

Operating Instructions for Linear FailSafe Actuators Type ACTUSAFE CM FS



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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 Linear FailSafe Actuators Type ACTUSAFE CM FS

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*.

Linear Actusafe actuators are designed to operate appropriate valves when a fail-safe functionality is required. Appropriate valves are all kind of valves that require a lineare movement to operate (valves, gate valves, etc.).

In the event of a power failure or if the fail-safe function is triggered deliberately, the linear Actusafe actuator shifts the valve to the fail-safe position, using the built-in energy storage device to do so.



Figure 1: CM FS - Actuator

3 Functional Description of the CM FS Failsafe Drive

In normal operation, the actuator is operated by the 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 in place by an operating current brake (5).

The ball screw converts the rotational movement of the gear unit into linear motion, which, on the one hand, tension the spring (6), which acts as an energy storage device. On the other hand, the linear motion is transmitted to the valve stem (8) via a spring-loaded spindle pin (7).

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 fail-safe direction, the electric motor has to move both the valve and the energy storage device (spring) for the fail-safe stroke.

If the supply for the operating current brake is interrupted (by a power failure, or intentionally to trigger a fail-safe stroke, the actuator will no longer be held, and the energy stored in the spring will be converted into kinetic energy. The actuator starts, forced by the spring, to move the valve in the failsafe position. In this case, the entire gear chain of the actuator with the exception of the worm gear stage will be moved until the end stop of the valve is reached. The spring-loaded spindle pin (7) dampens the stop to protect the valves seat.

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 ready for operation.

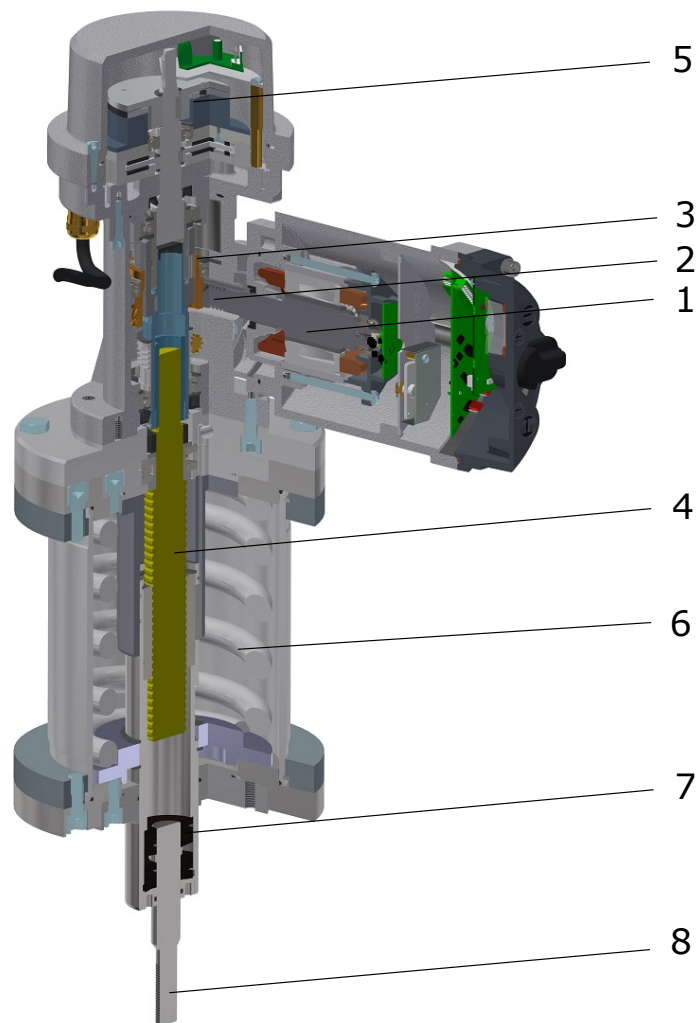


Figure 2: 1... Motor, 2... Worm gear stage, 3... Planetary gear train, 4... Ball screw, 5... Electrical holding brake, 6... Spring, 7... spring-loaded spindle pin, 8... valve stem

3.1 Failsafe-direction

This type of failsafe actuator can be built in a version for „Failsafe: stem move out“ or „Failsafe: stem move in“. A subsequent change of failsafe direction is not possible!

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. If the end limit is set travel dependent the actuator stops at this point. If the end limit is set force 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 force by the tensioned spring.

NOTE: For force 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 force dependent the force is build up by the motor.

NOTE: For force 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 force dependent. The force in end position is build up by the residual spring force. If the end limit should be travel dependent this is only possible by changing the mechanical connection to the valve so the actuator reaches the internal end stop before the end stop of the valve.

