn central wheel to mid position 	Signaling gear only: Turn central wheel so that arrows 1 and 2 point in upward direction.	Page 38
Approach position of first end position 	Approach position of first end position (here end position OPEN).	
Adjust central wheel 	Signaling gear only: Turn central wheel until arrow points downward and the save symbol appears in the display.	Page 39
Save position of first end position 	Turn Drive Controller until Save symbol starts to flash. Press Drive Controller.	
Adjust position indicator 	If mechanical position indicator is available, check/adjust position OPEN.	Page 40
Cut-off mode 2. Program end position 	Check/program cut-off mode in the second end position; travel-dependent or torque dependent.	Page 39
Approach position of second end position. 	Move actuator to second end position (Here end position CLOSED).	
Save position of second end position 	Select Save symbol and acknowledge.	
Adjust position indicator 	If mechanical position indicator is available, check/adjust position CLOSED.	Page 40
Change over to REMOTE control 	Change to REMOTE mode in the 'Local operation' menu.	Page 22



You do not have to perform all settings. Depending on whether settings have already been specified when ordering the actuator or whether the actuator was delivered mounted to the valve, checking the settings will be sufficient.

5.3 Check/set parameters

Parameters 'Cut-off torque CLOSE', 'Cut-off torque OPEN', 'Speed', and 'Signal set' are set/programmed via the 'Parameter' menu. The sequence of the programming steps is not binding. In the following descriptions, the sequence complies with the indication in the display.

5.3.1 Access to the Parameter menu

1. Change to the 'LOCAL mode' state:
 - a. Select symbol : Turn Drive Controller.
 - b. Confirm selection: Press Drive Controller.
2. Select symbol for 'Local operation'  Turn Drive Controller.
The symbol is blinking.
3. Confirm selection: Press Drive Controller.
The 'Local operation' symbol is blinking inversely.
4. Select 'Parameter' menu:
Turn Drive Controller until wrench symbols starts to flash inversely (fig. 1).
5. Confirm selection: Press Drive Controller.
The actuator is in the 'Parameter' menu, the wrench symbol is continuously illuminated and the symbol for the first parameter is blinking, here torque in end position CLOSED (fig. 2).

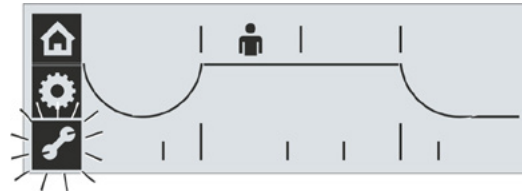


Fig. 1: Select Parameter menu

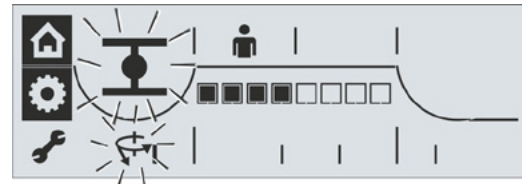


Fig. 2: Parameter menu active

Now the individual parameters can be selected (turn Drive Controller).

Select and confirm wrench symbol to quit the 'Parameter' menu.

5.3.2 Adjust tripping torques



For 2SQ7 actuators, the tripping torque can be set at the torque switching mechanism, refer to supplement to operations instructions Y070.449.

Tripping torque

The setting determines the torque to be achieved in relation to the load, to cause the motor to trip. This applies to torque-dependent tripping in the end position as well as to a block. Therefore, the tripping torque also has to be adjusted for travel-dependent cut-off mode.

The tripping torque of an actuator is based on the sizing, defined by the application. The tripping torque range of the actuator is listed on the name plate.

For

- actuators of duty classes A (OPEN-CLOSE duty) and B (inching/positioning duty) between 30 – 100 % and for
- actuators of duty class C (modulation duty) between 50 – 100 %,

the tripping torque can be set in steps of 10% of the max. torque. Default setting is the lowest possible value (typically 30 % of the maximum value for classes A and B, and 50 % of the maximum value for class C).

The following table shows the possible setting values.



■ If a cut-off mode is selected that is not appropriate for the valve, the valve may be damaged!

Tripping torques								
Tripping range [Nm]	Possible values for setting in Nm of M_{dmax}							
	30 %	40 %	50 %	60 %	70 %	80 %	90 %	100 %
Indication in the display ▶	■□□□□□□	■□□□□□□	■□□□□□□	■□□□□□□	■□□□□□□	■□□□□□□	■□□□□□□	■□□□□□□
Classes A and B (type of duty in compliance with EN 15714-2) – 2SA70.../2SA73...								
9 – 30	9	12	15	18	21	24	27	30
18 – 60	18	24	30	36	42	48	54	60
37 – 125	37	50	62	75	87	100	112	125
75 – 250	75	100	125	150	175	200	225	250
150 – 500	150	200	250	300	350	400	450	500
300 – 1,000	300	400	500	600	700	800	900	1,000
600 – 2,000	600	800	1,000	1200	1400	1600	1800	2000
1200 – 4,000	1200	1600	2000	2400	2800	3200	3600	4000
▲ 30 % are set as standard								
Class C (type of duty in compliance with European Standard EN 15714-2) – 2SA75...								
10 – 20			10	12	14	16	18	20
20 – 40			20	24	28	32	36	40
40 – 80			40	48	56	64	72	80
87 – 175			87	105	122	140	157	175
175 – 350			175	210	245	280	315	350
350 – 700			350	420	490	560	630	700
700 – 1,400			700	840	980	1120	1260	1400
1400 – 2,800			1400	1680	1960	2240	2520	2800
▲ 50 % are set as standard								

Operation sequence

1. Call up 'Parameter' menu; the wrench symbol  is blinking. Refer also to „5.3.1 Access to the Parameter menu“ on page 28.
2. Confirm; press Drive Controller.
The symbol for tripping torque (1) in end position CLOSED (2), both blinking, as well as the scale (4) with the setting range between 30 % and 100 % will be displayed. The segments (black triangles) (3) indicate the current setting, one segment represents a step of 10 %. The illustration on the right indicates that the adjusted tripping torque amounts to 60 % of the maximum torque.
3. To change the indicated setting, press the Drive Controller.
The symbols for tripping torque and end position CLOSED are continuously illuminated and the black segments of the scale are blinking.
4. Turn Drive Controller, to change the setting (for actuator classes A and B: 30 % – 100 %; for actuator class C: 50 % – 100 %).
For the setting values per level, refer to the table above.
The scale (fig. 2, item 1) indicates the modification.
5. Press Drive Controller; the changed setting is accepted and the symbols for end position CLOSED and tripping torque will be flashing again.

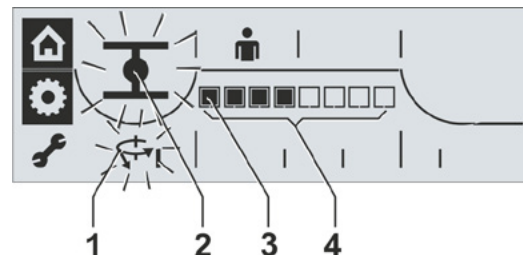


Fig. 1: Set tripping torque in end position CLOSED

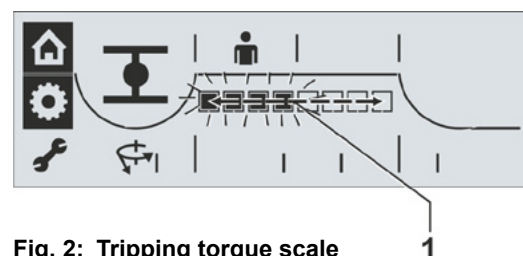


Fig. 2: Tripping torque scale

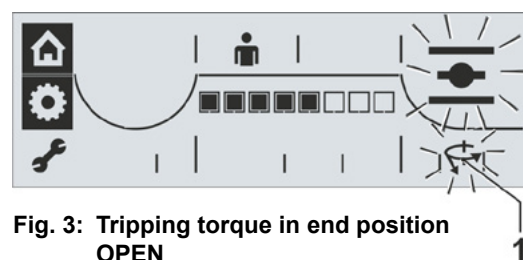


Fig. 3: Tripping torque in end position OPEN

Proceed accordingly to set tripping torque in end position OPEN. Select the symbol for tripping torque in end position OPEN (fig. 3, item 1) and continue from step 3 as described above.

5.3.3 Adjust speeds/positioning times

Adjust the speed/positioning time to define the speed at which the actuator is operated. Depending on the actuator type, different values can be set for speed/positioning time, refer to table below (actuator type and the adjustable speed range is also indicated on the name plate). New actuators are set in the factory. Unless requested otherwise by the customer, the default parameter for CLOSE and OPEN directions is level 4 of the 7-level setting range (step-up factor: 1.4).

If the current values are to be retained, continue with chapter „5.3.4 Select output signal set“ on page 31.

Speed ranges	Possible values for speed [rpm]						
Indication in the display ►	■□□□□□□	■□□□□□□	■□□□□□□	■□□□□□□	■□□□□□□	■□□□□□□	■□□□□□□
1,25 – 10	1.25	1.75	2.5	3.5	5	7	10
2,5 – 20	2.5	3.5	5	7	10	14	20
5 – 28	5	7	10	14	20	28	---
5 – 40	5	7	10	14	20	28	40
10 – 80	10	14	20	28	40	56	80
20 – 112	20	28	40	56	80	112	---
20 – 160	20	28	40	56	80	112	160
Positioning time for part-turn actuator 2SQ7							
Positioning time range	Possible values for positioning time [s/90°]						
80 – 10	80	56	40	28	20	14	10

▲
Level 4 is set as standard.

