



ST

Chain hoists
Original instructions

EN

Partner of Experts

STAHL
CraneSystems ®

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1 General information

1 General information

You have purchased a STAHL CraneSystems product.
This product was constructed in accordance with the applicable European standards and regulations.

Read carefully and observe the operating instructions. Store the operating instructions within easy reach at the place of operation.

1.1 Copyright

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1.2 Symbols

In these instructions, the safety notices are classified according to the severity of the danger and the probability of its occurrence.

The procedures described for avoiding danger must be followed without fail.

DANGER

This symbol gives warning of an imminent danger to health and life.
Ignoring these warning notices will lead to severe injuries, possibly resulting in death.

WARNING

This symbol gives warning of situations that are potentially dangerous to health and life.
Ignoring these warning notices may lead to severe injuries, possibly resulting in death.

CAUTION

This symbol gives warning of situations, which are potentially dangerous to health.
Ignoring these warning notices may lead to injuries.

NOTICE

Warns of damage to property or the environment.

Specific symbols:



Warning of electrical voltage

Covers such as hoods and caps which are marked with this symbol may only be opened by "skilled or qualified personnel".
Contact with live parts can cause death instantaneously.



Warning of suspended load

It is forbidden for persons to stand under suspended loads.
This entails risks to life and limb!



Warning of injuries to hands

Danger of crushing or cutting hands and fingers. The appropriate personal protective equipment should be worn for this task to avoid injury.

1 General information



Tips / recommendations

Tips for use and other particularly important information.

1.3 Warranty

Observance of the operating instructions is essential for safe operation and achieving the stated product characteristics and performance features. Non-observance will lead to loss of warranty for the product and the machine in which the product is installed. In addition to the instructions given in the operating manual, all official and statutory regulations must be observed when operating the product. Use the product only for its intended purpose. Please note also the chapters "Technical data", "Use for intended purpose" and "Inappropriate use".

1.4 Declaration of conformity / declaration of incorporation

See separate document.

1.5 Spare parts

WARNING

Incorrect or defective spare parts may lead to damage, malfunctions or the complete failure of the machine.

- Only original spare parts must be used.

1.6 Terminology

User

Whoever uses and employs the product or has it operated by suitable trained personnel is considered to be the user (employer/company).

Trained personnel

Trained personnel are persons who have been instructed and trained in the duties with which they are entrusted and the risks which may arise from incorrect behaviour, have been advised on the necessary protective devices, precautions, applicable regulations, accident prevention regulations and prevailing conditions and have proven their ability.

Skilled electrician

A skilled electrician possesses knowledge and experience on electrical equipment arising from specialist training and, with knowledge of the applicable standards and regulations, is able to assess the work with which he is entrusted and detect and avoid possible risks. The skilled electrician must be familiar with the commissioning and operation of the product and have been trained on it.

Definition of a qualified person:

A qualified person is one who has gained the specialised knowledge required for testing the equipment from his/her vocational training, professional experience and recent professional activity.

This person must be in a position to assess the safety of the system in conjunction with the application. Qualified persons with the competence to undertake installation, commissioning, periodic tests, certain maintenance work and repairs on our products include the manufacturer's service engineers and trained fitters with the corresponding certification.

1 General information

1.7 Test book / crane logbook

A completed test logbook must be kept for each hoist. The results of the periodic tests must be entered in the logbook and certified by the test engineer.

1.8 Transport and storage

Transport

⚠ CAUTION

Danger of falling parts

- Use the marked sling points for transporting the hoist.
- The sling points are designed for a max. diagonal pull $\geq 45^\circ$, see Fig. 1.
- The product is delivered on a special pallet. This enables it to be loaded and unloaded safely with a fork-lift truck.
- If the product is to be transported suspended, it must be attached to the sling points provided.
- Do not allow the hoist to drop. The product must always be set down on the ground correctly.
- Avoid damage to the product and its components by loading and unloading it correctly.

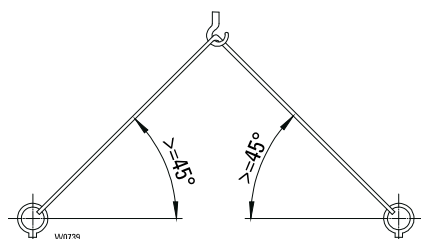


Fig. 1

Storage

- Store the product and its accessories in a dry place.
- Store it in a stable position, secure it against toppling or overturning.
- Observe environmental protection laws for storage (do not allow oil etc. to leak).
- The ground must be firm and must not permit the machine to sink in.
- Ensure the load is evenly distributed, support the hoist at several points.
- Do not kink the ropes and avoid contact with the ground.

1.9 Weight

See factory certificate.

1 General information

1.10 Installation, commissioning, maintenance and repairs

- Installation, commissioning, maintenance and repairs may be carried out by qualified persons only.
- We recommend having installation carried out by qualified personnel engaged by the manufacturer.
- Do not carry out any alterations or modifications.
- Additional fitments must be approved by the manufacturer.
(During welding work, electrode and ground must be in contact with the same component!)
- Use only original spare parts for repairs.
- Dismantled guards must be screwed down again and locked.

If the chain hoist is constantly operated out of doors and exposed to the elements without protection, we recommend fitting a canopy or at least "parking" the hoist under a roof.

1.11 After-sales service

You have purchased a high-quality product. A contracted after sales service will give you advice on its maintenance and correct use.

In order to maintain the safety and constant availability of the product, we recommend concluding a maintenance agreement.

1.12 Periodic tests

Hoists and cranes must be inspected by a qualified person (see chapter 1.6) at least once a year, more frequently if so specified by national regulations.

The results of the test must be recorded and filed in the test logbook.

The remaining service life of the hoist acc. to FEM 9.755 must also be established during this inspection.

The periodic tests must be adapted to the hoist's use. Intensive use or adverse environmental conditions entail shorter maintenance intervals.

All tests must always be initiated by the user! (see chap.1.6)

1 General information

1.13 Environmental information

Environmental aspects have been taken into account when developing and manufacturing this equipment. Please note the instructions on safe lubrication and waste disposal to avoid pollution risks during use. Appropriate use and correct maintenance will improve the environmental performance of this product.

1.13.1 Life cycle assessment

The stages of the product service life are:

- Production of materials,
- components and energy,
- transport to factory,
- manufacture and assembly,
- transport to customer,
- on-site installation,
- operating phase including maintenance and modernisation,
- dismantling and recycling of materials at end of service life.

1.13.2 Energy consumption

The energy consumption during the operating phase has the highest impact on the environment. Electricity is required for starting and running the motors and for lighting, heating, cooling and other optional electrical components and parts of the hoist.

2 Safety instructions

2 Safety instructions

2.1 Use for intended purpose

- Chain hoists are intended for lifting freely movable loads. Depending on their design, they are for stationary or mobile use.
- Chain hoists for "guided loads" have to be specially designed for this type of application. Pulling/towing or raising/lowering of a guided load is then only permitted if the chain hoist or system is designed for that purpose.
- Runways, suspensions and end stops must be of suitable dimensions.
- Any fundamental alterations and modifications to the product, such as e.g. welding on load-bearing components, structural alterations to load-bearing components, alteration of drives, alteration of speeds and motor outputs, replacing trolleys, etc. must be authorised by the manufacturer, otherwise the declaration of conformity/declaration of incorporation will be invalidated.
- Also any work on or additions to the control must be authorised by the manufacturer. The manufacturer cannot accept any liability for malfunctioning after unauthorised work on the control.
- Load hoist only up to the maximum working load, following the data on the rating plate. (Caution: danger of load falling).
- The conditions in the place of use of the hoist must correspond to the operating conditions for which the hoist was designed (including indoor/outdoor use, ambient temperature, radiation temperature, wind, dust, splash water, snow, water, etc.
- For hoists which work in combination and have more than one control (tandem operation), action must be taken to coordinate the controls. This applies also to the reaction of the protective devices.
- For hoists intended for automatic operation, the control must be designed accordingly
- In the case of chain hoists with multiple load-bearing equipment, ensure that the load is distributed evenly between the falls. Any asymmetry arising must not exceed the maximum load stated on the corresponding load capacity plate.

2.2 Inappropriate use

- Use in areas with potentially explosive atmosphere.
- Transporting molten metal.
- Exceeding the maximum working load.
- Transporting persons.
- Use of the hoist in applications where the load during a lifting procedure may exceed the maximum load-bearing capacity (e.g. single-sided attachment of long items), if no additional overload safeguard is present.
- Pulling loads loose, pulling or towing loads
- Pulling loads at an angle, dragging loads or moving vehicles with the load or load suspension equipment
- Do not knot load ropes or chains or shorten them with devices such as bolts, screws or similar
- Removing the safety latch from suspension and load hooks is not permitted
- Manipulating the slipping clutch
- Operating the hoist with slack chain
- Touching the chain during the hoisting motion
- Operating a damaged hoist
- Operating the hoist with the chain twisted
- Approaching the emergency limit switch in normal operation
- Approaching top and bottom hook position (slipping clutch) in normal operation.
- Manipulating the overload safety device.

2 Safety instructions

- Operating the chain hoist without a phase monitoring relay if a control supplied by the customer is not installed in an electrical connection box on the chain hoist, but e.g. in a stationary control cabinet.
- If the product forms "part of a machine," the person placing it on the market must ensure that the product meets the specific regulations of the application.
- Application of external torques due to forces that are exercised from outside the system, e.g. with gripper operation or through tilting/bumping of the load, in particular with the option 4×90° hook locking.

2.3 Residual dangers

The machine has been subjected to a risk analysis. The design and construction based on this correspond to the state of the art. However, residual hazards remain during operation and maintenance and these could result in serious or even fatal injuries to personnel.

- Risk of crushing
- Hazard due to falling parts (attached to the load or on the load)
- Load toppling due to unsuitable or damaged load-bearing equipment
- Risk of electric shock

Preventative measures:

- The machine functions with high voltage.
- Switch the machine off and ensure it cannot be switched on again before carrying out maintenance, cleaning and repair work.
- Switch off the power supply before all work on the electrical system. Check that the components to be replaced are free of current and voltage.
- Do not remove any safety devices or override them by manipulating them.
- When lifting or lowering loads ensure that no-one is in the immediate danger area.
- It is forbidden for anyone to stand in the danger area.

2.4 Organisational safety precautions

- The user may only employ persons to operate the product independently (crane operator), install or maintain the product if they
 1. have reached the age of 18,
 2. are capable both physically and mentally,
 3. have been instructed in operating and maintaining the crane and have shown him proof of their competence and
 4. may be expected to perform the duties assigned them reliably.
- At regular intervals, check that work is being carried out in a safety-conscious manner.
- Observe the intervals specified for periodic tests. File the test reports in the test log-book.

2 Safety instructions

2.5 General regulations

- Safety and accident prevention regulations.
- Official and statutory regulations.
- National regulations.

2.6 Personal protective equipment



Fig. 2

Personal protective equipment to be provided by the user

- Safety shoes
- Gloves (only if there is no danger of them being drawn into equipment)
- Protective goggles
- Protective helmet
- Hearing protection
- Closely fitting clothes (danger of clothing being drawn into equipment)
- When operating hoist or standing close to hoist, wire rope or chain there is a danger of fingers, clothing, jewellery, etc. being drawn into equipment

2.7 Protection against falling

Work over 2 m above the ground may only be performed from work platforms. Fitters working outside work platforms must be secured with a fall protection system.

2.8 Sound pressure level

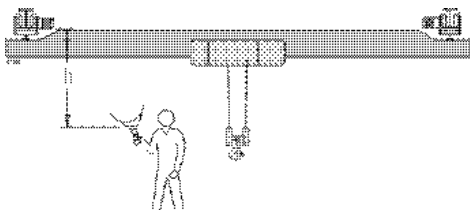


Fig. 3

The sound pressure level was measured at a distance of 1 m from the chain hoist. The mean sound pressure level is calculated for one operating cycle (50 % with maximum permissible load, 50 % without load).

Type	[dB A]
ST 05	76
ST 10 - ST 60	74

2.9 Fire safety

⚠ WARNING

Never use a powder extinguisher in the presence of high voltages

Only fight the fire if this is possible without subjecting yourself to risk. Switch off the crane if this is possible. Evacuate the area. Advise other persons on potential danger and call for help.

