

EUBA Antriebstechnik Operating instructions for actuator type: -B4- / -B4-W-

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1. Important Note

Please mind in any case all security and warning instruction specified in this publication.



Electrical hazard

Possible consequences: Death or serious injury.



Imminent danger

Possible consequences: Death or serious injury.



Dangerous situation

Possible consequences: Slight or minor injury.



Harmful situation

Possible consequences: Damage to the unit and the environment.

A requirement of fault-free operation and fulfilment of any rights to claim under guarantee is that the information in the operating instructions is adhered to.

The operating manuals contain important advises about servicing; therefore keep it close to the actuator.

1.1 Obligation and liability

This operating manual, especially the safety instructions, are to be observed by all persons who work with or service the actuators. In addition to it the valid national / regional safety rules for each operating site and case are to be adhered to.

The actuators are built according to established safety rules and state of engineering. Nevertheless severe or fatal injuries, impairments of the unit and the environment can happen due to inappropriate application. Therefore the running of the actuator is permitted only:

if it meets the safety requirements, is in a flawless condition and for appropriate application.

Malfunctions which effect the safety are to be eliminated immediately.

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to 1.1

Basically our "general terms of sale and delivery" are valid.

Claims for guaranty and liability are excluded, if one or several of the following reasons can be traced to:

**inappropriate application,
inappropriate mounting, start-up and maintenance of the actuators,
running of the actuators with defect safety appliances,
non-observance of the operating instructions,
unauthorized changes to the actuators,
changes of actuating conditions (e.g. power and speed),
inadequate control of wear-out parts and
unknown influences or force majeure.**

2. Security instructions

The following security instructions are related to the use of the actuators.

Please mind additional security instructions for motor and gear box in their corresponding operation manuals and also the supplementary security instructions in the individual chapters of this manual.

Mounting, connection, start-up, maintenance and repair only by trained personnel observing:

these instructions,
the warning and information signs on the motor / geared motor,
all other project planning documents, operating instructions and wiring diagrams appertaining to the drive
the specific regulations and requirements for the system and
currently valid national / regional regulations.

These actuators are intended for industrial systems. They comply with the applicable standards and regulations.

Technical data and information about the permitted conditions where the actuator is used can be found on the name plate and in these operating instructions.

It is essential for this specified information to be observed!



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3. Actuator layout

3.1 Basic layout

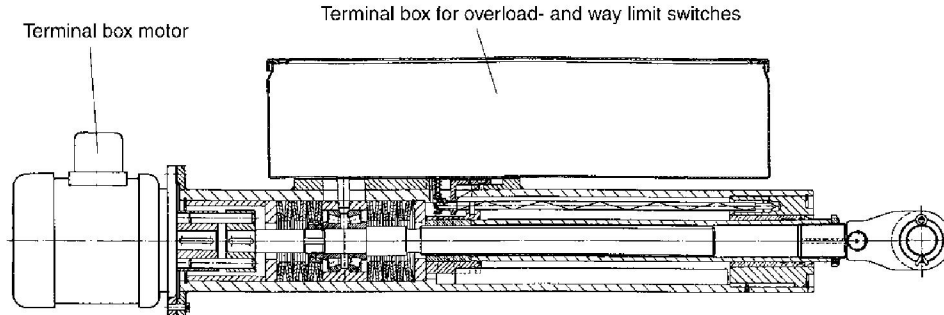


Image 1

The EUBA type –B4-W- is an electro mechanical actuator with an acme thread spindle. The spindle is protected against environmental conditions by a push rod and is internally protected against twisting. The connection to an existing unit is done by a yoke end and bolt. All motors are DIN IEC norm-motors. All switches are easy accessible due to external switch boxes.

3.2 Type of protection

On request, EUBA actuators can be delivered with a type of protection from IP-54 to IP-67.
Standard type of protection: **IP-55**

3.3 Designation of actuator type, name plate of the actuator

B4 Actuator type
W Actuator with way limit switches –WS ...-

The name plate of the actuator can be found on the casing. In addition, the actuator number is driven into the casing.



Type = type of actuator
Year = date of construction
F = force pull in daN
F = force push in daN
No = **fabrication no.**
s = stroke in mm
v = velocity in mm/s.

Image 2

3.4 Designation of actuator type, name plate of the motor



The specification on the name plate of the motors have to be met in any case.
Please see operating instructions of the motor manufacturer.

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4. Mechanical Assembly



Please mind the security instructions on page 4.

4.1 Transport

For loading / unloading as well as mounting it is permitted only to use the below mentioned points of contact. As load support straps should be designated. The maximum permissible sloping position is 30°. Only after a safe mounting of the EUBA-actuator to the existing unit it is permitted to release the connection. Please take the single- / total weights from the sketch drawing. In individual cases the push rod is secured for transport.

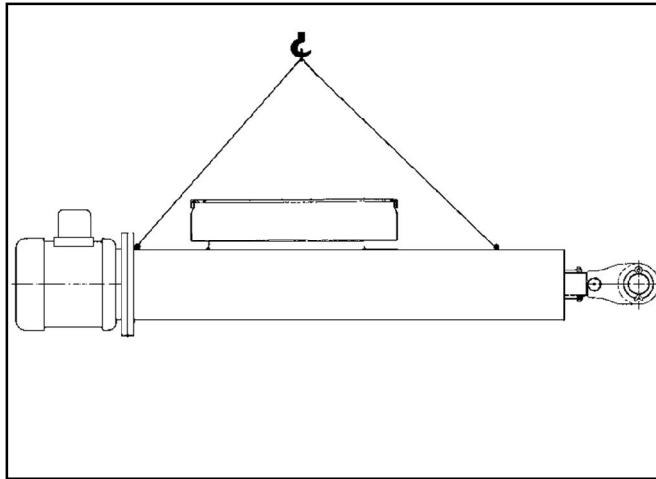


Image 3

4.2 Assembly

Before start-up of the actuator, please mind:

- The EUBA actuator is equipped with a grease lubrication (see point 7). Please mind that no grease will flow out into the switchbox of the actuator through neither the opening of the overload-switches nor the opening of the way-limit-switches during the installation.
- **A horizontal installation of the actuator through which the switchbox is pointing downwards has to be avoided!**
- It is indispensable that the extending push rod is aligned properly with the fastening point.
- Lateral stress on the push rod has to be avoided.
- The actuator can be extended manually by turning the motor fan, **but only in a current free state**, therefore remove the protection cap of the motor.
- It is possible to hinge the actuator into a steel construction by the welded-on pivot pin or to mount the actuator to a construction by using the EUBA-brackets, type -B4-.