Operation sequence

The actuator is in the 'Parameter' menu.

1. Turn Drive Controller until symbol for speed is blinking (fig. 1, item 2).
The black segment in the scale, fig. 1, item 1, indicates the currently set speed/positioning time level, see also table above.
2. Press Drive Controller.
The black segments in the scale are blinking (fig. 2).
3. Turn Drive Controller and selected desired speed/positioning time level.
The scale indicates the selected level (fig. 2, item 1).
4. Press Drive Controller.
The parameter value of the selected level is accepted and the speed symbol is blinking.

Now, one of the 4 output signal sets can be selected. Turn Drive Controller until the symbol for signal set is indicated.

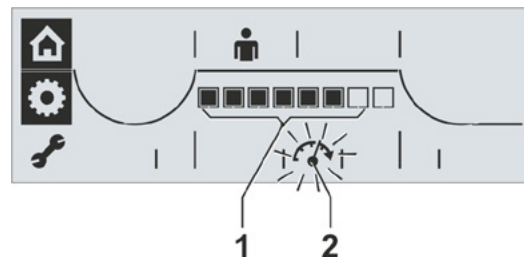


Fig. 1: Speed/positioning time level

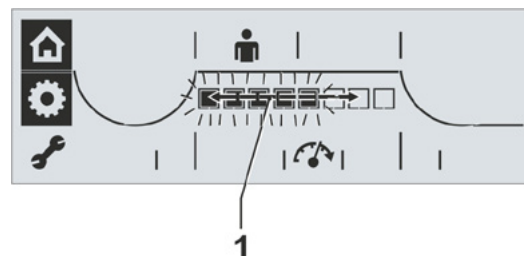
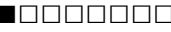
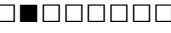
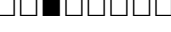


Fig. 2: Change speed/positioning time level

5.3.4 Select output signal set

You may define which output signals are present at the 5 signal outputs. You may choose between 4 output signal sets (consisting of predefined output signals for each of the 5 signaling outputs).

Output signal sets Indications on display	Signaling outputs	Level*	Signal	Explanation
Set 1 (default setting) 	1	H	a Travel OPEN	a Travel OPEN: For travel-dependent cut-off in position 100 % OPEN; for torque-dependent cut-off in position ≥ 98 % OPEN. b Travel CLOSE: For travel-dependent cut-off in position 0 % ; for torque-dependent cut-off in position ≤ 2 % OPEN. c Torque OPEN/CLOSED reached: For torque-dependent cut-off within end position range OPEN or CLOSED. d Ready + REMOTE If the actuator can be operated from REMOTE. e Warning motor temp.: If the set motor warning temperature (default: 135 °C) has been reached. f, g End position OPEN, end position CLOSED: For travel-dependent cut-off in position 100 % OPEN/ 0 % OPEN. For torque-dependent cut-off, if tripping torque within end position range (≥ 98 % OPEN/ ≤ 2 % OPEN) is reached. h Blinker: 0.5 Hz-change between high/low level if the actuator is operated (low at standstill). j Fault: If a fault has occurred. k Local: Actuator is in position Local. l Torque OPEN reached: If tripping torque in OPEN direction is reached. m Torque CLOSE reached: If tripping torque in CLOSE direction is reached.
	2	H	b Travel CLOSE	
	3	L	c Torque OPEN/CLOSE reached	
	4	H	d Ready + REMOTE	
	5	L	e Warning motor temperature	
Set 2 	1	H	f End position OPEN	
	2	H	g End position CLOSED	
	3	H	h Blinker	
	4	H	d Ready + REMOTE	
	5	L	i Warning motor temperature	
Set 3 	1	H	f End position OPEN	
	2	H	g End position CLOSED	
	3	L	j Fault	
	4	H	k Local	
	5	L	i Warning motor temperature	
Set 4 	1	H	a Travel OPEN	
	2	H	b Travel CLOSE	
	3	H	d Ready + REMOTE	
	4	L	l Torque OPEN reached	
	5	L	m Torque CLOSE reached	
* H = active high: supply voltage binary output, L = active low: 0 V). Level active high or active low is set when reaching the status.				

Operation sequence

1. Turn Drive Controller in the 'Parameter' menu until symbol for output signal sets is blinking (fig. 1, item 2).
A black segment indicates the current set within the first four digits of the scale (item 1); in fig.1, set 4 is selected (see also table above).
2. Press Drive Controller.
The black segment, which indicates the adjusted output signal set, is flashing (fig. 2).
3. Turn Drive Controller and select desired signaling set (fig. 2, item 1).
The segment in the scale indicates the selected output signal set; the first position on the left stands for output signal set 1.
4. Press Drive Controller.
The parameter values of the selected output signal set are accepted and the black segment for the selected output signal set is continuously illuminated and the control mode options are available.
Refer to following section.

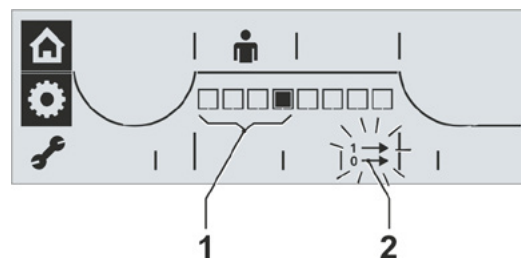


Fig. 1: Indication of output signal sets

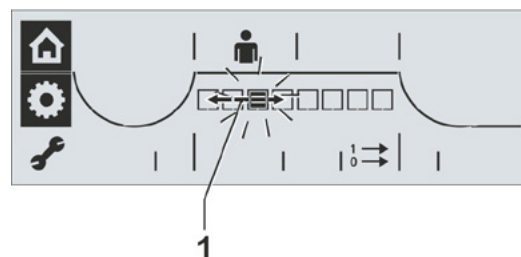


Fig. 2: Output signal set selection

5.3.5 Set control mode

After an output signal set has been selected, as a next step the setting of the control mode is enabled; in the display one, two or three segments will be flashing (see fig. 1, item 1).

Operation sequence

1. Turn Drive Controller until the segment(s) for desired control mode is/are flashing (see fig. 2):
 - a = Binary: Permanent contact (default setting)
 - b = Binary: Pulse contact,
 - c = Fieldbus: Permanent contact (only available with fieldbus hardware).
 2. Press Drive Controller.
- The selected control mode is accepted and the segment(s) for the selected control mode is/are continuously illuminated.

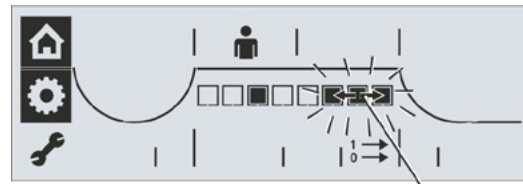


Fig. 1: Control mode indication

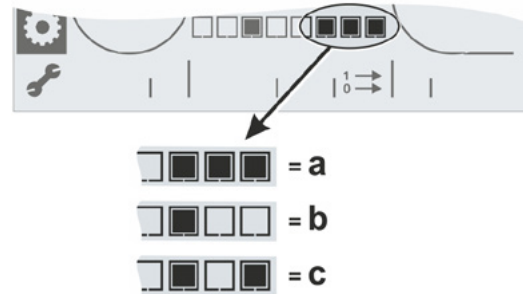


Fig. 2: Control mode selection

5.4 Further settings via COM-SIPOS

Other parameters can be set using the COM-SIPOS PC parameterization program. Some are described in the following. For further information refer to „4.8 COM-SIPOS PC programming software“ on page 24.

Retry torque block

If the actuator is blocked in move (block outside the end position range), the actuator is tripped and the red LED flashes periodically 5 times. The actuator is still "ready" since it can still be operated into the opposite direction.

If the value for the "retry torq.block" parameter is not equal to zero, the actuator is automatically operated into the opposite direction once a block has been detected and then again in the direction of the block. The partial stroke for this opposite movement will be corresponding to the setting of the end position range it was moving to, but not longer than 2 seconds. Then the movement reverses automatically back. This happens until the block has been overcome or the programmed number of tries has been reached.

Default setting is 0.

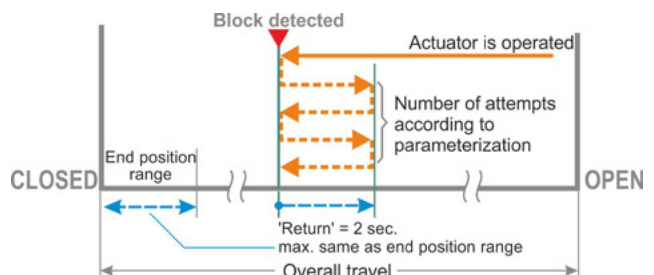


Fig.: Retry torque block

Motor temperature warning

A warning is issued once the motor temperature has reached a preset value.

A value between 0 and 155 °C can be set.

The warning signal can be provided via binary signal and fieldbus protocol.

Default value is 135 °C.

Motor heating

The motor heating can be switched on to prevent condensation. When the heater is activated, the motor can be heated with DC current. The heating up depends on the difference between motor temperature and ambient temperature.

The heater is switched off as standard.

If exposed to strong climatic fluctuations, the actuator should be operated with the motor heater switched on.



Motor protection

The motor is equipped with full electronic motor protection against thermal damage. The motor protection is activated in the factory.