2 Safety instructions

2.10 Safety-conscious operation

- ST chain hoists are constructed according to the state of the art and equipped with a slipping clutch as overload protection. In spite of this, dangers may arise from inappropriate use or use for an unintended purpose.
- The user is responsible for ensuring that work is carried out with safety in mind and avoiding risks, see chap. 1.6.
- Read the instructions before starting to work with the product.
- Standing under a suspended load is forbidden. Danger to life and limb!
- Observe the "Duties of crane operator".
- Before starting work, find out where the emergency stop button is (usually in the control pendant).
- Do not put your hand between edges that might crush or cut.
- Do not grasp the moving chain.
- Take note of the relevant instructions when attaching loads.
- Do not stand between load and wall.
- Start lifting the load carefully.
- Never attempt to remedy a malfunction while the load is suspended.
- Never use bent, open or distorted load hooks, or attempt to straighten them.
- Have a damaged hook latch repaired.
- Never anneal the hook.
- Never lock the buttons of the control switch in place.
- Never allow the load to drop into the hoist's load-bearing equipment.
- Before lifting loads, ensure that the stated maximum working load is not exceeded.
- When lifting and setting down loads, ensure that they are in a stable position in order to avoid accidents due to the load toppling or overturning.
- Secure the load if the power is cut.
- Have a damaged hook safety latch repaired.
- Do not kink or crush control cables.
- Choose a safe place from which to operate the hoist.
- Joining or mending ropes, chains or belts is not permitted.
- Never touch metal components that are colder than 0°C or hotter than 55°C without wearing protective gloves.
- Report damage and defects to the product (abnormal noises, impaired braking function, deformations, ...) to the person responsible immediately. Do not use the product until the faults have been eliminated.
- Do not remove information plates from the product. Replace illegible or damaged plates.
- Never expose control cables to tensile stress. It is strictly forbidden to move the hoist by pulling on the control pendant.
- Have hoist inspected by the relevant authority before commissioning.

2.11 Attaching load

- Use only tested and approved slings for attaching the load.
- The rope must not be wound around the load.
- The load must always be suspended from the base of the hook. The tip of the hook must not be subjected to load.
- Removing the safety latch from suspension and load hooks is not permitted.

3 Introduction

3 Introduction

Chain hoists are intended for lifting freely movable loads.

The modular system permits a multitude of combinations of the components.

The hoist drive is a cylindrical rotor motor with a separately activated D.C. brake. Its design complies with the FEM calculation regulations which are adapted to the requirements of hoist operation.

Our certified quality assurance system to ISO 9001 guarantees consistently high quality.

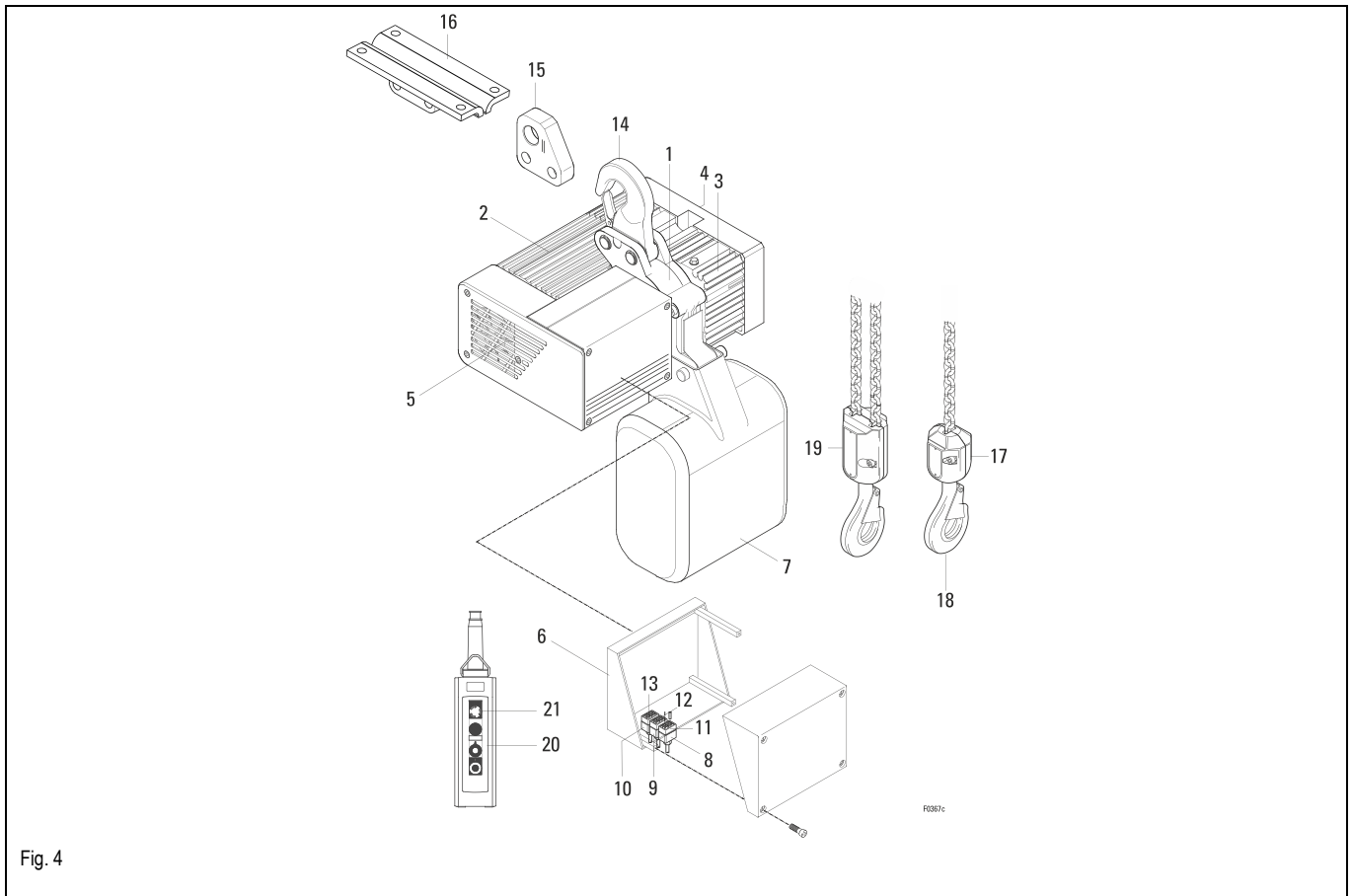


Fig. 4

- | | |
|-------------------------------|----------------------------------|
| 1 Chain drive | 12 Socket for travel drive |
| 2 Motor | 13 Socket for mains connection |
| 3 Gear | 14 Suspension hook |
| 4 Slipping clutch | 15 Suspension eye |
| 5 Brake | 16 Rigid suspension |
| 6 Panel box | 17 Single-fall bottom hook block |
| 7 Chain box | 18 Load hook |
| 8 Plug for control pendant | 19 Two-fall bottom hook block |
| 9 Plug for travel drive | 20 Control pendant |
| 10 Plug for mains connection | 21 Emergency stop |
| 11 Socket for control pendant | |

4 Installation

4 Installation

4.1 Stationary chain hoist

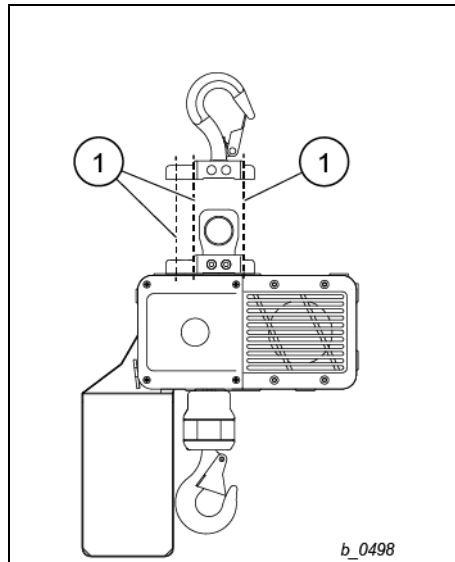
▲ WARNING



Danger due to falling parts

- Check correct assembly of the overhead suspension prior to commissioning.

ST 05



ST 10 - ST 60

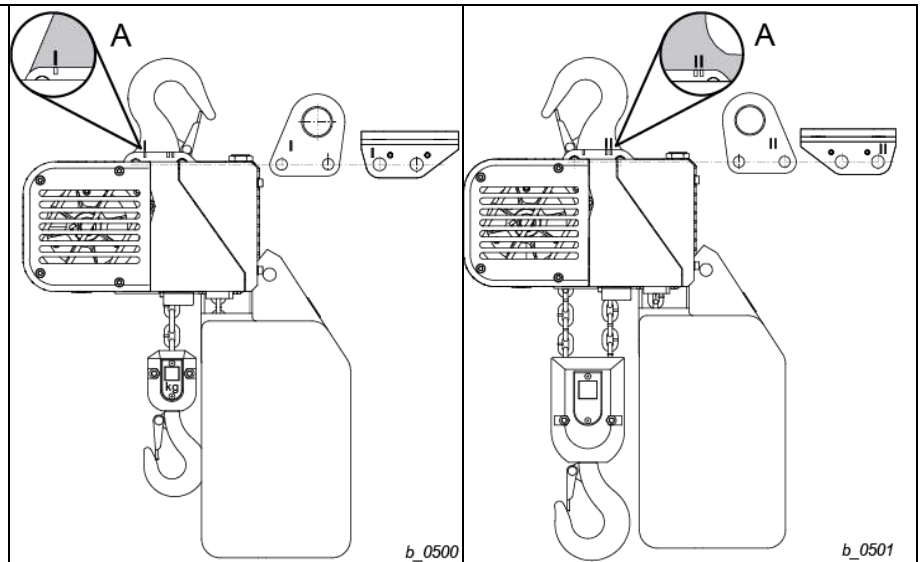


Fig. 5

Fig. 6

- (1) Threaded connection of the overhead suspension
Tightening torque of the screws (1) 15 Nm.

For the assembly procedure please refer to the chapter **Assemble trolley on chain hoist**.

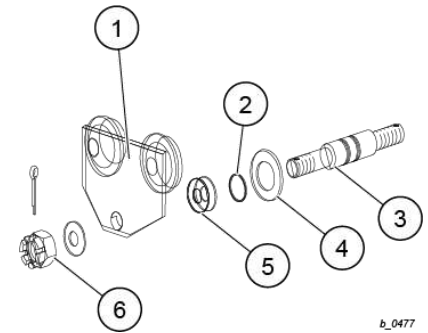
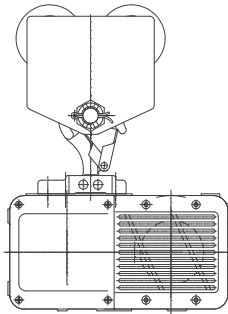
4 Installation

4.2 Chain hoist with trolley

4.2.1 Assemble the trolley

US-G10

- (1) Trolley side cheek
- (2) Snap ring
- (3) Suspension bolt
- (4) Washer
- (5) Distance washers
- (6) Castellated nut



b_0477

Fig. 7

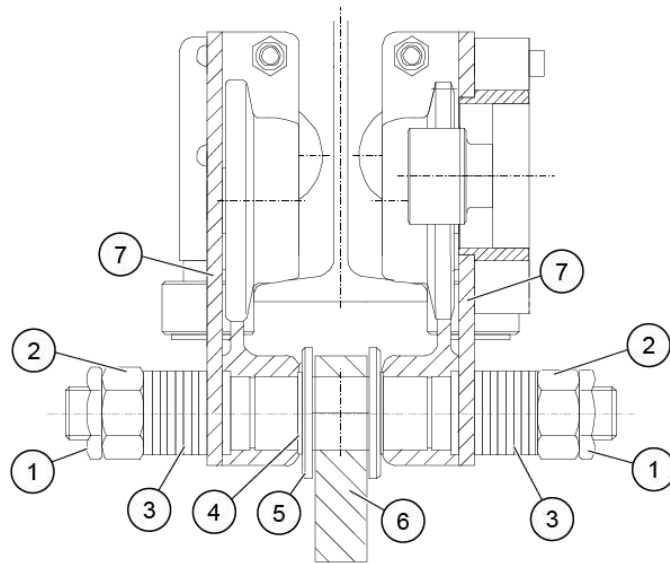
1. Fit the overhead suspension (if available) on the suspension bolt (3).
2. Fit the washer (4) on the suspension bolt (3).
3. Attach the snap ring (2) to the suspension bolt (3).
4. Set the correct dimension through the symmetrical distribution of the distance washers (5).
5. Fit the trolley side cheek (1) on the suspension bolt (3).
6. Screw on castellated nut (6) with distance washers (5).
7. Repeat steps 2 to 6 with the second side.
8. Adjust runway width with adjusting washers (see chapter Adjust trolley to runway width).
- Overhead suspension must be central to the trolley.
9. Tighten castellated nut and then release to the next cotter pin hole.
10. Attach screw locks.