Image 4: brackets -B4-

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5. Electrical installation



Please consider the safety regulations on page 4.

A start-up of the actuators is permitted only after a complete electrical connection. For safety of the actuator it will be delivered with a slightly extended push rod so that a change of the motor rotation is possible.

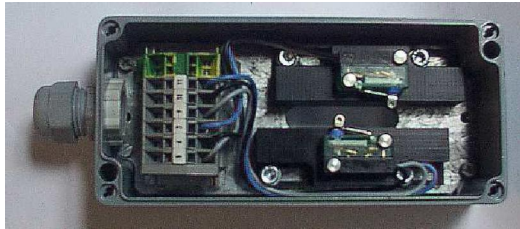
5.1 Motor



Please mind the data on the name plate of the motor manufacturer and the circuit diagram inside of the motor terminal box.

5.2 Actuator

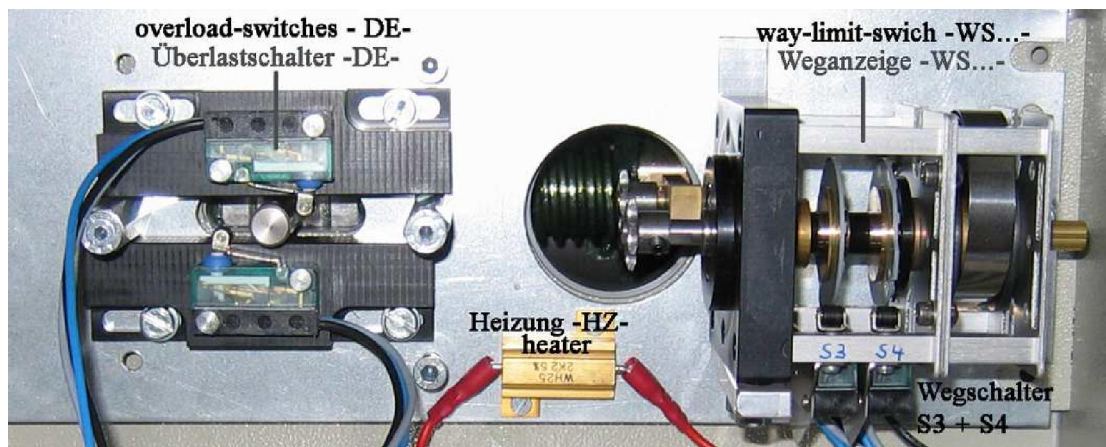
Terminal box for overload switches, actuators type –B4–



Overload- resp. Torque switches (DE) S1 + S2
(Micro switch Pos. 209)
S1 = switching off for extending push rod
S2 = switching off for retracting push rod

Image 5

Terminal box for overload- and way-limit switches (for actuators type –B4-W–)



Way limit switches
(WS) S3 + S4 (Micro switch Pos. 309)
S3 + S4 = two-way switches

Image 6

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6. Operating Instructions



Please consider the safety regulations on page 4.

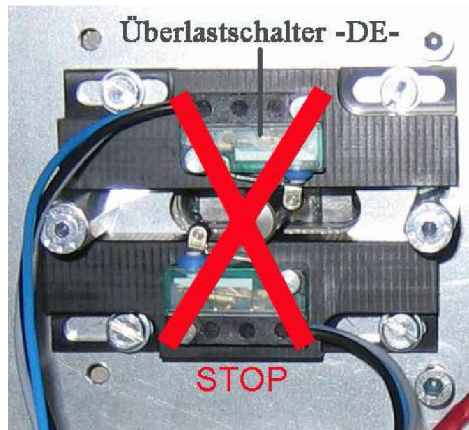
1. Keep the open connection boxes dry and dust free.
2. Compare the main voltage with the voltage of the motor.
3. Observe the phase sequence and direction of rotation.
4. Before switching-on, the protection cap must be fitted to the motor again, to avoid the risk of accident.
5. Connect overload switches S1 + S2 (Torque switches) according to the attached circuit diagram.
Switch S1 = switching off for extending push rod
Switch S2 = switching off for retracting push rod
6. Stroke indicator switches S3 – S... have to be connected according to point 6.2 and to a special circuit diagram.
7. Close the connection box. Examine gaskets and washers.
8. Screw up the conduit fitting and secure it from dust and wetness.
9. Adjust the thermal overcurrent release (bimetal) to the motor charging rate.
10. For first operation, the actuator should be switched on for a short time only and please mind point 7.
11. Compare the direction of rotation with the push rod movement.
Example: When switch S1 is actuated, it's impossible to extend the push rod.

6.1 Setup of the overload switches



The EUBA-actuator, type –B4/ B4W- is factory-adjusted to the stipulated force between 500 daN and 2500 daN (kp) before leaving our factory.

It is **NOT-permitted to change** the setting of the **overload switches** because otherwise the actuator is damaged.