End position range

Within the end position range, travel is at a low speed (positioning speed or long positioning time). In the event of torque dependent actuator tripping outside this range, a fault is detected („Status and fault signals“ on page 17).

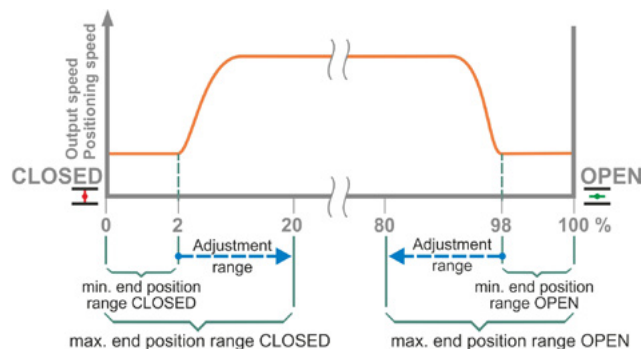


Fig.: End position ranges

5.4.1 DC link voltage limitation

During actuator standstill, high connection voltages (operating voltage above the voltage tolerance of up to +15 %) will increase the DC link voltage, which will be electronically limited to a permissible value.

Deactivating this function is only useful for very specific plant conditions and should only be performed after consulting SIPOS!

5.4.2 Runtime monitoring

As standard, SEVEN actuators are equipped with runtime monitoring. When running the actuator for the first time over a distance of at least 3 % of the entire travel after setting the end positions, the runtime is measured and stored in a non-volatile memory. The actual motor frequency or speed is taken into account during the measurements.

During future operation, it will be checked whether the position reached after the runtime is plausible. Tolerances due to different loads and measurement inaccuracies during position measurement are taken into account. If the expected position is not reached in time, the actuator changes over to the “fault” state and signals “runtime error”.

This internal monitoring can be deactivated, i.e. exceeding the runtime will not cause a fault signal. This can prove useful for special applications.

Runtime monitoring is activated on delivery.

5.4.3 End position speed

Within the end position ranges, the actuator operates at an end position speed defined for each device to change to the defined speed when leaving the end positions.

For extremely long total runtimes, it may be desired that the actuator changes as quickly as possible, even before leaving the end position range to the adjusted, typically high speed. It may, however, also be required that the actuator operates as long as possible at the defined speed when approaching the end position to be able to quickly stop in the end position.

Refer also to “End position range” on the previous page and chapter „Adjust speeds/positioning times“ on page 30.

Normal

for **travel** and **torque-dependent** cut-off mode, the actuator runs

- from the end position at the lowest speed, approx. 1 sec. (fig. 1: curve **a**), to change to the end position speed, refer to **b**;
- after the end position range with the set speed. This speed is usually higher than the end position speed (curve **c**). It can also be set lower, refer to curve **d**.
- to the end position with the "normal" end position speed (**e**).

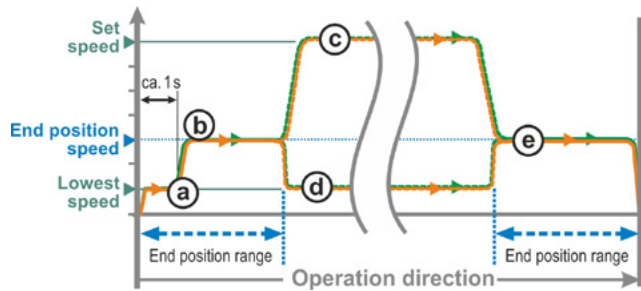


Fig. 1: End position speed 'Normal'

Quick start**Leaving the end position:**

- For **travel-dependent** cut-off, it will be immediately changed to the set speed to keep the runtime as short as possible. Refer to fig. 2, curve **a**.
- For **torque-dependent** cut-off, the end position is left at the lowest possible speed for approx. 1 sec. prior to changing to the set speed; refer to curve **b**.

The speed can however be lower than the end position speed, refer to curve **c**.

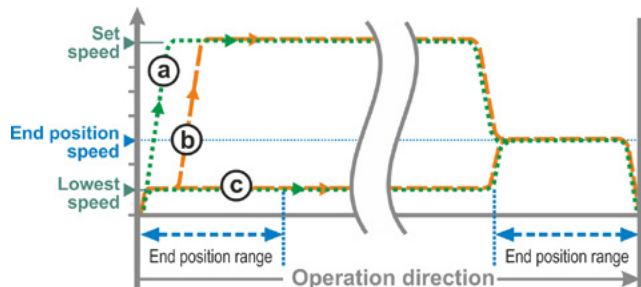


Fig. 2: End position speed 'Quick start'

Approaching the end position:

Shortly before reaching the end position range (independent of the cut-off mode), the speed will be reduced to the end position speed as for the "Normal" setting.

Quick start/stop

Leaving the end position is identical to 'Quick start' setting.

Approaching the end position:

- For **travel-dependent** cut-off, the speed will be reduced shortly before reaching the end position so that the actuator is at standstill; refer to fig. 3, curve **a**.
- For **torque-dependent** cut-off, the speed will still be changed to the end position speed before actually reaching the end position range to avoid excessive torque and potential damage to the valve, refer to curve **b**.

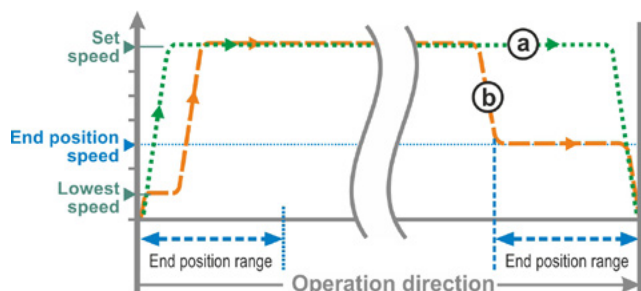


Fig. 3: End position speed 'Quick start/stop'

End position speed "Normal" is set in the factory.

5.5 Adjust end positions



If actuators are delivered mounted to a valve, this step has been done in the valve manufacturer's factory. The setting has to be checked during commissioning.

ECOTRON actuators are available in various versions:

- using signaling gear or
- the non-intrusive position encoder or the non-intrusive MWG.
- 2SQ7... part-turn actuator.



End position adjustment differs for the variant with signaling gear. This is indicated in the following description.

Adjustment of the signaling gear reduction ratio is not required for the non-intrusive versions or for the 2SQ7 part-turn actuator. These actuators are not equipped with an adjustable signaling gear.

5.5.1 Position recording with signaling gear - functional principle

By setting the signaling gear ratio and the end positions, it is ensured that length as well as start and end of the valve travel (end positions OPEN and CLOSED) are correctly signaled to the electronics unit.

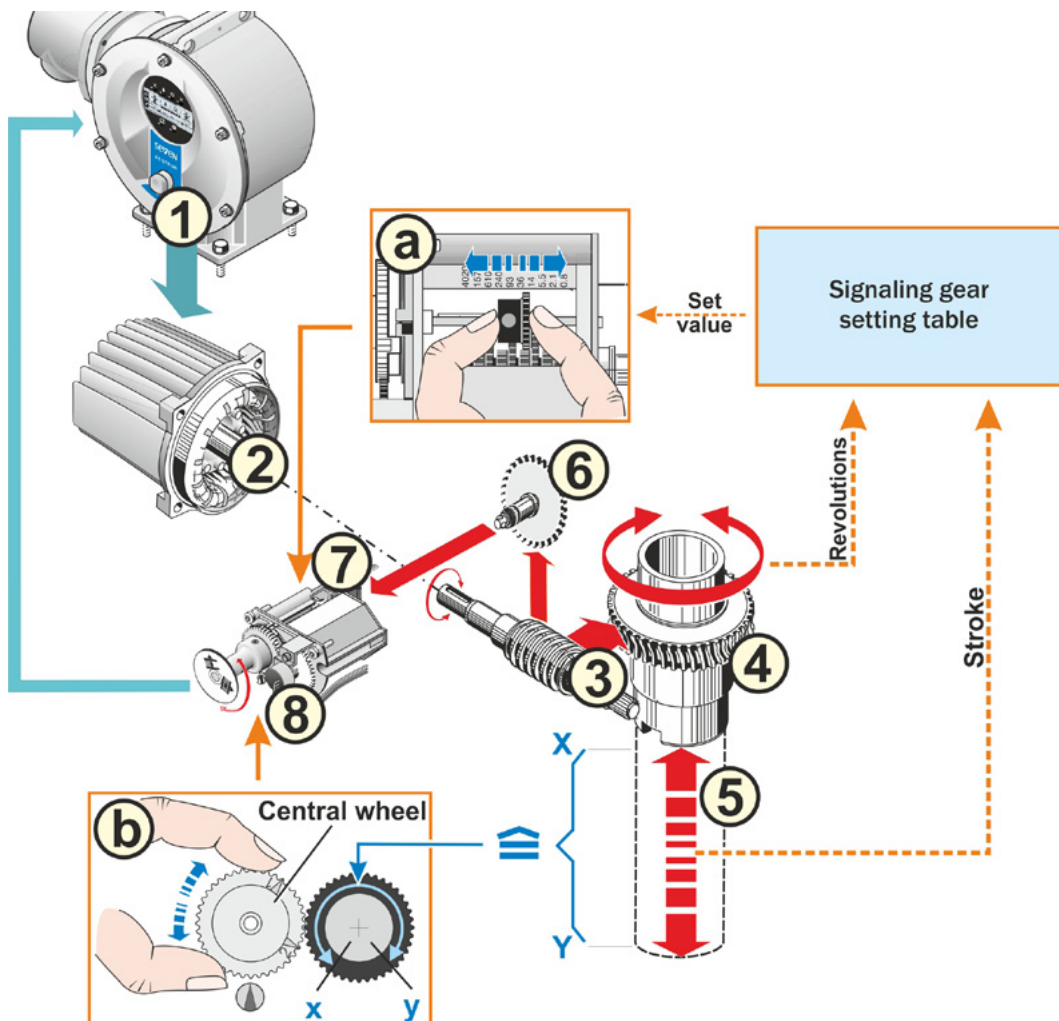


Fig.: Schematic representation of the settings: Signaling gear ratio and end positions

Explanation

The signaling gear (7) reduces the rotations of the output shaft (4) required for the complete travel [(5) X – Y] to a rotary movement of less than one full revolution (max. rotation angle of the potentiometer (x - y) (Setting (a), refer to following chapter, "Adjust signaling gear ratio").

