

OPERATING INSTRUCTIONS

LIFTKET | Electric chain hoists



MADE IN GERMANY

Please do not use the electric chain hoist before all operators have carefully read and understood this manual and signed the form on the rear cover.

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1 Safety advice

1.1 Advice for the use of electric chain hoists

Electric chain hoists are designed to lift and to lower loads vertically and to travel horizontally with lifted loads (with trolleys). Every other mode of use can cause severe damage and is prohibited. The risk is on the operator's responsibility. Please ask the producer in advance for any special mode of use.

Using the hoist to carry people is strictly prohibited!

The modern design of the electric chain hoists guarantees safety and economic use. The patented safety clutch system is located between motor and brake. This enables the brake to hold the load without any power transmitted by the clutch.



Electric chain hoists are driven by use of electrical energy.

Before first use please make sure, that all electrical wires are connected safely, that all wires are without damages and that the whole equipment could be switched off by a main switch.

It is the responsibility of the operator to make sure that all suspension points of the hoist are calculated to withstand the dynamic forces caused by the lifting equipment safely.



The chain hoist is usable when the hoist is safely suspended, and the outgoing chain can leave the hoist safely in the relevant direction.

Therefore, the container for the dead end of the chain outside the hoist must be big enough to allow the chain to come out. If not, the chain can be trapped inside the hoist and can break the casing of the hoist.



For use of the hoist in an aggressive environment – please consult the producer.

The following safety advice is issued for both the maintenance and the operation of the hoist and for most standard uses. It may not necessarily cover all situations. If you are in any doubt, please contact your dealer. This manual will tell you how to operate the hoist and how to handle its suspension or its loads safely. It is compulsory to take care of the following safety advice. They may not be complete for each mode of use, please ask the producer or your local service partner if any question comes up.

You should keep this manual clean, complete and in a legible condition.

Neither the manufacturer nor dealer accept responsibility for any damage or lack of functionality due to the following:

- Carrying out inappropriate operations for an electric chain hoist
- Product modification without the explicit authorization of the manufacturer
- Inappropriate operation of the hoist
- Operational errors
- Failure to use the product as instructed in the manual



1.2 European regulations

The basis for the assembly, first use, certification and maintenance of electric chain hoists are within Germany and within the area of the European community, the following regulations, and all recommendations of this manual.

Please pay particular attention to the rules for the prevention of accidents and the statutory regulations

European Regulations	
2006/42/EC	EC-Machine directive
2014/30/EC	EC-Directive relating to electromagnetic compatibility
2014/35/EC	EC-electrical equipment designed for use within certain voltage limits

Accident prevention regulations	
DGUV Vorschrift 1 (BGV A1:2009)	Principles of prevention
DGUV Vorschrift 3 (BGV A3:2005)	Electrical facilities and equipment
DGUV Vorschrift 52 (BGV D6:2000)	Accident prevention regulation for use in crane systems
DGUV Vorschrift 54 (BGV D8:1997)	Accident prevention regulation for electric winches, lifting and pulling equipment
DGUV Regel 100-500 (BGR 500-2.8:2008)	Hoisting accessories
DGUV Grundsatz 309-001 (BGG 905:2004)	Principles for checking of cranes

Harmonized regulations	
EN ISO 12100:2010	Safety of machinery
EN 14492-2:2006+A1:2009	Cranes - Power driven winches and hoists
EN 818-7:2002+A1:2008	Short link chain for lifting purposes; Fine tolerance hoist chain, Grade T
EN ISO 13849-1:2008	Safety-related parts of control systems; General principles for design
EN 60034-1:2010	Rotating electrical machines; Rating and performance
EN 60034-5:2001+A1:2007	Rotating electrical machines; Degrees of protection provided by the integral design of rotating electrical machines
EN 60204-1:2006	Electrical equipment of machines; General requirements
EN 60204-32:2008	Electrical equipment of machines; Requirements for hoisting machines
EN 60529:1991+A1:2000	Degrees of protection provided by enclosures (IP-Code)
EN 60947-1:2007+A1:2011	Low-voltage switchgear and control gear
EN 61000-6-2:2005	Electromagnetic compatibility, Immunity for industrial environments
EN 61000-6-3:2007+A1:2011	Electromagnetic compatibility, Emission standard for residential, commercial and light-industrial environments
EN 61000-6-4:2007+A1:2011	Electromagnetic compatibility, Emission standard for industrial environments
EN 82079-1:2013	Preparation of instructions for use - Structuring, content and presentation

Regulations and technical specifications	
FEM 9.511:1986	Classification of mechanisms
FEM 9.683:1995	Series lifting equipment; Selection of hoisting and travelling motors
FEM 9.751:1998	Series lifting equipment; Power driven series hoist mechanisms; Safety
FEM 9.755:1993	Serial hoist units; Measures for achieving safe working periods

The producers guarantee depends on consideration of these regulations and all of this manual.

Please pay attention to chapter 6 especially!

Other national regulations are valid for countries outside of the European community.



Maintenance work for hoisting equipment has to be carried out by trained and authorised people only. The main switch has to be switched off before.

Authorised people have to have a theoretical training as well as experience in the field of cranes and hoists. They have to have an excellent know-how of the special regulations and must be able to decide whether the lifting equipment is in a safe working condition or not. They have to fill in the forms of any maintenance work, repair work or test (for example: maintenance work on brake or clutch).

The hoist is only to be used by people who have complete knowledge of this manual; the manual should always be available showing who has signed the form on the rear cover of this brochure.

1.3 Spare parts

Only original spare parts may be used. The producers guarantee is given for those spare parts only.

The producer cannot be held responsible for failures and breakdowns caused by use of not original or wrong spare parts.

2 Technical overview

2.1 Assembly possibilities

The simple building block system makes it easy to convert the electric chain hoists. This allows the choice of single or double fall versions, stationary or mobile with manual or electric travelling trolleys, and the installation of greater hoisting and operating heights.

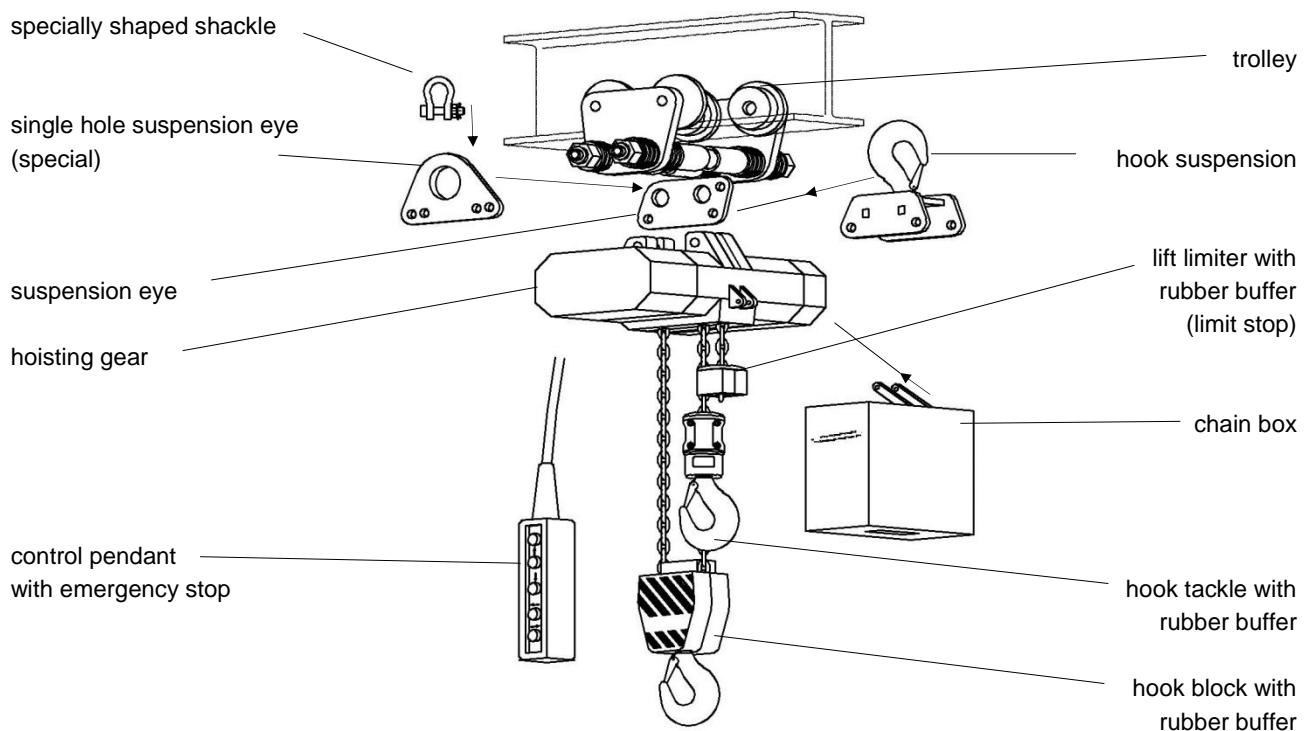


figure 1: possibilities for completion

2.2 Explanation of type designation

Example: Version 7.1
type 3200 / 2 - 3 / 0,75

3200	/	2	-	3	/	0,75	
							slow lifting speed in m/min
							main lifting speed in m/min
							number of falls
							capacity in kg

According to the Machine directive 2006/42/EG you will find all the technical data in the technical documentation attached to each hoist.

2.3 Sectional view

part no.	designation	part no.	designation
1	brake cover	13	clutch hollow shaft
2	casing	14	stator
3	gear cover	15	wheel IV
4	gear cap	16	pinion shaft V
5	magnet for DC brake	17	wheel VI
6	motor pinion shaft	18	drive shaft
7	clutch compression spring	19	load chain
8	pressure nut	20	hold down
9	retaining plate	21	hook tackle complete
10	brake disk	22	chain box
11	clutch disk	23	control cable
12	rotor	24	terminal strip for mains cable

