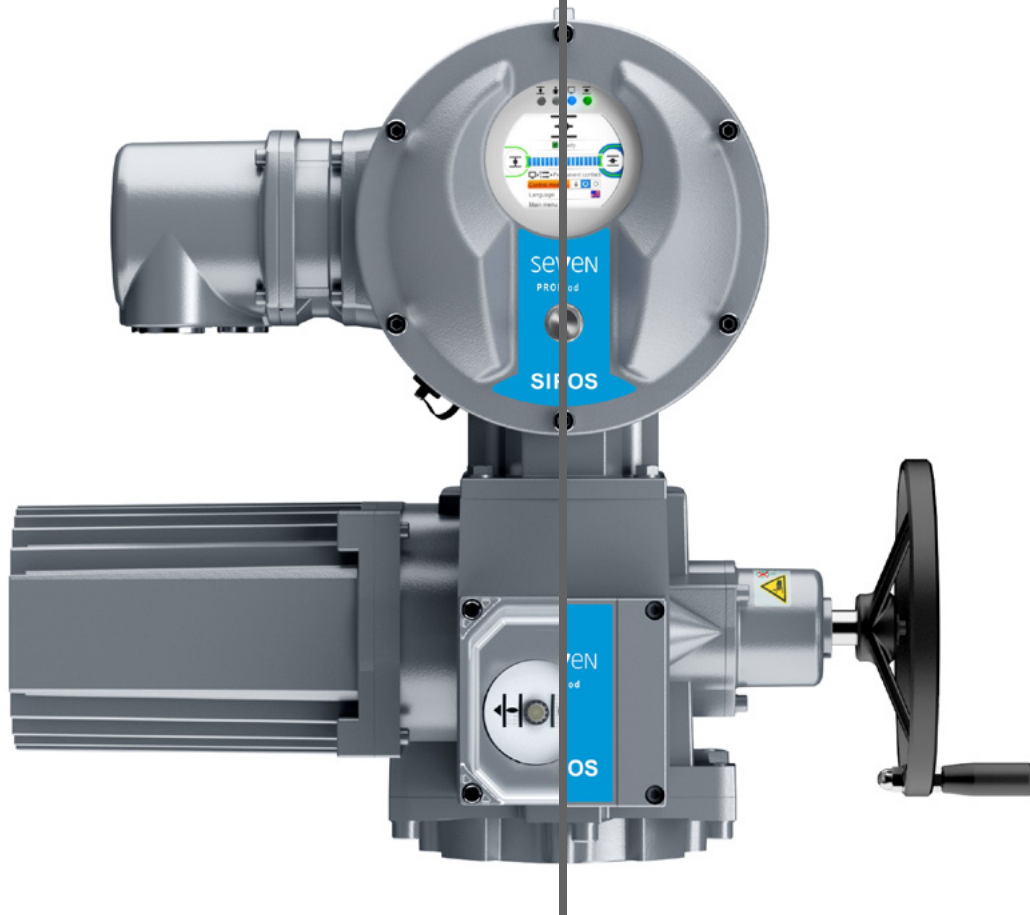


Operation instructions
Electric actuators
2SA7, 2SQ7

PROFITRON

HiMod



Contents

1	General information	5	6	User management.....	33
1.1	Safety information	5	6.1	General information	33
1.2	Transport and storage	6	6.1.1	User levels (permissions)	33
1.3	Disposal and recycling	6	6.1.2	Login configuration and access protection	33
1.4	Notes to the operation instructions	6	6.2	General procedure	34
1.4.1	Warnings: Used symbols and their meanings	6	6.2.1	Set up user management	34
1.4.2	Scope	7	6.2.2	Log in to actuator	35
1.5	Supplementary operation instructions ...	7	6.2.3	Log out from the actuator	35
2	General information	8	6.2.4	Rules	35
2.1	Functional principle	8	6.3	Perform settings	36
2.2	Sub-assemblies	9	6.3.1	'User levels': Log in as 'Administrator'	36
2.3	Block diagram (electrical connections) ..	10	6.3.2	Set login configuration 'Strong password'	37
3	Assembly and connection.....	11	6.3.3	'Strong password': Change password	37
3.1	Mount to valve/gear	11	6.3.4	Login configuration: Set 'User account' and create first user account	38
3.1.1	General assembly instructions for all output shaft types	11	6.4	Log in to actuator	40
3.1.2	Output shaft type A	11	6.4.1	Log in to „User level“ user level using PIN	40
3.1.3	Mount stem protection tube	12	6.4.2	“Strong password”: Log into user level with password	41
3.2	Electrical connection	13	6.4.3	Log in „User account“ user with password	42
3.2.1	Connection with round plug	13	6.5	Failed attempts	42
3.2.2	Fieldbus connection (PROFIBUS/Modbus)	14	7	Commissioning	43
3.2.3	PROFINET connection	15	7.1	General information	43
3.2.4	External potential conductor connection	15	7.2	Additional gear	45
3.3	Separate mounting	16	7.2.1	Select additional gear and change parameters.	46
4	Instructions on operator control and operation.....	17	7.2.2	Parameters and their values in the 'Additional gear' menu	47
4.1	Crank handle, hand wheel	17	7.3	Program closing direction, speeds, cut-off modes and tripping torques	49
4.2	Light emitting diodes (LED) and display	18	7.3.1	Select the closing direction	49
4.2.1	Overview of light emitting diodes	18	7.3.2	Program speeds/positioning times	50
4.2.2	Overview of status indication	18	7.3.3	Program cut-off modes and tripping torques/forces	51
4.3	Actuator status indication	20	7.4	Adjust end positions for version with signaling gear	54
4.4	Navigation through the menus	25	7.4.1	General information	54
4.4.1	Operation of the Drive Controller	25	7.4.2	Signaling gear ratio	56
4.4.2	Explanation of symbols, texts within menu	26	7.4.3	Procedure for new (initial) end position adjustment	57
5	Start menu	28	7.4.4	Readjust end positions	62
5.1	Control mode	28	7.4.5	Adjust mechanical position indicator ...	64
5.1.1	"LOCAL" control mode:  'Local' actuator operation	29	7.5	Adjust end positions for version with „non-intrusive“ position recording	65
5.1.2	"REMOTE" control mode: 	30	7.5.1	New setting (initial setting)	65
5.1.3	"OFF" control mode: 	30	7.5.2	Readjust end positions	68
5.2	Language selection	31			
5.3	Main menu overview	32			

8	Parameters and possible parameter values.....	70	8.6.16 End position speed	100
8.1	Parameter menu	70	8.6.17 Autom. TL adapt. end position	101
8.2	Valve-specific parameters	71	8.6.18 DCS acceptance time	102
8.2.1	Change parameters in the 'Valve' menu	71	8.7	Factory reset
8.2.2	Parameters and their values in the 'Valve' menu	73	9	System settings.....
8.3	Control system parameters	74	9.1	Display
8.3.1	Overview of Control system menu	74	9.1.1	Display orientation
8.3.2	Operation sequence: Change parameters in the 'Control system' menu	76	9.1.2	Standby screen
8.3.3	Control system – Control mode	76	9.1.3	Operation – latching function
8.3.4	Control system – Alternative control mode	79	9.1.4	Fast to local
8.3.5	Time control assignment	79	9.1.5	Set standby time
8.3.6	Control system – Switching control mode	80	9.1.6	Activate Standby
8.3.7	Control system – Binary input	80	9.2	Adjust real time clock
8.3.8	MODE input	80	9.3	Activate, deactivate Bluetooth
8.3.9	Control system – Analog input AI1	81	9.4	Activate, deactivate USB
8.3.10	Control system – Analog input AI2	81	9.5	Remote control unit
8.3.11	Control system – Binary outputs	82	10	Torque curve
8.3.12	Control system – Analog output AO1	84	10.1	General information
8.3.13	Control system – Analog output AO2	85	10.2	Record torque curve
8.3.14	Control system – Fieldbus	85	10.3	Save torque curve on USB flash drive
8.4	Safety related parameters	87	11	Observe
8.4.1	EMERGENCY input	87	11.1	Electronic name plate
8.4.2	EMERGENCY speed	87	11.1.1	Tag number
8.4.3	EMERGENCY position	88	11.1.2	Order number and equipment
8.4.4	Fault control source	88	11.1.3	Serial number
8.5	Software functions	88	11.1.4	Original serial number
8.5.1	Enable software functions and customer variants	89	11.1.5	Firmware version
8.5.2	Positioner	90	11.2	Inputs and outputs (observe)
8.5.3	Proportional move	91	11.2.1	Binary inputs
8.5.4	Optional software functions	92	11.2.2	Analog input and outputs
8.6	Special parameters	93	11.2.3	Torque switch (2SQ7 only)
8.6.1	Tag number	94	11.2.4	Fieldbus communication
8.6.2	Separate mounting	94	11.3	Actuator status
8.6.3	Intermediate contacts	94	11.4	Torque zero adjustment
8.6.4	Motor	95	12	Diagnosis (operating data and maintenance limits).....
8.6.5	Maintenance intervals of valve	96	12.1	Operation data actuator
8.6.6	Check maintenance	96	12.2	Valve maintenance limits
8.6.7	Close tightly	97	12.3	Maintenance valve
8.6.8	Rise time	97	12.4	Event memory
8.6.9	DC brake	97	13	Communication and data exchange
8.6.10	Delay of Power failure message	98	13.1	Remote control
8.6.11	Torque measurement flange	98	13.2	COM-SIPOS PC parameterization software
8.6.12	Thresholds for detection of open-circuit behavior at analog outputs	98	13.3	USB port
8.6.13	Test operation	99		
8.6.14	DC link voltage limitation	99		
8.6.15	Runtime monitoring	100		

13.4	Data exchange via USB flash drive ...	119
13.4.1	Firmware update	120
13.4.2	Download parameters to USB flash drive	120
13.4.3	Upload parameters from USB flash drive	120
13.4.4	Save log data on USB flash drive	120
13.4.5	Save torque curve	121
13.4.6	Clone actuator	121
13.4.7	Export, import user data	121
14	Maintenance, inspection, service	123
14.1	General information	123
14.2	Lubrication intervals and lubricants ...	124
14.3	Lubricant assignment and quantity ...	124
15	Spare parts	125
15.1	General information	125
15.2	Spare parts list	125
15.3	Exploded views	126
15.3.1	Gearboxes 2SA7...-	126
15.3.2	Small part-turn gear unit 2SQ7	127
15.3.3	Electronics unit	128
Index		129
	Original Declaration of Incorporation of Partly Completed Machinery according to Machinery Directive 2006/42/EC	135
	EU Declaration of Conformity	135

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, name 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 „14.2 Lubrication intervals and lubricants“ on page 124.



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

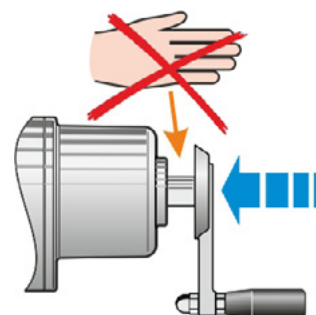


Fig.: Danger of crushing

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 (1) on the electronics unit 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 $-30\text{ }^{\circ}\text{C}$ – $+80\text{ }^{\circ}\text{C}$.
- 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 and position recording closed.

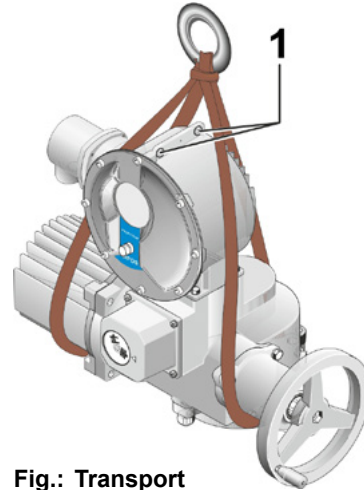


Fig.: Transport



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

Our 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 Warnings: 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 material.



Note 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 sales representative in charge. Always state the type designation and the serial number of the respective actuator (see name plate).



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.

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 electric part-turn actuator	
COM-SIPOS PC parameterization software	
PROFIBUS operation instructions	
Modbus operation instructions	
HART operation instructions	
PROFINET 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 with USP	
Binary and analog inputs freely available via fieldbus	
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.

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

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.

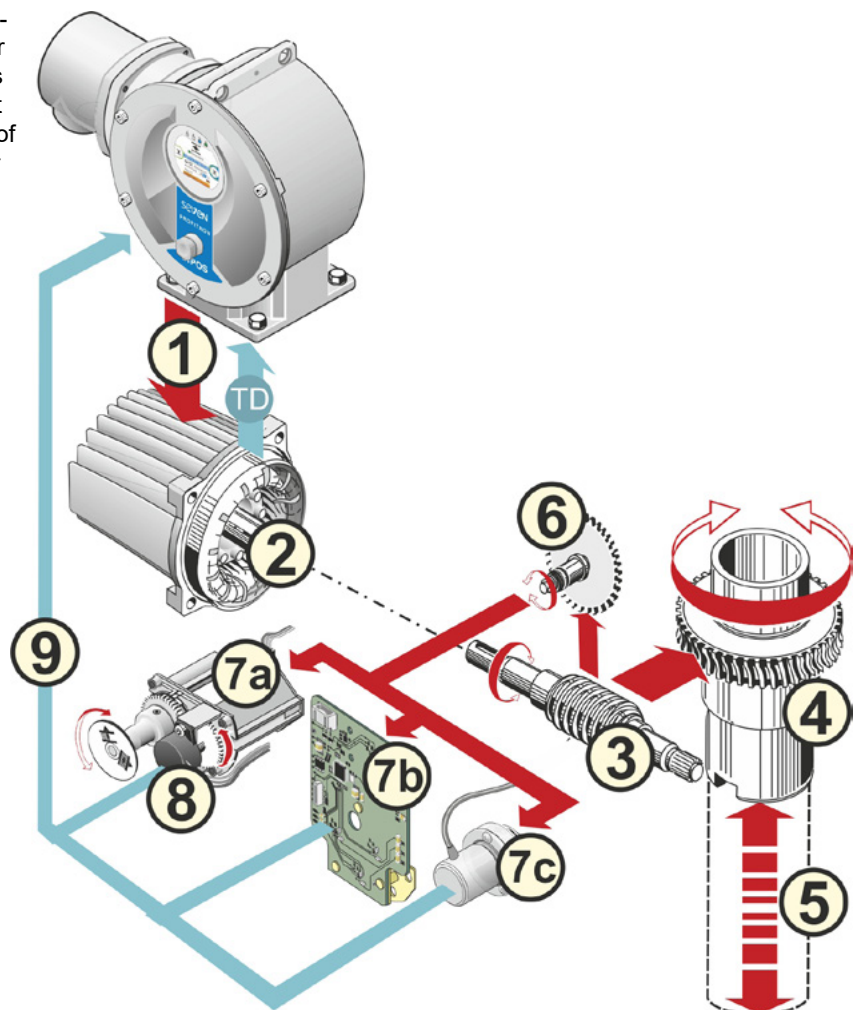


Fig.: Functional principle

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 „15.3 Exploded views“.

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 and the gear unit has a different shape.

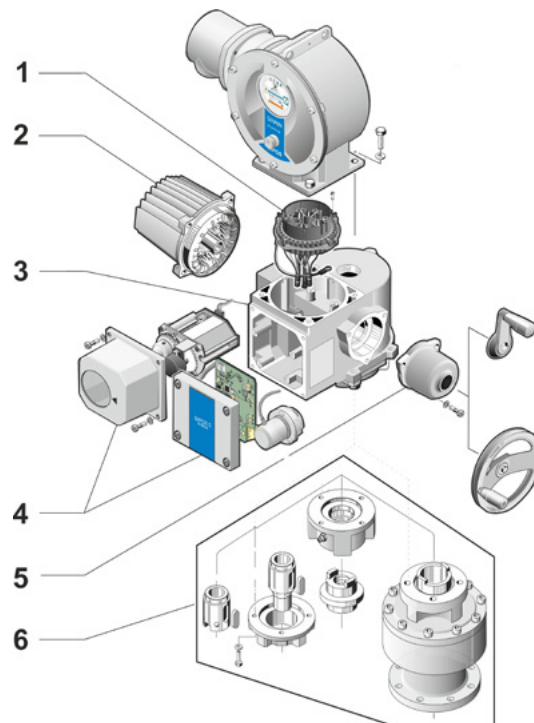


Fig.: Gear unit sub-assemblies

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

- | | |
|---|---|
| 1 Electrical connection (two versions available), | 5 Relay board (option), |
| 2 Plug element gear connection, | 6 Control PCB with display, |
| 3 Electronic housing with cover, | 7 Additional analog module for additional input and output (option) or HART control input (option). |
| 4 Power control PCB, including power module, | |

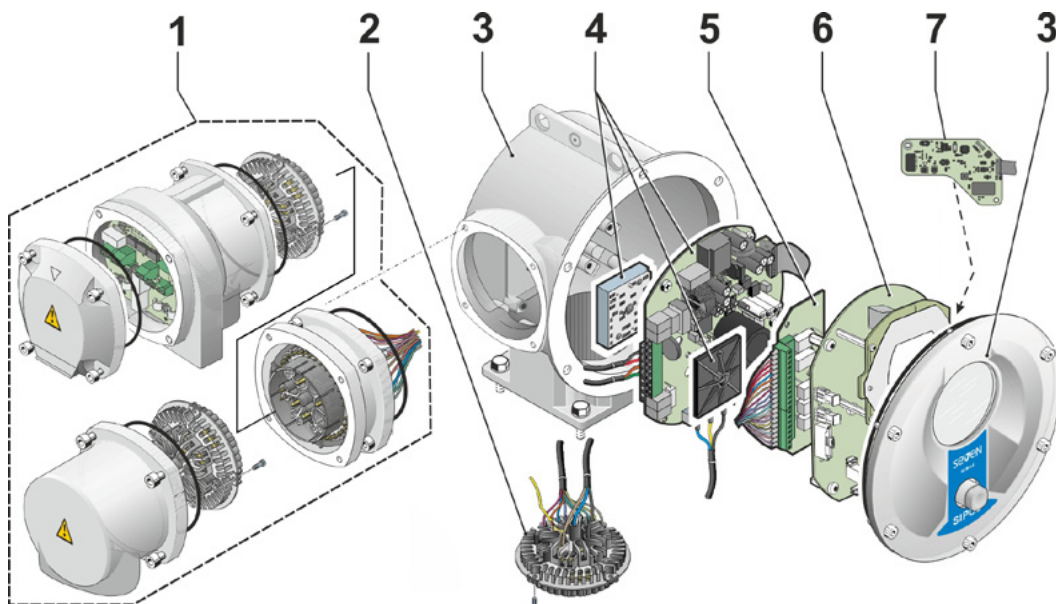


Fig.: Electronics unit sub-assemblies

2.3 Block diagram (electrical connections)

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

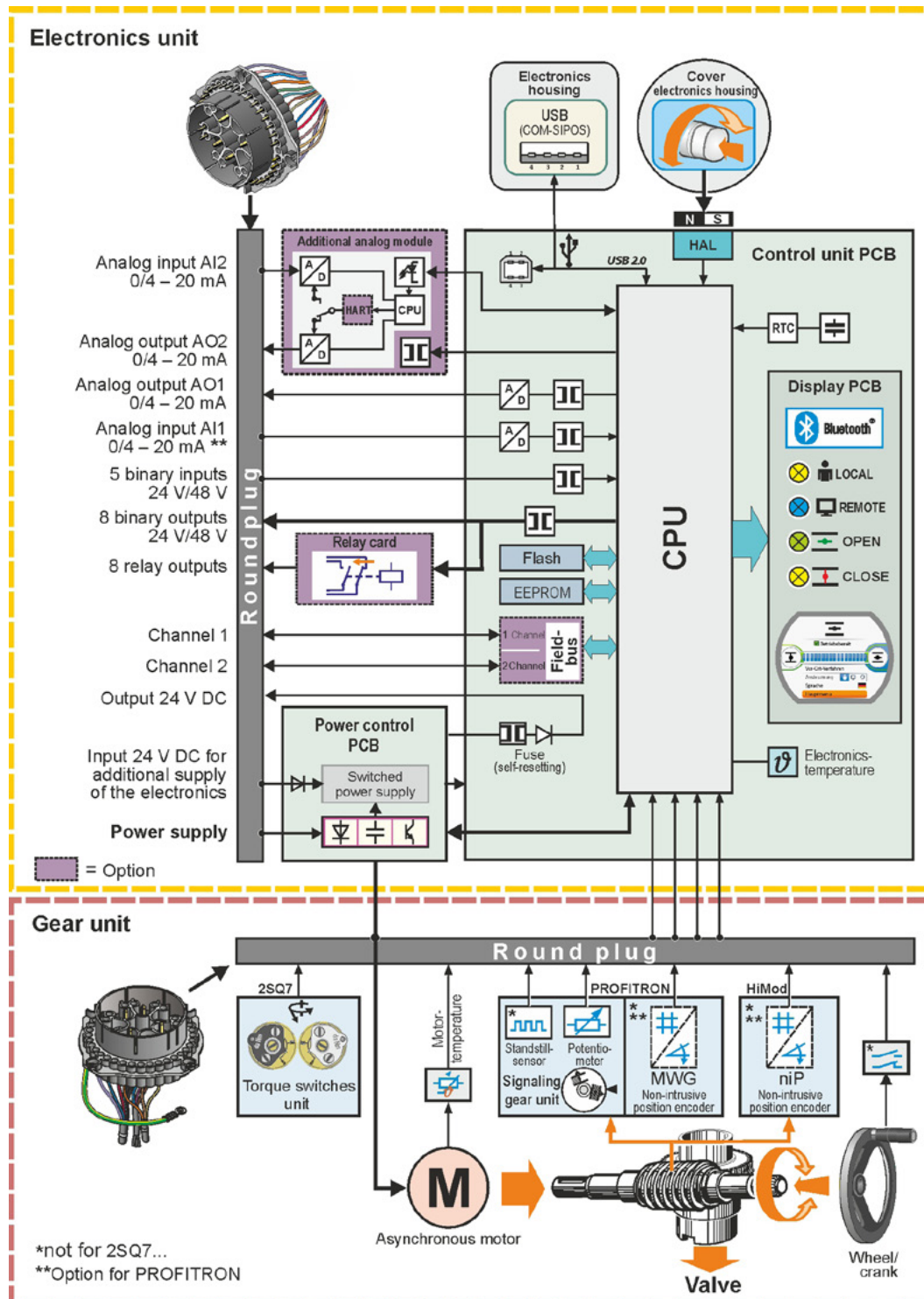


Fig.: Block diagram

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!
- 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.
- The bolts used upon delivery are not greased. 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 SIPOS 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 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 order 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 lubrication nipple (2) until lubricant is discharged between the centering ring (5) and the stem nut (4).

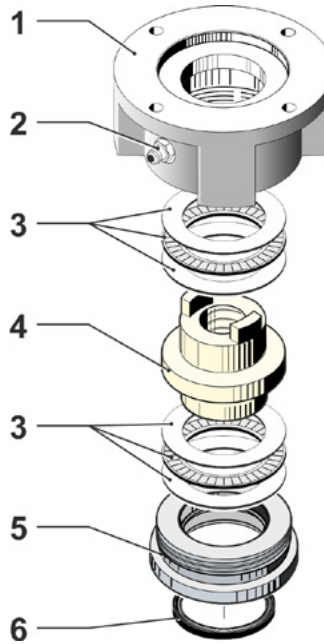


Fig.: Output shaft type A assembly

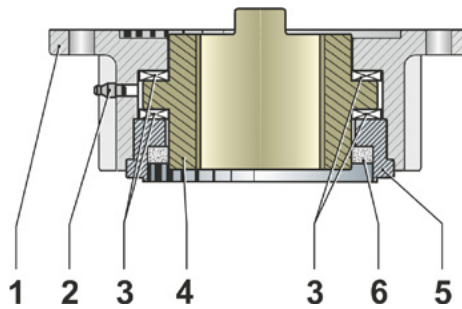


Fig.: Output shaft type A installed



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 protection 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).

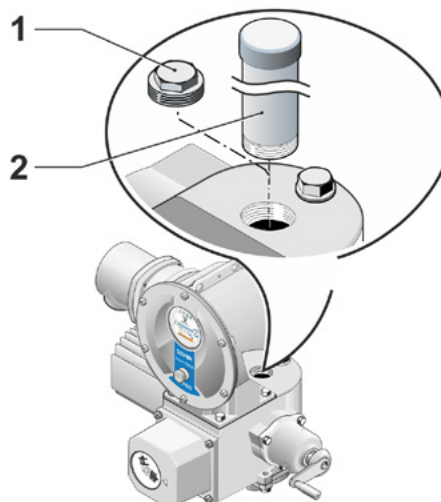


Fig.: Mount stem protection tube

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.
- On site fuses and disconnect switches are required for short circuit protection and enabling the actuator. For the current values for sizing, refer to the 'Technical data'.
- **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 wiring diagram enclosed in the connection housing, 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).

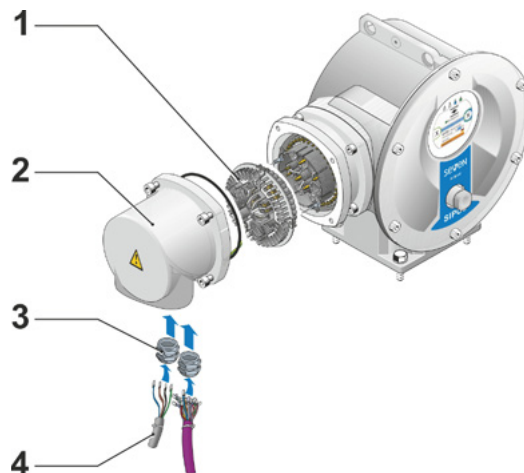
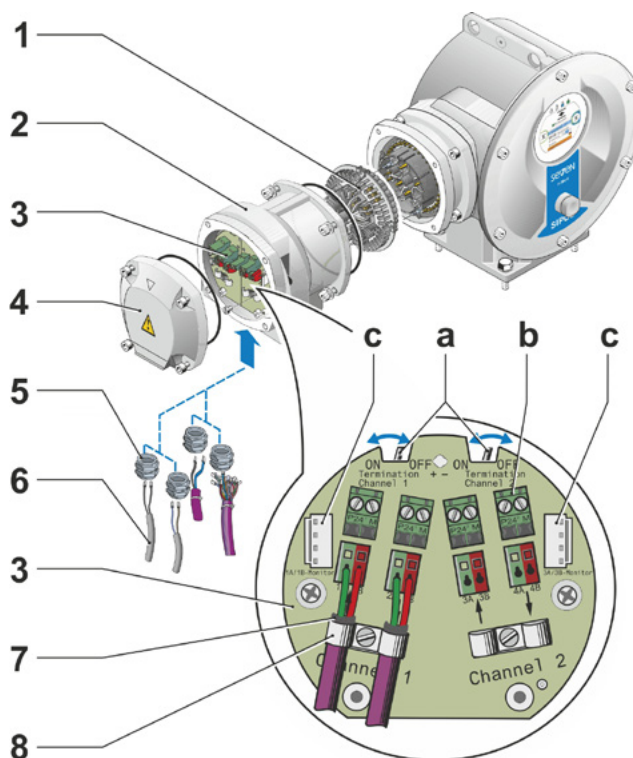


Fig.: Connection with round plug

3.2.2 Fieldbus connection (PROFIBUS/Modbus)

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 connection hood.
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 step 7 below.
5. Connect the mains cables and, if required, signal cables in accordance with the wiring 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 fieldbus 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 fieldbus 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 fieldbus monitor (Protocol Analyzer).

3.2.3 PROFINET connection

1. Dismantle PROFINET connection housing (fig. item 2) and connection cover (4).
2. Unscrew plug element (1) from PROFINET connection housing (2).
3. Unscrew screw plugs only from the required cable entries in the PROFINET connection hood..
4. Screw in the cable glands (5) only slightly and insert the connecting cables (6).
For PROFINET cables, cable glands without shield are sufficient, refer to step 7 below.
5. Connect the mains cables and, if required, signal cables in accordance with the wiring 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 PROFINET connection housing (2) again.
7. Connect PROFINET connection cables to PROFINET connection board (3). Lead shielding (7) under metal clamp (8).
8. Fit connection cover (4) and PROFINET connection housing (2) again.
9. Tighten cable glands (5).

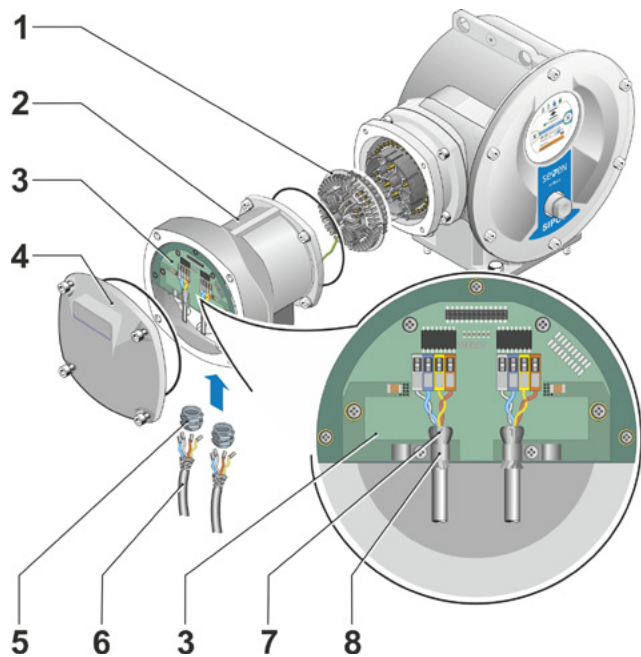


Fig.: PROFINET connection

3.2.4 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).

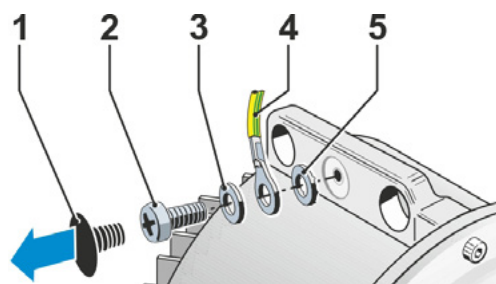


Fig.: Fit potential conductor

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 (8), turn round plug by 90° to 180° and fix screws again. Continue as described in section 3.

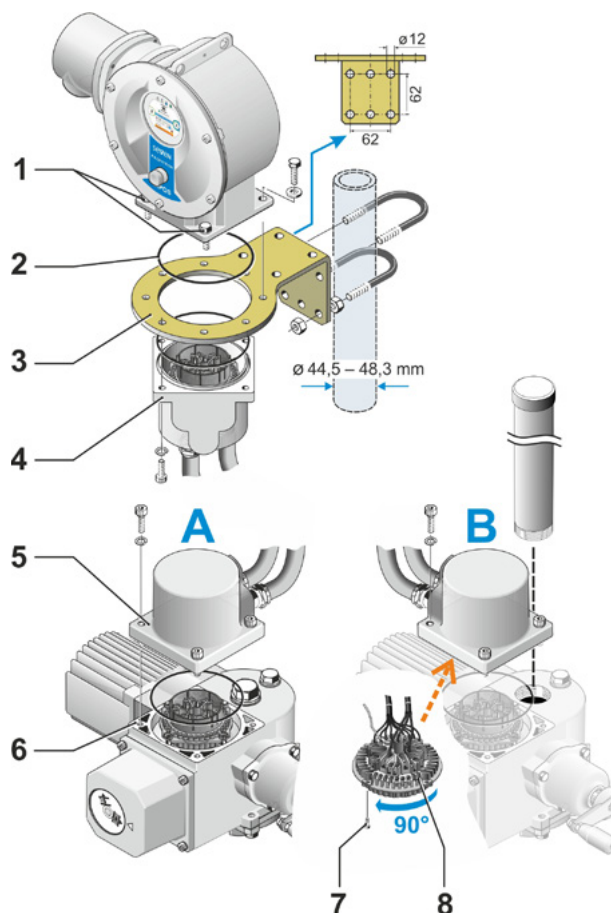


Fig.: Separate mounting
A = standard,
B = with stem protection tube



- 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, 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

The connecting cables are available in different versions:

- 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 '> 10 m with LC filter' has to be set for the 'Separate mounting' parameter. Refer to 'Special parameters' section „8.6.2 Separate mounting“ on page 94.

The actuator can also be equipped with a remote control unit that allows local operation in distances up to 100 m. The remote control unit has the function of a second local control unit. Refer to „9.5 Remote control unit“ on page 107.

4 Instructions on operator control and operation

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 the crank handle/the hand wheel and the housing: Danger of crushing! See the following operation step 3.

The crank handle/hand wheel 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/the hand wheel, if the actuator is exposed to heavy vibration or water pressure (enclosure protection IP68).
3. Press crank handle/hand wheel in direction of the gear housing against the spring force (3) and turn (4). (Caution: Danger of crushing when engaging!)

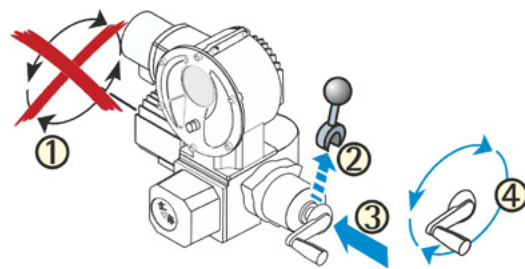


Fig.: Operate crank handle

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.

2SQ7 only:

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

The hand wheel does not rotate during motor operation!

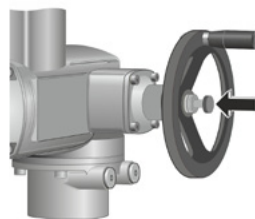


Fig.: Engage manual operation for 2SQ7

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 gear unit installed, the direction of rotation may vary.

4.2 Light emitting diodes (LED) and display

The actuator informs the user via

- Light emitting diodes (LED).
The light emitting diodes (LED) indicate the current status of the actuator.
- Display.
The graphic color displays informs the user on the status of the actuator. Clearly arranged representation and menu structure allow for comfortable operation and parameter setting. The Drive Controller (rotary push button) enables operation directly at the actuator.

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

An overview of the display status indication shows the multitude of information available for the user.

4.2.1 Overview of light emitting diodes

- 1 Depending on the actuator ordered, the colors of the light emitting diodes might vary:
 - a) Standard,
 - b) With add. version C73.
- 2 LED  (CLOSE).
The CLOSE LED is flashing if the actuator moves in CLOSE direction and is continuously illuminated, if the actuator is in end position CLOSED.
- 3 LED  (LOCAL)
The LOCAL LED is illuminated if 'local' control is selected.
- 4 LED  (REMOTE)
The REMOTE LED is illuminated if 'REMOTE' control is selected.
- 5 LED  (OPEN).
The OPEN LED is flashing if the actuator moves in OPEN direction and is continuously illuminated, if the actuator is in end position OPEN.

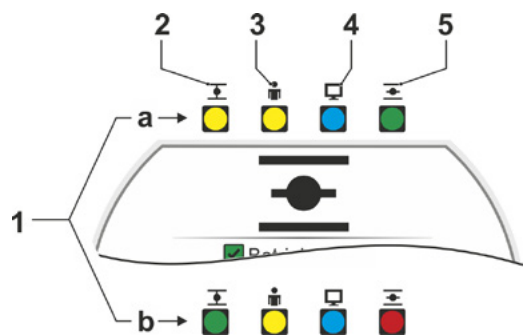


Fig.: LEDs



Further descriptions included in these operation instructions always refer to the standard version of the LEDs.

4.2.2 Overview of status indication

Display areas

If the Drive Controller (rotary push button) is operated in the initial state, the display will be activated and show the status indication. The status indication has two areas, refer to illustration:

- **A** = The upper section provides actuator status information.
- **B** = The lower section shows the start menu which allows access to the different operating and parameterization menus.

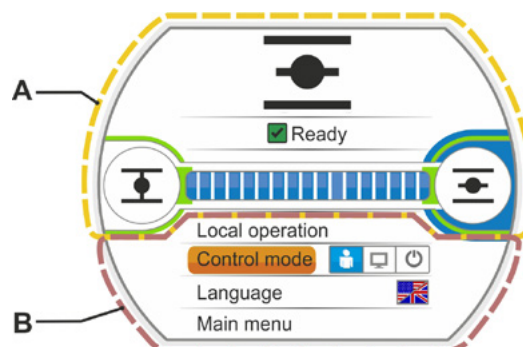


Fig.: Display areas



If the Drive Controller is not operated, the display automatically changes from the active state to the standby state after a preset duration (default value: 10 min.):

- Display illumination is reduced and
- the display changes to standby screen.

Turning or pressing the Drive Controller resets the display to the active state.

Refer also to „Standby screen“ on page 104.

Texts/symbols in the status indication

- 1 Indicates the state of the actuator.
Refer to chapter „4.3 Actuator status indication“ on page 20.
- 2 Position indication.
The figure and the position bar indicate how far the actuator has progressed in position OPEN.
The decimal places are displayed in accordance with the actuator variant:
 - HiMod – two decimal places;
 - PROFITRON with niP/MWG – one decimal place;
 - PROFITRON with signaling gear – no decimal place.

If the actuator is in one of the end positions, an end position symbol is indicated instead of the number, refer also to fig. 2.

- 3 Symbol for end position OPEN , end position CLOSED .
- For a detailed description, refer to the following section „End position symbols and position bars“.
- 4 Symbols for control mode.
They indicate the selected control mode: 'LOCAL' , 'REMOTE'  or 'OFF' , refer to chapter „5 Start menu“ on page 28.
- 5 Flag of the selected language.
- 6 Start menu. For a detailed description, refer to chapter „5 Start menu“ on page 28.

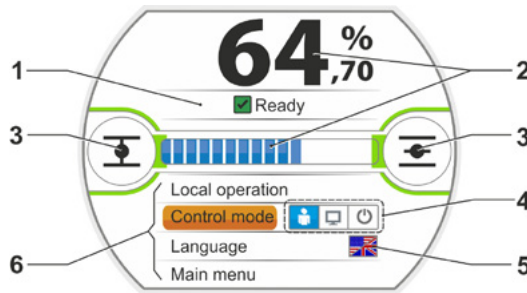


Fig. 1: Status indication

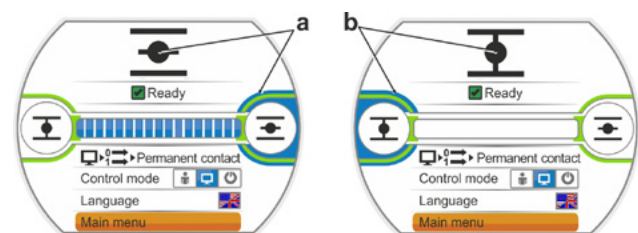


Fig. 2: Actuator in end position:
a = End position OPEN;
b = End position CLOSED

End position symbols and position bars

The top area of the status indication provides information on the cut-off mode in the end positions and on the current status of the actuator.

- 1 Cut-off mode in end positions:
 - 1a = Orange closed circle means 'torque-dependent cut-off mode'.
 - 1b = Green open circle means 'travel dependent cut-off mode'.
- 2 End position range indication:
 - 2a = End position range of end position CLOSED.
 - 2b = End position range of end position OPEN.

The length of the indication bar represents the scope of the end position range.
- 3 Indication during operation:
 - 3a = The position bar indicates the progress during operation (opening and closing the valve).
The value indicates in % how far the actuator has been operated to position OPEN.
 - 3b = The symbol of the end position into which the actuator is currently being operated is flashing.

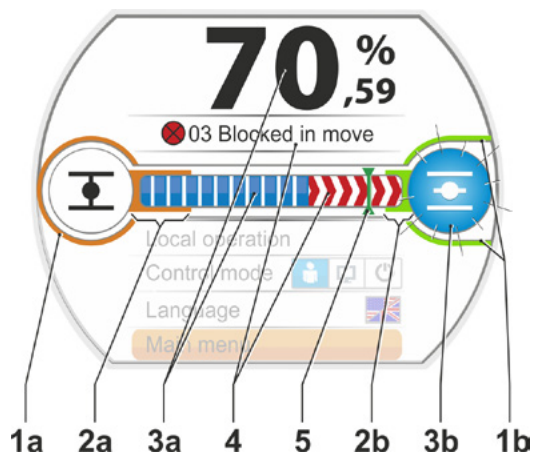


Fig. 1: End position symbols and progress bar

- 4 Should a block occur during operation, the respective status message is indicated and the remaining travel is represented as red hatched area, refer to fig. 2.
- 5 If an EMERGENCY position or a setpoint is being approached, the target position is indicated by a symbol (vertical line on the position bar).
- 6 If the actuator is in one of the end positions, the respective symbol is shaded in blue.

 = Block in OPEN direction
 = Block in CLOSE direction

Fig. 2: Indication of operation direction during block

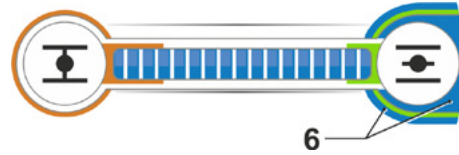


Fig. 3: Indication Actuator in end position OPEN

4.3 Actuator status indication

The actuator state is indicated in the display, refer to fig. item 1.

If a fault has occurred, the display shows a warning symbol (fig. item 2) and a hint with regard to potential causes. If the actuator is not ready for operation, the display is framed in red (item 4).

By selecting the fault signal, additional information, e.g. possible remedies, are indicated.

The figures in front of the message (fig. item 3) refer to the type of fault and allows unambiguous identification by the service staff.

The first digit of the figure signifies:

- 0 = operational state;
- 1, 8 = self-resetting fault;
- 2 = acknowledgeable fault;
- 3 = fault due to external causes;
- 4, 5, 6 = fault within the device.

For a detailed description of possible fault signals, refer to the table below.

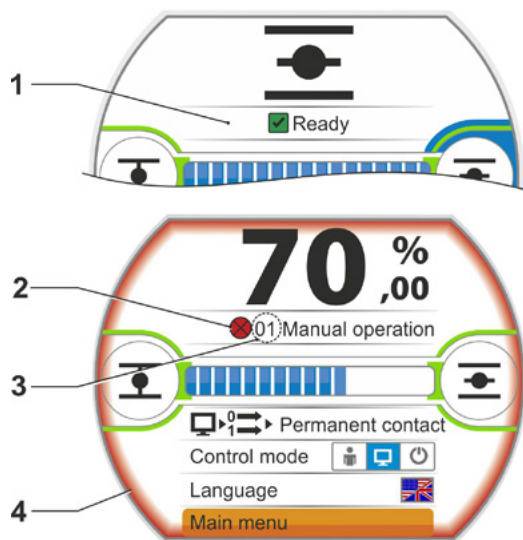


Fig.: Status indication

Status messages in the display including explanation		
Signal	Explanation	Possible remedy
01 Manual mode	■ Hand wheel/crank handle is pressed or ■ Cable to the hand wheel is defective	■ Pull hand wheel/crank handle and/or ■ Check feed cables and contact points of electronics/gear! Should this message occur sporadically, vibration could be the cause. In this case, use brackets. Refer to „4.1 Crank handle, hand wheel“ on page 17.
02 Emergency mode	An EMERGENCY signal is present. The parameterized EMERGENCY position is approached.	

