

# Operating Instructions for 90° FailSafe Actuators Type ACTUSAFE CM FSQT



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## Hazard Warnings

Hazard warnings in this manual indicate potential harm to the user or the product. For the person interacting with the product, the level of risk includes consequences ranging from slight, up to lethal injuries. As for the product, disobeying the warnings may cause damage to the equipment and/or void the warranty. Therefore, said warnings are made apparent to instruct and warn the user, which precautions have to be made prior to performing any actions described in this manual. The user must read and be familiar with the manual, before performing any tasks as described in this manual.

Hazard warnings in this manual are presented in these three forms:

**WARNING:** These warning notices refer to personal safety. Failure to obey these notices could result in personal injury or death.



**WARNING**

**CAUTION:** General precautions must be made. Failure to obey these notices could result in personal injury and/or equipment damage.



**CAUTION**

**NOTE:** Directs the user's attention to essential information.

# Operating Instructions for 90° FailSafe Actuators Type ACTUSAFE CM FSQT

## 1 Safety instructions

**WARNING:** The actuator has a pre-loaded coil spring or a disk spring assembly. Improper dismounting may lead to both damage to the actuator as well as serious injuries!



**WARNING**

**NOTE:** Using the unit as intended also entails the observance of these operating instructions!

**WARNING:** When operating electrical equipment, certain parts inevitably carry hazardous voltage levels. Work on the electrical system or equipment must be carried out only in accordance with electrical regulations by a qualified electrician or by specially instructed personnel under the control and supervision of a qualified electrician.



**WARNING**

**CAUTION:** Maintenance instructions must be observed as otherwise the safe operation of the actuator cannot be guaranteed.



**CAUTION**

**WARNING:** Failure to follow the warning information may result in serious bodily injury or property damage. Qualified personnel must be thoroughly familiar with all warnings contained in this operating manual.



**WARNING**

**CAUTION:** Proper transport, storage, installation, assembly and careful commissioning are essential for proper and safe operation.



**CAUTION**

**WARNING:** When working in potentially explosive areas, observe the Standards European Standards EN 60079-14 “Installing Electrical Systems in Explosion Endangered Areas” and EN 60079-17 “Inspection and Maintenance of Electrical Installations in Explosion Endangered Areas”.



**WARNING**

**WARNING:** Maintenance work on open actuators may only be conducted if these are de-energized. Reconnection during maintenance is strictly prohibited.



**WARNING**

**WARNING:** The actuator shall not be installed in areas of strongly charge generating processes. In addition, the equipment shall only be cleaned with an antistatic or damp cloth.



**WARNING**

## 2 Introduction

**NOTE:** Also consider the *Operating Instructions for Actuators Type CM* and *Operating Instructions for ACTUS-MART Control Units*.

90° ACTUSAFE actuators are designed to operate appropriate fittings when a Failsafe functionality is required. Appropriate fittings are all kinds of fittings that require a 90° movement to operate (butterfly valves, ball valves, taps in general, etc.).

In the event of a power failure or if the Failsafe function is triggered deliberately, the 90° ACTUSAFE actuator shifts the fitting to the Failsafe position, using the built-in energy storage device.



**Figure 1:** CM FSQT - Actuator

### 3 Functional Description of the CM FSQT Failsafe Drive

In normal operation, the actuator is operated by a motor (1). Via a worm gear stage (2) and a planetary gear train (3), the motor drives the spindle nut of a ball screw (4). The sun gear shaft of the planetary gear train is fixed by an operating current brake (5).

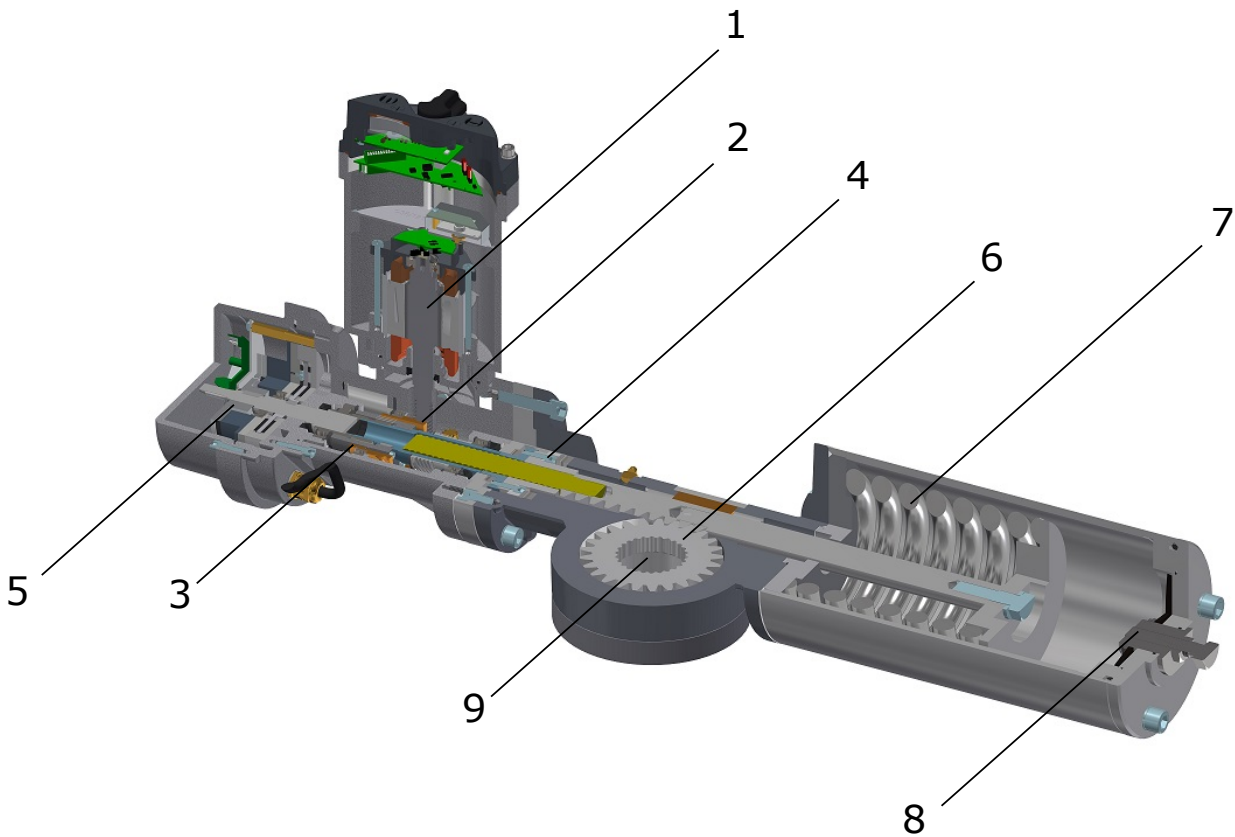
The ball screw converts the rotational movement of the gear unit into linear motion. On the one hand the linear movement, charges the spring (7), which acts as an energy storage device. On the other hand, a rack-and-pinion gear (6) converts the linear motion into the 90° output motion to move the fitting shaft (9).

There are no engaging or disengaging elements between the motor, the energy storage device and the fitting shaft in the actuator. All the gear unit components are permanently engaged.

While moving against the Failsafe direction, the electric motor has to move both the fitting and the energy storage device (spring) for the Failsafe stroke.

If the supply for the operating current brake is interrupted (by a power failure, or intentionally to trigger a Failsafe stroke, the actuator will no longer be held, and the potential energy stored in the spring will be converted into kinetic energy to move the actuator and thereby the fitting to the Failsafe position. In this case, the entire gear chain for the actuator except of the worm gear stage will be moved until the adjustable, mechanical end stop (8) is reached or, if applicable, the stop for the fitting.