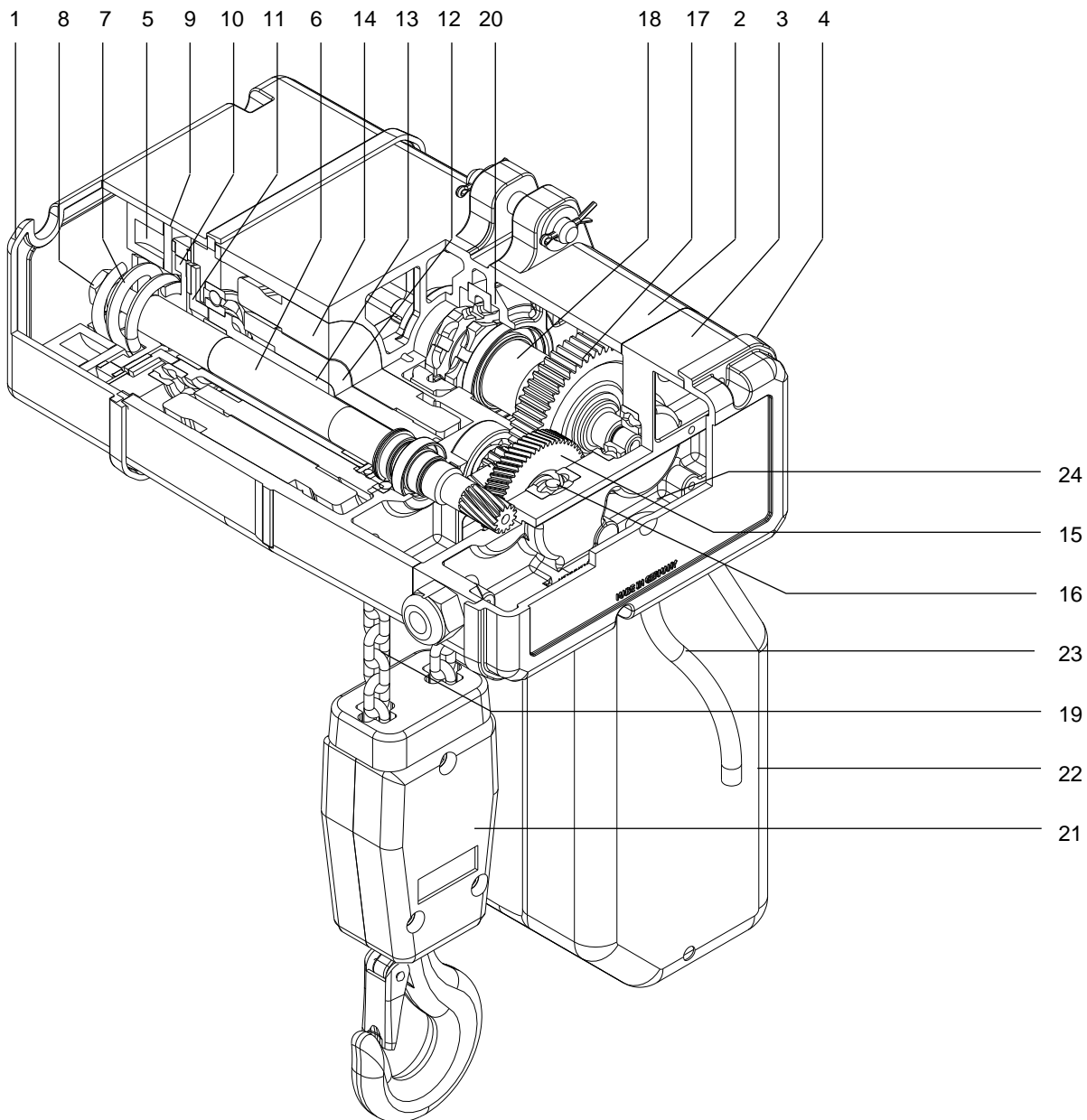
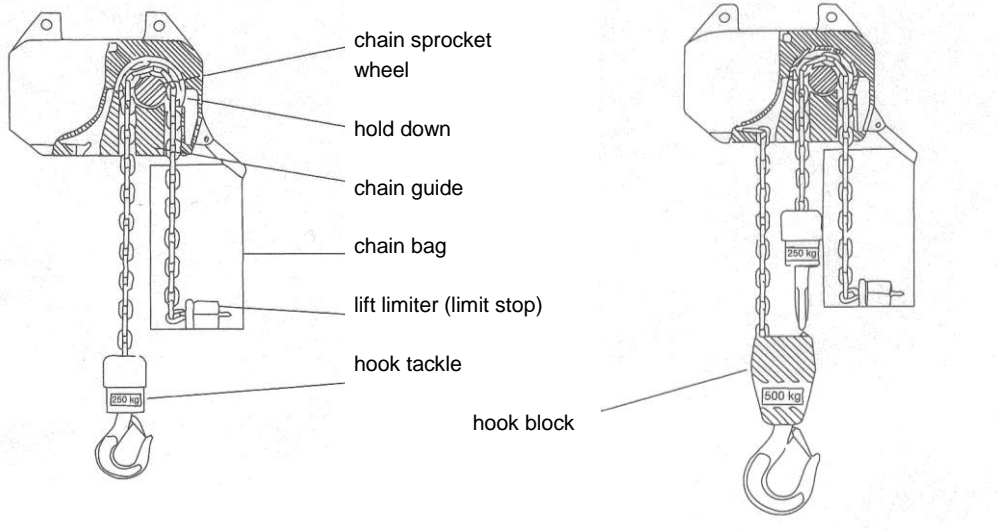


figure 2: sectional view

2.4 Schematic sketch of the load chain configuration

Use manufacturer's original parts only, as these meet the high stress and service life standards required.



3.1 single fall version

3.2 double fall version

figure 3: load chain configuration

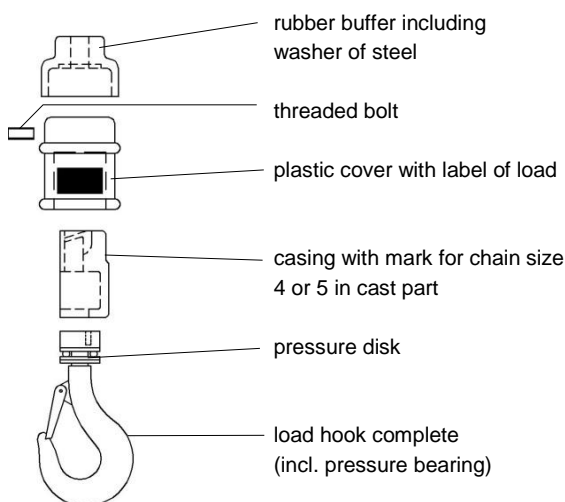
3 Assembly

Assembly work should only be carried out by trained specialists in accordance with DGUV V54 (BGV D8) §24.

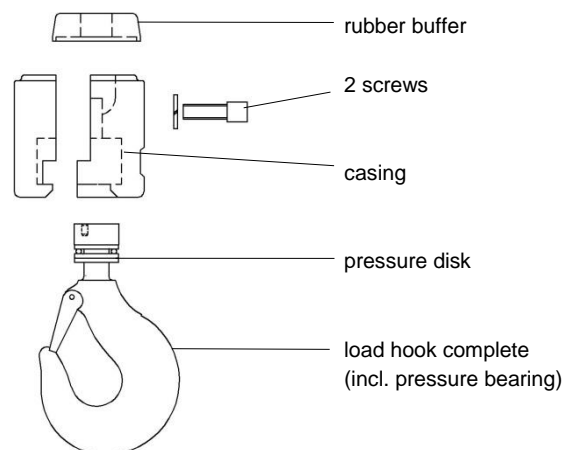
3.1 Mechanical assembly

3.1.1 Hook tackle

The hook tackle used to attach loads for hoists in single- fall version.



hook tackle for chains
4x12 and 5x15 mm



hook tackle for chains
7x22, 9x27, 11x31 and 11,3x31 mm

figure 4: assembly of hook tackles

During maintenance work the condition of the load hook has to be checked (wear and centre punch spacing, on page hook certificate). For the hook tackles of the chains 4x12 mm and 5x15 mm the plastic cover has to be checked additionally and changed if worn. Furthermore, the condition of the pin, which secures the hook nut, the pressure bearing and the safety latch have to be checked. If required, the axial bearing has to be cleaned and greased.

For the assembly of the hook tackles please tighten the connection screws with the following torques:

hook tackle designation	max. load capacity (kg)	dimension of screws	qty	tightening torque (Nm)
hook tackle for chain 4x12 mm	250	-	-	-
hook tackle for chain 5x15 mm	250	-	-	-
hook tackle for chain 7x22 mm	1000	M10x40 DIN 912	2	35
hook tackle for chain 9x27 mm	1600	M12x30 DIN 912	2	50
hook tackle for chain 11x31 mm	2500	M12x35 DIN 912	2	50
hook tackle for chain 11.3x31 mm	3200	M12x35 DIN 912	2	50

table 1: tightening torques of connection screws for hook tackles

3.1.2 Hook block

The hook block is used to attach the load in double fall version.

At all maintenance work the condition of all the parts has to be checked (according to chapter 3.1.1 and 3.1.2).

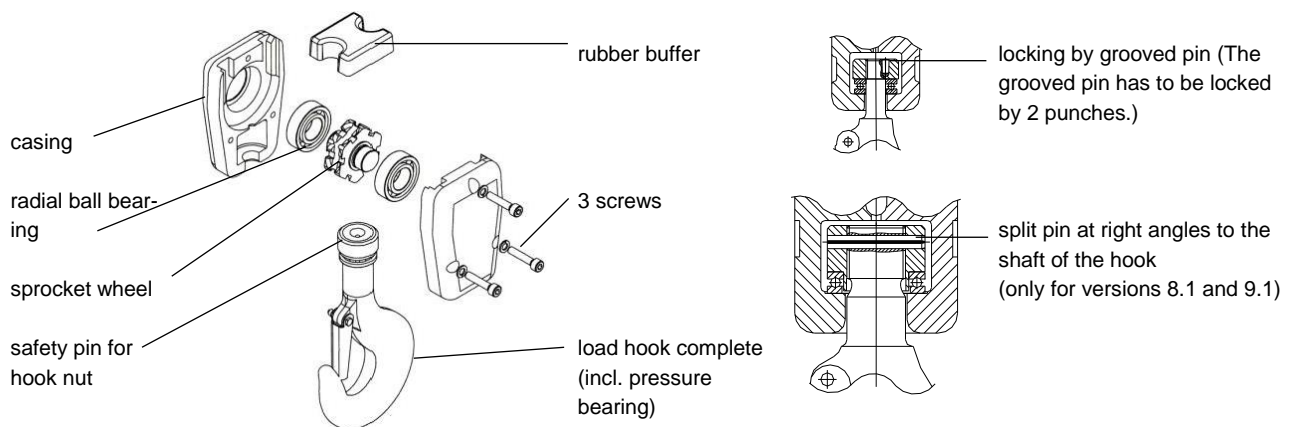


figure 5: assembly of hook block

For the assembly of the hook blocks please tighten the connection screws with the following torques:

hook block designation	max. load capacity (kg)	dimension of screws	qty	tightening torque (Nm)
hook block for chain 4x12 mm	500	M5x35 DIN 912	2/1	6/4*
hook block for chain 5x15 mm	500	M6x35 DIN 912	2/1	10/6*
hook block for chain 7x22 mm	2000	M8x50 DIN 912	2/1	20/10
hook block for chain 9x27 mm	2000 / 3200	M10x50 DIN 912	2/1	35/20*
hook block for chain 11x31 mm	5000	M12x60 DIN 912	3	35
hook block for chain 11.3x31 mm	6300	M12x60 DIN 912	3	35

* The marked tightening torques apply to the screw near the rubber buffer. This one screw has to be locked into the threaded bore hole with a registered screw locking paste.

table 2: tightening torques of connection screws for hook blocks

3.1.3 Stationary suspended hoists – basic version

Caution! Do not use other bolts than the original suspensions bolts. In particular, do not use screws to connect the electric chain hoist to its suspension elements.



3.1.3.1 Suspension with suspension eye

Assembly: The suspension eye section, which forms part of the standard delivery, must be inserted into the specially provided suspension holes on the electric chain hoist and pinned into place with the two bolts. Use washers with the lock bolts and secure position with eyebolts.



Caution! The hole for the tandem trolley of the suspension eye must be on the same side as the chain box.

