

LIFTKET

Operating instructions


STAR LIFTKET
Electric chain hoists





Please do not use the hoist until all operators have carefully read this manual and have signed the form on the last page.


LIFTKET Hoffmann GmbH

Dresdener Straße 64-68
04808 Wurzen / Germany

 +49-3425-89 24-0

 +49-3425-89 24-99

 sales@liftket.de

 www.liftket.de

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Original operating instructions

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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 those lifted loads (with trolleys). Every other mode of use is prohibited and at the operator's own risk. Prohibited operations (see topic 0) are especially life threatening.

Please ask the producer about any special mode of use in advance.

Using the hoist to carry people is strictly prohibited!

The modern design of the LIFTKET hoists guarantees safety and economic use.

The patented safety clutch system is located between the motor and brake. This enables the brake to hold the load without any power transmitted by the clutch. The brake acts directly on the load via the gearbox by using form-fit elements only. The friction clutch does not transmit any load while the brake is on.



Before first use please make sure that all electrical wires are connected safely, that all wires are not damaged and that the equipment can be switched off with a main switch. It is the responsibility of the operator to make sure that all suspension points of the hoist are calculated to safely withstand the dynamic forces caused by the lifting equipment.



The chain hoist can be used once it 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 safely operate the hoist and how to handle its suspension or its loads. It is compulsory to take care of the following safety advice. It may not be complete for each mode of use; please ask the producer or your local service partner if any questions remain. You should keep this manual clean, complete and in legible condition.

Neither the manufacturer nor the 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 express 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. Local legislation and directives for different countries may apply in addition to the regulations as stated in this manual (German/European).

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

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

Accident prevention regulations (DGUV)	
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)	Cranes
DGUV Vorschrift 54 (BGV D8:1997)	Electric winches, lifting and pulling equipment
DGUV Regel 100-500 (BGR 500-2.8:2008)	Hoisting accessories
DGUV Grundsatz 309-001 (BGG 905:2004)	Checking of cranes

Harmonized regulations	
DIN EN ISO 12100:2010	Safety of machinery
DIN EN 14492-2:2006+A1:2009	Cranes - Power driven winches and hoists
DIN EN 818-7:2002+A1:2008	Short link chain for lifting purposes; Fine tolerance hoist chain, Grade T
DIN EN ISO 13849-1:2008	Safety of machinery - Safety-related parts of control systems; General principles for design
DIN EN 60034-1:2010	Rotating electrical machines; Rating and performance
DIN EN 60034-5:2001+A1:2007	Rotating electrical machines; Degrees of protection provided by the integral design of rotating electrical machines
DIN EN 60204-1:2006	Electrical equipment of machines; General requirements
DIN EN 60204-32:2008	Electrical equipment of machines; Requirements for hoisting machines
DIN EN 60529:1991+A1:2000 +A2:2013	Degrees of protection provided by enclosures (IP-Code)
DIN EN 60947-1:2007+A1:2011	Low-voltage switchgear and control gear
DIN EN 61000-6-2:2005	Electromagnetic compatibility, Immunity for industrial environments
DIN EN 61000-6-3:2007+A1:2011	Electromagnetic compatibility, Emission standard for residential, commercial and light-industrial environments
DIN EN 61000-6-4:2007+A1:2011	Electromagnetic compatibility, Emission standard for industrial environments
DIN EN 82079:2013	Preparation of for use, structuring, content and presentation

Regulations and technical specifications	
FEM 9.511:1986	Rules for the design of series lifting equipment; 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 producer's guarantee depends on the adherence to 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 professionals only. The main switch must be switched off beforehand.



Authorised people must have theoretical training as well as experience in the field of cranes and hoists. They must have excellent know-how of the special regulations and must be able to decide whether the lifting equipment is in safe working condition or not.

They must fill in the forms of any maintenance work, repair work or test (for example: maintenance work on brake or clutch).

The hoist is allowed 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 its rear cover.

1.3 Spare parts

Only original spare parts must be used; the producer's guarantee is given for those spare parts only.

The producer cannot be held responsible for failures and breakdowns caused by use of unoriginal or incorrect spare parts.

2 Technical overview

2.1 Assembly options

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 push or electric trolleys, and the installation of greater hoisting and operating heights.

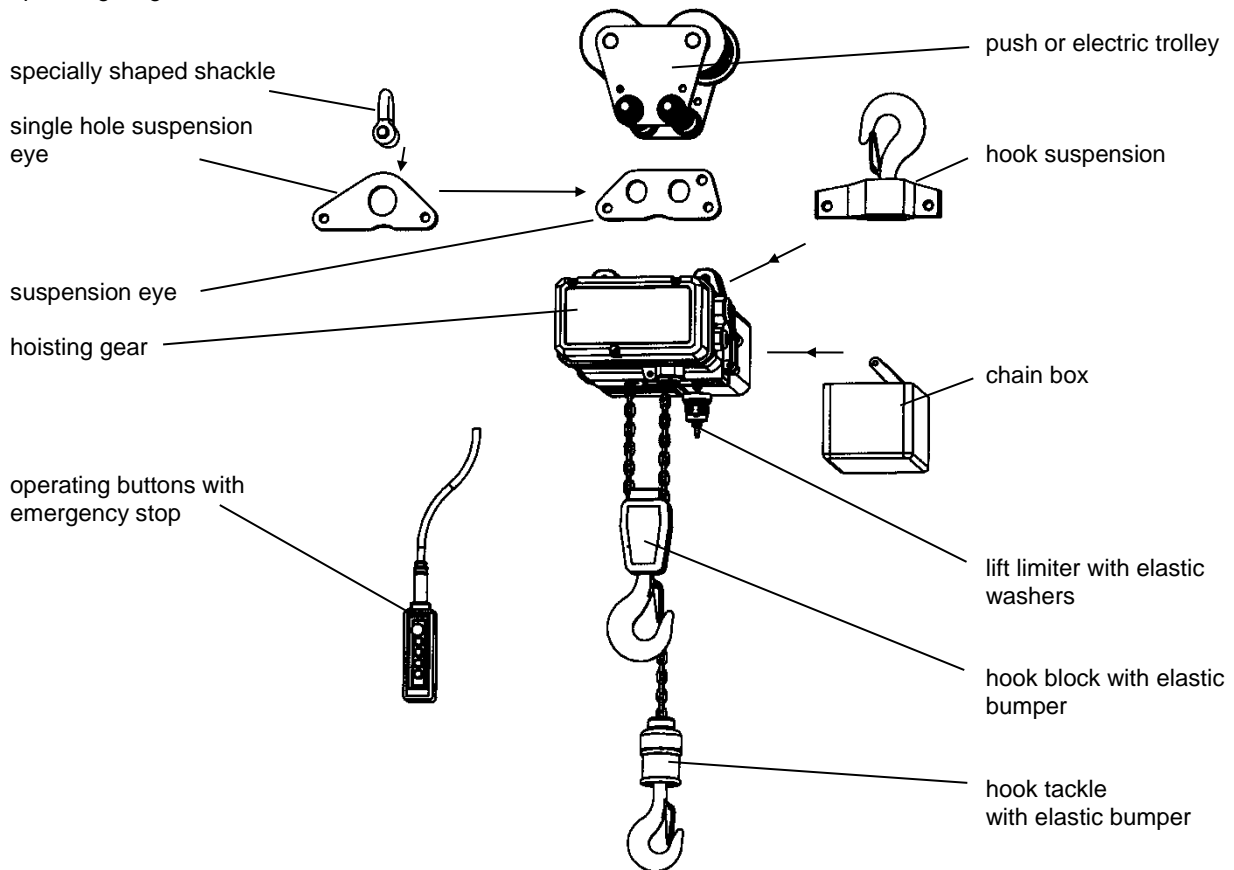


Figure 1: Assembly options

2.2 Explanation of type designation

Example: version 021 / 51 type 250 / 1 - 8 / 2

version 02 / 1 / 51

Model- Number
 Index for number of lifting speeds
 0 – lifting gear with one lifting speed
 1 – lifting gear with two lifting speeds
 index of number of hoist body

02 – size of hoist body I with chain 4×12
 03 – size of hoist body I with chain 5.2×15
 05 – size of hoist body II with chain 5.2×15
 07 – size of hoist body II with chain 7.2×21
 09 – size of hoist body III with chain 9×27
 11 – size of hoist body III with chain 11.3×31

type 250 / 1 - 8 / 2

slow lifting speed [m/min]
 main lifting speed [m/min]
 number of falls
 capacity [kg]

2.3 Sectional view

No.	Designation	No.	Designation
1	Cap for control	10	Pinion 1
2	Control	11	Load chain
3	Cap for fan	12	Suspension eye
4	Fan	13	Sprocket wheel
5	Motor pinion shaft	14	Gear cover
6	Stator	15	Cap for gear cover
7	Rotor	16	Terminal block board for power supply, pendant control and motorized trolley
8	Clutch unit	17	Brake unit
9	Hoist body	18	Double fall hook