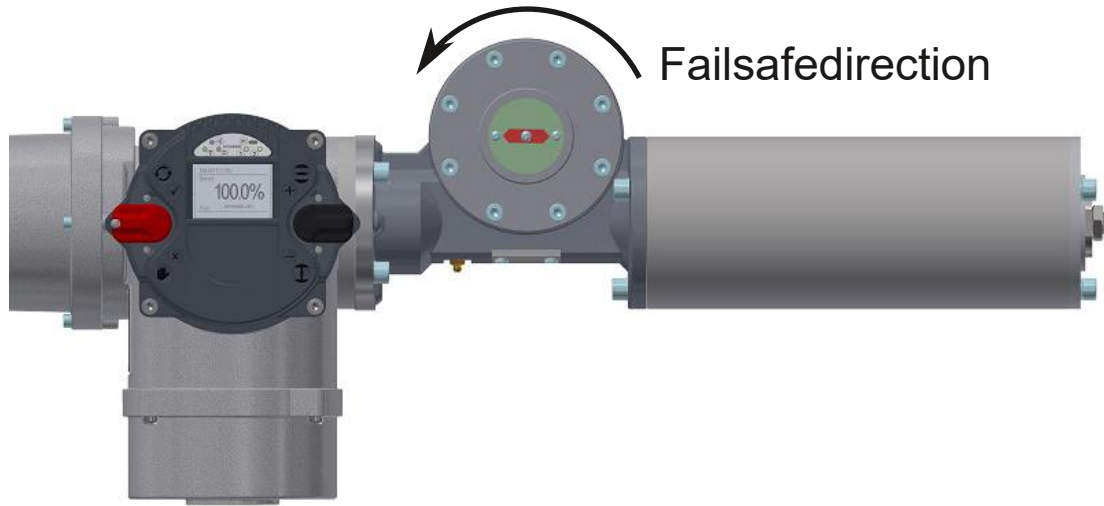
Owing to this operating principle, neither an initialising stroke nor resetting of the actuator is required after a Failsafe stroke. As soon as the power supply is restored, the actuator is immediately ready for operation.



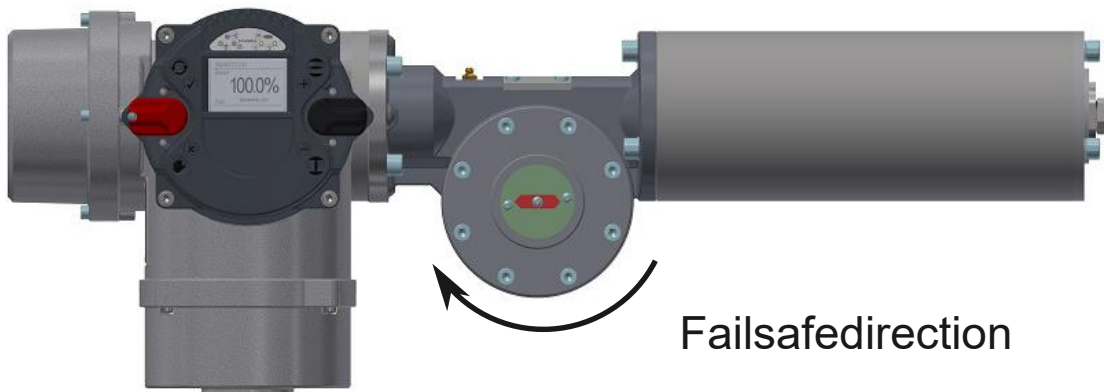
**Figure 2:** 1... Motor, 2... Worm gear stage, 3... Planetary gear train, 4... Ball screw, 5... Operating current brake, 6... Rack-and-pinion gear, 7... Spring, 8... End stop, 9... Fitting shaft

### 3.1 Failsafe-direction

This Failsafe actuator can be built as a version for “Failsafe CCW” (counter-clockwise direction of rotation when looking at the fitting shaft), see Figure 3, or “Failsafe CW” (clockwise direction of rotation). It is even possible to subsequently change the Failsafe direction (separate manual available), see Figure 4, which requires some assembly work. Having this conversion performed at our plant is recommended, however.



**Figure 3:** Failsafe-direction counter clockwise (CCW)



**Figure 4:** Failsafe-direction clockwise (CW)



## 3.2 Moving-behaviour of the actuator

How the actuator moves to the end limits depends on, whether the actuator is in Failsafe mode or in electrical mode.

### 3.2.1 Moving behaviour electrical mode

- **Moving in Failsafe direction**

In this case the actuator moves in Failsafe direction electrically by motor till the adjusted electrical end position is reached. If the end limit is set to travel dependent, the actuator stops at this point. If the end limit is set torque dependent, the actuator moves electrically till the end position. In the end position the electrical holding brake is released and the actuator build up the torque by the tensioned spring.

**NOTE:** For torque dependent end limit, the end position should be set in a sufficient range before the mechanical end position to avoid damage on the valve.

- **Moving counter Failsafe direction**

The actuator moves to the end position electrically by motor. If the end limit is set torque dependent the torque is build up by the motor.

**NOTE:** For torque dependent end limit the end position should be set in a sufficient range before the real end position to avoid damage on the valve.

### 3.2.2 Moving behaviour failsafe mode

- **Moving in Failsafe direction**

In Failsafe mode the actuator can only move in Failsafe direction. When the electrical holding brake is released the actuator moves against the end limit by spring. In this case the end limit is generally torque dependent. The torque in end position is build up by the residual spring torque. Travel depended positioning of the end limit is possible by adjusting the mechanical end stops from the actuator. Thus the mechanical end position can be set from 85° to 95°.

**CAUTION:** The mechanical end stops in the actuator are not designed to be moved against by torque regularly!



**CAUTION**

## 4 General Information

### 4.1 Serial number and type label

See *Operating Instructions for Actuators Type CM, section Serial number and type label.*

## 4.2 Mode of operation FSQT

### 4.2.1 CM03 FSQT

<b>ON-OFF &amp; INCHING operation</b>	
<b>CM03 FSQT30</b>	<b>CM03 FSQT60</b>
S2 - 15 minutes according to IEC 60034 or Class A and Class B acc. EN ISO 22153	
1,0 - 72 RPM	1,0 - 72 RPM
$M_{max} = 300 \text{ Nm}$	$M_{max} = 600 \text{ Nm}$
$M_{avg} = 150 \text{ Nm}$	$M_{avg} = 300 \text{ Nm}$
<b>Life time*</b>	
10.000 cycles	
<b>MODULATING operation</b>	
<b>CM03 FSQT30</b>	<b>CM03 FSQT60</b>
S4 - 1.200 c/h - max. 50% DC according to IEC 60034 or Class C acc. EN ISO 22153	
1,0 - 36 RPM	1,0 - 36 RPM
$M_{max} = 300 \text{ Nm}$	$M_{max} = 600 \text{ Nm}$
$M_{avg} = 150 \text{ Nm}$	$M_{avg} = 300 \text{ Nm}$
<b>Life time*</b>	
1.200.000 starts	
<b>CONTINUOUS MODULATING operation</b>	
<b>CM03 FSQT30</b>	<b>CM03 FSQT60</b>
S9 - 1.800 c/h according to IEC 60034	
1,0 - 20 RPM	1,0 - 20 RPM
$M_{max} = 300 \text{ Nm}$	$M_{max} = 600 \text{ Nm}$
$M_{avg} = 100 \text{ Nm}$	$M_{avg} = 200 \text{ Nm}$
<b>Life time*</b>	
1.200.000 starts	

**NOTE:** Life time is based on proper operation and maintenance according to SCHIEBEL operating manual

**CYCLE** = movement of 90° in both directions with at least 30% of nominal force and the ability to accept 100% of nominal torque for at least 5% of the stroke

**START** = movement of at least 1° of stroke in both directions with a load of minimum 30% of nominal torque

4.2.2 CM06 FSQT

<b>ON-OFF &amp; INCHING operation</b>			
<b>CM06 FSQT100</b>	<b>CM06 FSQT200</b>	<b>CM06 FSQT300</b>	<b>CM06 FSQT500</b>
S2 - 15 minutes according to IEC 60034 or Class A and Class B acc. EN ISO 22153			
1,0 - 60 RPM	1,0 - 60 RPM	1,0 - 60 RPM	1,0 - 60 RPM
$M_{max} = 1.000 \text{ Nm}$	$M_{max} = 2.000 \text{ Nm}$	$M_{max} = 3.000 \text{ Nm}$	$M_{max} = 5.000 \text{ Nm}$
$M_{avg} = 300 \text{ Nm}$	$M_{avg} = 600 \text{ Nm}$	$M_{avg} = 900 \text{ Nm}$	$M_{avg} = 1.500 \text{ Nm}$
<b>Life time*</b>			
10.000 cycles	5.000 cycles	5.000 cycles	2.500 cycles

<b>MODULATING operation</b>			
<b>CM06 FSQT100</b>	<b>CM06 FSQT200</b>	<b>CM06 FSQT300</b>	<b>CM06 FSQT500</b>
S4 - 1.200 c/h - max. 50% DC according to IEC 60034 or Class C acc. EN ISO 22153			
1,0 - 30 RPM	1,0 - 30 RPM	1,0 - 30 RPM	1,0 - 30 RPM
$M_{max} = 1.000 \text{ Nm}$	$M_{max} = 2.000 \text{ Nm}$	$M_{max} = 3.000 \text{ Nm}$	$M_{max} = 5.000 \text{ Nm}$
$M_{avg} = 500 \text{ Nm}$	$M_{avg} = 1.000 \text{ Nm}$	$M_{avg} = 1.500 \text{ Nm}$	$M_{avg} = 2.500 \text{ Nm}$
<b>Life time*</b>			
1.200.000 starts	500.000 starts	500.000 starts	250.000 starts