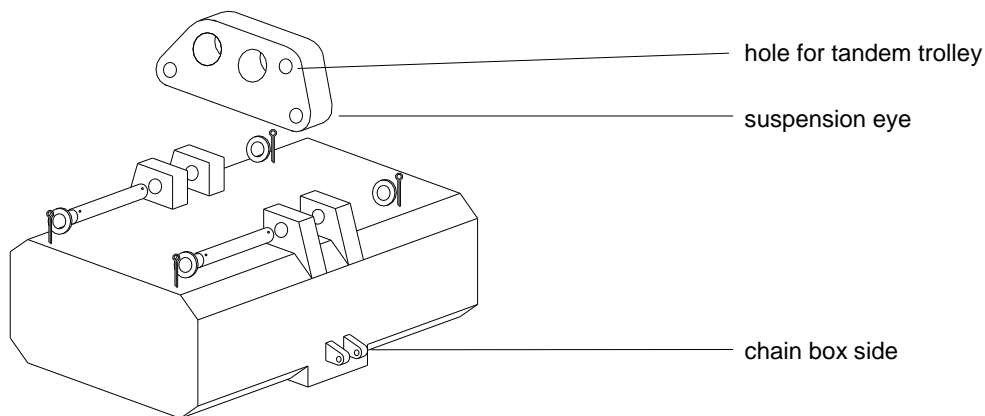


figure 6: suspension with suspension eye

3.1.3.2 Suspension with single hole suspension eye

Assembly: The suspension with single hole suspension eye, which forms part of the standard delivery, must be inserted into the specially provided suspension holes on the electric chain hoist and pinned into place with the two bolts. Use washers with the lock bolts and secure position with eyebolts.



Caution! The marking arrow on the single hole suspension eye must be on the same side as the chain box.

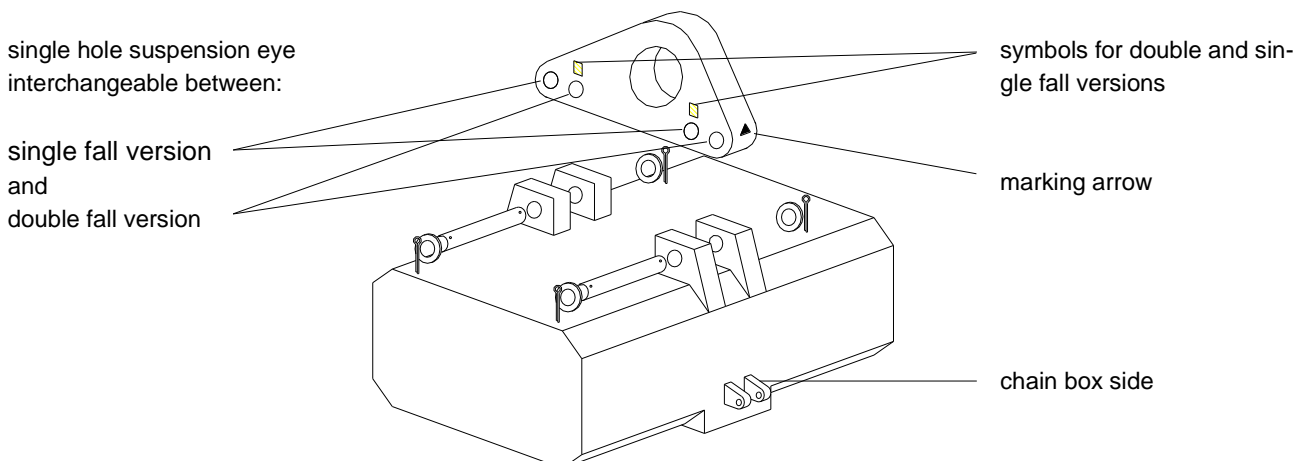


figure 7: suspension with single hole suspension eye

3.1.3.3 Suspension with hook suspension

Assembly: The hook suspension must be inserted into the specially provided suspension holes on the electric chain hoist and pinned into place with two bolts. Use washers with the lock bolts and secure position with eyebolts.

The assembly or the interchange should be done in accordance with version / chain size:



Hook suspensions for versions B1, B2 and B3 (chains 4x12 and 5x15)

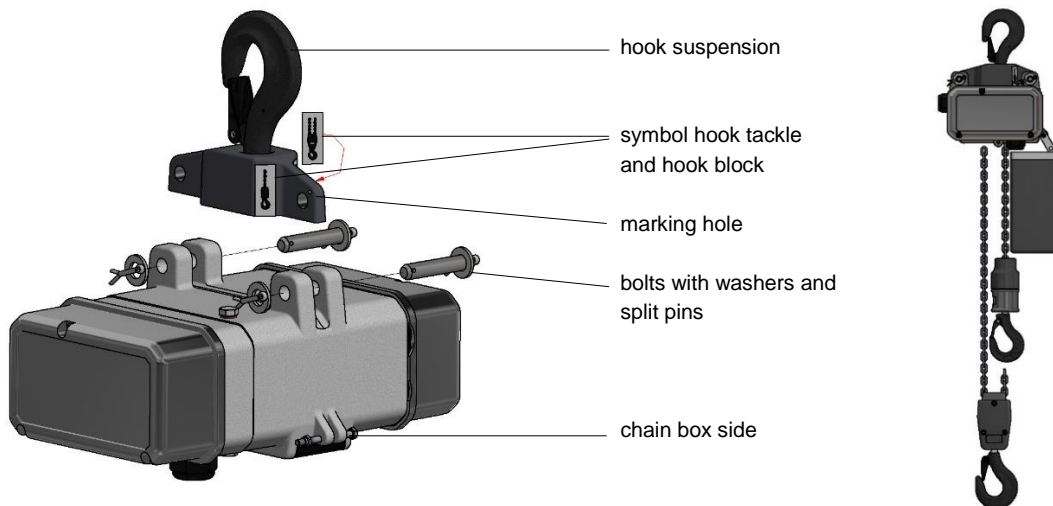


figure 8: configuration of hook suspensions for chains 4x12 and 5x15

Assembly: The hook suspension does not have to be rotated when changing from single fall version to double fall version or from double fall version to single fall version.



Hook suspensions for versions B4, B5, B6 and B8 (chains 7x22, 9x27 and 11x31)

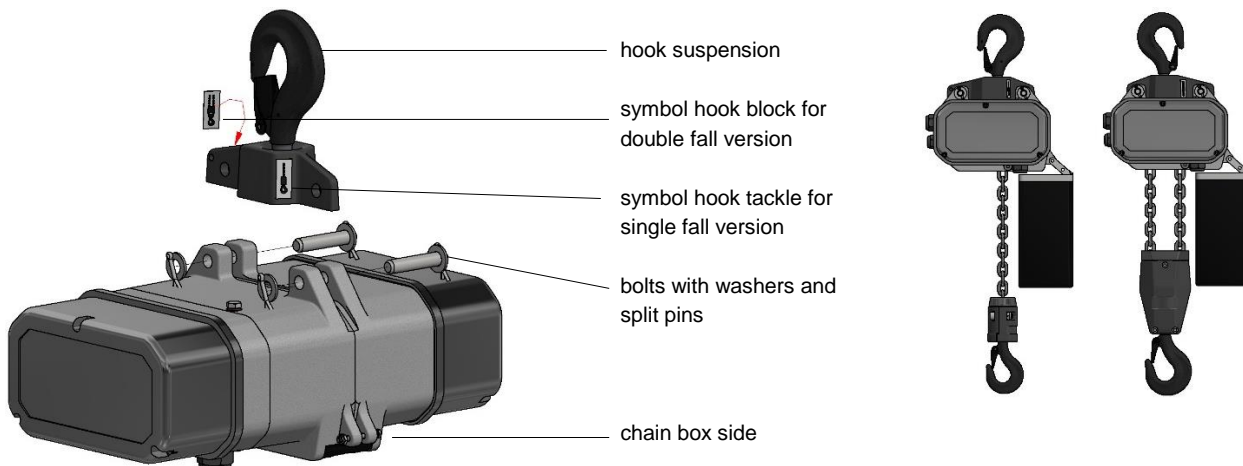


figure 9: configuration of hook suspensions for chains 7x22, 9x27 and 11x31

Assembly: The hook suspension must be rotated 180° when changing from single fall version to double fall version or from double fall version to single fall version.

Caution! The symbol hook tackle for single fall version or the symbol hook block for double fall version must be for the relevant version on the chain box side.



3.1.4 Gear ventilation

Having completed assembly, the split washer has to be placed under the oil filler plug (top side of casing) to avoid oil leakage due to low/high pressure inside the gearbox. You will find this split washer fastened with a piece of self-adhesive tape next to the oil filler plug. For outdoor use, high air humidity and big differences in temperatures the use of the split washer is not recommended.

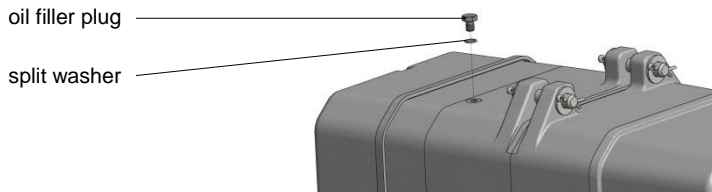


figure 10: oil filler plug

3.1.5 Chain box

3.1.5.1 Mounting of the chain box



figure 11: types of chain boxes

The following chain boxes are made from plastic:

chain dimension [mm]	max. filling quantity [m]	type of chain box
5×15	10	5/10 7/8
7×22	8	

table 3: plastic chain boxes

Chain boxes with bigger capacity are made from canvas material.

The chain box is mounted with screw and self-locking nut. The self-locking nut has to be securely screwed. The self-locking nut has to be replaced after repeated use when the nylon becomes noticeably worn.

Caution! Ensure that the chain box is sufficient for the amount of chain you are using. The chain dimension and capacity are shown on the chain box. Insert the chain end with lift limiter and its rubber buffer loosely into the chain box. After running the entire chain length through the hoist into the chain box, check that the box is not overloaded.
Do not overload the chain box.



3.1.5.2 Oversize chain box

If the chain weight is more than 25 kg the strain of the chain box has to be relieved with a special textile strap. When fitting the chain box to the suspension the customer must correctly adjust its position using the ratchet strap with a load of app. 10 kg inside the bag.



The suspension point of this strap for a stationary suspended hoist has to be provided by the buyer (see figure 12), as the prevailing conditions are unknown.

If the hoist is fitted to a trolley the producer provides a dual trolley to fit the chain box strainer strap (special fittings - see figure 13). Please take care that the strainer strap has to be tightened in accordance with this manual and inspected in regular intervals and corrected if necessarily.

Please use the edge protectors at the suspension points (see figure 12 und figure 13).

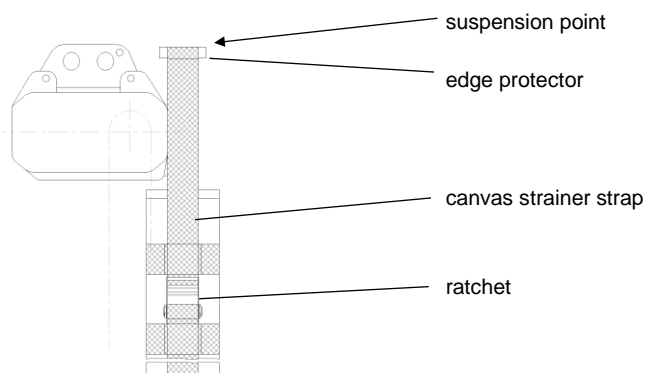


figure 12: stationary suspended electric chain hoist
The suspension point for the strainer strap has to be provided by the user.