4 Installation

KFN 10 / 63

KFK 10 / 63

- (1) Screw lock
- (2) Nut
- (3) Distance washer
- (4) Snap ring
- (5) Washer
- (6) Overhead suspension
- (7) Trolley side cheek



b_0478

Fig. 8

1. Fit the overhead suspension (6) on the suspension bolt.
2. Fit the washer (5) on the suspension bolt.
3. Attach the snap ring (4) to the suspension bolt.
4. Set the correct dimension through the symmetrical distribution of the distance washers (3).
5. Fit the trolley side cheek (7) on the suspension bolt.
6. Screw the nut (2) with the distance washers (3).
7. Repeat steps 2 to 6 with the second side.
8. Adjust runway width with adjusting washers (see chapter Adjust trolley to runway width).
- Overhead suspension must be central to the trolley.
9. Tighten the nut (2) with the specified torque (see table).
10. Attach screw locks (1).

Type	Nm
KFN 10 / KFK 10	130
KFN 63 / KFK 63	1100

4 Installation

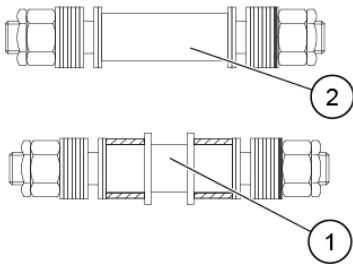
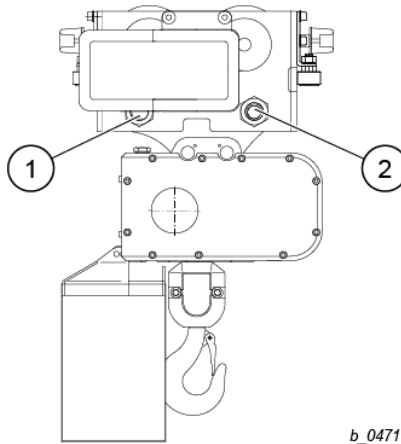


Fig. 9

- (1) Suspension bolt with spacer sleeves
- (2) Suspension bolt

b_0472

KFN 32



KFK 32

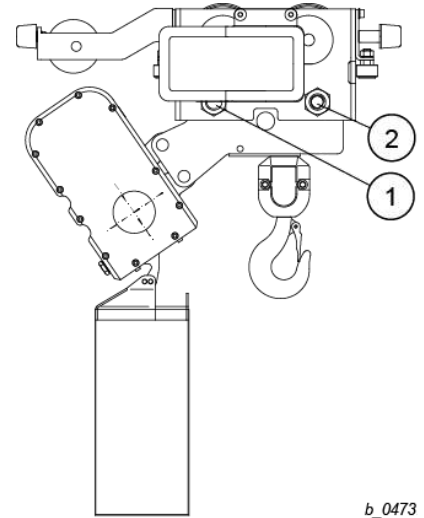


Fig. 10

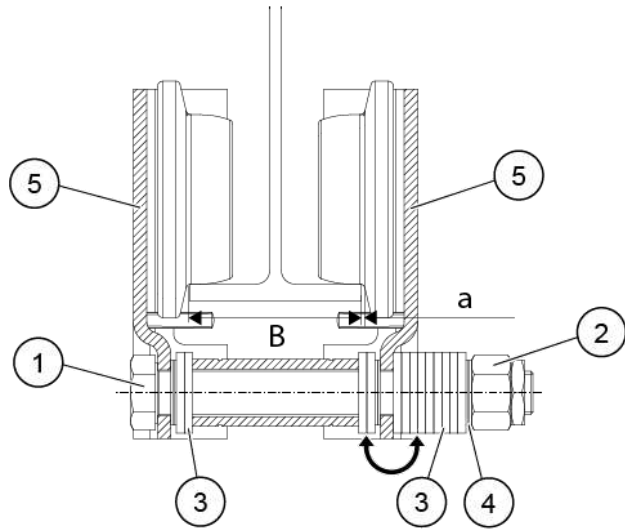
b_0471

b_0473

1. Insert the suspension bolt in the overhead suspension.
Insert the suspension bolt (1) in position (1) with spacer sleeves.
 - Set the correct dimension through the symmetrical distribution of the distance washers and spacer sleeves.Insert the suspension bolt (2) in position (2) without spacer sleeves.
 - Set the correct dimension through the symmetrical distribution of the distance washers.
2. Fit the trolley side cheeks on the suspension bolts.
3. Adjust runway width with adjusting washers (see chapter Adjust trolley to runway width).
 - Overhead suspension must be central to the trolley.
4. Tighten the nut with the specified torque (470 Nm).
5. Attach screw locks.

K.T 22

- (1) Hexagon head screw
- (2) Nut
- (3) Distance washer 3 mm
- (4) Distance washer 1 mm
- (5) Trolley side cheek
- B Runway width
- a Track clearance



b_0499

Fig. 11

1. Fit the first trolley side cheek (5) on the hexagon head screw (1).
2. Set the correct dimension through the symmetrical distribution of the distance washers (3, 4).
3. Fit the second trolley side cheek (5) on the hexagon head screw (1).
4. Adjust runway width with adjusting washers (see chapter Adjust trolley to runway width).
5. Screw the nut (2) with the distance washers (3, 4).
 - Overhead suspension must be central to the trolley.
6. Tighten the nut (2) with the specified torque (52 Nm).
7. Attach screw locks.

4.2.2 Adjust trolley to runway width

⚠ WARNING



Danger due to falling parts

The chain hoist must not be operated without screw locks.

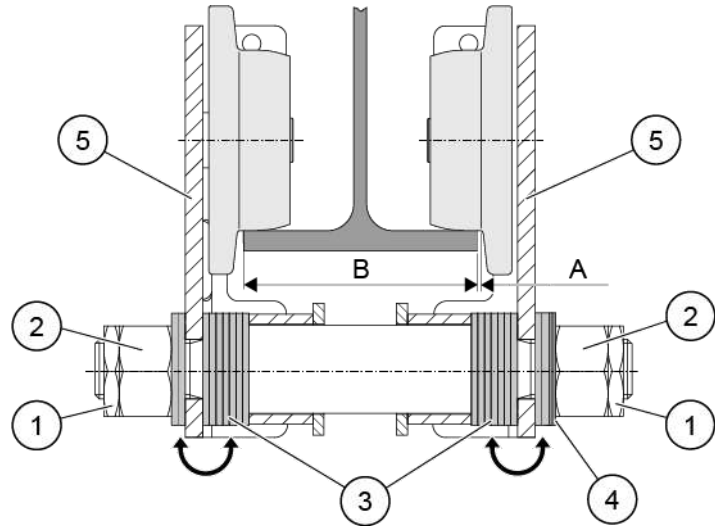
Check correct assembly of the overhead suspension prior to commissioning.



- If the runway width deviates from the dimension specified in the order, clarify with the manufacturer whether the trolley supplied is suitable for the actual runway width.
- Always hang the chain hoist in the centre of the trolley.
- Lubricate the teeth of the running rollers with grease.
- Only perform runway width adjustments with original parts.

4 Installation

- A Track clearance
 B Runway width
- (1) Screw lock
 (2) Nut
 (3) Distance washer 3 mm
 (4) Distance washer 1 mm
 (5) Trolley side cheek



b_0479

Fig. 12

The trolley is set to the runway width (B) specified in the order. The track clearance (a) per side is 3 mm. If necessary, the track clearance (a) can be readjusted by moving the distance washers (3) and (4) as described in the following. The track clearance (a) must not be greater than 3 mm on one side.

⚠ WARNING



Danger due to falling parts

An unsecured chain hoist can cause falls and injuries.

➤ Secure chain hoist against falling.

1. Secure chain hoist against falling.
2. Remove screw lock (1).
3. Loosen the nut (2).
4. Remove the trolley side cheek (5) from the suspension bolt.
5. Set the correct dimension through the symmetrical arrangement of the distance washers (3) and (4).
6. Fit the trolley side cheek (5) on the suspension bolt.
7. Tighten the nut (2) with the specified torque (see table).
8. Attach screw locks (1).

Type	Nm
US-G10	Tighten castellated nut and then release to the next cotter pin hole.
K.T 22	52
KFN 10 KFK 10	130
KFN 32 KFK 32	470
KFN 63 KFK 63	1100

4 Installation

4.3 Installing trolley on chain hoist

▲ WARNING



Danger from falling parts

There is a danger that an unsecured bolt may become loose and the hoist fall.
➤ Always secure the bolt.

1. US-G 10 with ST05

Always suspend chain hoist from centre of trolley. See sketch, page 15

US-G 10 with ST10

Fit suspension piece to chain hoist. Note installation position of suspension piece. Fit bolt (a) and locking plate (b), lock cheese-head screw (c) with medium-strength thread locker (e.g. Loctite 245), see sketch.

KFN 10/32 with ST10/ST20-ST32; ST50 /ST60 1/1 - KFN 63 with ST50 / ST60 2/1

Fit suspension piece to chain hoist. Note installation position of suspension piece. Fit bolt (a) and locking plate (b), lock cheese-head screw (c) with medium-strength thread locker (e.g. Loctite 245), see sketch.

US-G10 with ST05 1/1 ... 2/1

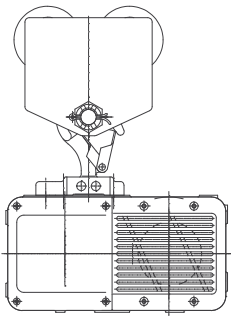


Fig. 13

US-G10 with ST10 1/1

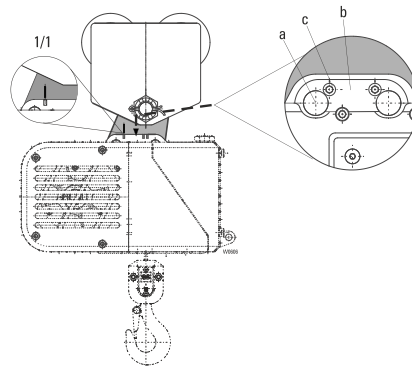


Fig. 14

KFN10/32 1/1

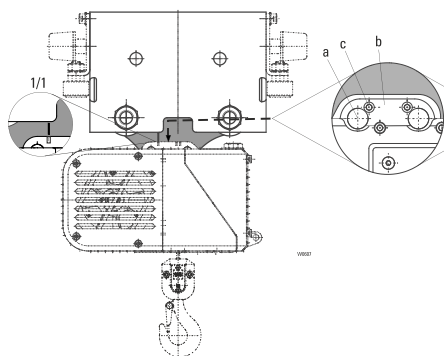
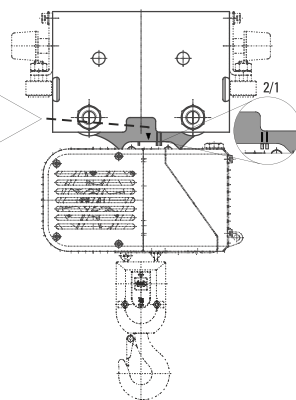


Fig. 15

KFN10/32 2/1



KFN 63 2/1

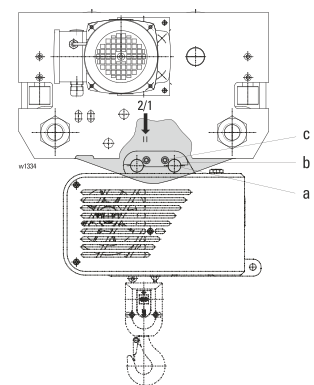


Fig. 16

2. Slide trolley onto runway or push on from below after swivelling the side cheeks up.
3. Check that screws and nuts are tightened with specified torque, see page 52.
4. Ensure screws are locked!

4 Installation

1. KFK

Fit suspension piece with suspension bolt (a) to chain hoist. Observe installation position of suspension piece for 1/1 and 2/1 reeving! Lock bolt (a) with washer (b) and circlip (c), see sketch.

KE-T 22

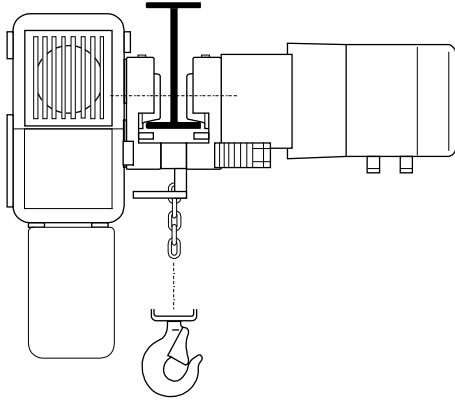


Fig. 17

KFK ..