CAUTION: The mechanical end stops in the actuator are not designed to move against them 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 CM FS

4.2.1 CM03 FS

ON-OFF & INCHING operation		
CM03 FS 30/5	CM03 FS50/8	CM03 FS 100/12
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	1,0 - 72 RPM
$F_{max} = 8,2 \text{ kN}$	$F_{max} = 19,4 \text{ kN}$	$F_{max} = 16,4 \text{ kN}$
$F_{avg} = 5 \text{ kN}$	$F_{avg} = 8 \text{ kN}$	$F_{avg} = 12 \text{ kN}$
Life time*		
10.000 cycles		

MODULATING operation		
CM03 FS 30/5	CM03 FS 50/8	CM03 FS 100/12
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	1,0 - 36 RPM
$F_{max} = 8,2 \text{ kN}$	$F_{max} = 19,4 \text{ kN}$	$F_{max} = 16,4 \text{ kN}$
$F_{avg} = 5 \text{ kN}$	$F_{avg} = 10 \text{ kN}$	$F_{avg} = 12 \text{ kN}$
Life time*		
1.800.000 starts		

CONTINUOUS MODULATING operation		
CM03 FS 30/5	CM03 FS 50/8	CM03 FS 100/12
S9 - 1.800 c/h according to IEC 60034		
1,0 - 20 RPM	1,0 - 20 RPM	1,0 - 20 RPM
$F_{max} = 8,2 \text{ kN}$	$F_{max} = 19,4 \text{ kN}$	$F_{max} = 16,4 \text{ kN}$
$F_{avg} = 3 \text{ kN}$	$F_{avg} = 7 \text{ kN}$	$F_{avg} = 8 \text{ kN}$
Life time*		
1.800.000 starts		

***ATTENTION: life time is based on proper operation and maintenance according to SCHIEBEL operating manual**

CYCLE = stroke of 40 mm in both directions with at least 30% of nominal force and the ability to accept 100% of nominal force for at least 10% 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 FS

ON-OFF & INCHING operation	
CM06 FS 100/30	CM06 FS 170/25
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
$F_{max} = 22,4$ kN	$F_{max} = 22,4$ kN
$F_{avg} = 15$ kN	$F_{avg} = 15$ kN
Life time*	
10.000 cycles	
MODULATING operation	
CM06 FS 100/30	CM06 FS 170/25
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
$F_{max} = 22,4$ kN	$F_{max} = 22,4$ kN
$F_{avg} = 15$ kN	$F_{avg} = 15$ kN
Life time*	
1.200.000 starts	
CONTINUOUS MODULATING operation	
CM06 FS 100/30	CM06 FS 170/25
S9 - 1.800 c/h according to IEC 60034	
1,0 - 20 RPM	1,0 - 20 RPM
$F_{max} = 22,4$ kN	$F_{max} = 22,4$ kN
$F_{avg} = 10$ kN	$F_{avg} = 10$ kN
Life time*	
1.200.000 starts	

***ATTENTION: life time is based on proper operation and maintenance according to SCHIEBEL operating manual**

CYCLE = stroke of 40 mm in both directions with at least 30% of nominal force and the ability to accept 100% of nominal force for at least 10% 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 = actuator stem to be retracted (move in)
- Counter-clockwise = actuator stem to be extended (move out)

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; Preparations

Check,

- whether valve flange and actuator base match
- if the bore of the coupling piece coincides with the spindle pin and sufficient thread engagement is available

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

General procedure:

- Clean the bare parts on the actuator coated with rust protectant.
- Clean the mounting surface for the fitting thoroughly.
- Lightly grease the valve stem.
- Put the actuator on the valve.
- Pay attention to the centered position and full support surface of the flanges.
- Fasten the actuator with suitable bolts:
 - Minimum strength grade: 8.8 or A2-70
 - Ensure sufficient thread engagement (min. 1xd)
- Tighten bolts to the correct torque, alternating between bolts on opposite sides

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!

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 of Linear Failsafe actuator

NOTE: In general, the stem of actuator is at failsafe position at delivery!

General:

Schiebel CM Failsafe actuators move the stem of valve to the failsafe position in case of failsafe event. Depending on valve has to be closed or opened by force (sealing force is required in Failsafe position) or by travel (actuator shall stop before touching the seat), mounting procedure has to be done different:

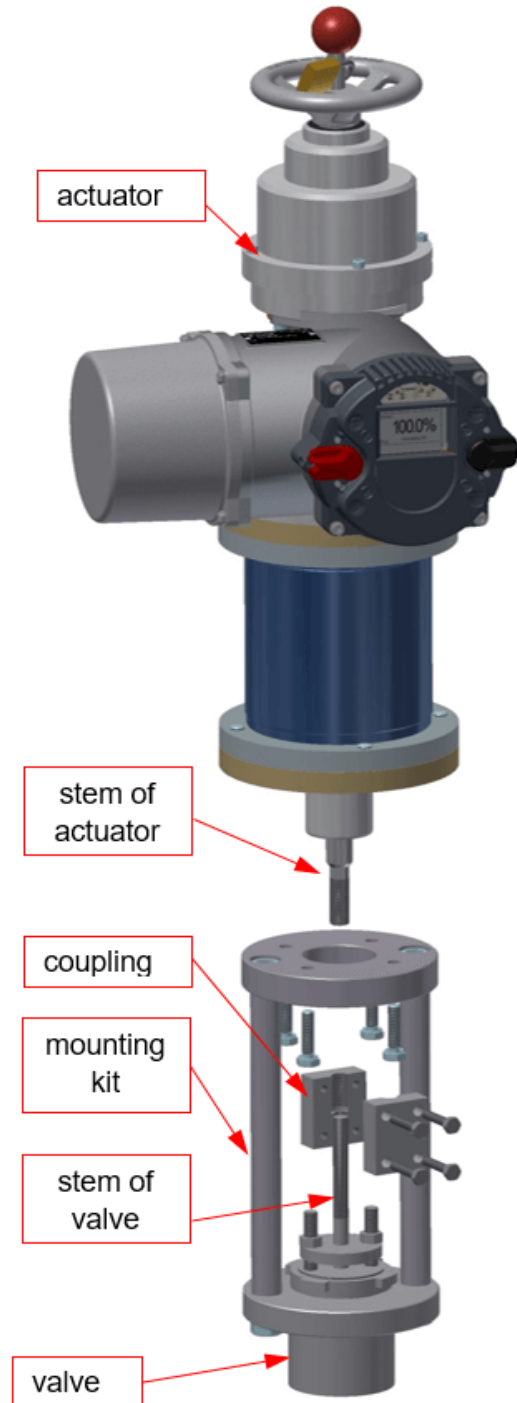


Figure 3: Mounting Linear Failsafe with Linear Adapter

6.2.1 Mounting procedure for valve without required sealing force:

- Connect mounting kit to valve and fix according valve producer specification.
- Be sure stem of valve is exact in desired failsafe end position.
- Be sure stem of actuator is in failsafe position:
actuator must not be electrically connected!
handwheel must not be engaged
(if applicable, refer to section 7.2, page 15, Manual operation)!
- Mount actuator to mounting kit and fix with 4 screws.
- Check distance between end of stem of actuator and end of stem of valve:
allowed range of distance is 2 – 25mm.
- Connect both stems with coupling and note symmetrical engagement of both threads!
- Fix coupling with 4 screws and note both halves of coupling have to be parallel after tighten the screws.

6.2.2 Alternative procedure for valve with required sealing force:

- Connect mounting kit to valve and fix according valve producer specification.
- Be sure stem of valve is exact in desired failsafe end position.
actuator must not be electrically connected!
handwheel must not be engaged
(if applicable, refer to section 7.2, page 15, Manual operation)!
- Mount actuator to mounting kit and fix with 4 screws.
- Check distance between end of stem of actuator and end of stem of valve:
allowed range of distance is 2 – 25mm.
- Move the Actuator electrically or by the handwheel 3-5mm out of the failsafe position.
- Connect both stems with coupling and note symmetrical engagement of both threads!
- Fix coupling with 4 screws and note both halves of coupling have to be parallel after tighten the screws.

6.3 Mounting position of the operating 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

6.4 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 6.1, 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 base actuator			
	In failsafe direction	Counter failsafe direction	nominal [mm]	Revolutions [U]	maximal [mm]	Revolutions [U]
CM03 FS 30/5	8	16	30	6	35	7
CM03 FS 50/8	16	32	50	10	55	11
CM03 FS 100/12	16	32	100	20	105	21
CM06 FS 100/30	24	64	100	25	105	26,25
CM06 FS 170/25	24	64	170	42,5	180	45
CM12 FS 120/45	40	125	120	30	130	32,5

NOTE: When commissioning and each time after dismounting 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: By activating the manual drive the failsafe function is disabled.



NOTE: By activating the manual drive the electrical function of the drive is disabled. In normal operation, the hand wheel (item (9) on figure 4, 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.