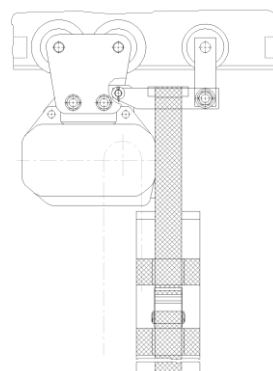


figure 13: electric chain hoist with chain box suspended at the tandem trolley
(Not suitable for curved beams. In special cases ask the producer.)

Caution!
Not suitable for
single bolt trolleys

The end of the strainer strap has to be fixed and tightened with the strainer strap and the ratchet.

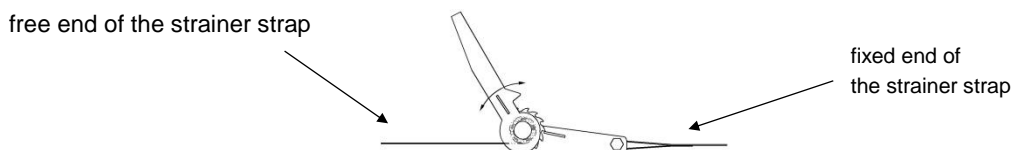


figure 14: strainer strap with ratchet

3.1.6 Fitting the load chain in case of delivery without preassembled piece of load chain - single fall version

1. Push the pull-in wire (special tool) into and through the chain guide cross plate shown in figure 15.1 until the wire hook is pushed out on the opposite side.
2. Starting with the flat chain link (see figure 15.1), hang chain end into the wire hook (always lead in from the chain box side) and pull chain with wire hook into the chain pocket.
3. Allow chain to be fed in using inching control on push button (figure 15.2).
4. Attach rubber limit stop onto the other chain end and assemble load hook (figure 15.3).
5. Lower the load hook to leave approx. 50 cm of the dead end of the load chain at the dead-end side.
6. Press the rubber buffer for lift limiter, included in delivery, onto the chain.
7. Fix lift limiter* onto the 3rd link before the chain end (figure 15.4).
8. Mount chain box as described in chapter 3.1.5.
9. Lubricate chain well and let it run into the chain bag.

Let the dead end of chain run into the chain box by pressing the up button and using the hoist motor to prevent knots inside the chain box. Allow filling of the chain box only by running the chain through the hoist by using the motor. To prevent knots inside the chain box do not put the chain in the box directly.



* Lift limiter

The lift limiter is designed to prevent the dead end of chain running out of the hoist. It is used as an emergency stop and cannot be used regularly as a lower limit switch.

If the lift limiter has a metal washer, then this should be mounted towards the electric chain hoist body.

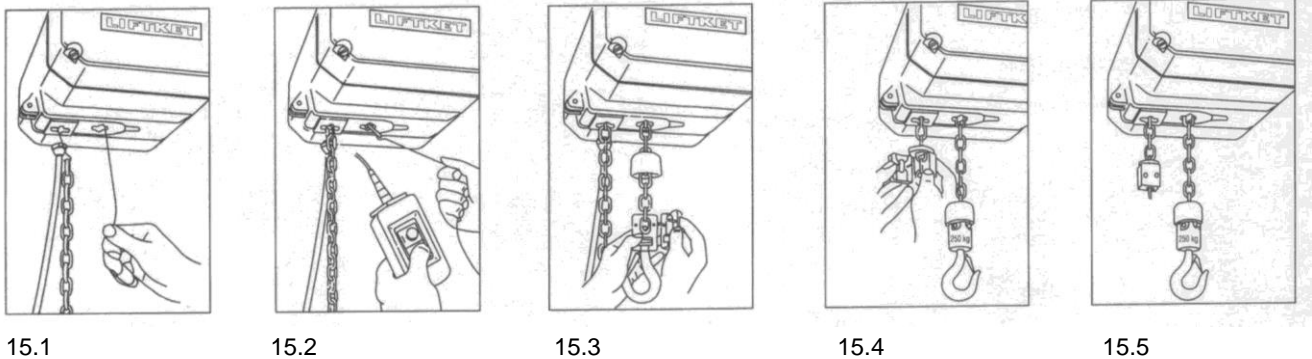


figure 15: fitting the load chain in single fall version (except version B6.1, B8.1 and B9.1)

3.1.7 Fitting the load chain in case of delivery with preassembled piece of load chain - single fall version

A short piece of chain is already fitted in these models by the manufacturer.

1. Always hang the connecting piece, included in the delivery, into the inserted chain fitted by the manufacturer on the chain box side and then attach the load chain to be drawn in.
2. Continue as described in 3.1.6.

Caution! When changing the load chain and converting to other numbers of falls, never allow the chain to come out of the casing completely, always pull in new chain or a short piece of chain with the connecting piece. (pay attention to chapter 3.1.9). After having mounted the new load chain remove the short piece of chain and connecting piece (chapter 3.1.9).



3.1.8 Fitting the load chain - double fall version

1. First insert the load chain into the basic hoist casing as described either in chapter 3.1.6 or chapter 3.1.7 depending on version.
2. Pull the chain through the hook block using the pull-in wire (special tool) as shown in figure 16.1.

Caution! Never allow the chain to be twisted between the chain outlet and the hook block! If an assembly with an untwisted chain according to figure 16.2 or figure 16.3 is not possible one chain link has to be cut and removed to allow correct assembly. Do not turn or swivel the hook block around the horizontal axis between the two chain falls.



3. Release the 4 bolts of the chain guide (part no. 1 in figure 17) and lower the chain guide (figure 16.2).
4. The chain end which has been pulled out of the hook block must be laid flat into the chain hoist casing pocket as shown in figure 3.2 or figure 16.3.
5. Fix chain guide onto casing again (figure 16.5).
6. Again, make sure that chain is not twisted (figure 16.6).
7. Lubricate the chain well over the full length.

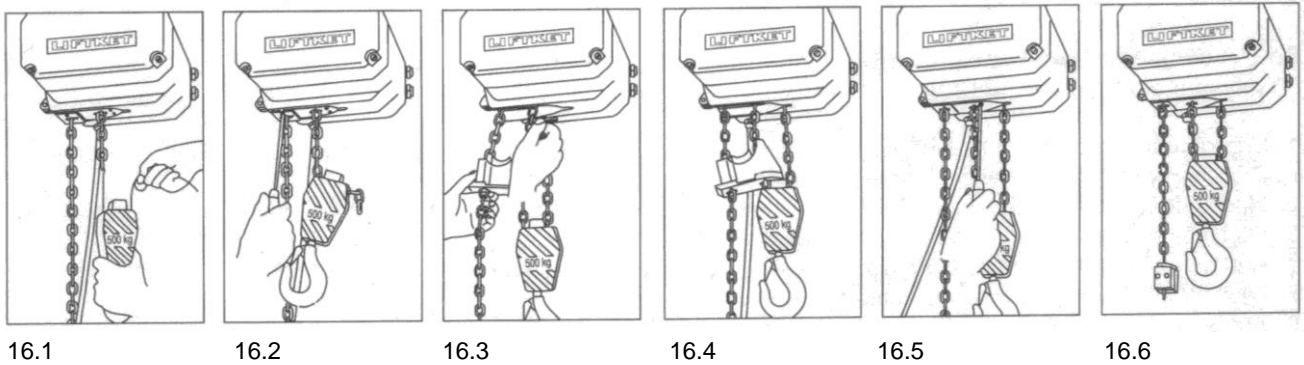
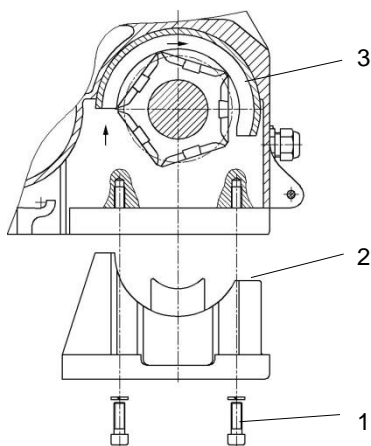


figure 16: fitting the load chain in double fall version

3.1.9 Replacing the load chain and hold down



The chain guide and the hold down must also be changed when load chain is being replaced.

1. Let worn chain move out.
2. Loosen 4 bolts (1).
3. Take out chain guide (2).
4. Press hold down (3), using the screwdriver (arrow in figure 17).
5. When inserting the new hold down (3), take care that the chamfered end shows in the direction of the chain box.
6. Push in the chain guide and screw tight.
7. Fit the load chain like described in the preceding chapters depending on version.

figure 17: replacing the load chain, the chain guide and the hold down

Caution! For hoist versions B6.1 and B8.1 the clutch must be relieved of stress by loosening the pressure nut (see part no. 8 in figure 2) before carrying out this work. This must be set in position again as described in chapter 7.3 after replacing the hold down.



3.1.10 Electric chain hoists for inverted use

Electric chain hoists can be delivered for inverted use. It is possible to convert the hoist to this mode of use after having bought it. (The necessary parts can be supplied by the producer!)

In case of outdoor use protect the chain hoist from rainwater. Check drain hole before outdoor use.

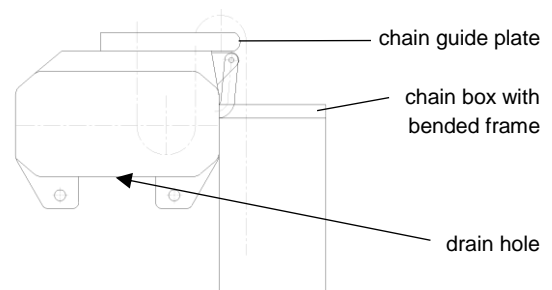


figure 18: electric chain hoist for inverted use

Caution! If the hoist is used in inverted use the chain leaving and entering the hoist must be kept tight at all times. Non-compliance may result in chain jam in the chain guide and damage of the chain hoist and the chain itself.



3.2 Electric connections

After having completed the electric installation check them in accordance with the European Regulations EN 60 204-32 or your national regulations.

Details on the control can be seen in the wiring diagram. The electric installation complies with the currently valid EN 60 204-32.



3.2.1 Mains connection

The mains current supply (main incoming line conductor) must be able to be disconnected at all poles by means of a main switch (in accordance with EN 60 204-32 section 5.3).

Work on the electric installation may only be carried out by trained specialists and equipment must first be disconnected from the current supply. In order to ensure the proper functionality of the hoist, the power must be connected to a clockwise (CW)–turning 3 phase AC supply. Connection has to be corrected if deviations occur. Power connection is correct, when the hoist button for lifting the load is pressed and the chain hoist moves the load upwards.

Fuses (slowly blowing) at 400 V (3 phase) in front of main switch:

fuse (slowly blowing)	model
4 A	B1.1
6 A	B2 / B3 / B4 / B4.1
10 A	B4.2 / B5 / B5.1 B6 / B6.1 / B7 / B7.1 / B7.2 / B8.1 / B9.1

table 4: fuses at 400 V

Check if the mains voltage agrees with that specified on the rating plate.

Connect mains current supply lines and control line in accordance with wiring diagram.

The L1, L2, L3 and PE terminals for the mains connection are located under the gear cap. Line 3 + PE (minimum cross section 1.5 mm²) are necessary for the connection.