From the position of the potentiometer, the electronics unit recognizes the position of the output drive shaft and therefore the position of the connected valve.

To this end, the potentiometer has to be set so that one of the mechanical end positions of the valve (X or Y) corresponds to one limit of the electric setting range of the potentiometer (x or y) (Setting (b), refer to the following chapter "Adjust end positions".)

5.5.2 Sequence during end position adjustment:

1. Adjust signaling gear reduction ratio (only for variant with signaling gear).
2. Adjust end positions ("End positions" menu)
 - a) Select closing direction.
 - b) Program/adjust first end position:
 - travel or torque dependent cut-off,
 - Position of first end position.
 - c) Program/adjust second end position:
 - travel or torque dependent cut-off,
 - Position of second end position.

5.5.3 Adjust signaling gear ratio (version with signaling gear)

The number of revolutions required to cover the whole travel should be known. The data is provided by the valve manufacturer. If this information is not available, see note below. For the required setting of the signaling gear, refer to the "Signaling gear setting" table below.

Intermediate values of rev/stroke are rounded up to the **next incremental** value (e.g. for 30 rev/stroke, the incremental value 36 has to be set).

Signaling gear setting										
Actuator type	Valve travel rev/stroke									
2SA7.1/2/3/4/5/6	0.8	2.1	5.5	14	36*	93	240	610	1575	4020
2SA7.7/8	0.2	0.52	1.37	3.5	9 *	23.2	60	152	393	1005
10 possible settings at the signaling gear (scale) ►	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
	0.8	2.1	5.5	14	36	93	240	610	1575	4020
*Default setting, unless required otherwise by the customer										



If the number of revolutions per stroke is not known, because, for example, the actuator is to be operated on an available "old" valve, operate the actuator over the whole travel and note the number of revolutions of the output drive shaft.

If it is not possible to monitor the output drive shaft, skip this chapter. Observe the note on the signaling gear in the "Prerequisite for end position adjustment" section in chapter 5.5.4, "Adjust end positions".

Procedure

1. Loosen 4 screws (item 1) from the signaling gear cover and remove cover.
2. Round up rev/stroke to the next incremental value (for incremental values refer to table above).
3. Adjust the slide wheel (2) so that the gear rim faces the desired incremental value on the scale.
Push the slide wheel in the desired direction, applying only little pressure.
Adjusting the slide wheel is facilitated by a slight movement of the central wheel (3).

Do not yet fit signaling gear cover.

The end positions have to be set and, if available, the mechanical position indicator.

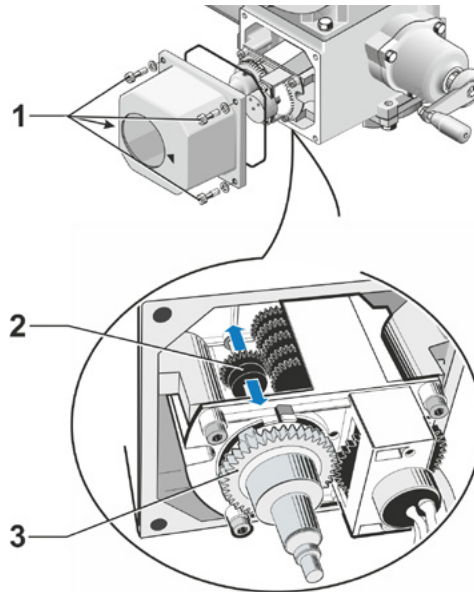


Fig.: Adjust signaling gear ratio

5.5.4 Adjust end positions

The end positions are directly set at the actuator.

Prerequisite for adjustment

- The valve must not be jammed. Use the crank handle/hand wheel for release, if necessary. For crank handle operation, refer to chapter „4.1 Crank handle, hand wheel“ on page 14.
- For version with signaling gear only:
 - The signaling gear should be set, refer to previous chapter "Adjust signaling gear ratio".
 - If the signaling gear ratio was not set because the number of revolutions/stroke is not known, proceed nevertheless as described in the following. Observe the note for operation step 15.



■ Abortion of end position setting

- Version **with** signaling gear: Once the central wheel (friction coupling) has been displaced, abortion is no longer possible. Turn Drive Controller several times in ccw direction.
- Version **without** signaling gear:
The former end position setting remains unchanged unless another end position is set.
- The end positions must not be set according to a specific sequence. The following operation steps describe end position OPEN adjustment.

Access to the 'End position' menu

The 'End position' menu can only be accessed in 'Local operation' mode (according to „Access to the Parameter menu“ on page 28).

1. Select 'End position' menu: Turn Drive Controller until the frame of the gear wheel symbol starts to flash (fig. 1). Gear wheel symbol is shown as inverted representation.
2. Confirm selection: **Hold down Drive Controller for approx. 3 s!**
Gear wheel is continuously illuminated and
 - the symbol of the currently set closing direction is blinking (fig. 2).
 - the OPEN symbol is blinking for 2SQ7. Continue with step 5.

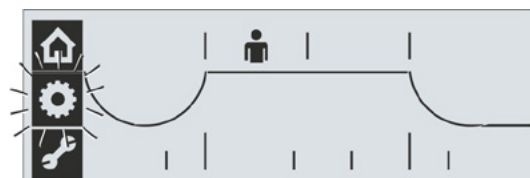


Fig. 1: Select End position menu

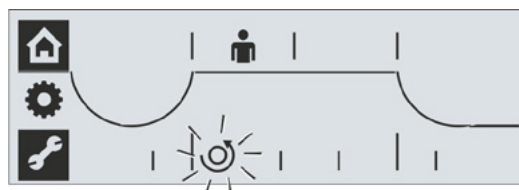


Fig. 2: End position menu is active, ccw closing direction

Program closing direction

3. Select closing direction: Turn Drive Controller.
In the display, the closing direction changes – in our example from ccw to cw closing direction (fig. 3).
4. Accept selected closing direction: Press Drive Controller.
The selected closing direction is saved and the display changes to end position OPEN; the OPEN symbol starts to flash (fig. 4).

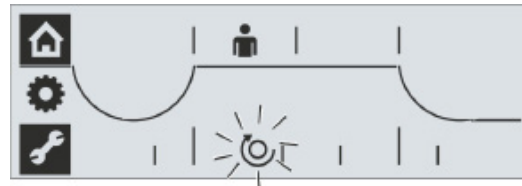


Fig. 3: End position menu active, cw closing direction

Adjust first end position

5. Select end position to be adjusted first:
 - If end position OPEN is to be adjusted first, continue with step 6.
 - If end position CLOSED is to be adjusted first, turn Drive Controller. The CLOSED symbol starts to flash.

In our example, end position OPEN (fig. 4) is to be adjusted first.

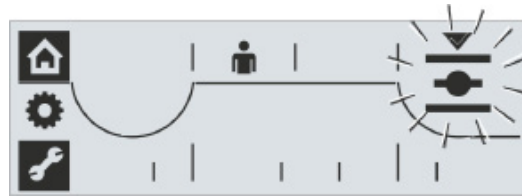


Fig. 4: End position OPEN is selected

6. Confirm selected end position: Press Drive Controller.
The display changes to cut-off mode adjustment for the selected end position. The current cut-off mode flashes (fig. 5):

= travel dependent
 = torque dependent

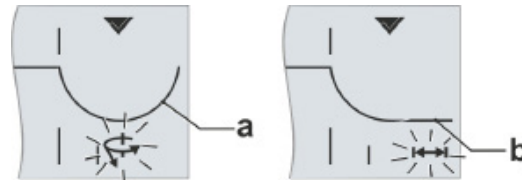


Fig. 5: Indication of active cut-off mode
a = torque dependent
b = travel dependent

7. Save cut-off mode:
 - Accept displayed cut-off mode: Press Drive Controller,
 - or
 - change cut-off mode: First turn, then press Drive Controller.

Different lines indicate the active cut-off mode in the display (fig. 5):

a = torque dependent
 b = travel dependent

8. Signaling gear only: Turn central wheel at signaling gear to mid position; markers 1 and 2 point in upward direction and the end position symbol of the selected end position starts to blink (fig. 6).
9. Operate actuator to first end position: Press Drive Controller.
The end position symbol is blinking.
If you hold down the Drive Controller for more than 3 sec., self-retaining starts. Press Drive Controller once again to stop operation.