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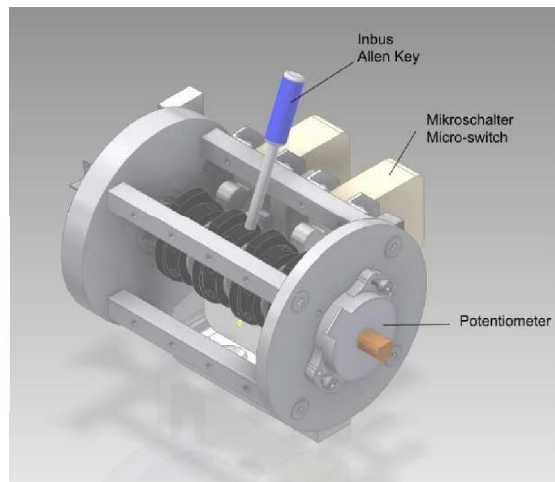
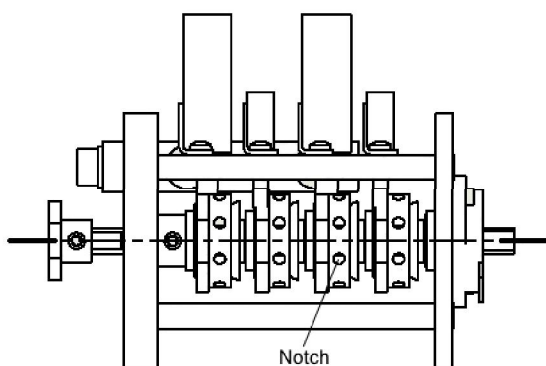
Operating instructions for actuator type: -B4- / -B4-W-

6.2 EUBA way-limit-switches –WS ...-

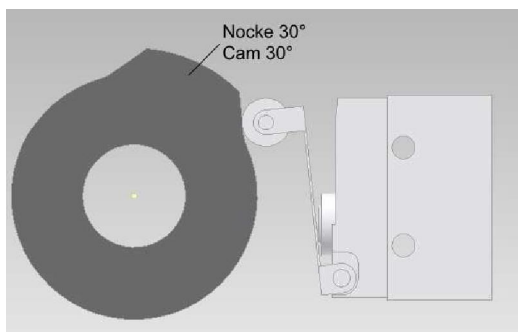
Designation	EUBA-way limit switch
Type	WS 2 / WS 4 / WS 6 (Order dependent)
Order No.	EL-WS2 / EL-WS4 / EL-WS6

Input ratio:	1:1
Number of cam disks:	2 / 4 / 6
Adjustable cam disk:	Cam 30° (cam height)
Micro-switches:	EUBA – Misc. switches possible
Including:	Allen key 2.5 Alternatively: Torx 10 screwdriver

Image:



Adjusting instructions for the cam disks:



Please use the included Allen key 2.5 respectively a Torx 10 screwdriver to adjust the cam disk. Insert the screwdriver into one of the notches of the cam disk and adjust the cam to the desired position.

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6.3 Application of Potentiometer (1 k Ω) optional – only for type –B4W-

- | | |
|---|---|
| <ul style="list-style-type: none"> • Widerstandswerte
Resistance • Hohe Auflösung
Excellent linearity | <p>1 kΩ / andere Werte optional erhältlich
 1 kΩ / different types available on request</p> <p>0,1...0,02%</p> |
|---|---|

Bestelltext	Order no.	EUBA – Potentiometer 1k Ω
-------------	-----------	----------------------------------

Drehwinkel mech. / elektr.	Rotation angle mech. / electr.	0...360° / 340°
Widerstandstoleranz	Resistance tolerance	± 20%
Linearität	Linearity	± 2%
Lebensdauer	Rotation life	2.000.000 Umdr. / Turns
Schleiferstrom	Slider current	1 mA
Temperaturkoeffizient	Temperature coefficient	400 ppm / °C
Arbeitstemperaturbereich	Working temperature	-50 °C -- +105 °C
Isolationswiderstand	Insulating resistance	500 M Ω
Spannungsfestigkeit	Dielectric strength	500 V AC

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7. Inspection und maintenance

7.1 Maintenance instruction :

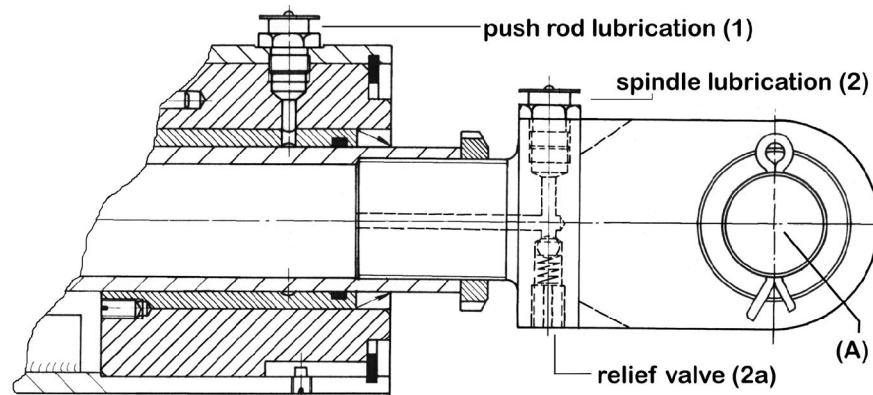


Image 9

EUBA- actuators need a minimum maintenance.
It's limited to a regular control of the push rod **(1)** and spindle-, spindle-nut lubrication **(2)** only. The excess pressure valve **(2a)** prevents a super fattening.
All inside parts as ball-, tapered roller-bearings, pressure- or cup-springs are "Long-Life" lubricated.
Relubrication has to be done after 20.000 working hours or every other 3 years.

7.2 Lubrication instruction

Push rod lubrication

For relubrication please use the flat lubrication nipple M1 –DIN 3404 so that you get a light lubrication film on the push rod surface always.
In exception the actuator can have an automatic lubricant transmitter or central lubrication with less impulse time.

Spindle-, spindle-nut-lubrication with grease excess pressure valve

At work the EUBA-actuators have a normal first fill quantity of grease (see table 1). A relubrication should be done with the same grease (see table 2), but a lithium saponifiable grease without MOS 2 – additions (Symbol "KP / 2N") can be used also.