After connecting, press button for lift. If the load moves downwards, interchange the L1 and L2 supply cores. (Disconnect mains supply before!).



Fuses (slowly blowing) at 230 V (single phase) in front of main switch:

fuse (slowly blowing)	model
6 A	B1.1AK
10 A	B2AK
16 A	B5AK

table 5: fuses at 230 V

Check if the mains voltage agrees with that specified on the rating plate.

Connect mains current supply lines and control line in accordance with wiring diagram.

The L1, N and PE terminals for the mains connection are located under the gear cap. Lines 2 + PE (minimum cross section 2.5 mm²) are necessary for the connection.

After connecting, press button for lift. If the load moves downwards, interchange the L and N supply cores. (Disconnect mains supply before!).



If the control unit is equipped with an emergency stop (EN 60 204-32) you will find this button on your control pendant. In accordance with European Regulations the main switch has to be installed in addition to the emergency stop and it has to be turned off after daily operation.

3.2.1.1 Direct control

Motor control has to be done by using the control pendant.

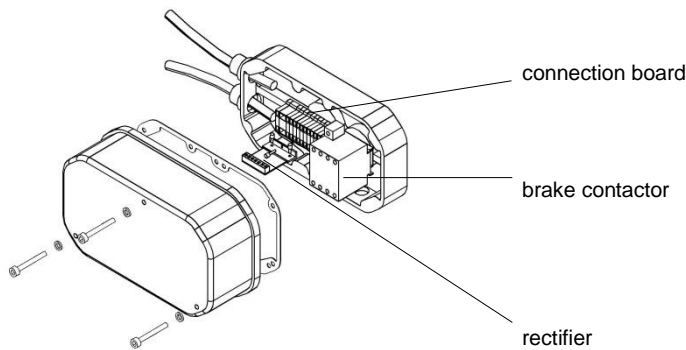


figure 19: direct control

3.2.1.2 Low voltage control

This mode of control is available as an option.

Control occurs in the control circuit, which receives 24 Volts through a safety transformer. This safety transformer can also be used for other primary voltages (reserve the terminal connections). If the control is fitted out with an “emergency stop” in accordance with EN 60204 section 32, a main contactor is also located in the switching area and the “emergency stop” button is on the control pendant.

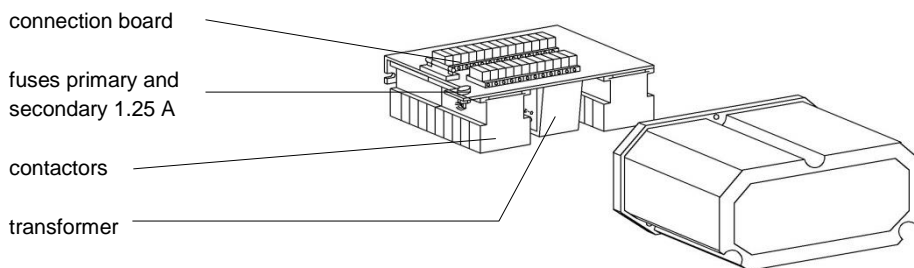


figure 20: low voltage control

3.2.2 230 V single phase current 50 Hz

The 230 V single phase 50 Hz version is provided with a single- phase asynchronous motor with starting capacitor. The starting capacitor is switched off by an electronic starter. Details of control can be found in the wiring diagram.

3.2.3 Electric limit switch for lift limitation

On request the electric chain hoists with low voltage control can be fitted out with electric limit switches to limit the highest and lowest load positions. These switches must not be used as operation limit switches. Please make sure during first operation that the lifting direction shown on the control pendant agrees to the real hoist movement as this is absolutely necessary for the safe operation of the limit switches (see 3.2.1). The safe operation of the respective limit switches for lifting and lowering has to be checked.

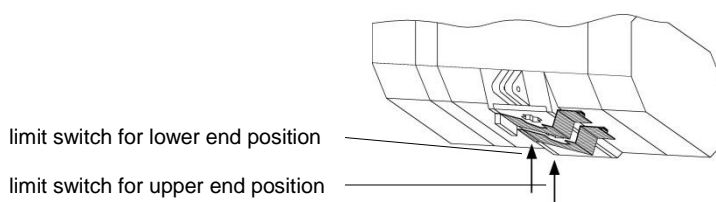


figure 21: electric limit switches

3.2.4 Voltages

The hoist has a standard voltage of 400 V, 3 Phases, 50 Hz. Please ask the producer if other voltages or frequencies are required. The delivered voltage can be seen on the type plate. The electric chain hoists are suitable for operation with a voltage range of 380 - 415 Volt (3 phases) except version B9.1.

The single phase hoists have a standard voltage of 230 V, 1 Phase, 50 Hz.

4 Electric chain hoist with trolley

All trolleys are suitable for

- thin flanges in accordance with DIN 1025 and European regulations 24-62
- medium flanges in accordance with DIN 1025
- wide flanges in accordance with DIN 1025

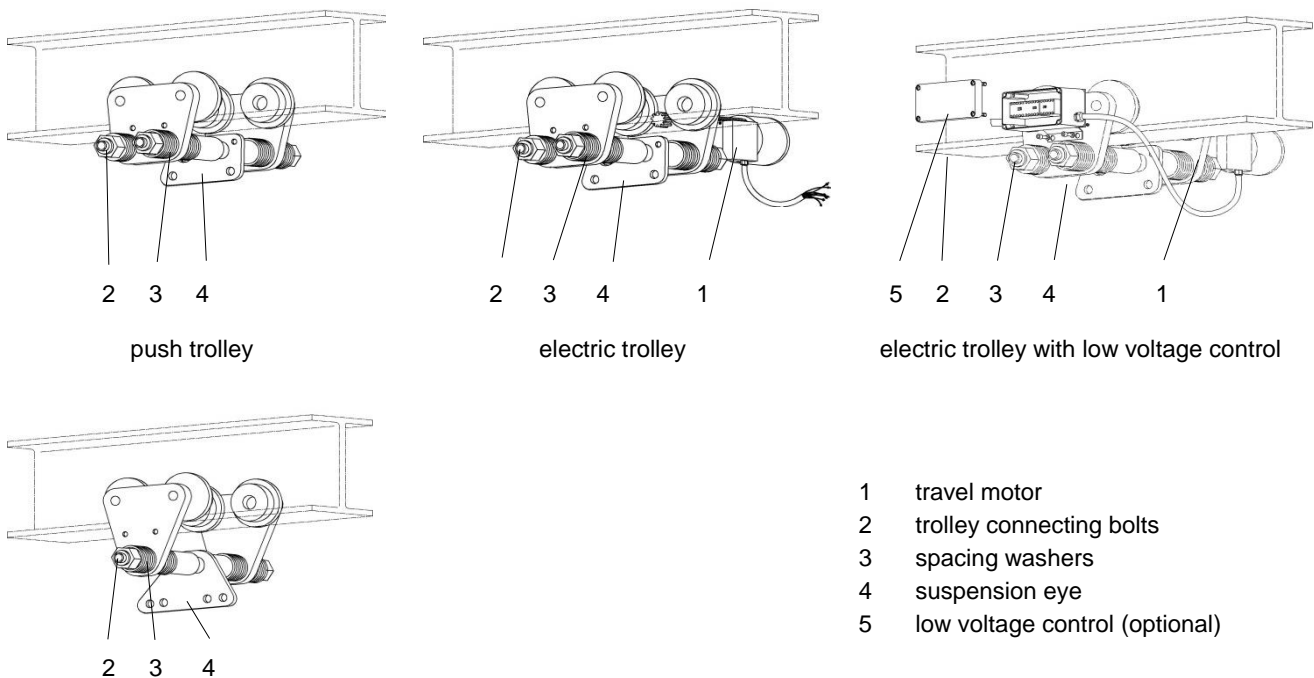


Elastic bumpers must be installed at all ends of the track, about the height of the axis of the running wheels. Additionally, the trolley can be fitted out with an electric cross-bar limit switch. Actuating bars at the track must be installed by user.

Radius of curves: If the electric trolley must run along curves the trolley motor has to be assembled at the outside of the curve all times.

trolley with max. load capacity (kg)	radius of curves (m)
up to 1000	1
up to 3200	1.5
up to 6300	2

table 6: radius of curves



trolley with one connecting bolt

figure 22: trolleys

4.1 Mechanical assembly

4.1.1 Positioning the electric chain hoist underneath the trolley



direct control

low voltage control

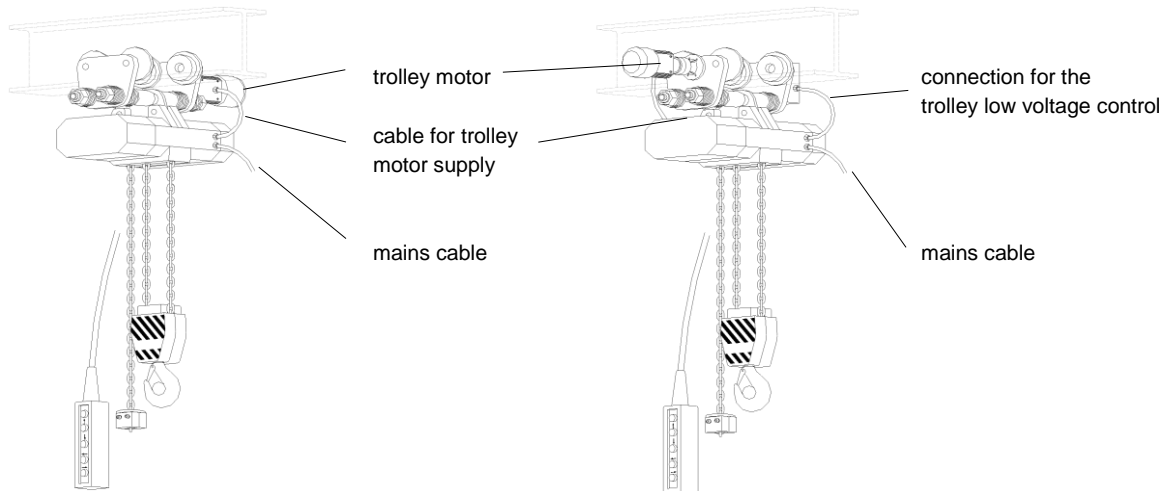


figure 23: Positioning the electric chain hoist underneath the trolley

4.1.2 Assembly of the trolley with two connecting bolts

The two trolley connecting bolts are to be fixed to the lateral boards so as to allow a space of one to two millimetres between the running wheel flange and the girder flange. The width is adjusted by inserting spacing washers **symmetrically**. The suspension eye is mounted between the spacing bushes on the trolley connecting bolts. Tighten the self-locking nuts with a torque wrench. Afterwards the electric chain hoist is mounted onto the suspension eye as described in chapter 3.1.3.1.



self-locking nut	tightening torque (Nm)
M16x1.5	75
M22x1.5	150
M36x1.5	560

table 7: tightening torques

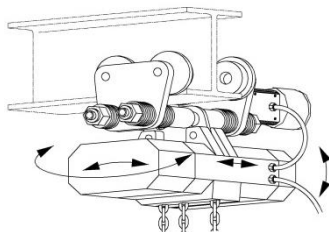


figure 24: flexibility between chain hoist and trolley

Caution! Movement in the directions shown by the arrows in figure 24 must still be possible between the hoist and the trolley when assembly is complete.!