<b>CONTINUOUS MODULATING operation</b>			
<b>CM06 FSQT100</b>	<b>CM06 FSQT200</b>	<b>CM06 FSQT300</b>	<b>CM06 FSQT500</b>
S9 - 1.800 c/h according to IEC 60034			
1,0 - 20 RPM	1,0 - 20 RPM	1,0 - 20 RPM	1,0 - 20 RPM
$M_{max} = 1.000 \text{ Nm}$	$M_{max} = 2.000 \text{ Nm}$	$M_{max} = 3.000 \text{ Nm}$	$M_{max} = 5.000 \text{ Nm}$
$M_{avg} = 300 \text{ Nm}$	$M_{avg} = 600 \text{ Nm}$	$M_{avg} = 900 \text{ Nm}$	$M_{avg} = 1.500 \text{ Nm}$
<b>Life time*</b>			
1.200.000 starts	500.000 starts	500.000 starts	250.000 starts

**NOTE:** Life time is based on proper operation and maintenance according to SCHIEBEL operating manual.

**CYCLE** = movement of 90° in both directions with at least 30% of nominal force and the ability to accept 100% of nominal torque for at least 5% of the stroke

**START** = movement of at least 1° of stroke in both directions with a load of minimum 30% of nominal torque

### 4.3 Protection class

See *Operating Instructions for Actuators Type CM, section Protection class.*

### 4.4 Mounting position

See *Operating Instructions for Actuators Type CM, section Mounting position.*

### 4.5 Direction of rotation

The standard direction of rotation for the actuator is:

- Clockwise = The actuator runs counter to the Failsafe direction
- Counter-clockwise = The actuator runs in the Failsafe direction

Which direction, opening or closing of the fitting causes, depends on:

- The Failsafe direction of the actuator
- The closing direction of the fitting

All the information in this operating manual refers to the standard direction of rotation.

### 4.6 Protection devices

See *Operating Instructions for Actuators Type CM, section Protection devices.*

### 4.7 Ambient temperature

See *Operating Instructions for Actuators Type CM, section Ambient temperature.*

### 4.8 Delivery condition of the actuators

See *Operating Instructions for Actuators Type CM, section Delivery condition of the actuators.*

### 4.9 Information notice (tag)

See *Operating Instructions for Actuators Type CM, section Information notice (tag).*

## 5 Packaging, transport and storage

See *Operating Instructions for Actuators Type CM, section Packaging, transport and storage.*

## 6 Installation Instructions

Installation work of any kind for the actuator may only be performed by qualified personnel.

**WARNING:** When working in potentially explosive areas, observe the Standards European Standards EN 60079-14 “Installing Electrical Systems in Explosion Endangered Areas” and EN 60079-17 “Inspection and Maintenance of Electrical Installations in Explosion Endangered Areas”.



**WARNING**

**WARNING:** The actuator shall not be installed in areas of strongly charge generating processes. In addition, the equipment shall only be cleaned with an antistatic or damp cloth.



**WARNING**

## 6.1 Mechanical Connection

Check,

- whether the fitting flange and actuator flange match up
- whether the drilled hole matches up with the shaft
- whether there is sufficient engagement of the fitting shaft in the actuator hole

**NOTE:** Make sure that both the valve and the actuator are in the failsafe position.

Make sure the fitting is in the same position as the actuator:

- **For a “Failsafe open” actuator, the fitting has to be completely open.**
- **For a “Failsafe close” actuator, the fitting has to be completely closed.**

In general, heed the following instructions:

- Clean the bare parts on the actuator coated with rust protectant.
- Clean the mounting surface for the fitting thoroughly.
- Lightly grease the fitting shaft.
- Set the actuator in place.
- Make sure of centred positioning and that the contact surface of the flange is full.
- Fasten the actuator with suitable bolts:
  - Minimum strength grade: 8.8 or A2-70
  - Ensure sufficient thread engagement (min. 1xd)

**CAUTION:** Screws, that are too long may go against the thread root, creating the risk of the actuator moving radially vis-à-vis the fitting. This may lead to the bolts shearing off.



**CAUTION**

**NOTE:** Unsuitable bolts may result in the actuator falling off!

- Tighten bolts to the correct torque, alternating between bolts on opposite sides

Thread	Tightening torque [Nm] for bolts with strength grade	
	8.8	A2-70 / A4-70
M6	11	8
M8	25	18
M10	51	36
M12	87	61
M16	214	150
M20	431	294
M30	1489	564

## 6.2 Mounting position of the control unit

See *Operating Instructions for Actuators Type CM, section Mounting position of the operating unit.*

**WARNING:** The control unit must not be opened when an explosive gas atmosphere is present.



# WARNING

**WARNING:** Certain parts of the actuator carry hazardous voltage levels. Work on open actuators may only be conducted if these are de-energized. Reconnection during maintenance is strictly prohibited.



# WARNING

## 6.3 Electrical connection

See *Operating Instructions for Actuators Type CM, section Electrical connection.*

**WARNING: Hazardous voltage!** Electrical connections may only be carried out by qualified personnel. Please observe all relevant national security requirements, guidelines, and regulations.



# WARNING

## 7 Commissioning

It is assumed that the actuator has been installed and electrically connected correctly. (See section 6, page 12 and *Operating Instructions for Actuators Type CM, section Installation instructions*).

**NOTE:** Remove silica gel from the alarm cover.

### 7.1 General information

#### Technical data

Type	Max. actuators torque [Nm]		Revolutions on the basic actuator			
	In Failsafe direction	Counter Failsafe direction	nominal [°]	Revolutions [U]	maximal [°]	Revolutions [U]
CM03 FSQT30	8	17	90	16,02	100	17,8
CM03 FSQT60	8	29	90	15,71	100	17,45
CM06 FSQT100	16	64	90	9,42	100	10,47
CM06 FSQT200	16	57	90	31,42	100	34,9
CM06 FSQT300	16	62	90	39,27	100	43,63
CM06 FSQT500	16	64	90	60,87	100	67,63
CM12 FSQT1200	32	125	90	78,54	100	87,27

**NOTE:** When commissioning and each time after dismantling the actuator, the electrical end positions have to be reset (see *Operating Instructions for Actuators Type CM, section End limit setting*).

## 7.2 Manual operation

The manual operation is only possible if the actuator is delivered with the optional handwheel. This option allows an adjustment of the valve in de-energized state.

**CAUTION:** The manual mode is intended to be activated only when the drive is in the failsafe position. Activating the manual mode while the actuator is not in failsafe position may damage components of the failsafe brake assembly.