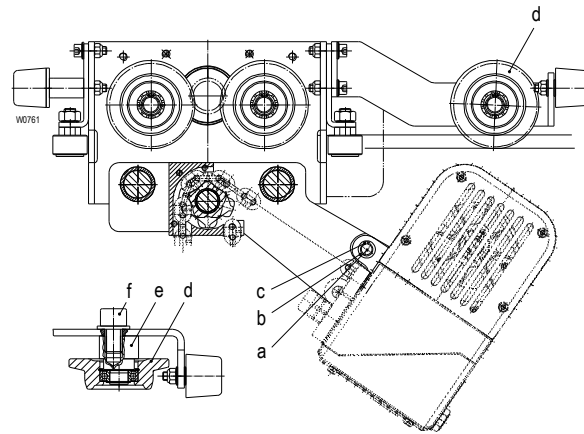


Fig. 18

Wheel Ø	Max. S.W.L. [kg]
50	500
63	500 (KE-T)
63	1000
80	3200
125	6300

2. Slide trolley onto runway or push on from below after swivelling the side cheeks up.
3. Check that screws and nuts are tightened with specified torque, see page 52.
4. Ensure screws are locked!

KFK ..

1. Turn wheel (d) by means of cam (e) until it is in contact with the running surface of the runway.
Tighten screw (f).

N.B.: The guide roller must be flush with the wheels

NOTICE

Danger of increased wear

Poor beam quality or lopsided running of the trolley may lead to increased wear. Ensure that the trolley runs smoothly over the whole distance.

4 Installation

4.4 Attach the trolley to the runway beam

- (1) Screw lock
- (2) Nut
- (5) Trolley side cheek
- a Track clearance

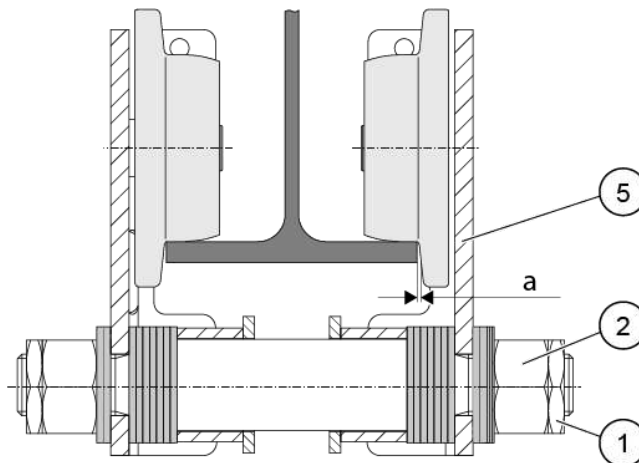


Fig. 19

b_0486

1. On one side, loosen the screw lock (1) and nut (2) and open the trolley side cheek (6) sufficiently far that the trolley fits on the runway beam.
2. Attach the trolley to the runway beam.
3. Make sure that the track clearance (a) is not greater than 3 mm on one side; if necessary readjust the trolley (see chapter Adjust trolley to runway width).
4. Tighten the nut (2) with the specified torque (see table).
5. Attach screw locks (1).

Type	Nm
US-G10	Tighten castellated nut and then release to the next cotter pin hole.
K.T 22	52
KFN 10 KFK 10	130
KFN 32 KFK 32	470
KFN 63 KFK 63	1100

4 Installation

4.5 Connecting electric trolley

Plug connection cable into chain hoist and secure.

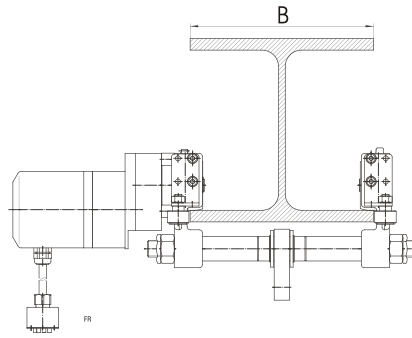


Fig. 20

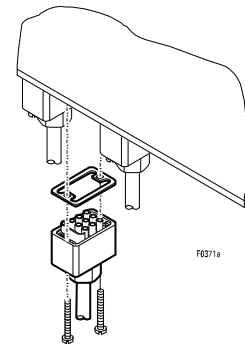


Fig. 21

4.6 Mounting guide rollers

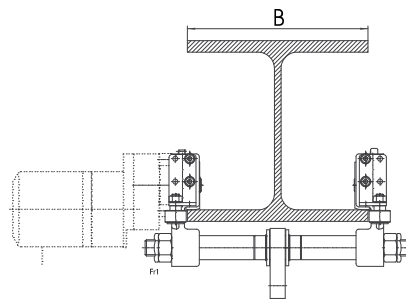


Fig. 22

KFN / KFK 10/ 32: $B \geq 260$
KFN / KFK 63 B: >300

4.7 Mounting support rollers

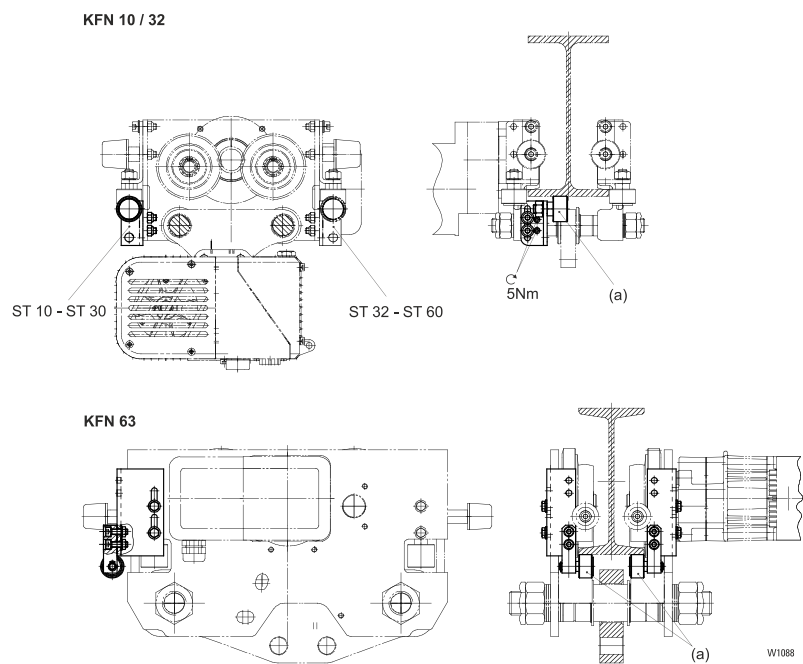


Fig. 23

The support wheel (a) must be in contact with the runway when mounted.

4 Installation

4.8 Runway end stop



▲ WARNING

Danger of falling parts

If there are no end stops, there is a danger of the trolley travelling over the end of the runway.

- Mount suitable end stops at the end of the runway before commissioning the hoist.

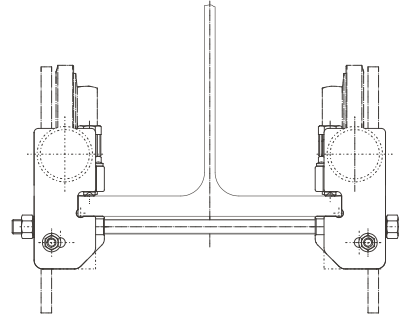


Fig. 24

4.9 Disassemble and assemble chain bucket

NOTICE

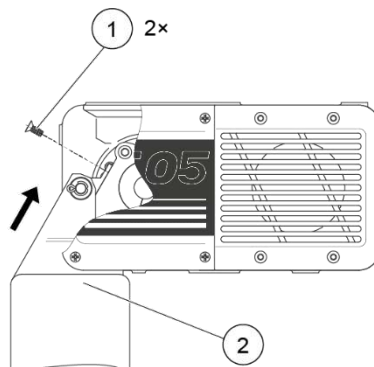
Danger of chain damage

- The chain must not grind on components.
- Lubricate chain with the chain grease supplied!
- Chain bucket must move freely.
- For max. chain length see sticker on the chain bucket.

4.9.1 Disassemble chain bucket

1. **▲ CAUTION** An unsecured chain bucket can fall and cause injuries.
 2. Secure the chain bucket (2) against toppling and falling.
 3. Move the chain hoist downwards, into the bottom limit position.
- Make sure that the chain bucket (2) is empty.

ST 05



- (1) 2×screw
- (2) Chain bucket

Fig. 25

1. Unscrew screws (1).
2. Hoist the chain bucket (2) in the direction of the arrow and remove.
3. Assembly takes place in reverse order.

4 Installation

ST 10 / ST 20 / ST 30

- (1) chain box
- (2) suspension bolt
- (3) splint
- (4) safety washer

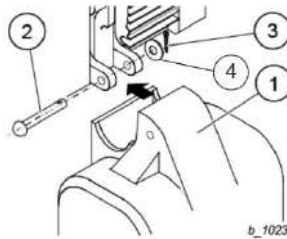


Fig. 26

1. Draw out splint (3)
2. Remove the suspension bolt (2) and safety washer (4).
3. Remove the chain box (1).
4. Assembly takes place in reverse order.
5. Splint (3) must be replaced.

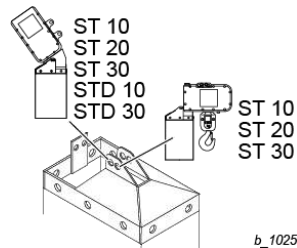


Fig. 27

Select the appropriate drilled hole depending on the version of the attachment

ST 32 / ST 50 / ST 60

- (1) chain box
- (2) suspension bolt
- (3) clip

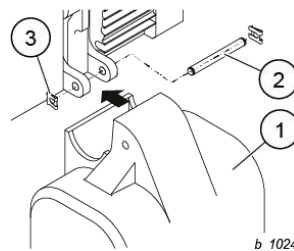


Fig. 28

1. Remove clip (3).
2. Remove suspension bolt.
3. Remove the chain box.
4. Assembly takes place in reverse order.

4 Installation

4.10 Mounting control pendant

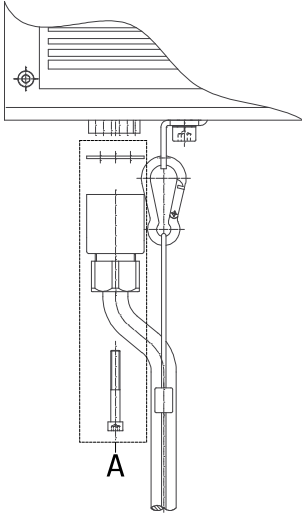


Fig. 29

Ensure sufficient clearance between cable and chain by turning the plug if necessary ($\pm 360^\circ$)! The cable must not touch the chain.

1. Plug in and secure cable.
2. Fit strain relief wire.

NOTICE

Danger of damage to cable

The control pendant must be suspended from the strain relief wire and not from the cable!

The circuit diagram must be followed if the customer connects the control cable by means of a plug kit, (parts marked "A" are supplied loose).

Prepare ends of cable acc. to sketch "Mains connection, plug-type".

For connecting control pendant without plug, see circuit diagram supplied. (Terminal strip X1, terminals 1...9. Connection is via a cable gland.)

4.11 Connecting to mains

⚠ WARNING



Danger from potentially lethal voltage

The chain hoist must be connected by a skilled electrician (see chapter 1.6).

The mains power supply cable must meet the requirements given in the technical data.

The relevant safety and accident prevention regulations must be observed!

Plug-in mains connection

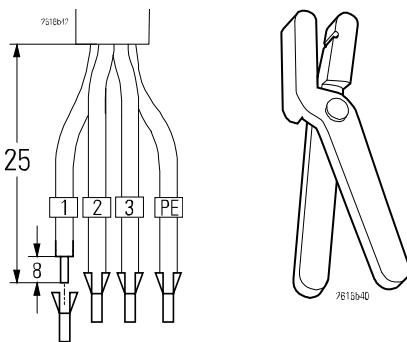
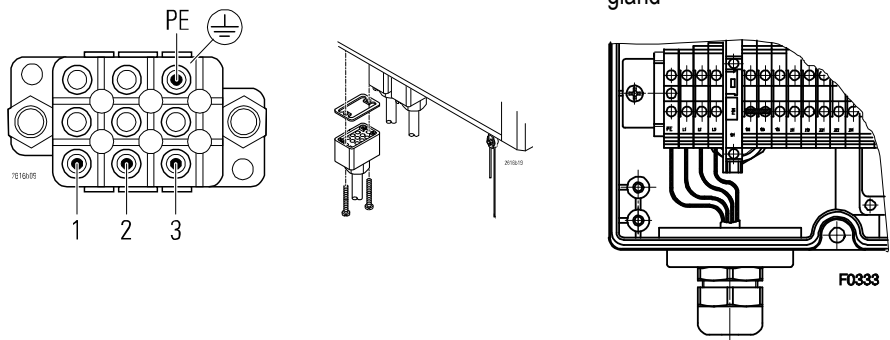


Fig. 30

Mains connection with cable gland



4.11.1 Protective conductor

⚠ WARNING



With a missing protective conductor, an electric shock hazard exists. Material damage, severe injuries or death can result.