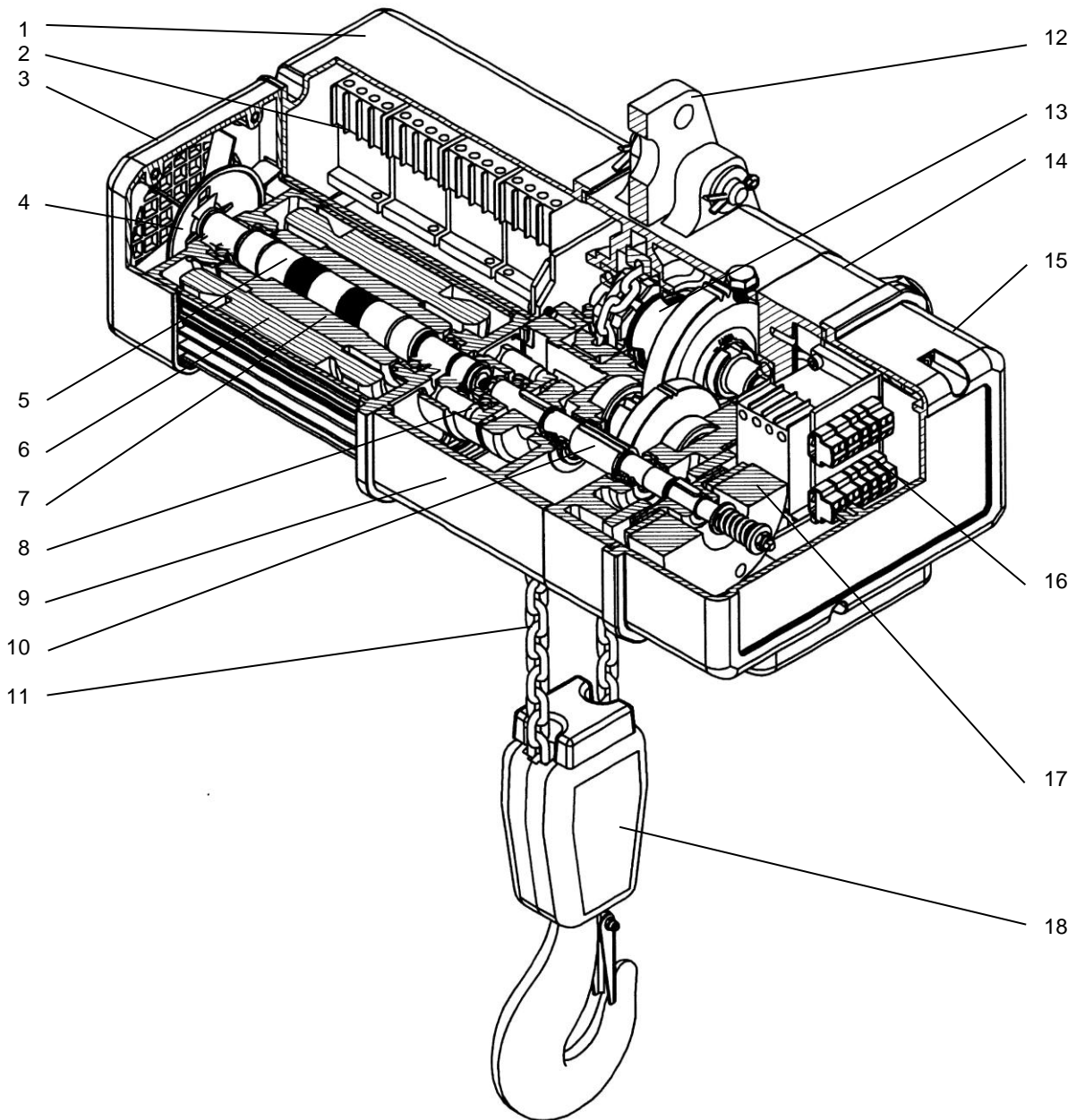


Figure 2: Sectional view

2.4 Illustration of the load chain configuration

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

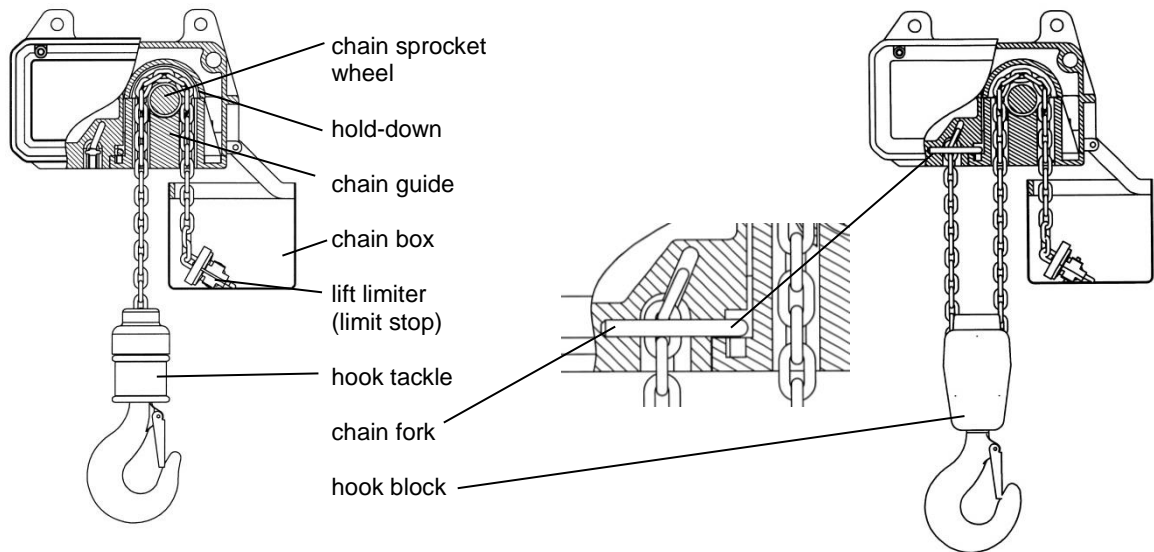


Figure 3: 3.1 Single fall version

3.2 Double fall version

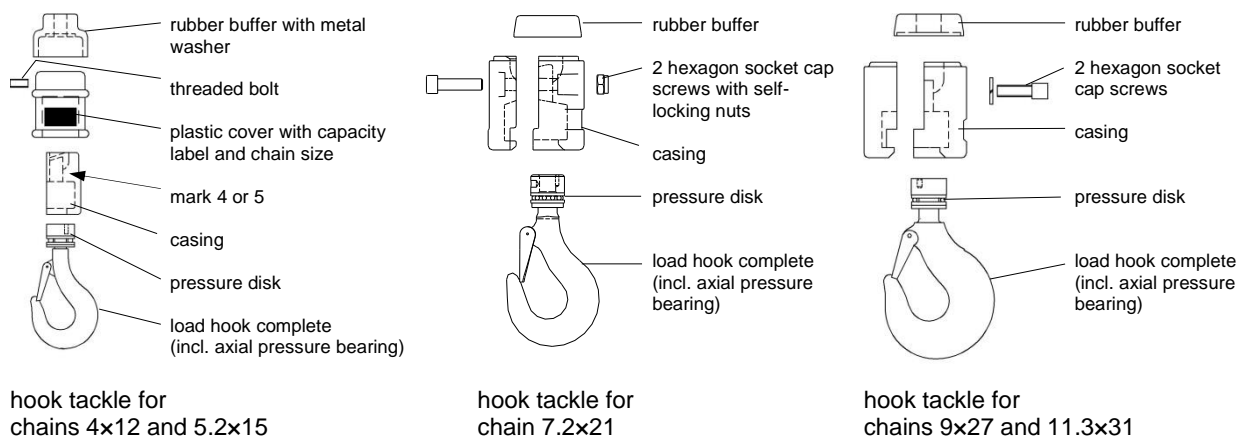
3 Assembly

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

3.1 Mechanical assembly

3.1.1 Hook tackle

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



hook tackle for chains 4x12 and 5.2x15

hook tackle for chain 7.2x21

hook tackle for chains 9x27 and 11.3x31

Figure 4: Details of the hook tackle

During maintenance work the condition of the load hook must be checked (wear and centre punch spacing). For the 4x12 mm and 5.2x15 mm hook tackle the plastic cover must 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 must be checked at regular intervals. If required, the axial bearing has to be cleaned and greased.

Tighten the connection screws with the following torque for the assembly of the hook tackles:

Hook tackle description	Max. load capacity [kg]	Dimension of screws	Quantity	Tightening torque [Nm]
Hook tackle for chain 4x12	250	-	-	-
Hook tackle for chain 5.2x15	500	-	-	-
Hook tackle for chain 7.2x21	1250	M10x40 DIN 912	2	35
Hook tackle for chain 9x27	1600	M12x30 DIN 912	2	50
Hook tackle for chain 11.3x31	3200	M12x35 DIN 912	2	50

Table 1: Connection screws with torques for hook tackles

3.1.2 Hook block

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

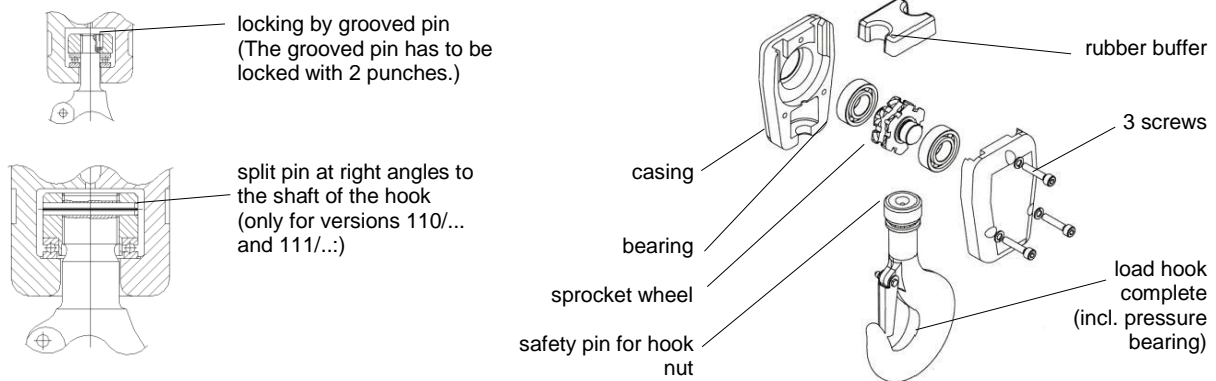


Figure 5: Details of the hook block

The condition of all of the parts must be checked (according to 3.1.1) during all maintenance work.

Tighten the connection screws with the following torque for the assembly of the hook blocks:

Hook block description	Max. load capacity [kg]	Dimension of screws	Quantity	Tightening torque [Nm]
Hook block for chain 4x12	500	M6x40 DIN 912	2/1	10/6
Hook block for chain 5.2x15	1000	M6x40 DIN 912	2/1	10/6
Hook block for chain 7.2x21	2000/2500	M8x50 DIN 912	2/1	20/10
Hook block for chain 9x27	3200	M10x50 DIN 912	2/1	35/20*
Hook block for chain 11.3x31	6300	M12x60 DIN 912	3	35

* The tightening torque of the screw near the rubber buffer is reduced.
This one screw has to be inserted into the threaded bore hole with LOOC® tide.

Table 2: Connection screws with torques 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 the position with split pins.

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

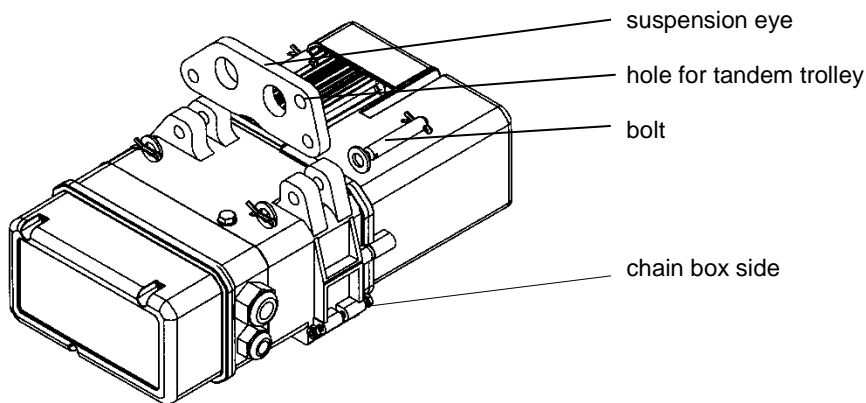


Figure 6: Suspension with suspension eye

3.1.3.2 Suspension with single hole eye

Assembly When changing from single fall use to double fall use, you must reverse the direction of the single hole suspension eye. The hole should be positioned directly above the load hook.

Caution! The relevant symbol on the suspension eye has to show either the single or the double fall hook on the chain box side.

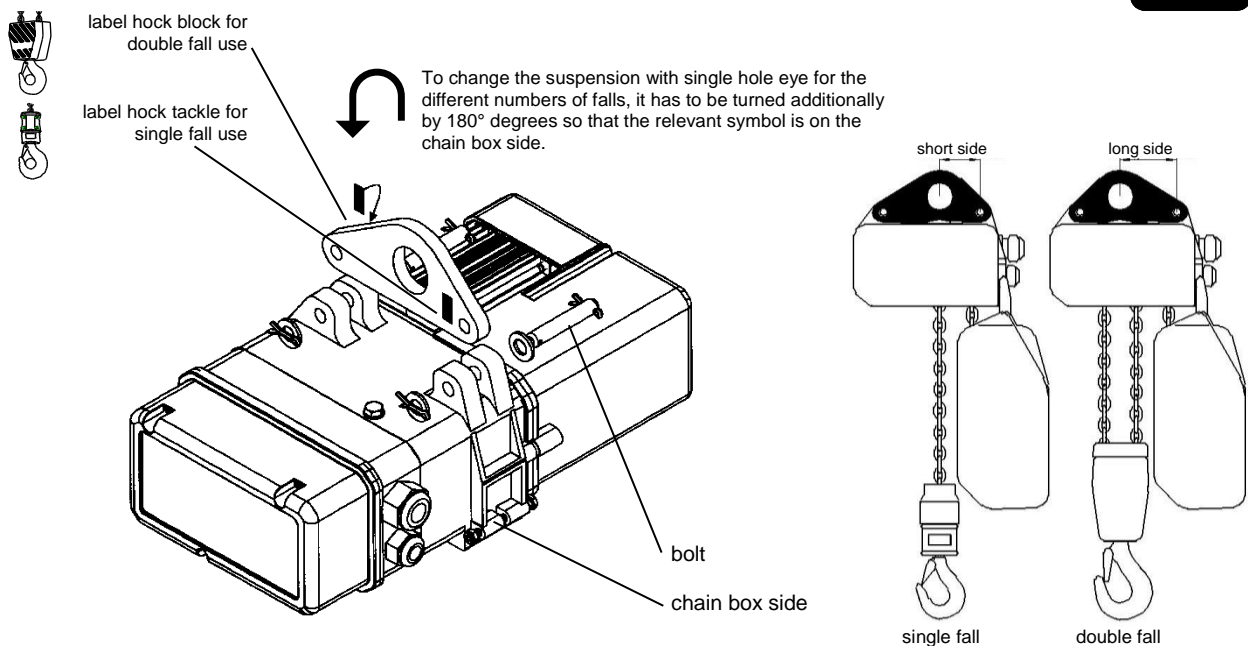


Figure 7: Suspension with single hole eye

3.1.3.3 Suspension with hook suspension

Assembly: The hook suspension included in the delivery as an option must be pinned to the casting with two pins and secured with washers and split pins.

Caution! When changing from single fall use to double fall use, do not forget to reverse the direction of the suspension hook; the hook should be positioned directly above the load hook. The relevant label on the suspension hook must be on the chain box side.