**CAUTION**

**CAUTION:** By activating the manual drive the failsafe function is disabled.



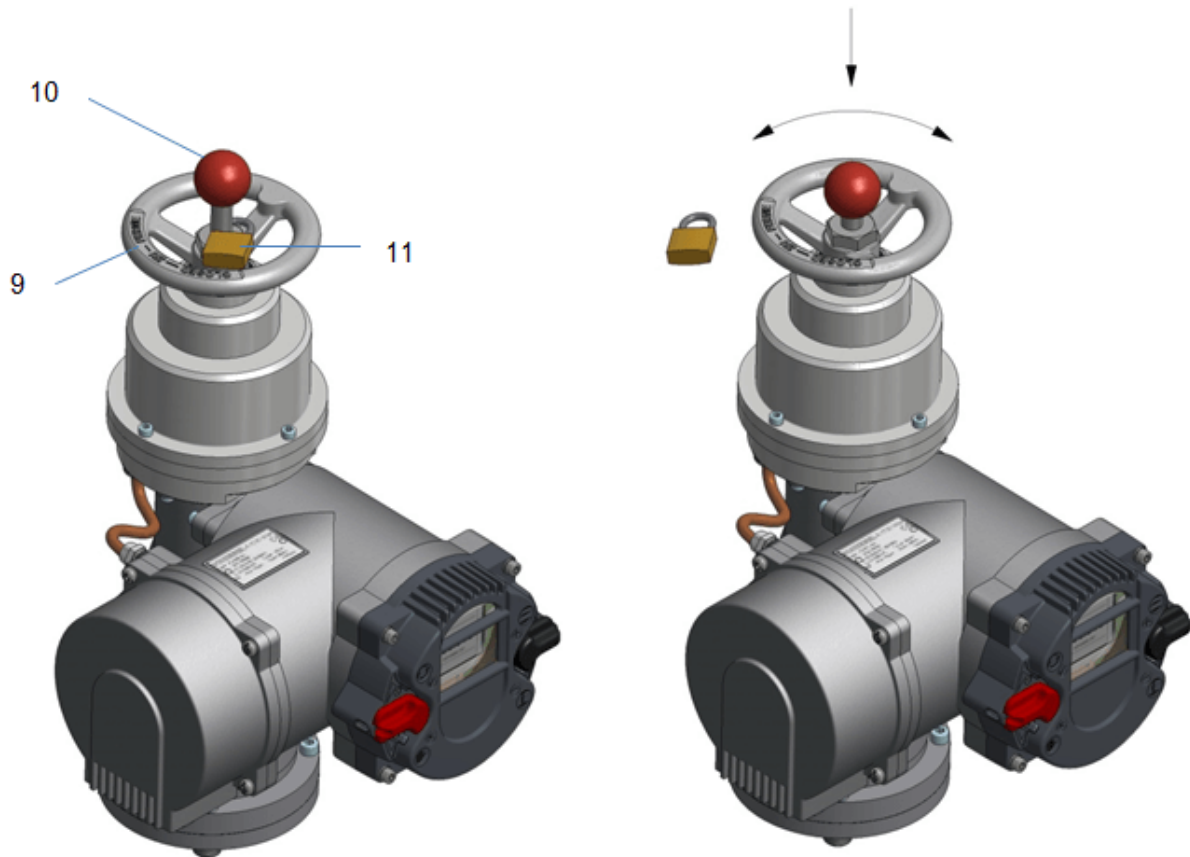
**CAUTION**

**NOTE:** By activating the manual drive the electrical function of the drive is disabled. In normal operation, the hand wheel (item (9) on figure 5, page 16) has no effect, it rotates idly by.

**CAUTION:** Manual operation with mechanical or electromechanical equipment (such as: lever, drilling machine, etc.) is **NOT ALLOWED**, as this may damage the product.



**CAUTION**



**Figure 5:** 9... Handwheel, 10... shift rod, 11... padlock

### 7.2.1 Activate manual operation

To activate manual mode:

- the padlock has to be removed
- the shift rod has to be pushed all the way into the actuator.

For easier clutch engagement move the hand wheel easily back and forth.

Through the engagement the actuator is automatically electrically disabled and the display shows „manual override“.

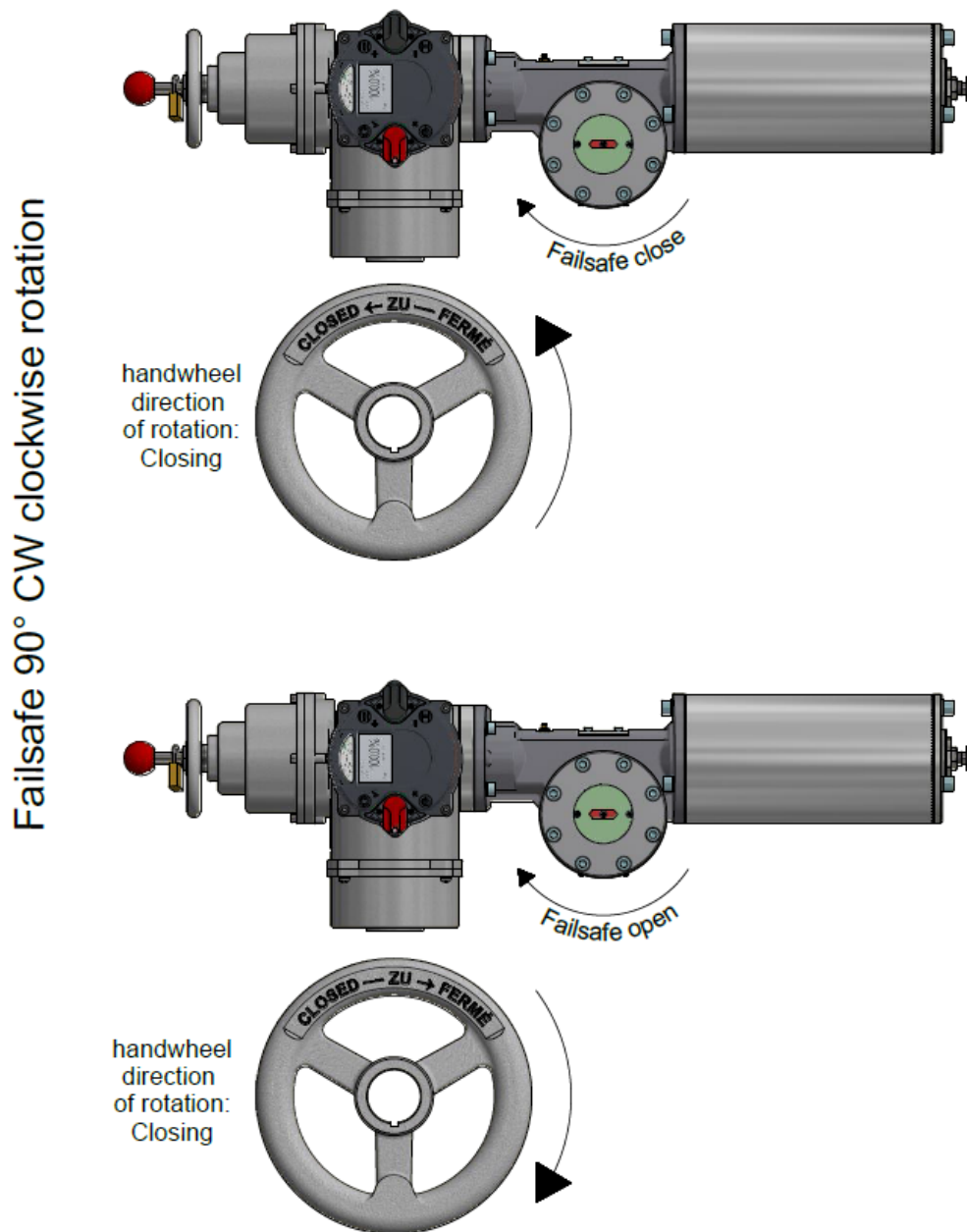
### 7.2.2 Deactivate manual operation

The following steps are done to exit the manual mode and to enable the automatic mode again:

- the actuator must be driven to the Failsafe position by handwheel.
- the shift rod is then pulled up to decouple the handwheel.
- lastly, the shift rod is secured with the padlock.