Status messages in the display including explanation		
Signal	Explanation	Possible remedy
03 Blocked in move	A block has been detected within actuator travel. The actually required torque exceeds the tripping torque.	Operate actuator into opposite direction. Should the message occur rather frequently, ■ Check valve and torque setting, increase tripping torque if necessary or use the 'Move again if blocked in move' function! ■ Check MOV for sluggishness.
04 Local blocked	Status signal only! Local control can be disabled via fieldbus or a binary signal (refer to section „8.3.8 MODE input“). In case of a fieldbus communication error, local control is automatically re-enabled.	
05 REMOTE commissioning	Status signal only! Actuator is commissioned in REMOTE mode.	Wait for termination of commissioning in REMOTE mode!
11 Motor temp. too high	The motor has exceeded the maximum temperature of 155 °C. Possible reasons: ■ excessive ambient temperature, ■ excessive runtime, ■ too many switching cycles, ■ actually required torque too high or ■ short-circuited motor coil, ■ parameter for separate mounting '>10 m with filter' not set.	Note: The motor temperature monitoring can be deactivated by programming at the actuator (plant protection has priority over motor protection). However, the warranty for the actuator immediately becomes void. ■ Check operation conditions, valve as well as motor; ■ Check ' Separate mounting ' parameter.
12 Overvoltage	Mains voltage too high (outside the tolerance +15 %).	■ Check connection voltage, ■ Check mains voltage for variations.
13 Undervoltage	Mains voltage too low (outside the tolerance -30 %).	■ Check power supply! ■ Check mains voltage for variations!
14 Power supply fault	Power supply failed or too low.	■ Check power supply! ■ Check connecting cable!
21 Run time error	After 3 % of the positioning time, the actuator has covered less than 0.5 % travel. The positioning time is measured and saved following the end position adjustment. Possible reasons: ■ Potentiometer contacts in the plug/socket connector were ejected. ■ Incorrect assembly and/ or setting of the potentiometer after replacement. ■ Motor cable interrupted (motor is not running). ■ Error during position recording (the gear backlash between potentiometer and central wheel is either too small or too large: No change of position is detected although the motor is running.) ■ Signaling gear ratio was changed: – Signaling gear turns in the opposite direction or – Setting of the slide wheel (rev/stroke) in the signaling gear is too high ■ Actuator is blocked (actuator cannot be operated from position/end position). ■ Faulty potentiometer (film is interrupted). ■ Parameter for separate mounting '>10 m with filter' not set.	■ Check valve, signaling gear, motor as well as potentiometer! ■ Check 'Separate mounting' parameter.

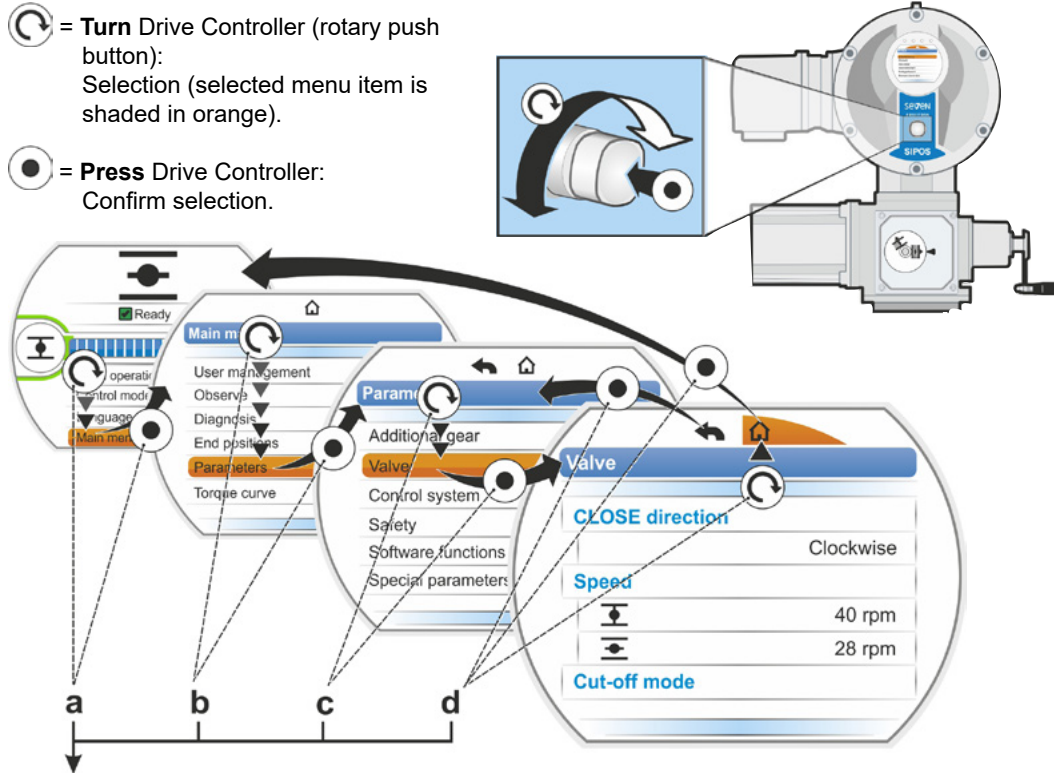
Status messages in the display including explanation		
Signal	Explanation	Possible remedy
22 Process Interlock	STOP input is active. Binary control only: Pulse contact.	Deactivate STOP input. Refer to chapter „8.3.3 Control system – Control mode“ on page 76.
24 Motor lock	The 'Enable motor operation' function is selected for the mode input, however the signal for enabling motor operation is missing.	Verify voltage level at mode input or deselect function if activated by accident.
30 Execute last command	No signal from signal source (wire break). The actuator continues to complete the last command according to parameterization (OPEN, CLOSE, setpoint). The actuator can be operated in 'LOCAL' control (e.g. hand wheel, emergency operation, alternative control mode).	Check cables/contacts in the round plug.
31 Set end positions!	No valid end position adjustment available. The indication may have the following reasons: ■ End position adjustment has not yet been performed, ■ End position was passed due to hand wheel operation, ■ Friction coupling of the signaling gear was twisted or the signal gear reduction was changed or ■ Cut-off type was changed (e.g. from torque-dependent to travel-dependent)	Perform end position adjustment!
32 No AI1 signal	This indication is only possible for live-zero setting (4 – 20 mA). Threshold I: > 21 mA or < 3.6 mA, or programmed values for detection of wire break (refer to chapter 8.6.12) exceeded or fallen short of.	Check input current!
33 Fault fieldbus	Fieldbus communication interrupted (timeout). This error status is only signaled as a fault if the REMOTE control is performed via fieldbus. Note: The fieldbus address must deviate from the default setting (126 for PROFIBUS and 247 for Modbus)!	Check fieldbus communication and connection!
34 No signal – Pos. held	No signal from signal source (wire break). Actuator stops. The actuator can be operated in 'LOCAL' control (e.g. hand wheel, emergency operation, alternative control mode).	Check cables/contacts in the round plug.
35 No signal – EMERGENCY pos.	No signal from signal source (wire break). Actuator performs an EMERGENCY operation. The actuator can be operated in 'LOCAL' control (e.g. hand wheel, emergency operation, alternative control mode).	Check cables/contacts in the round plug.
36 Keep actual process value	No signal (setpoint) from signal source (wire break). When detecting a wire break, the last detected actual process value will still be controlled. The actuator can be operated in 'LOCAL' control (e.g. hand wheel, emergency operation, alternative control mode). After change-over to 'REMOTE', the available actual process value will be controlled.	Check cables/contacts in the round plug.

Status messages in the display including explanation		
Signal	Explanation	Possible remedy
37 Move to fixed setpoint	No signal from signal source (wire break). Fixed process setpoint is approached and maintained. The actuator can be operated in 'LOCAL' control (e.g. hand wheel, emergency operation, alternative control mode).	Check cables/contacts in the round plug.
38 No AI2 signal	This indication is only possible for live-zero setting (4 – 20 mA). Threshold I: > 21 mA or < 3.6 mA, or programmed values for detection of wire break (refer to chapter 8.6.12) exceeded or fallen short of.	Check input current!
39 No signal FO	For fieldbus with ring topology: No telegram received from one or both sides.	Check feed cables or contact points!
41 No signal motor temp.	Connection to the temperature sensor interrupted.	Check feed cables and contact points of electronics/gear!
42 No signal potentiometer	No data received from the potentiometer.	■ Check feed cables and contact points of electronics/gear! ■ Check feed cables for separate installation. ■ Replace signaling gear.
43 No signal position encoder	No data received from the niP/MWG.	■ Check feed cables and contact points of electronics/gear! ■ Check feed cables for separate installation. ■ Replace niP/MWG.
44 End position overrun	Position of the central wheel is too close to the mechanical end stop of the signaling gear. ■ The end positions have been exceeded by hand wheel operation or ■ the friction coupling in the signaling gear was twisted or the signaling gear ratio was changed.	End position re-adjustment required. ► refer to chapter „7.4 Adjust end positions for version with signaling gear“ on page 54.
45 No signal standstill sensor	No data received from the standstill sensor.	■ Check feed cables and contact points of electronics/gear! ■ Check feed cables for separate installation.
46 Analog add-on module	No signal received from additional analog module.	■ Check ribbon cable to analog module. ■ Switch voltage on/off (AC/DC). If the indication is still displayed, replace electronics unit.
47 Failure HART Comm.	Analog module defect. No HART communication possible.	Switch voltage on/off (AC/DC). If the indication is still displayed, replace electronics unit.
48 Fault AO2	No analog output via AO2 possible.	Switch voltage on/off (AC/DC). If the indication is still displayed, replace electronics unit.

Status messages in the display including explanation		
Signal	Explanation	Possible remedy
49 No signal AO2 Connection between AO2 and DCS interrupted.		Check feed cables or points of contact!
50 Fault hardware Fault within the electronics.		Switch voltage on/off (AC/DC). If the indication is still displayed, replace electronics unit.
55 Parameter memory Fault internal parameter memory. Some or all parameters had to be reset to factory settings.		Check parametrization. Acknowledge fault.
60 Fault Bluetooth Communication fault in the Bluetooth module. The actuator still is ready for operation and can be programmed using the local control station or COM-SIPOS.		Switch voltage on/off (AC/DC). If the indication is still displayed, replace electronics unit.
61 Electronics temperature Electronics temperature sensor defective. The actuator is still ready for operation.		Switch voltage on/off (AC/DC). If the indication is still displayed, replace electronics unit.
62 Fault position encoder Bad signal quality of non-intrusive position recording (niP/MWG); position cannot be validated.		■ Check feed cables and contact points of electronics/gear! ■ Check feed cables for separate installation.
63 No signal torque switch 2SQ7 only: Signals from both torque switches are not recognized.		■ Check feed cables and contact points of electronics/gear! ■ Check feed cables for separate installation.
80 Warning RCU No connection to the remote control unit.		■ Check feed cables or points of contact! ■ Verify parameterization of the remote control unit at the actuator and at the remote control unit.
90 Fault hardware The signature of the control electronics PCB is either missing or incorrect. If, for example, older actuators are equipped with firmware version V3.12 or higher, the present fault signal will be display due to missing signature.		Request the current control PCB via service@sipos.de , stating the current parameterization (COM-SIPOS file).

4.4 Navigation through the menus

4.4.1 Operation of the Drive Controller



Operation sequence:

- a** = Select 'Main menu' and confirm . Display changes to 'Main menu'.
b = Select 'Parameter' and confirm . Display changes to 'Parameter' menu.
c = Select 'Valve' and confirm . Display changes to 'Valve' menu.
d = Select 'Back', or and confirm .
- : Display changes to status indication.
 - : Display changes one level back to 'Parameter' menu.

Representation of operating sequence in the operation instructions:

- a** → Main menu
b → Parameters
c → Valve
d → or



If the Drive Controller is not operated for a preset time (default value: 10 min.), the display changes from the active state to the standby state.

- Display illumination is reduced and
- the display changes to standby screen.

Turning or pressing the Drive Controller resets the display to the active state.

Refer also to „Standby screen“ on page 104.

4.4.2 Explanation of symbols, texts within menu

Overview of a menu

- 1 Name of the menu.
- 2 Reference to further menu items above/below within the menu.
- 3 Selected menu item (shaded with an orange bar).
- 4 Menu items, selections within the menu.
- 5 Progress bar, indicates that there are further menu items than currently displayed.
- 6 Slider, changes its position on the scrollbar according to the position of the selected item within the menu.
- 7 Return to previous menu level.
- 8 Return to status indication.

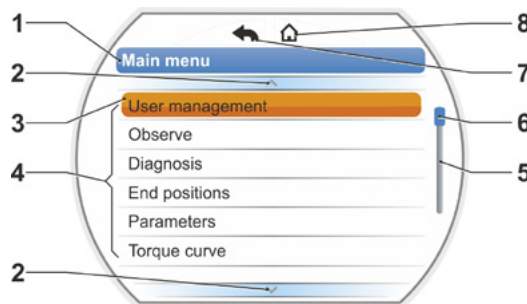


Fig.: Overview of a menu

Parameter selection

Select parameter first (shaded in orange) to change the value/characteristics of a parameter. The figure on the right shows the example of the selection of a parameter to be changed:

- 1 Name of the menu
- 2 Parameter name (cannot be selected)
- 3 Selection marker
- 4 Parameter value (current setting)

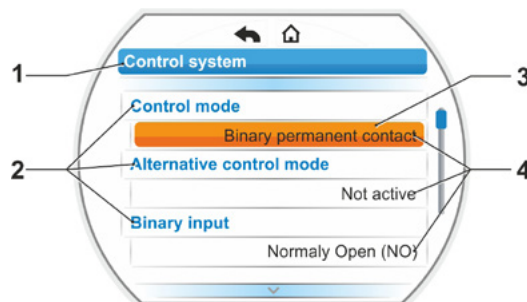


Fig.: Parameter selection menu

Changing parameter values/ characteristics

Adjustment varies depending on the type of parameter.

Either/or setting

Select parameter value/characteristics out of two possible options, like for example, for the cut-off mode: Either 'torque-dependent' or 'travel-dependent', refer to illustration on the right:

- 1 Parameter name 'Cut-off mode' (cut-off mode in end position CLOSED)
- 2 Selection marker (orange bar)
- 3 Possible parameter values/settings
- 4 Setting active
- 5 Setting not active

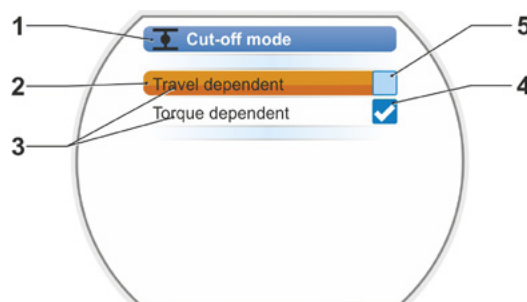


Fig.: Cut-off mode end position CLOSED menu

Yes/no setting

Furthermore, one or several settings/parameter values can be set to active. Active settings are ticked refer to fig. item 4.

Step-by-step setting

Depending of the parameter, parameter values are modified in predefined steps e.g. for tripping torque adjustment.

- 1 Parameter name
- 2 Operation direction. In this example, the setting applies to operation in CLOSE direction.
- 3 Current setting, indicated as number. If changed, the color of the number changes from blue to orange.
- 4 Current setting, graphic representation with regard to the entire setting range.
- 5 Setting range, from ... to ...
- 6 Unit of the parameter value.

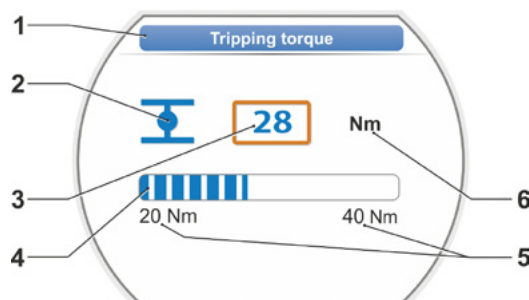


Fig.: Change parameter value

Digit setting

Some settings require entry of a multi-digit figure such as the 4-digit enable code for special functions. The parameter value can be directly entered as figure.

- 1 Parameter name.
- 2 Current setting, indicated as number. If changed, the color of the number changes from blue to orange.
- 3 Current setting, graphic representation with regard to the entire setting range. Possible setting range <----->, in the above example 0 to 100 %.
- 4 Setting acknowledgment.
- 5 Setting aborted.

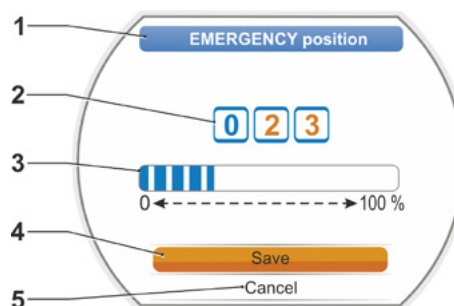


Fig.: Change numerical value



The following generally applies:

- Black writing = Function/setting can be selected.
- Gray writing = Function cannot be selected since access rights are insufficient, refer also to chapter „6 User management“ on page 33.

5 Start menu

- 1 Depending on the selected control mode, this menu line is active:
 - If 'LOCAL'  control is selected, 'Local operation' is displayed in this menu line.
 - For 'REMOTE'  control further information on control mode REMOTE is displayed here.
- 2 Control mode:
Change over between 'LOCAL', 'REMOTE' or 'OFF'.
- 3 Language selection:
The display language is selected via this menu item. In addition to the text in the desired language, the respective flag is displayed.
- 4 Main menu:
Access into the main menu for observing, parameterization of the actuator as well as end position setting.

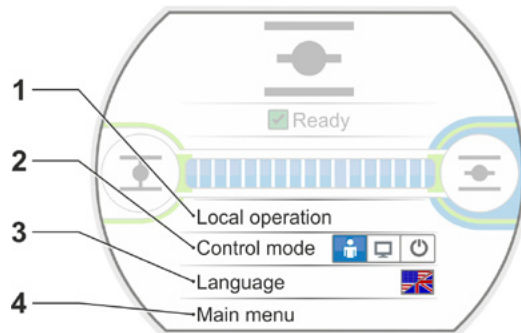


Fig.: Start menu

5.1 Control mode

Use the 'Control mode' menu item to change between 'LOCAL', 'REMOTE' and 'OFF'. The following table indicates the actuator control mode and which parameters can actually be changed and which parameters can only be displayed.

Display/change parameters at the actuator			
Menu	Control mode		
	LOCAL	REMOTE	OFF
Parameters	Display = O, Change* = X		
Language selection	X	X	X
Operate actuator	X	–	–
Observing			
Electronic name plate	O	O	O
Inputs and outputs	O	O	O
Actuator status	O	O	O
Diagnosis			
Operating data of actuator	O	O	O
Maintenance limits	O	O	O
Valve maintenance	O	O	O
End position adjustment			
Parameters	X	–	–
Parameter values	X	O	X
USB flash drive			
Firmware update	X	–	X
Download parameters to USB flash drive	X	X	X
Upload parameters from USB flash drive	X	–	X
Save log data on USB flash drive	X	X	X
Save torque curves	X	X	X
Clone actuator	X	–	X
System settings			
Display orientation	X	O	X
Latching function in local operation	X	O	X
Real time clock	X	O	X
Bluetooth activation	X	O	X
Remote control unit	X	O	X

*if the selected user level has sufficient access rights.

5.1.1 'LOCAL' control mode: 'Local' actuator operation

If 'LOCAL' control is selected, the menu item 'Local operation' is displayed. Via this menu item, the actuator can be operated locally (OPEN, CLOSE as well as STOP), control from 'REMOTE' is disabled.

Operation sequence

1. Select 'Control mode' menu item.
2. Press Drive Controller until symbol for LOCAL is active, fig. 1, item 1.
'Local operation' is displayed in the line above (refer to item 2) and the yellow LOCAL LED is illuminated (item 3).



Should the message appear that the function cannot be performed with the logged on access level, change the access level, refer to chapter „6 User management“ on page 33.

3. Select 'Local operation' menu item and confirm.
'Local operation' is indicated in the display, refer to fig. 2, item 1.
4. Select direction of operation (refer to fig. 3 on the right):
 - a: Symbol  = operation in CLOSE direction
 - or
 - b: Symbol  = operation in OPEN direction

Selected end position symbol is shaded in orange.

5. Press Drive Controller.
The actuator operates and
 - The end position symbol in operation direction, in our example end position OPEN, is flashing in blue (fig. 4, item 3);
 - The value (item 1) indicates in % how far the actuator has been operated to position OPEN and
 - The position bar (2) indicates the progress of the operation;
 - If a torque measurement flange is connected, the current torque will be indicated (5).

If the Drive Controller is held down for more than 3 seconds, 'Latching active' (fig. 4, item 4) is indicated in the display and the actuator resumes operation once the Drive Controller is released until;

- the end position or the target position has been reached or
- the Drive Controller is pressed once again.

Once the end position has been reached, this is indicated by the blue field behind the end position symbol (fig. 5, item d) and the respective LED is illuminated.



- In the LOCAL state, all changes (display language, end positions, parameters values) are possible, if you have sufficient access rights. Refer to table above.
- The 'latching' function can also be deactivated, refer to chapter „9.1.3 Operation – latching function“ on page 104.

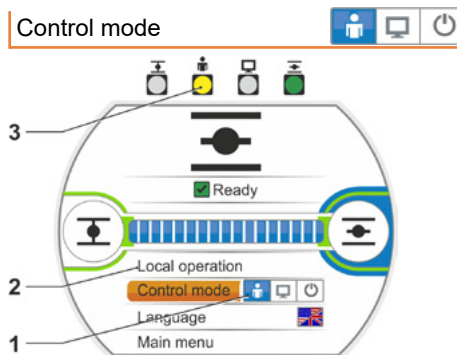


Fig. 1: Control mode Local operation



Fig. 2: "Local operation" indication



Fig. 3: Selection operation direction

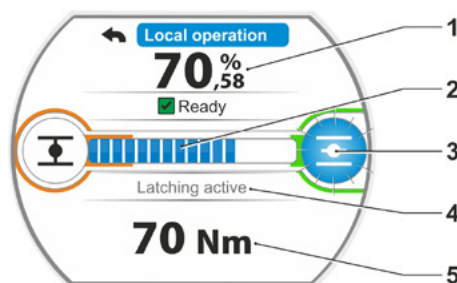


Fig. 4: Indication during operation

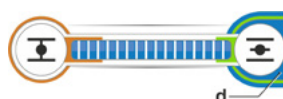


Fig. 5: Actuator in end position indication

5.1.2 'REMOTE' control mode:

In the REMOTE state, the actuator is controlled by the automation system (DCS).
In the REMOTE state, the display language can be selected and parameters be read.

Operation sequence

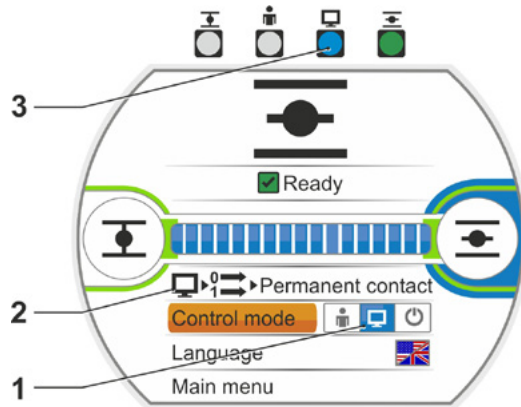
1. Select 'Control mode' menu item.
2. Press Drive Controller until symbol for remote is active, fig., item 1.
Additional information on the control mode is displayed in the line above (item 2) and the blue REMOTE LED is illuminated (item 3).
Actuator control is performed via the automation system, e.g. the DCS.



If LOCAL control is changed to 'remote' control, the actuator is operated if an operation command by the automation system (DCS) is present!

In REMOTE mode, the following can be performed on the actuator without interrupting operation:

- Selecting another language.
- Use the main menu to access information on the actuator, refer to table in chapter „5.1 Control mode“ on page 28.

**Fig.: Remote control mode****5.1.3 'OFF' control mode:**

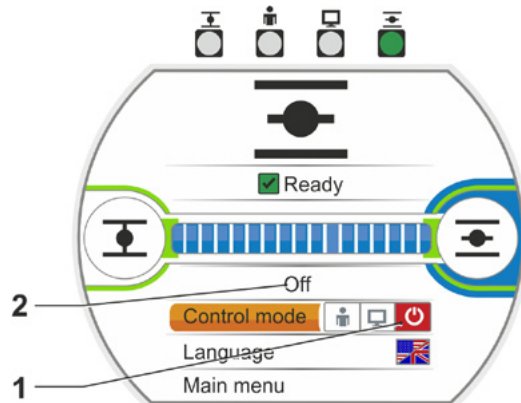
In this state, local or remote actuator operation is not possible.

Operation sequence

1. Select 'Control mode' menu item.
2. Press Drive Controller until symbol for OFF is active, fig., item 1.
The message 'OFF' is displayed in the line above refer to fig., item 2.

Now the following options are available at the actuator:

- Selecting another language.
- Use the main menu to change parameters and system settings as well as to display information on the actuator and valve maintenance, refer to table in chapter „5.1 Control mode“ on page 28.

**Fig.: Off control mode**

5.2 Language selection

Language selection is only required if the text in the display is not shown in the desired language.

Operation sequence

1. Select 'Language' in the start menu (fig. 1).
Display changes to the Language menu, refer to fig. 2.
The currently selected language (fig. 2, item 1) is displayed as well as a list with the symbols (flags) of the languages which can be selected.
The scrollbar (item 3) indicates, that more languages can be selected than those currently indicated in the display.
2. Set the orange selection marker (fig. 2, item 2) to the desired language.
3. Confirm selection.
Display texts are indicated in the selected language.

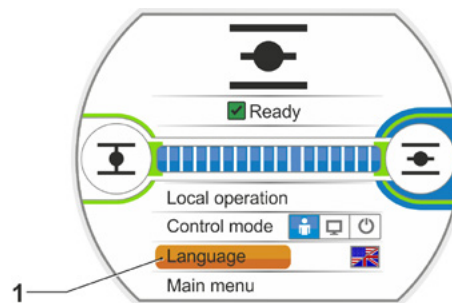


Fig. 1: Language selection within status menu



Fig. 2: Language menu

5.3 Main menu overview

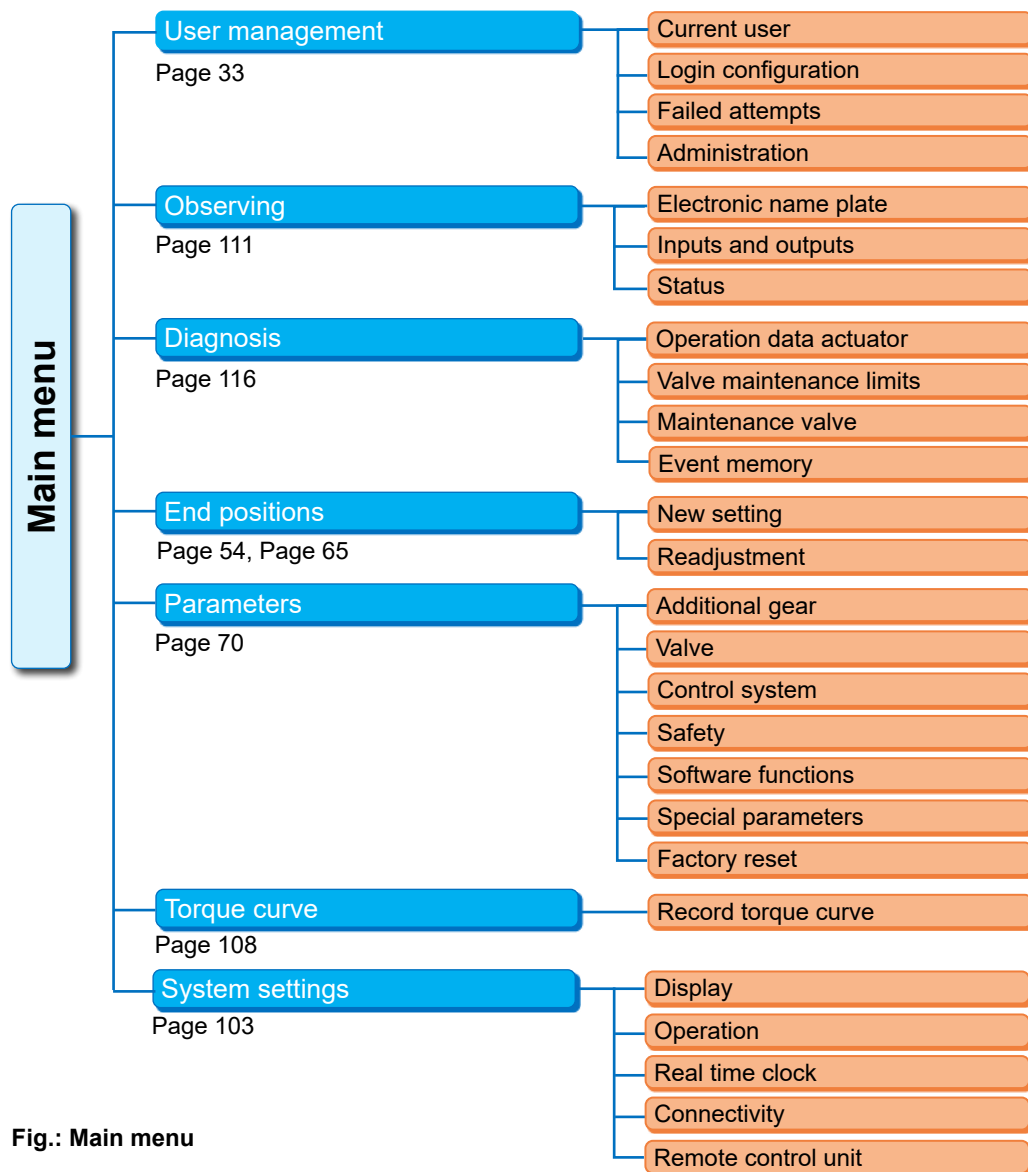


Fig.: Main menu

The main menu contains the following menu items:

- **User management:** For enabling access authorization.
- **Observing:** Indication
 - ‘Electronic name plate’,
 - Input and output status and
 - Actuator status.
- **Diagnosis:** Indication
 - of operating data (number of starts, cut-offs, operating hours) of the actuator since initial commissioning;
 - of operating data until next maintenance of the valve;
 - whether maintenance of the valve is required or not as well as confirmation of performed maintenance;
 - in the Event memory various events are recorded with a time stamp.
- **End positions:** End positions can be set via this menu item.
- **Parameters:** This menu is used to display and change the actuator parameters. Parameter values can only be changed with user level ‘Supervisor’ or higher.
If the access authorization has not been generally enabled, a prompt to enter the password is displayed (4-digit code).
- **Torque curve:** Three torque curves can be recorded.
- **System settings:** Display orientation and internal clock settings as well as activation/deactivation of the latching function, the Bluetooth module, the USB port and the remote control unit.

6 User management

6.1 General information

To ensure that unauthorized persons do neither change the parameters by accident nor willfully, many functions as well as parametrization can only be accessed with a permission.

6.1.1 User levels (permissions)

The permissions for operating the actuator are subdivided into levels, the user levels. The table below shows the user levels and the respective permissions:

User levels and their permissions	
User level	Grants access to
Observer	Read parameters - Parameters can be displayed but not changed. - Permission not required.
Operator	Operate actuator - Parameters can be displayed but not changed. - Local actuator operation is possible. - Permission required.
Supervisor	Write 'simple' parameters - Parameters can be displayed. - Parameterization of 'simple' parameters. - Local actuator operation is possible. - Permission required.
Expert	Write 'expert' parameters - Like for 'Supervisor' but in addition: - Parameterization of expert parameters. - Load firmware and parameters from USB flash drive, clone actuator. - Permission required.
Administrator	Manage users, write Bluetooth and USB parameters - Like for 'Expert' but in addition: - Parameterization of administrator parameters - Change of all passwords possible (for login setting 'User levels' and 'Strong password'). - Change of login setting or creation of user accounts. - Change of Bluetooth and USB parameters - Permission required.

6.1.2 Login configuration and access protection

Via the 'Login configuration' menu, you can select between different variants of access protection:

- 'User levels':
Each user level can be protected against unauthorized access by an individual 4 digit password .
This access protection is set by default. Or
- 'Strong password':
Each user level can be protected by an individual 'strong' password, consisting of up to 20 alpha-numerical characters, against unauthorized access. Or

■ 'User account':

Each operator can be assigned an individual, personal user account, consisting of a name and a password comprised of up to 20 alphanumeric characters, for the operation of the actuator.
Each operator can be assigned a user level (permission).

The following table show the potential access protection to the user levels/user accounts.

	Access protection		
	4-digit password (0 – 9)	20-character password: (123.../Abc...)	Name + 20-character password
Login configuration¹⁾ ▶	'User levels' ⁽²⁾	'Strong password' ⁽²⁾	'User account' ⁽²⁾
User levels	Default password setting	Default password setting	No default- password setting
Observer²⁾	---	---	---
Operator	0000	0000	Password must be assigned when creat- ing the user account.
Supervisor	9044	9044	
Expert	9044	9044	
Administrator	9044	9044	
Change password subsequently	in the logged on user level.	in the logged on user level.	in the own user account.
1) Changing the login configuration is only possible with administration rights. 2) The 'Observer' user level is not protected by a password. In this user level, parameters can be viewed but not changed.			

6.2 General procedure

6.2.1 Set up user management

In the 'Login configuration', the type of access protection is defined and how the operators should log in either via

- 'User levels' (4-digit password, default), **or**
- 'Strong password' (individual password with up to 20 alphanumeric characters), **or**
- 'User account' (name and password with up to 20 alphanumeric characters).

'User levels' (default):

If the default login via 'user levels', change the preset 4-digit passwords or the user levels, refer to the following chapter 6.4.1 on page 40.

'Strong password':

1. Change user level to 'Administrator', refer to chapter 6.3.1 on page 36.
2. Change login configuration (access protection) from 'User levels' to 'Strong password' (refer to chapter 6.3.2 on page 37).

Now, a 'strong password' can be assigned to any desired user level, refer to chapter „6.3.3 'Strong password': Change password“ on page 37.

'User account':

1. Change user level to 'Administrator', refer to chapter 6.3.1 on page 36.
2. Change **login configuration** to 'User accounts' **and** create an **own user account** (refer to chapter 6.3.4 on page 38).
3. For any further operator, create a user account (name and 'password') (refer to „Create new user account“ on page 39).

6.2.2 Log in to actuator

Depending on the login configuration:

- **'User levels'**: Log on to the desired user level using the 4-digit password, refer to chapter 6.4.1 on page 40.

Or

- **'Strong password'**: Log in the desired user level with the 'strong password', refer to chapter 6.4.1 on page 40.

Or

- **'User accounts'**: Select personal user account and log in with the pertaining password, refer to chapter 6.4.3 on page 42.

6.2.3 Log out from the actuator

In the 'User management' menu --> set 'Observer'.

Should the actuator not be operated during the set standby time (default: 10 minutes), the current user will automatically be logged off to the 'Observer' user level (default setting). Exception if „0000“ was assigned as password, refer to the following chapter „6.2.4 Rules“.

6.2.4 Rules

- No access protection - enable user levels (for 'User levels' login configuration only):
 - For the 'Operator' user level, password '0000' has been preset. The user level remains automatically enabled by password '0000'.
 - Any user level can remain enabled if it was assigned the password '0000', including all lower user levels.
- If the actuator is not operated during the set standby time (default 10 minutes), it switches to the 'Observer' user level (default setting) or for login via 'user levels' to the highest enabled user level, i.e. the current and all lower user levels were assigned the password '0000'.
- The change of the login configuration to a 'strong password' or 'user account is only possible as administrator.
- User account: Each operator can individually change the password assigned in their own user account. This change is not visible for the administrator. If the password was forgotten, the administrator must delete the user account and create it again.
- User levels/strong password: If you have forgotten the password or the strong password of a user level, it can be reset with the next higher user level, 'Administration' menu item.
- Notes on password entry:
 - Only when creating a user account will you have to repeat the password and receive confirmation that the password has been changed.
 - Note on operation during password entry:

- 1 Display of the entered characters. During password entry, only the last entered character will be visible.
- 2 Orange marker indicates the selected character or the selected function (refer to position 3, 4, 6).
- 3 Changes between upper case and lower case letters.
- 4 Changes between characters and digit entry.
- 5 Adds blanks.
- 6 Deletes the last entry.

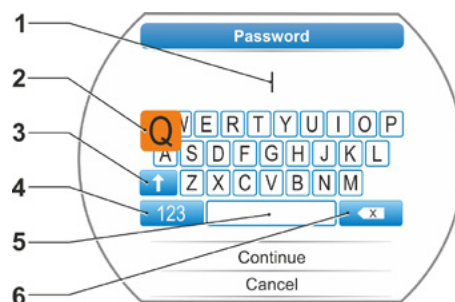


Fig.: Password entry

6.3 Perform settings

Changing the login configuration of 'User levels' to a 'Strong password' is only possible as administrator. The following description applies to initial commissioning.

6.3.1 'User levels': Log in as 'Administrator'

1. Select 'User management' in the main menu.
2. Set the orange selection marker to the line below 'Current user' (fig. 2 item 1).
3. Confirm selection: Press Drive Controller (fig. 2, item 2).
Display changes to 'Current user' menu. The current user level is ticked ☒.
4. Select desired user level; set orange selection marker to the desired 'User level', in our example 'Administrator' (fig. 2, item 3).
5. Confirm selection (item 4).
Display changes to prompt of the 4-digit password, the frame of the first digit is shaded in orange.
6. Press Drive Controller (5). The 0 digit is displayed.
If the user has not yet entered an individual password, the default password applies (refer to „Default setting“ in table in the previous chapter 6.1.2).
7. If the displayed digit is
 - a) not to be changed:
Press Drive Controller (7), the frame of the next digit changes to orange, or
 - b) to be changed:
- Turn Drive Controller (6), until the desired digit of the new password is displayed.
- Confirm selection (7). The changed digit is accepted and the next digit is displayed.
8. Operation step 7. (item 6 and 7) until all four digits have been entered. Once the fourth digit has been confirmed, the selection marker jumps to 'Continue'.
9. Press Drive Controller (8).
Display changes to the 'User management' menu, and the 'Current user', in our example 'Administrator', is displayed.

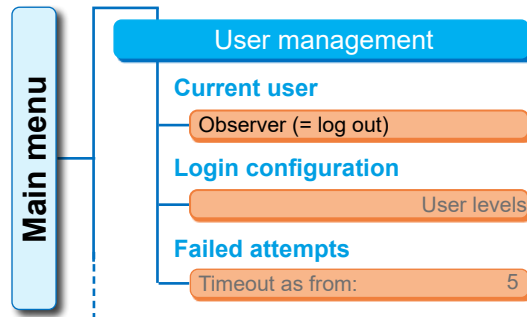


Fig. 1: Extract of User management menu

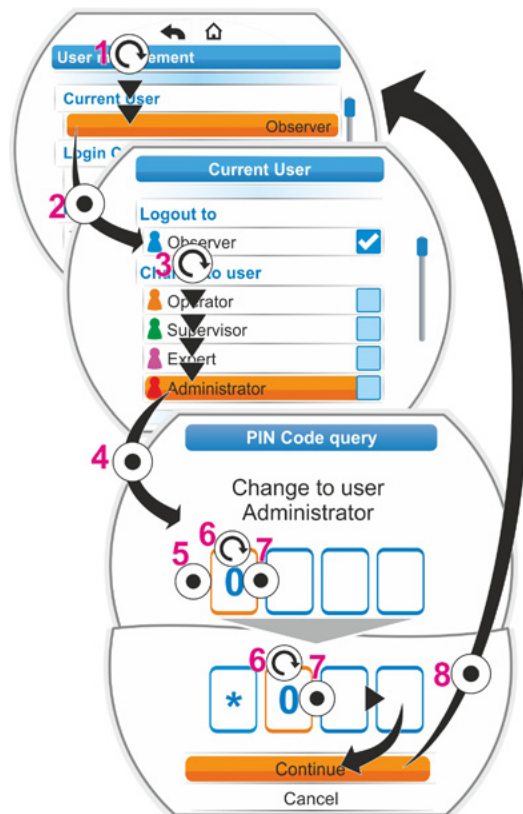


Fig. 2: Enable user level

6.3.2 Set login configuration 'Strong password'

Change login configuration:

Prerequisite:

This chapter continues the operation sequence of the previous chapter, i.e.

- login in the Administrator user level is complete, see above, „6.3.1 'User levels': Log in as 'Administrator'“ on page 36 and
- the display shows the 'User management' menu.

- Set the orange marker to the line below 'Login configuration' (fig. 1 item 1).
 - Confirm selection (fig. 1, item 2).
 - The display changes to the 'Login configuration' screen and the selection marker is on 'User levels'.
 - Set selection marker to 'Strong password' (fig. 1, item 3).
 - Confirm selection (item 4).
 - The message that all passwords are reset to default is shown in the display.
 - Set marker to 'Continue' (item 5) and confirm (item 6).
- The display changes to the 'User management' screen and 'Strong password' is displayed in the 'Login configuration' menu item.
- Now, any user level can be assigned a password with up to 20 characters.

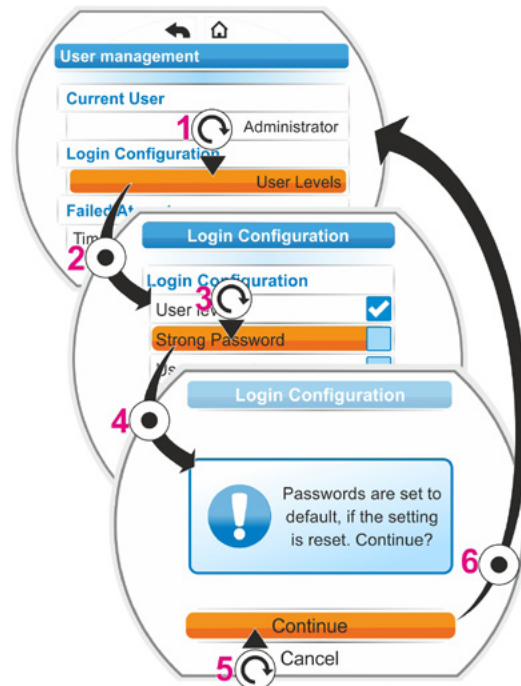


Fig. 1: Change login configuration

6.3.3 'Strong password': Change password

The operation sequence continues the previous operation sequence in the 'User management' menu.

- Turn Drive Controller and set the orange selection marker in the 'Administration' menu item to 'Change password' (fig. 2, item 1).
- Confirm selection (fig. 2, item 2).
- The 'Change password' menu appears with the user levels.
- Turn Drive Controller and select user level; in our example 'Supervisor' (fig. 2, item 3).
- Confirm selection (fig. 2, item 4).
- The display shows the prompt for alphanumeric entry.
- Enter the password for the previously selected user level:
 - Note:** Refer to the description „Entry of password or user name“ on the next page.
 - a) Select the first character (letter or digit) of the new password: Turn Drive Controller and set orange marker to the desired character (fig. 2, item 5a).
 - b) Press Drive Controller (fig. 2, item 5b).
 - The selected character is adopted to the line.

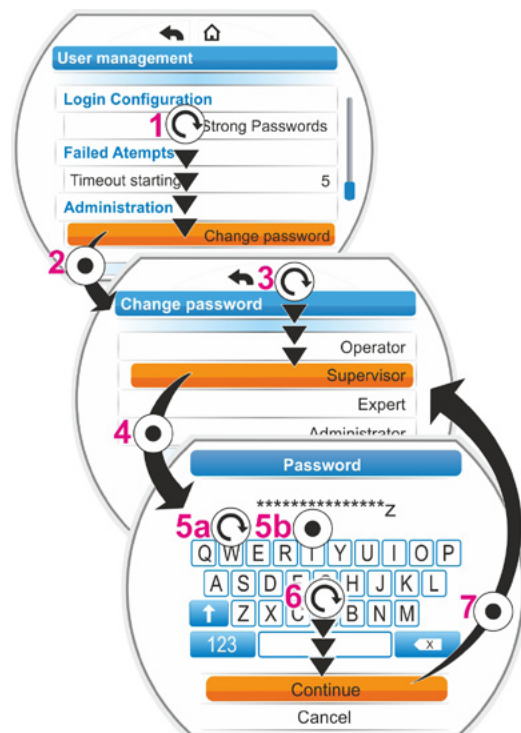


Fig. 2: Assign password to a user level

- c) Repeat a) and b) to enter further characters/digits.
- d) Once password entry is complete, set marker to 'Continue' (item 6) and confirm (item 7). The display changes to selecting another user level.