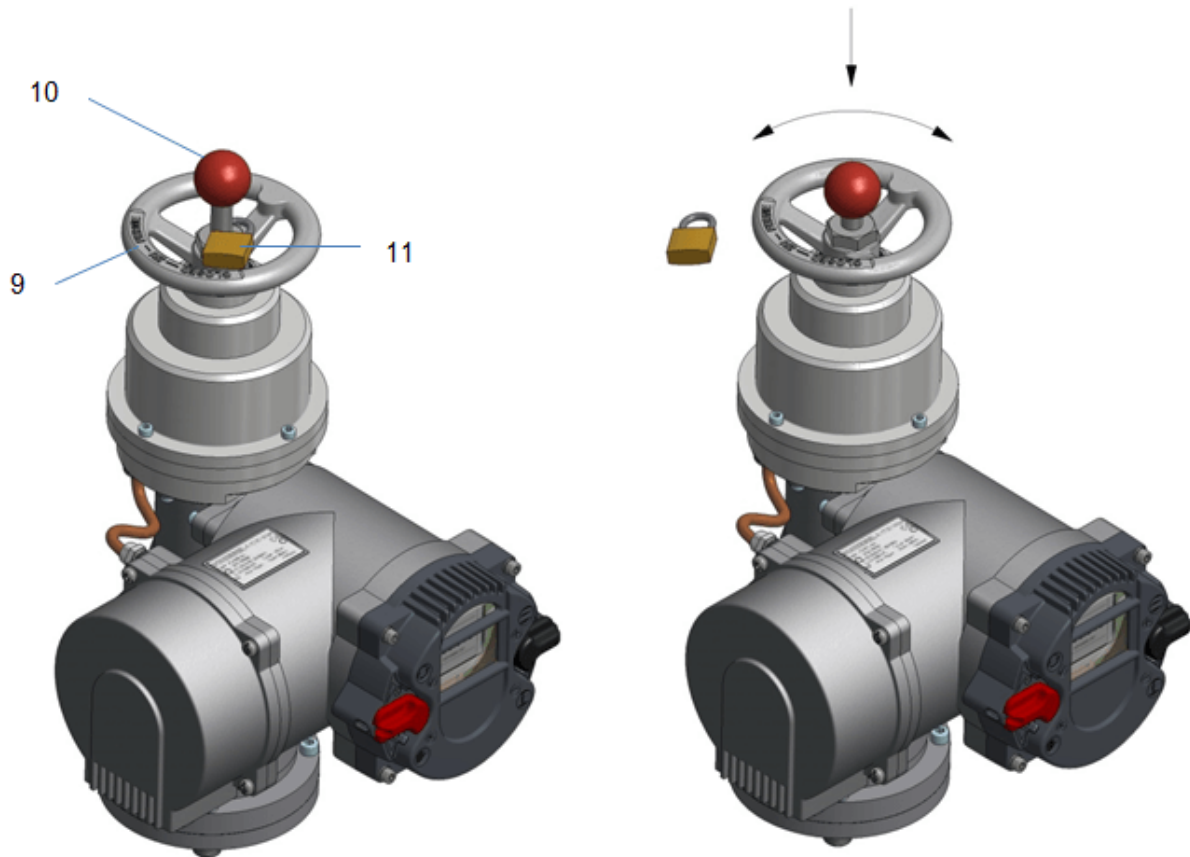


Figure 4: 9... Handwheel, 10... shift rod, 11... padlock

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 operation“.

7.2.2 Deactivate manual operation

To exit the manual mode and enable the actuator again for the automatic mode must:

- the actuator be driven in the failsafe position by handwheel.
- the shift rod be pulled up to the stop of the actuator.
- the shift rod again secured with the padlock.

7.2.3 Direction of rotation handwheel for closing the valve, Failsafe „move out“

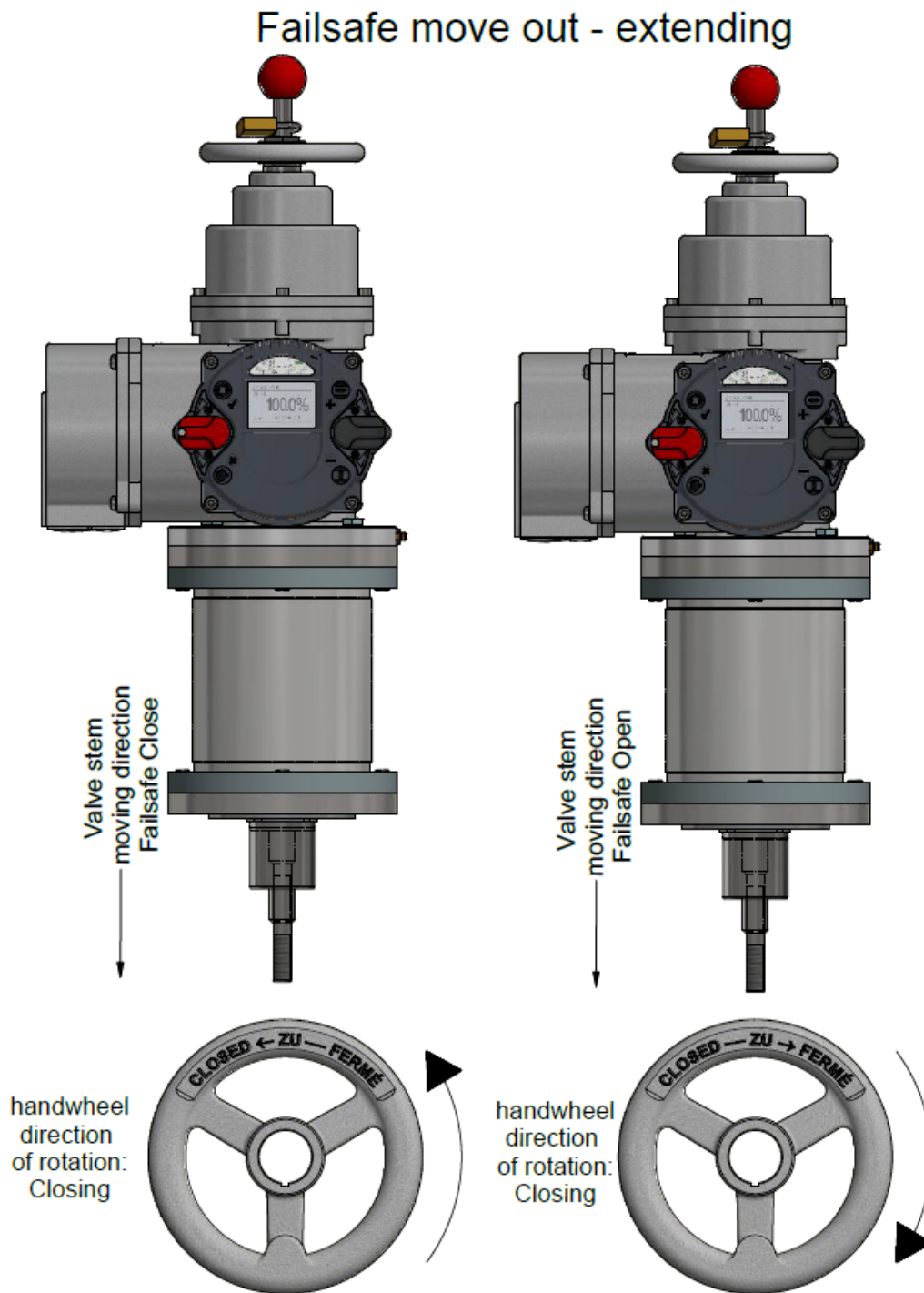


Figure 5: Roation of direction for Failsafe direction „move out“.