The best time for a relubrication fort his actuator types is after about 25.000 traversed strokes, but latest all 6 month. Extend the push rod approx. 50 mm before starting the lubrication process. For refilling quantities see table 1.

Table 1: Grease quantity in gram

TYPE	First fillings acc. To (2)		Refilling acc. to (2) for stroke up to mm						First filling Acc. to (1)
	for 0 – stroke	Additional 100 mm stroke	250	500	750	1000	1250	1500	
B4 / B4-W	60	20	80	80	100	100	-	-	5

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to 7.2

In case of difficult site conditions such as damp, dust laden and aggressive surroundings, high or low temperature as well as a not passing of the complete stroke, refillings are necessary within a shorter period of time. The installed grease excess pressure valve **(2a)** prevents a super fattening of the spindle-, spindle-nut-area.

Table 2: Analyse data for BERUPLEX LI-EP 2

Thickener of oil		Lithium complex	
NLGI- Grade	DIN 51818		2
Base oil vis 40 °C/100 °C	DIN 51562	mm ² / s	170 / 14
Dropping point min	IP 396	°C	>240
Walk - Penetration	DIN-ISO 2137	1 / 10 mm	265 - 295
Oil seperation (18 h/ 40°C)	DIN 51817	%	0,8
Temperature range		°C	-30 / +150
Symbol	DIN 51825		KP 2N - 30
Colour			Green

Alternative grease:

Shell Alvania EP (LF) 1 – Lithium-12-Hydroxystearat

ARAL Aralub HL2 or HLP 2 – Lithium

Castrol Spheerol EPL - Lithium

In case you want to store the actuator for a certain period of time please ask for our long-term preservation (E-20).

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8. Operation and Service

Malfunction	Possible cause	Elimination
actuator runs overload switches pos. 45 doesn't shut off	motor runs in wrong sense of rotation mistake of overload-switch connections "forward" and "backward"	Change 2 phases motor feeder resp. change connection of overload-switch pos. 45
Motor doesn't run	Missing motor voltage	Examine fuse
	Missing control voltage	Examine reversing contractor Examine motor and pilot wire
Motor starts up but disconnects immediately	Overload switch pos. 45 disconnects Load too large	false design of actuator new determination of forces, consider acceleration due to enhancement of force please contact supplier
Motor starting with continuous switching on and off	Starting torque too large Low-powered actuator Overload switches pos. 45 switches continuously	better design of actuator abolish permanent contact move overload switches pos. 45 into holding circuit of contactor adjust overload switches only after contact with supplier (guarantee loss)
actuator seizes in endpoint position, locking of spindle pos. 8 and spindle nut pos. 21	Overload-switches pos. 45 are not connected resp. mistake of overload switch connections "forward" and "backward"	connect overload switches pos. 45 change connections of overload-switch replace overload-switches pos. 45
actuator locks, motor disconnects with bi-metal and not with overload switch pos. 45	defect reversing contractor defect overload-switch pos. 45 defect spindle bearing pos. 10	exchange contractor exchange overload-switch pos. 45 exchange bearing pos. 10
Motor runs, push rod pos. 19 doesn't move "in" and "out"	defect coupling pos. 33 defect spindle nut pos. 21	dismount motor, exchange adjusting spring on engine shaft or spindle.
push rod pos. 19 chatters when moving "in" or "out"	not enough lubrication, worn out bushing guide pos. 26 defect coupling pos. 33	please relubricate, exchange bushing guide pos. 26, O-ring pos. 72 exchange coupling pos. 33
actuator makes loud noises during running	not enough lubrication defect spindle bearing pos. 10 out of true push rod pos. 19 due to counter fixing	please relubricate, exchange bearing pos. 10 line out push rod pos.19 with counterpart
push rod can be moved in an axial direction by hand	worn out spindle nut pos .21, spindle nut pulled out of push rod pos. 19 defect bearing pos. 10 loose shaft nut pos. 11	exchange spindle nut pos. 21, fix spindle nut with push rod exchange bearing pos. 10 tighten shaft nut pos. 11
actuator doesn't move into end position	twisted push rod pos. 19	exchange push rod pos. 19