Note on entry of a password or a user name

- 1 Display of the entered characters. During password entry, only the last entered character will be visible.
- 2 Orange marker indicates the selected character or the selected function (refer to position 3, 4, 6).
- 3 Changes between upper case and lower case letters.
- 4 Changes between characters and digit entry.
- 5 Adds blanks.
- 6 Deletes the last entry.

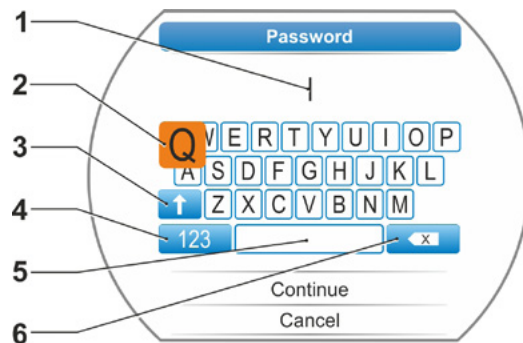


Fig. 3: Password entry

Operation sequence

1. Turn Drive Controller and highlight desired character with the orange selection marker (fig. 3, item 2) or the desired function (items 3, 4, 6).
2. Press Drive Controller. The desired character is adopted to the line (item 1) or the function is executed.

When entering a name, all characters will be visible. When entering a password, only the last entered digit will be visible.

6.3.4 Login configuration: Set 'User account' and create first user account

Prerequisite:

- Login in the Administrator user level is complete, see above, „6.3.1 'User levels': Log in as 'Administrator'“ on page 36 and
- the display shows the 'User management' menu.

1. Set orange marker to 'User levels' (fig. item 1).
2. Confirm selection (fig. item 2).
The display changes to the 'Login configuration' screen and the selection marker is on 'User levels'.
3. Set selection marker to 'User accounts' (fig. item 3).
4. Confirm selection (item 4).
The message that all passwords are reset to default is shown in the display.
5. Set marker to 'Continue' (item 5) and confirm (item 6).
The display changes to the 'User name' screen.
6. Enter user name:
 - a) Select the first character (letter or digit) of the name: Turn Drive Controller and set orange marker to the desired character (item 7a).
 - b) Press Drive Controller (item 7b).
The selected character is adopted to the line.
 - c) Repeat steps a) and b) to enter further characters/digits.
 - d) Once name entry is complete, set marker to 'Save' (item 8) and confirm (item 9).
Display changes to password entry.
7. Enter password (10a, 10b). Entry is identical to that of the name, however, when entering the password, only the last character will be displayed in plain text.
8. Once password entry is complete, set selection marker to 'Save' (11) and confirm (12).
Display changes to repeated password entry.
9. Repeat password entry (13a, 13b), set orange marker to 'Save' (14) and confirm (15).
The password is saved and the message 'Create new user account?' is displayed.

Create new user account

10. If you wish to create another user account, set selection marker to 'Yes' (16) and confirm (17).
The display changes to the user level prompt for the next user account.
 11. Set select marker to the desired user level, in our example 'Supervisor' (18) and confirm (19).
The display changes to the entry of the operator name for whom the user account is being created.
 12. Enter name and password as described from step 15.
- Repeat this procedure for any other operator for whom a user account is to be created.

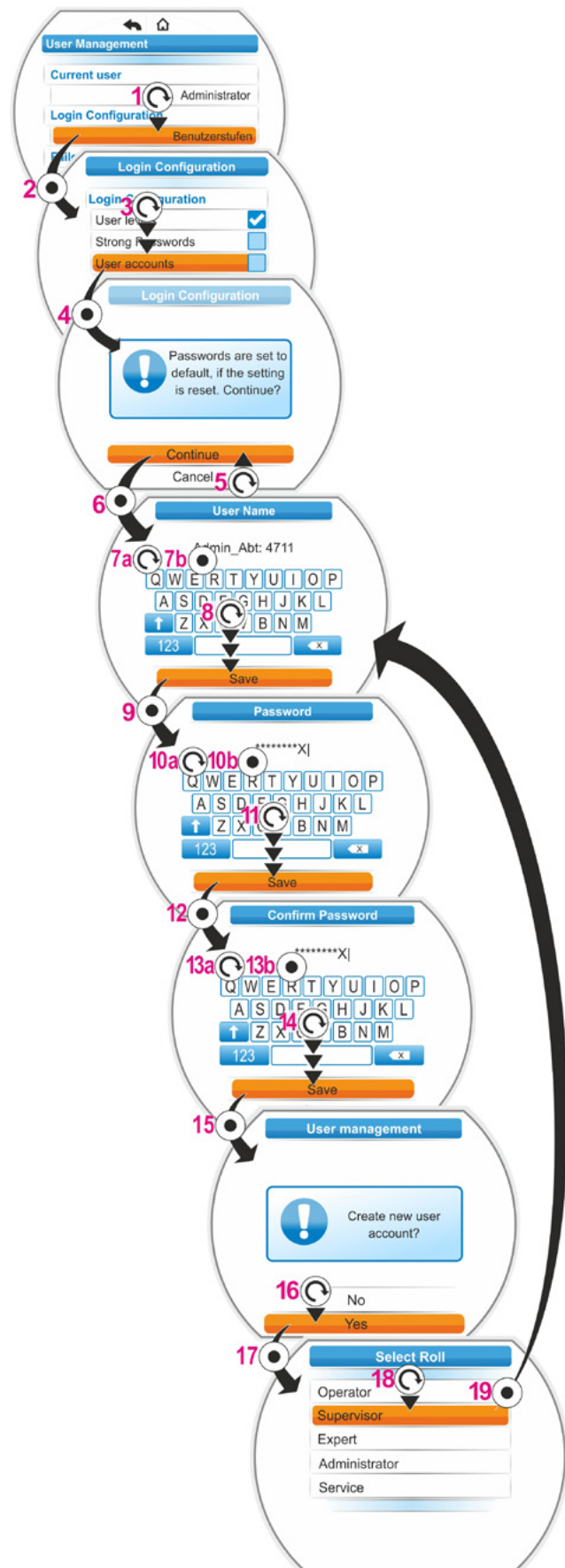


Fig.: Create user account

6.4 Log in to actuator

Depending on the login configuration – ‘User levels’ or ‘Strong password’, or ‘User accounts’ (refer also to chapter 6.3.), logging on to the actuator will vary accordingly.

6.4.1 Log in to ‘User level’ user level using PIN

1. Select ‘User management’ in the main menu. The ‘User management’ menu opens. The login type is shown under the ‘Login configuration’ menu item. In our example ‘User levels’.
2. Set the orange selection marker to the line below ‘Current user’ (fig. 2, item 1).
3. Confirm selection (fig. 2, item 2). Display changes to ‘Current user’ menu. Comment: The current user level is ticked ☒.
4. Select desired user level; set orange selection marker to the desired ‘User level’, in our example ‘Supervisor’ (item 3).
5. Confirm selection (item 4). Display changes to prompt of the 4-digit password (PIN) and the frame of the first digit is shaded in orange.
6. Press Drive Controller (5). The 0 digit is displayed.
7. Enter password: If the user has not yet entered an individual password, the default setting applies (refer to „Default setting“ in table in the chapter 6.1.2).

If the displayed digit is

a) not to be changed:

Press Drive Controller (7), the frame of the next digit changes to orange.

or

b) to be changed:

- Turn Drive Controller (6), until the desired digit of the password is displayed.
- Confirm selection (7). The changed digit is accepted and the next digit is framed in orange.

8. Operation step 7. (item 6 and 7) until all four digits have been entered. Once the fourth digit has been confirmed, the selection marker jumps to ‘Continue’.
9. Press Drive Controller (8). Display changes to the ‘User management’ menu, and the new ‘Current user’ is displayed.

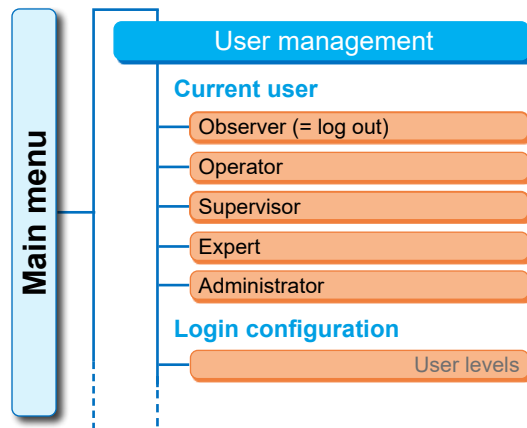


Fig. 1: User management menu

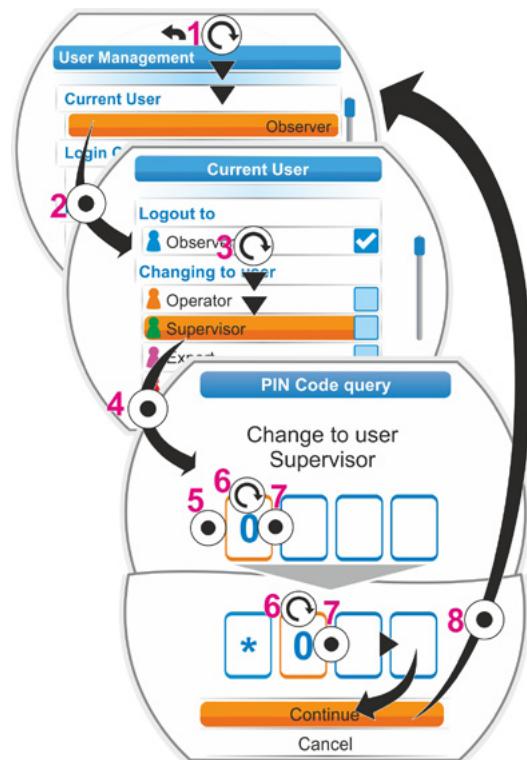


Fig. 2: Log on user level with PIN

6.4.2 'Strong password': Log into user level with password

1. Select 'User management' in the main menu. The 'User management' menu opens (fig. 1). The login type is shown under the 'Login configuration' menu item. In our example 'Strong password'.
2. Set the orange selection marker to the line below 'Current user' (fig. 2, item 1).
3. Confirm selection (fig. 2, item 2). Display changes to 'Current user' menu. Comment:
The current user level is ticked ☒.
4. Select desired user level; set orange selection marker to the desired 'User level', in our example 'Supervisor' (item 3).
5. Confirm selection (item 4). Display changes to password prompt.
6. Enter password (also refer to notes on password entry):
 - a) Select the first character (letter or digit) of the password: Turn Drive Controller and set orange marker to the desired character (item 5a).
 - b) Press Drive Controller (item 5b). The selected character is adopted to the line.
 - c) Repeat steps a) and b) to enter further characters/digits. For security reasons, only the last entry is displayed in plain text.
 - d) Once password entry is complete, set marker to 'Continue' (item 6) and confirm (item 7).

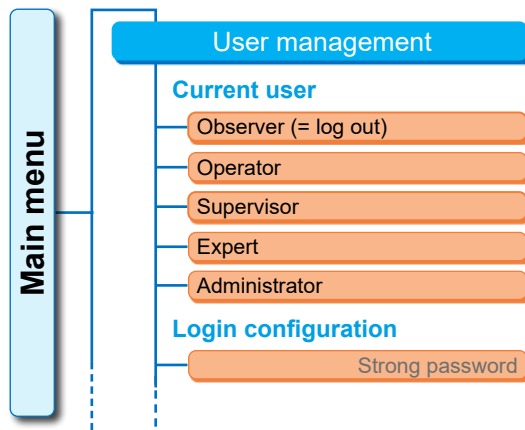


Fig. 1: User management menu

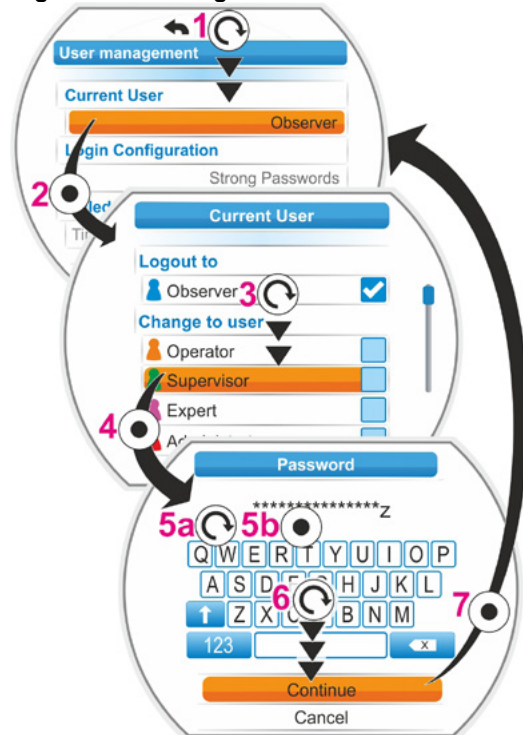


Fig. 2: Log on user level with 'Strong password'

Notes on password entry (refer also to fig. 3)

- 1 Display of the entered characters. During password entry, only the last entered character will be visible.
- 2 Orange marker indicates the selected character or the selected function (refer to position 3, 4, 6).
- 3 Changes between upper case and lower case letters.
- 4 Changes between characters and digit entry.
- 5 Adds blanks.
- 6 Deletes the last entry.

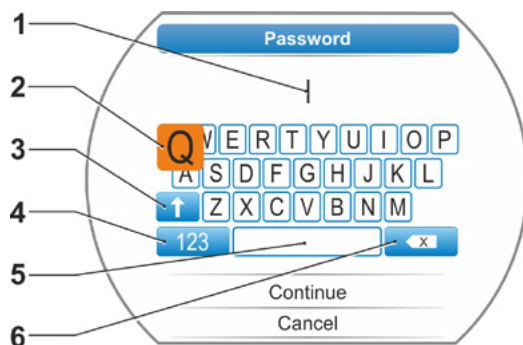


Fig. 3: Password entry

6.4.3 Log in 'User account' user with password

1. Select 'User management' in the main menu.
2. Set the orange selection marker to the line below 'Current user' (fig., item 1).
3. Confirm selection (fig. item 2).
Display changes to 'Current user' menu. The current user account is ticked ☒.
4. Set the orange selection marker to the name of the (own) user account in the 'Change to user' menu item, in our example 'John Doe Dept. 1234' (item 3).
5. Confirm selection (item 4).
The display changes to password entry for the selected user account.
6. Enter password (item 5a, 5b)
(for notes on password entry, refer also to the previous chapter)
and
set selection marker to 'Continue' (6).
7. Press Drive Controller (7).
The display changes to the 'User management' menu and under the 'Current user' menu item,
- name and
- user level can be found,
in our example 'Supervisor', of the currently logged on user account.

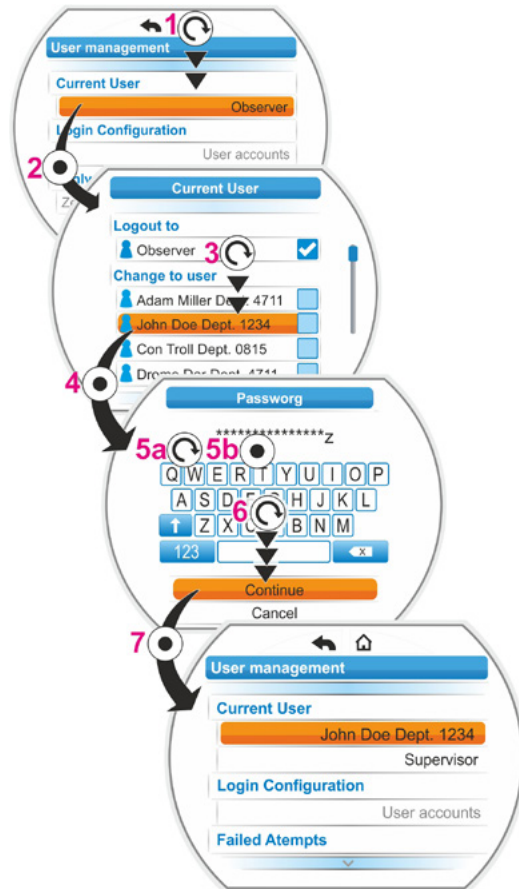


Fig.: Log on user

6.5 Failed attempts

The Failed attempts function makes authorized password entries harder. After a predefined number of failed attempts, a new login attempt will be disabled for one minute. The timeout will be doubled with every failed attempt.

Timeout can only be changed in the 'Administrator' user level.

1. Select 'User management' in the main menu.
2. Set the orange selection marker below the 'Failed attempts' (fig. item 1).
3. Confirm selection (fig. item 2).
The display changes to the 'Failed attempts' menu and shows the set number of the failed attempts in the orange frame.
4. Press Drive Controller (3).
The digit is flashing.
5. Turn the Drive Controller to change the setting. In our example, set to 3 (4). The indication of the dial changes accordingly.
6. Confirm the set value: Press Drive Controller (5).
The orange marker jumps to 'Save'.
7. Confirm 'Save' (6).
Display changes to the 'User management' menu, and the newly set number of failed attempts is displayed.

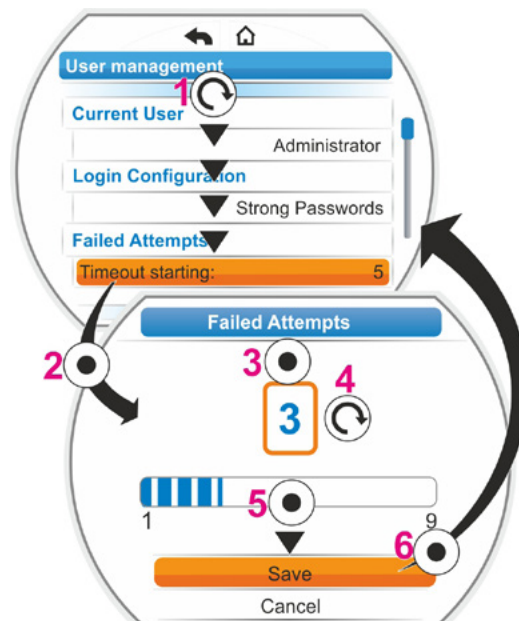


Fig.: Set number of failed attempts

7 Commissioning

7.1 General information



- Before performing any work on the installed and electrically connected actuator, check with the plant personnel in charge that commissioning may not cause any fault of the plant or hazards to persons.
- If a cut-off mode or torque setting is selected that is not appropriate for the valve, the valve may be damaged!
- If LOCAL control is changed to REMOTE control, the actuator is operated if an operation command by the automation system (DCS) is present!
- There are hazardous voltage levels within the actuator.



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.

Ensuring prerequisites for commissioning

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

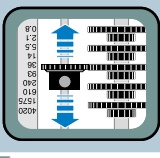
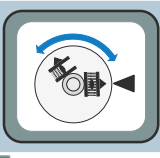
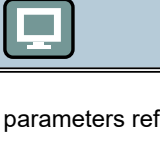
- The actuator is correctly assembled.
- All fixing screws and connecting elements are firmly tightened.
- The grounding and equipotential bonding has been correctly implemented.
- The electrical connections have been correctly implemented.
- All protection against accidental contact has been implemented 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.

Prior to commissioning

- Set language if the texts in the display are not shown in the desired language, refer to chapter „5.2 Language selection“ on page 31.
- Enable access rights for at least user level 3 ‘Supervisor’, refer to chapter „6 User management“ on page 33.

The overview below shows the sequence of the commissioning actions.

Action	Explanation	For a description, refer to:
Select additional gear 	Check/set gear type and model.	Page 45
Select closing direction 	Set/check closing direction: clockwise or counterclockwise.	Page 49
Program output speed or positioning speed, positioning time 	Program/check output speed or positioning speed, positioning time.	Page 50
Select cut-off mode 	Check/set cut-off mode: torque-dependent, force-dependent or travel-dependent.	Page 51
Program tripping torques 	Check/Program tripping torques/ cut-off forces.	Page 51
Adjust signaling gear 	Check/adjust signaling gear ratio. For version with signaling gear only.	Page 56
Adjust end positions 	End position adjustment for actuators with signaling gears.	Page 57
Adjust position indicator 	End position adjustment for actuators in „non-intrusive version“.	Page 65
Adjust position indicator 	Check/set mechanical position indicator, if available.	Page 64
Program REMOTE control 	Adapt actuator to the requirements of the automation system.	Page 74



- For the control system parameters refer to chapter „8.3 Control system parameters“ on page 74.
- 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.

7.2 Additional gear

‘Additional gear’ functional principle

This chapter does not apply to the 2SQ7 part-turn actuator.

The ‘Additional gear’ function allows convenient adaptation of all display variables to the overall system >Actuator + mounted units<. The properties (parameters) of the most common gear types are included in the actuator firmware.

Procedure

Mount additional gear to actuator, refer fig. item (a).

Select mounted additional gear in the ‘Additional gear’ menu, item (b).

The actuator converts the parameter values (e.g. speeds and torques) to the properties of the additional gear and indicates the converted values and units in the ‘Valve’, ‘Safety’ and ‘Observe’ menu, item. (c).

During programming, the values present at the output side of the additional gear are indicated as actual values (d).

Furthermore, the signaling gear reduction ratio to be set is displayed in the ‘Additional gear’ menu, refer to „7.4.2 Signaling gear ratio“ on page 56.

If the gearbox fitted is not included in the options displayed, manual user-defined gearbox parameter entry is required for appropriate selection.

The following parameters of an additional gear can be individually adjusted. The parameters and the available setting options are displayed according to the selected model:

- Rotary gearbox
 - Reduction ratio
 - Factor output/input torque
 - Max. output torque [Nm]
 - Max. input speed [rpm]
 - Rev./stroke
- Part-turn gearbox
 - Reduction ratio
 - Factor output/input torque
 - Max. output torque [kNm]
 - Max. input speed [rpm]
 - Positioning angle [°]
- Linear thrust unit
 - Spindle pitch
 - Factor input torque/output force
 - Max. output force [kN]
 - Max. input speed [rpm]
 - Stroke [mm]

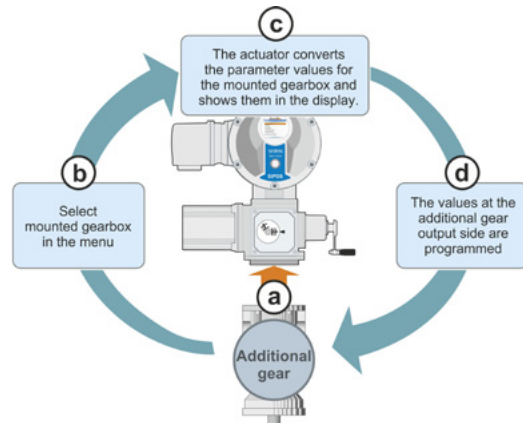
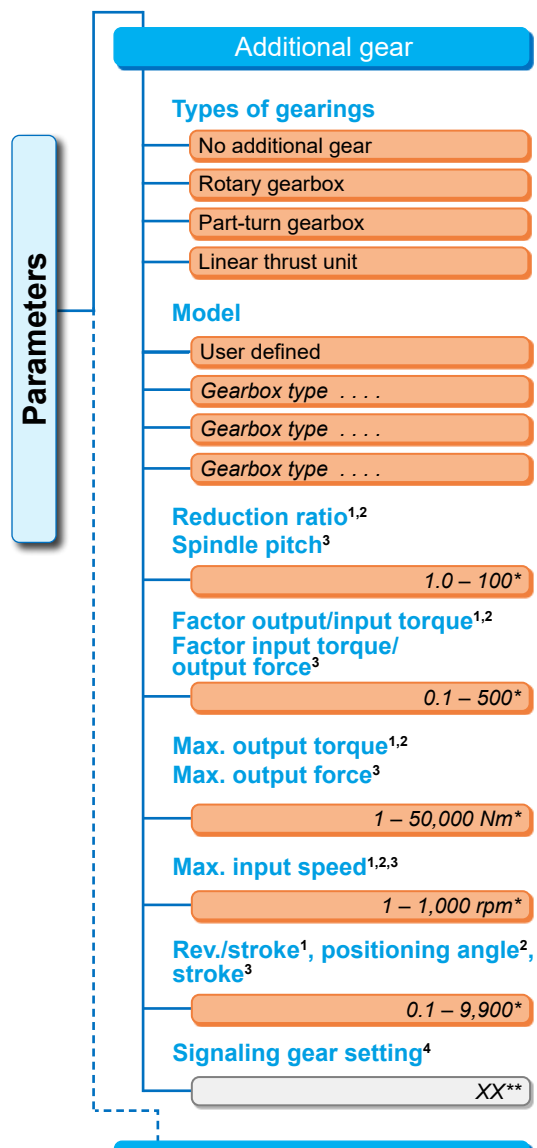


Fig. 1 „Additional gear“ principle



¹for rotary gearboxes

²for part-turn gearboxes

³for linear thrust units

⁴Actuators with signaling gear only

**Cannot be changed prerequisite for signaling gear setting.

Fig. 2: „Additional gear“ menu

7.2.1 Select additional gear and change parameters.

Select additional gear operation sequence

1. Select 'Parameter' in the 'Main menu' (fig. 2, item **1**) and confirm (**2**).
The 'Parameter' menu opens.
2. Select 'Additional gear' menu item (**3**) and confirm (**4**).
Display changes to the 'Additional gear' menu.
 - If the additional gear has not yet been selected, 'No additional gear' is displayed under the 'Gear type' menu item.
 - If the additional gear has been selected, gear type, model and the respective parameters will be displayed.
3. Set selection marker below 'Gear type' parameter. In our example to 'No additional gear' (**5**) and confirm (**6**).
The following options appear:
 - No additional gear
 - Rotary gearbox
 - Part-turn gearbox
 - Linear thrust unit
4. Select 'Gear type', in our example 'Part-turn gearbox' (**7**) and confirm (**8**).
Display changes to 'Additional gear'. Now, the model can be selected.
5. Select model (**9**) and confirm (**10**).
The display changes to the 'Model' menu with the available model options for this actuator. The currently selected model is ticked ☒.
6. Select model *:
 - a) Select model from list (**11**) and confirm selection (**12**).
The display changes to the previous screen; now suitable parameter values for the selected model will be set and displayed.
 - or
 - b) If the connected gear is not included in the list, select 'User defined'. The display returns to 'Additional gear'.
Now the parameter values for the additional gear can be set individually, refer to the following description.

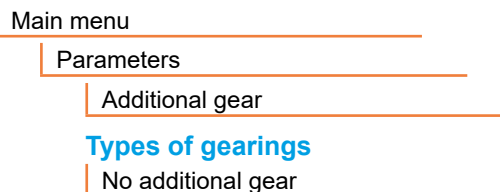


Fig. 1: Navigation to 'Additional gear; gear type'

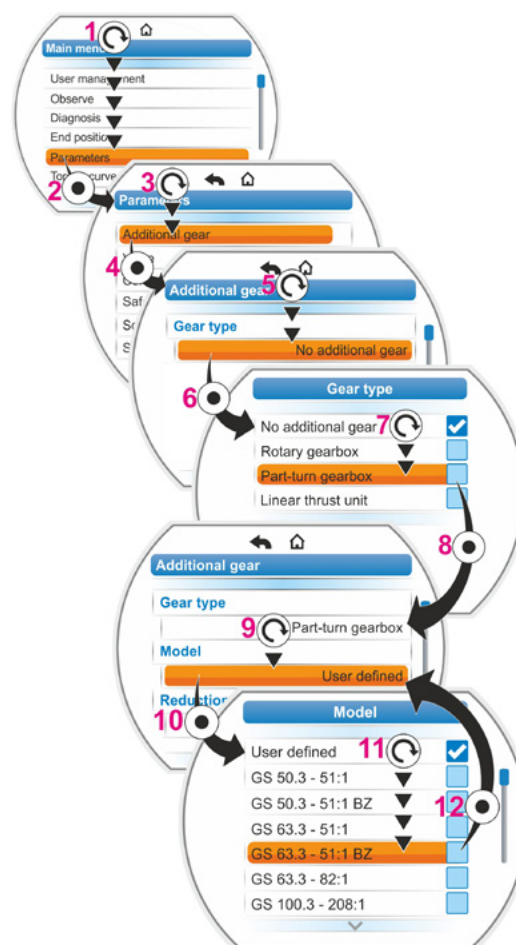


Fig. 2: Select additional gear

* BZ = Version with gear wheel made of bronze.

Change parameter value operation sequence for additional gear

The operation sequence described here is identical for all parameters of the additional gear and is the continuation of the previous operation sequence 6b); the display shows the 'Additional gear' menu and 'User defined' has been selected for 'Model'.

Main menu
Parameters
Additional gear

Fig. 1: Navigation to 'Additional gear'- menu

7. Select parameter; turn Drive Controller (11) and set selection marker to the parameter. The slider (fig. 2, item 1) changes its position on the scrollbar (2) according to the position of the selected item within the menu.
8. Confirm; press Drive Controller (12). The setting menu opens.
9. Change parameter value:
 - Press Drive Controller (digit is flashing).
 - Turn Drive Controller, until the desired digit is displayed.
 - Press Drive Controller; the selected digit is accepted.

Refer also to „Changing parameter values/ characteristics“ on page 26.

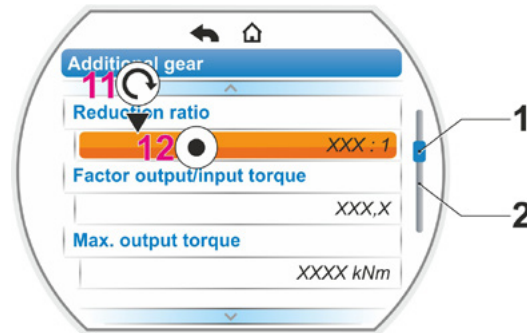


Fig. 2: Parameters within 'Additional gear' menu

7.2.2 Parameters and their values in the 'Additional gear' menu

The values which can be programmed in the 'Additional gear' menu refer to the properties of the additional gear and are listed on the gearbox name plate.

Reduction ratio (for rotary and part-turn gearboxes),
Spindle pitch (for linear thrust unit)

Reduction ratio

1.0 – 100

The reduction ratio is the ratio between speeds at gearbox input and gearbox output.

Setting range for

- Rotary gearboxes (reduction ratio): 1.0 to 100
- Part-turn gearboxes (reduction ratio): 1 to 10000
- Linear thrust unit (spindle pitch [mm]): 1.0 to 100

$$i_{(\text{Reduction ratio})} = \frac{n_{(\text{gearbox input})}}{n_{(\text{gearbox output})}}$$

Formula: Reduction ratio

Factor output/input torque (for rotary and part-turn gearboxes),
Factor input/output force (for linear thrust unit)

Factor output/input torque

0.1 – 500

The „output torque/input torque“ factor indicates the amount by which the torque or force at the gearbox output exceeds the torque or force at the gearbox input.

Setting range for

- Rotary gearbox (factor output/input torque): 0.1 to 500
- Part-turn gearbox (factor output/input torque): 1.0 to 5000
- Linear thrust unit (factor input torque [Nm]/output force [kN]): 1.0 to 100

$$f_{(\text{Factor})} = \frac{M_{(\text{gearbox output})}}{M_{(\text{gearbox input})}}$$

Formula: Factor output torque/input torque for rotary/part-turn gearboxes

Max. output torque (for rotary and part-turn gearboxes),
Max. output force (for linear thrust units)

Max. output torque

1 – 50000

The maximum torque/maximum force which may occur at the gearbox input (fig. item 2); i.e. the torque/force the additional gear may be loaded with.

Setting range for

- Rotary gearbox (max. output torque):
1 to 50000 Nm
- Part-turn gearbox (max. output torque): 0.01 to 500 kNm
- Linear thrust unit (max. output force):
1 to 1,000 kN

The tripping torque (max. torque for the valve) is set in the 'Parameter' menu --> 'Valve', refer to „Tripping torque/tripping force“ on page 53 et seqq.

Max. input speed

Max. input speed

1 – 1,000 rpm

The maximum speed which can be applied to the additional gear input is entered here. Refer to fig. item 1.

Setting range: 1 to 1,000 rpm

Rev./stroke (for rotary gearboxes)

Positioning angle (for part-turn gearboxes)

Stroke (for linear thrust units)

Rev./stroke

0.1 – 9,900

This menu item is only available for actuators with signaling gear.

The value required for covering the whole travel is set here.

Setting range for

- Rotary gearbox (rev/stroke): 0.1 to 9900
- Part-turn gearbox (positioning angle): 1 to 360°
- Linear thrust unit (stroke): 1 to 10,000 mm

Signaling gear setting

Signaling gear setting

XX

This menu item is only available for actuators with signaling gear.

The value calculated on the basis of the parameter values above is displayed here.

The signaling gear has to be adjusted to this value, refer to chapter „7.4.2 Signaling gear ratio“ on page 56.

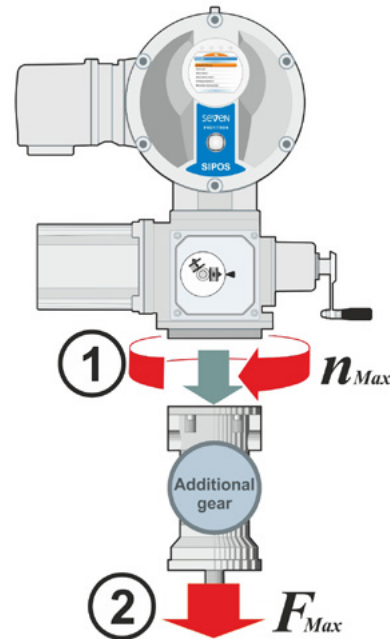


Fig.: 1 = Max. input speed
2 = Max. output torque/force

7.3 Program closing direction, speeds, cut-off modes and tripping torques

New actuators are set in the factory. Unless required otherwise by the customer, the default parameters are as follows:

- Clockwise closing direction;
- Cut-off mode in OPEN and CLOSE directions: travel-dependent;
- Tripping torque in OPEN and CLOSE directions: Lowest device-specific parameter value, for actuators of duty classes A and B (standard actuators) 30 %, for actuators of duty classes C and D (modulating actuators) 50 % of the maximum value (cannot be changed via parameters for 2SQ7).
- – Speed* for normal and EMERGENCY operation in CLOSE and OPEN directions: 35 % of maximum output speed.
- Positioning time for 2SQ7: 28 seconds.

*Depending on the gearboxes mounted, the following parameters apply:

Model: 2SA7... rotary actuator	Parameters	Unit	Parameters	Unit
... without or with rotary gearbox	Tripping torque	Nm	Speed	rpm
... with linear thrust unit	Tripping force	kN	Positioning speed	mm/min
... with part-turn gearbox 2SQ7 part-turn actuator	Tripping torque	Nm	Positioning time	s/90°

If the current values are to be retained, continue with chapter „7.4 Adjust end positions for version with signaling gear“ on page 54, or „7.5 Adjust end positions for version with „non-intrusive“ position recording“ on page 65.

If you are already familiar with the operation, you may also continue with chapter „8.2 Valve-specific parameters“ on page 71.

7.3.1 Select the closing direction (This chapter does not apply to 2SQ7.)

Unless required otherwise by the customer, the actuators are delivered with clockwise closing direction. If the output drive shaft has to turn counterclockwise in CLOSE direction, the closing direction has to be changed.

If the current closing direction is to be retained, continue with the next chapter.



After each change of the closing direction, the end position setting has to be performed again!

Operation sequence

1. Select 'Parameter' menu item in the 'Main menu'.
The 'Parameter' menu opens.
2. Select 'Valve' menu item.
'CLOSE direction' is displayed as first parameter with the current setting (clockwise or counterclockwise).
3. If the indicated setting is to be changed, set selection marker to the setting and confirm.
'CLOSE direction' menu opens. The current setting is indicated by a symbol ☒ (fig. 2, item 2).
4. Set the orange selection marker to desired setting (item 3) and confirm.
A message is displayed that the end positions have to be readjusted when changing the closing direction.
5. Click 'Yes' to confirm.
Display returns to the "Valve" menu and the current (modified) setting is displayed for 'CLOSE direction'.



Fig. 1: Navigation to „CLOSE direction“ parameter

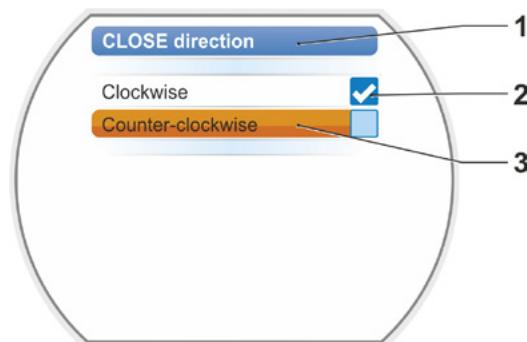


Fig. 2: „CLOSE“ direction menu

7.3.2 Program speeds/positioning times

By programming the speeds, the speed of the actuator during closing, opening and approaching the EMERGENCY position is determined.

The speed range of an actuator is based on the sizing, defined by the application. Refer to name plate for the possible actuator speed.

The following values apply to the actuator (without additional gear).

Tripping torque ranges [Nm]	Flange		Speed ranges [rpm]	Standard output speed [rpm] without additional gear
Classes A and B (type of duty in compliance with EN 15714-2)				
3 ~ 380 – 460 V				
1200 – 4000	F30	→	1.25 – 10	3.5
600 – 2000	F25	→	2.5 – 20	7
300 – 1000	F16	→	5 – 28	14
150 – 500	F14, F16	→	5 – 40	14
75 – 250	F12, F14	→	10 – 80	28
37 – 125	F10, F12, F14	→	20 – 112	56
18 – 60	F10	→	20 – 160	56
9 – 30	F7, F10	→		
1 ~ 220 – 230 V / 3 ~ 190 – 200 V				
37 – 125	F10, F12, F14	→	5 – 40	14
18 – 60	F10	→	10 – 80	28
9 – 30	F7, F10	→	20 – 160	56
		→	20 – 112	56
1 ~ 110 – 115 V				
37 – 112	F10, F12, F14	→	5 – 20	14
18 – 60	F10	→	10 – 40	28
9 – 30	F7, F10	→	20 – 56	56
		→	20 – 80	56
Classes C and D (type of duty in compliance with EN 15714-2)				
3 ~ 380 – 460 V				
1400 – 2800	F30	→	1.25 – 10	3.5
700 – 1400	F25	→	5 – 40	14
350 – 700	F16	→	10 – 80	28
175 – 350	F14, 16	→		
87 – 175	F12, F14	→		
40 – 80	F10, F12, F14	→		
20 – 40	F10	→		
10 – 20	F07, F10	→		
3 ~ 190 – 200 V				
40 – 80	F10, F12, F14	→	5 – 40	14
20 – 40	F10	→		
10 – 20	F07, F10	→		
1 ~ 220 – 230 V				
40 – 80	F10, F12, F14	→	5 – 40	14
20 – 40	F10	→	10 – 80	28
10 – 20	F07, F10	→		
1 ~ 110 – 115 V				
40 – 80	F10, F12, F14	→	5 – 14	14
20 – 40	F10	→	5 – 20	14
10 – 20	F07, F10	→		

When programming the speed, the defined model (refer to chapter „7.2 Additional gear“ on page 45) is considered: The speed values are converted considering the reduction ratio of the additional gear and indicated in the the display. Parameter names and units are displayed accordingly:

- For rotary actuator: Rev./stroke [rpm];
- For linear thrust unit: Stroke [mm/min];
- For part-turn actuator: Angle [s/90°].

In the following operation sequence, programming the the speed is described as example. For linear thrust units or part-turn actuators, the operation sequence is identical; however values and units are displayed in accordance with the additional gear selected.

Operation sequence

1. Select 'Parameters' menu item in the 'Main menu'.
The 'Parameter' menu opens.
2. Select 'Valve' menu item.
'Speed' is displayed as second parameter with the current values for operation in CLOSE(↕) and OPEN(↔)-directions.
3. If the indicated value is to be changed, set selection marker to the value to be changed and confirm.
'Speed' setting menu opens, refer to fig. 2.
The current value of the speed parameter is flashing in blue (fig. item 1).
4. Turn Drive Controller until desired value is displayed.
The color of the number changes from blue to orange and the progress bar (item 3) graphically represents the setting within the setting range of both speed (2) and positioning time (4).
In addition, the time is displayed (5), which is required to operate across the whole travel including the end position ranges.
5. Confirm selected value.
Display returns to 'Valve' menu.

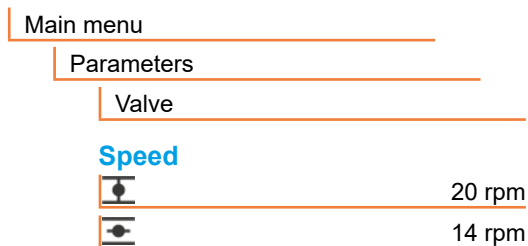


Fig. 1: Navigation to „Speed“ parameter

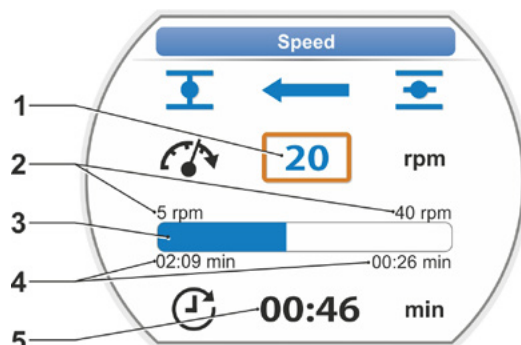


Fig. 2: Speed setting menu

7.3.3 Program cut-off modes and tripping torques/forces

Cut-off mode

If the actuator operates, the cut-off mode can be travel-dependent or torque-dependent.

Travel-dependent cut-off means the actuator trips once the valve has reached a defined position.

Torque dependent/force dependent cut-off means the actuator trips after reaching the tripping torque when moving in the end position range.

The set cut-off mode in the respective end position is shown in the display, refer to fig.:

- item 1 = torque-dependent
- item 2 = travel-dependent.

Default value for the cut-off mode of both end positions, OPEN and CLOSED, is **travel-dependent**.



- After each change of the cut-off mode, the end position setting has to be performed again.
- If a cut-off mode or a torque/force setting is selected that is not appropriate for the valve, the valve may be damaged!

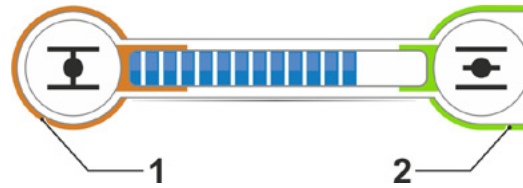


Fig.: Indication of cut-off mode
1 = torque dependent
2 = travel dependent

Operation sequence

1. Select 'Parameter' menu item in the 'Main menu'.
The 'Parameter' menu opens.
2. Select 'Valve' menu item.
The parameters (blue writing) with the current setting (parameter value) are displayed.
3. Turn Drive Controller until the settings for CLOSE  and OPEN  are displayed at „Cut-off mode“ parameter.
If, for example, the setting for end position CLOSED are to be changed, set marker to symbol CLOSED .
4. Confirm selection (press Drive Controller).
Display changes to 'Cut-off mode' setting menu and shows both options; 'Travel dependent' and 'Torque dependent', refer to fig. 2 .
The current setting is ticked  (fig. 2, item 1).
5. Set the selection marker to desired setting (item 2) and confirm.
A message is displayed that the end positions have to be readjusted when changing the cut-off mode.
6. Click 'Yes' to confirm.
Display returns to the "Valve" menu and the current (modified) setting is displayed for 'Cut-off mode' CLOSE.
7. The operation for changing the cut-off mode in end position OPEN applies accordingly (from operation step 3).