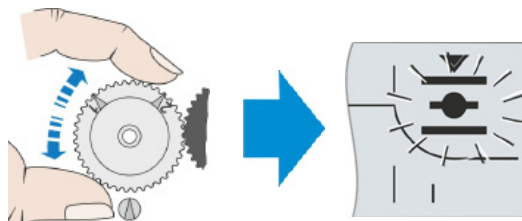


Fig. 6: Turn central wheel to mid position until end position symbol is flashing

Important: During operation

- heed valve position as well as
- Signaling gear only: heed direction of rotation of the central wheel (fig. 7), this is important for step 10.

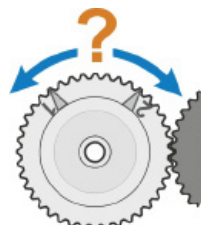


Fig. 7: Monitoring direction of rotation

For travel dependent cut-off mode:

Operate the actuator until the valve has reached the end position. Changing the operation direction enables precise end position adjustment.

For torque dependent cut-off mode: Hold down Drive Controller for more than 3 s. The actuator automatically moves until reaching the end position.

10. Signaling gear only: Slowly turn the central wheel into the same direction as it has turned when approaching the end position (refer to "Important" in operation step 9), until "Save" symbol is shown in the display (fig. 8 item a).
If the central wheel has already reached the stop, turn in the opposite direction.
11. Select Save: Turn Drive Controller until Save symbol starts to blink, refer to fig. 9.
12. Save end positions: Press Drive Controller. Tick symbol confirms saving of the first end position. The display changes to the other end position (in our example to end position CLOSED) and for programming the cut-off mode – the symbol for the currently set cut-off mode, travel or torque dependent, in end position CLOSED is blinking refer to fig. 10.
13. If the actuator is equipped with a mechanical position indicator, we recommend setting it now. Separate approaching of the end position can thereby be avoided. For the setting, refer to the following chapter 5.5.5.
14. Set cut-off mode - 'travel dependent' or 'torque dependent'- in the second end position (in our example end position CLOSED). Proceed in the same way as for cut-off mode adjustment in the first end position (OPEN). Follow the instructions of operation step 7.
15. Move actuator to second end position
Refer to operation step 9.
Operate the actuator until the Save symbol  is displayed, refer to fig. 11.



Signaling gear only:

If the actuator reaches the end position before the Save symbol is displayed, the signaling gear setting has to be changed to a lower value.

If the central wheel turns to the stop before reaching the end position, the signaling gear setting has to be changed to a higher value.

Repeat complete end position adjustment!

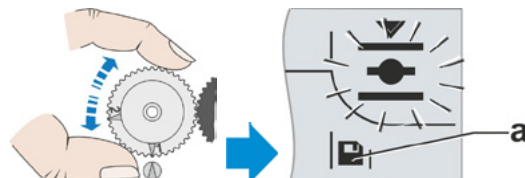


Fig. 8: Turning central wheel until Save symbol (a) is displayed

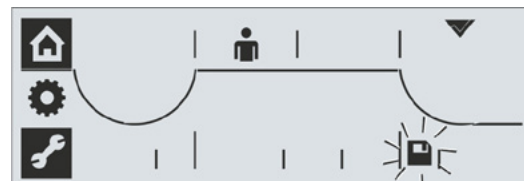


Fig. 9: Saving the end position is active

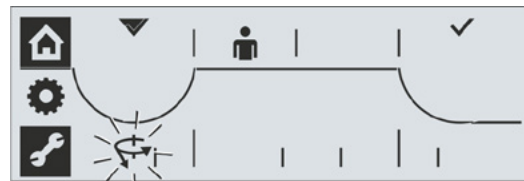


Fig. 10: Torque dependent cut-off mode in end position CLOSED

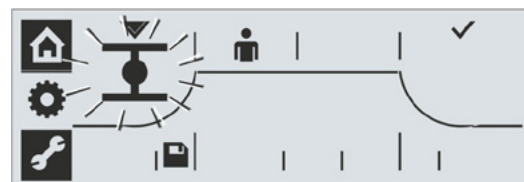


Fig. 11: Operate the actuator until Save symbol is displayed

16. Select Save symbol: Turn Drive Controller cw until the Save symbol starts to blink, fig. 12.

17. Confirm saving: Press Drive Controller. Two ticks, refer to fig. 13, confirm correct end position adjustment and the green LED "Ready" is illuminated. The "End position" menu symbol is blinking in the display.

18. If the actuator is equipped with a mechanical position indicator, end position CLOSED of the mechanical position indicator must be set, refer to chapter 5.5.5.

Now the other menus can be selected (turn Drive Controller).

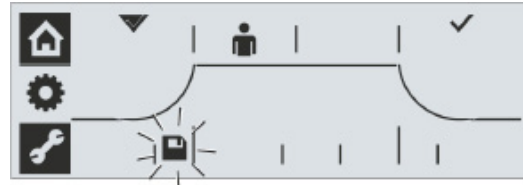


Fig. 12: Select Save symbol

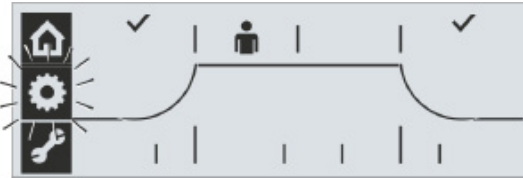


Fig. 13: Correct end position adjustment



After setting the end positions, the central wheel must no longer be moved! Otherwise, the complete end position adjustment must be performed once again.

5.5.5 Adjust mechanical position indicator

The mechanical position indicator indicates the valve position. The  symbol stands for OPEN and the  symbol for CLOSED (refer to illustration).

The mechanical position indicator is available as an option (standard for 2SQ7...).

If the actuator was delivered mounted on a valve, the setting may already be performed by the manufacturer. Verifying the adjustment during commissioning is imperatively required.

If the mechanical position indicator was not yet set with the end positions, adjust the indicator as follows.

Operation sequence

1. Operate the actuator into the end position CLOSED.
2. Unscrew signaling gear cover.
3. Turn white disc with CLOSED symbol (fig. 2, item 1), until the symbol and the arrow (3) are aligned in the indicator glass of the cover.
4. Operate actuator to position OPEN.
5. Hold white disc (1) in position and turn transparent disc (2) so that the OPEN symbol and the arrow (3) are aligned.
6. Fit signaling gear cover with screws, make sure the seals have been correctly fitted.

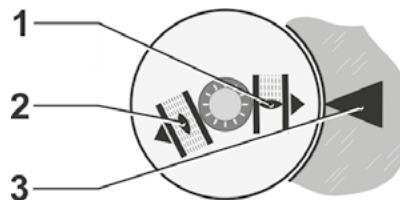


Fig. 1: Position indicator symbols

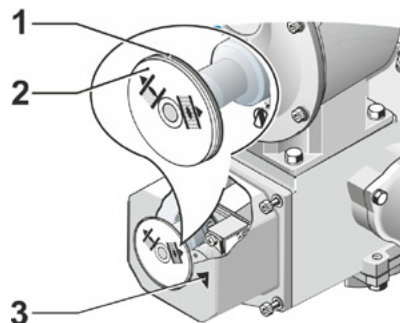


Fig. 2: Adjust position indicator

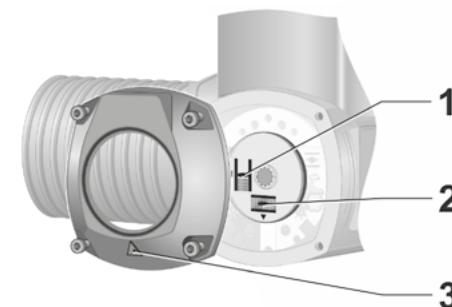


Fig. 3: 2SQ7 position indicator

6 REMOTE mode (Remote control)

6.1 REMOTE control

REMOTE control of actuators depends on the automation system and can be performed via

- **Conventional connection**

3 binary inputs 24/48 V DC: OPEN, CLOSE and STOP (control is performed via permanent contact signal)

or

- **Fieldbus** (e.g. PROFIBUS DP or MODBUS RTU).

Each actuator (device) on the bus is accessed via its bus address. On delivery, the bus address is preset for all devices: 126 for PROFIBUS and 247 for MODBUS, unless ordered otherwise using the programming form, add. version "Y11".

The operation via a fieldbus interface is also described in separate operation instructions, refer also to chapter 1.5 "Supplementary operation instructions".

The change-over from "REMOTE mode" to "LOCAL mode" can be disabled via fieldbus.



An EMERGENCY command received via fieldbus will in any case be performed by the actuator, even if the actuator is subject to conventional (binary) control.



If control is to be performed as pulse contact or via fieldbus, the control mode has to be set with the COM-SIPOS PC parameterization program (click 'REMOTE control' in the 'Input/Output' tab), or indicated when ordering the actuator.

6.2 Display and LED indications in REMOTE mode

During REMOTE mode, the following actuator information is displayed:

- REMOTE LED (fig. 1, item 4a) is illuminated and the REMOTE symbol (item 4b) is activated in the display.
- Cut-off mode depending on the end position:
 - Torque dependent - bent line (item 1a) or
 - Travel dependent - straight line (item 1b).
- Actuator is in end position CLOSED:
 - CLOSED symbol (2a) is displayed and the CLOSED LED (2b) is illuminated.
- Actuator is in end position OPEN:
 - OPEN symbol (5b) is displayed and the OPEN LED (5a) is illuminated.
- Actuator is in mid-travel:
 - 8-segment position scale (3) indicates the position in 9 steps, refer to figure 2.
 - Each segment corresponds to a travel of approx. 11 %.
 - Example:
 - = position OPEN 44.3 – 55.5 %.
 - If there is no segment active, the actuator is between CLOSED and 11 % OPEN.
- Actuator operation:
 - Depending on the direction of operation of the actuator, the respective LED (OPEN or CLOSE) and the end position symbol in the display are flashing.