- Connect the external protective earth system (PE) close to the terminals of the phase conductor using a protective conductor for each mains connection.

Without a protective earth connection, malfunctions can arise during operation. The protective earth connection facilitates protective equipotential bonding for protection against electric shocks, as well as functional equipotential bonding for the avoidance of electrical interference effects on electronic systems.

5 Commissioning

The chain hoist has been subjected to a final inspection by the manufacturer in accordance with the EC Machinery Directive.

▲ WARNING

Danger of bodily injury

The test before first commissioning must be carried out by a qualified person, see chapter 1.6.

The safety instructions in chapter 2 must be observed.

This applies for all chain hoists with electric trolley.

An exception is made for chain hoists with maximum working load of <1000 kg with push trolley or in stationary design.* (Monorail with push trolley, or stationary mounting.)

When the hoist is commissioned and / or after a service call a comprehensive retest must always be performed.

Test steps

- Remove sticker from air vent screw in gear
- Check suspension hook or suspension (visual inspection)
- Check load chain
 - clean and oiled
 - must not be twisted
- Check chain box
 - attachment
- Attach chain stopper to chain with hook at floor level and check chain anchorage
- Measure and record hook aperture
- Check that chain drive runs smoothly
- Check electrical connection
- Check runway
 - clean, free of grease and paint, even
 - end stops present
- Check tightening torque of screw connections of suspension piece or trolley suspension.
- Open step of travel drive must be clean and greased.
- Functional test of all control functions and safety circuits (motions, brakes, emergency stop, limit switches).
- Maximum working load of hoist with test loads
 - Dynamic test: 1.1 x maximum working load
 - Static test: 1.25 x maximum working load
 - The test loads must be provided by the user.
- Function of overload cut-off, see page 33.
- Confirm that commissioning has been duly carried out in the test logbook.

If required by national regulations, have chain hoist accepted before commissioning.

* The above exceptions do not apply if your chain hoist is operated on a crane!

6 Operating

6 Operating

6.1 Duties of crane operator

Personal protective equipment to be provided by the user

See chapter 2, Safety instructions.

Requirements for workplace

- The operator must not stand in the hazard area.
- The hazard area must be clearly visible.
- The movement of the load in all directions must be clearly visible.

⚠ WARNING

Danger of bodily injury

When working with chain hoists, the following points must be observed:

- The crane operator must observe the load, or if the crane is unloaded, the load suspension equipment during all movements of the crane if they could cause danger. If it is not possible to observe the crane, the crane operator may only control the crane by following signals from a signaller.
- Wear ear protectors in noisy environments.
- Start lifting load with the slowest hoisting speed.
- The crane operator must give warning signals as necessary.
- Loads attached by hand may only be moved by the crane operator after an unambiguous signal from the person attaching the load, the signaller or another person responsible appointed by the user. If signals need to be used to communicate with the crane operator they must be agreed between the person responsible and the crane operator before being used.
- Every day before starting work, check brakes and limit switches and inspect the system for any visible defects.
- Stop working with the crane if there are any defects which might prejudice its safety in operation.
- At close of work, secure cranes which are exposed to wind with the wind safeguard mechanism.
- Do not move loads above people.
- Before starting work, ensure there is sufficient workspace.
- Do not leave suspended loads unattended, the control pendant must be within easy reach.
- The slipping clutch is a safety device. It must not be activated in normal operation.
- Do not load above the permitted maximum working load.
- Pulling loads at angles, dragging loads, or towing vehicles with the load or load suspension equipment is forbidden!
- If the chain is slack, tauten it at minimum speed before lifting.
- Do not jerk free any loads which are jammed.
- Do not place your hands between edges which could pinch or cut.
- Approach final positions for hoisting, lowering and travel in normal operation only if an operational hoist limit switch is fitted.
- Inching operation (repeated brief activation of the motor to achieve small movements) is not permissible. Motors and brakes could be subjected to an impermissible temperature rise. This would lead to the temperature control disconnecting and the load could then not be set down for some time. Switchgear and motors could be damaged.
- Do not move in the opposite direction until the hoist has come to a stop.
- Observe the safety instructions, see chapter 2

6 Operating

6.2 Operating control pendant

NOTICE

Danger of unintentional movement of hoist

If the rocker switch is no longer depressed by the operator, it returns to the 0 position, the hoist motion is automatically stopped (dead man's control).

If the hoist malfunctions, e.g. the actual motion does not correspond to the motion intended in activating the rocker switch, release the rocker switch immediately. If the motion continues, press the emergency stop button.

If this also fails to bring the hoist to a standstill, the emergency stop switch (mains connection switch) should be immediately switched off and secured to prevent re-activation.

STH

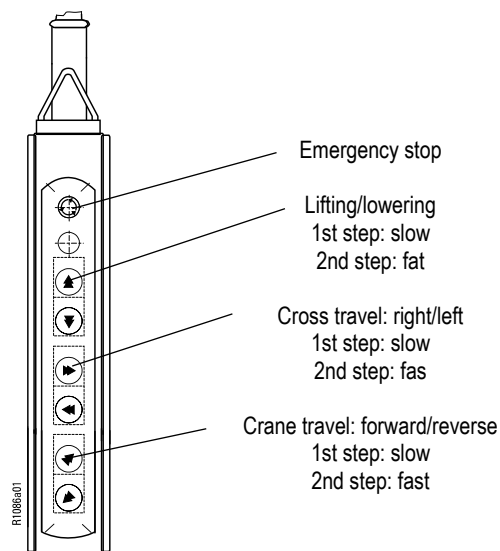


Fig. 31

6.3 Emergency stop

⚠ WARNING

Danger of bodily injury

After an emergency stop, the operator must not restart the hoist /crane system until a qualified person has determined that the fault which led to this function being activated has been eliminated and no danger can arise from the continued operation of the system.

Every hoist must have a means of disconnecting the power supply to all drives under load from the ground.

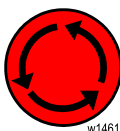


Fig. 32

- The emergency stop button is on the control pendant.
- Press emergency stop button, the system comes to a halt.
- To release the emergency stop:
 - with STH: turn the button in the direction shown

7 Inspection and maintenance

7 Inspection and maintenance

This section deals with operational reliability, availability, and maintaining the value of your chain hoist.
Although this chain hoist is practically maintenance-free, the components subject to wear (e.g. chain, brake) must be inspected regularly. This is required by the accident prevention regulations.
Inspection and maintenance must be carried out by qualified persons, see chapter 1.6

▲ WARNING



Danger of falling parts

- Cordon off and secure danger area before performing inspection and maintenance work.

NOTICE

General information on inspection and maintenance

- Maintenance and repair work may only be carried out when the hoist is unloaded.
- Before starting, switch off and lock main isolator.
- Check that the hoist is de-energised.
- Observe the requirements of the accident prevention regulations.
- Periodic tests including maintenance every 12 months, possibly earlier if so prescribed by national regulations, are to be performed by a certified fitter.
- The specified inspection and maintenance intervals apply for normal conditions of use.

If major components are replaced, further tests must be performed.

- Replacement of electrical equipment and renewal of electric leads and connections
Insulation resistance test and testing the continuity of the PE system
- Correct phase connection

The hoist's electrical equipment must be checked regularly. Damage to electrical equipment, loose terminals, damaged cables and worn switchgear contacts must be remedied immediately.

The inspection and maintenance intervals must be adapted accordingly if one or more the following conditions apply:

- If after evaluating the actual use it can be seen that the theoretical useful life of the hoist will be less than 10 years.
- In the case of operation in more than one shift or heavy duty.
- In the case of adverse conditions (dirt, solvents, temperature, etc.).

A general overhaul must be carried out after the useful lifetime has expired.
Lubricants and lubrication points, see page 53.

7 Inspection and maintenance

7.1 Inspection intervals

7.1.1 Every day

- Check correct functioning of brake(s).
- Check load chain (visual inspection)
 - clean, lubricated and not twisted
- Check that chain drive runs smoothly
- Check bottom hook block (visual inspection)

7.1.2 Every month

- Check suspension of control pendant (cable and strain relief wire must be fitted).
- Check load chain for wear, see page 38

7.1.3 Every three months

- Check hook for wear, see page 44.
- Check hook attachment
- Grease output pinion and open step of gearing on electric trolley
- Check attachment of rigid suspension or trolley suspension
- Clean and lubricate chain
- Check chain attachment

7.1.4 Every year

- Check the screw and bolt connections (tightening torques, corrosion, wear)
- Adjust brake
- Adjust slipping clutch; function of limit switch is also tested when allowing clutch to slip under overload
- Calculate service life expired. Read operating hours counter if any.
- Check chain stopper (visual inspection)

7.1.5 Every five years

- Gear oil
- Change oil, see "Oil change", chapter 7.16.

▲ WARNING

Danger of bodily injury

Periodic tests including maintenance at least every 12 months, possibly more frequently if so pre-scribed by national regulations, to be performed by a qualified person.

NOTICE

Heavy duty or unfavourable conditions (dirt, solvents, multi-shift operation, etc.) entail a reduction of this inspection and maintenance interval.

7 Inspection and maintenance

7.2 Checking function of slipping clutch without load

1. Without load, run bottom hook block to top or bottom hook position.
2. Allow clutch to slip in top or bottom hook position for a maximum of 3 sec. The chain must not move, the motor must rotate.

▲ WARNING

Danger of bodily injury and material damage

Slipping clutches and brakes may only be adjusted by a qualified person.

- The motor must be at a standstill during all work on the slipping clutch.

When starting to adjust the slipping clutch, the chain drive must be off-loaded! We recommend consulting our after-sales service. Before being adjusted, the function of the slipping clutch must be checked.

7.3 Adjusting slipping clutch - without load

The slipping clutch can be tested easily with the FMD1 slipping clutch testing device, and adjusted if required without any danger to the structural steelwork.

125⁺¹⁵ % of maximum working load is the specified value for the slipping clutch.

The function of the chain hoist must be tested with maximum working load at least once a year. Adjusting the slipping clutch with this testing device does not replace this test!

7.4 Adjusting slipping clutch with test load

▲ WARNING

Danger of bodily injury

Adjusting the slipping clutch with a test load may only be performed by a qualified person. Before starting, it must be ensured that the entire suspension structure (such as crane, crane runway, crane runway suspensions right up to the roof of the building, etc.) can support the increased load on the chain hoist.

Due to the polygon effect, oscillations and tolerances of the friction linings, in accordance with EN 14492-2 adjustment values between min. 110 % and max. 160 % of maximum working load are permissible for chain hoists.

If necessary, take the chain hoist down and carry out adjustment on a test stand. The slipping clutch is factory set to 125⁺¹⁵ % maximum working load.

▲ WARNING

Danger of bodily injury

It is forbidden to hoist test load to top hook position and activate the slipping clutch. The test load may be lifted by a maximum of 300 mm.

- In bottom hook position attach a test load of 125 % of maximum working load.
- Remove cover (1).
- A small amount of gear oil may escape when the cover is removed (n/a for ST05)
- Bend back locking plate (2) (ST05).
- Release slipping clutch setting with clamping screw (2a) (ST32/ST50/ST60)
- Adjust slipping clutch by turning the adjusting screw or nut (3).
- Turning to the right → the reaction force increases
- Turning to the left → the reaction force decreases
- If the reaction force is too high, the adjusting screw or nut must be loosened by one turn.
- Adjust slipping clutch so that the test load is just lifted. The test load must be held firmly in every position.
- Bend locking plate (2) up over 2 surfaces of the adjusting screw (ST05).
- Lock slipping clutch setting with clamping screw (2a) (ST32/ST50/ST60)
- Replace cover (1) and gasket.