4.1.3 Assembly of a trolley with one connecting bolt

The electric trolley with one connecting bolt is assembled as described in chapter 4.1.2.
Afterwards the electric chain hoist is mounted onto the suspension eye as described in chapter 3.1.3.2

4.2 Electric trolleys with compensation of weight

4.2.1 Counterwheels

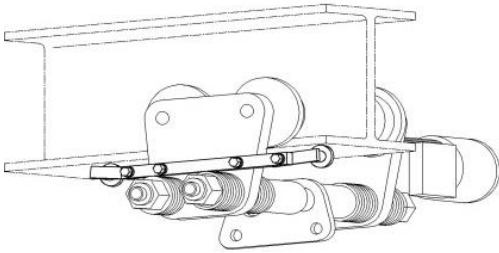


figure 25: counterwheels for electric trolley

If electric trolleys, especially with double speed, are used on girders with a very small width it may be necessary to provide a device, which prevents tipping up of the trolley.

This unit can be retrofitted to each trolley. It does not influence any features of a standard trolley, but cannot be used if the beam is equipped with connection plates welded underneath the beam.

Assembly guide:

- The unit has to be fitted in threaded holes at all the side-plates with screws M8×20.
- The counterwheels have to be adjusted that it touches the bottom of the girder.
- The screws, which adjust the counterwheels, have to be tightened to a torque of 40 Nm.
- To check the behaviour, the trolley should be travelled along the whole beam.
- The low voltage control box (if required) has to be assembled to the other side of the trolley as usual with two screws M8×10 (see figure 22).

4.2.2 Counterweight

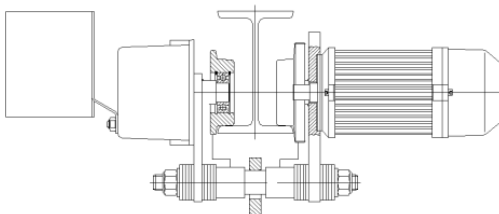


figure 26: counterweight for electric trolley

If electric trolleys, especially with double speed, are used on girders with a very small width it may be necessary to provide a device, which prevents tipping up of the trolley. This unit can be retrofitted to each trolley.

This kit does not influence any features of a standard trolley.

The replacement of the counterwheels by counterweight will be done in progress.

4.3 Electric connection of electric trolleys

4.3.1 Direct control

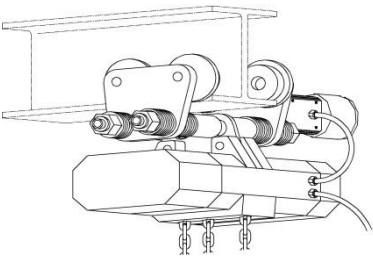


figure 27: hoisting gear with electric trolley

An electric cable which is approx. 0.5 m long is located on the travel motor of the electric trolley for connecting to the electric chain hoist. The terminals are in the electric chain hoist casing. Connection should be carried out as shown in wiring diagram.

The control pendant has buttons for controlling the travel motion. The motorized trolley for fast and precision travelling speed rates has buttons with step switching.

4.3.2 Low voltage control 24 V (option)

The contactors for switching the trolley motor are located in a special contactor box. This contactor box must be assembled with two screws M8x10 DIN 933 on the side plate without motor.

Connect the two leads protruding from the contactor box to the terminal section and to the trolley motor as shown in wiring diagram. After electric connection, check that the electric chain hoist and trolley are functioning correctly.

4.4 Type designation for trolleys

Explanation of trolley type designation for trolleys with suspension eye:

type-example:		HF	N	/	500		
		EF	S1	/	500	/	16
		EF	S2	/	2000	/	5+20
HF-	push trolley	flange width		load		travelling speed	
EF-	electric trolley	N, S1, S2		capacity		for electric trolleys	
HA-	winding trolley			in kg			

Explanation of trolley type designation for trolleys with one connecting bolt:

type-example:		EHF	N	/	1000		
		EEF	S1	/	500	/	16
		EEF	S2	/	2000	/	5+20
EHF-	Push trolley with one connecting bolt	flange width		load capacity		travelling speed	
EEF-	Electric trolley with one connecting bolt	N, S1, S2		in kg		for electric trolleys	

5 Tests

Use of the electric chain hoist is possible in accordance with accident prevention regulations for:

- Wind lasses, lifting and pulling equipment DGV V54 (BGV D8)
- Cranes DGV V52 (BGV D6)

The dynamic and static tests are accomplished acc. to EC Machinery Directive by manufacturer.

5.1 Test when used according to DGV V54 (BGV D8) § 23

A trained specialist must test the equipment before starting operation for the first time and after extensive alterations.

5.2 Test when used according to DGV V52 (BGV D6) § 25

An authorized expert must test the cranes before starting operation for the first time and after extensive alterations. The electric chain hoists are type tested.

5.3 Regular tests

- A trained specialist must test the equipment, cranes and supporting structures once a year. It may be necessary to carry out tests more often if the operating conditions are very demanding, that means for example high percentage of use with full load, dusty or aggressive environment, high duty rate, high number of operation cycles.
- Only **experts** appointed by the trade associations and experts from the Technical Control Association are considered qualified to test cranes.
- **Trained specialists** are highly qualified specialist personnel or the manufacturer's after-sales assemblers.

6 Directions and prohibitions for use

6.1 Directions for use

- The load may only then be moved if it is slung securely and no person is standing near enough to be at risk and when the operator has received an all clear signal from the person slinging the load.
- All electric chain hoists are suitable for an environment temperature of -20°C to $+40^{\circ}\text{C}$ as standard. For use in higher environmental temperature the duty rate has to be reduced accordingly.
- The protection class is IP 54 as standard.
- The motors are manufactured according to the requirement of Insulation Class F.
- The load must be placed vertically under the electric hoist before lifting.
- The motion directions are indicated with symbols on the control buttons.
- Do not turn the chain over edges.
- Only the load, the hook block or hook tackle may be pulled to move an electric chain hoist with manual travelling gear.
- Consult the manufacturer or supplier, if the hoist is to be used in aggressive environment (for instance acid or alkaline or dusty environment or to transport inflammable or other dangerous loads).
- For use for molten metals and similar hazardous materials – please ask the producer.
- Don't lower the double fall hook if the chain gets slack.
- The chain leaving and entering the hoist in inverted use must be kept tight at all times.
- Repair work has to be done only if mains supply is switched off and no load is suspended on the hook.
- After switching off the emergency stop the reason for this failure has to be found out by trained people and the hoist can only be used if all possible failures are removed.
- Lifting the load from the ground has to be done with the lowest possible speed. Before doing this slack sling chains or ropes have to be tightened carefully.
- Cranes in outdoor use require a roof for the park position.
- The S.W.L. of the trolley must be equal to or greater than the S.W.L. shown on the load-hoisting accessory.



6.2 Prohibitions for use

- **Inching mode**
- **Permanent run against the rubber washers of the lowest and highest hook position or lifting loads with bigger weight as marked on the specification plate**
- **Transporting people**
- **Using the hoist with people being underneath the load**
- Starting initial operation before an expert or a trained specialist has inspected the equipment
- Moving loads heavier than the nominal load
- Pulling loads which are tilted or dragging loads
- Tearing off loads
- Removing the cover of vessels under vacuum
- Moving trolley by pulling control pendant or control cable, even if these are relieved of strain
- Carrying out repairs without disconnecting the current supply and without special knowledge
- Use of hoists with worn rubber elements or without rubber buffer on hook tackle, hook block or lift limiter
- Using the lifting chain to sling the loads
- Operation with twisted chain, caused by swivelled hook block or wrong mounted fix chain end
- Using a lifting chain, which is longer than the chain box capacity stated under the chain box
- Using the hoist with higher duty rate as marked on the specification plate
- Using the hoist without having done the regular inspection
- Operation after the S.W.P. is exceeded
- When the hoist with trolley is used at girders, which are lower than or equal to 2.5 m above working platforms it is not allowed to grab on the trolley travel girder. Touching the chain during operation is not allowed.



7 Maintenance

- All maintenance work must be carried out by trained specialists.
- The maintenance table (table 8) lists the parts and functions to be tested and the necessary maintenance work. Defects must be rectified immediately by a trained specialist
- Maintenance work may only be carried out if the electric chain hoist is not loaded and the mains is switched off so that the current supply is disconnected.
- Shorten the periods between maintenance work in very demanding operating conditions, e.g. multi-shift operation, high number of switching actuation, poor environmental conditions.



Checking for wear

- Check suspension hook and load hook for deformation (measure punch spacing) and cracks.
- The chain sprocket in the hook block must be replaced if the running surface is worn by about 1 mm.
- **Replace rubber buffer if worn!**

7.1 Test and maintenance works

Please note chapter 1.2 !

If the hoist is working hard (two or three shifts, high percentage of work with nominal load, dusty or high temperature environment) this maintenance work has to be done more frequently.

	check		
	daily	3 months	yearly
visual check of the whole equipment	•		
function check of the brake	•		
of the lift limiter		•	
maintenance or adjustment of the brake			•
of the clutch			•
wear of the load chain (see chapter 7.4)		•	
renew chain end suspension at $d_m \leq 0,9d$			•
lubrication of the load chain		•	
wear of the rubber elements (visual check)	•		
lubrication of hook block and hook tackle acc. to chapter 11.2 / check condition of the pin which prevent the hook nut from loosening and chisel punch marks			•
check condition of safety latch	•		

	check		
	daily	3 months	yearly
universal checks of all screws hold down, chain guide safety devices			• • •
check of the condition and safe positioning of the chain box and condition of the canvas material as well		•	
check of the electric cable, power cable and control pendant			•
check of the trolleys and wheels			•

table 8: test and maintenance works

The electric chain hoist is designed in accordance with FEM 9.511. According to FEM 9.755 the residual safe working period must be established and documented every year.



If the residual safe working period calculations are fully available, then the electric chain hoist must be subjected to a general overhaul when the theoretical safe working period (maximum safe working period) has been reached.

If the usage of the electric chain hoist is not certified, then pursuant to FEM 9.755 the general overhaul must be carried out not later than after 10 years.

7.2 Maintenance and adjustment of the brake

7.2.1 Brake B1.1-B5.1

Caution! The brake is maintenance-free.
Never open the brake.
Never try to adjust the air gap.



The brake is mounted as a complete unit on the motor cover.