7.2.4 Direction of rotation handwheel for closing the valve, Failsafe „move in“

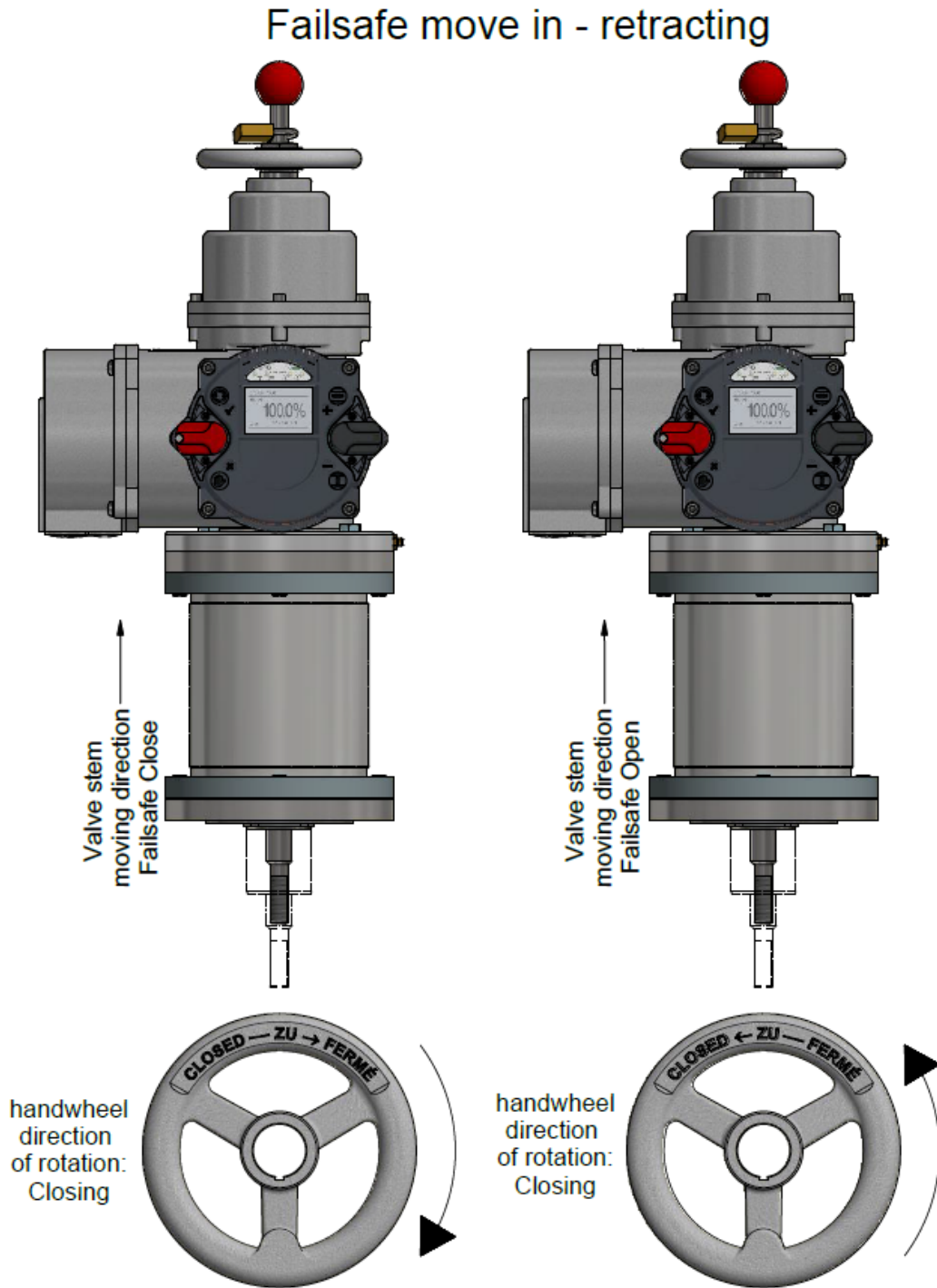


Figure 6: Rotation of direction for Failsafe direction „move in“.

7.2.5 Required force on the handwheel

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

Type	Max. handwheel torque [Nm]		Handwheel diameter [mm]
	In failsafe direction	Counter failsafe direction	
CM03 FS 30/5	4	8	140
CM03 FS 50/8	8	16	140
CM03 FS 100/12	8	16	140
CM06 FS 100/30	12	32	200
CM06 FS 170/25	12	32	200
CM12 FS 120/45	20	64	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 maximal 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 settings, preparation.*

7.4 End limit setting

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

7.5 Adjusting of Failsafe speed

General:

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

After mounting the actuator to valve and test run, failsafe speed can be increased if necessary.

CAUTION: Valve or piping may be damaged due to high actuating speeds!



CAUTION

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 fail-safe position! Any powering up must be ruled out during maintenance!



WARNING

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".