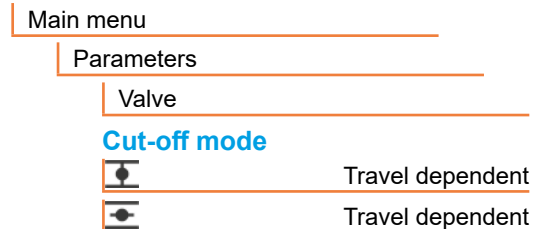


Fig. 1: Navigation to 'Cut-off mode' parameter

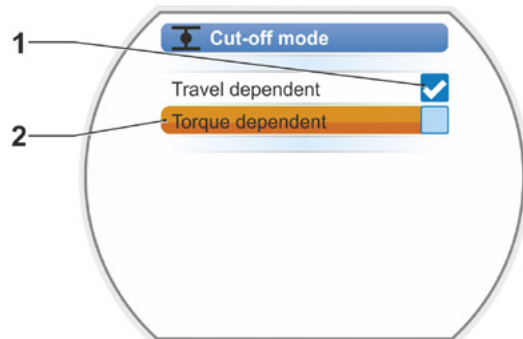


Fig. 2: Cut-off mode in end position CLOSED setting menu

Tripping torque/tripping force

The setting determines the torque or force to be achieved in relation to the load, to cause the motor to trip. This applies to torque/force-dependent tripping in the end position as well as to a block. For this reason, tripping torque or force also have to be set for travel-dependent cut-off mode.

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

A programmed additional gear is considered during programming (refer to chapter „7.2 Additional gear“ on page 45): The values for tripping torque/force are converted using the factor output/input torque or input torque/output force and displayed. Only those values are provided for programming in the display which are relevant to the combination of the actuator with the connected gearbox. Setting values are displayed accordingly:

- Rotary gearbox: Tripping torque [Nm];
- linear unit: Tripping force [kN];
- part-turn gearbox: Tripping torque [Nm].

The setting range for actuators of classes A and B ranges from 30 – 100 % and for modulating actuators of classes C and D from 50 – 100 % in 10 % steps of the maximum torque each (for some additional gears, other limit values apply). 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 classes C and D).

The following table shows the possible parameter values without additional gear.



- For 2SQ7, the tripping torque can be set via the torque switching, refer to supplement to operation instructions Y070.449.
- If a cut-off mode or torque setting is selected that is not appropriate for the valve, the valve may be damaged!

Tripping torques (without additional gear)								
Tripping range [Nm]	Possible values for setting in Nm of M_{dmax}							
	30 %	40 %	50 %	60 %	70 %	80 %	90 %	100 %
Classes A and B (type of duty in compliance with EN 15714-2)								
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 – 1000	300	400	500	600	700	800	900	1000
600 – 2000	600	800	1000	1200	1400	1600	1800	2000
1200 – 4000	1200	1600	2000	2400	2800	3200	3600	4000
▲ 30 % are set as standard								
Classes C and D (type of duty in compliance with EN 15714-2)								
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 – 1400			700	840	980	1120	1260	1400
1400 – 2800			1400	1680	1960	2240	2520	2800
▲ 50 % are set as standard								



For reasons of simplicity, the designation ‘torque’ shall also apply to force in the following description. For example, instead of torque or force dependent, only torque dependent will be used.

Operation sequence

1. Turn Drive Controller in the 'Valve' menu until the settings for CLOSE  and OPEN  are shown under 'Tripping torque' parameter in the display.
2. If the tripping torque for end position CLOSED is to be changed, for example, set selection marker to the value to be changed and confirm.
Display changes to 'Tripping torque ' setting menu (refer to fig.) and the current value is flashing (fig., item 1).
3. Turn Drive Controller until desired value is displayed.
The progress bar (item 2) shows the current position within the setting range (3).
4. Confirm selected value.
Display returns to 'Valve' menu.
5. Proceed accordingly to set tripping torque in end position OPEN.

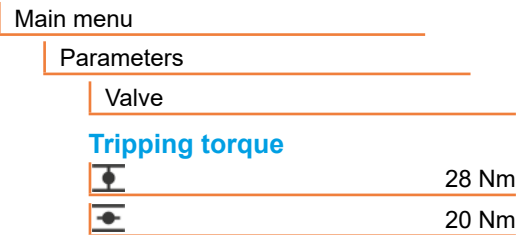


Fig. 1: Navigation to „Tripping torque“ parameter

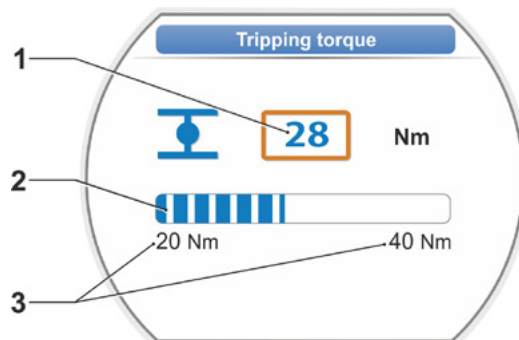


Fig. 2: Tripping torque setting menu

7.4 Adjust end positions for version with signaling gear



The position recording for the PROFITRON actuators is available in the following versions
– with signaling gear or
– „non-intrusive“ (niP/MWG).

End position adjustment for HiMod and PROFITRON in the „non-intrusive position“ is described in chapter 7.5.

7.4.1 General information



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



For the 2SQ7 part-turn actuator, the signaling gear ratio does not have to be set. These actuators are not equipped with an adjustable signaling gear. Continue with chapter 7.4.3.

Position recording functional principle

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

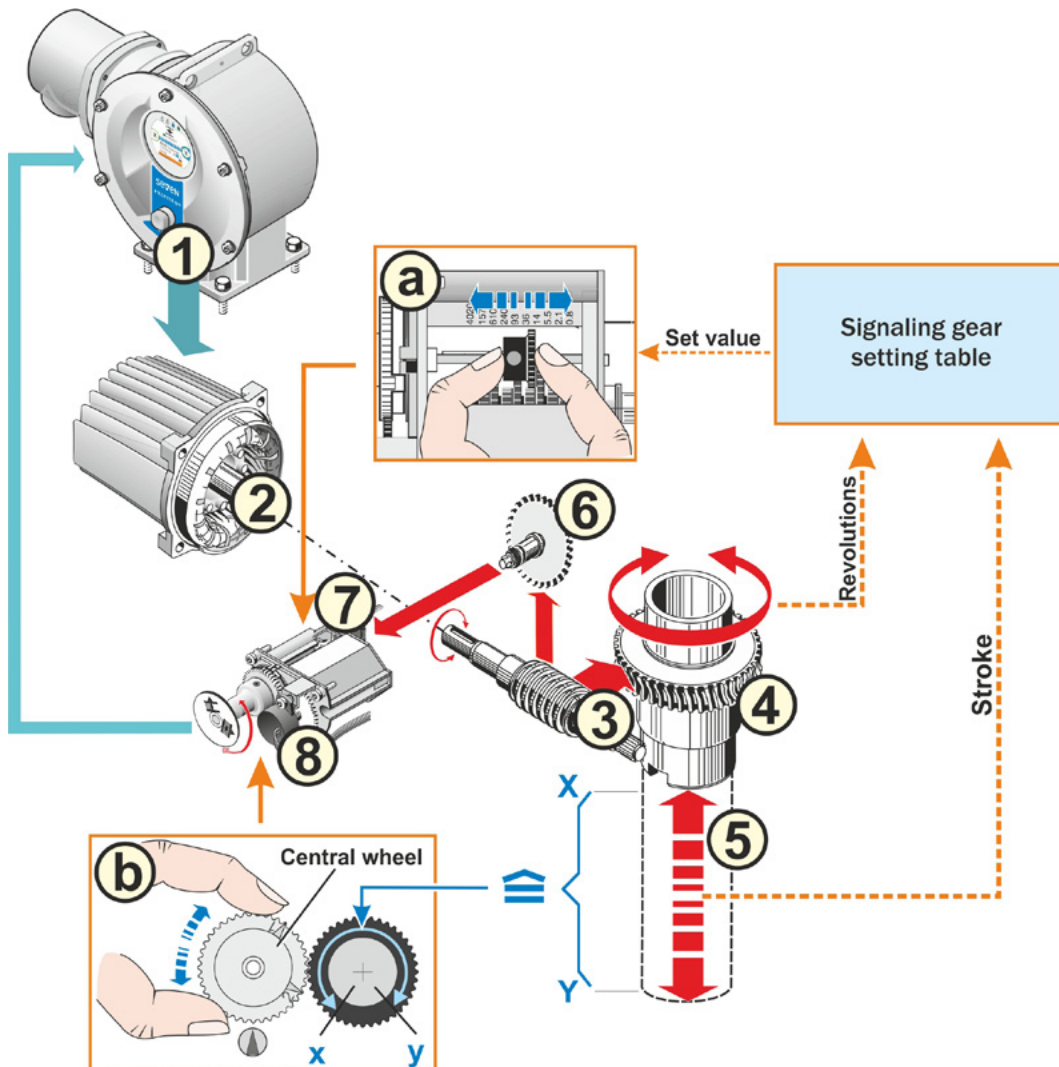


Fig.: Schematic representation of the signaling gear ratio and end position settings

Explanation

From the position of the potentiometer (8), the electronics unit recognizes the position of the output drive shaft (4) and therefore the position of the connected valve.

Two settings are required:

1. The signaling gear (refer to a in illustration) reduces the rotations of the output shaft (4) required for the complete travel [(5) X to Y] to a rotary movement of $\leq 300^\circ$ (x to y) of the potentiometer (8).
2. 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) (refer to b in illustration).

For a detailed description, refer to the following chapters „7.4.2 Signaling gear ratio“ and „7.4.3 Procedure for new (initial) end position adjustment“.

7.4.2 Signaling gear ratio

The number of rotations required to cover the whole travel must be known. For the required setting of the signaling gear, refer to the „Signaling gear setting“ table below. Intermediate values are rounded up to the **next incremental** value (e.g. for 30 rev/stroke, the incremental value 36 has to be set).

If an additional gear was set in the „Additional gear“ menu („7.2 Additional gear“ on page 45) , the firmware will calculate the signaling gear setting.

Setting the amount of the stroke at the additional gear output in the display is therefore required. Depending on the additional gear, the following setting units are displayed:

- Actuator without or with rotary gearbox = rev./stroke,
- Actuator with connected linear thrust unit = mm/stroke,
- Actuator with connected part-turn gearbox = degrees [°].

The valve maker can also provide the data (number of revolutions for the entire travel).



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 the output shaft cannot be observed, proceed according to the descriptions of the following chapter „Procedures for end position adjustment“ and heed the information in the display under 'Help' on the signaling gear and proceed accordingly.

The table shows possible signaling gear setting for actuators without additional gears.

Signaling gear setting without additional gear										
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.

7.4.3 Procedure for new (initial) end position adjustment

The end positions are directly set at the actuator.

The valve must not be jammed. Use the crank handle/hand wheel for release, if necessary. For crank handle/hand wheel operation, refer to chapter „4.1 Crank handle, hand wheel“ on page 17.



The setting procedure can be aborted by selecting „Back“ . The formerly valid end position adjustment is maintained unless the central wheel was turned.

1. Select LOCAL control
2. Select 'End positions' menu item in the 'Main menu'.
Display changes to 'End positions' menu.
3. Confirm 'New setting' menu item.
Display changes to 'Only end positions' (fig. 2, item 1) or 'Complete' setting query, including all parameters required for correct end position adjustment (item 2).
These parameters include:
 - CLOSE direction (clockwise or counter-clockwise)
 - Speed (in OPEN and CLOSE directions)
 - Cut-off mode (torque-dependent or travel-dependent in end positions CLOSED and OPEN)
 - Tripping torque (in end position CLOSED and end position OPEN)
 These parameters have already been described in chapter 7.3.
4. Select 'Only end positions' menu item and confirm. (For 2SQ7, continue with step 11).
Display changes to 'Remove signaling gear cover' animation.
5. Loosen 4 screws (fig. 3, item 1) from the signaling gear cover and remove cover.
6. Select 'Continue' in the display.
Display changes to 'Adjust signaling gear ratio to valve'.
7. Adopt scale value, either from
 - Additional gear menu, refer to „Signaling gear setting“ on page 48,
 - or from table „Signaling gear setting without additional gear“ on page 56
 and adjust slide wheel (fig. 3, item. 2) so that the gear rim faces the desired incremental value on the scale.



Fig. 1: End positions - new setting

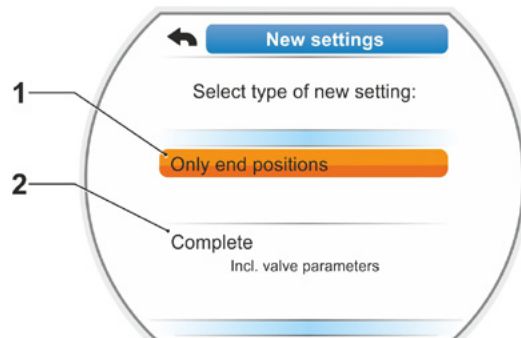


Fig. 2: End position setting with or without parameters

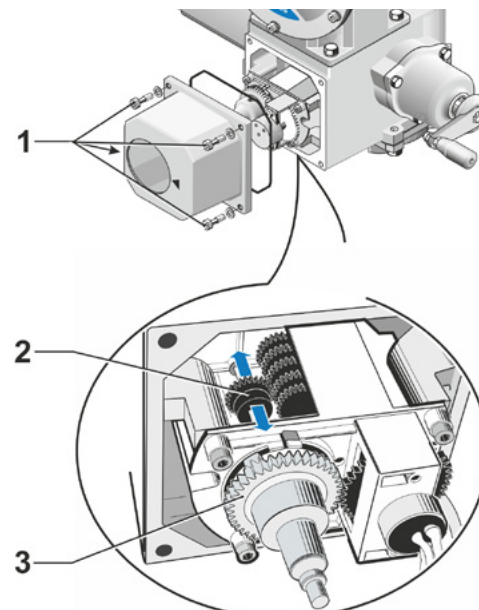


Fig. 3: Adjust signaling gear ratio



- If the value for the valve travel (rev/stroke) does not match the level value of the table, adjust the slide wheel to the next higher level value.
- 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 (fig. 3, item 3).
- If the number of revolutions/stroke is not known, proceed as follows, heeding the notes in the display for operating step 16.

8. Select 'Continue' in the display.
You are prompted to adjust the central wheel to mid-position.

9. Turn central wheel to mid-position:
Set the central wheel so that arrows 1 and 2 point in upward direction, see illustration 4.
The correct position is confirmed in the display and the selection marker is set to 'Continue'.

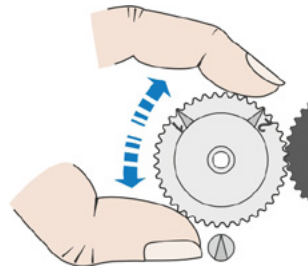


Fig. 4: Turn central wheel to mid-position

10. Confirm 'Continue'.
The display changes to the query which end position CLOSED or OPEN is to be set first (fig. 5).
The end positions must not be set according to a specific sequence. Adjustment of end position OPEN is described in the following. End position CLOSED is adjusted accordingly.

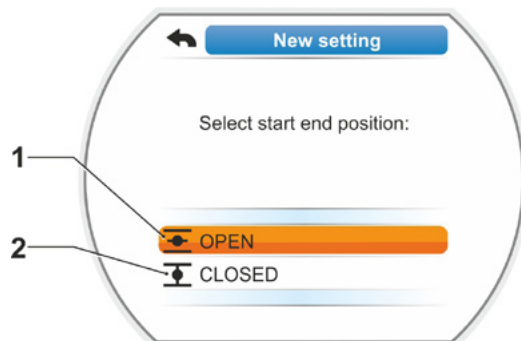


Fig. 5: End position selection

11. Select end position to be set first (in our example end position OPEN) (fig. 5, item 1) and confirm.

Display changes to end position adjustment and you are requested to approach end position OPEN (fig. 6). Operation in OPEN direction is suggested: End position OPEN symbol is shaded in orange (fig. 6, item. 1). If operation in the opposite direction is desired, turn Drive Controller and set orange selection marked to symbol CLOSED (fig. 6, item 2).



Generally, the end position selected in operation step 11 is to be adjusted first! Furthermore, the display indicates the set cut-off mode. In our example

- End position CLOSED = torque-dependent (fig. 6, item 3) and
- End position OPEN = travel-dependent (item 4)



Fig. 6: Approach end position in OPEN direction

12. Depending on whether the cut-off mode for the end position is travel-dependent or torque-dependent, select the following operation sequence.

■ Travel-dependent cut-off mode:

- a) Heed valve position and approach end position; press Drive Controller.
Operate the actuator until the valve has reached the end position.
The LED of the selected end position flashes while the actuator is operated.



- When pressing the Drive Controller for a short time (< 3 s), the actuator moves as long as the Drive Controller is pressed. For longer activation (> 3 s), latching starts (display shows 'Latching active') and the actuator moves until the Drive Controller is pressed again.
- If torque-dependent tripping occurred in travel-dependent cut-off mode, e.g. if the MOV is sluggish, unfavorable torque characteristics or approaching of a mechanical stop, '**Torque dependent cut-off**' is shown in the display.

- b) Once the desired position has been reached, press Drive Controller to stop the actuator. Perform possible fine adjustment by operation in the opposite direction.
- c) Turn Drive Controller and set selection marker 'Accept end position' (fig. 7).
- d) Press Drive Controller.
(For 2SQ7 continue with step 15.)

Shown in display:

- Request to „turn central wheel in direction of the arrow until 0 is displayed' (fig. 8); continue with step 13;
- Adjustment is correct, continue with step 14.



Fig. 7: Accept end position

■ Torque-dependent cut-off mode:

Hold down Drive Controller – refer to note below – for more than 3 s. The actuator automatically moves until reaching the end position. (For 2SQ7, continue with step 14).

Shown in display:

- Request to 'turn central wheel in direction of the arrow until 0 is displayed' (fig. 8); continue with step 13;
- Adjustment is correct, continue with step 14.



When holding down the Drive Controller for more than 3 seconds and the actuator does **not** change to latching, activate the latching function, refer to „9.1.3 Operation – latching function“ on page 104.

When pressing the Drive Controller for a short time (< 2 s), the actuator moves as long as the Drive Controller is pressed. If the actuator is operated, i.e. by pressing the buttons repeatedly for a short time, torque dependent cut-off is not immediately performed.

13. Turn central wheel (fig. 8, item. 1) in the indicated direction of the arrow (item 2) until the value (item 3) is set to '000'.
The correct setting of the first end position is confirmed in the display and the orange selection marker jumps to 'Continue' (fig. 9).
14. Select 'Continue' in the display.
The first end position is set. The system changes to setting the other end position. The request to approach the end position (in our example end position CLOSED) is shown in the display.
15. If the actuator is equipped with a mechanical position indicator, we recommend setting the indicator at this stage. Separate approaching of the end position can thereby be avoided. For the setting, refer to the following chapter „7.4.5 Adjust mechanical position indicator“ on page 64.
16. Depending on whether the cut-off mode for the end position is travel-dependent or torque-dependent, move the actuator accordingly to the end position:

■ **Travel-dependent cut-off mode**

- a) Operate the actuator until the valve has reached the end position. Pay attention to the valve during operation!
Display indicates whether the valid setting range (fig. 10, item 1) has been reached (3b) or not yet (3a) and the progress bar (2)* changes the color from yellow to green.

- If the valid setting range is exceeded, the progress bar changes color from green to red (fig. 11, item 1) and the 'Setting range exceeded' message is displayed.
Select 'Help' (fig. 11, item 2) and confirm. An information to change the signaling gear ratio is displayed. Confirm the info box and adjust the sliding wheel within the signaling gear accordingly (also refer to step 7) and repeat end position adjustment.
- Once the end position has been reached before the valid setting, or in case of torque-dependent cut-off due to a block before reaching the end position, e.g. if the MOV is sluggish, unfavorable torque characteristics or approaching of a mechanical stop (return to desired end position), this is indicated by 'Torque dependent cut-off' in the display.

In this case, check the following:

- Smooth valve operation;
- Set tripping torque;
- Cut-off mode.

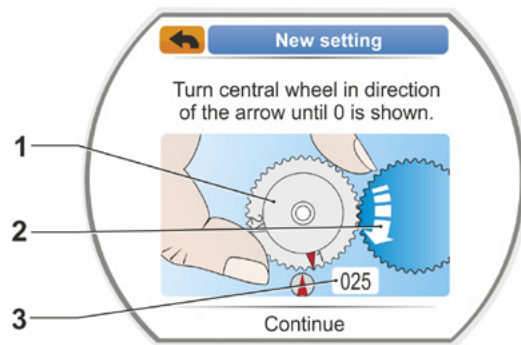


Fig. 8: Adjust central wheel



Fig. 9: First end position setting is correct

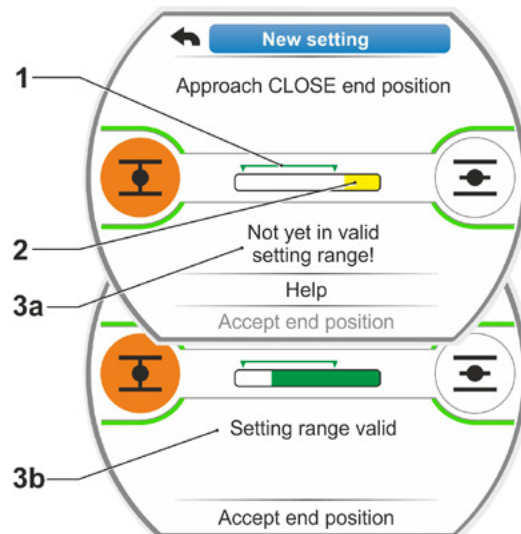


Fig. 10: Approach end position CLOSED



Fig. 11: End position range exceeded

* Progress bar is not displayed for 2SQ7.

- b) Set selection marker to 'Accept end positions' menu item (fig. 12, item 4).

Continue with operation step 17.

■ Torque-dependent cut-off mode

Select CLOSE operation direction (OPEN for setting in OPEN direction) and hold down Drive Controller for more than 3 s (refer also to note on p. 50). The actuator automatically moves until reaching the end position. Display indicates whether the valid setting range (fig. 12, item 1) has been reached (3b) or not yet (3a) and the progress bar (2) changes the color from yellow to green. Once the tripping torque has been reached, the „Tripping torque reached” message (3b) is displayed and the 'Accept end position' menu item is active (fig. 12, item 4).

If 'Torque dependent cut-off' is displayed prior to reaching the valid setting range, select 'Help' and adjust the sliding wheel in the signaling gear accordingly and repeat end position adjustment (refer also to step 7).

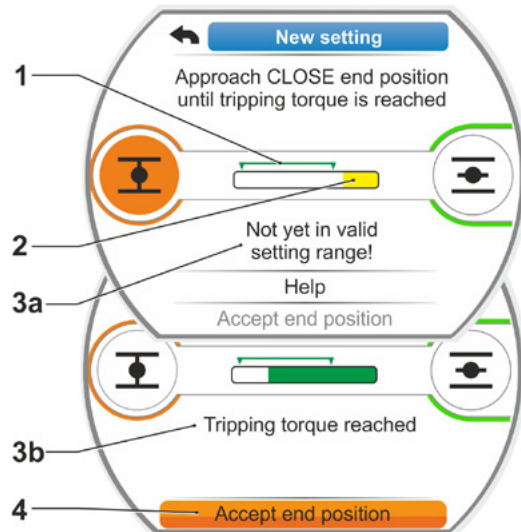


Fig. 12: Approach end position CLOSED in torque dependent cut-off mode

17. Confirm 'Accept end position'.
The correct setting is confirmed in the display (fig. 13).
18. Press Drive Controller. Actuator changes to 'End position' menu.
Now set the second end position of the mechanical position indicator, refer to chapter „7.4.5 Adjust mechanical position indicator“ on page 64.



Fig. 13: End position setting correct



- When changing to 'REMOTE' control, the actuator moves once an operation command from the DCS is present!
- Once the end positions have been adjusted during commissioning, the central wheel must not be moved! Otherwise a complete readjustment of the end positions is required.

7.4.4 Readjust end positions

Prerequisites

- Valid end position adjustment is mandatory! If there is no valid end position adjustment, refer to previous section „7.4.3 Procedure for new (initial) end position adjustment“ on page 57.
- At the beginning of the end position adjustment, the valve must not be in a jammed state; if necessary, release it by means of the crank handle/hand wheel (see chapter 4.1).
- After initial setting, the position of the central wheel must not be changed and will not be changed during readjustment!



The setting procedure can be aborted by selecting „Back“ . The formerly valid end position adjustment is maintained unless the central wheel was turned.

Operation sequence

1. Select LOCAL control
2. Select 'End positions' menu item in the 'Main menu'.
Display changes to 'End positions' menu.
3. Confirm 'Readjustment' menu item (fig. 1, item. 1).
Display changes to selection of end position to be readjusted (fig. 2).
4. Select end position to be readjusted (in our example end position OPEN) and confirm.
Display changes and prompts to approach the desired end position. If end position OPEN is selected, the orange selection marker is on end position symbol OPEN . If end position CLOSED is selected, the selection marker is on end position symbol CLOSED .
Display additionally indicates:
 - Current position within the travel in percent (fig. 3, item 1);
 - the valid setting range for the new end position (fig. 3, item 2);
 - the progress bar* as graphic representation of the potentiometer signal (item 3a);
 - deviation in percent from the currently valid end position (item 4).
 - The signal that
 - the valid setting range has not yet been reached (item 5a) or
 - the setting range is valid (item 5b).
 The end position can be accepted within the valid setting range (6).
5. If required, set selection marker on the end position symbol to the end position to be approached (new end position).

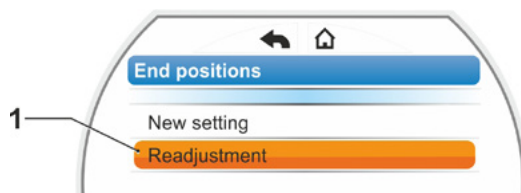


Fig. 1: End position readjustment

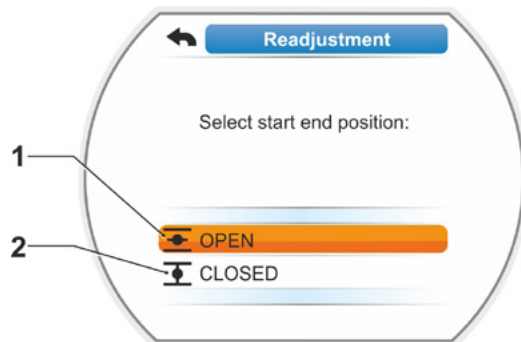


Fig. 2: Select end position

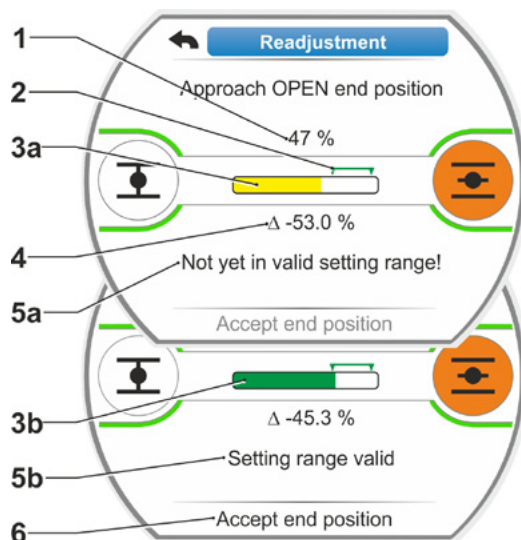


Fig. 3: Approach new end position

* Progress bar is not displayed for 2SQ7.

6. Move actuator to new end position.

■ **Travel-dependent cut-off mode:**

Hold down Drive Controller until new end position is reached. Changing the operation direction enables fine adjustment. Once the value is outside the valid adjustment range, the color of the progress bar changes. Refer also to instruction in chapter „Procedure for initial ...“ on page Page 60.

■ **Torque-dependent cut-off mode:**

Readjustment of the end positions in torque dependent cut-off mode might become necessary in exceptional cases if, e.g. the 'Adaptive end position' function is switched of or a deviation up to 0.7 % is to be corrected (refer also to Page 101). Hold down Drive Controller for more than 3 s! The actuator automatically moves until reaching the end position, refer also to the following note:



When pressing the Drive Controller for a short time (< 2 s), the actuator moves as long as the Drive Controller is pressed. If the actuator is operated, i.e. by pressing the buttons repeatedly for a short time, torque dependent cut-off is not immediately performed.

The display indicates the valid adjustment range as well as the change in percent compared to the overall travel covered so far as well as the deviation up to the previous end position.

7. Set selection marker to 'Accept end position' (fig. 4, item 3) and confirm.
A signal confirms successful readjustment.
8. Confirm 'OK' (fig. 5, item 1).
Display changes to 'End position' menu.

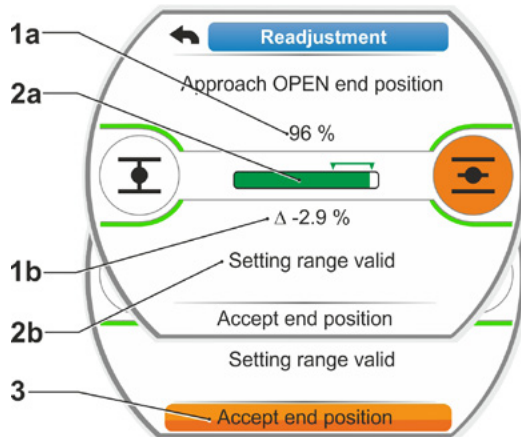


Fig. 4: Accept new end position



Fig. 5: End position readjustment correct

7.4.5 Adjust mechanical position indicator

The mechanical position indicator indicates the valve position. The  symbol stands for OPEN and the  symbol for CLOSED (refer to fig. 1, items 1 and 2).

The mechanical position indicator is an option, and not included in all devices.



If the actuator was delivered mounted on a valve, the setting may already be performed by the valve manufacturer. The setting must be checked during commissioning.

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

Operation sequence

1. Operate the actuator into the end position CLOSED.
2. Remove signaling gear cover.
3. Turn white disc with red symbol (fig. 2, item 1) until the symbol for CLOSED (fig. 1, item 1) and the arrow (3) are aligned in the indicator glass of the cover.
4. Operate actuator to position OPEN.
5. Hold white disc (fig. 2, item 1) in position and turn transparent disc (2) until the green symbol for OPEN (fig. 1, item 2) and the arrow (3) are aligned.
6. Fix signaling gear cover with screw while heeding proper fit of the seal.

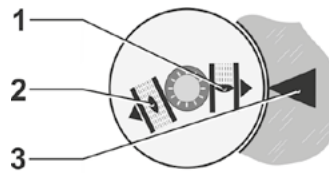


Fig. 1: Position indicator symbols

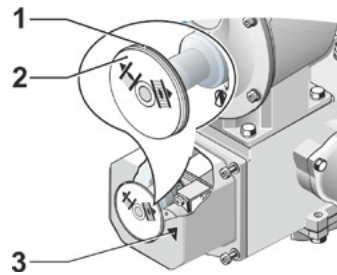


Fig. 2: Adjust position indicator

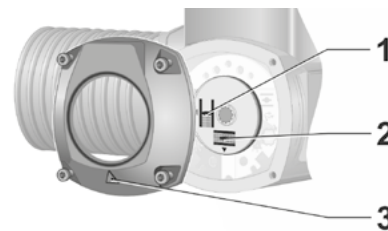


Fig. 3: Position indicator for 2SQ7

7.5 Adjust end positions for version with „non-intrusive“ position recording



The position recording for the PROFITRON actuators is available in the following versions either with signaling gear or in 'non-intrusive' version with niP or MWG.

End position adjustment with signaling gear is described in the previous chapter 7.4.

The non-intrusive position encoder niP is standard for HiMod actuators.



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

7.5.1 New setting (initial setting)

The end positions are directly set at the actuator.

The valve must not be jammed. Use the crank handle/hand wheel for release, if necessary. For crank handle/hand wheel operation, refer to chapter 4.1.

The end positions must not be set according to a specific sequence. In the following example, the display messages for end position OPEN are shown. The messages for setting end position CLOSED are similar.



The setting procedure can be aborted by selecting „Back“ . The formerly valid end position adjustment is maintained unless the actuator was operated.

Operation sequence

1. Select LOCAL control   .
2. Select 'End positions' menu item in the 'Main menu'.
The display changes to 'New setting' (fig.1).
3. Confirm selection.
Display changes to 'Only end positions' (fig. 2, item 1) or 'Complete' setting query, including all parameters required for correct end position adjustment (item 2).
These parameters include
 - CLOSE direction (clockwise or counter-clockwise),
 - Speed (in OPEN and CLOSE directions),
 - Cut-off mode (torque-dependent or travel-dependent in end positions CLOSED and OPEN),
 - Tripping torque (in end position CLOSED and end position OPEN).
 These parameters have already been described in chapter 5.3.
4. Select 'Only end positions' menu item and confirm. The display changes to query which end position CLOSED or OPEN is to be set first.



Fig. 1: End positions - new setting

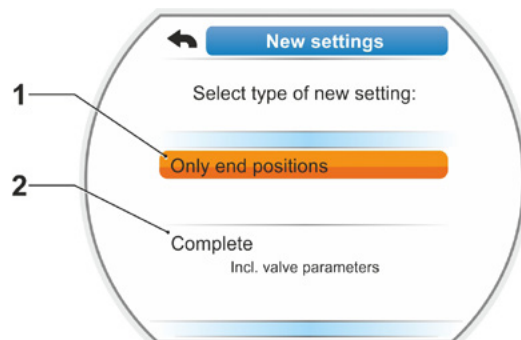


Fig. 2: End position setting with or without parameters

The end positions must not be set according to a specific sequence. Adjustment of end position OPEN is described in the following. End position CLOSED is adjusted accordingly.

5. Select end position to be set first (in our example end position OPEN) (fig. 3, item 1) and confirm. Display changes to end position adjustment and you are requested to approach end position OPEN (fig. 4). OPEN direction is offered as operation direction: End position OPEN symbol is shaded in orange (fig. 4, item 1). If operation in the opposite direction is desired, turn Drive Controller and set orange selection marked to symbol CLOSED (fig. 4, item 2).



Generally, the end position selected in operation step 4 is to be adjusted first! Furthermore, the display indicates the set cut-off mode. In our example

- End position CLOSED= torque-dependent (item 3) and
- End position OPEN = travel-dependent (item 4).

6. Depending on whether the cut-off mode for the end position is travel-dependent or torque-dependent, select the following operation sequence.

■ **Travel dependent cut-off mode:**

- a) Heed valve position and approach end position; press Drive Controller. Operate the actuator until the valve has reached the end position.*
The LED of the selected end position flashes while the actuator is operated.



- When pressing the Drive Controller for a short time (< 3 s), the actuator moves as long as the Drive Controller is pressed. For longer activation (> 3 s), latching starts (display shows 'Latching active') and the actuator moves until the Drive Controller is pressed again.
When holding down the Drive Controller for more than 3 seconds and the actuator does **not** change to latching, activate the latching function, refer to „9.1.3 Operation – latching function“ on page 104.
- If torque-dependent tripping occurred in travel-dependent cut-off mode, e.g. if the MOV is sluggish, unfavorable torque characteristics or approaching of a mechanical stop, **'Torque dependent cut-off'** is shown in the display.

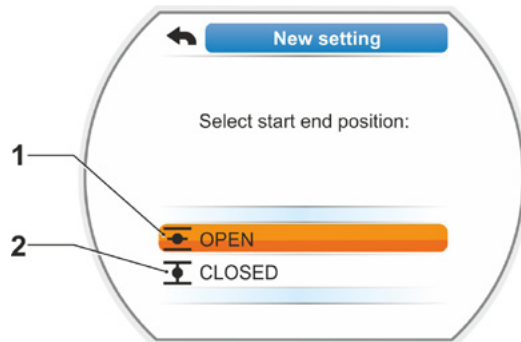


Fig. 3: End position selection

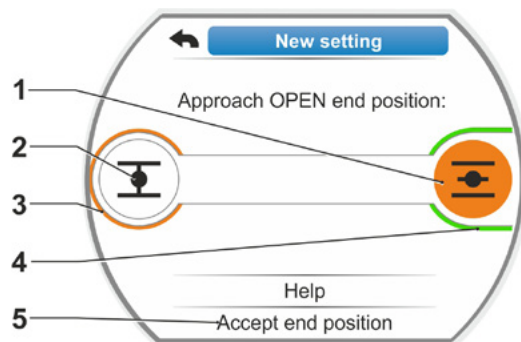


Fig. 4: Approach end position in OPEN direction

* If the actuator has switched off automatically before reaching the end position, two causes are possible:
– Sluggish MOV or unfavorable torque curve. In this instance, abort process. Or
– Valve has reached mechanical stop. In this instance, return to desired end position.

- b) Once the desired position has been reached, press Drive Controller to stop the actuator. Perform possible fine adjustment by operation in the opposite direction.
- c) Acknowledge position with 'Accept end position' (fig. 5).
The non-intrusive position recording (niP/MWG) is initialized. This will take a few seconds. The first end position is then set and the system changes to setting the other end position. The request to approach end position CLOSED is shown in the display.

Continue with operation step 7.

■ Torque-dependent cut-off mode:

- a) Hold down Drive Controller for more than 3 s! (Refer also to note on Page 66.) The actuator moves automatically.

Note:

When pressing the Drive Controller for a short time (< 2 s), the actuator moves as long as the Drive Controller is pressed. If the actuator is operated, i.e. by pressing the buttons repeatedly for a short time, torque dependent cut-off is not immediately performed.

Once the tripping torque has been reached in the end position, the actuator switches off automatically and 'Tripping torque reached' is shown in the display.

- b) Acknowledge position with 'Accept end position'. This will take a few seconds. The niP/MWG is being initialized. The first end position is then set and the system changes to setting the other end position. 'Approach CLOSE end position' is displayed.

7. Move the actuator to the other end position: Depending on whether the cut-off mode for the end position is travel-dependent or torque-dependent, select the operation sequence in accordance with step 6.

During operation to the second end position, the number of revolutions/stroke (fig. 6, item 1) is displayed, indicating whether the valid setting range (item 3) has been reached.

Once the tripping torque has been reached for travel-dependent cut-off mode, this will be indicated in the display (fig. 7, item 1).



Fig. 5: Accept end position

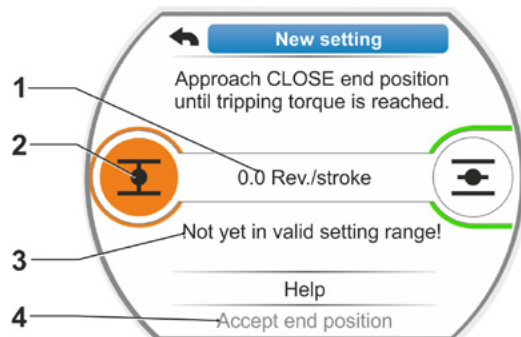


Fig. 6: Approach end position CLOSED

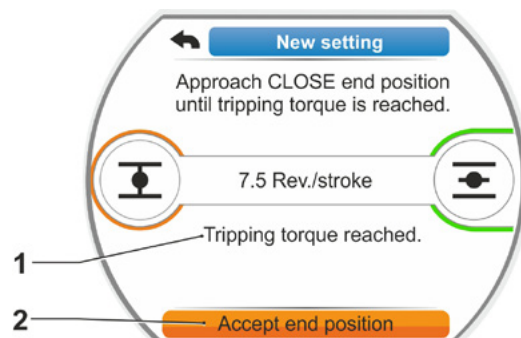


Fig. 7: End position CLOSED reached

If torque-dependent tripping occurred in travel-dependent cut-off mode, 'Torque dependent cut-off' is shown in the display. In this case, refer to note below.*

8. Set marker to 'Accept end position' (fig. 7, item. 2) and confirm; end positions are now set and the respective message confirms correct adjustment (fig. 8).
9. Confirm 'OK' menu item (fig. 8, item. 1).
Actuator changes to 'End position' menu.



Fig. 8: End position setting complete

7.5.2 Readjust end positions

Prerequisites

- Valid end position adjustment is mandatory! If there is no valid end position adjustment, refer to previous section „7.5.1 New setting (initial setting)“ on page 65.
- At the beginning of the end position adjustment, the valve must not be in a jammed state; if necessary, release it by means of the crank handle/hand wheel (see chapter 4.1).



The setting procedure can be aborted by selecting 'Back' . The formerly valid end position adjustment is maintained unless the central wheel was turned.

Operation sequence

1. Select LOCAL control
2. Select 'End positions' menu item in the 'Main menu'.
Display changes to 'End positions' menu.
3. Confirm 'Readjustment' menu item (fig. 1, item. 1).
Display changes to selection of end position to be readjusted (fig. 2).
4. Select end position to be readjusted (in our example end position OPEN) and confirm.
Display changes and prompts to approach the desired end position. If end position OPEN is selected, the selection marker is on end position symbol OPEN. If end position CLOSED is selected, the selection marker is on end position symbol CLOSED.

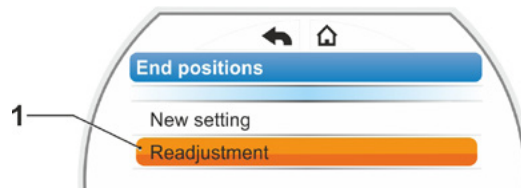


Fig. 1: End position readjustment

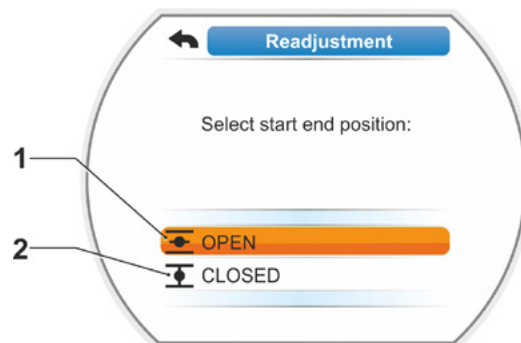


Fig. 2: Select end position

* If the actuator has switched off automatically before reaching the end position, two causes are possible:
– Sluggish MOV or unfavorable torque curve. In this instance, abort process.
Or
– Valve has reached mechanical stop. In this instance, return to desired end position.

Display additionally indicates:

- Current position within the travel in percent (fig. 3, item 1);
 - Travel in revolutions per stroke without considering and additional gear (fig. 3, item 2);
 - Deviation in percent from the currently valid end position (item 3).
 - Signal whether the setting range is valid (item 4). The end position can be accepted for a valid setting range (5).
5. If required, set selection marker on the end position symbol to the end position to be approached (new end position).
 6. Move actuator to new end position.

■ **Travel-dependent cut-off mode:**

Hold down Drive Controller until new end position is reached. Changing the operation direction enables fine adjustment.

■ **Torque-dependent cut-off mode:**

Hold down Drive Controller for more than 3 s! (Refer also to note on page 66.)
The actuator automatically moves until reaching the end position, refer also to the following note:



When pressing the Drive Controller for a short time (< 2 s), the actuator moves as long as the Drive Controller is pressed. If the actuator is operated, i.e. by pressing the buttons repeatedly for a short time, torque dependent cut-off is not immediately performed.

The display indicates whether the actuator is within the valid adjustment range, as well as the change in percent compared to the overall travel covered so far as well as the delta up to the previous end position.

7. Set selection marker to 'Accept end position' (fig. 3, item 5) and confirm. A signal confirms successful readjustment (fig. 4).
8. Confirm 'OK' (fig. 4, item 1). Display changes to 'End position' menu.