ST 05: if no further adjustment is possible, replace clutch

ST 10 - ST 60: non-wearing lining

7 Inspection and maintenance

ST05

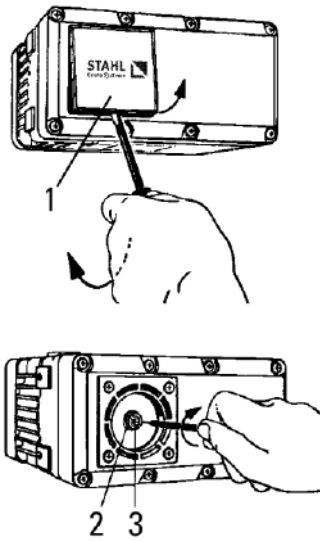


Fig. 33

ST10/ST20/ST30

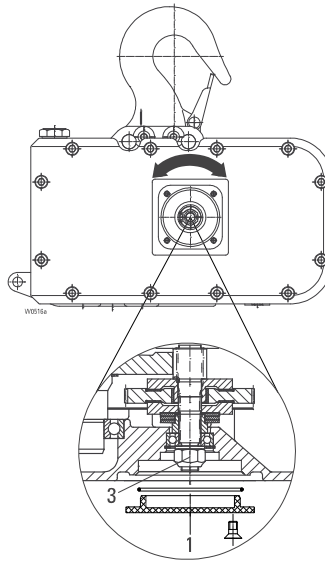


Fig. 34

ST32/ST50/ST60

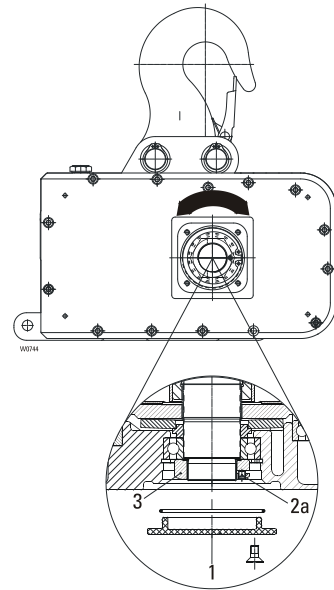


Fig. 35

7.5 Hoist motor brake

⚠ WARNING



Danger of falling loads

- Check brake at regular intervals

7.5.1 Checking brake

1. Attach test load
2. Activate brake during lifting and lowering.
3. Slowing-down paths of up to 10 cm are permissible.

ST05

- Measure distance between fan cover and motor shaft
 1. with motor standing still
 2. with motor running

The brake displacement is the difference between these two values. If value (S) is greater than 1.5 mm, the brake must be adjusted. Nominal dimension: 1 ± 0.25 mm.

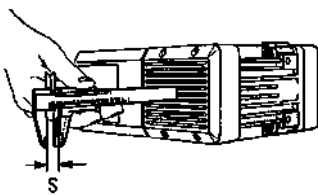


Fig. 36

7.5.2 Adjusting brake

⚠ WARNING



Danger of bodily injury

The brake may only be adjusted by a qualified person.

After working on brake, always perform a functional test with maximum working load.

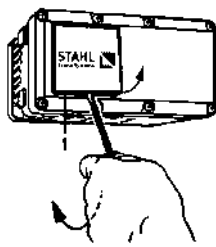


Fig. 37

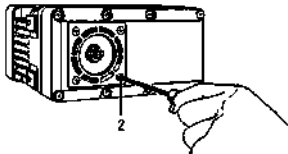


Fig. 38

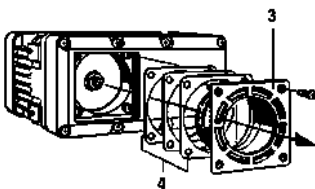


Fig. 39

ST05

- Set load down.
 - Calculate number of shims to be removed. The brake displacement is altered by 0.5 mm per shim.
 - Example:
Brake displacement measured: 1.8 mm
Remove 2 shims: -1.0 mm
New brake displacement: 0.8 mm
 - Lever off cover (1) with a screwdriver.
 - Remove 4 screws (2).
 - Pull off brake flange (3).
 - Remove number of shims (4) calculated.
 - Push on brake flange.
 - Reassemble in reverse order.
 - Check brake displacement.
-
- Replace brake/slipping clutch unit if all shims have been removed. Then reset brake displacement.

7 Inspection and maintenance

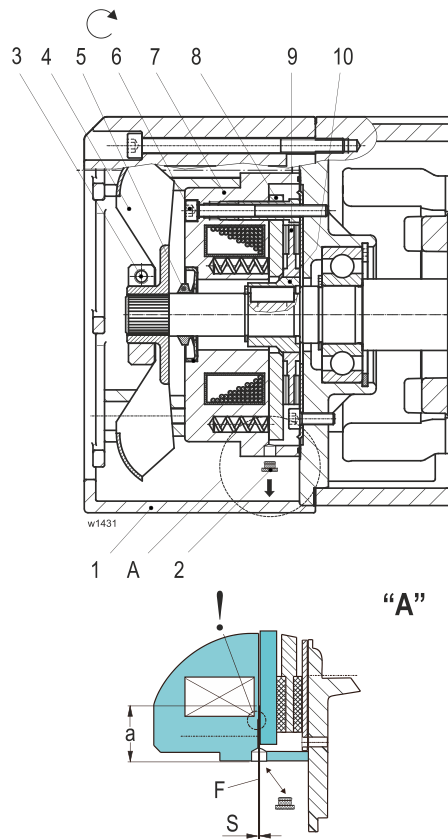


Abb. 40

ST10 - ST60

- Remove fan cover (1)
- Remove plug (2)
- Measure air gap (S) with feeler gauge (F). N.B.: When measuring, ensure that the feeler gauge is pushed in at least as far as depth "a" (see Tab.) and does not catch on shoulder (!). See Tab. for max. permissible air gap (S). The brake is not adjustable. If the max. permissible air gap (S) has been reached, the brake disc (brake rotor) must be replaced.

Replacing brake disc (brake rotor)

- Remove fan cover (1)
- Release clamp (3) of fanwheel (4)
- Disconnect brake
- Remove fanwheel (4)
- Remove V-ring (5) IP66
- Unscrew fixing screws (6)
- Remove magnet piece (7) together with armature disc (8)
- Remove brake disc (brake rotor) (9)
- Clean brake (wear a dust protection mask)
- Check friction surfaces for wear
- Push new brake disc (brake rotor) (9) onto hub (10) and check radial play. If there is increased play in the gearing between brake disc (9) and hub (10) the hub (10) must be pulled off the motor shaft and replaced.


NOTICE

Danger of damage

Always contact the manufacturer before removing the hub (10).

Replace in reverse order. Ensure that the check hole for measuring the air gap is underneath.

Observe tightening torques of fixing screws (6) (see Tab.).

Hoist motor type	Hoist brake	S max. mm	a	
2E21	FDW08	0,7	20	3 Nm
2/8E21	FDW08	0,7	20	3 Nm
2E22	FDW08	0,55	20	3 Nm
2/8E22	FDW08	0,55	20	3 Nm
2E31	FDW10	0,8	25	6 Nm
2/8E31	FDW10	0,8	25	6 Nm
2E32	FDW10	0,6	25	6 Nm
2/8E32	FDW10	0,6	25	6 Nm
2/8E42	FDW13	0,8	25	10 Nm
252/8E42-MF	M16	0,6	25	9 Nm

Check backlash of motor shaft - brake.

- Bottom hook block unloaded
- Brake closed

Turn the motor shaft with the fan wheel (4) back and fore.

If there is noticeable backlash the brake must be replaced.

7 Inspection and maintenance

7.6 Travel motor brake

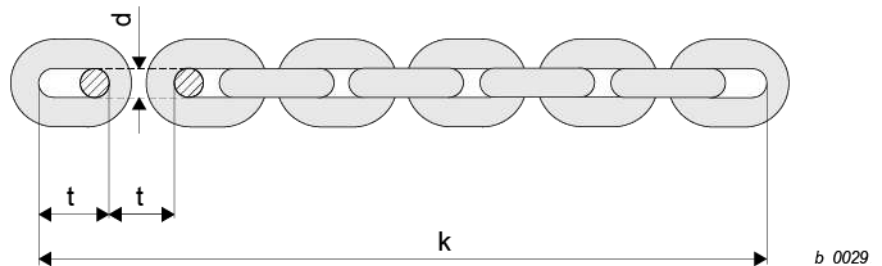
See operating instructions of travel drive

7.7 Checking chains

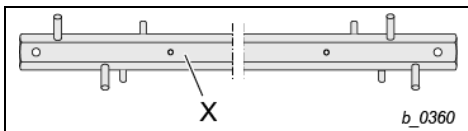
7.7.1 Check condition of the chain

1. **WARNING** Damaged chains can break during operation and cause serious injuries and a load crash.
 - Check chains for damage such as cracks, deformation and corrosion.
2. With visible damage or corrosion, replace the chains.
3. Operate chain hoist with load.
4. If heavy clicking noises arise, check the lubrication and wear of the chains, chain drive wheel, and return sheaves.
5. If necessary, perform relubrication or replace worn components.

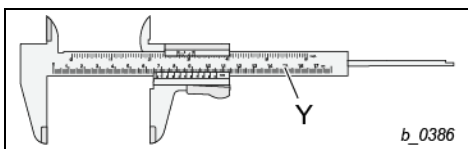
7.7.2 Check wear of the chains



Type	ST 05 [mm]	ST 10 [mm]	ST 20 [mm]	ST 30 [mm]	ST 32 [mm]	ST 50/60 [mm]
dxt	4x12	5x16	7x21.9	9x27	9x27	11.3x31
d min	3.6	4.5	6.3	8.1	8.1	10.2
t max	12.5	16.8	23	28.3	28.3	32.5
k max	134.4	179.66	245.92	303.18	303.18	350.37



Chain wear gauge



Caliper

The dimension “ k ” can be checked with a chain wear gauge “ X ” or a caliper “ Y ”.

1. Check the chain length “ k ” with 11 chain links respectively at multiple points.
2. Compare the determined values with the max. permissible value “ k max” (see table above).
3. If “ k max” is exceeded, replace the chain.
4. Measure the dimensions “ d ” and “ t ” at multiple points.
5. Compare the measured values with the permissible values “ d min” and “ t max” (see table above).
6. If “ d min” is undershot or “ t max” is exceeded, replace the chain.

7 Inspection and maintenance

7.8 Lubricate the chain

1. Have suitable lubricant to hand (see chapter "Lubrication points/lubricants").
 2. **NOTICE** Insufficient lubrication can lead to premature chain wear.
- Lubricate the entire length of the chain and all chain links.

7.9 Replacing load chain

⚠ WARNING

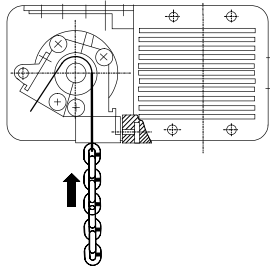
Danger from unsuitable chain

Use only original chain from the manufacturer as replacement.

Do not turn and refit a used chain suspension bolt!

Max. length of chain see sticker on chain box.

ST05



The welds of the upright chain links must point to the outside over the chain sprocket.

Fig. 41

ST10 - ST60

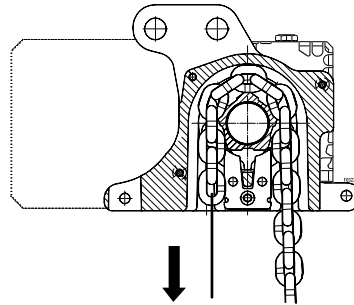


Fig. 42

ST10 - ST32

short headroom with double chain guide

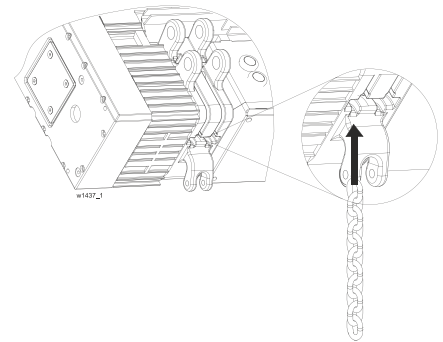


Fig. 43

⚠ WARNING



Danger of injury from moving chain

➤ Keep hands away from chain entry.

1. Attach a fitting aid, e.g. cable tie, to last link.
2. Let chain run into guide at slow speed as illustrated.

7 Inspection and maintenance

7.10 Replace the chain stopper

⚠ WARNING



Danger due to falling chain

The chain hoist must not be operated without the chain stopper.
Check the correct assembly of the chain stopper

7.10.1 Disassemble chain stopper ST 05, ST 10, ST 20, ST 50/60

- (1) 2×screw
- (2) 2×nut
- (3) Chain stopper

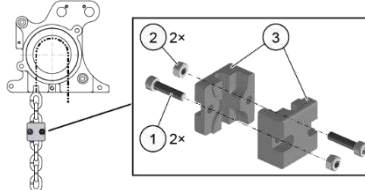


Fig. 44

b_0453

ST 30, ST 32

- (1) Screw
- (2) Nut

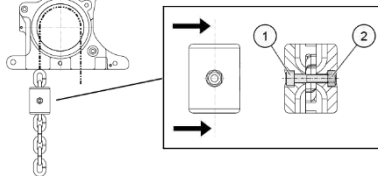


Fig. 45

e_0464

1. Disassemble chain bucket (see chapter "Disassemble chain bucket").
2. Remove the screws (1) and the nuts (2).
3. Remove the chain stopper (3).