WARNING

7.5.1 Setting procedure

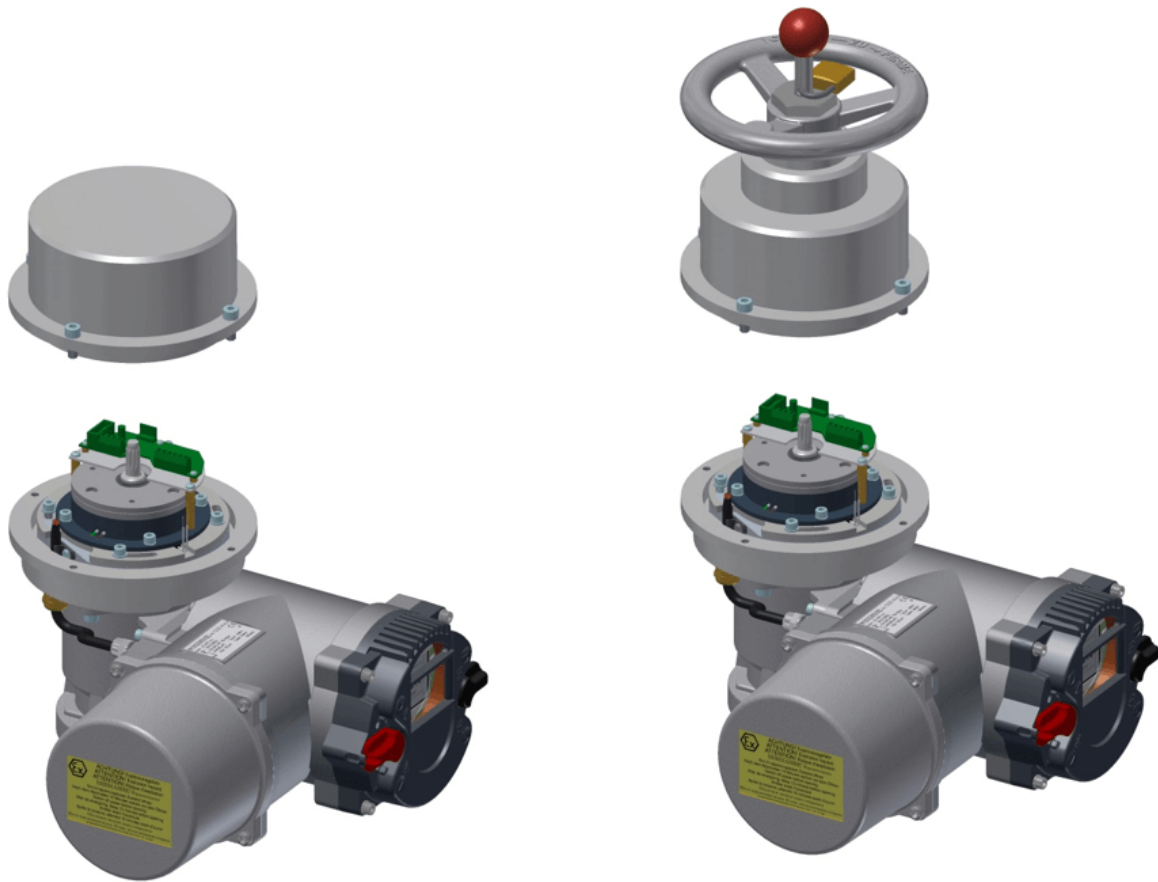


Figure 7: Cover removing

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.



CAUTION

1. Remove cover according picture 7, page 20
2. Loosen but do not remove 4pcs of screws according picture 8, page 21
3. Insert 3mm allen key into radial borehole of flange.
4. Turn flange by use of allen key in direction according picture 8, page 21
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 be aware of correct position of O-ring sealing
7. Retest actuator to check for correct failsafe speed

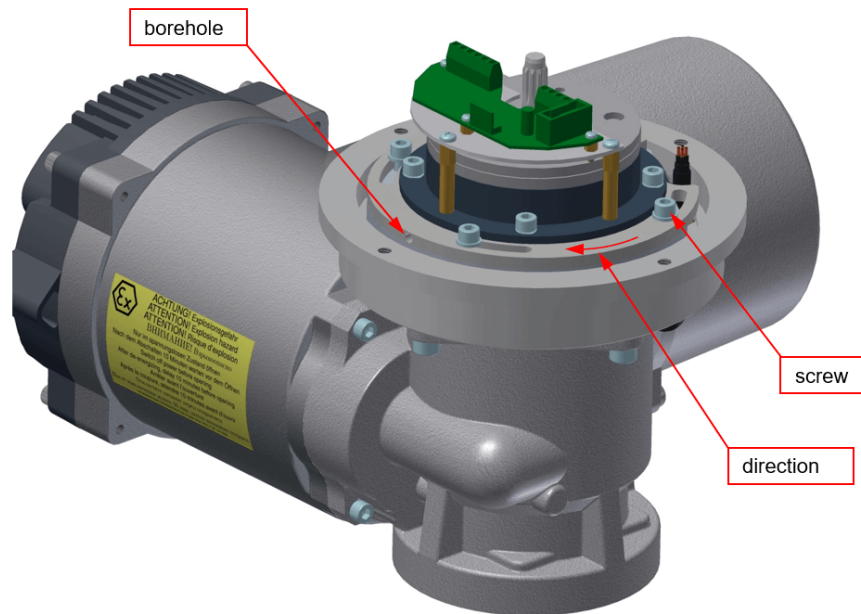


Figure 8: Adjusting speed

7.6 Final works

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

8 Control unit

See *Operating Instructions for ACTUSMART Control Units*.