B1.1

B2-B5.1

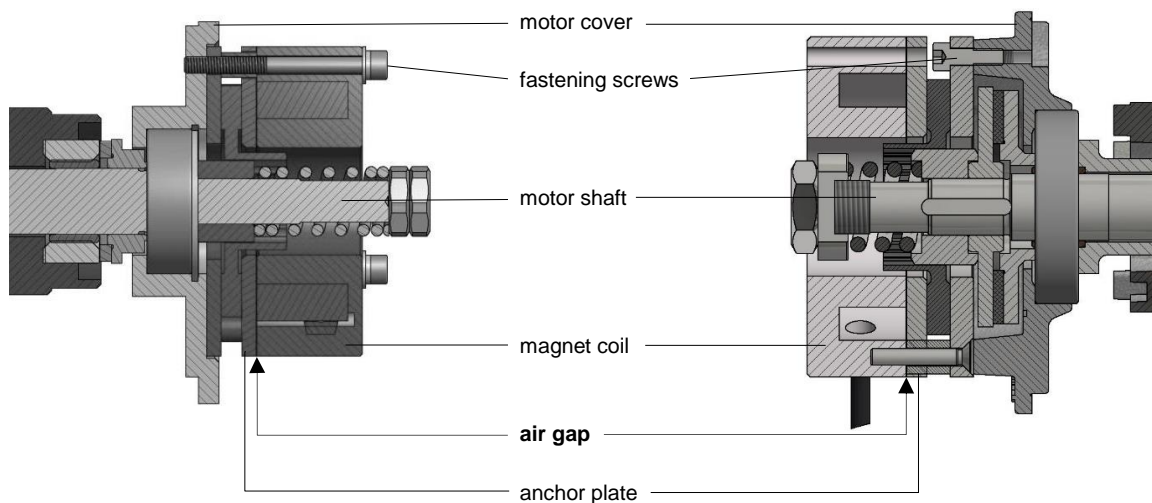


figure 28: Construction of the brake B1.1 and B2-B5.1

Caution! If, after a long period of use, the air gap between the magnetic coil and anchor plate has increased the brake must be replaced.



The tightening torque of the fastening depends on brake type.

Replacement of the brake

Type	Brake type	Screws DIN 912	Tightening torque [Nm]	Coil resistance R20 nominal [Ω] ¹	Air gap S _L nominal [mm]	Air gap S _L maximal [mm]
B1.1	BFK 457-05	3xM4	2,8	3184	0,15 ±0,1	0,35
B2-B5.1	BFK 457-08	3xM5	5,5	1681	0,2 ±0,1	0,6

¹ at 205V coil voltage

table 9: technical data of the brakes

1. Loosen the screws of the cap.
2. Remove the cap.
3. Disconnect brake cables.
4. Loosen the three fastening screws of brake unit.
5. Remove worn-out brake unit.
6. Fit new brake unit onto the motor shaft.
7. Tighten the three cylindrical screws of the new brake (in scope of supply of the brake unit).
8. Tighten the screws (tightening torques see table 9).
9. Connect brake cables according to wiring diagram.
10. Replace cap.

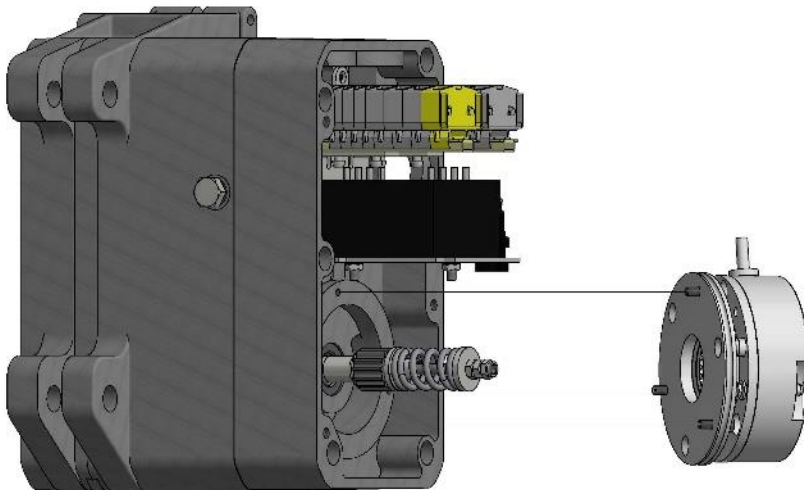


figure 29: Replacement of the brake B1.1-B5.1

7.2.2 Brake B6-B9.1

The brake needs very little maintenance.

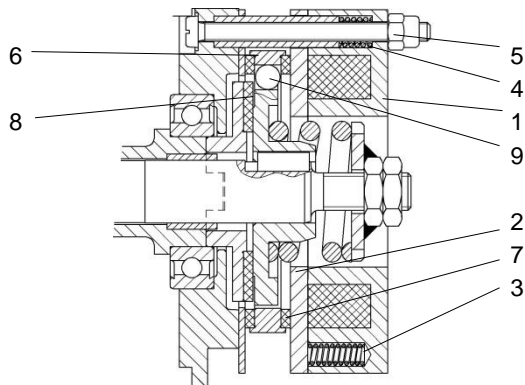


figure 30: Construction of the brake B6-B9.1

The brake consists of the magnetic coil (1), the plate (2), brake pressure springs (3), the 3 positioning springs (4), the 3 self-locking nuts (5), the brake disc (6) with the 2 pieces of brake lining (7) and the brake hub (8), which is connected by 3 balls with the brake disc (6).

7.2.2.1 Adjusting the brake B6-B9.1

Caution! If, after a long period of use, the air gap between the magnetic coil (1) and anchor plate (2) has increased to approx. 0.8 mm, the brake must be adjusted.



1. Put thickness gauge between magnetic coil (1) and anchor plate (2).
Measurements have to be distributed in 3 places around the circumference. Insert thickness gauge not more than 10 mm into the air gap.
2. Tighten the 3 self-locking nuts until the air gap between magnetic coil and anchor plate reaches the dimension as defined.
3. Finally check the right thickness and regularity of the air gap with thickness gauge.
4. After repeated adjustment of the brake, the 3 self-locking nuts must be replaced as their locking function becomes ineffective.



figure 31: adjusting the brake B6-B9.1

7.2.2.2 Replacing the brake lining B6-B9.1

For version B6 - B9.1 the brake lining (7) has to be replaced, when the thickness of it is less than 3.0 mm.

7.2.3 Electric control of brake - function

The brake is supplied through a rectifier circuit.

It operates according to the fail-safe principle. If there is a power failure, the brake acts automatically so that the load is held securely in every position.

To shorten the braking distance the brake is operated in a DC circuit.

The different methods of connection in direct control and low voltage control can be seen in the respective wiring diagram.

7.2.4 Checking brake functioning

When braking the nominal load during the lowering process, the load should be braked after approx. two chain link lengths and the load should not be braked in a jerking manner.



7.3 Sliding clutch

The sliding clutch is located between the motor and the brake, so that the force is transmitted from the brake to the load via form-fit gear parts. Even with heavy clutch wear, uncontrolled load reduction is not possible, as the brake can hold the load in any position.

The slipping clutch is set so that the rated load is safely lifted under all operating conditions.

The sliding clutch operates as a dry clutch using an asbestos-free lining.

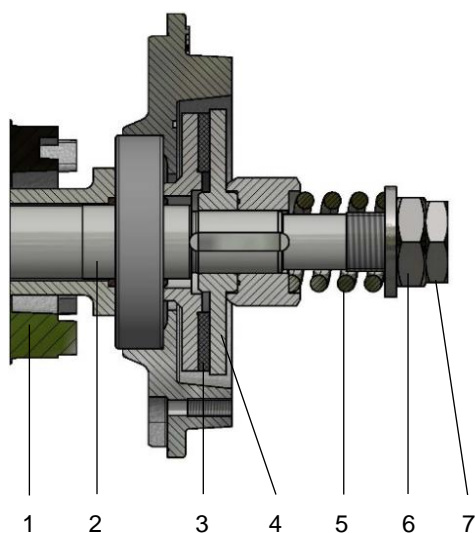
The slipping clutch is an **emergency stop** and must not be approached during operation.

This means that the hook block or the hook tackle for the highest load position or the lift limiter for the lowest load position must not be driven up to the housing of the electric chain hoist during normal operation.



7.3.1 Structure of the sliding clutch

B1.1-B5.1



B6.1-B8.3

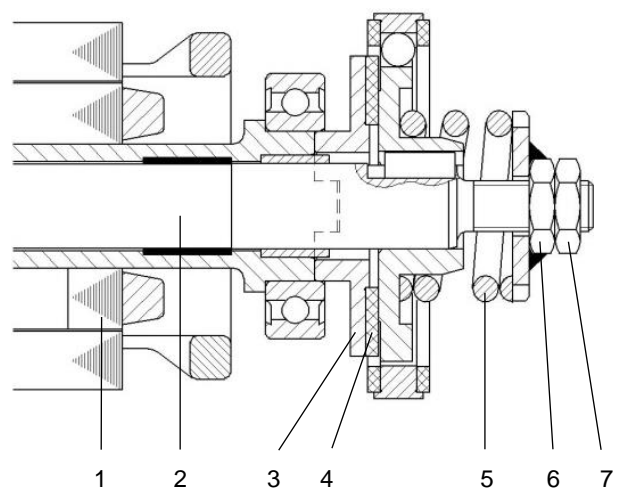


figure 32: structure of the sliding clutch

7.3.2 Mode of operation of the sliding clutch

The rotor (1) is mounted on the motor pinion shaft (2) via two maintenance-free bearing bushes. The torque of the motor is transmitted by the clutch lining (3) to the clutch hub (4), which is firmly connected to the motor pinion shaft (2) with a feather key. The clutch torque for the power transmission is adjusted externally with the adjusting nut (6) on the compression spring (5) and secured with the lock nut (7).

7.3.3 Adjusting the clutch

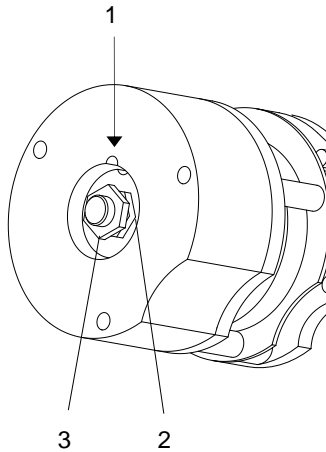


figure 33: adjusting nut for clutch power

1. only B6.1-B8.3: Turn adjusting nut (2) with welded on spring plate until the groove of the spring plate is aligned with the magnetic body groove (1).
2. only B6.1-B8.3: Insert a rod (screwdriver) into the groove of the magnetic body and hold the spring plate of the adjusting nut. Then loosen the lock nut (3).
3. Tension the compression spring sensitively with the adjusting nut (2) so that the test load is just lifted.
4. Secure adjusting nut (2) again with lock nut (3) according to the torque specified:

clutch version B1.1	hex. nut M10×1.5 ISO 4035	torque 15 Nm
clutch version B2-B5.1	hex. nut M12×1.5 DIN 936	torque 30 Nm
clutch version B2-B5.1	hex. nut M16×1.5 DIN 936	torque 30 Nm
clutch version B6-B9.1	hex. nut M16×1.5 DIN 936	torque 30 Nm
5. Check the clutch setting again by lifting the rated load to the highest load position and sliding the clutch. The slip time of 2-3 seconds should not be exceeded.

7.4 Load chain

Hoist chains are means of carrying which require official approval. It is, therefore, important to observe the guidelines issued by the trade association's centre for accident prevention with regard to round steel chains in hoisting operation, the guidelines for general inspection and test specifications in accordance with DIN 685-5, DGUV V54 (BGV D8) und DGUV V52 (BGV D6) und DIN EN 818-7 or equivalent regulations in the respective country.

7.4.1 Lubricating the load chain before starting and during operation

The links along the entire length of the load chain must be lubricated with a penetrating gear lubricant oil before starting operation for the first time and during unloaded operation. Subsequent lubrication, whereby the links must be cleaned first, depends on the degree of use and the operating conditions.

A dry-film lubricant, e.g. lubricating varnish, graphite powder, should be used when ambient influences are conducive to wear (sand, emery).