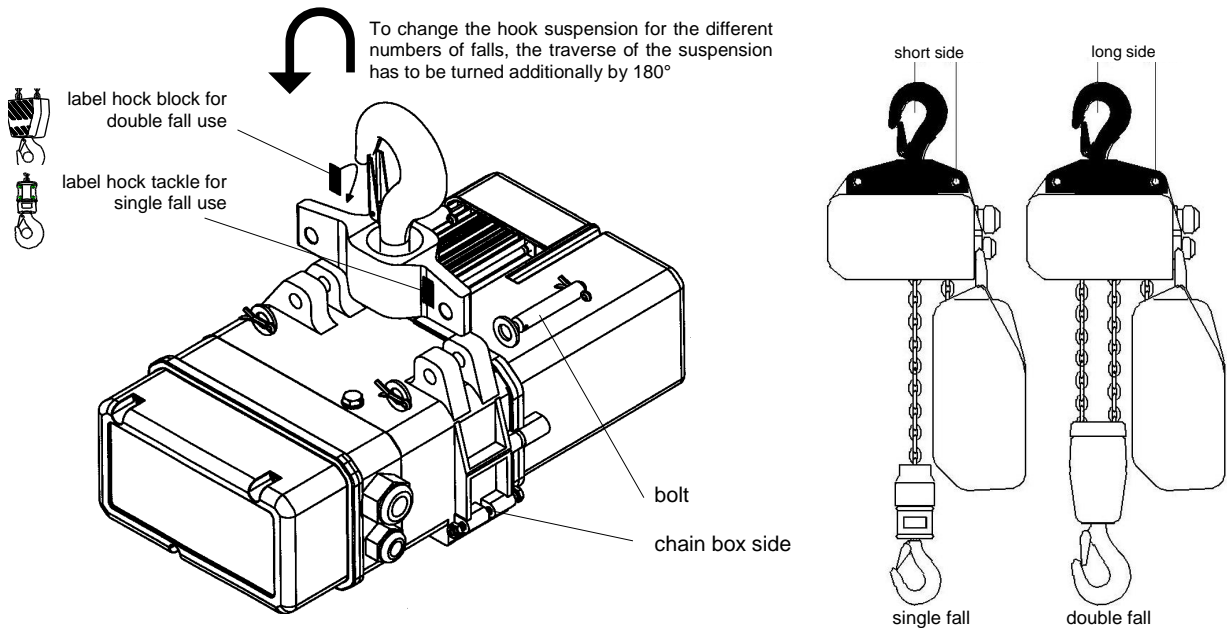
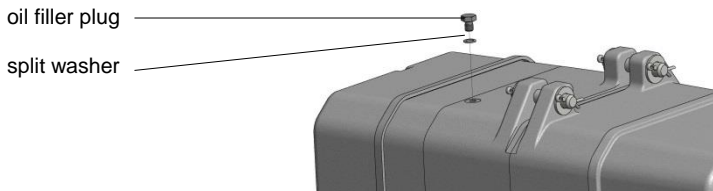


Figure 8: Suspension with hook suspension

3.1.4 Gear ventilation

Having completed the assembly, the split washer must be placed under the oil filler plug (top side of casing) to avoid oil leakage due to 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.

The use of the split washer is not recommended for outdoor use, high humidity and large differences in temperatures.



3.1.5 Chain box

3.1.5.1 Mounting the chain box



Plastic chain box

Canvas chain box

Flip bag

Figure 9: Types of chain boxes

The following chain boxes are made of plastic:

chain dimension [mm]	max. filling quantity [m]	type of chain box
5x15	10	5/10 7/8
7x22	8	

Table 3: Plastic chain box

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 is 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 must 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 approx. 10 kg inside the bag.

The suspension point of this strap for a stationary suspended hoist has to be provided by the buyer (Figure 10), as the prevailing conditions are unknown. If the hoist is fitted to a trolley, the producer will provide a tandem trolley to fit the chain box strainer strap (Figure 11).

Make sure that the strainer strap is tightened in accordance with this manual and inspected at regular intervals and corrected if necessary.

Please use the edge protectors at the suspension points (see Figure 10 and Figure 11).



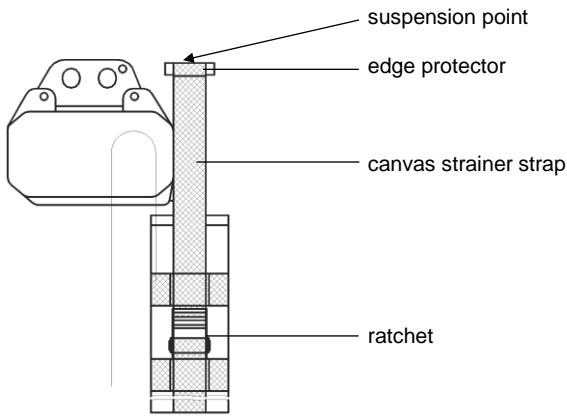


Figure 10: Stationary suspended electric chain hoist
The suspension point for the strainer strap has to be provided by the user.

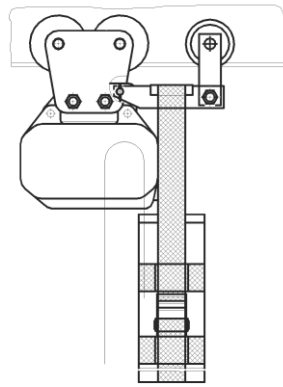


Figure 11: Electric chain hoist with chain box suspended at the tandem trolley. (Not suitable for curved beams. In special cases ask the producer).

Caution!
Not suitable for single bolt trolleys

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

free end of the strainer strap

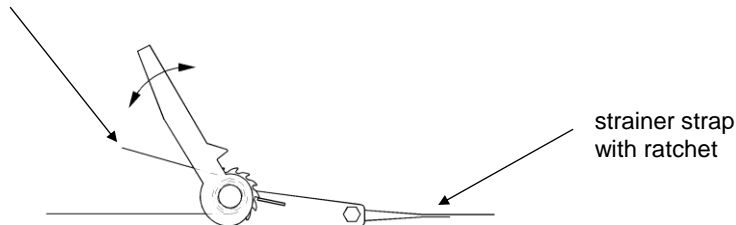


Figure 12: Scheme of the fixed strainer strap

3.1.6 Assembling the load chain without the pre-assembled piece of chain - single fall version -

1. Push the pull-in wire (special tool) into and through the chain guide cross plate (Figure 13-A) until the wire hook is pushed out on the opposite side.
2. Starting with the flat chain link (Figure 13-A): when feeding the chain into the hoist, ensure that the first link is aligned parallel to the ends (hence at right angles to the sides).
3. Move the chain in by inching the pendant (Figure 13-B).
4. Put the rubber buffer on the chain and assemble the load hook (Figure 13-C).
5. Lower the load hook to leave 50 cm of the dead end of the load chain on the dead end side.
6. Attach the rubber buffer for the lift limiter onto the remaining dead end of chain.
7. Attach the lift limiter onto the 3rd link of the dead end (Figure 13-D).
8. Assemble the chain box according to 3.1.5.1.
9. Allow the chain to run into the chain box and lubricate the entire length of the chain

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 from running out of the hoist. It is used as an emergency stop and cannot be used regularly as an operational lower limit switch.



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

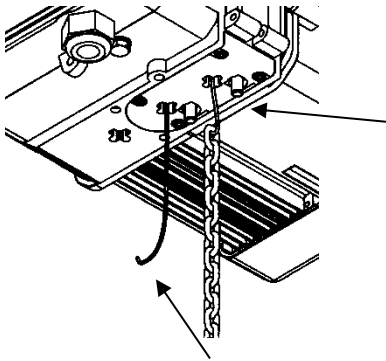


Figure 13 A

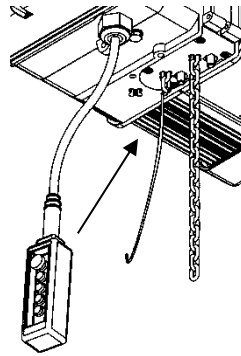


Figure 13 B

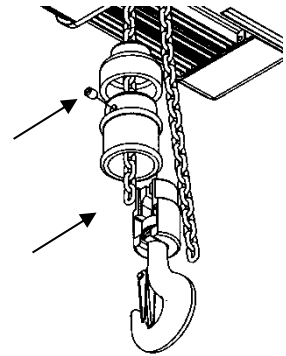


Figure 13 C

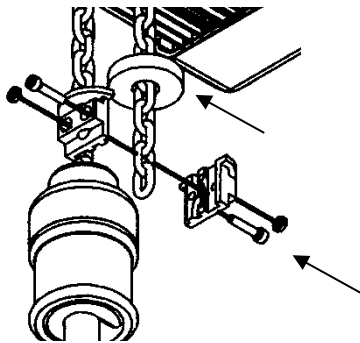


Figure 13 D

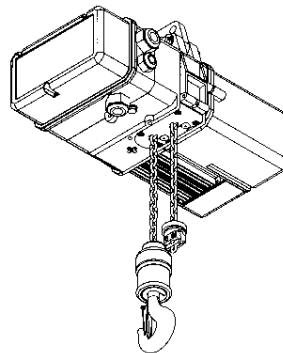


Figure 13 E

Figure 13: Assembling the load chain - single fall version

3.1.7 Assembling the load chain without the pre-assembled piece of chain – double fall version -

1. First insert the load chain into the hoist casing according to the version as described in 0. and 0.
2. Pull the chain through the hook block using the pull-in wire (special tool) (Figure 14-A).

Caution! Never allow the chain to be twisted between the chain outlet and the hook block! If the assembly (according to Figure 14-B or Figure 14-C) is not possible without a twisted chain, 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.



Loosen the four screws (

Figure 15) of the chain guide, take the chain guide out of the hoist (Figure 14-C) and pull the U-shaped fork back.

4. Pull the chain end from the hook up to the cross chain hole on the under casing of the hoist to the point where the first link protrudes inside the casing. (Figure 14-C) The fork should then be inserted into the hoist to capture this link (Figure 14-D). Pull hard on the chain to ensure that it is securely fixed.
5. Re-assemble the chain guide (Figure 14-E). Please note chapter 3.1.8!
6. Double-check that the chain is not twisted.
7. Lubricate entire length of chain

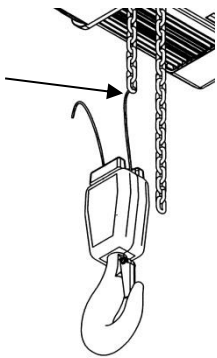


Figure 14-A

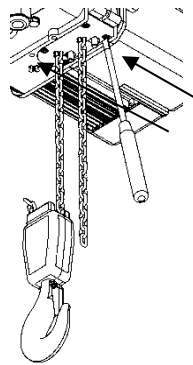


Figure 14-B

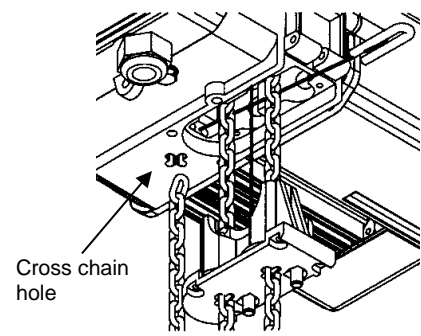


Figure 14-C

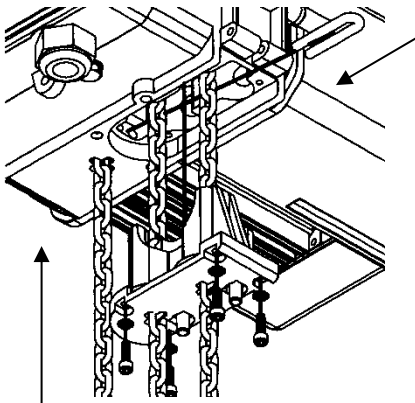


Figure 14-D

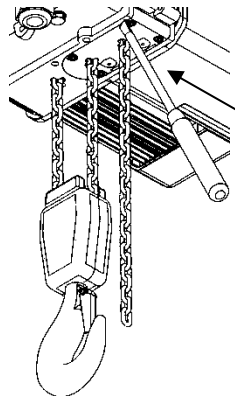


Figure 14-E

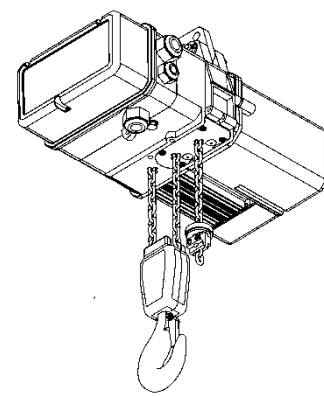


Figure 14-F

Figure 14: Assembling the load chain – double fall version

3.1.8 Replacing the load chain

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

1. Allow worn chain to move out.
2. Loosen screws (1).
3. Take out chain guide (2).
4. Press the hold down (3) out using a screwdriver.
5. Put a new hold down in by turning it through the groove over the sprocket wheel.
6. Push chain guide in and tighten the screws.
7. Fit new chain in single fall designs as described in the preceding section.