### 7.2.3 Direction of rotation handwheel for closing the valve, Failsafe direction „CW“



**Figure 6:** Rotation of direction for Failsafe direction „CW“.

7.2.4 Direction of rotation handwheel for closing the valve, Failsafe direction „CCW“

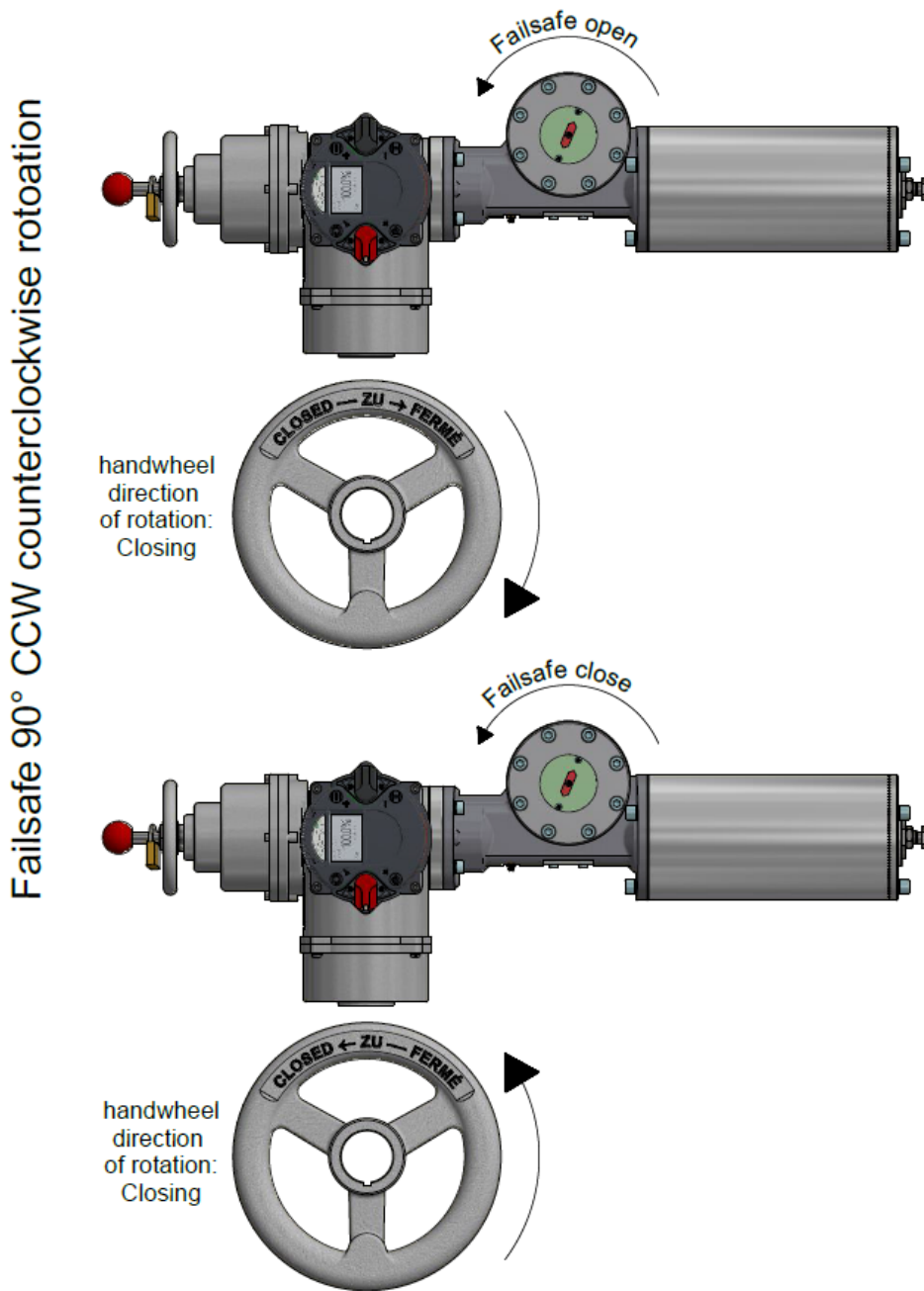


Figure 7: Roation of direction for Failsafe direction „CCW“.

### 7.2.5 Required torque on the handwheel

The following table shows the maximum torque applied to the handwheel for the different actuator sizes.

Type	Max. handwheel torque [Nm]		Handwheel diameter [mm]
	In Failsafe direction	Counter Failsafe direction	
CM03 FSQT30	4	8,5	140
CM03 FSQT60	4	14,5	140
CM06 FSQT100	8	32	200
CM06 FSQT200	8	28,5	200
CM06 FSQT300	8	31	200
CM06 FSQT500	8	32	200
CM12 FSQT1200	16	62,5	250



The force on the handwheel was calculated for one-handed operation. With two-hand operation, the value per hand is halved. The maximum force may be exceeded by 20% in manual mode. The direction of rotation and the maximum handwheel torque are written on the handwheel label, as shown on figure above.

### 7.3 Mechanical default setting, preparation

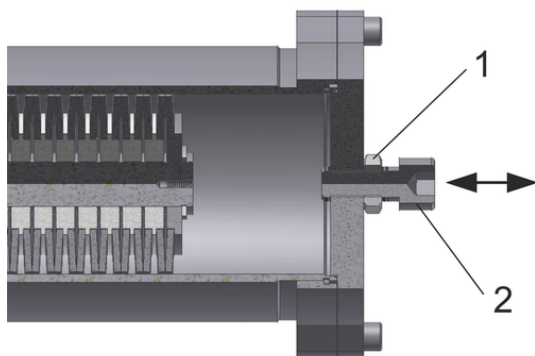
See *Operating Instructions for Actuators Type CM, section Mechanical default setting, preparation.*

### 7.4 Setting the end positions

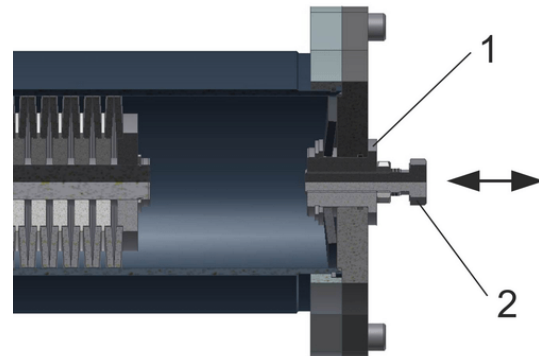
See *Operating Instructions for Actuators Type CM, section End limit setting.*

### 7.5 Setting the mechanical end stop

The 90° Failsafe actuator only has one limited mechanical end stop that limits the travel at the Failsafe end position. The end stop is at the end of the spring cup.



**Figure 8:** 1... Locknut, 2... End stop



**Figure 9:** 1... Locknut, 2... End stop

To adjust the end stop, first undo the locknuts.

To lengthen the stroke by means of the end stop, unscrew the end stop out of the cover flange.

**CAUTION:** Upon delivery, the end stop is set to the maximum possible stroke. Further unscrewing causes no further extension of stroke; the end stop becomes ineffective. This must be ruled out no matter what.



Check the end stop by:

- Letting the actuator run against the stop in Failsafe operation.
- Despite the locknut being undone, it should not be possible to screw the end stop further into the cover flange.

**CAUTION:** If the stroke is to be shortened by means of the end stop, the actuator must not be in the Failsafe position. Before adjusting, it is necessary to move the actuator electrically for at least 10% away from the end position.



After undoing the locknut, screw the end stop into the cover flange, and check the adjustment of the end stop by triggering a Failsafe stroke.

**CAUTION:** In electrical operation, it is not permissible for the mechanical end stop to be run into. After adjusting the mechanical end stop, check the setting of the travel end position and correct it if necessary.



**NOTE:** After completing the adjustment work, fix the locknuts back in place!

## 7.6 Adjusting of Failsafe speed

### General:

Schiebel CM Failsafe actuators are equipped with an adjustable passive eddy current brake, through which it is possible to change the Failsafe speed. When delivered, the Failsafe speed is set to minimum.

After mounting the actuator to a valve and after conducting a test run, the Failsafe speed can be increased if necessary.

**CAUTION:** Valve or piping equipment may be damaged, if the actuation speed is too high!



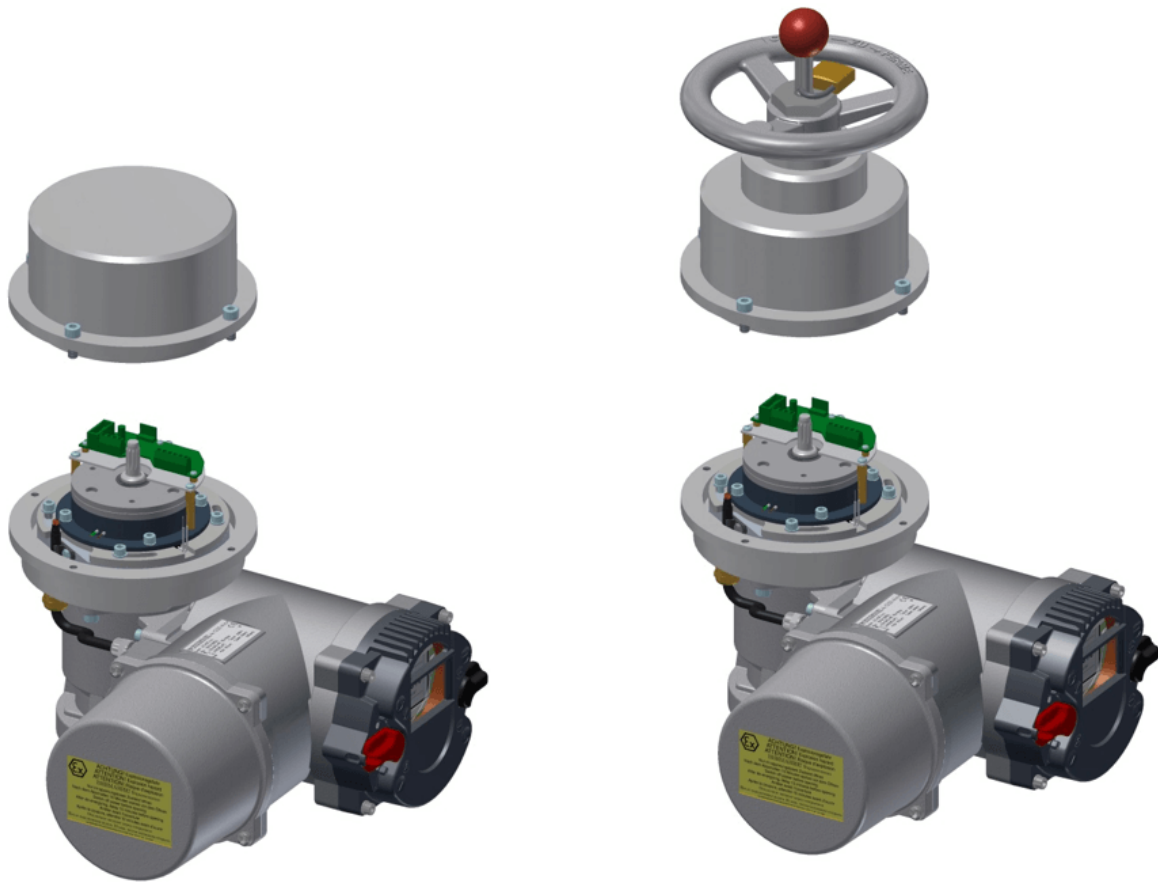
**WARNING:** All adjustment work may only be performed with the actuator disconnected from the power supply. Due to this requirement, the actuator has to be in the Failsafe position! Any powering up must be ruled out during maintenance!