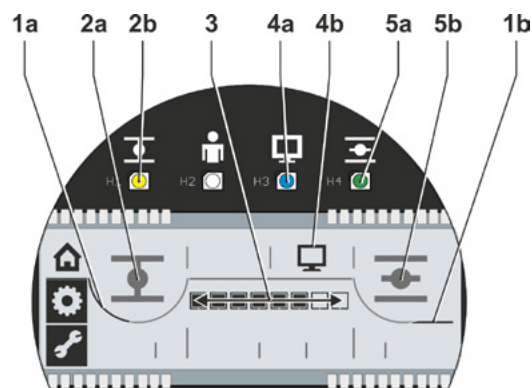


Fig. 1: REMOTE mode

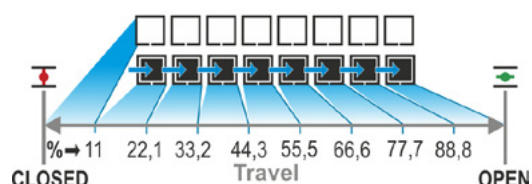


Fig. 2: Position scale

6.3 View parameter settings in REMOTE mode

Viewing the parameter settings is possible without interrupting the REMOTE mode. Refer also to „Check/set parameters“ on page 28.

Operation sequence

The actuator is in REMOTE mode, the  symbol is active and the REMOTE LED is illuminated.

1. Select 'Local operation' menu: Turn Drive Controller (do not press!) until 'Local operation' symbol  starts to flash.
2. Confirm selection: Press Drive Controller. The 'Local operation' symbol is flashing inversely (fig. 2).
3. Select 'Parameter' menu: Turn Drive Controller, until the 'Parameter' symbol  starts to flash (fig. 3).
4. Confirm selection: Press Drive Controller. The 'Parameter' symbol (fig. 4, item 1) is active: both parameters and settings will be displayed one after the other, refer to figure 4:
 - a. Tripping torque in CLOSE direction,
 - b. Scale; indicates the setting of the respective parameters,
 - c. Speed,
 - d. Output signal set selection for binary outputs and the control mode,
 - e. Tripping torque in OPEN direction.
5. Press the Drive Controller to quit the parameter view. The 'Parameter' symbol is blinking inversely. Now, the 'Local operation' menu can be selected.

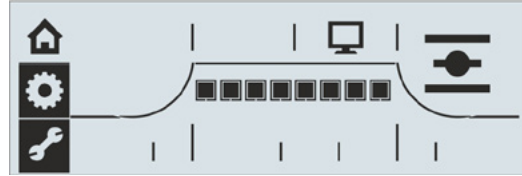


Fig. 1: REMOTE mode

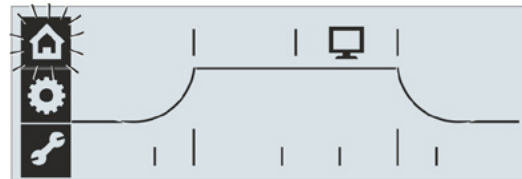


Fig. 2: Access to the menu

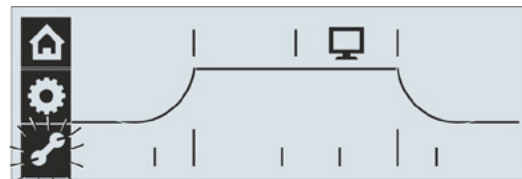


Fig. 3: Select Parameter menu

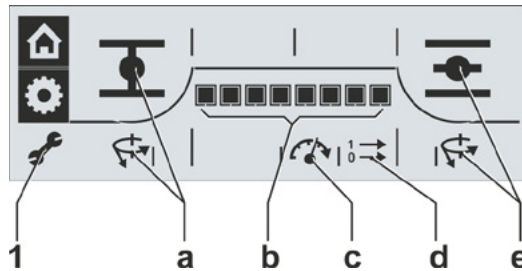


Fig. 4: View parameters

7 Maintenance, inspection, service



Before any work is carried out on the actuator, ensure that

- the planned measures (possible operation of valves, etc.) will not result in injury to persons or faults in the plant,
- the actuator or plant section is properly isolated. In addition to the main circuits, also check that any additional or auxiliary circuits are disconnected!
- Furthermore, the general safety regulations have to be observed:
 - Disconnect all poles (also 24 V DC). This can also be achieved by removing the connection hood.
 - Prevent accidental reconnection.
 - Confirm that equipment is not live.
 - Ground and short-circuit equipment.
 - Fit barriers or covers to neighboring live components.

7.1 General information

The actuators are virtually maintenance-free (for relubrication intervals, refer to chapter „7.2 Lubrication intervals and lubricants“).

We recommend submitting the actuators after commissioning or after approx. 50 operation hours to a general inspection to verify that

- correct functioning is guaranteed,
- no unusual noises/vibration occur,
- the fixing components have not become loose,
- no leakages occur.

The housing of the SEVEN actuator consists of an aluminum alloy which is corrosion resistant under normal environmental conditions. If the paint was damaged during assembly, it can be touched up with original paint supplied in small quantity units by the service.

This list cannot cover every eventuality. Further checks may be necessary in accordance with the plant-specific conditions. Any impermissible deviations or changes detected during inspection must be rectified immediately.

Under normal operation conditions, service or inspection of the devices is recommended every 8 years, including storage time. The following maintenance work also has to be performed:

- Replace lubricant within gear housing,
- replace seals,
- check all parts within the direct power drive for wear,
- tighten screw connections of electrical connections.

Depending on the operation conditions, shorter maintenance intervals may be required

This applies in particular to actuators in high temperature version – add. version T09. They have to be checked for proper condition by the service every 2 years and wear parts have to be replaced!

Replace all seals after continuous immersion within the framework of an inspection.



It is recommended that the services of the local SIPOS Aktorik service center are utilized for this purpose.

Please contact **SIPOS Aktorik GmbH** for any service requests. You can find the address and the phone number of your competent contact at www.sipos.de. You may also send your requests directly via e-mail to service@sipos.de.

7.2 Lubrication intervals and lubricants

7.2.1 Lubrication intervals

Perform service or inspection after **approx. 8 years** (refer to 8.1).

After 50 operating hours or 1 year, regrease coupling shaft A, if available, at the greasing nipple.



For output shaft form A, ensure that the valve stem is greased separately!

These intervals are valid for normal load. When exposed to more intensive loads, the maintenance intervals are reduced accordingly.

Actuators in high temperature version – add. version T09 – have to be checked for proper condition by the SIPOS service every 2 years and wear parts have to be replaced!



Whenever the covers and hoods are removed, the seals must be inspected for damage. Replace and regrease if necessary.

7.2.2 Lubricant assignment and quantity:

		Actuator type		
		2SA7.1/2	2SA7.3/4	2SA7.5/6/7/8
Gear oil	Lubricant quantity	760 cm ³	1,600 cm ³	2,400 cm ³
	Filling level ¹	max. 46 mm	max. 58 mm	23 – 27 mm
	Lubricant ²	Klübersynth GH 6 – 220 N (by Klüber) ³ or Alphasyn PG 220 Polyglycol (by Castrol), Berusynth EP 220 (by Bechem), Panolin EP gear synth 220 (by Kleenoil).		Mobil SHC Gear 220 ³ (refer to identification at the equipment)
Other lubrication points ⁴	Lubricant quantity	50 cm ³		
	Lubricant ²	Lubrication grease AR1 (ZEPF)		
Output shaft type A ⁵ (2SA7)	Lubricant quantity	2 cm ³		
	Lubricant ²	Commercial ball bearing grease		
2SQ7... part-turn actuator		virtually maintenance-free (The recommendations for the actuators should also be observed here.)		



- The manufacturer's instructions and relevant regulations are to be observed when handling and disposing of lubricants. Technical information concerning lubricants is available on request.
- Before using a new alternative lubricant (other than the lubricant filled in the factory), the gear units and gear parts have to be rinsed and cleaned (avoid mixing the oils).

¹ Measured from the lubricant surface to the external wall of the housing at oil filling screw.

² Ambient temperature range -20 – +60 °C.

³ Lubricant used in the factory.

⁴ e.g. sealing rings, gear systems, bearings, feather keys, uncoated surface etc.

⁵ If applied.

8 Spare parts

8.1 General information

With the exception of standardized, generally available components, only original spare parts may be used. Spare parts are usually supplied as complete sub-assemblies (see list below). In the following representation drawings, designations with 3 digits are listed. These numbers are prefixed with "2SY7" to give the full spare parts designation.

When ordering spare parts, always provide the following information:

1. Order number and serial number of the actuator (refer to name plate),
2. Spare parts designation 2SY7 . . . (refer to following list),
3. Quantity required.