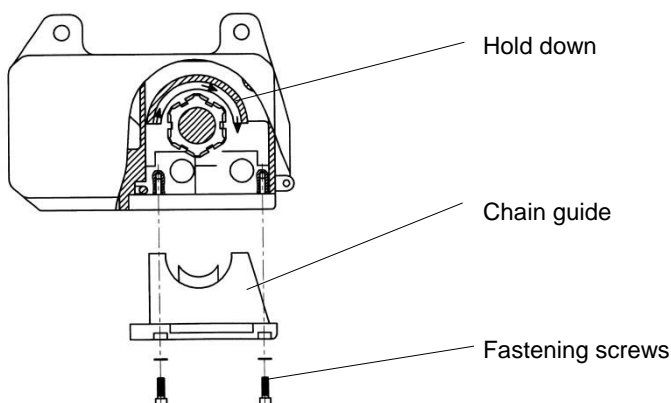


Figure 15: Replacing the load chain

Caution! The fastening screws for chain guides of the chain dimensions 9×27 and 11.3×31 must be screwed in by using locking paste during assembly. All components must be free of oil or grease in order to achieve optimal strength. For recommended locking pastes see chapter 11.5.



3.2 Electric connections

Electrical installation must comply with EN 60204-32 or relevant national regulations.

After having completed the installation, checks must be executed in accordance with the European Regulation EN 60204-32, section 19 or national regulations.

Details of the control can be seen in the wiring diagram. The electric installation complies with the currently valid EN 60204 part 32.



3.2.1 Mains power

The mains current supply (main incoming line conductor) must be able to be disconnected at all poles by means of a mains switch (in accordance with EN 60204-32 section 5.3).

Work on the electrical installation may only be carried out by trained specialists and the equipment must first be disconnected from the mains power supply.

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

Fuse (slowly blowing)	Version
6 A	02../...; 03../...
10 A	05../...; 07../...; 09../...
16 A	091/57; 091/58; 11../...

Table 4: Fuses at 400 V

Check if the mains voltage complies with that specified on the type plate.

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

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



After connecting, press the button for lifting. If the load moves downwards, interchange the L1 and L2 supply cores. The mains supply must be turned off!

If the hoist is equipped with an emergency stop (according to EN 60204-32), it will be a red mushroom-shaped button on the pendant.



The cessation of the use of the hoist by the use of the emergency stop does not constitute the correct shutting down of the equipment.

The connection terminal for the control cable and the electric trolley are located under the gear cap.

The polarity of the supply network phases must be set for clockwise (right turning) rotation. If they are incorrectly set, the hoist will operate in reverse and will lift when the "Down" button on the control is pressed. Please ask your electrician to set the power supply correctly. The polarity of the supply network is correct if the hoist will lift the load upwards when the "Up" – button is pressed.

Fuses (slowly blowing) at 230 V (1-phase) in front of main switch:

Fuse (slowly blowing)	Version
6 A	020/01
10 A	050/01, 050/02
16 A	070/01, 070/02

Table 5: Fuses at 230 V

Check if the mains voltage complies with that specified on the type plate.

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

The L1, N und 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 the button to lift. If the load moves downwards, interchange the Z1 and Z2 supply cores. Disconnect mains supply before!

If the control unit is equipped with an emergency stop (EN 60204-32), you will find this button on your control pendant.

In accordance with European regulations, the main switch must be installed in addition to the emergency stop and must be returned off after daily operation.



3.2.1.1 Direct control

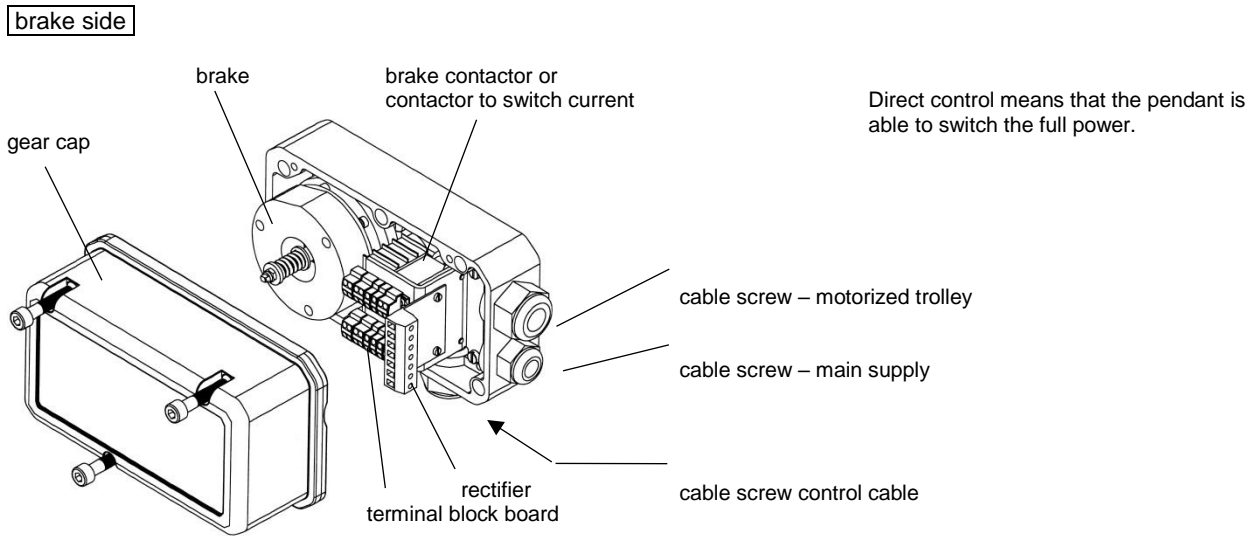


Figure 16: Direct control

3.2.1.2 Low voltage control 24 V

This mode of control is available as an option.

The contactors are easily accessible on a plate underneath the cap of electric control next to the lifting motor. On the same plate, you will find the optional limit switches. – See wiring diagram.

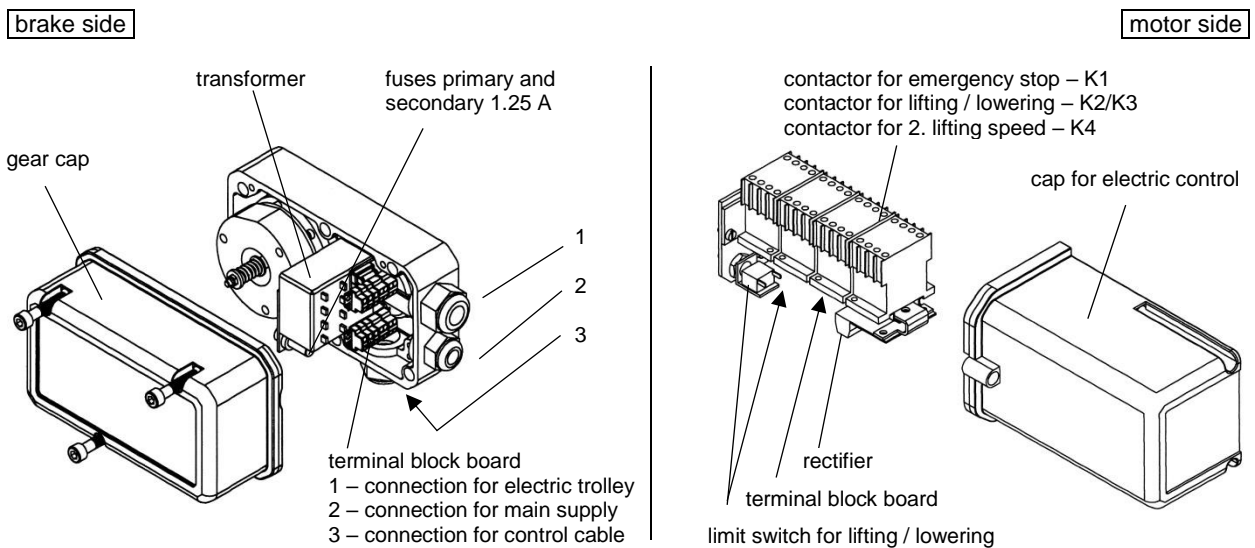


Figure 17: Low voltage control

The control occurs in the control circuit, which receives 24 volts through a safety transformer. Other secondary voltages are possible as well.

If the control is fitted out with an “emergency stop” in accordance with DIN EN 60204 part 32, a main contactor is also located under the motor side cap for control and the “emergency stop” button is fitted on the control pendant.

3.2.2 Electric limit switches for lift limitation

As an additional option, all electric chain hoists equipped with a low voltage control may be fitted with limit switches. (top and bottom limits).

These limit switches are operated by two buttons protruding out of the chain guide which can be activated either by the hook (top limit) or lift limiter (bottom position).

Caution! For the proper function of limits, the up/down directions at the pendant (see chapter 3.2.1) must be set correctly. Check the function for switching off by the limit switches for lifting and lowering.

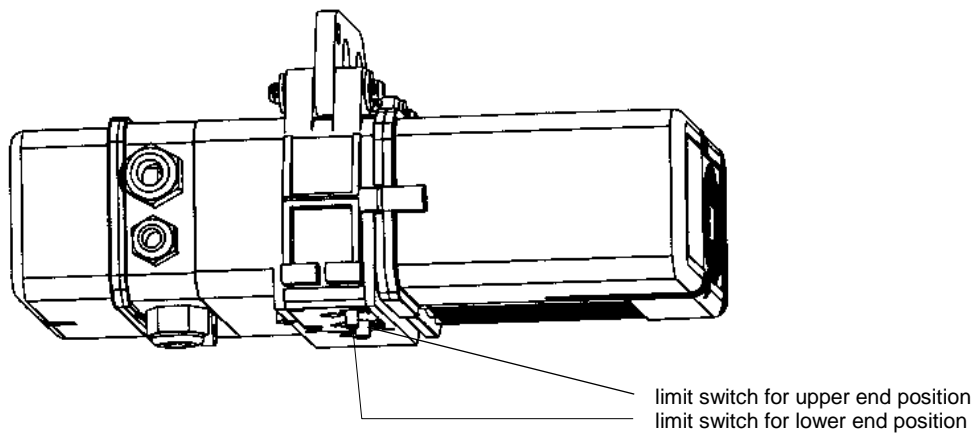


Figure 18: additional electric limit switches for low voltage

3.2.3 Voltages

The standard electric hoist supply is 400 volts, 3-phase 50 Hz. Different voltages and frequencies are available on request and are marked on the motor plate.

The electric chain hoists are suitable for operation with a voltage of 380 - 415 volts (3 phases). Other voltages are available on request.

3.2.4 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.

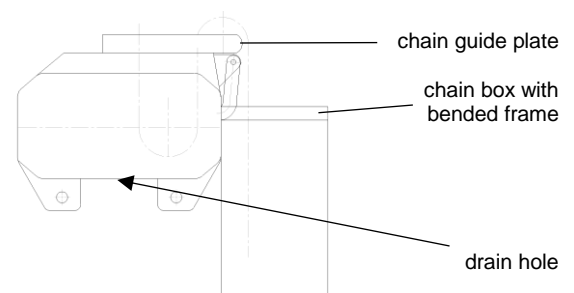


figure 19: electric chain hoist for inverted use

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.



4 Electric chain hoist with trolley

All trolleys are suitable for:

- flanges with small width in accordance with DIN 1025 and European regulations 24-62
- flanges with medium width in accordance with DIN 1025
- flanges with large width in accordance with DIN 1025



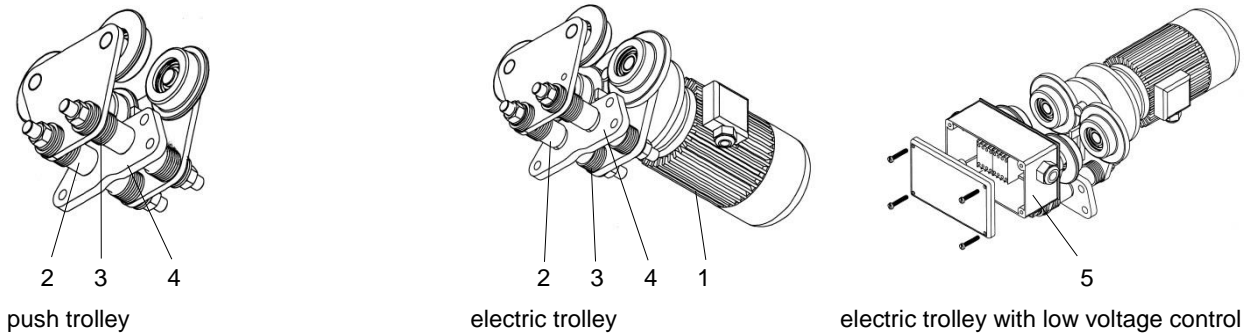
Elastic bumpers, stopping the trolley at about the centre of the running wheels, must be mounted as limit stops at each end of the track.