**WARNING:** When working in potentially explosive areas, heed European Standards EN 60079-14 "Installing Electrical Systems in Explosion Endangered Areas" and EN 60079-17 "Inspection and Maintenance of Electrical Installations in Explosion Endangered Areas".



### 7.6.1 Setting procedure:

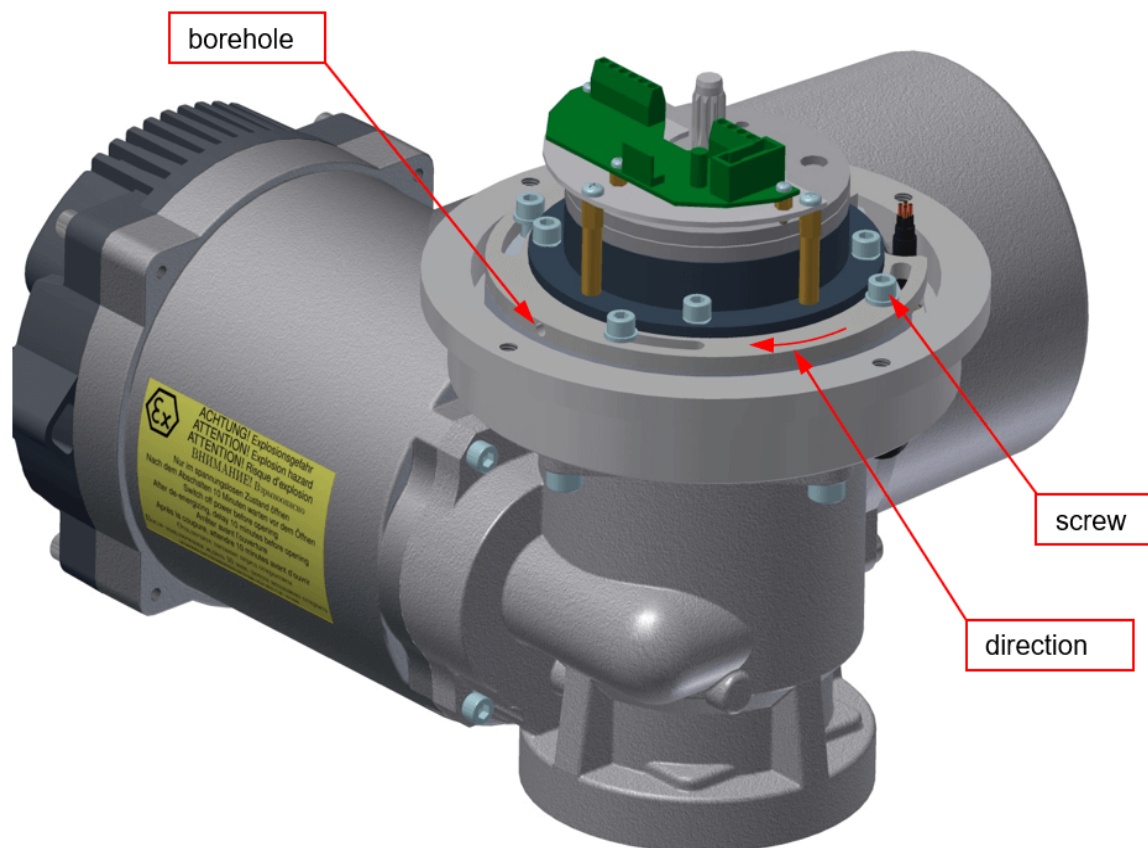


**Figure 10:** Cover removing

**CAUTION:** For Failsafe actuators with handwheel, there is a cable connection between components on the cover and on the failsafe brake assembly, which has to be unplugged upon removing the cover. Care must be taken when removing the cover to avoid damaging the connection.



1. Remove cover according Figure 10, page 21
2. Loosen, but do not remove 4pcs of screws according Figure 11, page 22.
3. Insert a 3mm allen key into the radial borehole of flange.
4. Turn flange with the help of the allen key in direction according Figure 11, page 22  
Half of possible rotating angle will approximately double Failsafe speed of actuator.  
While holding flange with key in desired position retighten screws.
5. In the version with handwheel reconnect the cable to the cover
6. Remount the cover while being aware of correct positioning of the O-ring sealing.
7. Retest the actuator to check for correct Failsafe speed.



**Figure 11:** Adjusting speed

## 7.7 Final works

See *Operating Instructions for Actuators Type CM*, section *Final works*.

## 8 Control unit

See *Operating Instructions for ACTUSMART Control Units*, section *Control unit*.



## 9 Maintenance

**WARNING:** Maintenance work on open actuators may only be conducted if these are de-energized. Reconnection during maintenance is strictly prohibited. Work on the electrical system or equipment must be carried out only in accordance with electrical regulations by a qualified electrician or by specially instructed personnel under the control and supervision of a qualified electrician.



**WARNING**

**CAUTION:** Due to this requirement, the actuator has to be in the failsafe position! If this is not the case, it may be because of a fault in the fitting (stuck valve stem).



**CAUTION**

**WARNING:** The actuator shall not be installed in areas of strongly charge generating processes. In addition, the equipment shall only be cleaned with an antistatic or damp cloth.



**WARNING**

**WARNING:** Do not open the control unit when an explosive gas atmosphere is present!



**WARNING**

**WARNING:** The actuator has a pre-loaded coil spring or a disk spring assembly! When loosening the flange mounting bolts, the spring force against the valve can cause the actuator to come loose from the valve. Adequate safety measures must be taken.



**WARNING**

After completing their commissioning, the actuators are ready for use. The actuator is filled with oil as standard when shipped.

### Routine checks:

- Be mindful of increased running noises. In cases of long down times, operate the actuator at least every three months.
- Check the failsafe function (check the operating time and smoothness of running in failsafe operation). Lengthening in the running time may also be caused by an increased torque requirement for the fitting after long down times.

**WARNING:** The actuator has a pre-stressed coil spring or disk spring assembly. Improper dismantling may lead to both damage to the actuator as well as serious injuries! If maintenance work is needed requiring the actuator to be dismantled, contact SCHIEBEL Antriebstechnik GesmbH regarding detailed instructions and/or any special-purpose tools for relaxing the spring assembly!



**WARNING**

The actuators are designed for any mounting position (See *Operating Instructions for Actuators Type CM, section Mounting position*), which is why there is neither a filling level indicator nor a drain plug on the main casing.

Depending on the stressing subjected to, do the following approx. every 10,000 to 20,000 hours (about 5 years; see *Operating Instructions for Actuators Type CM, section Lubricant recommendation, lubricant requirements*):

- Oil change
- Replace seals
- Check all the roller bearings and the worm gear assembly and replace if necessary.

Take the types of oils and greases to be used from our Lubricant Table. (see *Operating Instructions for Actuators Type CM, section Lubricant recommendation, lubricant requirements*).

**NOTE:** Check the cable glands at regular intervals (annually) for tightness of the cables and retighten if necessary.

**WARNING:** For explosion-proof actuators, the cable gland on the failsafe brake unit (see figure 12) may only be replaced by the manufacturer!