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 9) 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/mm²).

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 9), gap for brake shaft), the device must be replaced!



CAUTION

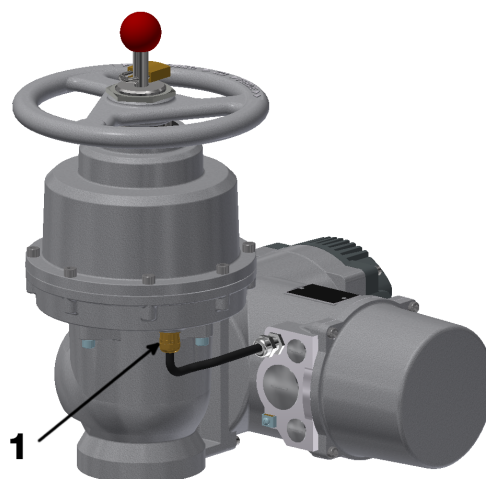


Figure 9: 1...Cable gland on the failsafe assembly of the failsafe base actuator

10 Technical data failsafe brake

10.1 CM03 FS

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

10.2 CM06 FS

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

10.3 CM12 FS

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 9) 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/mm²) 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* lubricant recommendations.

12.1 Lubricant points FS

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.

After that the grease fittings should be installed .

At initial assembly or upon complete disassembly of the spindle nut is filled, all gears and bearings pocketed filling. 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
	Bearing	Intermediate gear
	[cm ³]	[cm ³]
CM03 FS 30/5	4	-
CM03 FS 50/8	5	-
CM03 FS 100/12	8	-
CM06 FS 100/30	12	35
CM06 FS 170/25	15	35