- All external metallic housing parts are made of a corrosion resistant aluminum alloy, painted with color similar to RAL 7037 (silver-gray) as standard and meet the requirements up to corrosivity category C5.
- Other finish paint color ► add. version **Y35**
- Very high corrosion protection
corrosivity category C5 with long protection duration ► add. version **L38**

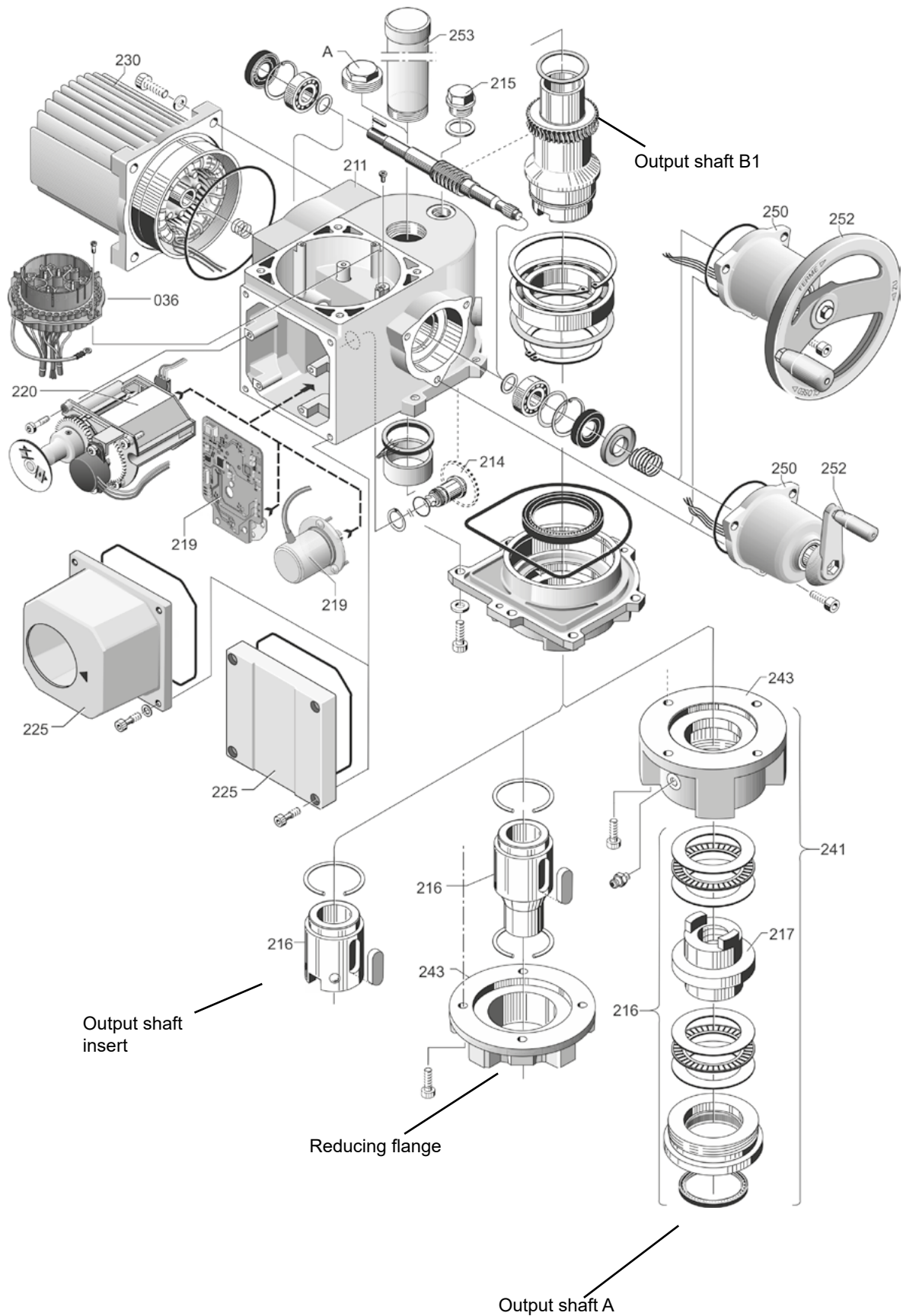
8.2 Spare parts list

SEVEN actuators are designed for fault-free operation within the maintenance intervals. As we know from experience, external causes may damage the actuator already during commissioning stage. For such events, the recommended spare parts are listed in the following table. If you require other parts, please contact the Service department.

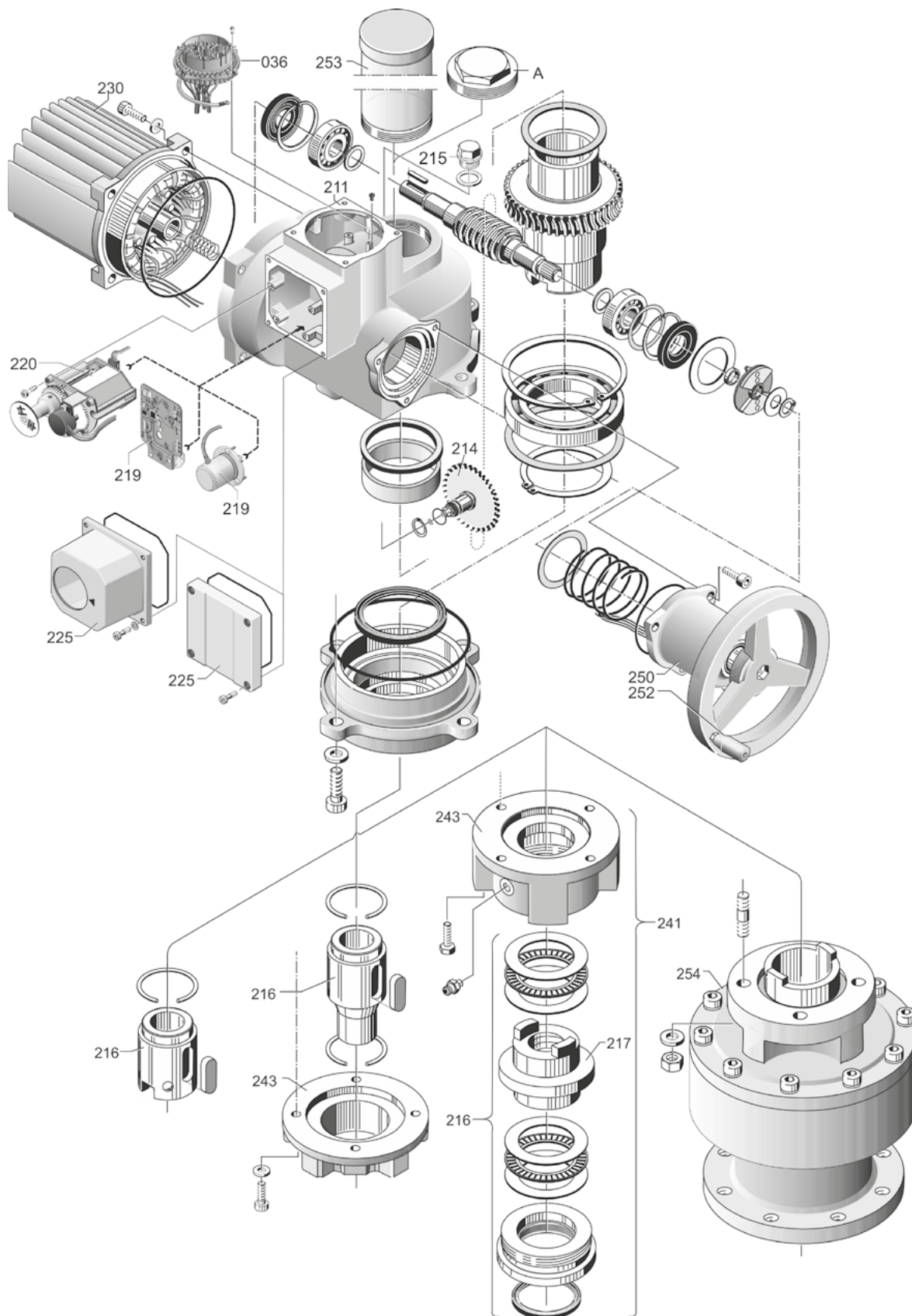
No.	Designation
2SY7001	Electronics unit (010 – 042)
2SY7041	Cover for electronic housing
2SY7218	Sealing kit (without illustration)
2SY7219	Position recording „non-intrusive“ (niP/MWG)
2SY7220	Signaling gear
2SY7225	Signaling gear cover
2SY7250	Manual drive
2SY7252	Handle
▲▲▲ = The last three digits indicate the part numbers in the exploded views.	