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9. Spare part list

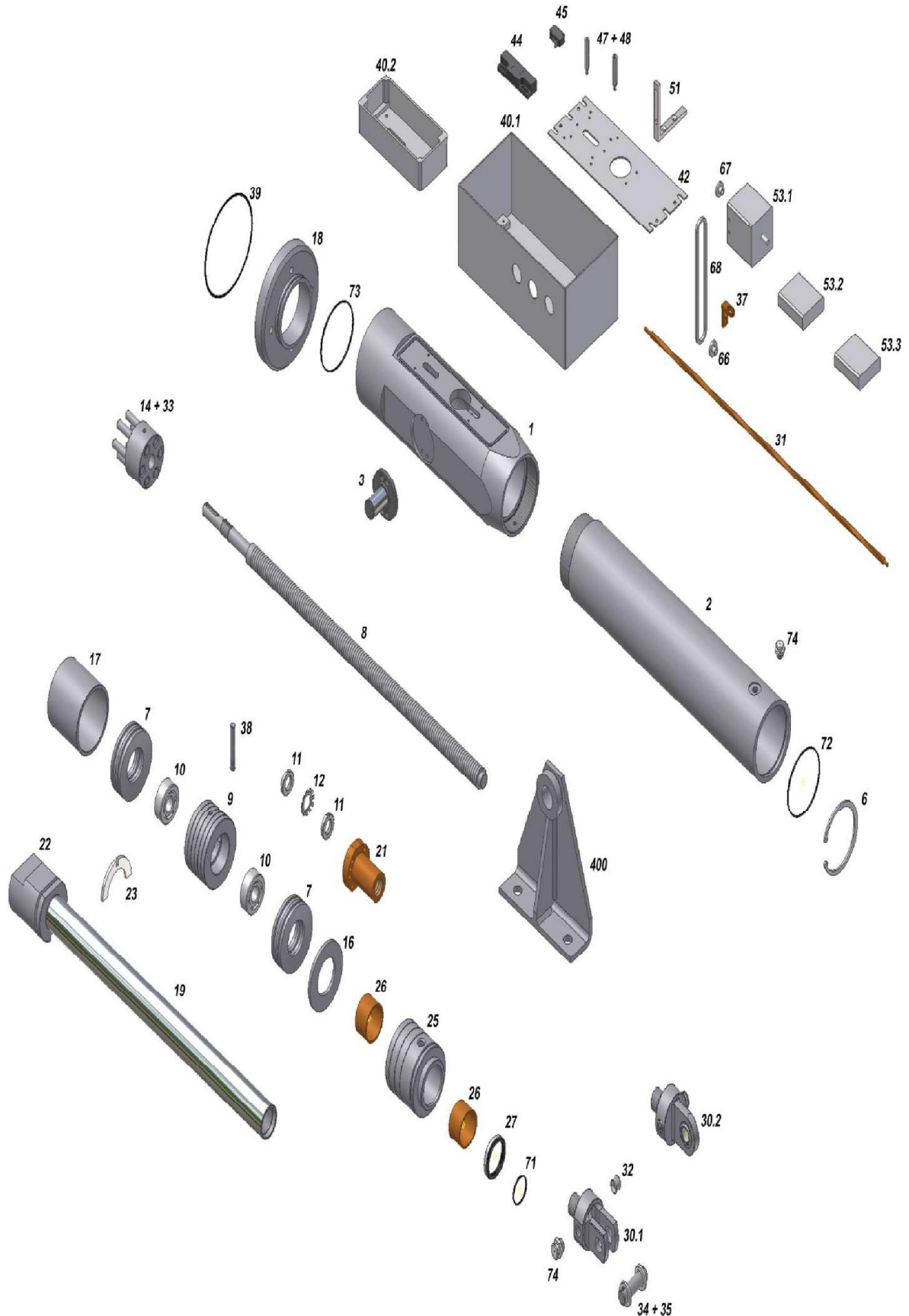
9.1 Spare part list –B4W-

<u>Objekt no.</u>	<u>Quantity</u>	<u>Bezeichnung</u>	<u>Description</u>
1	1	Überlastgehäuse	Overload housing
2	1	Gehäuserohr	Rod housing
3	2	Drehzapfen	Turning pin
6	1	Sicherungsring	Lock ring
7	Satz	Druckfeder / Tellerfeder	Cup spring
8	1	Spindel	Acme thread spindle
9	1	Lageraufnahme	Bearing housing
10*	2	Kegelrollenlager	Tapered roller bearing
11*	2	Nutmutter	Shaft nut
12*	1	Sicherungsblech	Safety sheet
14 + 33	2	Kupplung komplett	Coupling
16	2	Druckring	Thrust ring
17	1	Distanzhülse	Spacer sleeve
18	1	Flansch	Flange
19	1	Schubrohr	Push rod
21*	1	Flanschmutter	Acme spindle nut
22	1	Schubrohrkopf	Push rod head
23*	1	Drehstabführung	Torsion rod guide
25	1	Schubrohführung	Push rod guide
26*	2	Führungsbuchse	Bushing guide
27*	1	Abstreifer	Scraper
30.1	1	Gabelkopf	Yoke end
30.2	1	Gelenkauge mit Lager	Shackle toggle joint
31	1	Drehstab	Torsion rod
32	1	Überdrucksicherung	Pressure safety
34 + 35	1	Gabelkopfbolzen mit Scheiben	Yoke end bolt + washer
37	1	Winkel für Drehstab	Angle for torsion rod
38	1	Schaltbolzen	Switching piece
39*	1	O-Ring hinterer Flansch	O-Ring rear flange
40.1	1	Weg- Schaltkasten komplett (WS..)	WS-Switch box complete
40.2	1	Überlastschaltkasten (nur –DE-)	Overload switch box complete (-DE-)
42	1	Befestigungsplatte	Mounting board
44	2	Mikroschalterplatte	Micro end switch board
45*	Satz	Mikroschalter 1-/ 2-polig	Micro end switches 1-/ 2-polar
47+ 48	2	Abstandsbolzen mit Schiene	Distance bolt + rail
51	1	Winkel für Weganzeige	Angle for way limit switch
53.1	1	Weganzeige –WS...-	Way limit switch –WS...-
53.2	1	Potentiometer	Potentiometer
53.3	1	Stromschnittstelle (4...20 mA)	Electronic position transmitter (4/20 mA)
66	1	Kettenrad	Roller chain sprocket
67	1	Kettenrad	Roller chain sprocket
68*	1	Rollenkette	Roller chain
71*	1	O-Ring Gabelkopf	O-Ring yoke end
72*	1	O-Ring Führungsbuchse	O-Ring bushing guide
73*	1	O-Ring vorderer Flansch	O-Ring front flange
74*	2	Schmiernippel	Flat grease nipple
400	2	Stehlager	Brackets

Die mit * gekennzeichneten Teile sind **VERSCHLEISSTEILE** !

“*“ => wear out parts !