Figure 10: Lubrication points

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

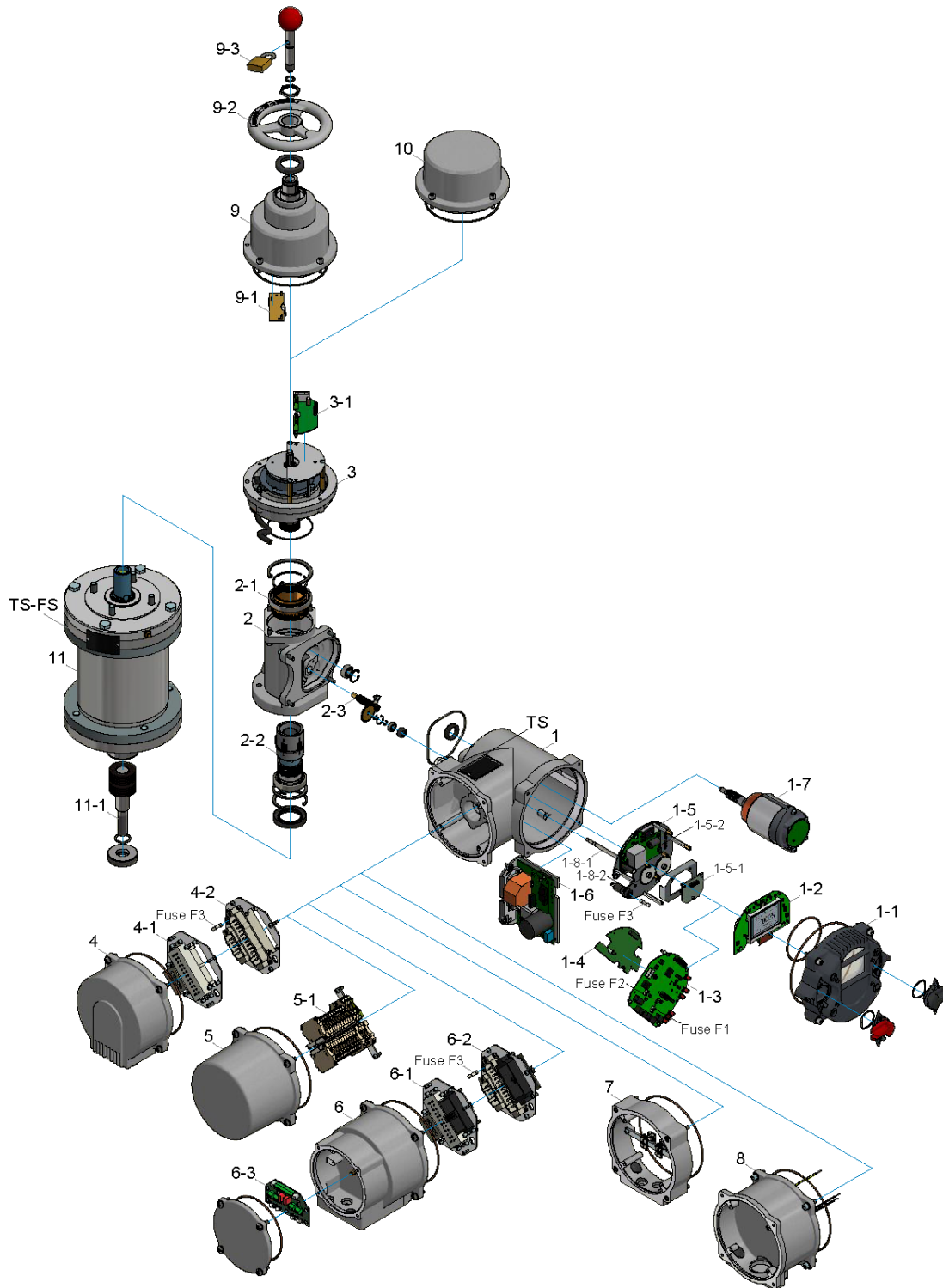
12.2 Basic lubricant service interval

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

13 Training

NOTE: If you experience problems during installation or upon adjustments on site, please contact SCHIEBEL, Vienna at +43 (1) 66 108 or via the Internet at www.schiebel-actuators.com to prevent any operational errors or damage to the actuators. Schiebel recommends engaging only qualified personnel for installation of Schiebel actuators. Upon special request of the client, SCHIEBEL can conduct training on the activities listed in this operating manual at the factory of SCHIEBEL.

Spare parts ACTUSMART (ex)(r)CM03 FS



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.

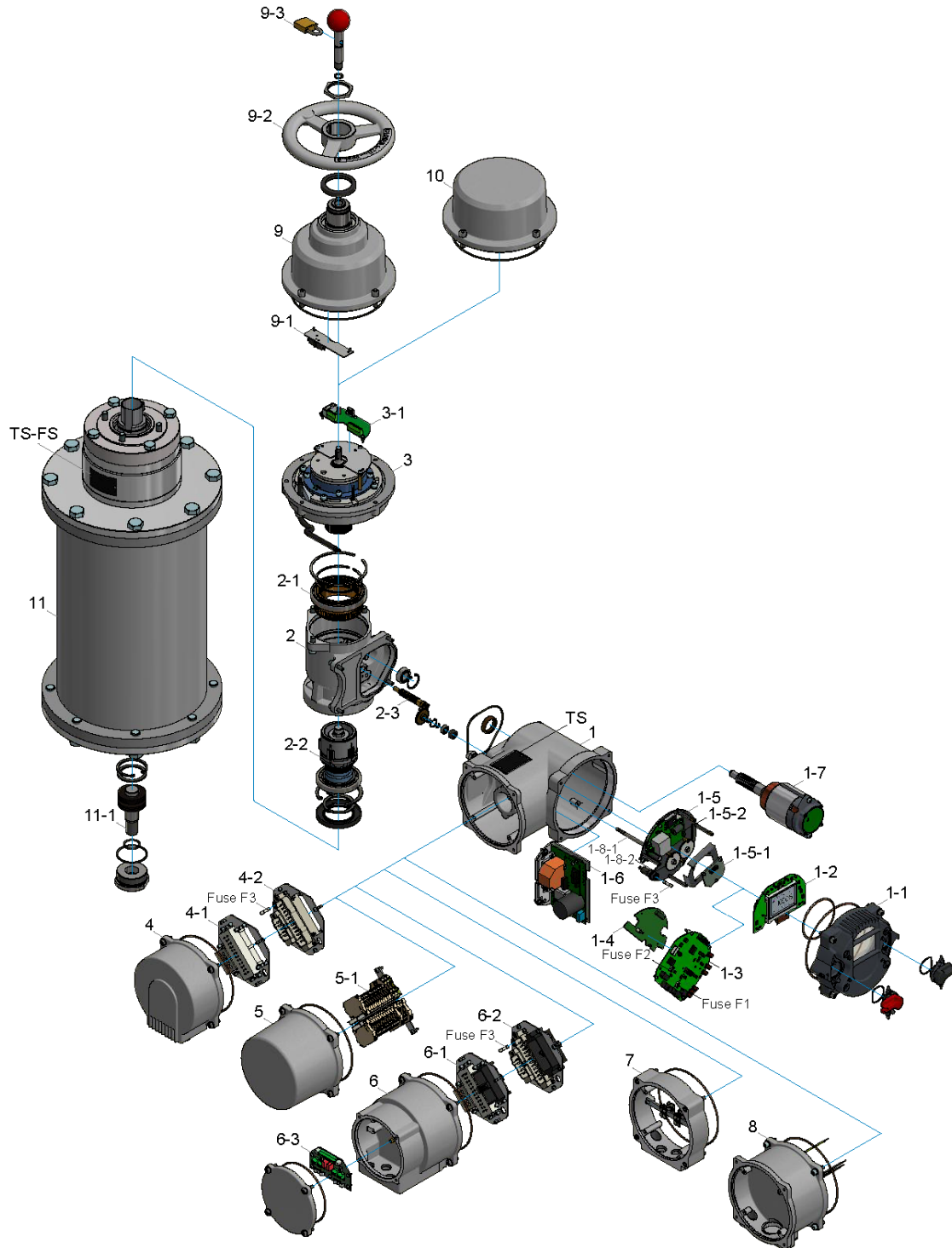


Illustrations may differ from actual spare parts.

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	Spindle Pin
TS-FS		Type plate Failsafe Unit

Spare parts ACTUSMART (ex)(r)CM06 FS



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	Spindle Pin
TS-FS		Type plate Failsafe Unit

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