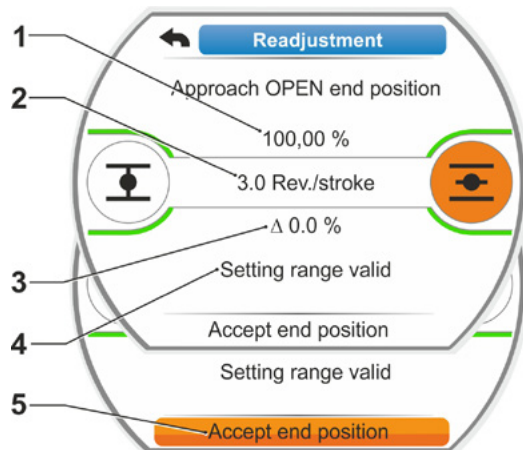


Fig. 3: Approach and accept new end position



Fig. 4: End position readjustment correct

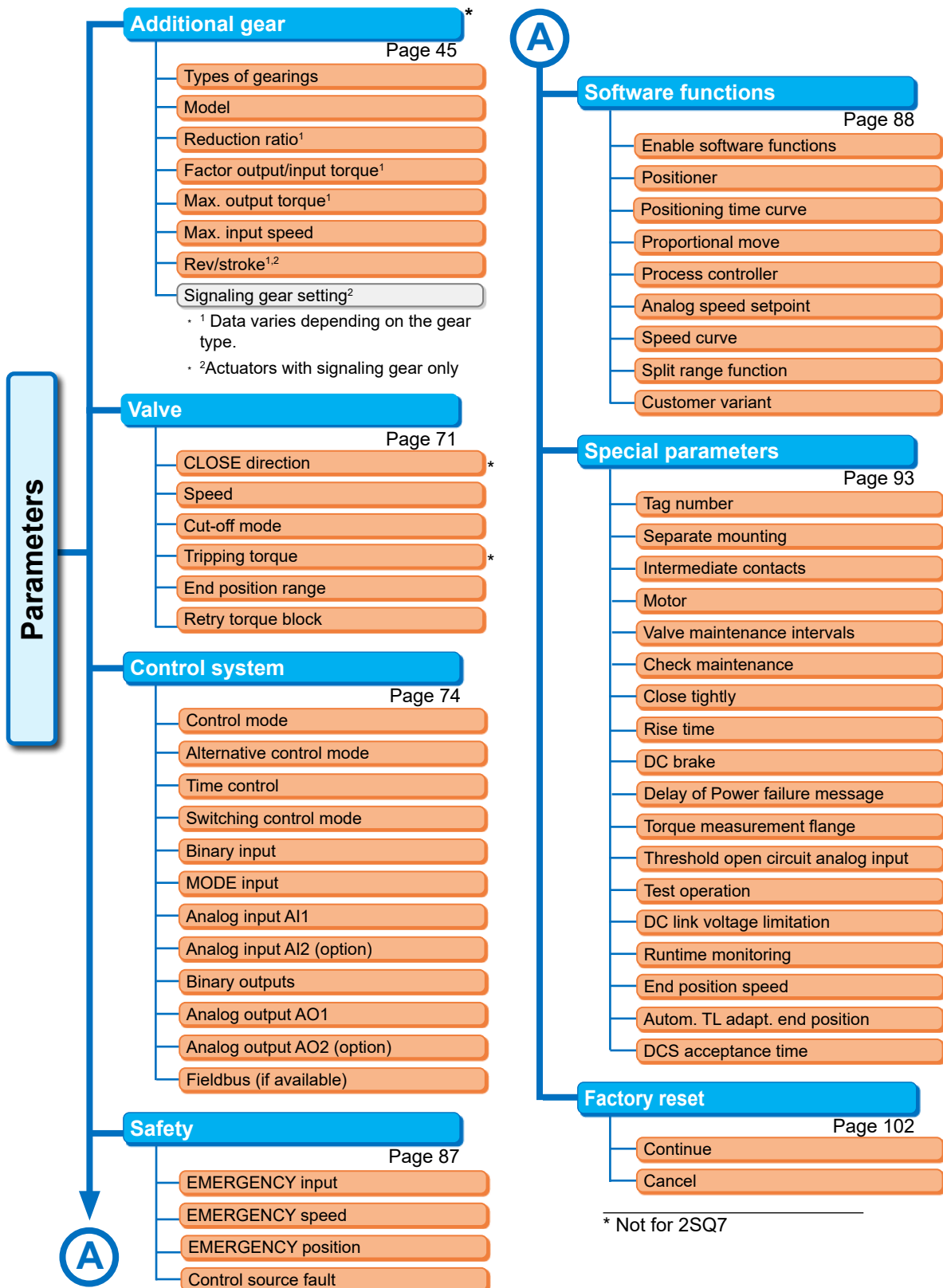
8 Parameters and possible parameter values

The present chapter describes the parameters and the possible parameter values.

Should a factory reset of all adjustable parameter values be required, this can be done via the „Factory reset“ on page 102 function.

In the following description of the parameters, the default values set in the factory are listed.

8.1 Parameter menu



8.2 Valve-specific parameters

This chapter lists the parameters and the parameter values which directly affect the valve. The sequence of the description of the individual parameters corresponds to the menu structure, refer to illustration.

Navigation in the menu is described in chapter „4.4 Navigation through the menus“ on page 25.

The available parameter values for

- Speeds (positioning times for 2SQ7) refer to tables in chapter „7.3.2 Program speeds/positioning times“ on page 50;
- For tripping torques, refer to chapter „7.3.3 Program cut-off modes and tripping torques/forces“ on page 51.

8.2.1 Change parameters in the 'Valve' menu

Changing the parameter values in the 'Valve' menu varies, depending on whether a

- Characteristic or
- A figure is changed.

The individual steps are described in the following operation sequences.

Change the characteristic of a parameter

In our example, the 'CLOSE direction' parameter characteristic is changed from 'Clockwise' to 'Counter-clockwise'.

1. Select 'CLOSE direction' in the 'Valve' menu; set the orange selection marker to the line below 'CLOSE direction' (fig. item 1). The selection marker cannot be set to the header, in our example 'CLOSE direction' but only to the line below showing the current parameter.
2. Confirm selection (item 2). The display changes to the 'CLOSE direction' menu, the selection marker is set to the first parameter value. Comment: The current parameter value is ticked ☒.
3. Select new parameter for control; set the orange selection marker to 'Counter-clockwise' in the example on the right (item 3).

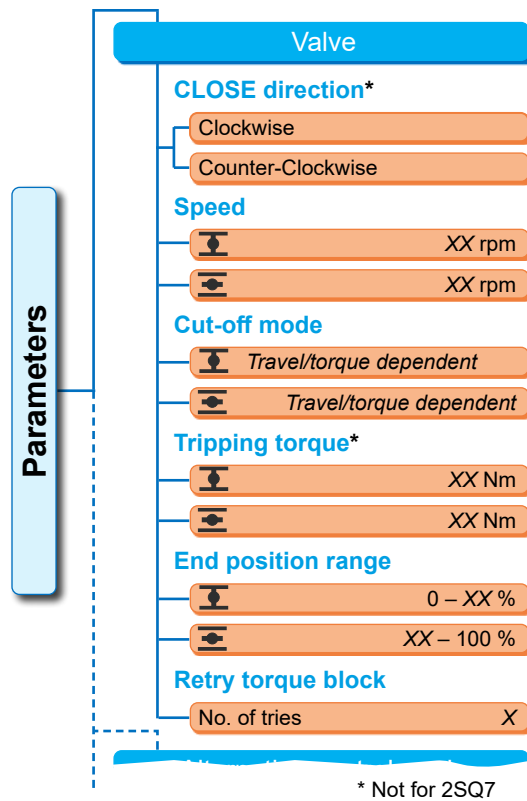


Fig.: Valve menu

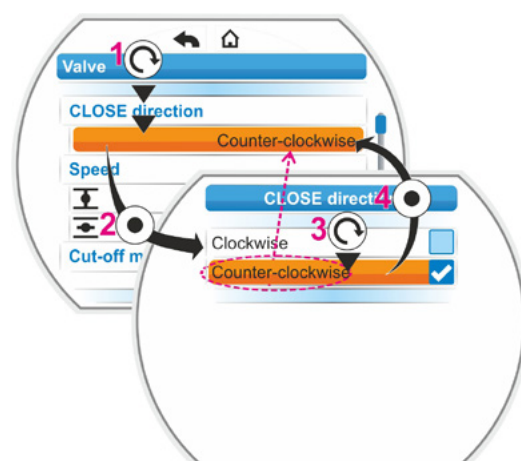


Fig.: Change parameter characteristic in Valve menu

4. Confirm selection (item 4).
A message is displayed that the end positions have to be readjusted when changing the closing direction.
5. Confirm message.
Display returns to 'Valve' menu and the newly set characteristic is displayed for 'CLOSE direction'.
Comment: When changing to the 'CLOSE direction' menu, the 'Counter-clockwise' parameter is ticked.

Change the numerical value of a parameter

In our example, the value of the 'Tripping torque' parameter for CLOSE direction is changed.

1. Select 'Tripping torque' in the 'Valve' menu; set the orange selection marker to the line below 'Tripping torque' (fig. item 2).
2. Confirm selection (item 3).
Display changes to the 'Tripping torque' menu and the value of the current tripping torque value is flashing in blue.
3. Turn Drive Controller. The tripping torque is changed and flashes in orange. (item 4).
4. Confirm selection (item 5).
Display returns to 'Valve' menu and the newly set characteristic is displayed for 'Tripping torque'.
Comment: When changing to the 'Tripping torque' menu, the newly set value is flashing in blue.

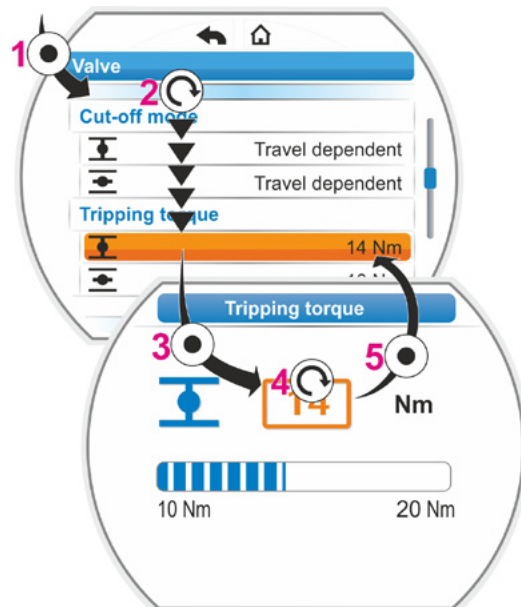


Fig.: Change parameter value in Valve menu

In the following the parameters and possible parameter settings for the valve are listed in a table. The sequence of the parameters corresponds to the structure of the 'Control system' menu.

8.2.2 Parameters and their values in the 'Valve' menu

Unless stated otherwise during order, the following values/settings are set as default.

CLOSE direction parameter (Not for 2SQ7.)

CLOSE direction

Clockwise

Direction of rotation of the output drive shaft when closing. Possible setting: Clockwise or Counter-clockwise.



If the closing direction was changed, the end positions must be set afterwards.

Speed parameter

Speed

	14 rpm
	14 rpm

 = Speed in CLOSE direction.  = Speed in OPEN direction

Parameterization within the speed range, refer to name plate.

Cut-off mode parameter

Cut-off mode

	Travel dependent
	Travel dependent

 = Cut-off mode in end position CLOSED.  = Cut-off mode in end position OPEN.

Possible setting: Clockwise or Counter-clockwise.



If the cut-off mode was changed, the end positions must be set afterwards.

Tripping torque parameter (Not for 2SQ7.)

Tripping torque

	20 Nm
	20 Nm

 = Tripping torque in end position CLOSED.  = Tripping torque in end position OPEN.

Possible setting: in 10% steps:

- Actuators classes A and B (8 levels) from 30 % to 100 % M_{trip} (default setting = 30 %).
- Actuators classes C and D (6 levels) from 50 % to 100 % M_{trip} (default setting = 50 %).

End position range parameter

End position range

	0 – 2 %
	98 – 100 %

 = End position range in end position CLOSED.

 = End position range in end position OPEN.

Possible setting (in 1 % steps):

- End position range CLOSED
from [0 % to 2 %] to [0 % to 20 %].
- End position range OPEN
from [98 % to 100 %] to [80 % to 100 %].

Within the end position range, travel is at a low speed (or long positioning time). If the actuator trips torque-dependently outside this range, it is recognized as a fault ('Blocked in move', refer to chapter „4.3 Actuator status indication“ on page 20).

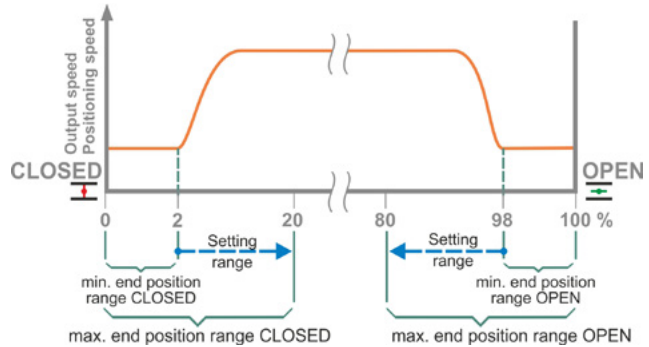


Fig.: End position ranges

Retry torque block parameter

Retry torque block

No. of tries	0
--------------	---

In case of block outside the end position range, the actuator repeatedly moves against the block (1 to 5 times).

If the „Retry torque block“ parameter value is equal to 0, this means that the position does not have to be approached again.

If the parameter value is not equal to zero, the actuator is automatically operated in the opposite direction (for a travel which corresponds to the end position range, but not longer than 2 s) and the back in direction of the block. This happens until the block has been overcome or the programmed number of tries has been reached.

If the block is not overcome, the actuator is tripped and the „Blocked in move“ fault signal is set. The actuator continues to signal 'ready' since it can still be operated into the opposite direction.

Default setting is 0.

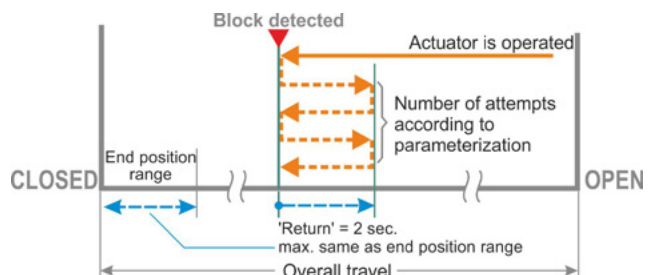


Fig.: Retry torque block

8.3 Control system parameters

8.3.1 Overview of Control system menu

The overview on the next page shows the structure of the 'Control system' menu with the parameter options. Depending on the product configuration, the indication in the display may vary.

When navigating on the display, the orange selection marker cannot be set to the blue group header, but directly on the lines below showing the possible parameter values.

Main menu

Parameters

Control system

Control mode

Binary

Permanent contact
Pulse contact
Proportional move

Analog

Positioner AI1
Process controller AI1
Positioner AI2
Process controller AI2

Fieldbus

Permanent contact
Positioner
Process controller
Proportional move

Internal

Process controller fixed setpoint
Time control

Alternative control mode

Not active

Binary

Permanent contact
Proportional move

Analog

Refer to control

Fieldbus

Refer to control

Internal

Refer to control

Time control

Switching point 1

HH:MM
Deactivated / CLOSE / OPEN

...

Switching point 10

Switching control mode

Not active
Binary input STOP
Binary input EMERGENCY

Binary input

Normally Closed (NC)
Normally Open (NO)

MODE input

No function
Interlock LOCAL/REMOTE
Enable motor operation
Enable LOCAL

Analog input AI1

Slope
Rising
Falling
Range
4 – 20 mA
0 – 20 mA

Analog input AI2

Slope

Rising
Falling

Range

4 – 20 mA
0 – 20 mA

Binary outputs

Signal assignment

Output 1

Signal
Level

Output 2

Output 3 ... 8

Analog output AO1

Signal

Position actual value
Process actual value

Range

4 – 20 mA
0 – 20 mA

Slope

Rising
Falling

Readjustment

4 mA Adjustment
20 mA Adjustment

Analog output AO2

For available additional analog module only.
Parameterization like for analog output AO1.

Fieldbus

PROFIBUS DP

Channel 1
Channel 2
Process data

MODBUS

Address
Baud rate
Parity/stop bit
Monitoring time

HART

Address 0 – 63
Monitoring time 0 – 3600 s.

PROFINET

Activate port 1
Activate port 2

8.3.2 Operation sequence: Change parameters in the 'Control system' menu

The procedure for changing the parameter values within the 'Control system' menu is identical for all parameters and is done in four steps.

The individual steps are described in the following operation sequences. In our example the 'Binary, control - 'Permanent contact' is change to, Binary - 'Pulse contact'.

Operation sequence

1. Select the parameter in the 'Control system' menu, in our example 'Control mode'; set the orange selection marker to the line below 'CLOSE direction' (fig. item 1).
The selection marker cannot be set to the heading, in our example 'Control mode' but only to the line below showing the current parameter. If the current parameter is to be changed, continue with step 2.
2. Confirm selection (item 2).
The display changes to the 'Control mode' menu, the selection marker is set to the first parameter value.
Comment: The current parameter value is ticked ☒.
3. Select new parameter for control; set the orange selection marker to 'Pulse contact' in the example on the right (item 3).
4. Confirm selection (item 4).
Display returns to 'Control system' menu and the newly set characteristic is displayed for 'Control mode'.
Comment: When changing to the 'Control mode' menu, the 'Pulse contact' parameter is ticked.

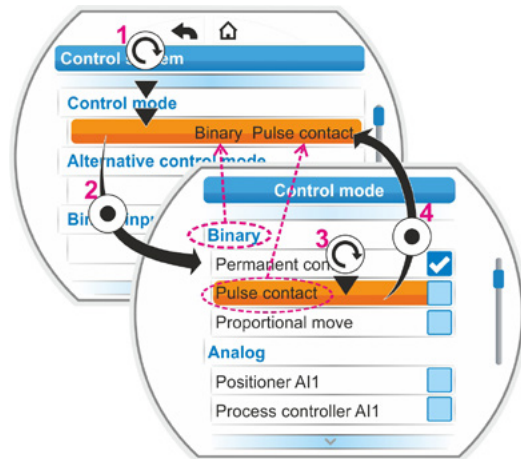


Fig.: Programming in Control system menu

In the following, the parameters and possible parameter settings for the control system are listed in a table. The sequence of the parameters corresponds to the structure of the 'Control system' menu.

8.3.3 Control system – Control mode

The illustration on the right shows an overview of the 'Control system'; depending on the version, the actuator can be differently controlled from the control system:

- 'Binary',
- 'analog' or via
- 'fieldbus'.

The control mode is determined by setting a (parameter) value (shown in orange in the menu illustration on the right) for the 'Control mode' parameter.

Permanent contact, Pulse contact or Proportional move can be selected for Binary control mode.

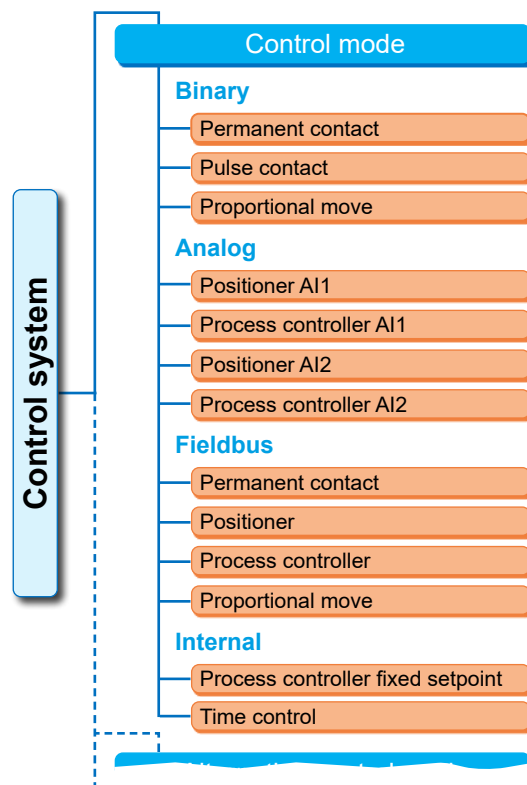


Fig.: Parameters menu: 'Control mode'

Binary control mode

Binary

Permanent contact

Pulse contact

Proportional move

Permanent contact

Permanent contact via binary inputs OPEN and CLOSE.

The actuator moves as long as an OPEN or CLOSE signal is present. The actuator stops, if the signal is deactivated, the end position has been reached or the OPEN and CLOSE commands are present simultaneously. Default setting unless ordered with positioner.

Pulse contact

Pulse contact signal via binary inputs OPEN, CLOSE, and STOP.

After an OPEN/CLOSE pulse, the actuator operates until a STOP command is present or the end position has been reached. A signal for the opposite direction leads to a direct change of the direction of operation.

Only possible if the 'Alternative control mode' parameter is set to 'non-active'.

Proportional move

Even for very short control times, the actuator is operated proportionally to the length of the control time on the OPEN/CLOSE binary inputs. The ratio of the actuator travel to the total travel is identical to the ratio of the control time to the total positioning time, refer to formula on the right.

$$\frac{\Delta \text{ Travel}}{\text{Total travel}} = \frac{\text{Control time}}{\text{Total positioning time}}$$

Formula: Travel positioning time ratio

The entire positioning time (run time) has to be parameterized to this end. It will be automatically determined by the actuator once end position setting is complete. Refer also to „8.5.3 Proportional move“ on page 91.

Only adjustable for enabled positioner function.

Analog control mode

Analog

Positioner AI1

Process controller AI1

Positioner AI2

Process controller AI2

Positioner AI1

Positioner with setpoint via analog setpoint input AI1.

The positioner within the actuator is activated and the actuator moves proportionally to the analog signal 0/4 – 20 mA.

Only adjustable for enabled positioner function.

Default setting if ordered with positioner.

Process controller AI1

The process controller within this actuator is activated. Setpoint is recorded via analog input AI1 (0/4 – 20 mA). The actual process value is recorded via AI2 (0/4 – 20 mA).

Only adjustable with enabled process controller.

Positioner AI2

Only if analog setpoint input AI2 is available.

As for positioner AI1, however, only setpoint input AI2 is used.

(If an analog setpoint input AI2 is available, you may decide at your own discretion whether the setpoint of the positioner is to be defined via AI1 or AI2.)

Process controller AI2

As for process controller AI1, however setpoint definition via analog input AI2 and actual process value via analog input AI1. Only possible, if AI2 is available (generally valid for process controller).

(If an analog setpoint input AI2 is available, you may decide at your own discretion whether the setpoint is to be defined via AI1 or AI2.)

Fieldbus control mode

Fieldbus

- Permanent contact
- Positioner
- Process controller
- Proportional move

Permanent contact

Permanent contact signal via fieldbus with OPEN and CLOSE commands.
The actuator moves as long as an OPEN or CLOSE signal is sent. The actuator stops if the commands are deactivated in one of the following telegrams or if the end position has been reached.
Only adjustable for available fieldbus interface.

Positioner

Positioner with setpoint via fieldbus interface (refer to positioner AI1). Page 77
Only for available fieldbus interface and enabled positioner.

Process controller

As for analog control mode 'Process controller AI1' or 'Process controller AI2', refer to Page 77.
Process controller with setpoint via fieldbus.

Proportional move

As for 'Binary control modes', 'Proportional move', refer to Page 77.
Control for proportional move is implemented via OPEN/CLOSE commands within the fieldbus telegram.
Only for enabled positioner function.

Internal control mode

Internal

- Process controller fixed setpoint
- Time control

Process controller fixed setpoint

The adjustable fixed setpoint is controlled by the process controller.
The fixed setpoint is set under software functions (refer also to „8.5.1 Enable software functions and customer variants“ on page 89 and „Process controller“ supplementary operation instructions).
Actual process value via AI2 (if available), otherwise AI1.
Only for enabled process controller.

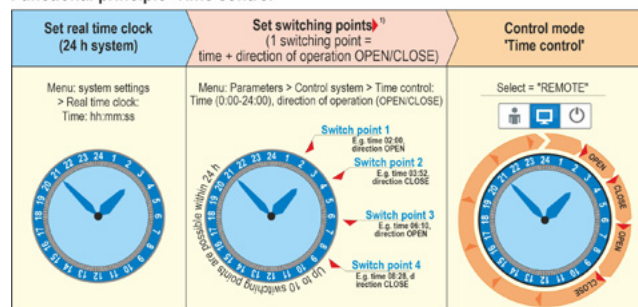
Time control

Actuator control (OPEN or CLOSE) at pre-defined times.

Prerequisites are:

- The RTC is set (refer to chapter „9.2 Adjust real time clock“ on page 105). As standard, the following time is set in the factory.
- Control or alternative control is selected as time control.
- Switching points (time and direction of operation) are set.
- REMOTE state is selected.

Functional principle 'Time control'



1) Control mode or alternative control mode for time control is set.

Fig.: Function principle Time control

- If during active time control the subsequent switching point is reached, the actuator operated into the predefined direction
 - until the respective end position is reached, or
 - to the next switching point with operation command in opposite direction, or
 - operation is interrupted by manual operation, REMOTE-LOCAL switch-over or a fault.
 Following an interruption, operation is not automatically resumed. Only once the next time switching point is reached, the actuator operated into the direction defined for the switching point. If required, operate the actuator into the desired position in 'LOCAL control mode'.
- If the same time is selected for several switching points with different directions of operation OPEN/CLOSE, these switching points are ignored.

Procedure for setting the time control, refer to chapter 8.3.5.

8.3.4 Control system – Alternative control mode

The 'Alternative control mode' parameter enables the change-over to a second control mode, to change, e.g. in case of an error, from analog to binary control. As a prerequisite, 'Binary Pulse Contact' may not be selected for the 'Control mode' parameter. Change over between control mode and alternative control mode is done via binary input STOP or EMERGENCY (selectable via 'Switching control mode').

The setting of the parameters is identical to 'Control mode', refer to previous chapter „8.3.3 Control system – Control mode“ on page 76. By setting a parameter value, the alternative control mode option is activated. The alternative control mode option is deactivated via „Not active“.

Alternative control mode

Not active

'Not active': 'Alternative control mode' is not active. It can only be controlled via the control mode set via the 'Control mode' parameter.

8.3.5 Time control assignment

Operation sequence

Select 'Time control' as control mode

1. In menu 'Control system', set the selection marker to the line below 'Control mode' (5) and confirm (6).
The display changes to currently active control mode (blue check mark).
2. Set selection marker to 'Internal' 'Time control' (7) and confirm (8).
The display returns to the 'Control system' menu and 'Time control' is displayed as control mode.

Time control setting: Select switching points (time and direction of operation).

3. Select 'Time control setting' (9) and confirm (10). The menu 'Time control setting' is displayed.
 4. Set the first switching point:
 - a) Setting the time
 - Set the selection marker to the first line below 'Switching point' (10a) and confirm (10b)
 - Set time (hour and minute) (10b to f) and save (10g).
 The menu return to 'Time control setting' and the selection marker is located in the second line below 'Switching point 1'.
 - b) Setting the direction of operation
 - Press Drive Controller (11).
 - Selection operation direction; in the present example 'OPEN' (11a) and confirm (b).
 The display returns to 'Time control assignment' and the time and direction of operation for the first switching point are indicated.
 5. Set the further switching points, as described as of step 4. (10a ...).
- Please heed notes indicated in .

Time control activation

6. Set 'Control mode' to REMOTE (fig. 2, item 2). In the first line of the start menu, the display shows that time control is active (item 1).

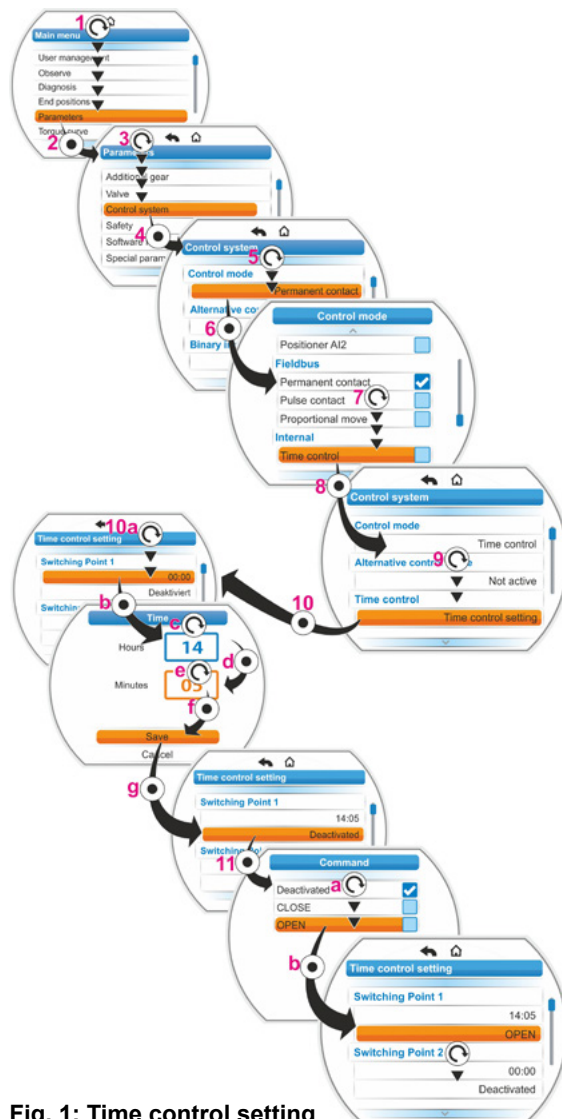


Fig. 1: Time control setting

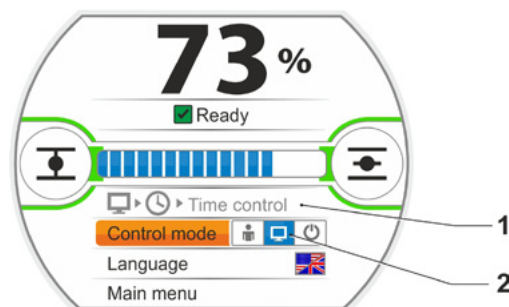


Fig. 2: Time control active

8.3.6 Control system – Switching control mode

Only visible if an 'Alternative control mode' was selected.

Selection of the binary input for changing between control mode and alternative control mode.

Switching control mode

Not active

Binary input STOP

Binary input EMERGENCY

Not active

'Alternative control mode' is not active. It can only be controlled via the control mode set via the 'Control mode' parameter.

Binary input STOP

With the binary input STOP, you can switch to 'Alternative control mode'.

Binary input EMERGENCY

With the binary input EMERGENCY, you can switch to 'Alternative control mode'.

8.3.7 Control system – Binary input

Adjustment of OPEN, CLOSE, STOP and MODE inputs.

Binary input

Normally Open [NO]

Normally Closed [NC]

Normally open [NO] (high active)

Active for 24/48 V DC signal.

Normally CLOSED [NC] (low active)

Active for 0 V DC signal.

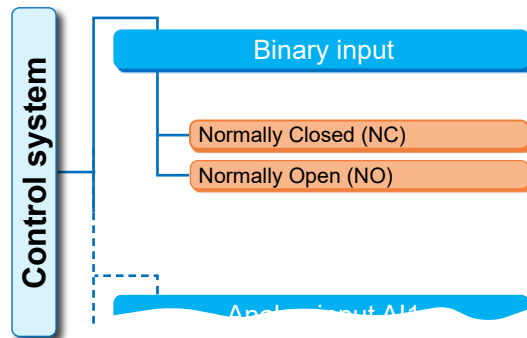


Fig.: Parameter menu 'Binary inputs'

EMERGENCY input adjustment is made in the 'Safety' menu, „8.4.1 EMERGENCY input“ on page 87.

8.3.8 MODE input

Additional functions can be controlled by the control system via this binary input.

MODE input

No function

Interlock LOCAL/REMOTE

Enable motor operation

Enable LOCAL

No function

Signal from the control system shows no effect.

Interlock LOCAL/REMOTE

This control system signal prevents control mode change-over of the actuator between REMOTE and LOCAL.

Signal = active: Change-over interlocked.

Signal = not active: Change-over possible.



To be able to operate the actuator from Local for open circuit behavior of the binary inputs (OPEN, CLOSE, STOP and Mode), the latter have to be set to NO, i.e. active for 24/48V DC!

Enable motor operation

A signal from the DCS enables or disables electric operation of the actuator (motor lock).

Signal = high (24/48 V, irrespective of NO/NC setting): Actuator can be operated.

Signal = low (0 V): The actuator is not ready for operation. 'Motor lock' is displayed in the status bar.

Enable LOCAL

The DCS can enable or restrict local actuator operation.

Signal = active: Local actuator operation is enabled in accordance with the selected user level.

Signal = not active: Operation is only possible in the 'Observer' user level. In addition, you can change between LOCAL, REMOTE or OFF control mode.



Resetting this parameter is only possible

- for active external binary signal at the mode input,
- via the COM-SIPOS program,
- via fieldbus (if available).

8.3.9 Control system – Analog input AI1

Setpoint at analog input 1 for positioner or process controller setpoint or for speed setpoint.

Slope

Slope

Rising

Falling

Rising

Rising: 20 mA corresponds to 100 % OPEN, refer to fig. 2.

Falling

Falling: 20 mA corresponds to 0 % OPEN.

Range

Range

4 – 20 mA

0 – 20 mA

4 – 20 mA

Detection of open-circuit behavior is possible (live zero).

0 – 20 mA

Detection of open-circuit behavior is not possible (dead zero).

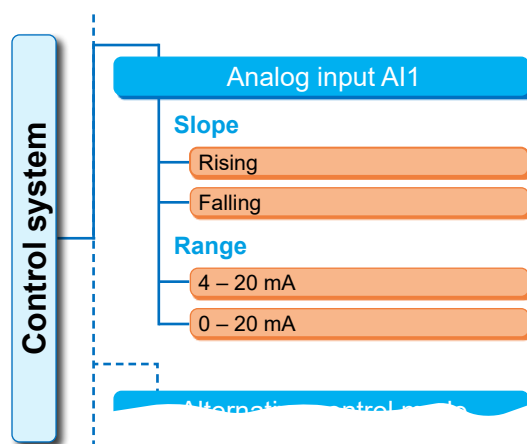


Fig. 1: Parameter menu 'Analog input AI1'

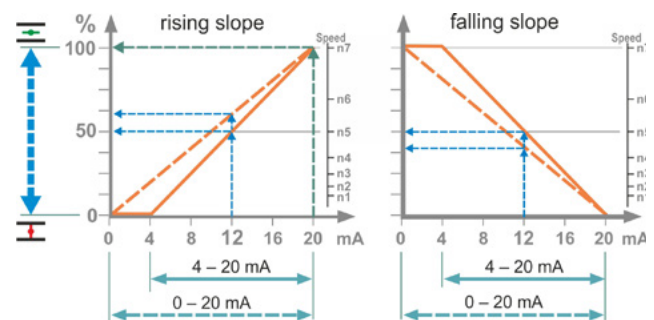


Fig. 2: Conversion 0/4 – 20 mA to 0 – 100 % or to speed with different curve

8.3.10 Control system – Analog input AI2

Analog input AI2 is only displayed if the additional analog module is available. The setting of the parameters is identical to 'Analog input AI1', refer to previous chapter.

8.3.11 Control system – Binary outputs

All in all 8 signaling outputs are available for the binary feedback signal of the actuator to the control system. Each of these outputs can be deactivated or assigned one of 23 status messages available, refer to menu overview on the right.
Furthermore, the level of the feedback signal can be determined: Normally Closed (NC) or Normally Open (NO).

Normally Open (NO): Active for 24/48 V DC signal.

Normally Closed (NC): Active for 0 V DC signal.

Output 1

For a menu overview, refer to illustration on the right

The default setting shows the table on the next page.

Not used

Signaling output 1 is not assigned a possible status message. 'Output 1' is switched off.

End position CLOSE

The actuator has cut off in end position CLOSED.

End position OPEN

The actuator has cut off in end position OPEN.

Torque CLOSE reached

Torque-dependent actuator cut-off in CLOSE direction.

Torque OPEN reached

Torque-dependent actuator cut-off in OPEN direction.

Torque CL/OP reached

Torque-dependent actuator cut-off in CLOSE or OPEN direction.

Fault

A fault has occurred (for the type of fault refer to chapter „4.3 Actuator status indication“ on page 20).

Blinker

The actuator operates. Signal changes between 'high' and 'low' state every 2 sec.

Ready

The actuator can be operated in 'LOCAL' and 'REMOTE' control mode.

Ready + REMOTE

The actuator can be operated in 'REMOTE' control mode.

Local

The actuator ins in LOCAL control of OFF.

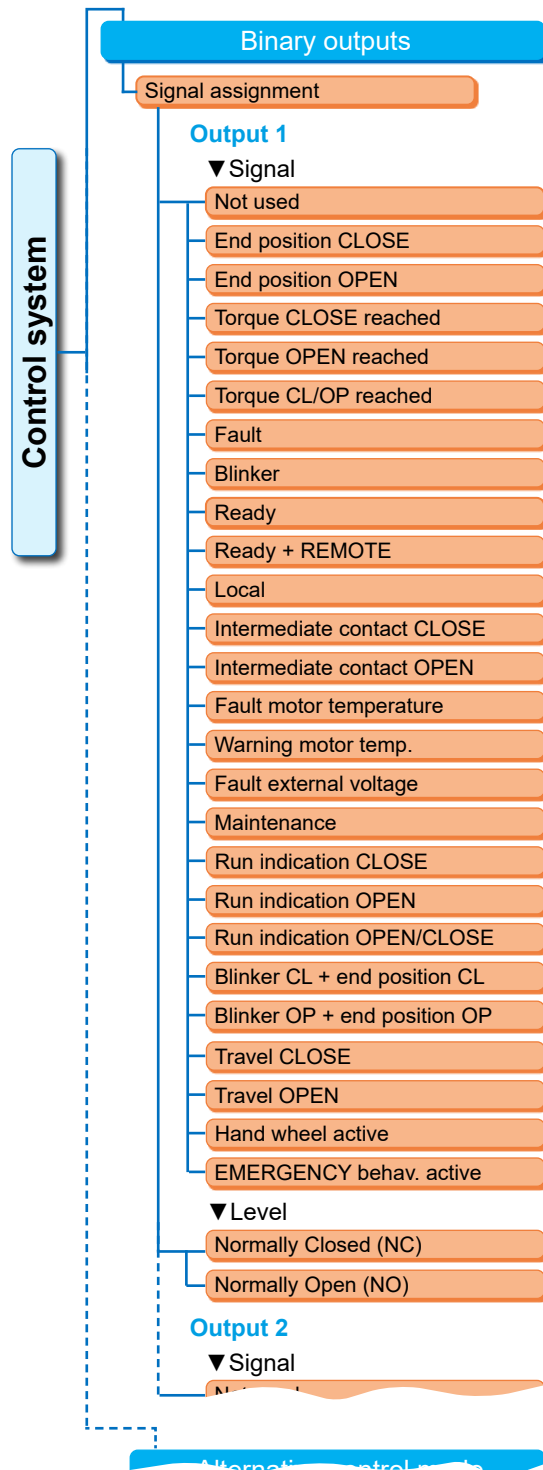


Fig.: „Binary outputs“ menu parameters

Intermediate contact CLOSE

The actuator position is within the range from 0 % to the position programmed as „Intermediate contact CL“ position, refer also to Page 94.

Intermediate contact OPEN

The actuator position is within the range from the position programmed as 'Intermediate contact OP' position to 100 %. Refer also to Page 94.

Fault motor temperature

The max. motor temperature (155 °C) has been exceeded.

Warning motor temp.

The programmed motor warning temperature has been exceeded, refer to Page 95.

Fault external voltage

Low voltage or excessive voltage has been detected, or power supply has failed.

Maintenance

One of the set maintenance limits has been exceeded, refer to Page 96.

Run indication CLOSE

The actuator operates in CLOSE direction .

Run indication OPEN

The actuator operates in OPEN direction .

Run indication OPEN/CLOSE

The actuator runs in OPEN or CLOSE direction.

Blinker CL + end position CL

The actuator runs in CLOSE direction; the signal changes between 'high' and 'low' every 2 sec. Once end position CLOSED has been reached, the signal is set to 'active'. Also refer to figure on the right.

Blinker OP + end position OP

The actuator runs in OPEN direction; the signal changes between 'high' and 'low' every 2 sec. Once end position CLOSED has been reached, the signal is set to 'active'.

'Travel CLOSE' or 'Travel OPEN'

- For travel-dependent cut-off mode:
Signal will be issued if position 0 %, or 100 % is reached.
- For torque-dependent cut-off mode:
Signal will be issued once the individual end position range has been reached.

Hand wheel active

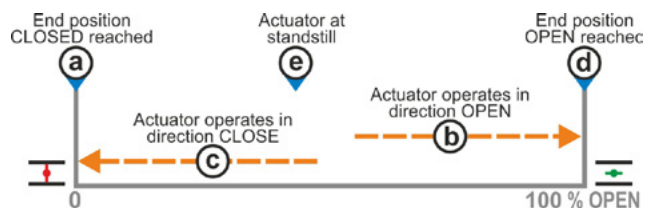
The hand wheel is pressed.

EMERGENCY behav. active

Actuator runs to EMERGENCY position or is in EMERGENCY position.

Reason is an active EMERGENCY signal or open circuit behavior with EMERGENCY position response.

Default setting of signaling outputs		
Signaling output	Signal	Level
1	End position OPEN	NO
2	End position CLOSE	NO
3	Torque OPEN reached	NC
4	Torque CLOSE reached	NC
5	Fault	NC
6	Local	NO
7	Blinker	NO
8	Warning motor temp.	NC



Status	a	b	c	d	e
Blinker CL + end pos. signaling	XXXXX	OOOOO	OXOXOX	OOOOO	OOOOO
Blinker OP + end pos. signaling	OOOOO	OXOXOX	OOOOO	XXXXX	OOOOO
"Active" signal	XXXXX				
Signal changes		OXOXOX			
"Not active" signal		OOOOO			

Fig.: Blinker CL/OP parameter + end position signaling

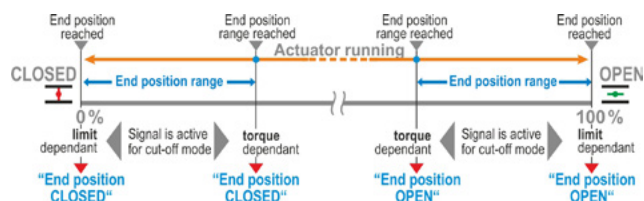


Fig.: Signal Travel CLOSE/OPEN

8.3.12 Control system – Analog output AO1

The analog output provides analog signals on:

- The position of the actuator,
- or
- the actual process value for activated process controller (transfers the sensor signal).

Process actual/position actual value

Process actual/position actual value

Process actual value

Position actual value

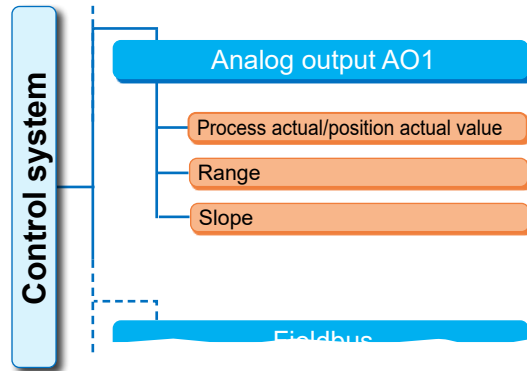


Fig.: Parameter menu 'Analog output AO1'

Process actual value

Actual process value is issued via the analog output. Only adjustable for process controller.

Position actual value

Actual position value is issued via the analog output.

Range

Range

4 – 20 mA

0 – 20 mA

4 – 20 mA

Detection of open-circuit behavior is possible (live zero).

0 – 20 mA

Detection of open-circuit behavior is not possible (dead zero).

Slope

Slope

Rising

Falling

Rising

4 mA corresponds to 0 % OPEN, 20 mA corresponds to 100 % OPEN.

Falling

4 mA corresponds to 100 % OPEN, 20 mA corresponds to 0 % OPEN.

Readjustment

Readjustment

4 mA Adjustment

20 mA Adjustment

4 mA Readjustment

4 mA can be adjusted in steps from –20 to +20. Factory setting is 0.