**WARNING**

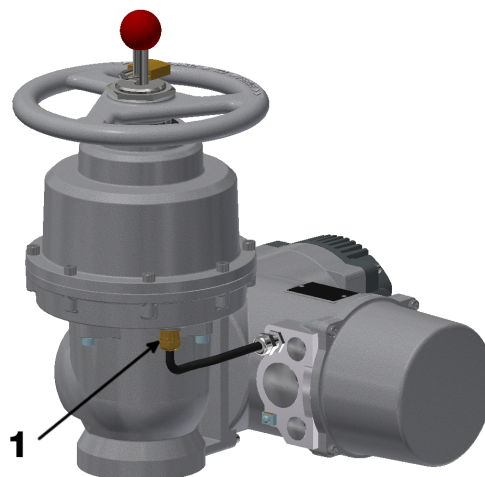
If the visual inspection (eg. dust or water penetration) indicates that the effectiveness of the sealing elements of the cable entry has suffered damage or aging, such elements have to be replaced preferably by using the original spare parts from the manufacturer of the equipment or through cable entries of comparable quality as well as the same ex- or IP protection class.

If screws need to be replaced, it is preferable to use original replacement parts. The tensile strength of the screws must be at least 450 MPa (450 N/mm<sup>2</sup>).

**CAUTION:** In the case of explosion-proof actuators, repairs to the flameproof joints are **NOT** intended. If damage is found on the gap surfaces (control unit cover, motor shaft, sensor shaft, cable bushings, cover for brake, shift rod, shaft for handwheel, threaded joint for cable gland on failsafe brake assembly (see figure 12), gap for brake shaft), the device must be replaced!



**CAUTION**



**Figure 12:** 1...Cable gland on the failsafe assembly of the failsafe base actuator



## 10 Technical data Failsafe brake

### 10.0.1 CM03 FSQT

Power: ..... 16 W  
Voltage: ..... 24 V  
Current: ..... 0,67 A

### 10.0.2 CM06 FSQT

Power: ..... 21 W  
Voltage: ..... 24 V  
Current: ..... 0,875 A

### 10.0.3 CM12 FSQT

Power: ..... 28 W  
Voltage: ..... 24 V  
Current: ..... 1,17 A

## 11 Spare parts

When ordering spare parts, let us know the serial number of the actuator.  
A separate exploded diagram and a spare parts list is available for selecting spare parts.

**WARNING:** For explosion-proof actuators, the cable gland on the failsafe brake unit (see figure 12) may only be replaced by the manufacturer!



# WARNING

**CAUTION:** Only original spare parts shall be used to replace faulty components. As for the failsafe brake cover, screws with a minimum yield stress of 450 MPa (450 N/mm<sup>2</sup>) shall be used for the closing for the flameproof enclosure.



# CAUTION

## 12 Lubricant recommendation, lubricant requirements

See *Operating Instructions for Actuators Type CM, section Lubricant recommendation, lubricant requirements.*

### 12.1 Lubricant points FSQT

The table values given apply to relubrication in accordance with the relubrication intervals in the operating instructions. After relubrication has been carried out, 2-3 full strokes must be performed. If torque switch off occur, the grease nipples must be removed and the strokes repeated.

**NOTE:** Lubricant can leak out of the lubrication points.

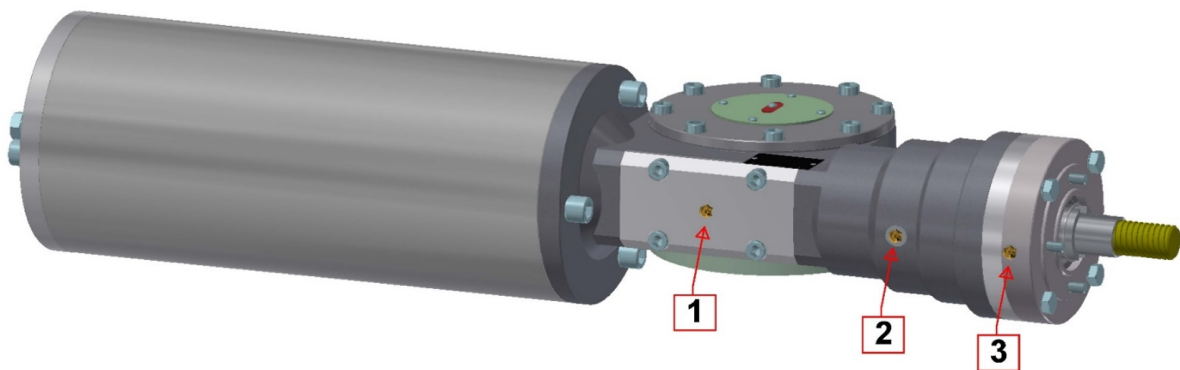
The grease nipples should be reinstalled, in case of removal.

The spindle nut is or should be lubricated during initial assembly or after complete disassembly, including all gears and bearings. Also, all moving parts as well as internal surfaces are coated to cover them.

→ Lubricant quantity according to expenditure

→ Lubricant specification according to the operating instructions depending on the temperature range

Type	Lubrication point [Quantity]		
	1	2	3
	Main gear	Bearing spindle drive	Intermediate gear
	[cm <sup>3</sup> ]	[cm <sup>3</sup> ]	[cm <sup>3</sup> ]
CM03 FSQT30	8	-	-
CM03 FSQT60	18	-	-
CM06 FSQT100	20	42	-
CM06 FSQT200	20	68	29
CM06 FSQT300	20	90	59
CM06 FSQT500	20	80	90



**Figure 13:** Lubrication points

For more information, see *Operating Instructions for Actuators Type CM, section Lubricant recommendation, lubricant requirements.*

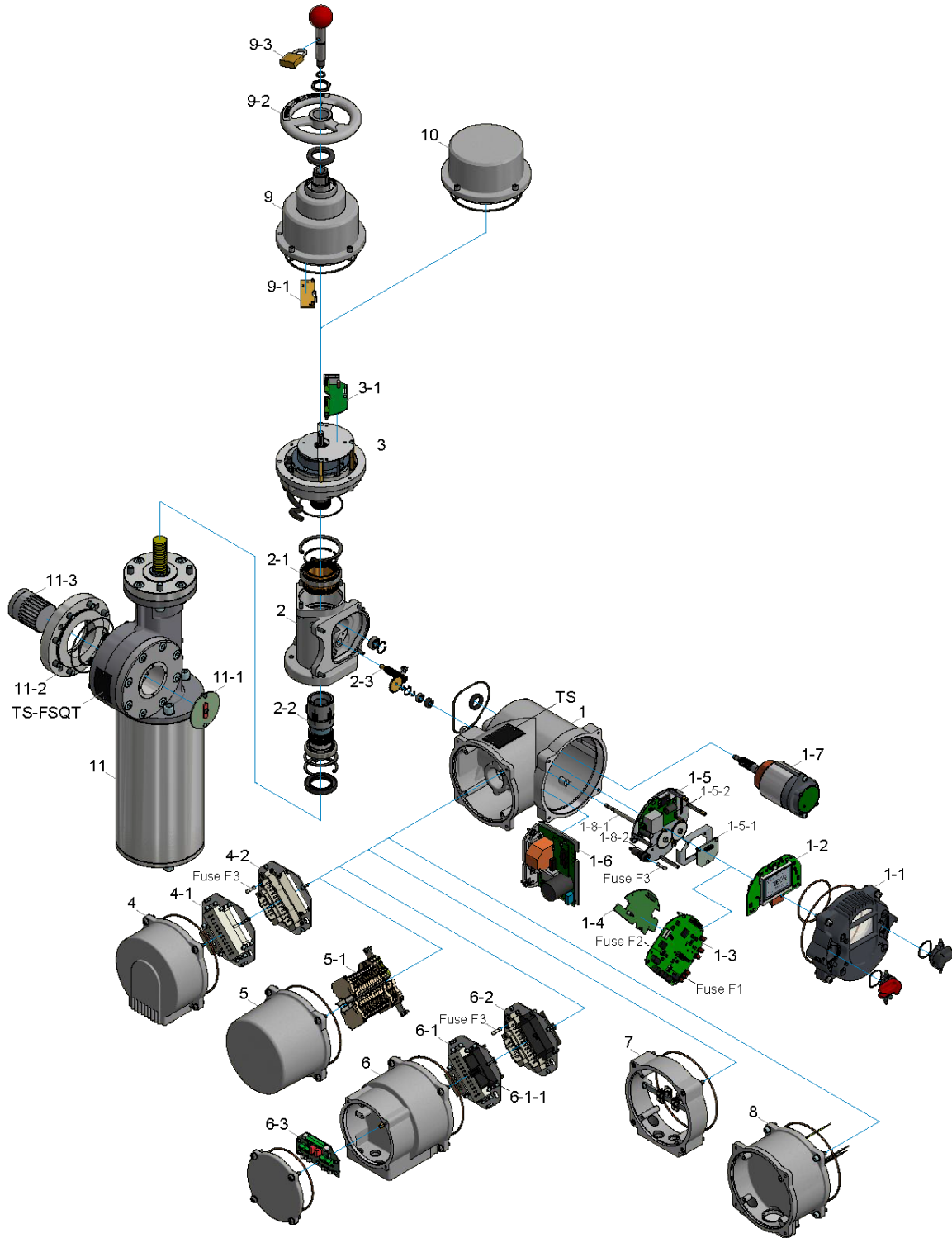
## 12.2 Basic lubricant service interval

See *Operating Instructions for Actuators Type CM, section Lubricant recommendation, lubricant requirements.*

## 13 Training

**NOTE:** Should you experience any problems during installation or in doing the adjustment work on site, please contact SCHIEBEL, Vienna, either by telephone on +43 (1) 66 108 or via internet at [www.schiebel-actuators.com](http://www.schiebel-actuators.com) so as to avoid any possible faulty operation or damage to the actuators. Schiebel recommends only using qualified personnel to do the installation work for Schiebel actuators. On special request by SCHIEBEL customers, training courses can be conducted at SCHIEBEL's plant for the work listed in this operating manual.