Additionally, the trolley can be fitted with an electric cross limit switch. Actuating bars at the travelling girder must be installed by user.

Trolley with max. carrying load [kg]	Radius of curves [m]
bis 1000	1
bis 3200	1.5
bis 6300	2

Table 6: Radius of curves

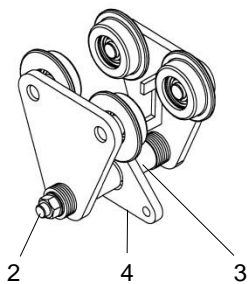
If the electric trolley has to run along curves, the trolley motor has to be assembled at the outer side of the curve at all times.



push trolley

electric trolley

electric trolley with low voltage control



trolley with one connecting bolt

- 1 trolley motor
- 2 suspension bolts
- 3 spacing washers
- 4 suspension eye
- 5 low voltage control (optional)

Figure 20: Trolleys

4.1 Mechanical assembly

4.1.1 Positioning the hoist underneath the trolley

Fit the suspension eye, which is included in delivery, onto the electric chain hoist as described in chapter 3.1.3.1. Please take care of the following assembly advice:

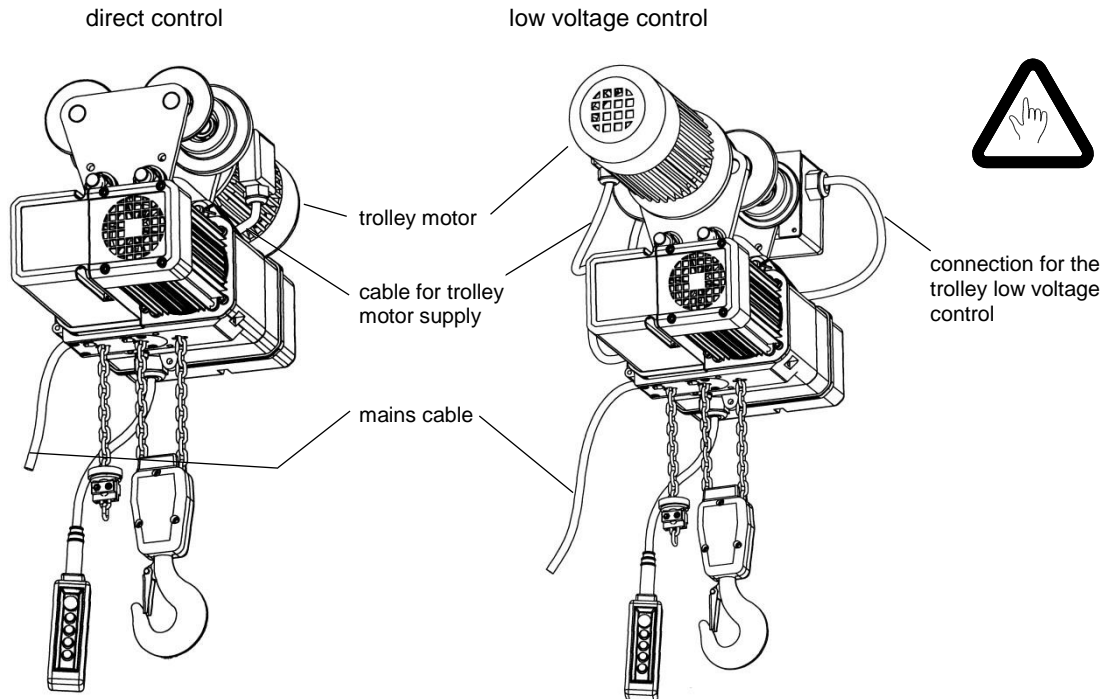


Figure 21: Positioning the hoist underneath the trolley

4.1.2 Assembly of a trolley with two connecting bolts

The two trolley connecting bolts are to be fixed to the lateral boards so as to allow a clearance 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 nuts of the connecting bolts with a torque wrench.

Hexagon nuts	Tightening torque (Nm)
M16x1.5	75 Nm
M22x1.5	150 Nm
M36x1.5	560 Nm

Table 7: Tightening torques

Caution! The type of suspension eye employed depends on the respective chain hoist type and trolley type (girder flange width). When retrofitting a trolley to an electric chain hoist, the suspension eye must be selected in accordance with Table 8 or Table 9.



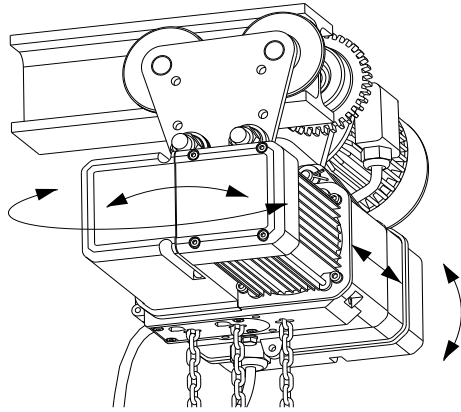


Figure 22: Flexibility between chain hoist and trolley

Caution! Movement in the directions shown by the arrows in Figure 22 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 one trolley connecting bolt is to be fixed to the lateral boards so as to allow a clearance of one to two millimetres between the running wheel flange and the girder flange. The width is adjusted by inserting spacing washers **symmetrically**. Tighten the nuts of the connecting bolts with a torque wrench. Take care that the spacing bushes will not be braced! The relevant tightening torques are listed in Table 7.

4.2 Electric trolleys with counterweight

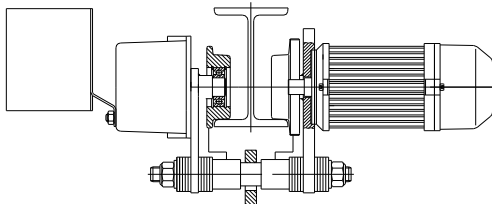


Figure 23: Counterweight for electric trolley

If electric trolleys, especially with double speed, are used on girders with a very small width, it may be necessary to provide a counterweight 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.

4.3 Electric connection of electric trolleys

Direct control

An electric cable which is clearly labelled and 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 the wiring diagram.

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

Low voltage control 24 V (option)

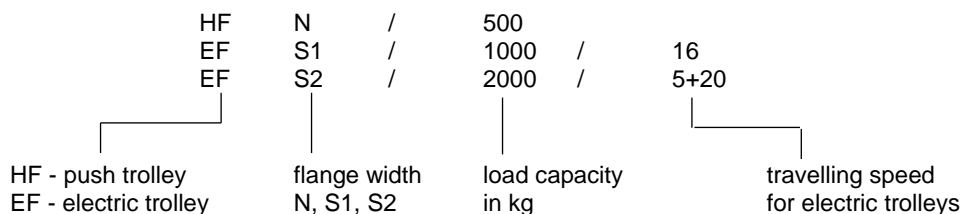
The contactors for switching the trolley motor are located in a special contactor box. The contactor box must be assembled with two hexagon socket head cap screws M8x10 DIN 933 on the side-plate without the motor. Connect the two leads protruding from the contactor box to the terminal section and to the trolley motor as shown in the wiring diagram. After electric connection, check that the electric chain hoist and trolley are working correctly.

4.4 Technical data for trolleys with two suspension bolts

Push trolley type	Electric trolley type	Travelling speed [m/min]	Load capacity [kg]	Girder width/ Setting range [mm]	Suspension eye type	For version /	
HFN 500	EFN	500 / 16 oder 25 oder 5+20	500	50-106	500 N, S1, S2	020/50 020/52 021/51	021/52 021/53 030/50
HFS1 500	EFS1	500 / 16 oder 25 oder 5+20		110-200			
HFS2 500	EFS2	500 / 16 oder 25 oder 5+20		210-300			
HFN 500	EFN	500 / 16 oder 25 oder 5+20	500	50-106	500 N, S1, S2	050/52 051/52 051/55	
HFS1 500	EFS1	500 / 16 oder 25 oder 5+20		110-200			
HFS2 500	EFS2	500 / 16 oder 25 oder 5+20		210-300			
HFN 1000	EFN	1000 / 16 oder 25 oder 5+20	1000	66-135	1000 N	030/51 030/35 030/53	
HFS1 1000	EFS1	1000 / 16 oder 25 oder 5+20		137-215	1000 S1		
HFS2 1000	EFS2	1000 / 16 oder 25 oder 5+20		220-300	1000 S2		
HFN 1000	EFN	1000 / 16 oder 25 oder 5+20	1000	66-135	1000 N	050/53 070/51 071/53	
HFS1 1000	EFS1	1000 / 16 oder 25 oder 5+20		137-215	1000 S1		
HFS2 1000	EFS2	1000 / 16 oder 25 oder 5+20		220-300	1000 S2		
HFN 2000	EFN	2000 / 16 oder 25 oder 5+20	2000	66-135	2000 N	070/53 070/54 070/55	070/57 071/55
HFS1 2000	EFS1	2000 / 16 oder 25 oder 5+20		137-215	2000 S1		
HFS2 2000	EFS2	2000 / 16 oder 25 oder 5+20		220-300	2000 S2		
HFN 2000	EFN	2000 / 8 oder 12 oder 5+20	2000	82-155	2000 N	090/52 090/54	091/51 091/52
HFS1 2000	EFS1	2000 / 8 oder 12 oder 5+20		137-215	2000 S1		
HFS2 2000	EFS2	2000 / 8 oder 12 oder 5+20		220-300	2000 S2		
HFN 3200	EFN	3200 / 8 oder 12 oder 5+20	3200	82-155	2500 N	070/56	
HFS1 3200	EFS1	3200 / 8 oder 12 oder 5+20		137-215	2500 S1		
HFS2 3200	EFS2	3200 / 8 oder 12 oder 5+20		220-300	2500 S2		
HFN 3200	EFN	3200 / 8 oder 12 oder 5+20	3200	82-155	3200 N	090/55	091/56 091/57 091/58
HFS1 3200	EFS1	3200 / 8 oder 12 oder 5+20		137-215	3200 S1		
HFS2 3200	EFS2	3200 / 8 oder 12 oder 5+20		220-300	3200 S2		
HFN 5000	EFN	5000 / 4+16	5000	90-155	5000 N,S1	110/52	111/50 111/52
HFS1 5000	EFS1	5000 / 4+16		160-226			
HFS2 5000	EFS2	5000 / 4+16		240-310	5000 S2		
HFN 6300	EFN	6300 / 4+16	6300	90-155	6300 N,S1	110/54	111/54
HFS1 6300	EFS1	6300 / 4+16		160-226			
HFS2 6300	EFS2	6300 / 4+16		240-310	6300 S2		

Table 8: Technical data for selecting trolleys for electric chain hoists

Explanation of trolley type designation

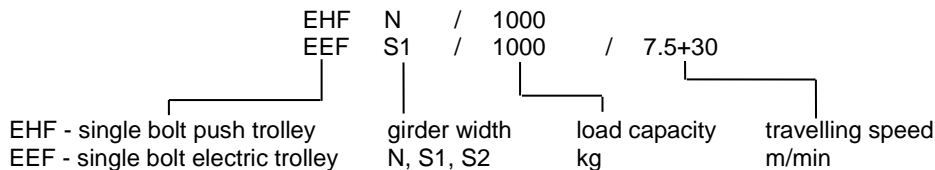


4.5 Technical data for trolleys with one suspension bolt

Push trolley type	Electric trolley type	Travelling speed [m/min]	Load capacity [kg]	Girder width [mm]
EHFN 1000	EEFN 1000	/ 16 oder 25 oder 5+20 oder 7.5+30	1000	66-135
EHFS1 1000	EEFS1 1000	/ 16 oder 25 oder 5+20 oder 7.5+30		137-215
EHFS2 1000	EEFS2 1000	/ 16 oder 25 oder 5+20 oder 7.5+30		220-300
EHFN 2000	EEFN 2000	/ 16 oder 25 oder 5+20 oder 7.5+30	2000	66-135
EHFS1 2000	EEFS1 2000	/ 16 oder 25 oder 5+20 oder 7.5+30		137-215
EHFS2 2000	EEFS2 2000	/ 16 oder 25 oder 5+20 oder 7.5+30		220-300
EHFN 3200	EEFN 3200	/ 5+20 oder 7.5+30	3200	82-155
EHFS1 3200	EEFS1 3200	/ 5+20 oder 7.5+30		137-215
EHFS2 3200	EEFS2 3200	/ 5+20 oder 7.5+30		220-300
EHFN 5000	EEFN 5000	/ 4+16	5000	90-155
EHFS1 5000	EEFS1 5000	/ 4+16		160-226
EHFS2 5000	EEFS2 5000	/ 4+16		240-310
EHFN 6300	EEFN 6300	/ 4+16	6300	90-155
EHFS1 6300	EEFS1 6300	/ 4+16		160-226
EHFS2 6300	EEFS2 6300	/ 4+16		240-310

Table 9: Technical data for selecting trolleys

Explanation of trolley type designation



5 Tests

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

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

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

5.1 Test when used according to DGUV 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 DGUV V52 (BGV D6) § 25

An authorised person must test the cranes before starting operation for the first time and after extensive alterations. The electric chain hoists are type-approved.