20 mA Readjustment

20 mA can be adjusted in steps from –20 to +20. Factory setting is 0.

How to proceed:

1. Operate the actuator to the position in which the analog output signal is to be adjusted:
0 % or 100 % OPEN.
2. In the Adjustment menu, select 4 mA Adjustment or 20 mA Adjustment and adjust the dial value (–20 to +20), until the output signal assumes the desired value.
3. Adopt value.

8.3.13 Control system – Analog output AO2

Analog output AO2 is only displayed if the additional analog module is available. The setting of the parameters is identical to 'Analog output AO1', refer to previous chapter.

8.3.14 Control system – Fieldbus

PROFIBUS DP

Only for available PROFIBUS interface.
For details, refer to PROFIBUS operation instructions.

PROFIBUS DP

Channel 1 address

Channel 2 address

PZD settings

Channel 1

Channel 1

Address 0 – 126

Fieldbus address of the actuator on channel 1 from 0 to 126.

Set to 126 in the factory.

Channel 2

Channel 2

Address 0 – 126

Channel 2 (redundant version only)

Fieldbus address of the actuator on channel 2 from 0 to 126.

Set to 126 in the factory.

Process data

Process data

PZD 3 0 – XXX

In the 'PPO2' process representation, four process data values (PZD) can be 'fed' with data from the actuator. The parameter numbers entered under PZD 3 to 6 are valid for both channels 1 and 2. For detailed information, refer to the PROFIBUS operation instructions.

MODBUS

Only for available MODBUS interface.
For more detailed information, refer to MODBUS operation instructions.

MODBUS

Channel 1

Address

Data transmission speed

Parity/stop bit

Monitoring time

Channel 2

Channel 1

Channel 1

Address 1 – 247

Fieldbus address of the actuator on channel 1 from 1 to 247.

Set to 247 in the factory.

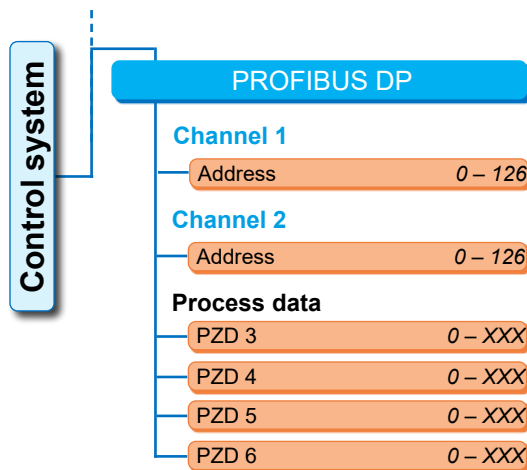


Fig.: 'PROFIBUS DP' menu

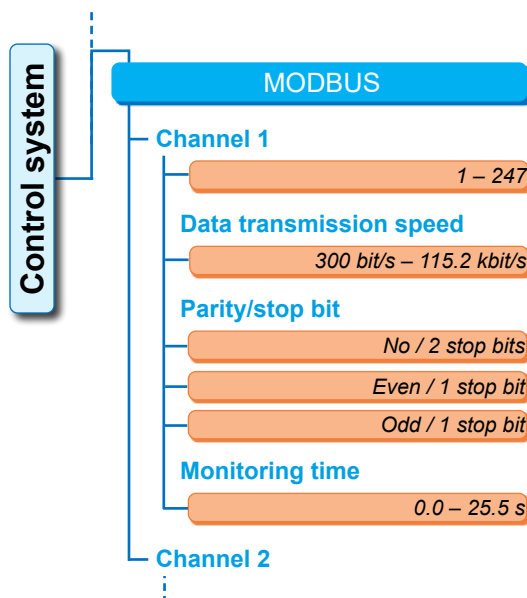


Fig.: 'MODBUS' menu

The following communication parameters, i.e. baud rate, parity and connection control time must match those of the DCS (master).

Data transmission speed

Data transmission speed

300 bit/s – 115.2 kbit/s

Transmission rate

in bits per second.

Possible settings:

300 bit/s, 600 bit/s, 1.2 kbit/s, 2.4 kbit/s, 4.8 kbit/s, 9.6 kbit/s, 19.2 kbit/s, 38.4 kbit/s, 57.6 kbit/s, 115.2 bit/s. Set to 19.2 kbit/s in the factory.

Parity/stop bit

Parity/stop bit

No / 2 stop bits

Even / 1 stop bit

Odd / 1 stop bit

No / 2 stop bits

No parity and 2 stop bits.

Even / 1 stop bit

Even parity and 1 stop bit.

Odd / 1 stop bit

Odd parity and 1 stop bit.

Set to 'even / 1 stop bit' in the factory.

Monitoring time

Monitoring time

0.0 s – 25.5 s

Connection control time, possible setting:

0.0 to 25.5 s.

For setting '0', the monitoring is deactivated.

3.0 s are set in the factory.

HART

Only for available HART interface.

For more detailed information, refer to HART operation instructions.

HART communication

Address

Monitoring time

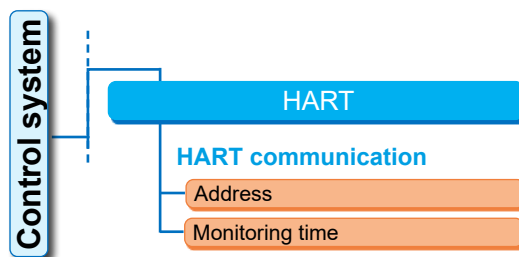


Fig.: 'HART' menu

Address

Can be set from 0 s to 63 s.

Set to 0 in the factory.

Monitoring time

Monitoring time can be set from 0 to 3,600 s; whereas the monitoring is switched off for ,0' setting. 0 s are set in the factory.

PROFINET

Only for available PROFINET interface.

For details, refer to PROFINET operation instructions.

PROFINET

Activate port 1

Activate port 2

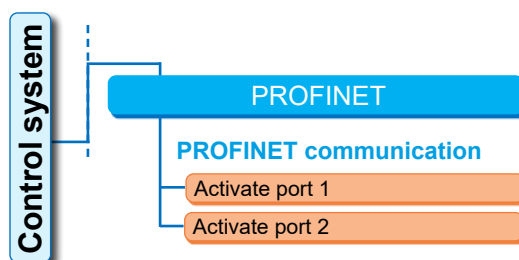


Fig.: 'PROFINET' menu

Unused ports can be deactivated.

8.4 Safety related parameters

The present chapter describes

- the parameters for EMERGENCY operation (EMERGENCY input, EMERGENCY speed, EMERGENCY position) and
- possible actuator behavior on interruption of the control signal.

The sequence of the description of the individual parameters corresponds to the menu structure, refer to illustration.

The procedure for changing the parameter values in the 'Safety' menu is identical to the procedure in the 'Control system' menu, refer to „8.3.2 Operation sequence: Change parameters in the 'Control system' menu“ on page 76.

Parameters

Safety

- EMERGENCY input
- EMERGENCY speed
- EMERGENCY position
- Control source fault

EMERGENCY operation:

EMERGENCY operation can be triggered in REMOTE mode via

- Binary input EMERGENCY, or
- Fieldbus telegram or in case of
- Open circuit behavior of control source.

8.4.1 EMERGENCY input

EMERGENCY input

- Normally Closed (NC)
- Normally Open (NO)

Normally Closed (NC)

Active for 0 V DC signal.

Normally Open (NO)

Active for 24/48 V DC signal.

Set to active high in the factory.

8.4.2 EMERGENCY speed

During EMERGENCY operation, EMERGENCY position is approached at EMERGENCY speed.

EMERGENCY speed

-  XX rpm
-  XX rpm

 = EMERGENCY speed in CLOSE direction

 = EMERGENCY speed in OPEN direction

Parameterization within the speed range, refer to name plate.

Factory settings:

- Speed 35 % n_{max} .
- Positioning time 28 s/90°

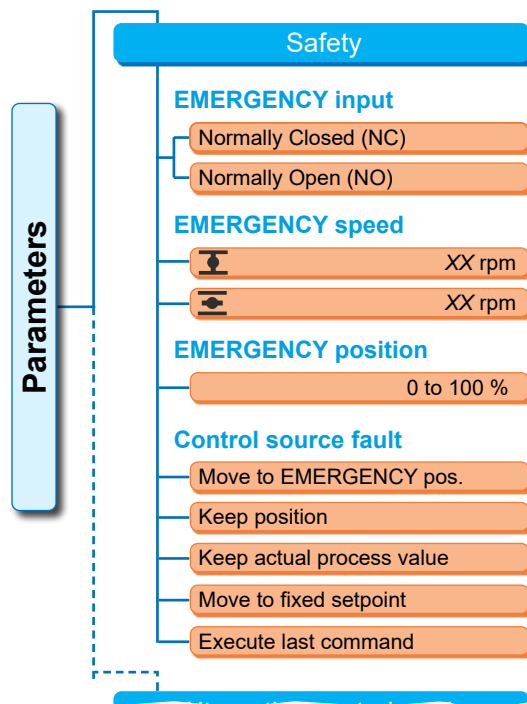


Fig.: Safety menu

8.4.3 EMERGENCY position

During EMERGENCY operation, the position indicated here will be automatically approached.

EMERGENCY position

XX %

EMERGENCY position 0 to 100 % in 1 % increments.
Set to 0 in the factory.

8.4.4 Fault control source

A control wire interruption is detected for control via

- Analog inputs with signal range 4 – 20 mA;
- Fieldbus

Control source fault

Move to EMERGENCY pos.

Keep position

Keep actual process value

Move to fixed setpoint

Execute last command

Move to EMERGENCY pos.

In the event of signal loss from the control room, EMERGENCY operation will be triggered.

The following is shown in the display: 'No signal – EMERGENCY pos.'

Keep position

In the event of signal loss, the current position is held and 'No signal - Pos. held' is shown in the display.

Keep actual process value

The actual process value is held and 'Keep actual process value' is shown in the display. Only if 'Process controller' is active.

Move to fixed setpoint

On loss of signal of the actual process value, the fixed process setpoint is approached and held. The following indication will then be displayed: 'Move to fixed setpoint'.

Execute last command

In the event of signal loss from the DCS, the last command prior to signal loss will be executed.

The following is shown in the display: 'Execute last command'.

This setting is only useful for control via fieldbus.

'Keep position' is set in the factory.

8.5 Software functions

In addition to the standard functions, further software functions can be enabled. The additional functions are classified as

- Software functions and
- Customer variants.

Software functions are functions which enhance the scope of delivery of the actuator (refer also to the following section „Optional software functions“).

Customer variants are customized programmed functions deviating from the standard functions and adapting the actuator behavior to specific customer requirements.

Software functions and customer variants are already enabled within the actuator if they were part of the order. They can also be enabled at a later date, refer to fig „Software function menu“ above and the following chapter.

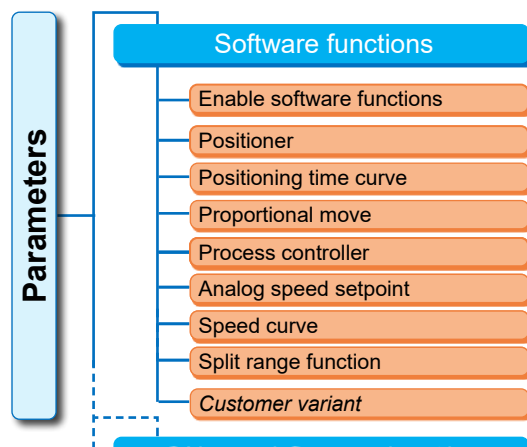


Fig.: Software functions menu

8.5.1 Enable software functions and customer variants

The present chapter describes how to enable optional software functions and customer variants. A software function or customer variant can only be enabled in the 'Expert' user level. For information on changing the user level, refer to „6 User management“ on page 33.



To enable a software function or a customer variant, a PIN code available as accessory is required. The PIN code is different for each actuator.



Unauthorized enabling, setting of customer variants can lead to damage of the actuator/valve/ plant!

The operation sequence for enabling the software functions is always the same and therefore described as an example.

Operation sequence

1. Select 'Software functions' in the 'Parameter' menu.
The 'Software function menu' with 'Enable software functions' menu item opens (fig. 1, item 1).
Should software functions and/or customer variants, which can be programmed, already be enabled, their names will be displayed, fig. 1, item 2.
2. Select 'Enable software functions' (fig. 2, item 1) and confirm (fig. 2, item 2).
A menu listing all possible software functions including status appears:
 - 'Enabled': Function is already enabled.
 - 'Enter PIN Code': Function is not enabled.
3. Select desired software function*, fig. item 3; in our example 'Process controller'.
4. Confirm selection, fig. item 4.
The display changes to the PIN code entry.
5. Enter PIN code, fig. item 5.
Once all four characters of the PIN code have been entered, 'Continue' will be highlighted.
6. Confirm 'Continue' (item 6).
The display changes to the 'Software functions' menu where the enabled function will be displayed accordingly (see above operation step 1. and fig. 1, item 2).
7. Select 'Software functions' for programming the function.
Continue as described in the supplementary operation instructions.

Procedures for programming software functions and customer variants are described in separate operation instructions.

*If a **customer variant** is to be enabled, turn the Drive Controller until 'Customer variant' is highlighted by the orange selection marker.

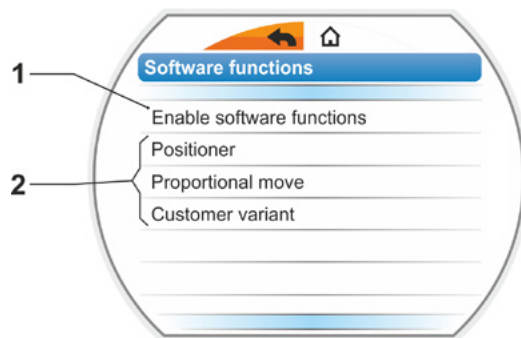


Fig. 1: Indication in the display: 'Software functions' menu

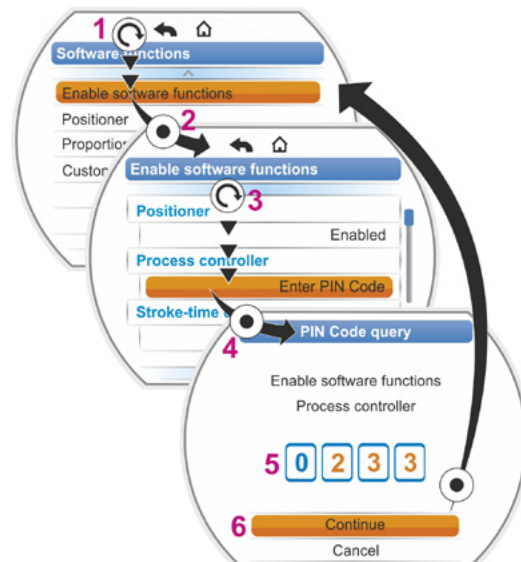


Fig. 2: Enable software function

8.5.2 Positioner

Positioner

Setpoint	
Linear	
Equal percentage	
Fast opening	
Dead band	
Min.	0.2 %
Max.	2.5 %

Setpoint

For the default setting of the setpoint input 'rising/falling', it is possible to adapt the curve and to deviate from the linearity.

Setpoint

Linear	
Equal percentage	
Position feedback	
Actual value = position	
Actual value = acc. to setpoint	
Fast opening	
Position feedback	
Actual value = position	
Actual value = acc. to setpoint	

Linear

Identical to default setpoint curve.

Equal percentage

The actual position value (of the actuator) between end positions is considerably lower than the defined position setpoint, refer to fig. on the right.

Position feedback

Actual value = position: Indicates the position in linear measurement.

Actual value = acc. to setpoint: Indicates the position according to the inverse curve of the setpoint.

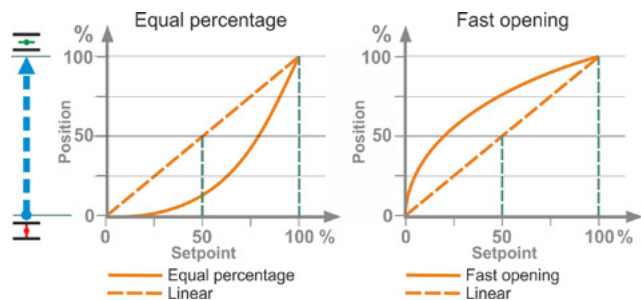


Fig.: Curve adaptation

Fast opening

The actual position value (of the actuator) between end positions is considerably higher than the defined position setpoint, refer to fig. „Curve adaptation“.

Position feedback: see above „Equal percentage“.

The positioner works in adaptive control mode, i.e. the dead zone (threshold) is continuously adapted to the controlled system. Depending on the process requirements both minimum and maximum values of the dead band can be set.

Dead band

Dead band

Min.	0.2 %
Max.	2.5 %

Minimum dead band

0.2 % to 5 %.

Default setting is 0.2 %.

Maximum dead band

0.2 % to 5 %.

Default setting is 2.5 %.

8.5.3 Proportional move

Even for very short control times, the actuator is operated proportionally to the length of the control time.

The entire positioning time (run time from end position to end position) has to be determined to this end. The time can either be automatically determined by the actuator after end position adjustment or measured and defined by the user.

Refer also to „Binary control mode“ on page 77.

Proportional move

Duration
Autom. determination
User defined

Duration

Duration

Autom. determination
User defined

Autom. determination

Automatic determination of the run time.

User defined

Duration is defined by the user.

Autom. determination

Duration OPEN	X.X s
Duration CLOSE	X.X s

Duration OPEN

Duration CLOSE

The duration (run time) will automatically be determined after any end position adjustment or changes in the ramp-up time. For determining the duration, the actuator must be operated into one direction for at least 3 % of the travel.

User defined

Duration OPEN	X.X s
Duration CLOSE	X.X s

Duration OPEN

Duration CLOSE

Individual durations for OPEN and CLOSE can be specified.

Possible setting for the positioning time: 5 to 3,276 s.

Default setting is 60 s.

8.5.4 Optional software functions

- Positioner (for the description refer to „8.5.2 Positioner“ on page 90), order no.: 2SX7200-3FC00*
Type: 2S . 7 -4 . B .
For HiMod, the „positioner“ software function is included in the scope of delivery.
- Process controller (PI controller), order no.: 2SX7200-3FG00* or 2SX7200-3FG08 for HiMod.
Type: 2S . 75 -4 . C/L . or 2SA78 -4.C/L.
Supplementary operation instructions Y070.346
- Travel-dependent speed adjustment (speed curve)**, order no.: 2SX7200-3FD00*
Type: 2S . 7 -4 . D/E .
Supplementary operation instructions Y070.345
- External analog speed setpoint**, order no.: 2SX7200-3FE00*
Type: 2S . 7 -4 . F/G .
Supplementary operation instructions Y070.344
- Positioner with split range function, order no.: 2SX7200-3FH00* or 2SX7200-3FH08 for HiMod.
Type: 2S . 7 -4 . H .
Supplementary operation instructions Y070.343
- Travel-dependent freely settable positioning times, order no.: 2SX7200-3FJ00*
Type: 2S . 7 -4 . J/K .
Supplementary operation instructions Y070.340

*Order number for subsequent enabling of the software function.

- ** - Speed for 2SA7 rotary actuator. . . ;
- Positioning time for 2SQ7 part-turn actuator. . . or 2SA7. . with part-turn gearbox

Always state the serial number of the actuator when ordering the optional software functions at a later date.

Serial number is indicated on the name plate of the electronics unit (refer to fig.) and can also be viewed via 'Main menu' ► 'Observing' ► 'Electronic name plate' ► 'Serial number'.

If the control board was exchanged, the serial number of the new control board is not identical to the number on the name plate. When ordering the software function, always state the number displayed in the 'Observing' menu.

Enabling an optional software function is described in the previous chapter. If a later firmware version is required for a software function, the firmware can be requested from the Service.

The firmware update of the actuator is performed with the COM-SIPOS parameterization software.

During a firmware update, the actuator parameters (customer settings and work parameters) including end position setting and operational data are not changed.



Fig.: Serial number on electronics unit

8.6 Special parameters

Special parameters enable adaptation of the actuator behavior to the automation environment. Furthermore, they allow efficient planning of valve maintenance intervals in relation to the number of starts or the operating hours.

The following illustration shows an overview of the 'Special parameters' menu.

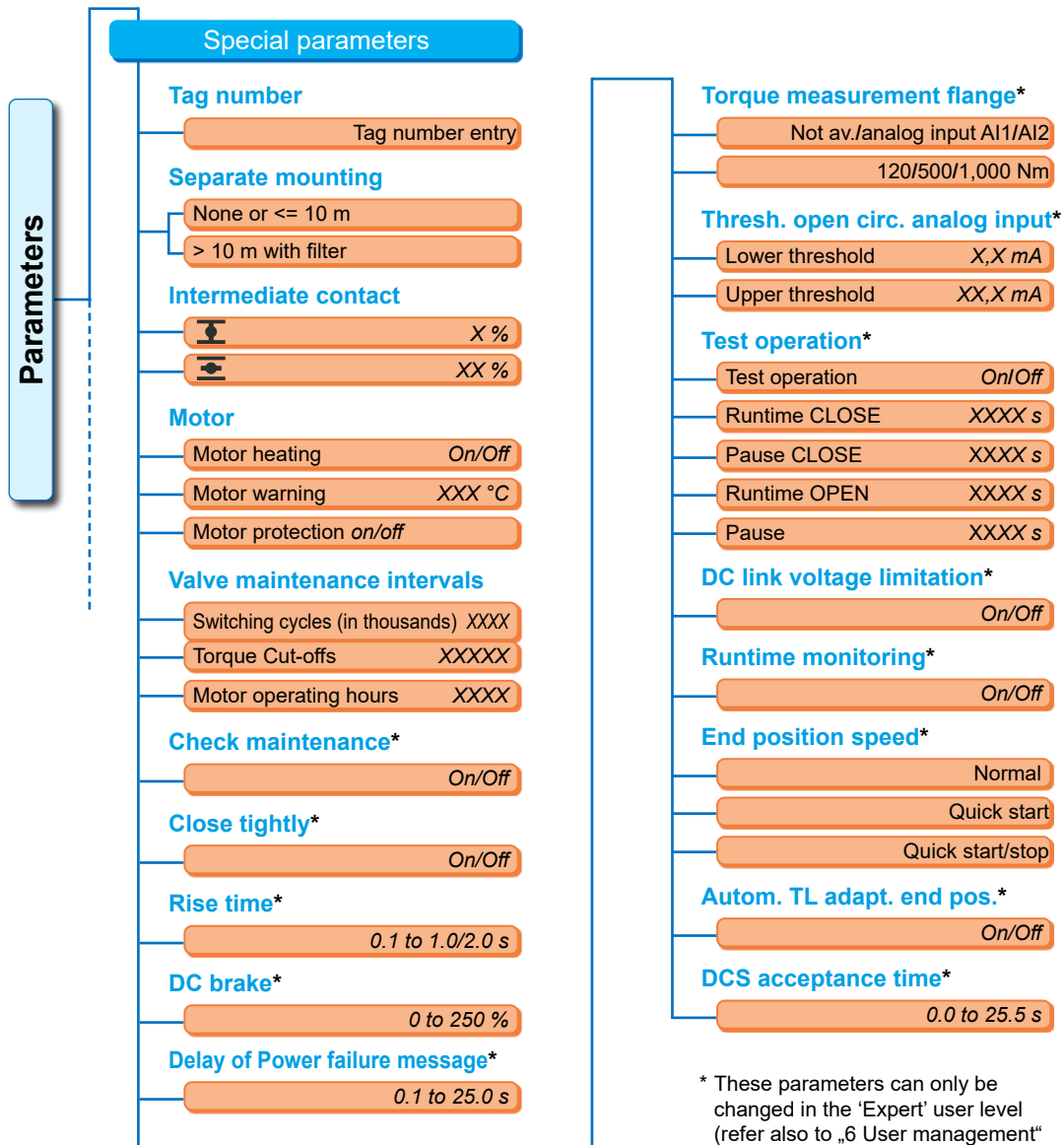


Fig.: 'Special parameters' menu

8.6.1 Tag number

The tag number is used for plant identification. It may contain up to 20 characters.

If 'Tag number' is selected in the 'Special parameters' menu, the indication on the right with the current tag number is shown in the display, fig. 2, item 1.

Tag number entry

1. Turn Drive Controller and highlight desired character with the orange selection marker (fig. 2, item 2).
2. Press Drive Controller. The desired character is copied to the entry line (fig. 2, item 1).

To correct the last entry use **X** button (fig. 2, item 3).

Use 123 key to **change over to digit entry** (item 4).

Blanks are entered via the space bar (item 5).

Parameters

Special parameters

Tag number

Fig. 1: Navigation to „Tag number“ parameter



Fig. 2: Tag number entry

8.6.2 Separate mounting

If the electronics unit is mounted separately from the gearbox, this parameter is vital for fault-free operation of the actuator.

For incorrect setting the actuator might trip if the torque is too low.

Separate mounting

None or ≤ 10 m

> 10 m with filter

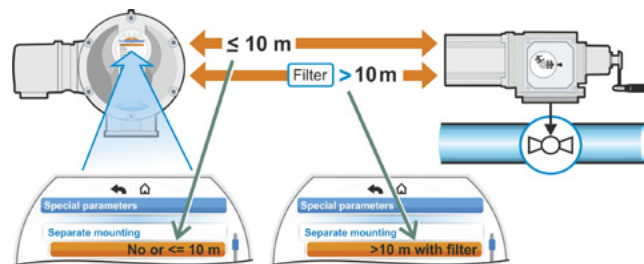


Fig.: Separate mounting

None or ≤ 10 m

Setting if no separate mounting or separate mounting of up to 10 m is used.

> 10 m with filter

Setting for separate mounting of more than 10 m with LC filter.

In the factory, the parameter is set according to order.

8.6.3 Intermediate contacts

The 'Intermediate contacts' parameter is used to define a setting range and if the actuator is within this range, a signal (active) will be sent to the DCS.

Intermediate contact

	0 %
	100 %

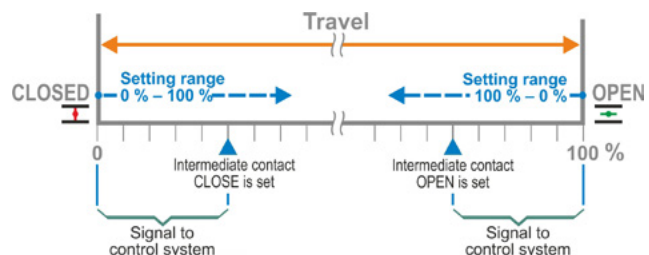


Fig.: Intermediate contact function principle

Intermediate contact CL

The signal is active from 0 % to the programmed value.

Setting range: 0 to 100 % of the travel.

In the factory, 0 to 2 % are set for torque-dependent cut-off, 0 to 0 % for travel-dependent cut-off.

Intermediate contact OP

The output signal is active from the programmed value to 100 %.

Setting range: 100 to 0 % of the travel.

In the factory, 98 to 100 % are set for torque-dependent cut-off, 100 to 100 % for travel-dependent cut-off.

8.6.4 Motor

Motor

Motor heating

Motor warning

Motor protection

Motor heating On/Off

To prevent condensation while the motor is at standstill, the motor can be heated with DC current when the heater is activated. The heating up depends on the difference between motor temperature and ambient temperature.

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

In the factory, the motor heater is set according to order.

Motor warning

If the temperature set here (within a range between 0 and 155 °C) is exceeded, a warning signal will be issued. The warning signal can be provided via binary signal and fieldbus protocol.

135 °C is set in the factory.

Motor protection on/off

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

Disabling the motor protection will void the warranty for the motor!

To prevent accidental disabling of the motor protection, the information on the right will be displayed and must be confirmed.



Fig.: Motor protection warning

8.6.5 Maintenance intervals of valve

Maintenance parameters enable effective planning of valve maintenance intervals depending on the number of starts performed or the operating hours, for example.

If one of the values programmed here is not achieved, the „Maintenance necessary“ message will be issued.

Refer to chapter Observe „12.2 Valve maintenance limits“ on page 117.

Valve maintenance intervals

Switching cycles (in thousands)	XXXX
Torque Cut-offs	XXXX
Motor operating hours	XXX

Switching cycles (in thousands)

After reaching the programmed number of switching cycles, the „Maintenance necessary“ signal is generated.

Possible settings:

- Actuators of duty classes A and B: 1,000 to 100,000, in steps of 1,000 each.
Factory settings: 30,000.
- Actuators of duty classes C and D: 1,000 to 30,000,000, in steps of 1,000 each.
Factory settings: 10,000,000.

Torque cut-offs

After reaching the programmed number of torque-dependent cut-offs, the „Maintenance necessary“ message is generated.

Possible settings:

- Actuators of duty classes A and B: 1 to 10,000 in steps of 1 each.
Factory settings: 3,000.
- Actuators of duty classes C and D: 1 to 20,000 in steps of 1 each.
Factory settings: 10,000.

Motor operation hours

After reaching the programmed number of motor operation hours, the „Maintenance necessary“ message is generated.

Possible settings: 1 h to 2,500 h in steps of 1 each.

Factory settings: 2,500 h.

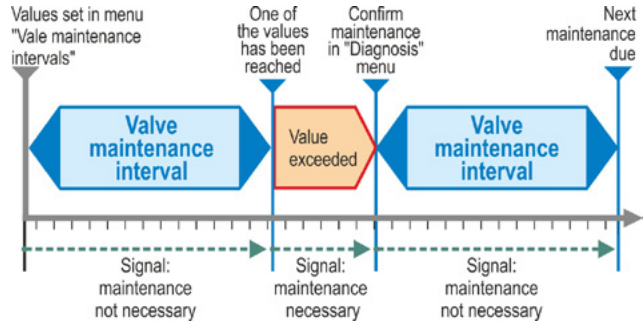


Fig.: Maintenance intervals of valve

8.6.6 Check maintenance

If one of the values programmed in the 'Valve maintenance intervals' is reached, the „Maintenance necessary“ message is generated, refer to previous chapter 8.6.5.

If the 'Check maintenance' parameter is set to off, the maintenance limits will not be checked.

Check maintenance

☐	On
☐	Off

8.6.7 Close tightly

If the 'Close tightly' function is active, closed-loop control within the end position ranges is not possible.

If, within a end position range, the operation command in direction of this end position is canceled or a STOP signal sent, the actuator continues its operation until either a torque-dependent cut-off occurs or a command in the opposite direction is issued.

Even for travel-dependent cut-off mode and for control via positioner or process controller, similar to torque-dependent cut-off mode, the internal operation command is extended until the end position (0 % or 100 %) is reached.

Close tightly



Close tightly off

This setting is required, if closed-loop control is to be applied within the end position ranges.

Close tightly is activated in the factory.

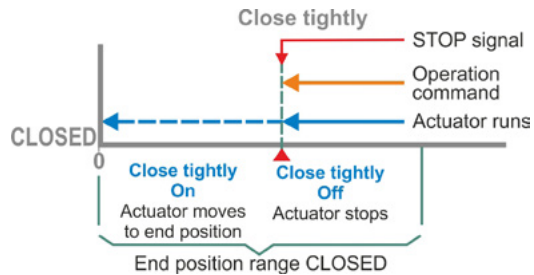


Fig.: Close tightly functional principle

8.6.8 Rise time

The 'Rise time' parameter accesses the integral frequency converter. The shorter the rise time the faster the actuator reaches the specified speed. The setting of the rise time influences the modulating behavior. Longer rise times lead to higher modulating accuracy, which reduces the control dynamics at the same time.

Rise time



The setting range is, in 0,1 s increments, for actuators of duty classes

- A and B: 0.1 s to 1 s.
- C and D: 0.1 s to 2 s.

Set to 0.5 s in the factory.

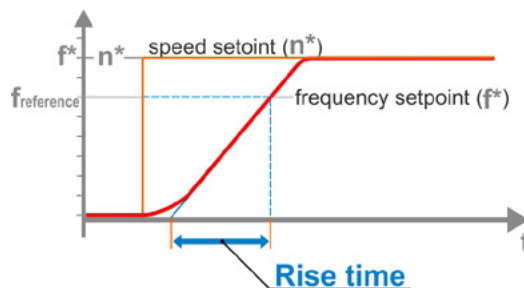


Fig.: Rise time principle

8.6.9 DC brake

A value not equal to '0 %' triggers the DC brake via the integral frequency converter. The higher the value, the higher the DC braking current is set.

For a value of '0 %', the speed of the motor is reduced as quickly as possible to a standstill via the frequency converter. For nearly all operation points, this is the shortest time to achieve a standstill. We therefore recommend maintaining the default settings.

DC brake



The setting range is 0 to 250 % in 1 % increments.

Set to 0 % in the factory.

8.6.10 Delay of Power failure message

If the mains voltage is outside the tolerance of -30% / $+15\%$, a fault signal is set. To prevent fault signals for short-term voltage fluctuations, a delay time (duration of the power failure) can be defined after which the fault signal will be issued. Also refer to figure on the right.

Delay of Power failure message

X.X s

Delay

Possible setting for tolerance time: 0 to 25 s.
Factory setting is 6 s.

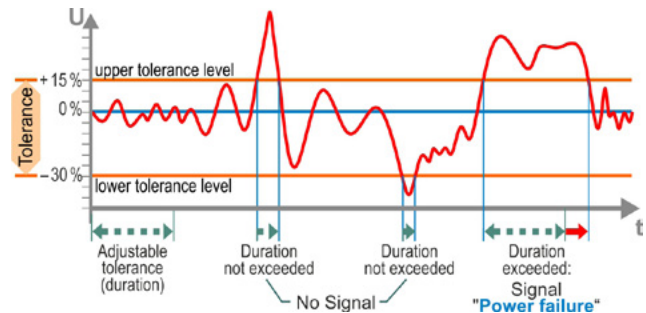


Fig.: Delay of Power failure message

8.6.11 Torque measurement flange

This menu item is used to set whether a torque measurement flange is actually available and if so, where the signal cable is actually connected. Furthermore, the size of the torque measurement flange is set: 120 Nm, 500 Nm or 1,000 Nm. Depending on the actuator type, the correct torque measurement without flange reduction has been preset.

Torque measurement flange

Input

Not valid

Analog input AI1

Analog input AI2

Size

120 Nm (10.1, 2SX7100-6A..)

500 Nm (14.5, 2SX7100-6B..)

1,000 Nm (16.1, 2SX7100-6C..)

The current value can be displayed via the Observe > Status menu. Possibly required zero adjustments can also be performed via this menu, refer to „11.4 Torque zero adjustment“ on page 115.

8.6.12 Thresholds for detection of open-circuit behavior at analog outputs

According to NAMUR specification on the harmonization of signal levels for the 4 – 20 mA interface,

- the lower threshold is 3.6 mA,
- the upper threshold for the failure detection is 21 mA.

For analog inputs with this programming, 4 – 20 mA signals outside these limits are detected as failures (wire break).

Changing the lower and/or upper limit is only reasonable for control systems whose signals might not lie within the NAMUR specification.

Threshold open circuit analog input

Lower threshold

Upper threshold

Lower threshold

Possible setting from 0.0 to 3.6 mA.

Upper threshold

Possible setting from 20.0 to 22.0 mA.

3.6 mA have been set for the lower threshold and 21 mA or the upper threshold in the factory. This parameter is not applicable for „Split range function“.

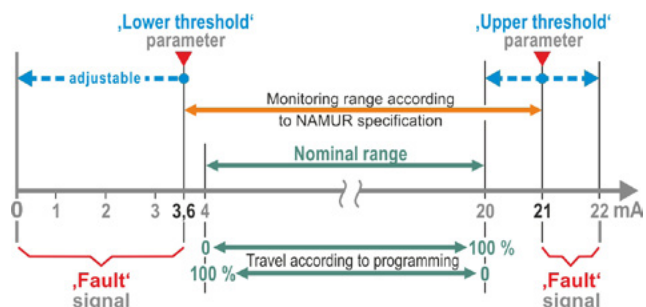


Fig.: Threshold open circuit analog input

8.6.13 Test operation

With this function, the actuator is switched to a continuous duty in REMOTE mode, by continuously repeating a cycle with the following steps:

Operation into CLOSE direction – pause – operation into OPEN direction – pause – operation into CLOSE direction etc. The duration of each step can be individually set from 0 to 6,553 s.

The number of cycles can be completed can be read via the 'Diagnosis' - 'Operation data actuator' - 'switching cycles'. In this case, a switching cycle corresponds to a cycle.

Prerequisites: The actuator must be ready for operation, i.e. end position, speed, cut-off mode and tripping torques are set.

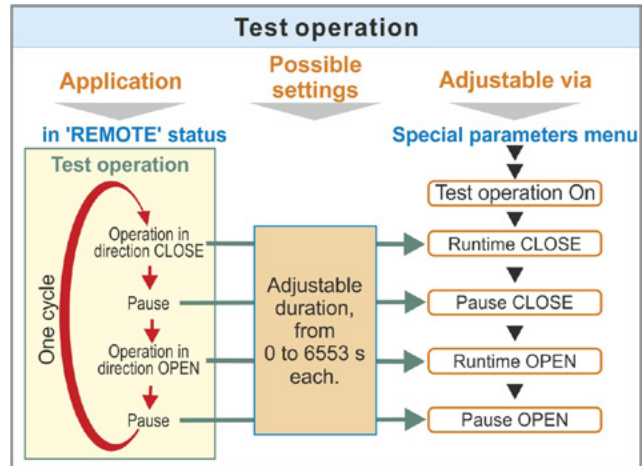


Fig.: Test operation principle

Test operation

Test operation	Off/On
Runtime CLOSE	XXXX s
Pause CLOSE	XXXX s
Runtime OPEN	XXXX s
Pause OPEN	XXXX s

Hints for operation

1. Set duration of each pause and for operation into OPEN and CLOSE directions individually (from 0 to 6,553 s), refer also to „Changing parameter values/ characteristics“ on page 26.
2. Switch on test operation, select 'On' in the 'Test operation' menu and switch actuator to REMOTE mode. Changing over to LOCAL mode will stop the test operation.

If test operation is switched on and off again, the cycle will be continued from the step the test was stopped.

Operation in the LOCAL mode via Drive Controller is not detected by the cycle. If the actuator has already reached the end position when changing over to REMOTE mode, the remaining run time and the following pause first have to expire before the actuator starts to move again.

Should the actuator reach the end position before the set operation time has elapsed, it will switch off.

8.6.14 DC link voltage limitation

Some torque peaks exceeding the voltage tolerance (+15 %), can cause charging of the DC link during standstill.

This is avoided if the parameter (DC link voltage limitation = on) is active.

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

DC link voltage limitation

	On
	Off

8.6.15 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

☐	On
☐	Off

Runtime monitoring On

Runtime check.

Runtime monitoring Off

No runtime check.

Runtime monitoring is activated on delivery.

8.6.16 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 parameter“ on page 74 and „Program speeds/positioning times“ on page 50.

End position speed

☐	Normal
☐	Quick start
☐	Quick start/stop

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**;
- Between the end position ranges 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**).

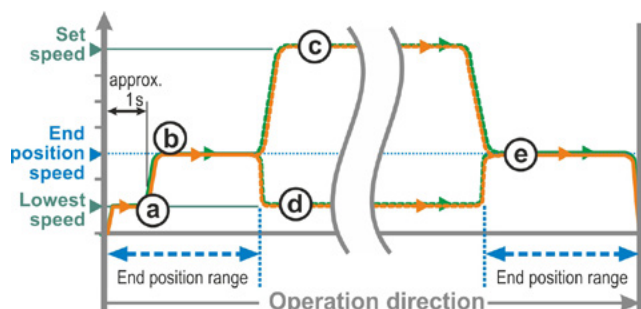


Fig. 1: End position speed 'Normal'

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.

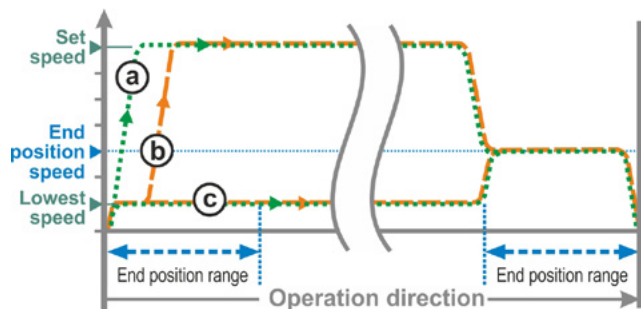


Fig. 2: End position speed 'Quick start'

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 mode, the speed will be reduced shortly before reaching the end position so that the actuator comes to a 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.

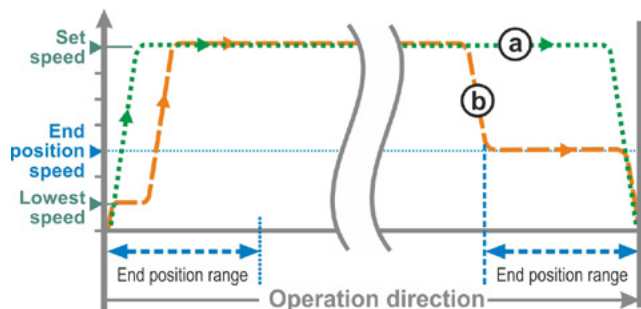


Fig. 3: End position speed 'Quick start/stop'

End position speed „Normal“ is set in the factory.

8.6.17 Autom. TL adapt. end position

Due to longer operation, the travel between end positions OPEN and CLOSE (0 to 100 %) for torque dependent cut-off mode can change due to temperature, wear and deposits. If the actuator is in torque dependent cut-off mode and should the change of the end position deviate by more than $\pm 0.7\%$ from the currently set end position, the actuator will detect this deviation and reset the new position as end position.

If the 'Autom. TL adapt. end position' parameter is switched to 'Off', the autom. standardization (adaption) is suspended and the end position set during commissioning remain unchanged. In case of torque dependent tripping of the actuator during operation within the end position range, 'End position reached' will be displayed. Should the actuator trip outside the end position range, the actuator signals 'Blocked in move'.

Autom. TL adapt. end position

☐	On
☐	Off

8.6.18 DCS acceptance time

General information

Should the DCS signal drop, the actuator can nevertheless continue its operation e.g. if the functions 'Close tightly' or 'Control mode RE-MOTE' are programmed to 'Proportional move'.

Should the end position be reached due to continued operation, or the actuator trip torque-dependently within the end position range, the DCS receives the signal ('End position...' or 'Torque.. reached').

Should this signal occur once the acceptance time has expired, the DCS might consider this signal as failure.

This is prevented by means of the 'DCS acceptance time' function.

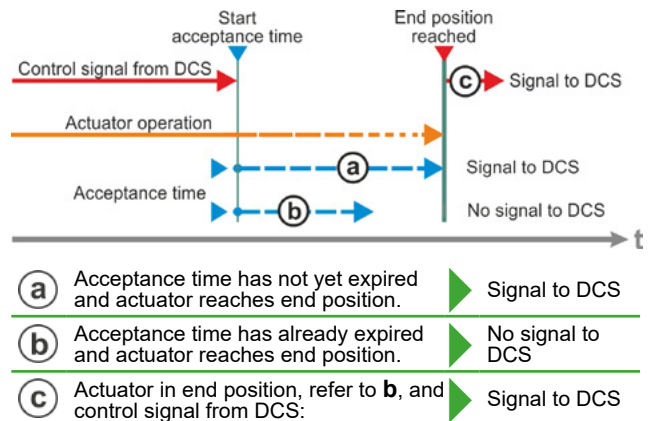


Fig.: DCS acceptance time

Function

- a The interval during which the DCS will accept the 'End position reached' signal without failure interpretation after the control signal is no longer present can be adjusted via this parameter (refer to a in fig.).
- b Once the set interval (acceptance time) has expired, no signal is sent to the DCS (refer to b in fig.).
- c The signal will only be issued for the next operation command into the same direction (refer to c in fig.).