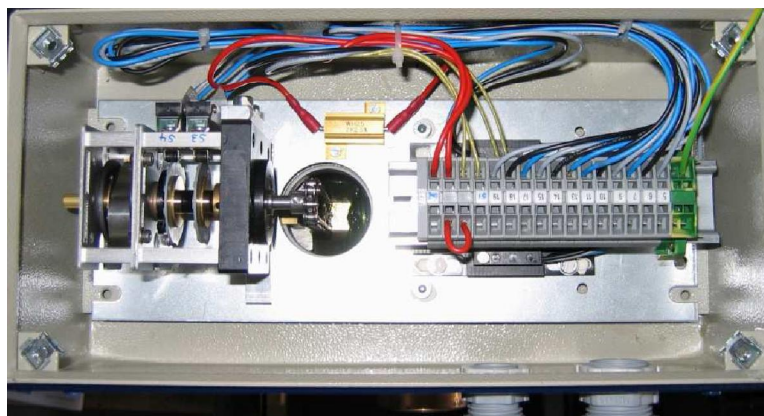
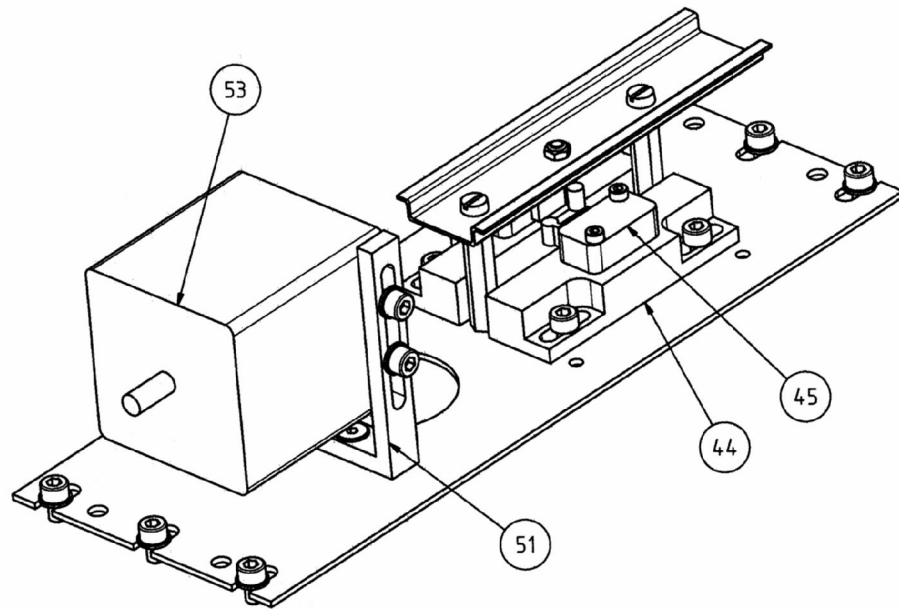
9.2 Spare part drawing -B4W-



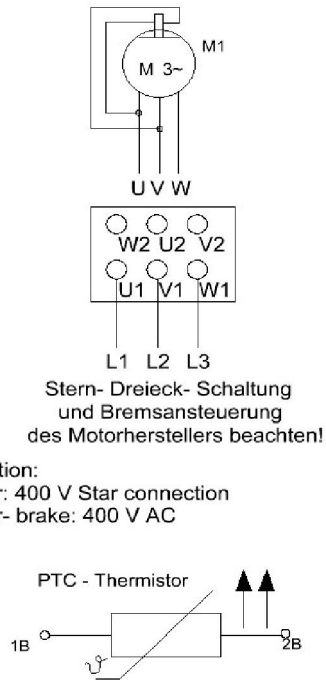
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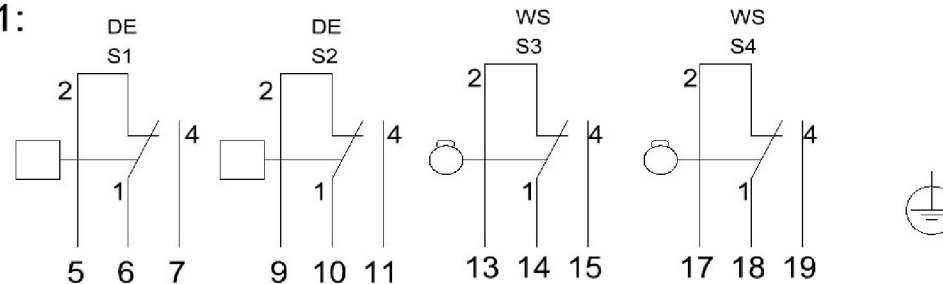
To 9.2



10.1 Wiring Diagram



X1:



Key:

M1 = 3-phased-geared-brake-motor 4-polar, P= 2,2 kW, U= 400 V Star , f= 50 Hz , Brake: U= 400 V, directly connected

PTC = 3 x Thermistor 150°C, ISO-F

DE = Overload- or torque switch 1-polar, S1: shutdown when pushrod extends, S2: pushrod retracts

WS = Limit switch or limit end switch 1-polar -WS 2- (adjustable)

=> ATTENTION: When the torque switches (DE) are activated the motor must be shut down immediatly.