7.10.2 Assemble chain stopper

⚠ WARNING



Danger due to falling load

An incorrectly mounted chain stopper can lead to a load crash and cause serious injuries.

- Ensure the correct mounting direction.
 - Tighten the screws with the specified tightening torque.
1. Align the screw holes in the chain stopper (3) in the direction of the gear side.
 2. Mount the chain stopper (3) such that the screw holes in the chain stopper (3) point in the direction of the gear side and fasten to the correct dimension X (per the following table).
 3. Tighten the screws with the prescribed tightening torque (see chapter "Tightening torques for bolted connections").

7 Inspection and maintenance

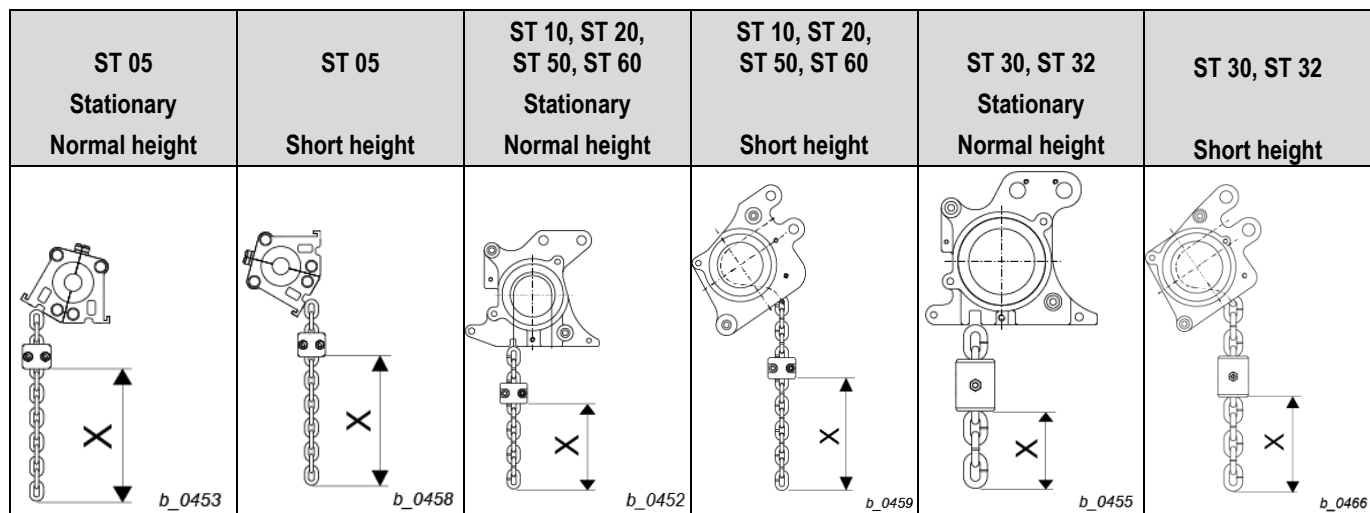


Fig. 46

Min. chain overhang X for free chain length

Type		X min. [mm]	Chain designation				
			4x12	5x16	7x21.9	9x27	11.3x31
		Installation in chain link					
ST 05	Stationary	130	12				
	Normal height						
	Short height						
ST 10	Stationary	110		8			
	Normal height						
	Short height						
ST 20	Stationary	110			6		
	Normal height						
	Short height						
ST 30	Stationary	100				5	
	Normal height						
	Short height						
ST 32	Stationary	150				7	
	Normal height						
	Short height						
ST 50 ST 60	Stationary	160					6
	Normal height						
	Short height						



If the dimension X min. deviates from the given number of chain links, 1 chain link must be added.

7 Inspection and maintenance

7.11 Checking and mounting chain anchorage

ST05

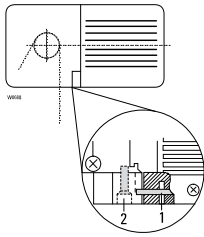


Fig. 47

ST10 - ST30

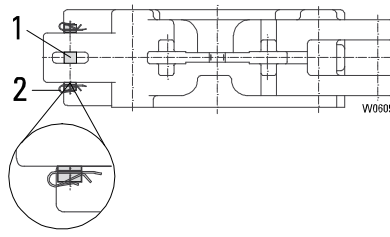


Fig. 48

ST32/ST50/ST60

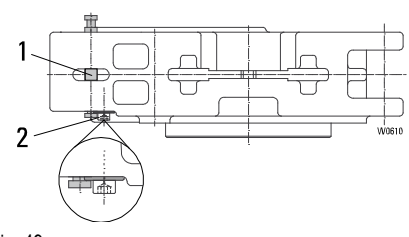


Fig. 49

⚠ WARNING



Danger from falling parts

Check chain suspension bolt for wear regularly.
Always secure chain suspension bolt with screw retention.
Do not turn over and refit a used chain suspension bolt.

Secure chain suspension bolt (1) with retention (2).
Replace chain suspension bolt if any grooves or distortion are visible.

7.12 Replace bottom hook block

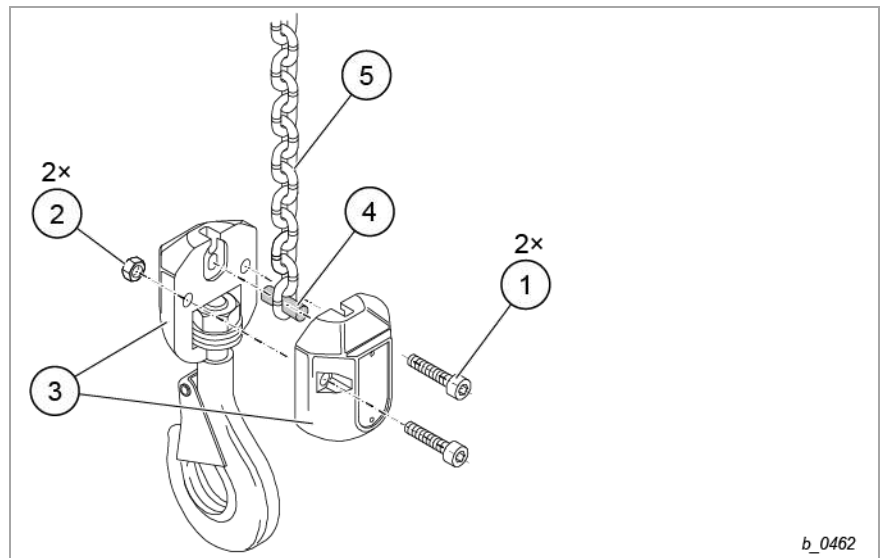


Fig. 50

- (1) 2×screw
- (2) 2×nut
- (3) Side cheeks
- (4) Bolt
- (5) Chain

7.12.1 Disassemble bottom hook block

1. Lower the bottom hook block and set it down on a level surface.
2. Disconnect the machinery from the power supply and attach a lock-out/tag-out (LOTO) maintenance lock.
3. Remove the screws (1) and the nuts (2).
4. Pull the two side cheek halves (3) apart.
5. Remove the bolt (4) so that the chain is free (5).
6. Remove the bottom hook block and dispose of it properly.

7 Inspection and maintenance

7.12.2 Assemble new bottom hook block

1. Assemble the new bottom hook block in the reverse sequence to disassembly.
2. Tighten the screws (1) to the prescribed tightening torque, for torque see chapter "Tightening torque for bolted connections".

7.13 Replacing two-fall bottom hook block

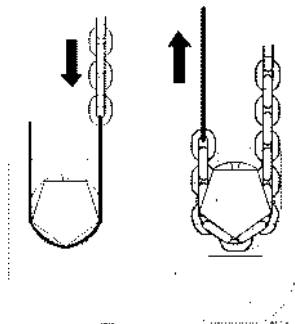


Fig. 51

1. Unscrew chain anchorage.
2. Run chain into new bottom hook block.
3. Refit chain anchorage.
4. Grease moving parts.
5. Run through hook path, check that chain is not twisted.

7.14 Replacing return sheave

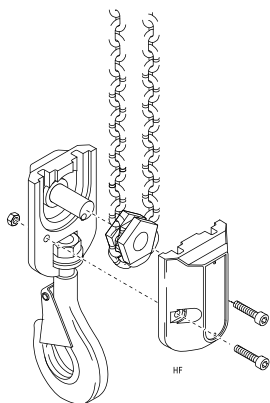


Fig. 52

7 Inspection and maintenance

7.15 Checking hook for wear

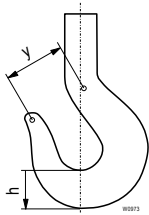


Fig. 53

NOTICE

Danger of material damage

The load hook, suspension hook and bottom hook block must be checked for damage and wear. Deformations, cracks, cuts caused by impact and corrosion must be assessed.

The hook safety latch must close completely, replace if necessary.

The damage can only be assessed by a qualified person.

- The hook dimensions must not exceed those specified in the following table.

		ST05		ST10		ST20		ST30		ST32		ST50/ST60	
		1/1	2/1	1/1	2/1	1/1	2/1	1/1	2/1	1/1	2/1	1/1	2/1
		[mm]		[mm]		[mm]		[mm]		[mm]		[mm]	
Load hook	h	19	24	19	24	24	31	31	37	31	40	37	48
	h min.	18	22.8	18	22.8	22.8	29.5	29.5	35.2	29.5	38	35.2	45.6
Suspension hook	h	24	24	24	24	37	37	37	37	39.5	39.5	39.5	39.5
	h min.	22.8	22.8	22.8	22.8	35.1	35.1	35.1	35.1	37.5	37.5	37.5	37.5

y_{new} see hook certificate

$y_{\text{perm}} = \leq 1.1 \times y_{\text{new}}$

If value h_{min} and/or y_{perm} is reached → replace hook

- If the load hook or suspension hook should display distortion, breaks, cracks or corrosion they must be replaced.

7.16 Oil change

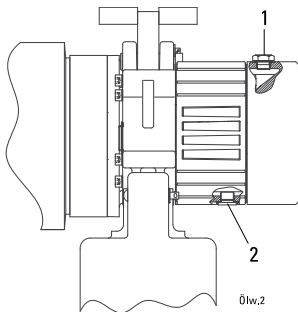


Fig. 54

- Suspend chain hoist horizontally.
- Change oil while warm if possible.
- See "Technical data" for suitable types and quantity.
- Replace copper gaskets.
- Screw down oil drain plug (2) and oil filling plug (1) (25 Nm).

Dispose of used oil in accordance with environmental regulations.

7 Inspection and maintenance

7.17 Trolley

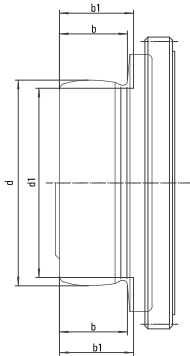


Fig. 55

Wheels, wheel drive and runway

- Visual inspection of wheels for wear.
- Visual inspection of runway beam for wear.
- Inspection of flanges for wear.

Nominal value		Limit for wear	
$\varnothing d$ [mm]	b [mm]	$\varnothing d1$ [mm]	b1 [mm]
50	15.5	48	17
63	17	60	18.5
82	27.5	76	29.5
100	33	95	35
125	38	119	40

NOTICE

Danger of material damage

If any one of the limits for wear $d1$, $b2$ is attained, the part must be replaced. Ensure that the trolley runs smoothly over the whole distance.

7.18 Operating hours counter

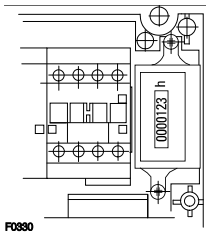


Fig. 56

The integrated operating hours counter measures the hoisting time only, thus the value measured must be doubled.

Example: 123 h measured; 246 h to be recorded

7.19 General overhaul

If the theoretical duration of service is reached, it is necessary to perform a general overhaul. The general overhaul must be commissioned by the owner or their representative. The release for further use must be implemented by the manufacturer or by a specialist company authorised by the manufacturer. The results must be documented in the log book.