DCS acceptance time

0.0 to 25.5

DCS acceptance time

Possible settings: 0 to 25.5 s.

Setting 0.0 s – 25.4 = No signal at DCS if the end position is reached once the acceptance time has expired.

The signal will only be issued for the next operation command into the same direction.

Setting 25.5 s = Signal is always sent.

Factory setting is 25.5 s.

8.7 Factory reset



A „Factory reset“ can only be executed in the 'Administrator' user level.

With this function, the following settings/parameters are reset to the default values:

- All parameter values which can be set via the 'Parameter' menu.
- All parameter values which had already been changed in the factory due to an additional feature.
- Settings which had already been changed via the 'System settings' menu.
Exception: Real time clock.

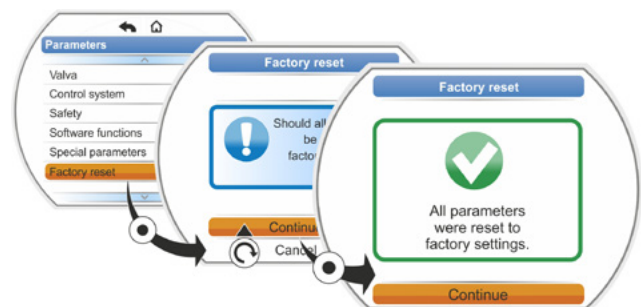


Fig.: Factory reset

The 'Current user' settings made via the 'User management' menu and the assigned passwords as well as the end positions and the cut-off mode will not be reset.

Refer also to „Save log data on USB flash drive“ on page 120, enabling to undo any parameter changes.

9 System settings

The 'System setting' menu enables the setting of

- Display:
 - Display orientation; rotation of the display depending on the actuator mounting position.
 - Standby screen: selection of information shown in standby mode on the display.
- Operation:
 - Switching on and off the latching function during local operation.
- Real time clock:
 - Setting date and time.
- Connectivity:
 - Activation and deactivation of Bluetooth and USB.
- Remote control unit:
 - Only for available Modbus hardware.

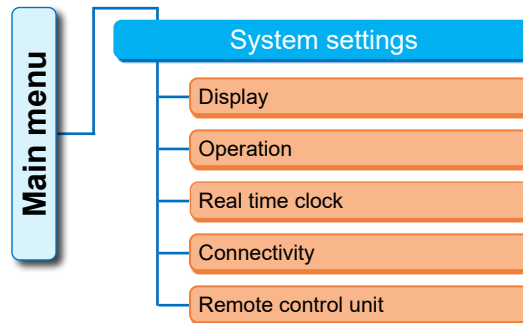


Fig.: System settings menu

9.1 Display

9.1.1 Display orientation

Depending on the mounting position, shifting the display indication by 90° ccw or cw or by 180° for improved legibility is possible. Default setting is 0 degree.

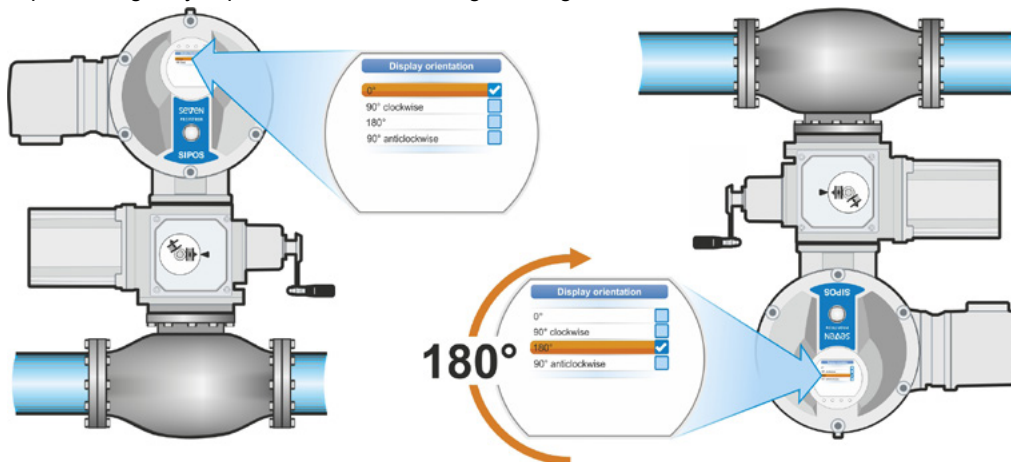


Fig. 1 Turn display by 180°

Operation sequence

1. Select 'System settings' in the main menu (fig. 2, item 1) and confirm (fig. 2, item 2). The 'System settings' menu appears.
2. Set selection marker to 'Display' (3) and confirm (4). The currently set number of degrees by which the display is shifted is shown in the 'Display' menu.
3. Set selection marker to number of degrees (5) and confirm (6). The display changes to 'Display orientation'. The current setting is ticked ☒.
4. Set selection marker to desired setting (7) and confirm (8). The indication in the display is adapted accordingly.

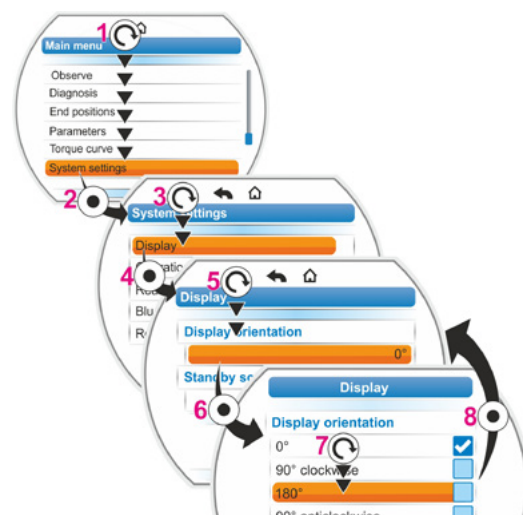


Fig. 2: Change display orientation

9.1.2 Standby screen

This function is used to select the information shown on the display in standby mode.

If the Drive Controller is not operated during the set interval, the display changes to the standby mode;

- the display illumination is dimmed;
- the display changes to the standby screen and
- the user is signed off.

If a USB flash drive is connected, the display will not change to the standby mode.

The follow representations can be selected as standby screen:

- 'Standard' (fig. 1):
The status indication is shown.
- 'Position' (fig. 2):
 - Position in percent OPEN (a).
 - If the actuator is in end position OPEN or CLOSED, the respective symbol is shown (b).
- 'Position+filling' (fig. 3):
 - Position in percent
 - Opening percentage, visually indicated as filling level.
- 'Position+Bar+Status' (fig. 4):
 - Position in percent (item 1)
 - Position bar, visually indicates the opening percentage (item 2).
 - Status of the actuator (item 3).
 - If a torque measurement flange is available, the torque applied is indicated (item 4).
- 'Fast to local': Refer to the following chapter.

Operation sequence

1. Perform steps item 1 to item 4, as described in the previous chapter, 'Display orientation'.
2. Set selection marker for 'Standby screen' to 'Standard' (fig. 5, item 5) and confirm (item 6).
The display changes to 'Standby screen' menu.
The current setting is ticked ☒.
3. Set selection marker to desired setting (7) and confirm (8).
As soon as the display changes to the initial state, the newly selected standby screen is shown in the display.

9.1.3 Operation – latching function

If the Drive Controller is held down for more than 3 seconds during local operation, 'Latching active' is displayed and the actuator will continue its operation once the controller is released.

If the actuator should not continue its operation once the Drive Controller is released, deactivate the latching function, refer to fig.

Refer also to pages 29, 59, 66.

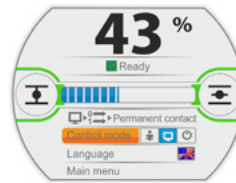


Fig. 1: „Standard“ standby screen

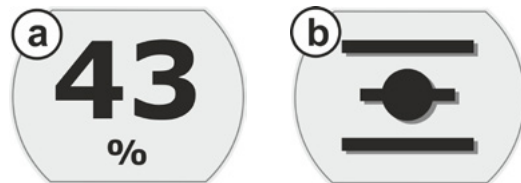


Fig. 2: „Position“ standby screen:
a: Position 43 % OPEN,
b: End position OPEN

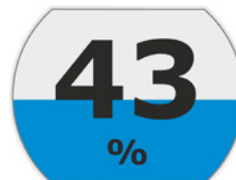


Fig. 3: „Position+Filling“ standby screen

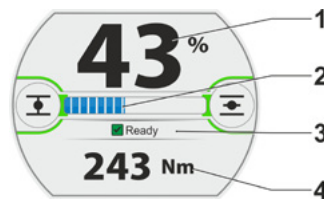


Fig. 4: „Position+Filling+Status“ standby screen

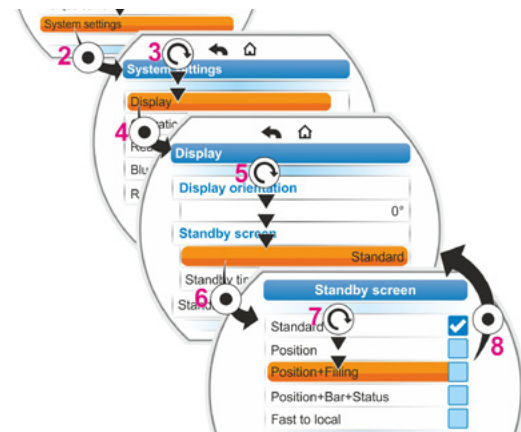


Fig. 5: Select standby screen

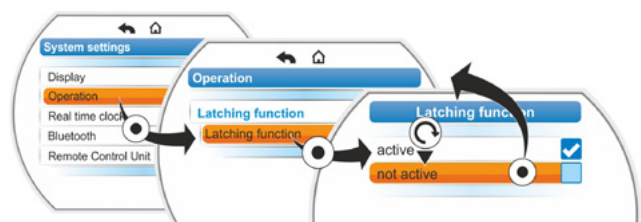


Fig.: Deactivate latching function

9.1.4 Fast to local

This setting is reasonable under critical conditions where immediate operation is required directly at the actuator, irrespective of control and user level.

If the Drive Controller is held down in standby mode during „Fast to local“, the actuator switches to

- Local operation: The operation direction can be immediately selected and the actuator be operated, even if 'Observer' user level is set;
- Control from 'REMOTE' to 'LOCAL'.
- The user level to the highest access level with password '0000', if password '0000' has been assigned to the lower user levels. Refer to hints in chapter „6.2.4 Rules“ on page 35.

For set 'Fast to local' function, the display shows the same standby screen as for 'Position+Bar+Status' selection, refer to above.

9.1.5 Set standby time

The standby time defines the interval, after how many minutes after the last operation of the Drive Controller the display will change to standby mode.

Default setting is 10 minutes.

9.1.6 Activate Standby

Via this menu item, the display is directly switched to the standby mode;

- the brightness of the display is dimmed;
- the selected standby screen appears and
- the user level is reset according to the settings, refer to chapter „6 User management“ on page 33.

9.2 Adjust real time clock

On delivery, date and time match the time zone of the manufacturer.

Operation sequence

1. Select 'System settings' in the main menu (fig. item 1) and confirm (item 2).
'The 'System settings' menu appears.
2. Set selection marker to 'Real time clock' (3) and confirm (4).
The 'Real time clock' menu appears and both date and set time is displayed.
3. Set selection marker to date or time (5) and confirm (6).
The display changes to the setting menu, in our example, of the date. The current setting is displayed.
4. Set selection marker to the number to be changed (7) (the frame around the number changes from blue to orange) and confirm (8).
5. Change number (turn Drive Controller) (9) and confirm (press Drive Controller) (10).
The orange selection marker changes to 'Save'.
6. Confirm 'Save' (11).
Display changes to 'Real time clock' menu and the changed value is displayed'.

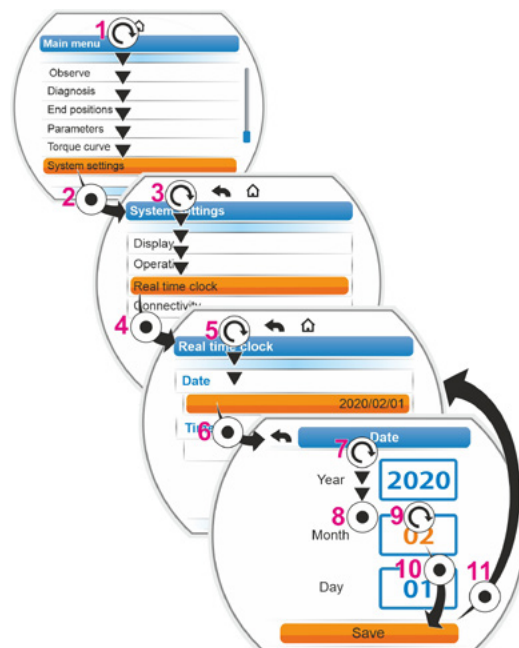


Fig.: Adjust real time clock

9.3 Activate, deactivate Bluetooth

Actuators are equipped with Bluetooth. Each Bluetooth device (slave) has an unambiguous Bluetooth address for identification. To facilitate selection, each Bluetooth device has a device name, consisting of the plant ID (if available) and the 9-position serial number of the actuator as a standard.

In case of communication via Bluetooth, the Bluetooth symbol is flashing in the display. Bluetooth can be deactivated in the 'Administrator' user level. Bluetooth is activated by default. The operation sequence below shows Bluetooth deactivation.

Operation sequence

Select 'System settings' in the main menu (fig. item 1) and confirm (item 2). The 'System settings' menu appears.

1. Set selection marker to 'Connectivity' (3) and confirm (4).
Set selection marker to 'Bluetooth' (5) and confirm (6).
The 'Bluetooth' menu appears in the current state, in our example 'Bluetooth active'. The current setting is ticked ☒.
2. Set selection marker to 'not active' (7) and confirm (8).
The display changes to 'Connectivity' setting menu.

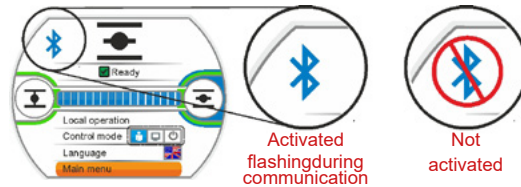


Fig.: Bluetooth indication in the display

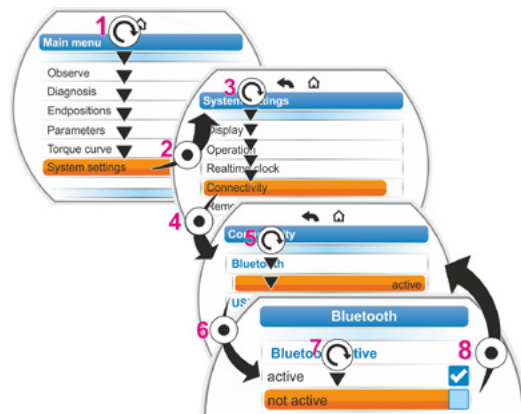


Fig.: Activate/deactivate Bluetooth

9.4 Activate, deactivate USB

Actuators are equipped with a USB port (refer to chapter 13.3). In case of communication via USB, the USB symbol is indicated in the display.

USB can be deactivated in the 'Administrator' user level. The USB port is activated by default. The operation sequence below shows USB deactivation.

Operation sequence

Select 'System settings' in the main menu (fig. item 1) and confirm (item 2). The 'System settings' menu appears.

1. Set selection marker to 'Connectivity' (3) and confirm (4).
Set selection marker to 'USB' (5) and confirm (6).
The 'USB' menu appears in the current state, in our example 'USB active'. The current setting is ticked ☒.
2. Set selection marker to 'not active' (7) and confirm (8).
The display changes to 'Connectivity' setting menu.

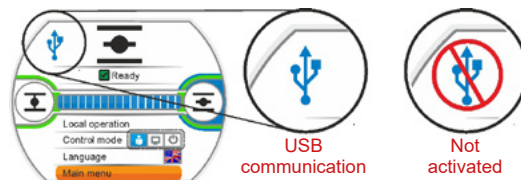


Fig.: USB indication in the display

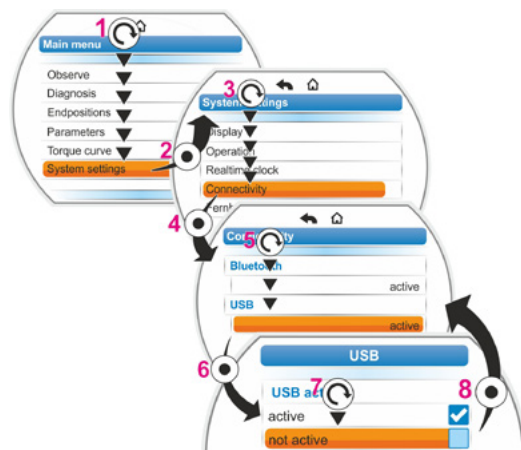


Fig.: Activate/deactivate USB

9.5 Remote control unit

The remote control unit provides the option to operate an actuator from a distance of up to 100 m and thus has the function of a second local control unit. The representation on the display and the LED indication of the actuator is „projected“ to the remote control unit. This ensures 1:1 operation of the actuator from the remote control unit.

The actuator must be prepared for using a remote control unit. Data exchange between actuator and remote control unit is made via a RS485 connection with just one 2/4-wire fieldbus cable. Refer to the wiring diagram for proper wiring.



When connecting the remote control unit, the two termination resistors must be set to ON!

Operation sequence: Activate remote control unit

Activate the 'Remote control unit' function both at the actuator and the remote control unit. Except for step 3 of the operation sequence, the operation sequence is identical for both cases. The following operation sequence applies to the actuator.

1. Select 'System settings' in the main menu (fig. 3, item 1) and confirm (item 2).
The 'System settings' menu appears.
2. Set selection marker to 'Remote control unit' (3) and confirm (4).
The 'Remote control unit' menu appears.
3. Select 'Actuator' parameter for 'mode' (5).
Select 'Remote control unit' for parameterization of the remote control unit.
4. Select the transmission rate for 'Baud rate'.
5. Should the connection quality not be sufficient (see bottom part of the display), reduce baud rate.
5. Set the remote control unit in 'active' selection to 'Yes'.
6. Also execute operation steps 1 to 5 at remote control unit.



Should the connection quality not be sufficient (see bottom part of the display), reduce baud rate.



- The connection is visualized by means of the connection symbol 2 in the status bar:
 - Symbol is illuminated: Connection available,
 - Symbol is flashing: No connection
 - No symbol: Connection 'Not active'.
- Prior to a possible firmware update at the remote control unit, set the remote control unit in 'Active' selection to 'No'.

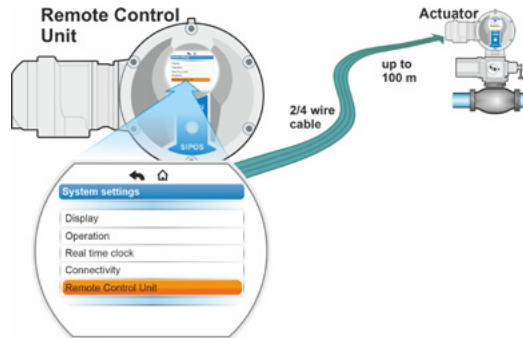


Fig. 1: Remote control principle

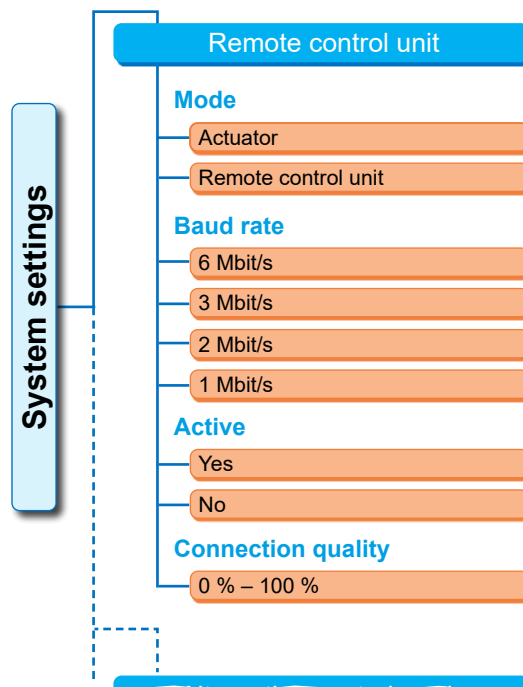


Fig. 2: Remote control unit menu

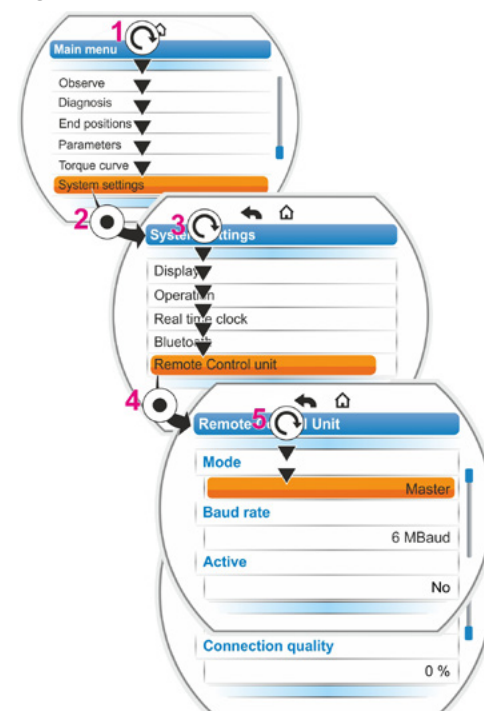


Fig. 3: Activate remote control unit

10 Torque curve

This chapter does not apply to 2SQ7.

Preventive valve monitoring is possible by comparing up to three torque curves recorded at different times which the actuator is in operation.



- Prerequisite for the recording of the torque curves is a valid end position setting.
- Realistic comparison of the recorded torque curves is only possible for identical actuator settings during recording.

10.1 General information

The recording of the torque curves can be performed:

- Directly at the actuator via
 - display using the Drive Controller. This method is described in the following,
 - the COM-SIPOS PC parameterization software (actuator must be in LOCAL mode);
- From the DCS via PROFIBUS DP-V1 (actuator must be in REMOTE mode, 'Ready').

The travel is scanned in 1 % steps. Each curve can be overwritten.

There are different methods to determine the torques recorded in a torque curve:

- Calculation using the DC link converter current:

The torque values may differ from the actual torque, especially in the end positions and for speed variations during operation.

This version is automatically used if no torque measurement flange is programmed.

Or

- Measurement with torque measurement flange:

Prerequisite is that a torque measurement flange is available and the 'Torque measurement flange' parameter is set to analog input AI1/AI2.

If this parameter is set, the value of the torque measurement flange is automatically used for the torque curve.

For actuators with linear thrust units and part-turn gearboxes, the displayed curve is proportional to the actual force curve of the linear actuator or the torque curve of the part-turn actuator (the torque at the actuator output/additional gear input is displayed).



- When recording the torque curves, the actuator operates the valve at least twice across the complete travel.
- The procedure can be aborted at any time: Press Drive Controller.
- Faults during recording (blockage of the travel, cancellation by the operator, failure of the power supply etc.) are shown in the display. Acknowledge signal.

The actuator changes to the 'Record torque curve' initial state. The aborted recording or curve is not saved.

The recorded torque curves can be viewed via the COM-SIPOS parameterization program or PROFIBUS DP (e.g. SIMATIC PDM, DTM).

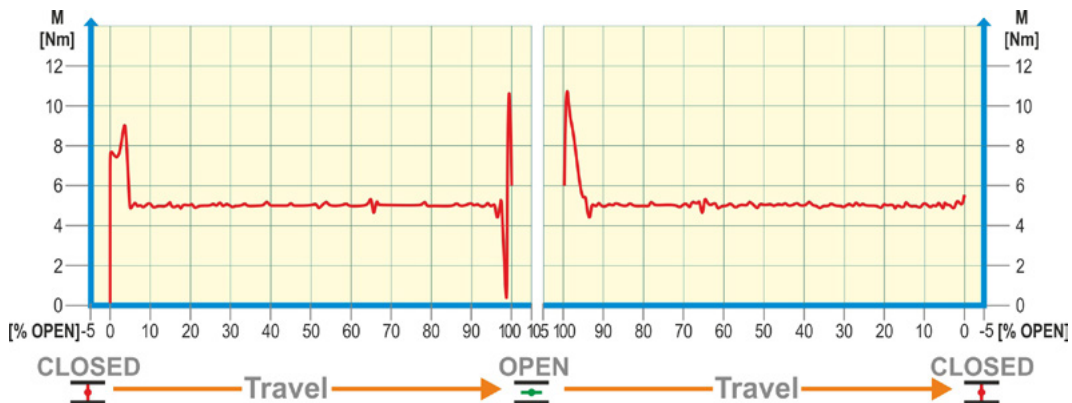


Fig.: Example of a valve torque curve

10.2 Record torque curve

Operation sequence

1. Select 'Torque curve' in the main menu (fig., item 1) and confirm (item 2).
The 'Torque curve' menu appears.
2. Set selection marker to 'Torque curve' (3) and confirm (4).
'Record torque curve' appears and you can choose between three curves.
3. Set selection marker to curve 1, 2 or 3. In our example 'curve 1' (5) and confirm (6).
The display changes to the 'Record torque curve' screen and the actuator starts the recording:
The display shows
 - the current position in percent and on the progress bar,
 - the torque applied.
 The actuator runs into both directions over the complete travel.
The recording can be aborted: Confirm 'Abort'.
The torque curve is saved and the successful saving is confirmed in the display.
4. Confirm 'Continue' (7). The display changes to the selection of the torque curves.

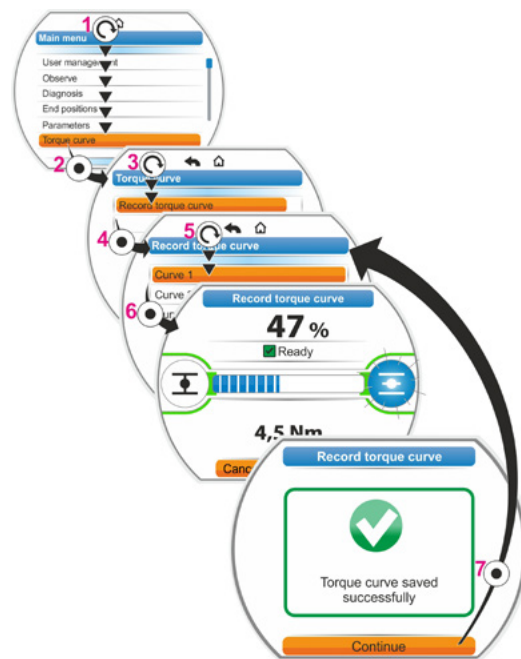


Fig.: Record torque curve

10.3 Save torque curve on USB flash drive

Operation sequence

1. Connect USB flash drive:
 - Unscrew cover of USB port on the left below the electronics unit (fig.1, item 1).
 - Connect USB flash drive (item 2).
The 'USB flash drive' selection menu appears.
2. Select 'Save torque curves' (fig. 2) and confirm.
'Select folder' menu opens. If the USB flash drive comprises several folders, they will be displayed for selection.
3. Select folder and confirm.
The data is saved and a message confirms successful saving.

The torque curve may be viewed using COM-SIPOS.

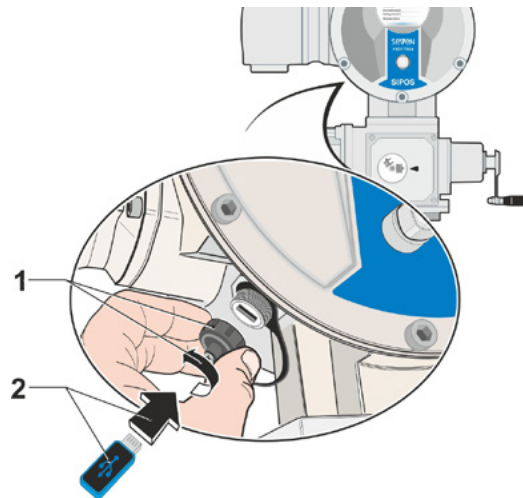


Fig. 1: Connect USB flash drive

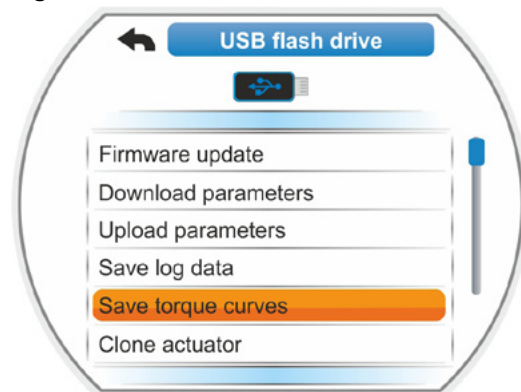


Fig. 2: USB flash drive menu

11 Observe

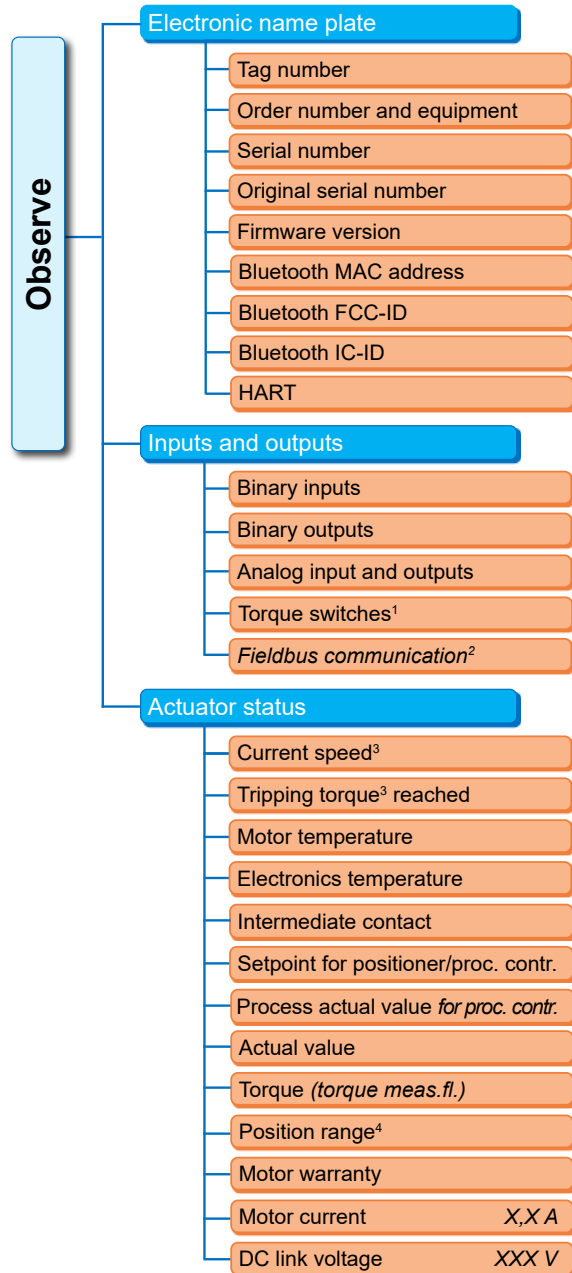
Use the 'Observe' menu to display information on the actuator:

- Electronic name plate
- Inputs and outputs
- Actuator status

The illustration on the right shows the structure of the 'Observe' menu.

Parameters cannot be change in the 'Observe' menu.

Navigation through the menu 'Observe' is identical to the other menus, refer also to „4.4 Navigation through the menus“ on page 25.



11.1 Electronic name plate

11.1.1 Tag number

The tag number is displayed here.

The tag number is entered in the 'Special parameters' menu, refer to „8.6.1 Tag number“ on page 94.

11.1.2 Order number and equipment

If 'Equipment' is selected in the 'Order number and equipment' menu, a list with all characteristics of the actuator appears.

The overview is generated by decoding the order number.

11.1.3 Serial number

The 13-digit number of the current electronics unit is displayed. If the electronics unit is replaced, the serial number of the 'former' electronics unit can be found under the 'Original serial number' menu item.

11.1.4 Original serial number

Here, the number of the originally supplied electronics unit is displayed (only relevant when exchanging the electronics unit). When delivering an actuator, serial number and original serial number are identical. If the electronics unit is replaced once again, the first number remains identical.

¹ 2SQ7 only.

² Different indication depending on the fieldbus:
- PROFIBUS
- Modbus
- HART
- PROFINET

³ Depending on the additional gear the following is displayed:
- Speed for rotary gearbox
- Positioning time for part-turn gearbox
- Positioning speed for linear thrust unit
- Tripping torque for rotary and part-turn gearboxes
- Tripping force for linear thrust unit.

⁴ Actuator with niP only.

Fig.: Observe menu

11.1.5 Firmware version

Version number and issue number is displayed, see illustration on the right.

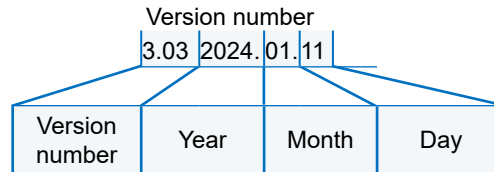


Fig.: Example of firmware version number

11.2 Inputs and outputs (observe)

11.2.1 Binary inputs

Display of the voltage level applied (low oder high):

- Binary input CLOSE,
- Binary input OPEN,
- Binary input STOP,
- Binary input EMERGENCY and
- Binary input MODE

Refer also to chapter „8.3.7 Control system – Binary input“ on page 80 and chapter „8.4.1 EMERGENCY input“ on page 87.

Binary outputs

The voltage level issued via signaling outputs 1 – 8 (low or high) is indicated here. Refer also to „8.3.11 Control system – Binary outputs“ on page 82.

11.2.2 Analog input and outputs

The currently measured currents at analog inputs AI1 and AI2 as well as the currents supplied at analog outputs AO1 and AO2 can be viewed here.

Analog input AI2 and analog output AO2 are only displayed if the HART module or the additional analog sub-assembly are available.

Refer also to „8.3.12 Control system – Analog output AO1“ on page 84 and „8.3.13 Control system – Analog output AO2“ on page 85.

11.2.3 Torque switch (2SQ7 only)

Here, it will be indicated whether the torque switches in CLOSE direction and OPEN direction are active.

11.2.4 Fieldbus communication

PROFIBUS DP

Displayed for available PROFIBUS interface:

- Active channel
 - Channel 1 active
 - Channel 2 active
 - No channel active
- Baud rate:
 - No data exchange
 - 9.6 kbit/s – 1.5 mbit/s; e.g. Baud 187.5 kbit/s
- Status:
 - Wait Prm (no fieldbus parameterization)
 - Wait Cfg (no fieldbus configuration)
 - Data Exchange (cyclic data exchange)

Modbus

Displayed for available MODBUS interface:

- Active channel
 - No channel active
- Channel 1
 - No communication
 - Baud rate
 - Data Exchange
- Channel 2
 - No communication
 - Baud rate
 - Data Exchange

HART

Displayed for available HART interface.

HART

HART communication
Not active
Active
Data exchange
Last Req. Telegram
CMD no. + receive tel.
Last Command
ResponseCode + send tel.

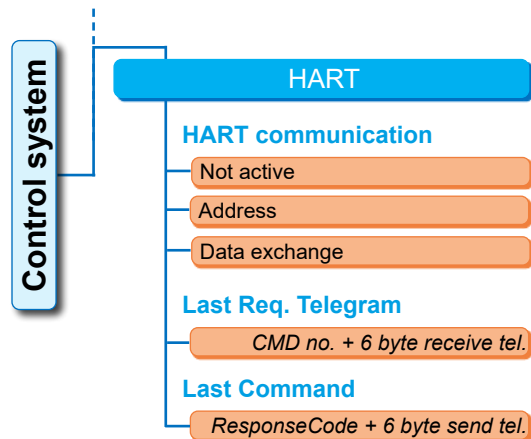


Fig.: 'HART' menu

- HART communication
 - Not active: Communication via HART is not active.
 - Active: Communication via HART is active.
 - Data exchange: Cyclic data exchange with the actuator.
- Last Req. Telegram
 - CMD no. + 6 bytes of the last receive telegram are displayed.
- Last Command
 - ResponseCode 6 bytes of the last sent telegram are displayed here.

PROFINET

- Device name
- IP address
- IP subnet mask
- IP gateway
- Module MAC
- Port 1 MAC
- Port 2 MAC
- PROFINET S2 redundancy
 - S2 redundancy available Yes/No
- Network status
 - Global link status Yes/No
 - IP address received Yes/No
 - Link status P1 Yes/No
 - Port1 bus activity Yes/No
 - Link status P2 Yes/No
 - Port2 bus activity Yes/No

- Data exchange
 - Cyclic mode Yes/No
- Status
 - PROFINET status
 - Setup
 - Network init
 - Wait process
 - Wait I/O
 - Process active I/O
 - Fault
 - Exception
 - Fieldbus module can be reached Yes/No
- Module firmware version

11.3 Actuator status

In this menu, the current operating data of the actuator is displayed:

- Current speed [rpm] *for rotary actuator*;
current positioning speed [mm/min] *for linear actuator*;
current positioning time [90°/s] *for part-turn actuator*
- Tripping torque reached *for rotary actuator/part-turn actuator*;
Tripping force reached *for linear actuator*
 - CLOSE (yes/no)
 - OPEN (yes/no)
- Motor temperature [°C]
- Electronics temperature [°C]
- Intermediate contact
 - CLOSE (active/not active)
 - OPEN (active/not active)
- Setpoint (for positioner/proc. contr.)
 - Position [%]
 - DCS (only for non linear valve curve) [%]
- Process actual value (for process controller) [%]
- Actual value
 - Position [%]
 - DCS (only for non linear valve curve) [%]
- Torque (with torque measurement flange only).
For a detailed description refer to 'Torque zero adjustment'.
 - Actuator [Nm]
 - Additional gear [Nm] (only if additional gear has been parameterized.)
 - Offset [Nm]
- Zero adjustment*
- Reset zero adjust*
- *User level 'Supervisor' or higher required.
- Travel '(non-intrusive position recording only)'
 - Rev./stroke for rotary actuator
 - STROKE [mm] for linear actuator
 - Angle [°] for part-turn actuator
- Motor warranty
 - Valid
 - Not valid
- Motor current [A]
- DC link voltage [V]

11.4 Torque zero adjustment

This chapter only applies for mounted and parameterized torque measurement flange.

Depending on the mounting position of the actuator and the valve as well as on the ambient temperature, torque can already be present under no load conditions. This torque would distort the indication of the actual torque displayed under load conditions. Zero adjustment is required for correction.

Operation sequence

1. Move actuator to no load condition.
2. Select 'Torque' parameter in the 'Observe', 'status' menu.
The 'Actuator' line (fig. item 1) indicated the torque of the actuator under no load conditions.
3. Select 'Zero adjust' (fig. item 5) and confirm.
The rotating symbol (item 2) indicates that zero adjustment is in progress.
'0' will be displayed in the 'Actuator' line and the corrected value in the 'Offset' line (item 4).

Item 3 will only be displayed if an additional gear has been parameterized.

Use the 'Reset zero adjust' (item 6) to reset the value for zero adjust to the factory setting (12 mA from torque measurement flange = 0 Nm).

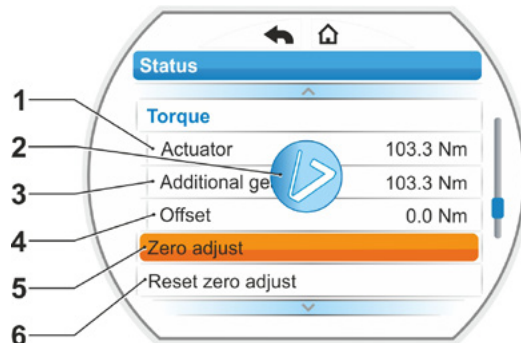


Fig.: Zero adjust menu

12 Diagnosis (operating data and maintenance limits)

Operational data is collected and stored in the RAM. For backup purposes, the data is written to the internal EEPROM. The values for maintenance limits are stored for any modification. Therefore operational data and the values for the maintenance limits are safe, even in case of power failure.

Operating data and maintenance limits can be read via the 'Diagnosis' menu. The indicated values cannot be changed as they represent the state of the actuator.

The Diagnosis menu has three submenus:

- Operation data actuator
- Valve maintenance limits
- Maintenance valve

The illustration on the right shows the functions.

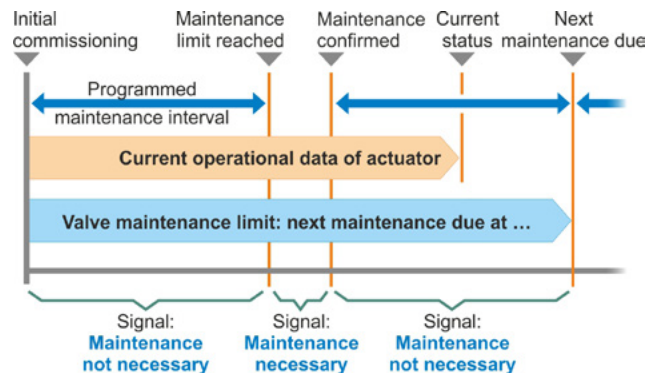


Fig.: 'Diagnosis' menu function

12.1 Operation data actuator

Information on the actuator is displayed here.

Switching cycles

Total number of switching cycles since first commissioning.

Switching cycles per hour

Average number of switching cycles/hour calculated over the last 10 minutes.

Torque cut-offs

Total number of torque-dependent cut-offs since commissioning.

Travel cut-offs

Total number of travel-dependent cut-offs since commissioning.

Motor operating hours

Total number of motor operating hours since commissioning.

Electronic operating hours

Total number of electronics unit operating hours since commissioning.

Cycles per hour

Relative operating time during the last 10 minutes.

For further information on actuator maintenance, refer to chapter „14 Maintenance, inspection, service“ on page 123.

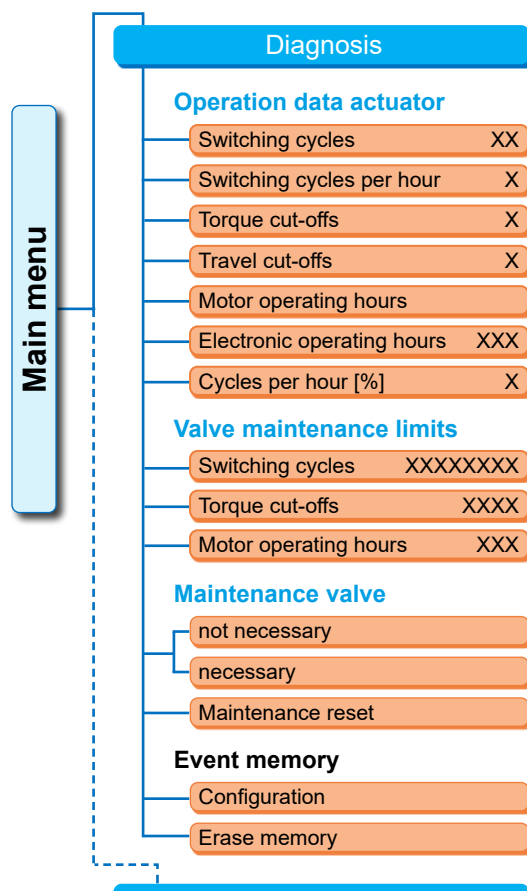


Fig.: 'Diagnosis' menu

12.2 Valve maintenance limits

The data shown in this menu are values for which maintenance is required. This enables effective planning of valve maintenance operated the actuator in compliance with specified operation criteria for

- Number of switching cycles,
- Number of torque cut-offs,
- Number of operating hours of the motor.

Once one of these criteria has reached the defined value, i.e. the maintenance limits, the „Maintenance necessary“ indication is issued.

The maintenance limit is re-set every time „Maintenance reset“ menu item has been confirmed. The limit consists of the number e.g. of switching cycles since the first commissioning to the last ‘Maintenance reset’ confirmation and the parameterized values in the ‘Maintenance interval’ menu, refer to figure on the right.