8.3 Exploded views

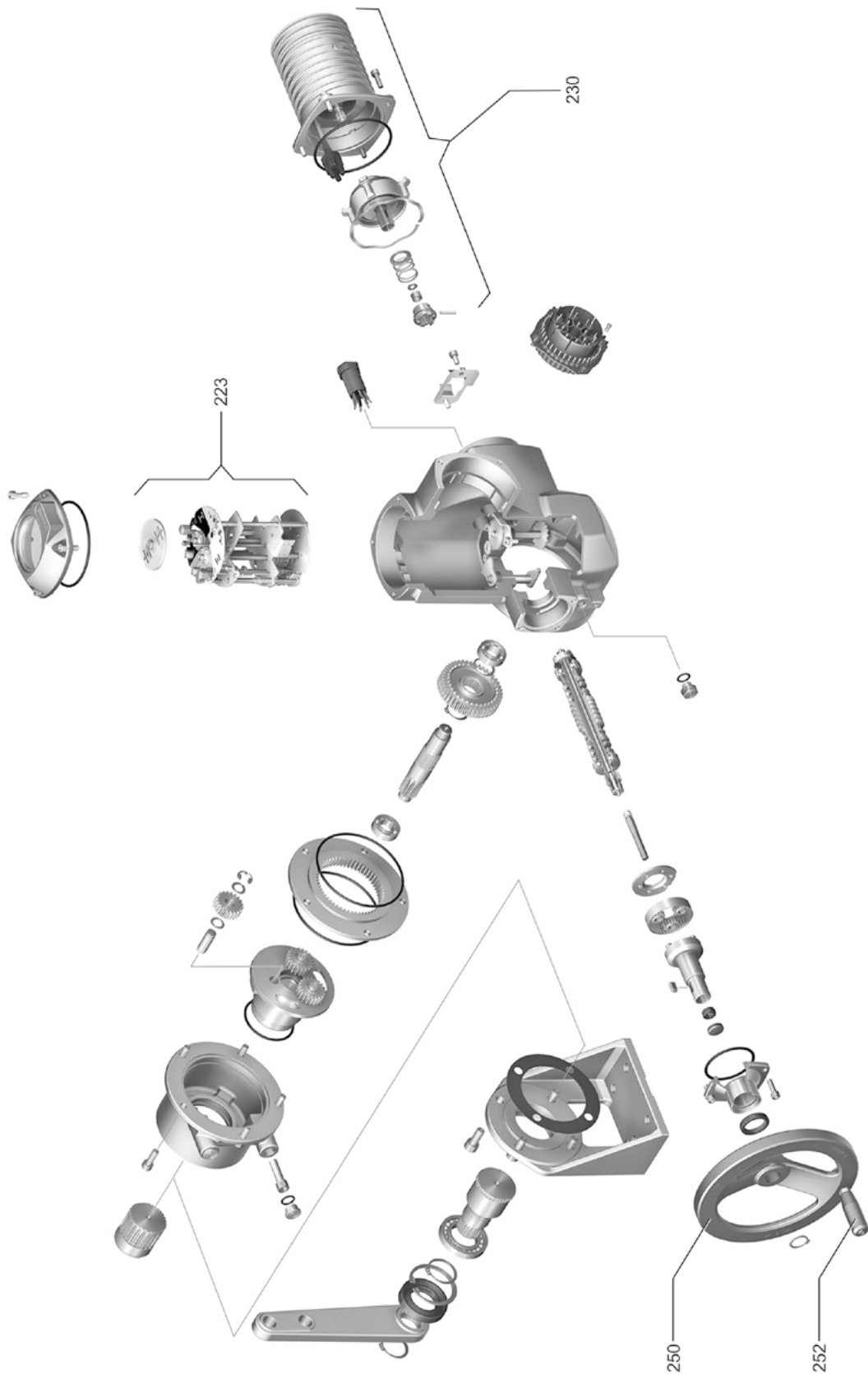
8.3.1 Gear unit 2SA7.1/2/3/4.-



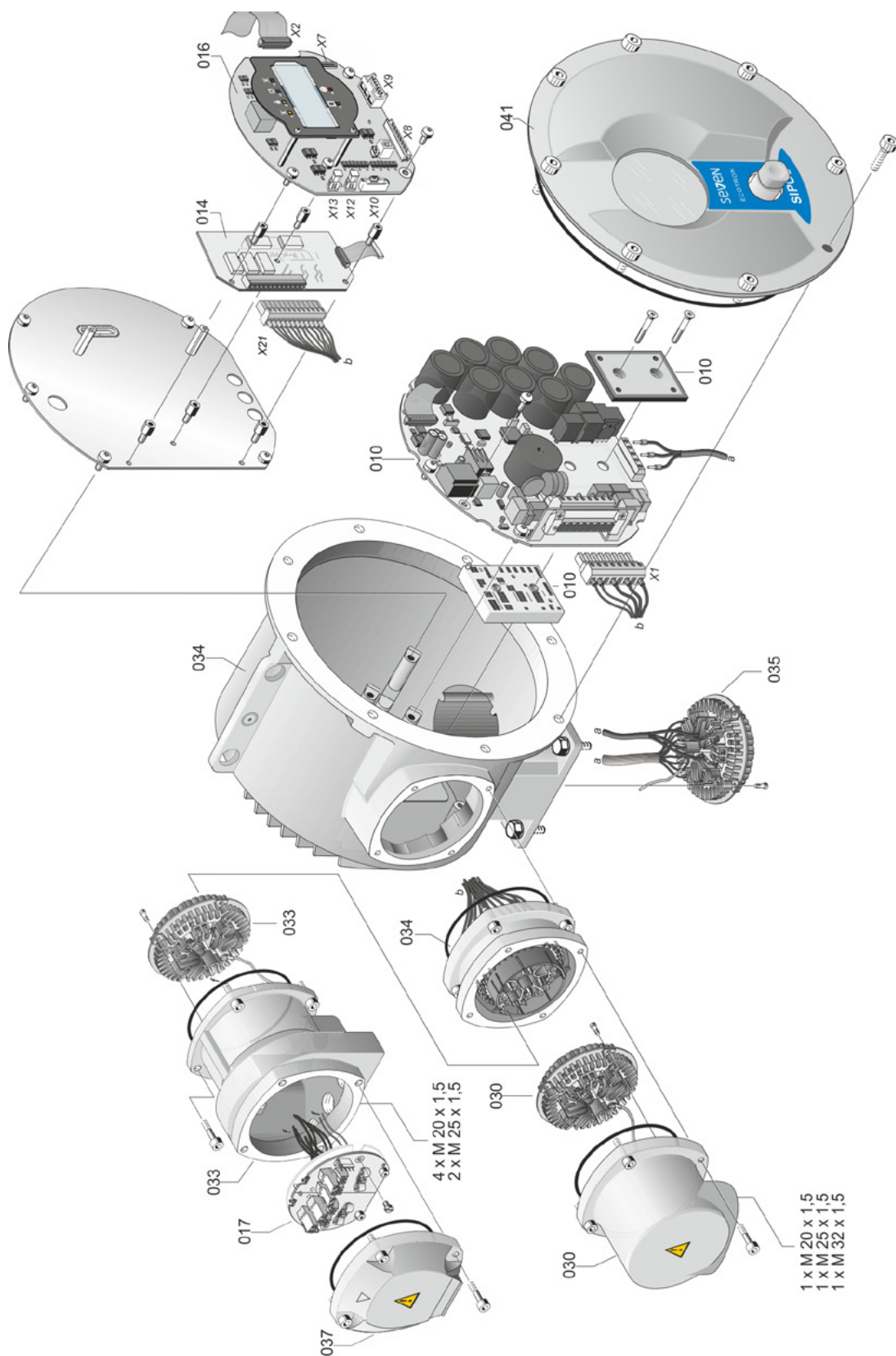
8.3.2 Gear unit 2SA7.5/6/7/8.-



8.3.3 Small part-turn gear unit 2SQ7...-



8.3.5 Electronics unit (motor from 3 kW)



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Declaration of Incorporation of Partly Completed Machinery in compliance with Machinery Directive 2006/42/EC

For rotary and part-turn actuators of the following SIPOS SEVEN device series:

2SA70, 2SA73, 2SA75, 2SA78

2SQ70, 2SQ73, 2SQ75

in versions:

(1) ECOTRON

(2) PROFITRON

HiMod

Manufacturer: SIPOS Aktorik GmbH, Im Erlet 2, 90518 Altdorf, Germany

The before mentioned rotary and part-turn actuators are intended for operation of industrial valves.

The following essential health and safety requirements in compliance with annex I of Directive 2006/42/EC are respected:

Articles 1.1.2, 1.1.3, 1.1.5, 1.2.1, 1.2.6, 1.3.1, 1.3.7, 1.5.1, 1.6.3, 1.7.1, 1.7.3, 1.7.4

SIPOS Aktorik GmbH shall be obligated to electronically submit the documents for the partly completed machinery to national authorities on request. The relevant technical documentation pertaining to the partly completed machinery described in annex VII, part B has been prepared.

Putting into service is not permitted until the final machinery into which the before mentioned multi-turn and part-turn actuators are to be incorporated has been declared in conformity with the provisions of the Directive 2006/42/EC.

Furthermore, the safety requirements of the **Low Voltage Directive 2014/35/EU** are fulfilled by applying the following harmonized standards, as far as applicable for the products.

DIN EN 61800-5-1:2007/A1:2017 DIN EN 61800-1-11:2007/A1:2021

Authorized person for documentation: Thomas Weber, Im Erlet 2, 90518 Altdorf, Germany

EU Declaration of Conformity

The manufacturer SIPOS Aktorik GmbH declares herewith in sole responsibility, that the before mentioned devices meet the essential requirements of the following directives. The following harmonized standards were applied:

RoHS Directive 2011/65/EU

DIN EN IEC 63000:2018

EMC Directive 2014/30/EU for versions (1)

DIN EN 61800-3:2004/A1:2012

RED directive 2014/53/EU for versions (2)

DIN EN 300 328 V2.2.2 DIN EN 301 489 V2.2.3 DIN EN 301 489-17 V3.2.2

Furthermore, the before mentioned standards of the **EMC Directive 2014/30/EU** and the **Low Voltage Directive 2014/35/EU** were applied.

Altdorf, 2024-04-15

Thomas Weber
Managing Director

This declaration does not contain any guarantees and shall become void in the event of unauthorised modification of the devices



Certificates are valid as from the indicated date of issue. Subject to changes without notice! The latest versions are available for download at <http://www.sipos.de>.