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 harsh, for example, high percentage of use with full load, a dusty or aggressive environment, high duty rate, high number of operation cycles, etc.
- Only an authorised person appointed by the BG - associations and experts from the Technical Control Association (TÜV) are considered qualified to test cranes.
- Trained specialists are highly qualified specialist personnel or the manufacturer's after-sales service personnel.

6 Directions and prohibitions for use

6.1 Directions for use

- The load may only be moved if it is slung securely, 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 (DGUV V54 (BGV D8), § 29.1, para. 1).
- All electric chain hoists are suitable for an environment temperature of $-20^{\circ}\text{Celsius}$ to $+40^{\circ}\text{Celsius}$ as standard.
For use at higher environmental temperatures the duty rate must be reduced correspondingly.
- The standard protection class is IP 55.
- 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 the hook tackle may be pulled to move an electric chain hoist with push trolley horizontally.
- Consult the manufacturer or supplier if the hoist is to be used in an aggressive environment (for instance, in an acidic, alkaline or dusty environment or to transport inflammable or other dangerous loads).
- Do not 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 must 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 must be found out by trained personnel and the hoist can only be used if all possible failures are removed.
- Lifting the load from the ground must be done at the lowest possible speed. Before doing this, the slack sling chains or ropes must be tightened carefully.
- Cranes in outdoor use require a roof for the park position.
- The S.W.L. of the trolley must be greater or equal to the S.W.L. shown on the load-hoisting accessory.
- The second chain fall must only be fitted with the fork supplied by the manufacturer.



6.2 Prohibitions for use

- **Inching mode**
- **Permanent run against the rubber buffers of the lowest and highest hook position (ultimate safety limit for emergency only)**
- **Transporting people**
- **Using the hoist while people are 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 which are under vacuum
- Drop loads
- Lifting of submerged loads
- Moving a trolley by pulling the control pendant or the 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 a rubber washer on hook tackle, hook block or lift limiter
- Using the lifting chain to sling the loads
- Operation with a twisted chain caused by a swivelled hook block or wrongly mounted chain end
- Using the lifting chain, which is longer than the chain box capacity stated under the box (see chapter 3.1.5.2)
- Using the hoist with a higher duty rate as marked on the specification plate
- Using the hoist without having done the regular inspection
- Operation after S.W.P. is exceeded
- Fitting the second chain fall with a fork not supplied by the manufacturer
- 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 onto the trolley travel girder. Touching the chain during operation is not allowed.



7 Maintenance

- Trained specialists must carry out all maintenance work.
- Maintenance Table 10 lists the parts and functions to be tested and the necessary maintenance work. Defects must be rectified immediately by a trained specialist. Defects must be reported immediately to the owner. The owner is responsible to get defects remedied by a trained specialist.
- Maintenance work may only be carried out if the electric chain hoist is not loaded and the main switch is switched off so that the power supply is disconnected.
- Shorten the periods between maintenance works in very harsh operating conditions, e.g. multi-shift operation, high number of switching actuation, poor environmental conditions, etc.



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 all rubber buffers if worn!**

7.1 Maintenance and checks

Please note chapter 1.2 !

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

	Check:		
	Daily	Every 3 months	Annually
Visual check of the entire equipment	•		
Function check of the brake of the lift limiter	•	•	
Check of the brake (point 7.2)			•
Maintenance or adjustment of the clutch			•
Wear of the load chain (point 7.4)		•	
Lubrication of the load chain		•	
Wear of the rubber elements (visual check)	•		
Lubrication of single and double fall hooks thrust bearings (point 11.3), check condition of the pin which prevent the hook nut from loosening and chisel punch marks			•
Check condition of safety latch	•		
Universal checks of all screws hold down, chain guide, twisted chain safety devices			• • •
Check of the condition and safe positioning of the chain bag and condition		•	
Check of the electric cable, power cable and pendant control			•
Check of the trolleys and wheels			•

Table 10: Test and maintenance work

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 Construction of the brake

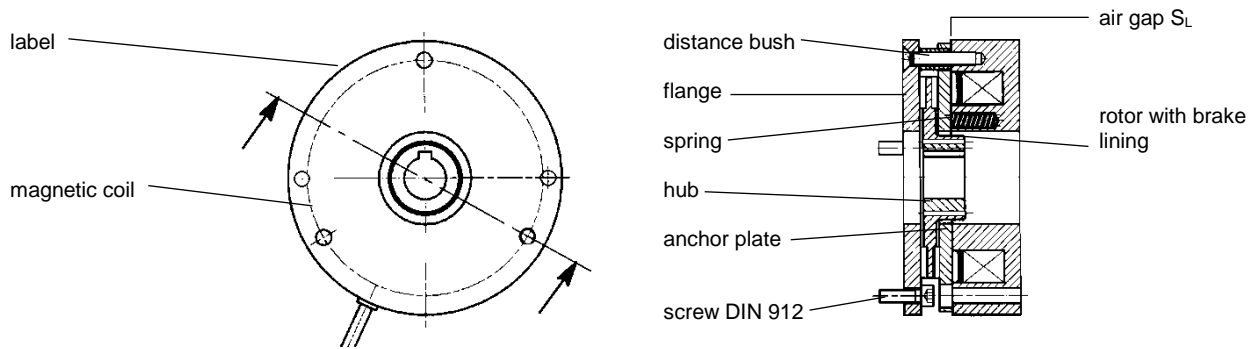


Figure 24: Construction of the brake

7.2.1 Replacement of the brake

1. Loosen the screws of the cap for gear cover.
2. Remove the cap for gear cover.
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 with tightening torque acc. to table 'data of the brake'.
9. Connect brake cables according to wiring diagram.
10. Replace cap for gear cover.



type	Brake type	Screws DIN 912	Tightening torque [Nm]	Coil resistance R20 nominal [Ω]	Air gap S_L nominal [mm]	Air gap S_L maximal [mm]
02../... 03../...	BFK 457-06	3xM4	2.8	2101	0.2	0.5
05../... 07../...	BFK 457-08	3xM5	5.5	1681		
09../... ¹⁾	BFK 457-10	3xM6	9.5	1273	0.2	0.7
09../... ²⁾ 11../...	BFK 457-12			1051	0.3	0.8

1) not valid for type 090/54 and type 090/57
2) valid for type 090/54 and type 090/57

Table 11: Data of the brake

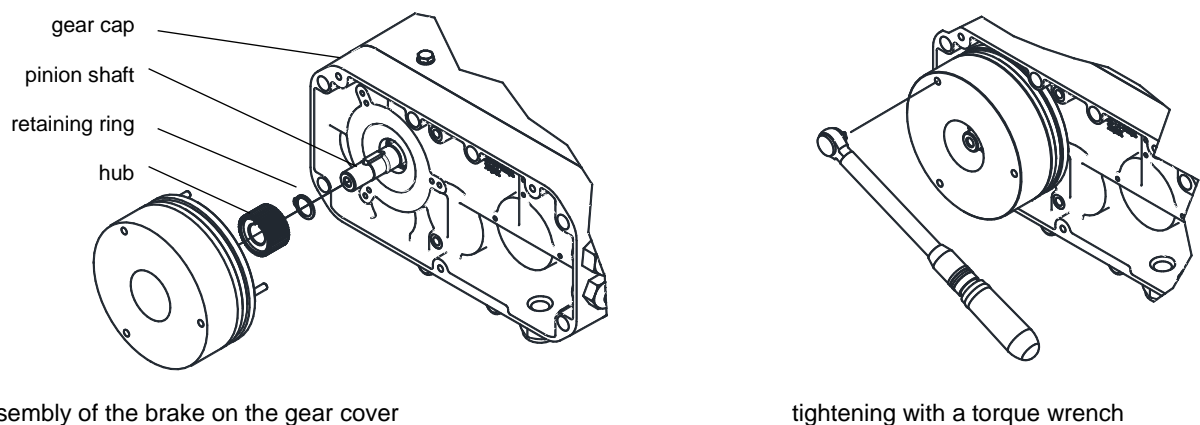


Figure 25: Assembly of the brake

For order of spare parts, the complete type number must be submitted.



7.2.2 Electric control of the brake

Mode of functioning

The disk 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 time 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.

7.2.3 Faults on brake

Troubleshooting and fault elimination

Faults	Causes	Remedy
Brake does not release, air gap is not zero	Coil has contact to ground or between the windings	Replace the brake (see Table 11)
	Wrong or defective wiring	Check and correct wiring
	Defective or wrong rectifier	Compare wiring at rectifier with wiring diagram; especially correct setting of the bridge. Measure DC – voltage between terminals 5 and 6. If differences occur, change the rectifier
	Air gap too large	Replace the brake

Table 12: Troubleshooting and fault elimination

If rectifier defects occur repeatedly, the brake should be replaced even if no winding short circuit can be detected. Defect may occur only in warm operating conditions.

7.2.4 Checking brake functioning

When braking the nominal load during the lowering process, the load should be stopped after approx. two chain braking link lengths and the load should be in a jerking manner.



7.3 Safety clutch

The sliding clutch is located between the lifting motor and main pinion shaft and transmits the torque. The secondary function is that it limits the transmission of torque depending on the setting, hence preventing overloading of the electric chain hoist and/or suspension points.



The safety clutch acts as an emergency stop should the hook or end stop run against the hoist body in top/bottom positions. This must only be used as an emergency limit and must not be used during regular operation of the hoist.

A special advantage of the patented safety clutch is that it is situated directly after the motor shaft and before the brake. In case of heavy wear on the clutch lining, one would not see an uncontrolled downward movement of the load, because the load can be held at every point by the brake.

The clutch unit acts as a sliding clutch with asbestos-free linings.

The clutch is easily adjustable and accessible. The wear resistant lining material doesn't require re-adjustment under normal operational circumstances.

7.3.1 Construction of sliding clutch

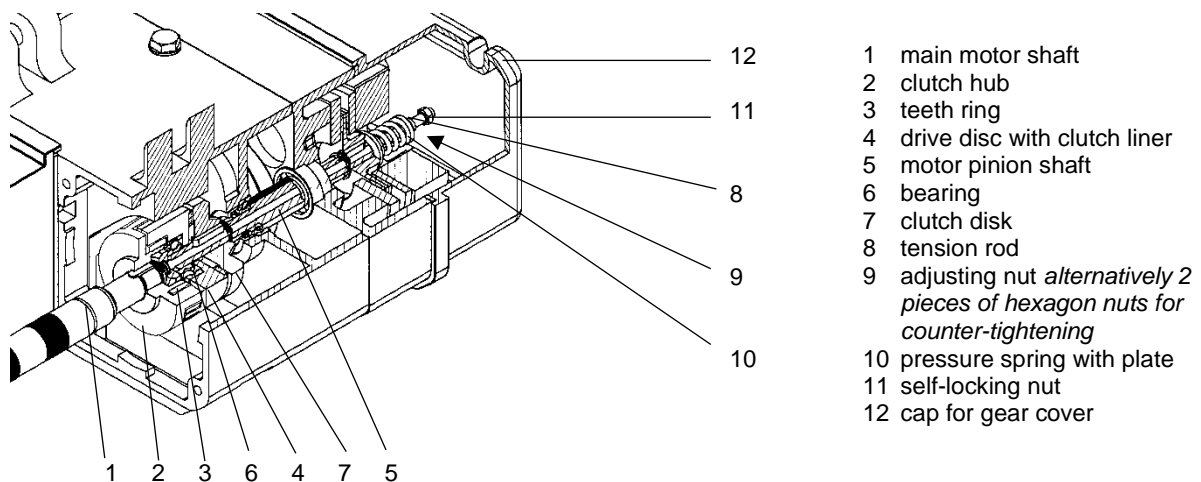


Figure 26: Construction of the sliding clutch

7.3.2 Adjustment of the sliding clutch

Adjusting the sliding clutch should only be carried out by a trained or competent person.