Maintenance intervals are defined in the „Special parameters“ menu, refer to chapter „8.6.5 Maintenance intervals of valve“ on page 96 and is only possible in the ‘Expert’ user level, refer to „User management“ on page 33.

Maintenance limits do not affect actuator maintenance.

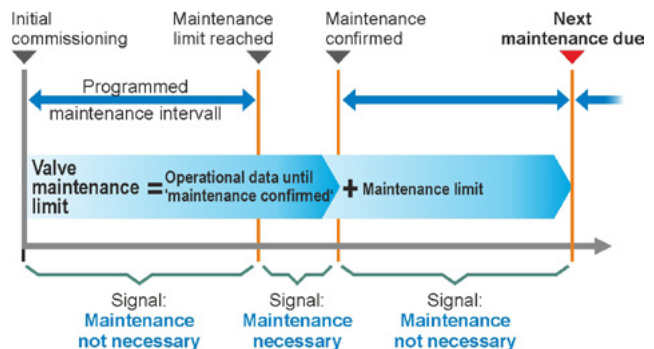


Fig.: Maintenance limit

12.3 Maintenance valve

For an explanation, refer to previous chapter, „Valve maintenance limits“.

‘Maintenance not necessary’

Indicates that none of the defined maintenance limits for the number of switching cycles or torque-dependent cut-offs or operating hours has been reached so far.

‘Maintenance necessary’

Indicates that one of the current values has reached the defined maintenance limit.

‘Maintenance reset’

This menu item has to be confirmed after each maintenance. The next maintenance limits are set.

12.4 Event memory

In the event memory, various events are recorded with a time stamp. They can be transferred via a USB flash drive to a computer and be evaluated.

The data is stored with a non-volatile memory (power failure safe). In each memory, up to 52,416 records can be stored. The memories are designed as ring memories.

Configuration:

Events to be recorded with a time stamp can be selected here.

- Incoming and outgoing events (selectable)
 - Control commands (analog signal/binary signal/fieldbus signal)
 - Status information (e.g. end position, motor/electronic temperature, fieldbus communication)
- Logins and logouts
- Parameter changes
- Incoming and outgoing faults

Erase memory:

The event memory is being erased.



Erasing the event memory takes a few seconds. A security challenge „Really erase the event memory?“ does not appear.



Further memories such as Fault memory are described in chapter „13.4.4 Save log data on USB flash drive“ on page 120.

13 Communication and data exchange

In addition to operation directly at the actuator, the actuator can also be controlled

- from remote (DCS, automation system);
- via the COM-SIPOS PC parameterization system whereby data exchange via Bluetooth or USB cable is possible.

13.1 Remote control

Depending on the automation system and the parameterization for 'REMOTE control' and 'Alternative control mode' (refer to 8 chapter), actuator control is done via

- **Conventional connection** (24/48 V binary or 0/4 – 20 mA analog) or
- **Fieldbus** (e.g. PROFINET, PROFIBUS DP, Modbus or HART).

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



An EMERGENCY command sent from the DCS is always executed by the actuator (irrespective of the selected control type and signal source), even if the actuator is conventionally controlled and the EMERGENCY command is sent via fieldbus and vice versa.

13.2 COM-SIPOS PC parameterization software

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

- Operation: Operation of the actuator in LOCAL mode;
- Observe: Reading the actuator parameters and the device state;
- Diagnosis: Trouble shooting;
- Parameterization: Reading and changing the actuator parameters;
- Loading new firmware: Software update to the state-of-the-art;
- Archiving: Saving of the actuator parameters and torque reference curves of the actuator.

Connection from the laptop to the actuator is possible via:

- Bluetooth
The communication is wireless via the Bluetooth interface integrated in the actuator.
- USB cable
Communication is established via the USB port on the left bottom of the electronics housing.

Refer also to the following chapter.

The COM-SIPOS PC parameterization program is described in separate operation instructions.

13.3 USB port

The USB port is protected against dust and water and is located at the bottom left of the electronics housing.

Connect USB cable or USB flash drive:

1. Unscrew the protective cap of the USB port (fig.1, item 1) (it is provided with a plastic band for retention).
2. Connect
 - a) USB flash drive
 - or
 - b) USB cable
 to the USB port (item 2).

The backlight is activated and the communication via USB port is indicated with a USB symbol in the display, refer to fig. 2.

The reference potential of the auxiliary voltage supply (M24 ext. pin 39) is often grounded. If the reference potential is different from the grounding potential of the actuator (PE), transient currents may occur when connecting the USB communication cable, which might cause damage to laptop.

To avoid this,

- prevent potential differences (lay compensating cables), or
- use galvanically isolated USB cables, or
- use laptop **without** mains cable.

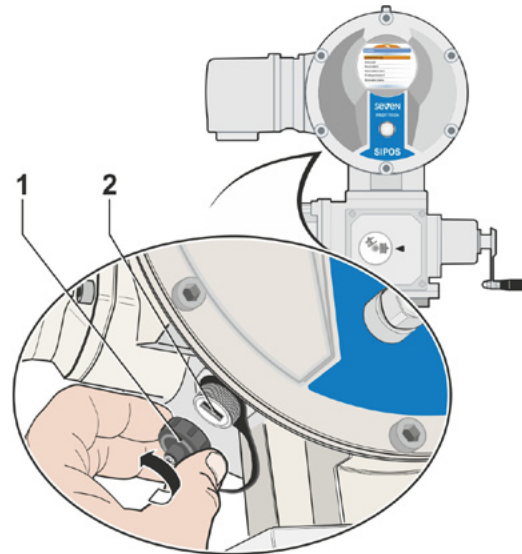


Fig. 1: USB port

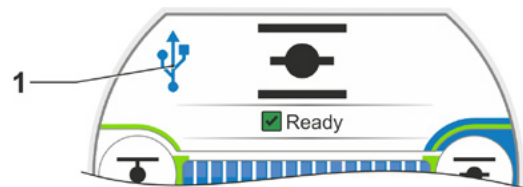


Fig. 2: Indication in the display: Communication via USB

13.4 Data exchange via USB flash drive

As soon as a USB flash drive is connected, the actuator shows the 'USB flash drive' menu with the following menu items (fig.):

- Firmware update,
- Download parameters
- Upload parameters,
- Save log data,
- Save torque curves,
- Clone actuator.
- Export user data*
- Import user data*

Select menu items/functions as usual.

The following functions are only available in

- 'Expert' user level and in 'LOCAL' or 'OFF' mode:

- Update firmware
- Upload parameters
- Clone

■ *'Administrator' user level:

- Export user data
- Import user data



Fig.: USB menu

13.4.1 Firmware update

Firmware updates are only possible in 'LOCAL' or 'OFF' mode and in the 'Expert' user level. Firmware versions are updated via the 'Update firmware' menu item. The following current data, settings and parameter values will **not** be modified:

- Factory parameters
- End position adjustment
- Parameters to be changed by the customer
- Torque curve
- Operational data

Prior to a firmware update at a remote control unit, set the remote control unit in the 'Active' menu to 'No'.

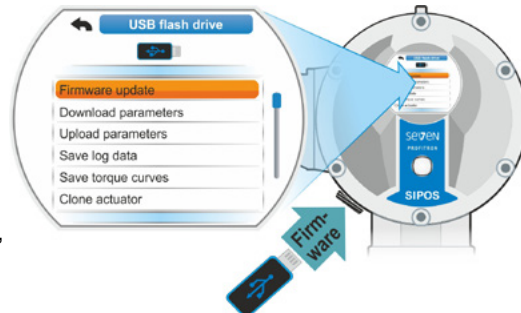


Fig.: Firmware update

13.4.2 Download parameters to USB flash drive

Use this menu item to save the following parameter values on the USB flash drive.

- Factory parameters
- End position adjustment
- Operational data
- All parameters, including the parameters that can be modified by the customer.
- 'System settings', without real time clock.

This function is useful for plant documentation and, in the event of failure, to allow using data stored on the USB flash drive

- To write them to a replacement electronics (refer to chapter below, „Clone actuator“);
- To provide it to SIPOS service for fault diagnostics.

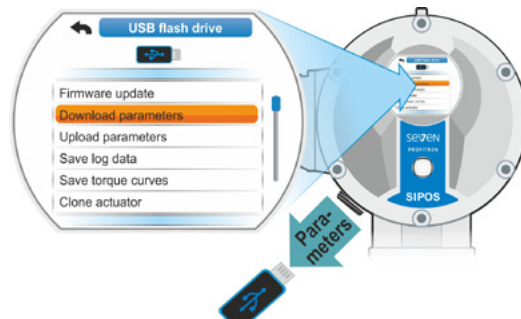


Fig.: Save parameter on USB flash drive

13.4.3 Upload parameters from USB flash drive

Via this menu item, only the parameters that can be changed by the customer are loaded to the actuator. The following parameters will not be loaded

- Factory parameters
- End position adjustment
- Diagnostic values

This function can be used to restore the original parameter settings stored on the flash drive after modifying some parameters.

13.4.4 Save log data on USB flash drive

Log data can prove extremely helpful during trouble shooting and when eliminating faults.

All changes/events are stored with time stamp in an internal storage area. Texts are stored in log files in the language set at the actuator. Each file can contain up to 52,400 signals.

The log files can be saved to a USB flash drive.

- Events (File: <tag number_>serial_number_events.csv)
Incoming and outgoing events are recorded. Which events will be stored can be adapted, refer to chapter „Event memory“ on page 117.
- Faults (File: <tag number_>serial_number_errors.csv)
Incoming and outgoing faults are recorded.
- Parameter changes – File: „<tag number_>serial_number_ParamChg.csv“.
– Parameter changes with old and new value are recorded.
– The parameter numbers are explained in the „7_parameterliste_profibus“ file, Available for download at www.sipos.de.
- Login (<tag number_>serial_number_Login.csv)
Logins and logouts from the actuator are recorded.

These files can be opened with EXCEL, for example, and help to:

- undo selected parameter changes,
- reproduce in which time frame the faults have occurred in the event of a failure.
- Import to Excel: Select Load date on the Data tab > From file > From text/CSV > Import data
File source: 65001: Select Unicode (UTF-8) and semicolon as separator.

13.4.5 Save torque curve

This function is described in chapter „10.3 Save torque curve on USB flash drive“ on page 110.

13.4.6 Clone actuator

Only available in 'Expert' user level and in 'LOCAL' or 'Off' mode.

The 'Clone actuator' function is used to write all actuator parameter values (factory parameters including end position adjustment, parameters which can be modified by the customer and operating data such as motor operating hours, number of cut-offs, etc.), which were written to the USB flash drive (refer to „13.4.2 Download parameters to USB flash drive“ on page 120), to a 'new' electronics unit. In terms of the functions, the actuator with the 'new' electronics unit is a duplicate of the 'original actuator'.

This function enables quick and easy commissioning, for example after replacing the electronics unit.

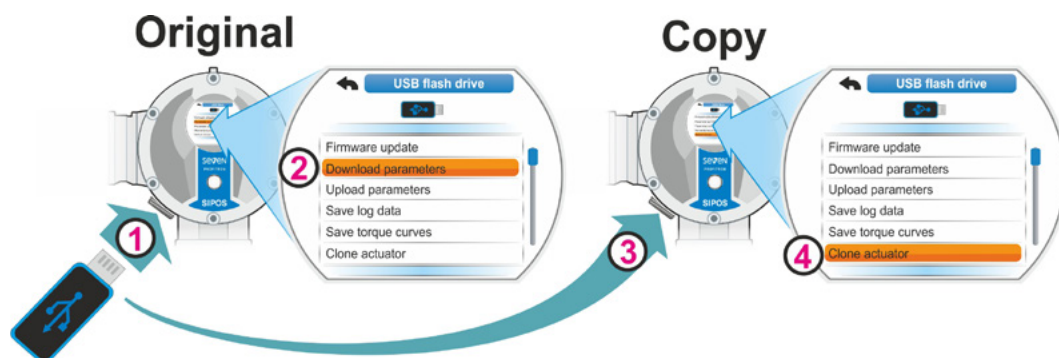


Fig. 1: Clone actuator procedure

Operation sequence

1. Connect USB flash drive to the original electronics unit refer to fig. item 1.
The 'USB flash drive' menu appears.
2. Select „Download parameters“ from the menu (item 2) and confirm. (refer also to „13.4.2 Download parameters to USB flash drive“ on page 120).
The .STE file is saved to the USB flash drive. Successful saving is confirmed via a message.
3. Connect USB flash drive to the "new" replacement electronics unit (fig. item 3).
The 'USB flash drive' menu appears.
4. Select 'Clone actuator' in the menu (fig. item 4) and confirm (2).
The display changes to the 'Select file' menu.
5. Select .STE file of the 'original actuator' and confirm.
A note is displayed requesting you to verify whether conversion rate and mains voltage of the target actuator match.
6. If not, abort cloning selecting 'No'. If yes, continue cloning selecting 'Yes'.
Data is written from the USB flash drive to the actuator. Successful cloning is confirmed with a message, refer to fig. 3.



Fig. 2: Note: Check conversion rate and mains voltage

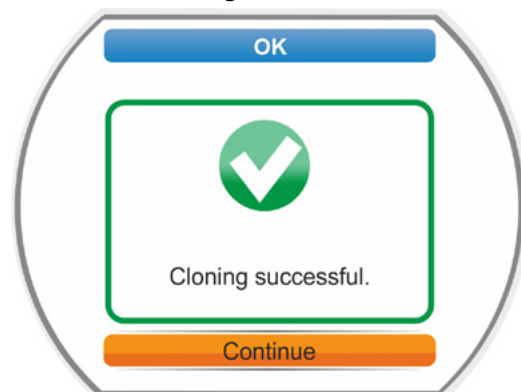


Fig. 3: Message: Cloning successful

13.4.7 Export, import user data

With this function, the user management data is stored on an USB flash drive and thus the passwords or user accounts are stored and can be loaded to the actuator if required.

The user data can also be loaded to further actuators. Thus, the permissions can be quickly and easily transferred to further actuators without having to enter the individual passwords and user accounts.

The following will be transferred with the 'user data':

- Login configuration
- User accounts
- Passwords

Login as 'Administrator' is required for execution of this function.

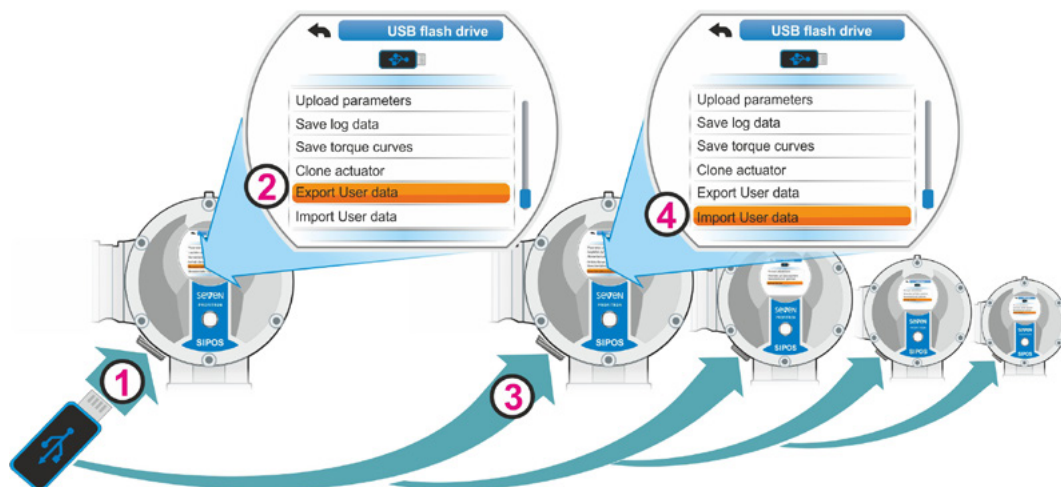


Fig. 1: Export user data to a USB flash drive and import to an actuator

Operation sequence

1. Connect USB flash drive to the original electronics unit refer to fig. 1, item 1.
The 'USB flash drive' menu appears.
2. Scroll down in the menu and select 'Export user data' (fig. 1, item 2).
If there are several folders on the USB flash drive, 'Select folder' appears on the display.
3. Select folder and confirm with 'Save'.
The file is saved and successful saving is confirmed via a message.
4. Connect USB flash drive to electronic unit of another actuator (fig. 1, item 3).
The 'USB flash drive' menu appears.
5. Select 'Import user data' in the menu (fig. 1, item 4) and confirm.
The display changes to the 'Select file' menu.
6. Select the '<tag_number>serial_number_' file and confirm.
The file is saved and successful saving is confirmed via a message, refer to fig. 2.

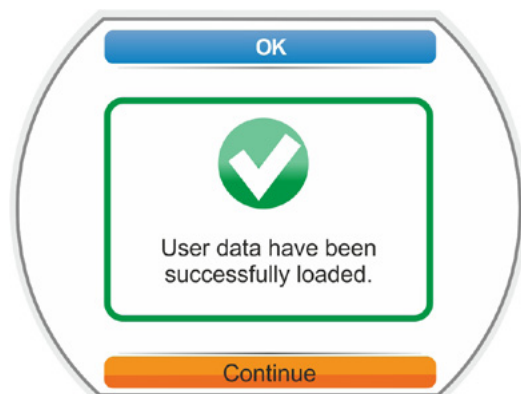


Fig. 2: Message: User data successfully loaded

14 Maintenance, inspection, service



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

- the planned measures (possible operation of valves, for example) 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 24/48 V DC),
- Prevent accidental reconnection.
- Confirm that equipment is not live.
- Ground and short-circuit equipment.
- Fit barriers or covers to neighboring live components.

This can also be achieved by removing the connection hood.

14.1 General information

The actuators are virtually maintenance-free (for the relubrication intervals, refer to chapter 14.2).

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 SIPOS Aktorik.

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 SIPOS service every 2 years and wear parts have to be replaced!



It is recommended that the services of the local SIPOS Aktorik service centers 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**.

14.2 Lubrication intervals and lubricants

Lubrication intervals

Perform service or inspection after **approx. 8 years** (refer to previous chapter 14.1).

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.

14.3 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	2400 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 Kleenol).		Mobil SHC Gear 220 ³ .
Other lubrication points ⁴⁾	Lubricant quantity	50 cm ³		
	Lubricant ²	Lubrication grease AR1 (ZEPF)		
Output shaft form A ⁵ (2SA7)	Lubricant quantity	2 cm ³		
	Lubricant ²	Commercial ball bearing grease		
2SQ7... part-turn actuator		virtually maintenance-free		



- 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 – +70 °C.

³⁾ Lubricant used in the factory.

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

⁵⁾ if applicable.

15 Spare parts

15.1 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**

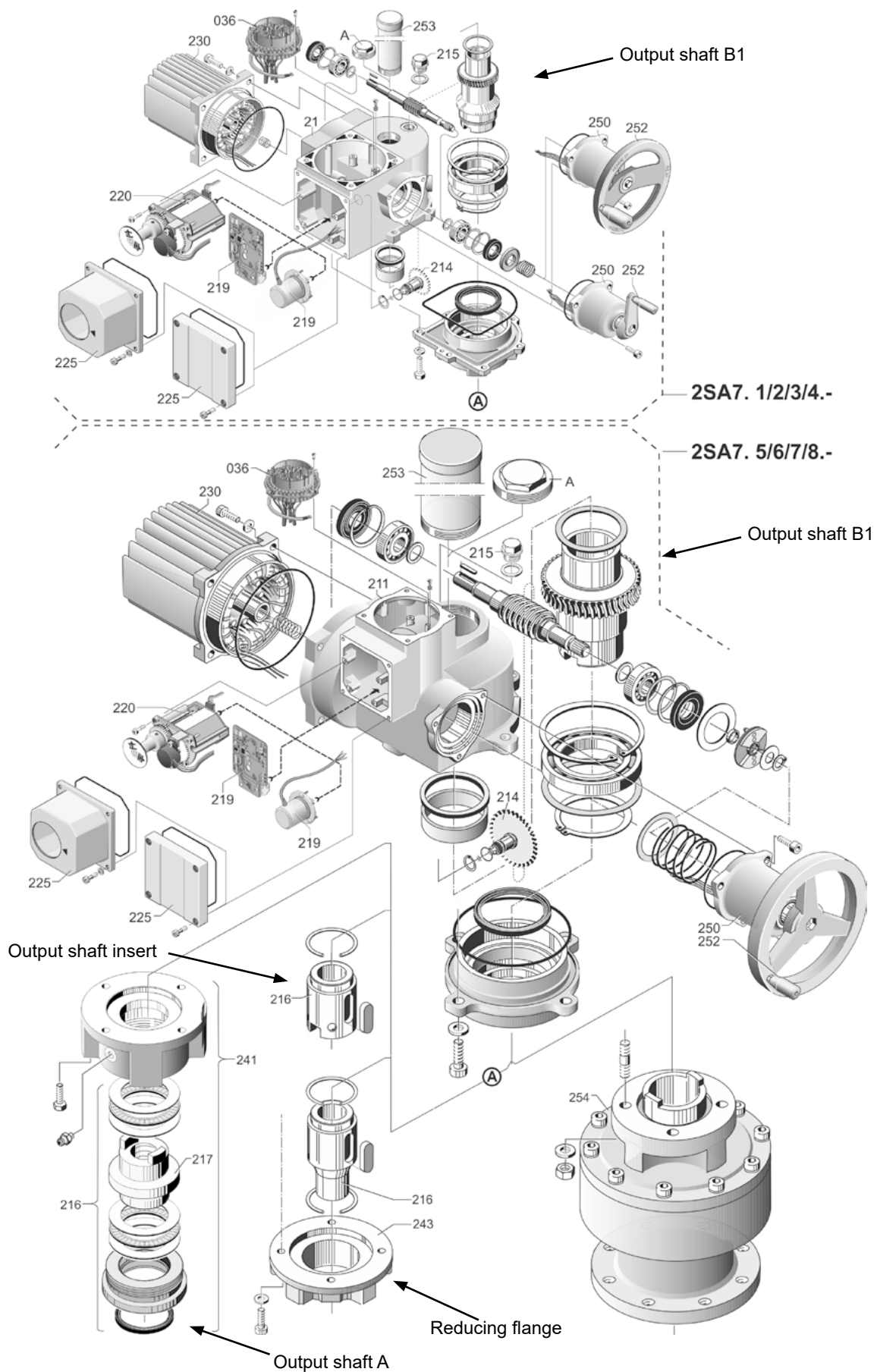
15.2 Spare parts list

Our 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 our service.

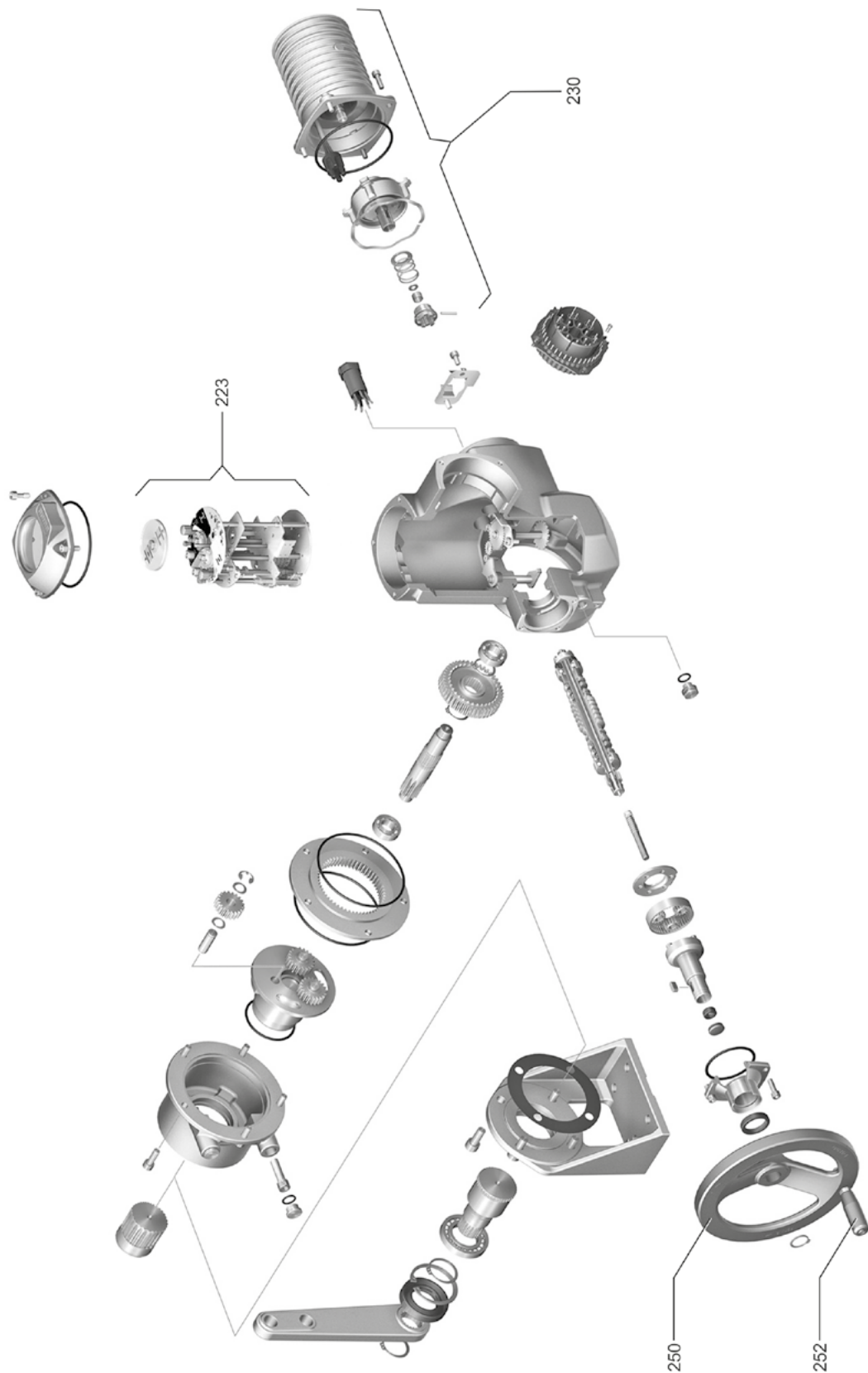
No.	Designation
2SY7001	Electronics unit (010 – 042)
2SY7041	Cover for electronics unit
2SY7218	Sealing kit (without illustration)
2SY7219	'Non-intrusive' position recording
2SY7220	Signaling gear
2SY7225	Signaling gear cover
2SY7250	Manual drive
2SY7252	Handle
▲▲▲ = The last three digits indicate the part numbers in the exploded views.	

15.3 Exploded views

15.3.1 Gearboxes 2SA7...-

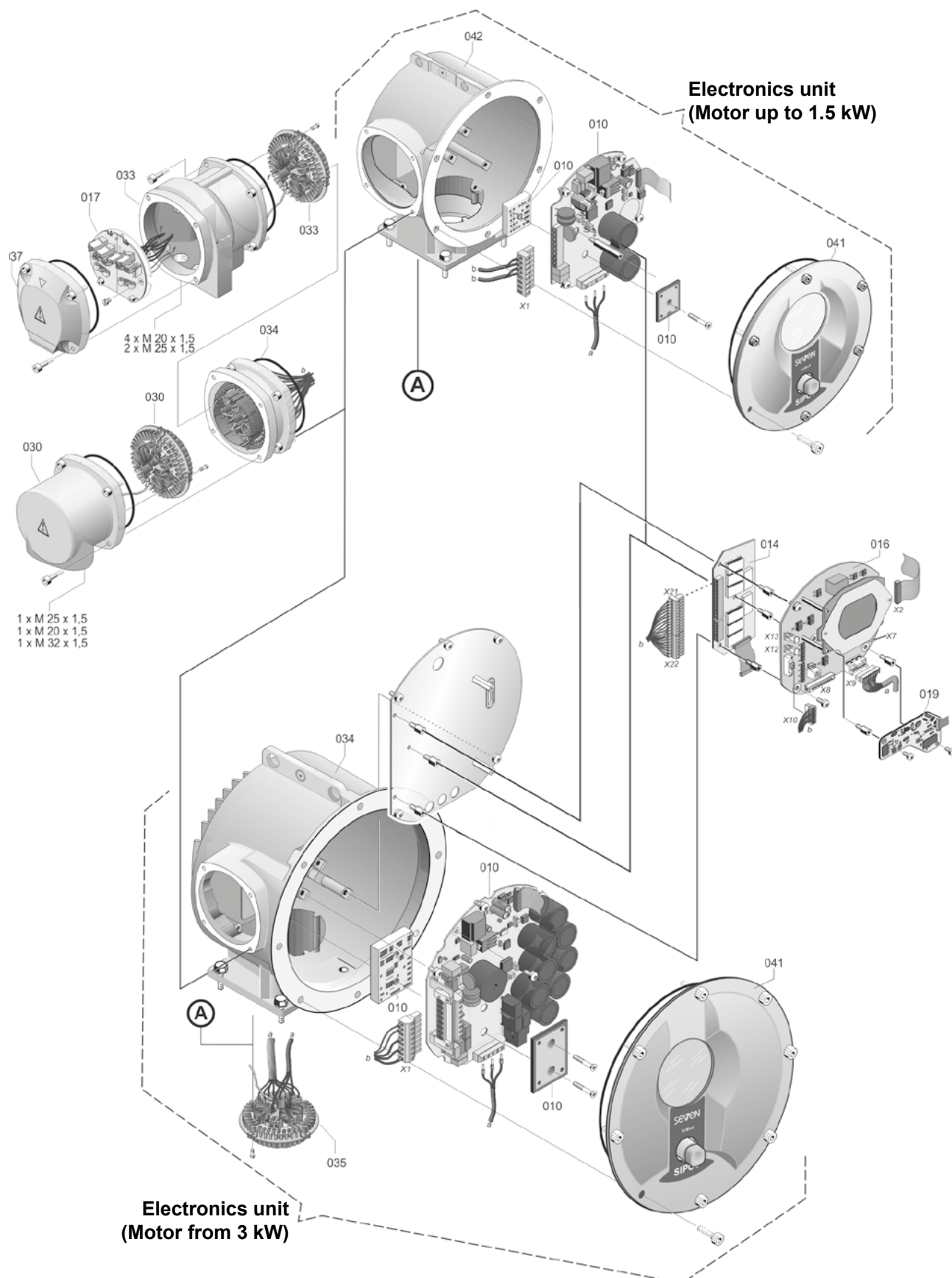


15.3.2 Small part-turn gear unit 2SQ7



15
Spare parts

15.3.3 Electronics unit



Index

A

Acceptance time.	102
Access authorization.	33
Access protection.	33
Activate Bluetooth.	105
Activate standby.	105
Actuator duplication.	121
Actuator state.	20
Actuator status indication.	20
Additional gear.	45
Additional gear parameter.	47
Adjust position indicator.	64
Adjust position indicator, mechanical.	64
Adjust real time clock.	105
Adjust signaling gear ratio.	57
Administrator.	33
Analog inputs	
Analog input AI1.	81
Block diagram.	10
Assembly kit for separate mounting.	16
Autom. TL adapt. end position.	101

B

Behavior on loss of signal parameter.	88
Binary outputs	
Signaling output 1 overview.	82
Block diagram.	10
Bus termination PCB.	14, 15

C

Central wheel.	55, 58
Change login configuration.	37
Change password.	37
Changing the characteristic of a parameter.	71
Changing the numerical value of a parameter.	72
Clone actuator.	121
Close tightly.	97
Code	
Enable software functions.	89
Commissioning.	33, 43, 44
Access authorization.	44
General information.	43
Prerequisites.	43
Sequence of the measures.	44
Communication and data exchange	
COM-SIPOS PC parameterization software.	118
Remote control.	118
USB port, Bluetooth.	119

COM-SIPOS.	118
COM-SIPOS PC parameterization software.	118
Connection	
Direct connection.	13
Electronics and gear unit separated.	16
Fieldbus.	14, 15
Mechanical connection.	11
PROFINET connection.	15
Round plug.	13
Control mode	
Alternative control system.	79
Analog.	77
Binary.	77
Control system.	76
Fieldbus.	78
Internal.	78
LOCAL.	29
REMOTE.	30
Control system	
Alternative control mode.	80
Analog control mode.	77
Analog input AI2.	81, 85
Analog output AO1.	84
Binary control mode.	77
Binary inputs.	80
Binary outputs.	82
Change parameters.	76
Control mode.	76
Fieldbus.	85
Fieldbus control mode.	78
Functions.	74
Internal control mode.	78
Menus.	74
Process controller fixed setpoint.	78
Control system - control mode.	76
Control system parameters.	74
Control system – Switching control mode. .	80
Crank handle	
Danger of crushing. . .see <i>Safety instructions</i>	
Operation.	17
Create user account.	38
Cut-off mode.	49, 73
Cycle operation.	99
D	
Data exchange.	119
Deactivate Bluetooth.	105
DC brake.	97
DC link voltage.	99
DC link voltage limitation.	99
DCS acceptance time.	102
DCS parameters.	74

Dead band.	90	Exploded views.	126
Default values.	102	Export user data*.	122
Degrees.	<i>see Signaling gear</i>	External analog speed setpoint. . .	<i>see Options</i>
Diagnosis		External potential conductor.	15
Maintenance valve.	117	F	
Operation data actuator.	116	Factory reset.	102
Valve.	117	Factory setting	
Valve maintenance limits.	117	In the Parameter menu.	70
Diodes.	18	Operation.	102
Display.	18	Failed attempts.	42
Language.	31	Fast opening.	90
Rotate.	103	Fast to local.	105
Standby screen.	104	Fast to LOCAL.	105
Display operation data.	116	Fault signals.	20
Display orientation.	103	Fieldbus.	118
System settings.	103	Firmware update.	120
Disposal.	6	Firmware version.	112
Download parameters to USB flash drive.	120	Freely adjustable	
Drive Controller.	25	positioning times.	<i>see Options</i>
Drive Controller operation.	25	Functional principle.	8
E		H	
Electrical connection		Hand wheel.	17
Connection with round plug.	13	HART.	86, 113
Direct connection.	13	Heater.	<i>see Motor heating</i>
Fieldbus connection.	14, 15	I	
Electronic name plate		Import.	122
Firmware version.	112	Indication	
Observing.	111	Display.	18
Order number and equipment.	111	LEDs.	18
Original serial number.	111	Standby.	104
Serial number.	111	Valve position.	64
Tag number.	111	Inspection.	123
EMERGENCY.	50	Interlock.	<i>see DCS acceptance time</i>
EMERGENCY input.	87	Interlock LOCAL/REMOTE.	80
EMERGENCY speed.	87	Intermediate contact.	94
Enable		L	
Software functions.	89	Latching function	
Enable customer variants.	89	In the System settings menu.	103
Enable/disable motor operation.	81	Switching on and off.	104
Enable motor operation.	75, 81	Local operation.	29
Enable software functions.	89	Login configuration.	36
End position adaptation.	101	Login configurations.	36
End position adjustment.	101	Login configuration 'Strong password'.	37
End position adjustment for version		Login configuration: 'User account'.	38
with "non-intrusive" position encoder.	65	Log on to actuator.	35, 40
with signaling gear.	54	Loss of signal, behavior.	88
End position range.	74	Lubricant assignment.	124
End position speed.	100	Lubricant quantities.	124
Equal percentage.	90	Lubrication intervals and lubricants.	124
Event memory.	117		
Expert.	33		
Explanation of display symbols.	18		

M

Magnetic limit and torque transmitter.	8
Main menu.	32
Maintenance, inspection, service.	123
Maintenance intervals of valve	
Motor operation hours.	96
Switching cycles.	96
Torque cut-offs.	96
Maintenance valve.	117
Mechanical position indicator.	64
Menu	
Control system.	74
Diagnosis.	116
Observing.	111
Parameters.	70
Control system.	74
Safety.	87
Software functions.	88
Special parameters.	93
Valve.	71
Special parameters.	93
System settings.	103
MODBUS.	118
MODBUS operation instructions.	7
Motor	
Motor heating.	95
Motor protection.	95
Motor warning.	95
Motor heating.	95
Motor protection.	95
Motor protection on/off.	95
Motor warning.	95
Mounting position.	11
Display orientation.	103
Remote control unit.	107
Separate mounting.	16
Separate mounting parameter.	94
MWG (Magnetic limit and torque transmitter).	8
Block diagram.	10

N

Name plate	
Serial number.	92
Name plate, electronic.	111
Navigation in the menu.	25
Navigation through the menus.	25
'Non-intrusive' position recording.	8

O

Observer.	33
Observing.	111
Actuator status.	114
Binary inputs.	112

Binary outputs.	112
Electronic name plate.	111
Fieldbus communication.	112
Inputs and outputs.	112
OFF.	29
Operate actuator.	29
Operation data actuator.	116
Operator.	33
Options	
Customer variants.	89
Software function overview.	92
Software functions.	88
Original serial number.	111
Output flange.	12
Output shaft. <i>see Spare parts</i>	
General assembly instructions.	11
Type A.	11
Overview	
Control system parameters.	74
Observe menu.	111
Optional software functions.	92
Parameters and possible parameter values.	70
Safety related parameters.	87
Special parameters.	93
Overview of a menu.	26

P

Packaging.	6
Parameter menu.	70
Parameters	
Change.	26, 73, 74
Control system.	70, 74
Cut-off mode.	73
EMERGENCY input.	87
EMERGENCY position.	88
EMERGENCY speed.	87
End position range.	74
Intermediate contact.	94
Menu.	70, 74
Retry torque block.	74
Select.	26
Speed.	73
Tripping torque.	73
Valve.	70
Valve-specific parameters.	71
Parameters and possible parameter values.	70
Parameter selection.	26
Password. <i>see Access authorization</i>	
Password entry.	38
Position.	10
Positioner. <i>Refer to Options</i>	
Programming.	90
Positioner with proportional/split range function. s. <i>ee Options</i>	

- Position feedback. 90
- Position indicator. 60, 64
- Positioning time adjustment. 50
- Position recording. 8
- Position recording – functional principle. . . 55
- Position recording functional principle. . . 55
- Potential conductor, external. 15
- Power failure message. 98
- Power module. 9
- Process controller. *see Options*
- PROFIBUS. 118
- PROFIBUS DP. 85
- PROFIBUS operation instructions. 7
- PROFINET. 15
- Program closing direction. 49
- Program cut-off modes and tripping torques. . . 49, 73
- Program EMERGENCY position. 88
- Programming
 - CLOSE direction. 49
 - Cut-off mode and tripping torque. . . 49, 51
 - Positioning time. 50
 - Speed. 49, 50
- Program speeds. 49
- Proportional move. 91
- Proportional/split range function. *Refer to Options*
- Q**
- Quick start. 100, 101
- Quick start/stop. 100
- R**
- Read commissioning data. 32
- Readjustment. 84
- Recognition
 - Open circuit analog input. 98
- Recommended spare parts. 125
- Record torque curve. 109
- Recycling. 6
- Reduction ratio. 56
- Relay board. 9
- Remote. 30
- Remote control. 118
 - Bluetooth. 119
 - COM-SIPOS. 118
 - Remote control unit. 107
 - Separate mounting. 16
- Remote control unit. 107
- Retry torque block. 74
- Revs/stroke. *see Signaling gear*
- Rise time. 97
- Rotary push button. 25
- Rotate display representation. 103
- Runtime monitoring. 100
- S**
- Safety instructions. 5
- Safety related parameters. 87
 - Behavior on loss of signal. 88
 - EMERGENCY input. 87
 - EMERGENCY position. 88
 - EMERGENCY speed. 87
- Save data on USB flash drive. 120
- Save log data on USB flash drive. 120
- Select additional gear. 46
- Select closing direction. 49, 73
- Select language. 31
- Self-retaining. 29, 59, 66
- Separate assembly. 16, 94
- Separate mounting
 - Cable lengths. 16
 - Parameters. 94
 - Specification. 16
- Serial number. 92, 111
- Service. 123
- Set clock. 105
- Set cut-off modes and tripping torques. . 51, 73
- Set display. 104
- Set standby time. 105
- Setting
 - Functions. 70
 - Language. *see Display language*
 - Maintenance intervals of valve. 96
 - Mechanical position indicator. 64
 - Real time clock. 105
 - Standby time. 105
 - Valve-specific parameters. 71
- Setting range. 60
- Set up user management. 34
- Signaling gear. 8
 - General information. 54
 - Prerequisite for adjustment. 56
 - Transmission ratio. 56
 - Transmission ratio adjustment. 56
 - Valve travel. 56
- Software functions. 88
 - Enable customer variants. 89
 - Enable software functions. 89
- Spare parts. 125
- Special parameters. 93
 - Autom. TL adapt. end position. 101
 - Check maintenance. 96
 - Close tightly. 97
 - DC brake. 97
 - DC link voltage limitation. 99
 - DCS acceptance time. 102
 - Delay of Power failure message. 98
 - End position speed. 100
 - Intermediate contact. 94
 - Maintenance intervals of valve. 96
 - Motor heating On/Off. 95

Motor protection on/off.	95	Torque-dependent cut-off mode.	59
Motor warning.	95	Torque measurement flange.	98
Rise time.	97	Connect.	98
Runtime monitoring.	100	Torque adjustment.	115
Separate mounting.	94	Torque switch.	112
Tag number.	94	Torque switch 2SQ7.	112
Test operation.	99	Torque zero adjustment.	115
Threshold open circuit Analog input.	98	Transport.	6
Torque measurement flange.	98	Travel-dependent cut-off mode.	59
Speed adjustment.	50, 73	Travel-dependent freely adjustable positioning times.	<i>see Options</i>
Speed in end positions.	100	Travel-dependent positioning times.	<i>see Options</i>
Standby screen.	104	Travel-dependent speed adjustment.	<i>see Options</i>
Start menu.	28	Tripping torque.	53, 73
Status indication.	18, 20	Trouble shooting.	120
Status messages.	20		
Stem protection tube.	12	U	
Storage.	6	Upload parameters from USB flash drive.	120
Strong password.	34	USB menu.	119
Sub-assemblies		USB port.	119
Electronics unit.	9	User account.	34
Gear unit.	9	User level	
Supervisor.	33	Expert.	33
Supplementary operation instructions.	7	Observer.	33
Switching control mode.	75, 80	Operator.	33
Symbols.	6	Supervisor.	33
Display (status indication).	19	User level (password).	33
LED.	19	User levels.	34
Menu.	25	User management.	32, 33
Symbols in display.	<i>see Display</i>	Access protection.	33
Symbols in the operation instructions:		V	
Electrostatics.	7	Valve maintenance limit.	117
Notice.	7	Valve maintenance limits.	117
Warning.	6	Valve-specific parameters.	71
Working steps by valve manufacturer.	7	Valve travel.	56
System settings.	103	View maintenance limits.	116
Activate, deactivate Bluetooth.	106		
Adjust real time clock.	105	W	
Display orientation.	103	Warnings on the device.	5
T		Z	
Tag number.	94, 111	Zero adjustment.	115
Test operation.	99		
Texts			
Language version. <i>siehe Display</i>			
Threshold open circuit Analog input.	98		
Time control			
Functional principle.	78		
In the Control system menu.	75		
Setting.	79		
Torque curve.	108		
record.	109		
record on USB flash drive.	110		
save.	110		

Original Declaration of Incorporation of Partly Completed Machinery according to 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:

ECOTRON
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 rotary 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.

EN 60204-1:2006/A1:2009/AC:2010 EN 60034-1:2010/AC:2010 EN 50178:1997

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
EN 50581:2012

EMC Directive 2014/30/EU for versions (1)
EN 61800-3:2004/A1:2012

RED directive 2014/53/EU for versions (2)
EN 301 489-1 V2.1.1 EN 301 489-17 V3.1.1 EN 300 328 V2.1.1

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

Altdorf, 2021-02-23

Thomas Weber
Managing Director

This declaration does not contain any guarantees. The safety instructions in product documentation supplied with the devices must be observed. Non-concerted modification of the devices voids this declaration.



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>.