S1 = Shutdown when pushrod extends

S2 = Shutdown when pushrod retracts

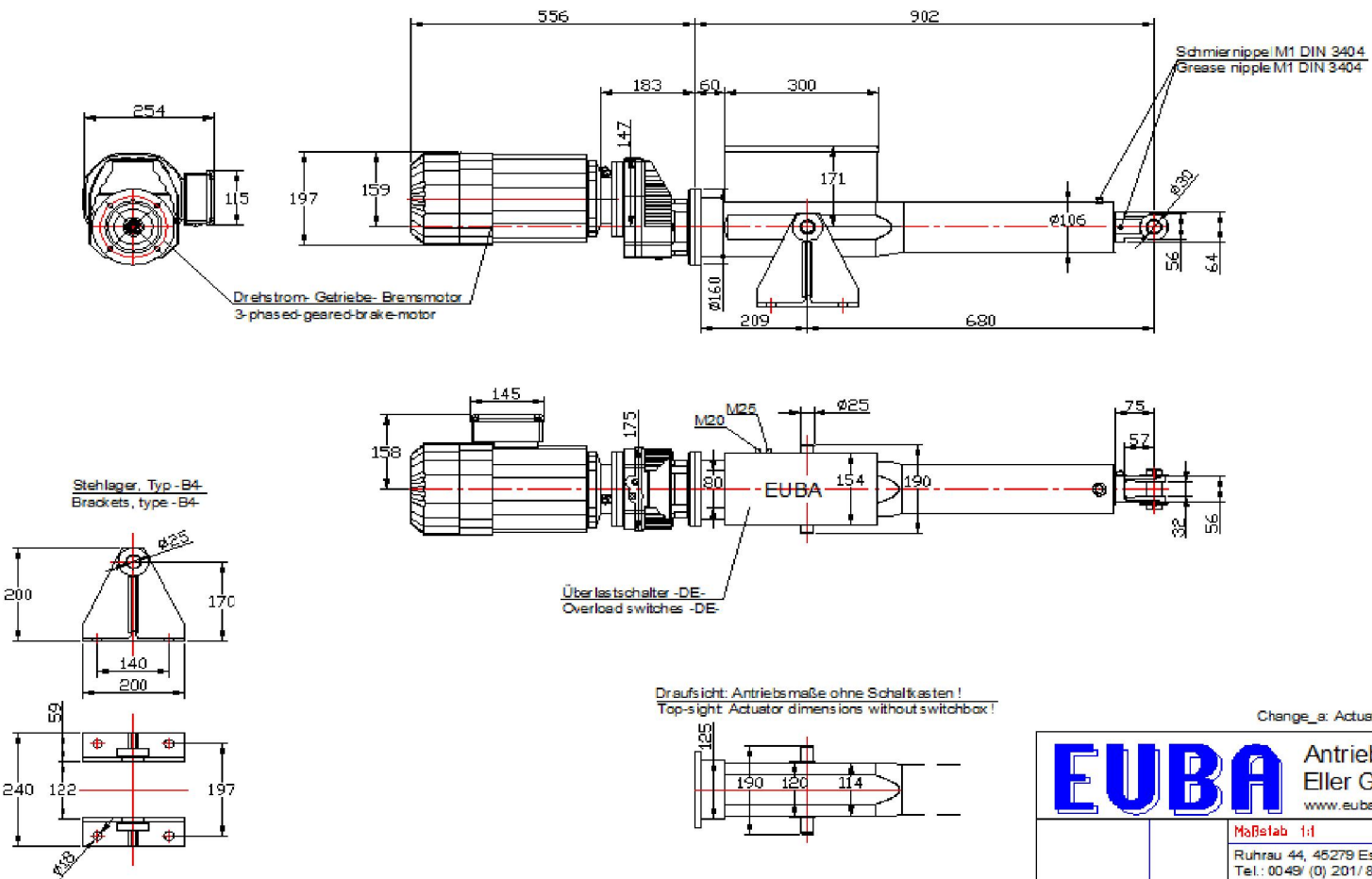
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Schaltplan für / Wiring wiagram for
EUBA- ELEKTRO- VERSTELLANTRIEB
EUBA- ELECTRO-MECHANICAL-ACTUATOR

Schaltplan- Nr. / Diagram No.: 1. 7a. 2. (e)
EUBA Order No.: 52 490/ 15
Factory No.: 52490-01
Date: 28.09.2015

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10.2 Sketch Drawing



Change_a: Actuator with way-limit-switches -WS 2-

EUBA		Antriebstechnik Eller GmbH www.euba.de	
Maßstab 1:1		Ruhrau 44, 46279 Essen Tel.: 0049/ (0) 201/ 85311 -0, Fax: -25	
Datum	Name	F= 1.500 daN Zug/ Druck (Push/ Pull) s= 0- 400 mm v= 40 mm/s P= 2,20 kW, U= 400 V Star, f= 50 Hz	
Bearb. 25.06.15	T. Anders		
Gepr.			
Norm			
Type: B4-W		Drawing-No.: E/X- B4- 780/ a	Blatt BL

EUBA Antriebstechnik

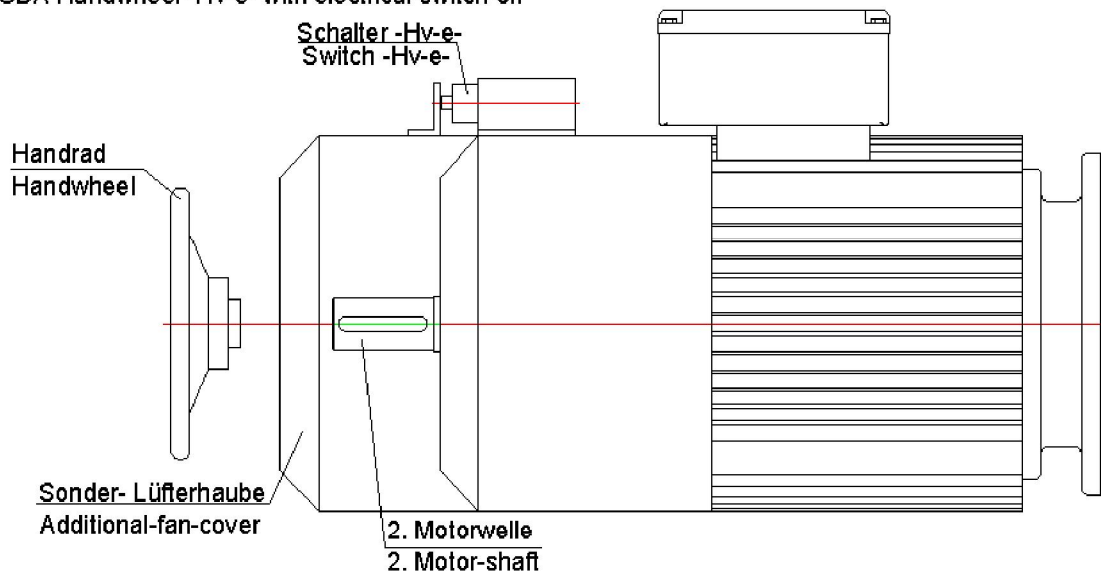
Operating instructions for actuator type: -B4- / -B4-W-

10.3 Additional accessory for EUBA actuators

10.3.1 Handwheel with electrical switch-off –Hv-e-

EUBA Handverstellung -Hv-e- mit elektrischer Abschaltung

EUBA Handwheel -Hv-e- with electrical-switch-off



Mode of operation:

The security switch –Hv-e– will be activated when the additional fan-cover of the motor is removed. The included hand wheel can now be attached to exposed motor-shaft and the actuator can be adjusted manually.