1. Apply the test load =1.1 times the nominal/rated load onto the load hook or the clutch testing device.
2. Switch on the chain hoist and check that the test load can be lifted or the clutch testing device shows approximately 1.3 times the nominal load. The factor 1.3 is dependent on the hoisting speed.
3. Lower the test load to the floor.
4. Decrease or increase clutch torque until the test load is just lifted or the clutch testing device shows the required value.
5. Adjust the clutch torque as follows:
 - a. Loosen and remove the cap for gear cover (12).
 - b. Use a spanner to hold the retaining self-locking nut (11).
 - c. Use a second spanner to loosen/tighten the adjusting nut (9) until the required test load is just lifted or the clutch testing device shows the required value.
Alternatively if using 2 pieces of hexagon nuts:
Use two spanners to loosen the counter-tightening. Tighten (turn adjusting nut clockwise) or loosen (turn adjusting nut counter-clockwise) the pressure spring until the required test load is just lifted or the clutch testing device shows the required value. After adjustment use two spanners to counter-tighten the two hexagon nuts.
 - d. Finally, recheck the clutch torque by lifting the test load.
Record the adjusting value in the inspection book of the electric chain hoist.

The sliding clutch is set with the test load by the manufacturer. After changing or replacing the lift motor, it is not necessary to reset the clutch. A test with nominal load is required.

The original distance between the end of the tension rod and the pressure plate of the coupling is marked on a tag on the brake coil.

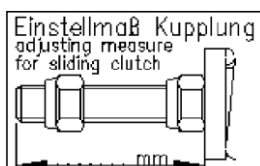


Figure 27: Adjustment of the sliding clutch

7.3.3 Checking the release limit of the sliding clutch during regular inspections

The release limit of the sliding clutch has to be checked by a specialist during the annual work safety inspection in accordance with DGUV V52 (BGV D6) §26, or DGUV V54 (BGV D8) §23. If the hoist lifts the nominal load should be checked! The hoist must not lift more than a 1.6 x nominal load.

If test loads larger than nominal load are not available, then the release limit of the slipping clutch can be checked by a clutch testing device. In this case, the slipping limit should be approximately 1.3 x nominal load. After checking the release limit, verify again if the hoist lifts the nominal load.

When measuring the wrong release value, the sliding clutch has to be readjusted in accordance with chapter 7.3.2 and verification of chapter 7.3.3 must be repeated. The adjustment value must also be recorded.

7.4 Load chain

Hoist chains are a means of carrying which require official approval. Therefore, it is 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, section 5:1981, the accident prevention regulations in DGUV V54 (BGV D8) and in DGUV V52 (BGV D6) and EN 818-7:2002 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 penetrating gear lubricant oil before starting operation for the first time and during operation with no load. Subsequent lubrication, whereby the links must be cleaned first, depends on the frequency 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 section 5 and 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 harsh 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 the chain or a link is elongated by 5 %, or an eleven links piece of chain is elongated by 2%
- if the links are rigid

Caution! For replacement of chains should only be used the original chains from the manufacturer. The chain guide and hold-down must also be replaced with the chain.



7.4.3 Measuring wear and replacing chain

Chain dimensions [mm]	Chain measurements	4x12	5.2x15	7.2x21	9x27	11.3x31
Measure 1 link inside max. measurement t		12.6	15.8	22.1	28.4	32.6
11 chain links		134.6	168.3	235.6	302.9	347.8
Measure chain link diameter $d_m = \frac{d_1 + d_2}{2}$ minimum measurement $d_m=0.9d$		3.6	4.7	6.5	8.1	10.2

Table 13: Measurement of chain dimensions

See points 0 et seq. Follow them on how to change the chain.

7.4.4 Measuring wear and replacing load hook

According to DIN 15401-1 load hooks must be replaced if the length between the chisel punch marks (dimension Y) are 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 10 of point 7.1.



7.5.1 Construction of the brake of the trolley

Typ BFK

The brake operates absolutely maintenance free.

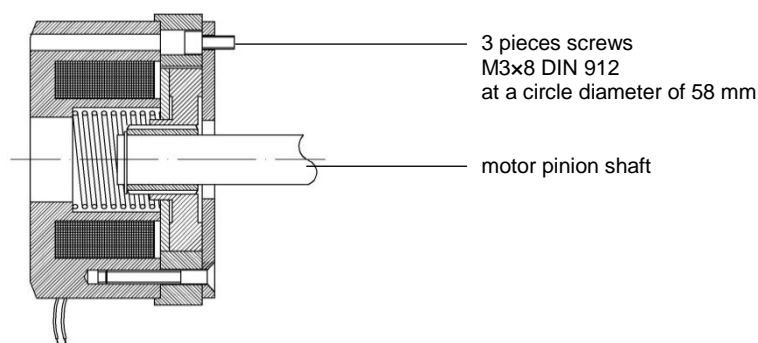


Figure 28: Construction of the brake type BFK

Typ EFB

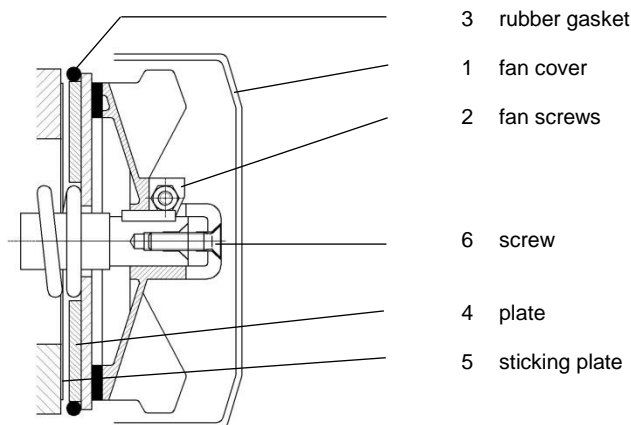


Figure 29: Construction of the brake type EFB

If the brake linings are worn so that the air gap is about 0.9 mm, it is necessary to adjust the gap.

1. Dismantle the cover (1).
2. Loosen the fan screws (2).
3. Remove the rubber gasket (3) and put a thickness gauge of 0.25 mm between the plate (4) and sticking plate (5).
4. Tighten the screw (6) so far that you can remove the thickness gauge easily.
5. Tighten the fan screws (2) symmetrically. Tighten the screws opposite the key first (torque 4-5.5 Nm).
6. Tighten the screw (6) again.
7. Remove the thickness gauge.
8. Assemble the fan cover (1).
9. Observe the test run of the trolley.

7.6 Dismantling and assembly of the lifting motor

The lifting motor (1) is an independent assembly group. The cooling fan is mounted on the shaft on the B-side under the fan cap. The clutch hub (4) with a coupling (5) is mounted with a key and retaining ring onto the A-side (drive side) of the motor. The motor flange (8) has a centring and four holes for fixing it to the gear housing. The motor cables (9) leave the motor at the motor flange A-side.

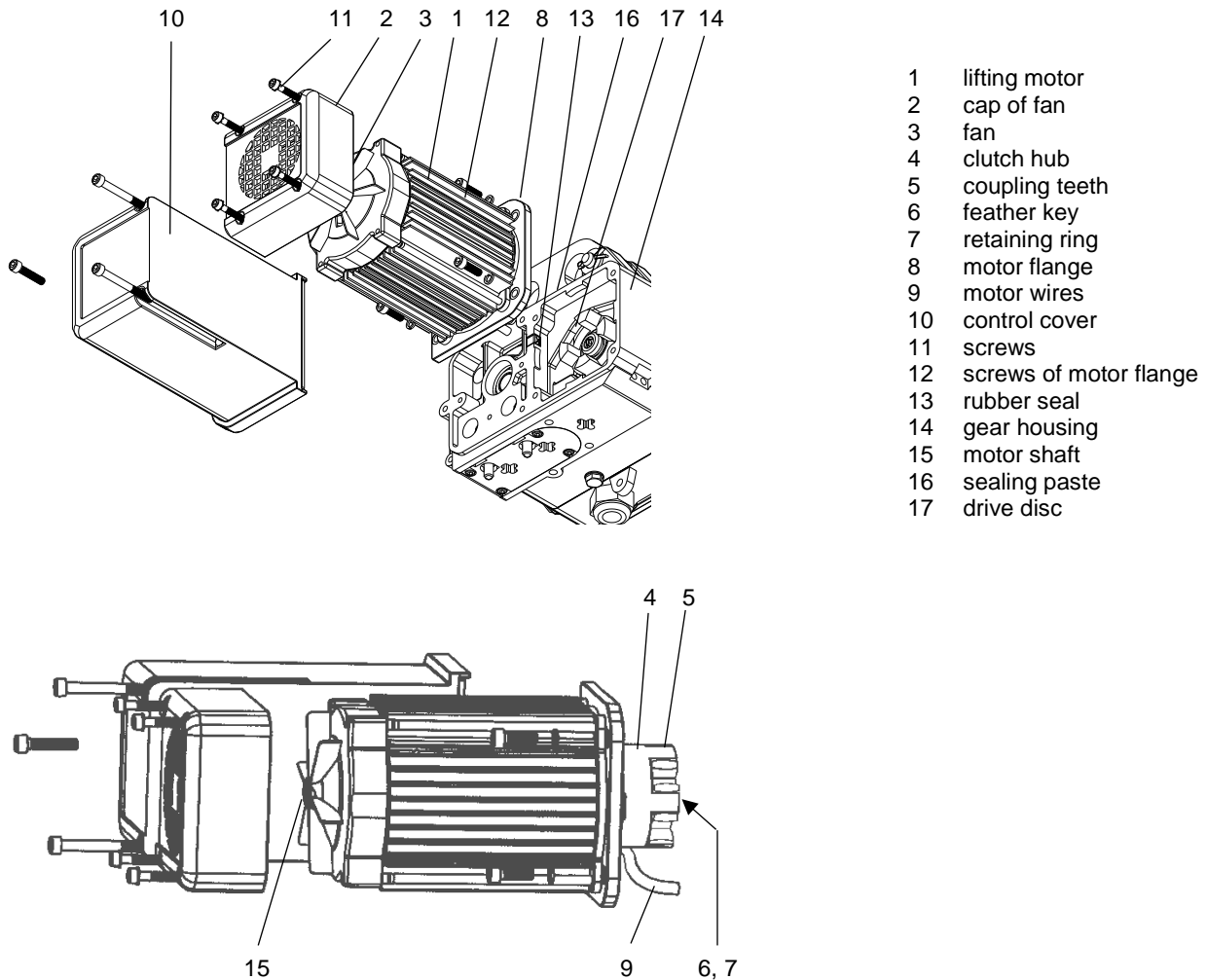


Figure 30: Dismantling and assembly of the lifting motor

7.6.1 Dismantling the lifting motor

1. Loosen the screws of the control cover (10) and remove cover.
2. Loosen the screws (11) of the fan cover (2) and remove it.
3. Disconnect the motor wires from the distribution panel on the control plate using the wiring diagram. The motor wires are directly led through the gear housing on hoists with direct control and are clamped on the terminal board under the cap on the brake side.
4. Loosen the screws of the motor flange (12) and remove the motor from the gear casing. Be careful not to damage the motor wires (9) and do not loosen the rubber seal (13) of the motor cables, which is located inside the gear casing (14).

7.6.2 Assembling the lifting motor

The assembly of a complete hoisting motor with fan is taken into consideration.

1. Press the coupling hub with the coupling teeth onto the motor shaft until the shaft collar is reached. Take care that the feather key (6) is tightly connected between the shaft (15) and hub (4).
2. Secure the clutch hub onto the shaft with a retaining ring (7).
3. Coat sealing paste (16) on the motor flange (8) very thinly.
4. Put the lifting motor on the gear casing (14). The motor cables must be placed in the provided gap in the gear casing and sealed with a rubber profile. Prevent the cables from damage or pinching. When attaching the clutch hub (4) it may be necessary to rotate the motor shaft on the fan gently until the teeth of the hub engage.
5. Tighten the screws of the motor flange using spring washers.
6. Connect the motor wires to the distribution panel at the control plate using the wiring diagram. Check that the wires are not pinched or obstructed and that they are well sealed.