7.4.2 Testing of wear of the load chain

The continuous monitoring of the load chain is compulsory according to DIN 685-5 and the accident prevention regulations in DGUV V54 (BGV D8) § 27. The load chain must be tested before starting operation and after approx. 200 operating hours or 10,000 load cycles under normal conditions or more often under demanding and severe conditions. Testing must cover checking links, particularly at their points of contact, for wear, cracks, deformation and other damages.



The chain must be replaced:

- if the nominal thickness at the points of contact is reduced by 10%,
- if a chain link is elongated by 5%, or an eleven links piece of chain is elongated by 2%,
- if the links are rigid.

The chain guide and hold down must also be replaced along with the chain.

Caution! For replacement of chain only use original spare chain obtained from the manufacturer or his approved service agent.



7.4.3 Measuring wear and replacing chain

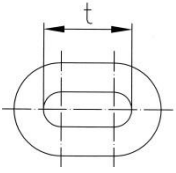
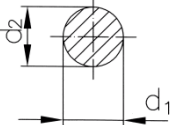
chain dimensions mm	link dimension	4×12	5×15	7×22	9×27	11×31	11.3×31
measure 1 link inside max. measurement t		12.6	15.8	23.1	28.4	32.6	32.6
11 chain links		134.6	168.3	246.8	302.9	347.8	347.8
measure chain link diameter $d_m = \frac{d_1 + d_2}{2}$ min. measurement $d_m = 0.9d$		3.6	4.5	6.3	8.1	9.9	10.2

table 10 measurement of chain dimensions

See chapter 3.1.6 and following for how to change the chain.

7.4.4 Measuring wear and replacing load hook

According to DIN 15401 part 1 load hooks have to be replaced if the length between the chisel punch marks (dimension Y) widened more than 10%. The permissible values are shown on the hook certificate in the 'Inspection book'.

7.5 Maintenance work on trolley

The checks and maintenance work on the electric trolley and push trolley have to be done in accordance with table 8 in chapter 7.1.

The brake is maintenance-free.



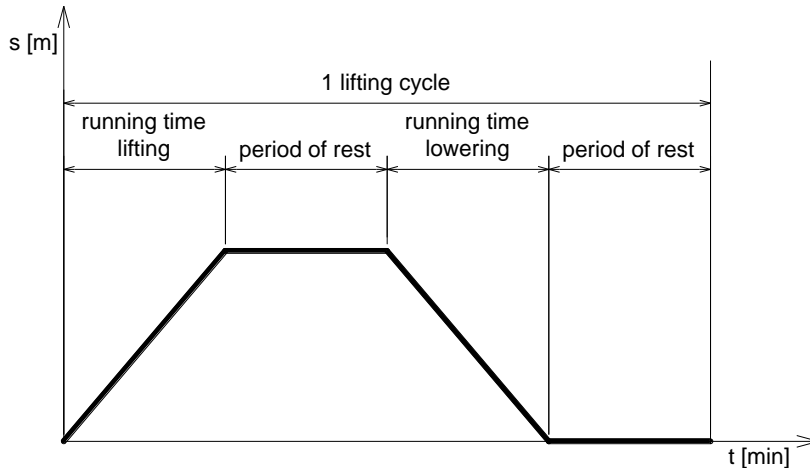
8 Duty rate of an electric chain hoist (acc. to FEM 9.683)

Caution! The duty rate and the number of operating cycles in one hour must not be higher than as shown on the specification plate of the hoist or in a technical data table.
(European regulation FEM 9.683).



The duty rate, expressed as the cyclic duration factor (c.d.f.) is the ratio of **running time to running time + period of rest**

Formula:
$$\text{c.d.f. \%} = \frac{\text{running time} \times 100\%}{\text{running time} + \text{period of rest}}$$



The duty rate is limited by the permissible degree of heat in the lifting motor. The running time is dependent on the necessary lifting height, lifting speed of the electric chain hoist and the number of lifting motions required for a particular transport procedure (unloading trucks, feeding machines). It is difficult in practice to take note of the duty rate during the lifting operation. We, therefore, give the following practical guidelines:

8.1 Short time duty

This duty type is not permissible for the slower speed of precision hoisting motors. After having reached the maximum running time a break is required and the hoist can be further used in intermittent duty mode. The permissible operating periods without cooling interval when operation starts and with a motor temperature of approx. 20° C are following:

duty group acc. to FEM 9.511	duty group acc. to ISO 4301	duty rate c.d.f.	operating period * acc. to FEM 9.683 (t_B in min)
1 Bm	M 3	25 %	15
2 m	M 5	40 %	30

* The operating periods t_B of the electric chain hoists are higher than required acc. to FEM 9.683.

table 11: duty rate for short time duty

8.2 Intermittent duty

Operation must be interrupted whenever the highest permissible operating time is reached. The following breaks are necessary depending on the duty rate c.d.f. of the electric chain hoist:

duty rate c.d.f.	break (min)
15 %	5 times running time
20 %	4 times running time
25 %	3 times running time
30 %	2.5 times running time
40 %	1.5 times running time
50 %	1 times running time
60 %	0.66 times running time

table 12: intermittent duty

8.3 Example

The electric chain hoist type 500/1-10 is to lift loads of 500 kg to a height of 5 m.
At the beginning of the lifting operation the electric chain hoist has a temperature of approx. 20 °C.

Performance data:

load capacity	500 kg	lifting speed	10 m/min
duty rate	40 %	duty group of the hoist	2 m

$$\text{c.d.f.} = \frac{5 \text{ m lifting} + 5 \text{ m lowering}}{10 \text{ m/min lifting speed}} = 1 \text{ min for each lifting cycle}$$

During the operation without break (short-time duty = max. 30 minutes without break acc. to FEM 9.683) max. 30 lifting cycles are possible.

After 30 minutes of operating time, 1.5 minutes break for each minute of operating time must be taken (i.e. 1.5 times the operating time). This break is usually necessary for slinging and taking off loads.

Caution! Cooling periods are imperative for extreme lifting heights (from 10 metres on). Low lifting speed should only be used for precise lowering and lifting. It is not suitable when greater lifting heights shall be driven through.

Option! To protect the lifting motor a thermal overload device is offered as an option (24 Volts low voltage control is required!).



9 Duty rate of the electric trolleys (acc. to FEM 9.683)

If the hoist is equipped with an electric trolley the operators have to take care of the duty rating of the trolley as well. This especially applies to very long track systems.

electric trolley type	duty rate (%)	running time (min)
trolleys with single travelling speed	40 %	30
trolleys with double travelling speed	40/20%	30*

* The ratings are relevant for the fast travelling speed.

table 13: duty rate for the electric trolleys

10 Strainer clamp for the control cable

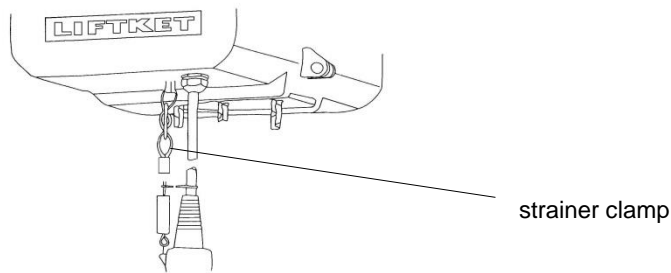


figure 34: assembly of the strainer clamp

Caution! The strainer clamp must be fixed in such a way as to prevent any tensile forces affecting the control cable. Pulling the chain hoist at the control pendant by means of the strainer clamp is not permitted.



11 Lubrication

11.1 Lubrication of the gear

The gear is already filled with oil by the manufacturer. The oil must be changed if the hoist is going to be overhauled. The oil has to be disposed in accordance with the law of environment protection.

Use oil for 220 mm²/s at 40° C. The necessary amount of oil needed for the different versions of electric chain hoists is shown in table 14.

Version (basic type)	Amount (litre)
B1.1	0.2
B2 - B5.1	0.25
B6 - B9.1	0.5

table 14: amount of oil

Alternative oils are:

producer	oil designation	remarks
Tectrol ©	Tectrol Gear CLP 220	
Tectrol ©	Tectrol Food CLP 220	food industry
Fuchs Europe ©	Renolin CLP 220	
Mobil ©	Mobil SHC 630	
Shell ©	Omala 220 S2 G220	
Total ©	Carter EP 220	
Castrol ©	Alpha SP 220	

table 15: alternative oils

11.2 Lubrication of the chain

The following lubricants are recommended for lubrication of chain depending on operating conditions:

producer	lubricant designation	remarks
Tectrol ©	Kettenöl K50	
Tectrol ©	Tectrol Multi Spray XL	dry lubricant
Tectrol ©	Food Kettenspray	food industry
Klüber ©	Klüberoil CA 1-460	
Klüber ©	Klüberoil 4UH 1-1500	food industry
Castrol ©	Optimol Viscogen KL300	
Fuchs Lubritech ©	Ceplattyn 300	dry lubricant
Fuchs Lubritech ©	Stabylan 2001	
Fuchs Lubritech ©	Stabylan 5006	
Fuchs Lubritech ©	Decordyn 350	
Fuchs Europe ©	Renolit SO-GFB	grease
Klüber ©	Microlube GB 00	grease

Table 16: Alternative lubricants for chain

11.3 Lubrication of the hook block and hook tackle

Lubricate the anti-friction bearings on the hook and the chain sprocket after approx. 20,000 lifting cycles or once a year, if in heavy use shorten the interval, use a special anti-friction bearing grease.



Lubricants recommended for lubrication of bearings:

producer	lubricant designation
Tectrol ©	Tectrol Spezial-Fett LX 2
Fuchs Europe ©	Renolit Duraplex EP3
Fuchs Lubritech ©	Lagermeister LX EP2

Table 17: Alternative lubricant for bearing

11.4 Lubrication of the trolleys

The pinion, the geared wheels and the roller bearings of the electric trolley have to be lubricated with grease once a year or after 10,000 driving cycles, if in heavy use the interval has to be shortened.



Lubricants recommended for lubrication of gearing:

producer	lubricant designation
Tectrol ©	Tectrol Spezial-Fett LX 2
Fuchs Europe ©	Renolit Duraplex EP3
Fuchs Lubritech ©	Lagermeister LX EP2

Table 18: Alternative lubricant for gearing of the trolley

11.5 Auxiliary materials

Following threadlocking pastes are recommended for threadlocking of screws:

producer	designation	characteristics
Weicon	Weiconlock AN 302-42	locking paste, appropriate to connections up to M36, breakaway dismantle torque min. 14 -18 Nm
Henkel	Loctite 243	locking paste, appropriate to connections up to M20, breakaway dismantle torque min. 20 Nm

table 19: locking pastes

12 Measures to be taken at the end of the S.W.P.

After the hoist or its components have reached the end of the S.W.P. the hoist or its components have to be overhauled or to be taken finally out of operation.

The parts have to be disposed in accordance to the laws of environment protection. Metals, rubber, plastics have to be disposed or recycled separately.

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The advice contained within this manual should be implemented by the appropriate skilled and qualified operators of industrial hoists. Further information for other fields of operation are not considered herewith.

If changes to the normal operations are discovered (such as unusual noise, vibrations, higher input current or frequently blowing fuses) the hoist has to be taken out of operation and the load area has to be isolated because a fault is possible, which can result in danger to people or goods. The operator or owner of the hoist has to call a trained specialist to repair the hoist.

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