Electrical Installation:

The security switch –Hv-e– is a bipolar N/C contact (please see wiring diagram). It has to be integrated into the open loop control in such way that when the switch is activated the motor will be de-energized and secured against re-starting.

Additional accessories:



Cardan joint



Plug connection

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11. Storage instructions for long-term preservation

If **EUBA-Electric-Actuators** are stored for a longer period of time before the start-up, an increasing protection from damage caused by corrosion or humidity can be achieved if the following instructions are observed.

Please mind that the protective covering (actuators are shrink-packed with added humidity indicators) has to remain undamaged until installation of the actuators.

We reserve the right of verification of the packing in order to accept the warranty agreed upon.

Should the packing be damaged resp. be removed, as it occurs frequently, the following instructions have to be considered especially.

Please mind that the above mentioned facts are also applicable when the actuators are well stored (well packed, dry and vibration free) for more than 2-3 years resp. beyond the agreed storage time.

However, if the actuators are installed into a facility which is not due to start-up shortly, the actuators should be operated in short intervals. In any case the steps described as per point 3 need to be observed.

The real operating conditions can be very strongly dependent on the local circumstances, therefore the times stated can only be considered as approximate values. These times do not include a prolongation of the warranty time.

1. State of condition of EUBA-Electric-Actuators with mounted norm- resp. geared- motors as well as the storage room:

- 1.1 Please check that all factory supplied plugs of the switch boxes are tightly fitted and that they are not damaged due to shipment. If required please replace the damaged plugs.
- 1.2 Shipment damages of the paint-work or the corrosion protection of the bare parts need to be repaired.
- 1.3 If the environmental conditions differ from normal conditions of approx. -20°C to +40°C or varies often considerably, the steps described as per point 3 may become handy even after shorter storage times.
- 1.4 The storage room should be dry, ventilated and vibration-free.

2. Precautions during storage time

- 2.1 If the storage facilities allow so, we recommend a turning of 180° of the actuators every other year. This has to be considered especially for actuators with mounted gear-motors. These turnings ensure that the opposite gearwheels are lubricated again.
- 2.2 The turning of the actuators can be cancelled if the gear box is completely filled up with lubricants on special agreement. For this case the lubricant level has to be reduced to its rated level according to the operating instructions and the lubrication plate before start-up. (Please see point 3.3.1)

3. Precaution before start-up

3.1 EUBA – Actuator unit

- 3.1.1 Lubrication of the spindle bearings (Tapered-roller bearings).
If the storage time exceeds 2-3 years or if both the temperatures and the humidity have been unfavourable for a time as per point 1.3, the lubricant of the EUBA-actuator has to be exchanged. Please consider the relevant instructions for precautions and lubrication recommendations.
- 3.1.2 Lubrication of the spindle and the spindle-nut.
These parts have been lubricated with a high-quality ex-works lubricant which however has to be exchanged as per point 3.1.1 too. Please observe the relevant instructions.
- 3.1.3 Lubrication of the push rod and the guiding bush

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The lubricant has to be renewed if the conditions correspond to those as per point 1.3.

- 3.1.4 In connection with the exchange of the lubricant as per point 3.1.3, make sure also that the gaskets of the push-rod, i.e. the scraper and the O-ring work properly. If any changes in shape, colour, hardness or sealing effect are noticed, replace these parts immediately by observing the disassembly and assembly instructions.
- 3.1.5 Check the built-in torque (DE) and stroke –indicator-switches (WE) with regard to their transition resistance.
- 3.2 Motor unit
 - 3.2.1 Check of the insulation
Please check the insulation resistance of the windings in combination of all winding parts as well as in combination with the housing and the windings by using a proper measuring device (e.g. a hand generator)
Indicated value above 50 MΩ : No drying required. State of conditions **as being new**.
Indicated value above 5 MΩ: Drying advisable.
Indicated value about 1 MΩ : Lowest limit allowed.
 - 3.2.2 Drying of the windings by heating the stator without disassembly.
Connection to gradually or stepwise adjustable AC voltage up to max. 20% of the nominal voltage.
Heating current max. 65 % of the nominal current as stated on the motor data plate.
Observe heating process during the first 2-5 hours and reduce the heating voltage if required.
Heating time approx. 12-24 hours so that the insulation resistance increases to its rated value again.
 - 3.2.3 Furnace drying of the windings after disassembly.

Disassemble the motor properly.

Dry the stator windings in a well ventilated drying furnace at +80°C to +100°C for approx. 12-24 hours until the insulation resistance has reached its stipulated rated value again.
 - 3.2.4 Lubrication of the rotor bearings.
If the storage time exceeds some 2-3 years or if the temperatures have been very unfavourable during a shorter storage time as per point 1.3, please check the lubricant of the rotor bearings and exchange it if required. For this purpose it will be sufficient to disassemble the fan side of the motor partially. After removal of the fan cowl, fan and bearing flange the tapered-roller bearing will become visible.
- 3.3 Gear unit (for geared-motors only)
 - 3.3.1 Lubricant
If the storage time exceeds some 2-3 years or if the temperatures have been very unfavourable during a shorter storage time as per point 1.3, please check the lubricant of the gear box. Please consider the relevant instructions for precautions and lubrication recommendations.
 - 3.3.2 Shaft sealings
In connection with the exchange of the lubricant please take into consideration that the shaft sealing between motor unit and gear unit as well as that of the motor shaft are working properly. If any changes in shape, colour, hardness or sealing effect are noticed, replace these parts immediately by observing the disassembly and assembly instructions.
 - 3.3.3 Sealants
In case of any lubricant leaking at the mating surfaces of the gear unit, please renew the sealing compound immediately.