Caution! Following the assembly of the control and fan covers, check the rotation orientation of the motor.

If the direction shown on the buttons is reversed, change the positions of motor wires L1 and L2.



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

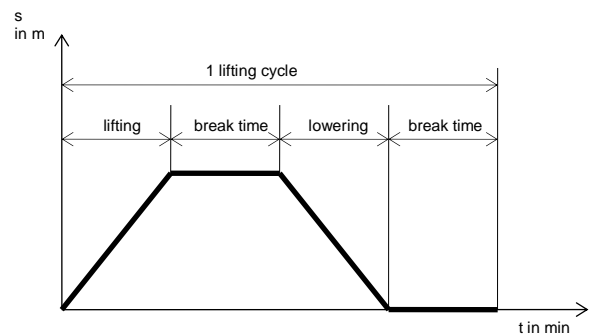
The duty rate and the number of operating cycles for one hour must not be higher than shown on the specification plate of the hoist or a technical data table (European regulation FEM 9.683).

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:

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



The duty rate is limited by the permissible temperature of the windings in the lifting motor. The running time depends 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

The duty type is not permissible for the slow speed of dual speed hoisting motors. After having reached the maximum running time, a break is required and the hoist can be further used in intermittent mode.

Duty group FEM 9.511	Duty group ISO 4301	Duty rate [c.d.f. %]	Operating period * acc. to FEM 9.683 (t _B in min)
1 Bm	M 3	25 %	15
1 Am	M 4	30 %	15
2 m	M 5	40 %	30
3 m	M 6	50 %	30
3 m	M 6	60 %	60

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

Table 14: Permissible operating period without cooling interval when operation starts and with a initial motor temperature of approx. 20° C.

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 15: Intermittent duty

8.3 Example

The electric chain hoist type 030/50 is to lift loads of 250 kg to a height of 6 m.

Performance data:	Carrying load:	250 kg
	Lifting speed:	12 m/min
	Duty rate:	60 %
	Duty group of the hoist:	2 m

At the beginning of the lifting operation the electric chain hoist has a temperature of approx. 20 °C.

$$c.d.f. = \frac{6 \text{ m lifting} + 6 \text{ m lowering}}{12 \text{ m/min lifting speed}} = 1 \text{ min for each lifting cycle}$$

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

After 30 minutes of operating time, a 40-second break for each minute of operating time must be taken (i.e. 0.66 times the operating time). This break is usually necessary for slinging and taking off loads.

Caution! Cooling periods are imperative for extreme lifting heights (above 10 metres).

Low lifting speed should only be used for precise lowering and lifting. It is not suitable when greater lifting heights should 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 must take care of the duty rate of the trolley as well. This especially applies to very long track systems.

Electric trolley type	Duty rate	Running time
Trolleys with a single speed	40 %	30 min
Trolleys with double speeds	40/20 %	30 min*

* The ratings are relevant for fast travelling speed.

Table 16: Duty rate for electric trolley

10 Strainer clamp for the control cable

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.

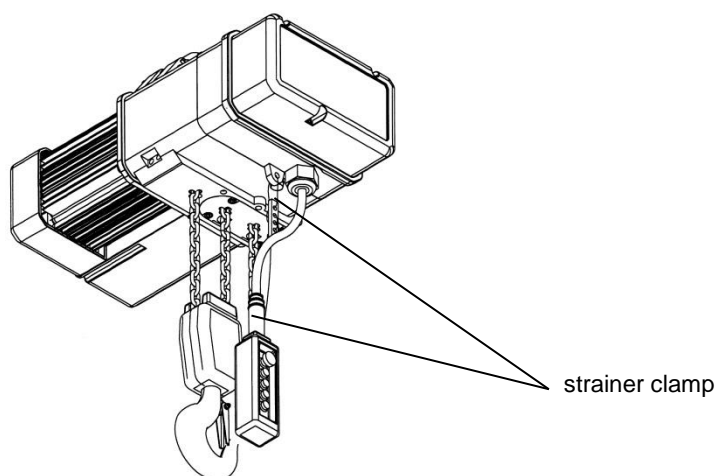


Figure 31: Assembly of the strainer clamp

11 Lubrication/Auxiliary materials

11.1 Lubrication of the gear

The gear has already been 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 environmental protection.

Use oil for 220 mm²/s at 40° C.

The necessary amount is shown in the following table:

Version (basic type)	Amount [ml]
020 to 031	175
050 to 071	350
090 to 111	525

Table 17: Amount of oil

Alternative oils are:

Supplier's	oil designation
Fuchs ©	Renolin CLP 220
Castrol ©	Alpha Zn 200
ESSO ©	EP 220
Mobil ©	Mobil gear 630
Shell ©	Omala 220
ELF ©	Reductelf SP 220
BP ©	XP 220 BP Energol GR

Table 18: Alternative oils

11.2 Lubrication of the chain

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

Supplier's	lubricant designation
Fuchs ©	Stabylan 2001
Klüber ©	Klüberoil 4UH 1-1500
Fuchs ©	Ceplattyn 300
Castrol ©	Optimol Viscogen KL300
Fuchs ©	Stabylan 5006
Klüber ©	Klüberoil CA 1-460
Fuchs ©	CTP D 350
Fuchs ©	RENOLIT SO-GFB
Klüber ©	Microlube GB 00
Exxon Mobil ©	Mobilux EP2

Table 19: 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 and use a special anti-friction bearing grease.



Lubricants recommended for lubrication of bearings:

Supplier's	lubricant designation
Fuchs ©	Renolith Duraplex EP3; NLGI - class 3
Fuchs ©	Lagermeister LX EP2

Table 20: Alternative lubricant for bearing

11.4 Lubrication of the trolleys

The exterior gearing of the electric trolley must be lubricated with grease by the customer prior to initial operation, under normal conditions at least once a year, or after 10,000 driving cycles. If in heavy use, the lubrication intervals must be shortened.



Lubricants recommended for lubrication of gearing:

Supplier's	lubricant designation
Fuchs ©	Renolith Duraplex EP3; NLGI - class 3

Table 21: Alternative lubricant for gearing of the trolley

11.5 Auxiliary materials

The following locking pastes are recommended for the locking of the fastening screws of chain guides:

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 22: Locking paste

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 must be overhauled or taken finally out of operation completely.

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

14 Example of Declaration of Incorporation

LIFTKET	Declaration of Incorporation for partly completed machinery (Machine Directive 2006/42/EC supplement II 1 B)	Dok-nr. / Sprache HFTXXXXXX / DE Seite 1/1																																				
<p>Herewith the manufacturer: LIFTKET Hoffmann GmbH Dresdener Straße 64-68 04808 Wurzen Germany</p> <p>of the partly completed machinery (electric chain hoist)</p> <p>Type: Serial number:</p> <p>declares that the use is not allowed until it has been certified that - as appropriate - the machinery which the electric chain hoist has been installed into meets the regulations of the Machine Directive 2006/42/EC.</p> <p>The following essential health and safety requirements relating to the supplement I of the Machine Directive 2006/42/EC are applied and observed:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 5%; vertical-align: top;">1.1</td> <td>General 1.1.1; 1.1.2; 1.1.3; 1.1.5; 1.1.6</td> </tr> <tr> <td style="vertical-align: top;">1.2</td> <td>Control systems 1.2.1; 1.2.2; 1.2.3; 1.2.4; 1.2.4.1; 1.2.4.2; 1.2.4.3; 1.2.6</td> </tr> <tr> <td style="vertical-align: top;">1.3</td> <td>Protection against mechanical hazards 1.3.2; 1.3.3; 1.3.4; 1.3.7; 1.3.9</td> </tr> <tr> <td style="vertical-align: top;">1.5</td> <td>Risks due to other hazards 1.5.1; 1.5.4; 1.5.6; 1.5.8; 1.5.11</td> </tr> <tr> <td style="vertical-align: top;">1.6</td> <td>Maintenance 1.6.1; 1.6.3; 1.6.4</td> </tr> <tr> <td style="vertical-align: top;">1.7</td> <td>Information 1.7.1; 1.7.2; 1.7.3; 1.7.4; 1.7.4.1; 1.7.4.2; 1.7.4.3</td> </tr> <tr> <td style="vertical-align: top;">4.1</td> <td>General 4.1.1; 4.1.2; 4.1.2.3; 4.1.2.4; 4.1.2.6; 4.1.3</td> </tr> <tr> <td style="vertical-align: top;">4.2</td> <td>Requirements for machinery whose power source is other than manual effort 4.2.1; 4.2.2</td> </tr> <tr> <td style="vertical-align: top;">4.3</td> <td>Informationen and markings 4.3.3</td> </tr> <tr> <td style="vertical-align: top;">4.4</td> <td>Instructions 4.4.2</td> </tr> </table> <p>All relevant essential health and safety requirements relating to the Machine Directive 2006/42/EC are applied and observed up to the interfaces described in the order confirmation, in the operating instructions and in the wiring diagram.</p> <p>The conformity with the rules of the following further EC-Directives will be declared:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">2014/30/EU</td> <td>Directive relating to electromagnetic compatibility</td> </tr> </table> <p>The following harmonised regulations are applied:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">EN ISO 12100: 2010</td> <td>Safety of machinery</td> </tr> <tr> <td>EN 60204-32: 2008</td> <td>Electrical equipment of machines; Requirements for hoisting machines</td> </tr> <tr> <td>EN 818-7: 2002 + A1: 2008</td> <td>Short link chain for lifting purposes; Fine tolerance hoist chain, Grade T</td> </tr> <tr> <td>EN 14492-2: 2006 + A1: 2009</td> <td>Power operated winches and hoists</td> </tr> </table> <p>The following national regulations and technical specifications are applied:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">FEM 9.511: 1986</td> <td>Rules for the design of series lifting equipment; Classification of mechanisms</td> </tr> <tr> <td>FEM 9.751: 1998</td> <td>Series lifting equipment; Power driven series hoist mechanisms; Safety</td> </tr> </table> <p>The relevant technical documents according to the Machine Directive 2006/42/EC supplement VII 1 B are issued and will be provided on reasonable request to national authorities. Authorised person of technical documents: Matthias Müller, LIFTKET Hoffmann GmbH, Dresdener Straße 64-68, 04808 Wurzen</p> <p>The type was certified by:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">TÜV Rheinland Industrie Service GmbH Prüflaboratorium für Maschinen Burger Chaussee 9 03044 Cottbus Germany</td> <td>Test certificate number:</td> </tr> </table> <p>Wurzen, 01.08.2017</p> <p>Matthias Müller Technical Manager</p>			1.1	General 1.1.1; 1.1.2; 1.1.3; 1.1.5; 1.1.6	1.2	Control systems 1.2.1; 1.2.2; 1.2.3; 1.2.4; 1.2.4.1; 1.2.4.2; 1.2.4.3; 1.2.6	1.3	Protection against mechanical hazards 1.3.2; 1.3.3; 1.3.4; 1.3.7; 1.3.9	1.5	Risks due to other hazards 1.5.1; 1.5.4; 1.5.6; 1.5.8; 1.5.11	1.6	Maintenance 1.6.1; 1.6.3; 1.6.4	1.7	Information 1.7.1; 1.7.2; 1.7.3; 1.7.4; 1.7.4.1; 1.7.4.2; 1.7.4.3	4.1	General 4.1.1; 4.1.2; 4.1.2.3; 4.1.2.4; 4.1.2.6; 4.1.3	4.2	Requirements for machinery whose power source is other than manual effort 4.2.1; 4.2.2	4.3	Informationen and markings 4.3.3	4.4	Instructions 4.4.2	2014/30/EU	Directive relating to electromagnetic compatibility	EN ISO 12100: 2010	Safety of machinery	EN 60204-32: 2008	Electrical equipment of machines; Requirements for hoisting machines	EN 818-7: 2002 + A1: 2008	Short link chain for lifting purposes; Fine tolerance hoist chain, Grade T	EN 14492-2: 2006 + A1: 2009	Power operated winches and hoists	FEM 9.511: 1986	Rules for the design of series lifting equipment; Classification of mechanisms	FEM 9.751: 1998	Series lifting equipment; Power driven series hoist mechanisms; Safety	TÜV Rheinland Industrie Service GmbH Prüflaboratorium für Maschinen Burger Chaussee 9 03044 Cottbus Germany	Test certificate number:
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