## Spare parts ACTUSMART (ex)(r)CM03 FSQT



**CAUTION:** When ordering spare parts, you **must** provide the **serial number** (look type shield or status menu S6). Use only original spare parts supplied by SCHIEBEL. Using other parts will render the warranty void.

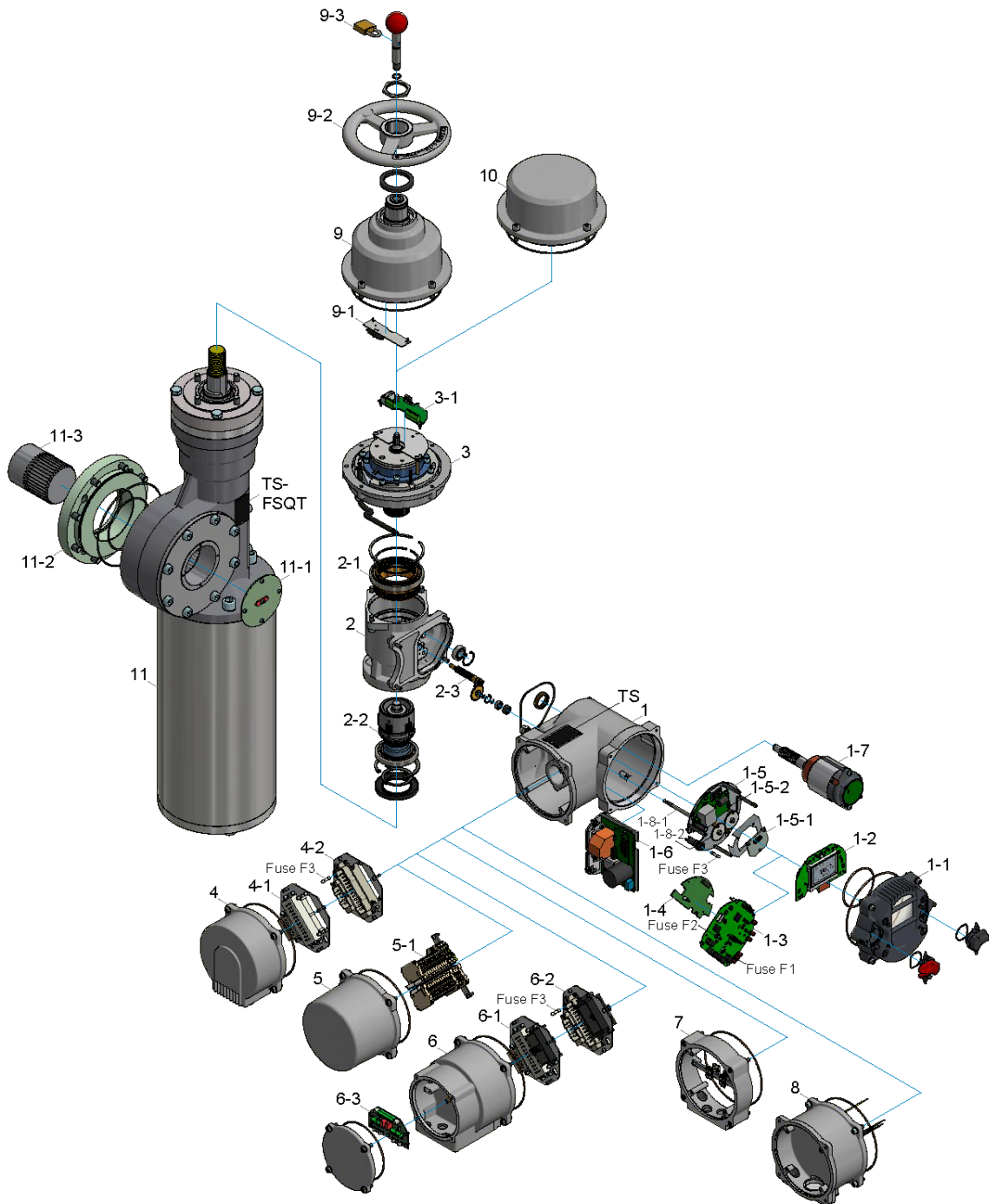


Illustrations may differ from actual spare parts.

Asm.	No.	Description
1		E-case
	1-1	Control unit cover
	1-2	Display circuit board
	1-3	Logic circuit board
	Fuse-F1	Micro fuse 1A
	Fuse-F2	Micro fuse 4A
	1-4	Expansion board (bus, relay)
	1-5	Multiturn sensor assembly
	1-5-1	Multiturn sensor
	1-5-2	24VDC Step-Down Converter
	1-6	BLDC Power Electronics
	Fuse-F3	Fuse 5AT (16AT for 24V actuators with BLDC version 200)
	1-7	Motor
	1-8-1	Sensor shaft
	1-8-2	Gear
2		Mech. case
	2-1	Worm gear
	2-2	Output shaft
	2-3	Helical cut pinion gear
3		Failsafe Brake Assembly
	3-1	Failsafe PCB
4		Plug cover
	4-1	Plug frame customer side (socket)
	4-2	Plug frame actuator side (pins)

Asm.	No.	Description
5		Terminal box cover
	5-1	Terminal block
6		Entire bus plug cover with plugs & circuit board
	6-1	Bus plug frame customer side (socket)
	6-2	Bus plug frame actuator side (pins)
	6-3	Bus connection board
7		Additional ring bus (Ex)
8		400V module
TS		Type plate
9		Handwheel Cover
	9-1	Switch for Manual Mode
	9-2	Handwheel
	9-3	Padlock
10		Failsafe Brake Cover
11		Failsafe Unit
	11-1	Mechanical Position Indicator
	11-2	Output Flange
	11-3	Drive bushing
TS-FSQT		Type plate Failsafe Unit

## Spare parts ACTUSMART (ex)(r)CM06 FSQT



**CAUTION:** When ordering spare parts, you **must** provide the **serial number** (look type shield or status menu S6). Use only original spare parts supplied by SCHIEBEL. Using other parts will render the warranty void.



Illustrations may differ from actual spare parts.

Asm.	No.	Description
1		E-case
	1-1	Control unit cover
	1-2	Display circuit board
	1-3	Logic circuit board
	Fuse-F1	Micro fuse 1A
	Fuse-F2	Micro fuse 4A
	1-4	Expansion board (bus, relay)
	1-5	Multiturn sensor assembly
	1-5-1	Multiturn sensor
	1-5-2	24VDC Step-Down Converter
	1-6	BLDC Power Electronics
	Fuse-F3	Fuse 5AT (16AT for 24V actuators with BLDC version 200)
	1-7	Motor
	1-8-1	Sensor shaft
	1-8-2	Gear
2		Mech. case
	2-1	Worm gear
	2-2	Output shaft
	2-3	Helical cut pinion gear
3		Failsafe Brake Assembly
	3-1	Failsafe PCB
4		Plug cover
	4-1	Plug frame customer side (socket)
	4-2	Plug frame actuator side (pins)

Asm.	No.	Description
5		Terminal box cover
	5-1	Terminal block
6		Entire bus plug cover with plugs & circuit board
	6-1	Bus plug frame customer side (socket)
	6-2	Bus plug frame actuator side (pins)
	6-3	Bus connection board
7		Additional ring bus (Ex)
8		400V module
TS		Type plate
9		Handwheel Cover
	9-1	Switch for Manual Mode
	9-2	Handwheel
	9-3	Padlock
10		Failsafe Brake Cover
11		Failsafe Unit
	11-1	Mechanical Position Indicator
	11-2	Output Flange
	11-3	Drive bushing
TS-FSQT		Type plate Failsafe Unit



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