Mechanism group per ISO 4301-1	M3	M4	M5	M6	M7
Theoretical duration of service	400 h	800 h	1600 h	3200 h	6300 h

8 Wearing parts

8 Wearing parts

8.1 Hoist

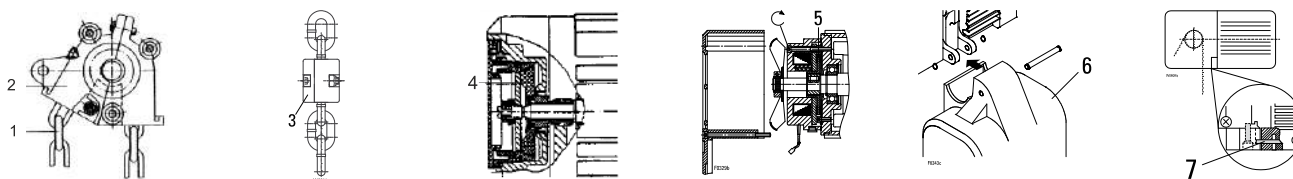


Fig. 57

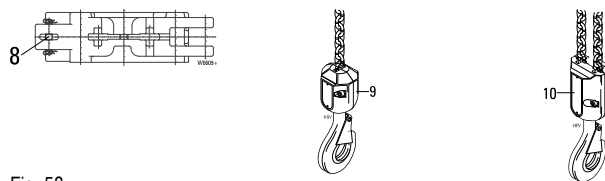


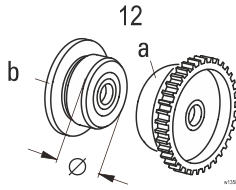
Fig. 58

	Designation	ST05	ST10	ST20	ST30	ST32	ST50	ST 60
1*1	Chain	331 005 9	331 006 9	331 001 9	331 004 9	331 004 9	331 013 9	331 023 9
2	Chain drive	nBh 32 320 96 30 0 kBh 32 320 96 30 0	nBh 14 320 00 41 0 kBh 14 320 01 41 0	nBh 16 320 00 41 0 kBh 16 320 01 41 0	nBh 13 320 00 41 0 kBh 13 320 01 41 0	nBh 17 320 00 41 0 kBh 18 320 02 41 0	nBh 18 320 00 41 0 kBh 18 320 01 41 0	nBh 19 320 00 41 0 kBh 19 320 01 41 0
3	Chain stopper	32 320 01 27 0	14 320 01 27 0	16 320 01 27 0	20 320 00 27 0	20 320 00 27 0	18 320 02 27 0	18 320 02 27 0
4	Brake/slipping clutch	32 320 90 30 0	-	-	-	-	-	-
5	Brake / brake set	-	E21 14 320 09 64 0	E31 16 320 39 64 0	E31 16 320 39 64 0	E42 567 167 0 -100V 567 168 0 -190V 567 169 0 -240V 567 170 0 -290V	E42 567 167 0 -100V 567 168 0 -190V 567 169 0 -240V 567 170 0 -290V	E42 567 167 0 -100V 567 168 0 -190V 567 169 0 -240V 567 170 0 -290V
			E22 14 320 10 64 0	E32 16 320 40 64 0	E32 16 320 40 64 0	E42-MF 18 320 36 64 0 -100V 18 320 37 64 0 -180V 18 320 38 64 0 -240V 18 320 39 64 0 -290V	E42-MF 18 320 36 64 0 -100V 18 320 37 64 0 -180V 18 320 38 64 0 -240V 18 320 39 64 0 -290V	E42-MF 18 320 36 64 0 -100V 18 320 37 64 0 -180V 18 320 38 64 0 -240V 18 320 39 64 0 -290V
6	Chain box	32 320 00 26 0 32 320 03 20 0 *2	12m 35 322 04 32 0 25m 33 320 26 26 0	8m 35 32204 32 0 16m 33 320 26 26 0	6m 35 320 04 32 0 10m 33 32026 26 0	6m 17 320 00 32 0 20 m 18 322 00 32 0	8m 18 320 00 26 0 12m 18 322 00 32 0	8m 18 320 00 26 0 12m 18 322 00 32 0
7	Suspension bolt	32 322 10 92 0	-	-	-	-	-	-
8	Suspension bolt	-	14 320 00 24 0	16 320 00 24 0	13 320 00 24 0	17 320 00 24 0	18 320 00 24 0	18 320 00 24 0
9	Bottom hook block 1/1	125 kg 32 320 00 59 0 250 kg 32 320 01 50 0	14 320 01 59 0	16 320 02 59 0	17 320 00 59 0	17 320 00 59 0	18 320 00 59 0	18 320 00 59 0
10	Bottom hook block 2/1	32 320 00 59 0	14 320 01 50 0	16 320 03 50 0	13 320 01 50 0	17 320 01 50 0	18 320 01 50 0	19 320 01 50 0

*1 Please state length
*2 For chain hoist with KE-T trolley
nBh = standard headroom
kBh = short headroom

8 Wearing parts

8.2 Trolley



Designation						
12	Wheel	∅ 50 a	∅ 63 - KE-T a 02 250 01 40 0	∅ 63 - KF. 10 a 02 250 03 40 0	∅ 80 a 03 250 01 64 0	∅ 125 a 05 250 04 40 0
		b 01 250 00 41 0	b 02 250 01 41 0	02 250 02 41 0	b 03 250 00 64 0	b 05 250 03 41 0

Fig. 59

NOTICE

Danger of material damage

Replacement and repairs may be carried out by trained personnel only.

8.3 Dismantling

⚠ WARNING



Falling parts

- Secure hoist when dismantling.

Dismantle hoist correctly. First of all remove lubricants.

8.4 Scrap disposal

NOTICE

Electronic components, electric scrap, lubricants and other auxiliary substances are hazardous waste and may only be disposed of by approved recycling companies. Overload devices must be returned to the manufacturer.

Dismantled components must be recycled after correct dismantling. It is imperative to observe national regulations on environmentally compatible disposal. Local authorities will provide relevant information.

9 Technical data

9 Technical data

9.1 Conditions of use

The hoist is designed for use in industry and for the ambient conditions usual in industry in non-hazardous areas.

Special measures are necessary for particular applications such as e.g. high degree of chemical pollution, outdoor use, offshore application, etc.

The manufacturer will be pleased to advise you.

Protection against dust and moisture to EN 60 529

IP55

Permissible ambient temperatures

see factory certificate

9.2 Hoist

9.2.1 Hoist motor data 50Hz

50 Hz														
Type	Hoist motor type	kW	DC %	c/h	In			Ik			cos φ k	Mains fuse		
					230V	400V	500V	230V	400V	500V		230 V	400 V	500 V
					[A]			[A]						
ST 0501-8	2A04	0.2	40	240	2.3	1.3	1.0	5.7	3.3	2.6	0.88	6	6	6
ST 0501-8/2	2/8A04	0.2/0.05	35/15	120/240	2.3/1.9	1.3/1.1	1.0/0.9	5.7/2.1	3.3/1.2	2.6/1.0	0.88/0.83	6	6	6
ST 0501-16	2A04	0.4	40	240	2.3	1.3	1.0	5.7	3.3	2.6	0.88	6	6	6
ST 0501-16/4	2/8A04	0.4/0.1	35/15	120/240	2.3/1.9	1.3/1.1	1.0/0.9	5.7/2.1	3.3/1.2	2.6/1.0	0.88/0.83	6	6	6
ST 0502-8	2A04	0.4	40	240	2.3	1.3	1.0	5.7	3.3	2.6	0.88	6	6	6
ST 0502-8/2	2/8A04	0.4/0.	35/15	120/240	2.3/1.9	1.3/1.1	1.0/0.9	5.7/2.1	3.3/1.2	2.6/1.0	0.88/0.83	6	6	6
ST 0503-6	2A04	0.4	40	240	2.3	1.3	1.0	5.7	3.3	2.6	0.88	6	6	6
ST 0503-6/1	2/8A04	0.4/0	35/15	120/240	2.3/1.9	1.3/1.1	1.0/0.9	5.7/2.1	3.3/1.2	2.6/1.0	0.88/0.83	6	6	6
ST 1005-8	2E21	0.8	60	360	3.4	2.0	1.6	20.0	11.5	9.2	0.79	10	6	6
ST 1005-8/2	2/8E21	0.8/0.2	40/20	120/240	3.7/2.1	2.2/1.2	1.7/1.0	15.8/4	9.1/2.3	7.3/1.8	0.89/0.73	6	6	6
ST 1005-12	2E22	1.2	60	360	5.4	3.1	2.5	28.2	14.3	13.0	0.85	10	6	6
ST 1005-12/3	2/8E22	1.2/0.3	40/20	120/240	7.1/3.8	4.1/2.2	3.3/1.8	20.5/6.8	11.8/3.9	9.4/3.1	0.93/0.77	10	6	6
ST 2006-12	2E31	1.5	60	360	6.3	3.6	2.9	28.9	16.6	13.3	0.82	16	10	6
ST 2006-12/3	2/8E31	1.5/0.37	40/20	120/240	6.8/3.7	3.9/2.1	3.1/1.7	25.6/7.3	14.7/4.2	11.8/3.4	0.92/0.80	10	6	6
ST 2010-8	2E31	1.5	60	360	6.3	3.6	2.9	28.9	16.6	13.3	0.82	16	10	6
ST 2010-8/2	2/8E31	1.5/0.37	40/20	120/240	6.8/3.7	3.9/2.1	3.1/1.7	25.6/7.3	14.7/4.2	11.8/3.4	0.92/0.80	10	6	6
ST 2010-12	2E32	2.3	60	300	9.0	5.7	4.6	55.7	24.5	19.6	0.90	20	10	10
ST 2010-12/3	2/8E32	2.3/0.57	40/20	120/240	9.9/5.2	5.7/3.0	4.6/2.4	42.6/10.6	24.5/6.1	19.6/4.9	0.90/0.79	16	10	10
ST 3016-8	2E32	2.3	60	300	9.0	5.7	4.6	55.7	24.5	19.6	0.90	20	10	10
ST 3016-8	2/8E32	2.3/0.57	40/20	120/240	9.9/5.2	5.7/3.0	4.6/2.4	42.6/10.6	24.5/6.1	19.6/4.9	0.90/0.79	16	10	10
ST 3212-16/4	2/8E42	3.8/0.9	33/17	100/200	16.0/7.0	9.2/4.0	7.4/3.2	55.7/14.3	32.0/8.2	25.6/6.6	0.86/0.82	20	16	10
ST 3216-8/2	2/8E42	2.4/0.6	40/20	120/240	10.3/5.4	5.7/3.0	4.6/2.4	43.5/10.8	25.0/6.2	20.0/5.0	0.87/0.74	16	10	10
ST 3216-12/3	2/8E42	3.8/0.9	33/17	100/200	16.0/7.0	9.2/4.0	7.4/3.2	55.7/14.3	32.0/8.2	25.6/6.6	0.86/0.82	20	16	10
ST 5025-6/1	2/8E42	3.0/0.76	40/20	120/240	12.7/6.9	7.3/3.8	5.8/3.2	55.7/14.3	32.0/8.2	25.6/6.6	0.86/0.82	20	16	10
ST 5025-8/2	2/8E42	3.8/0.9	33/17	100/200	16.0/7.0	9.2/4.0	7.4/3.2	55.7/14.3	32.0/8.2	25.6/6.6	0.86/0.82	20	16	10
ST6032-6/1	2/8E42	3.8/0.9	33/17	100/200	16.0/7.0	9.2/4.0	7.4/3.2	55.7/14.3	32.0/8.2	25.6/6.6	0.86/0.82	20	16	10

9 Technical data

9.2.2 Hoist motor data 60Hz

60 Hz														
Type	Hoist motor type	kW	DC %	c/h	I _n			I _k			cos φ k	Mains fuse		
					400V	460V	575V	400V	460V	575V		400 V	460 V	575 V
					[A]			[A]						
ST 0501-8	2A04	0.24	40	240	1.6	1.4	1.1	4.0	3.5	2.8	0.88	6	6	6
ST 0501-8/2	2/8A04	0.24/0.06	35/15	180/360	1.6/1.3	1.4/1.1	1.1/0.9	4.0/1.5	3.5/1.3	2.8/1.0	0.88/0.83	6	6	6
ST 0501-16	2A04	0.48	40	240	1.6	1.4	1.1	4.0	3.5	2.8	0.88	6	6	6
ST 0501-16/4	2/8A04	0.48/0.12	35/15	120/240	1.6/1.3	1.4/1.1	1.1/0.9	4.0/1.5	3.5/1.3	2.8/1.0	0.88/0.83	6	6	6
ST 0502-8	2A04	0.48	40	240	1.6	1.4	1.1	4.0	3.5	2.8	0.88	6	6	6
ST 0502-8/2	2/8A04	0.48/0.12	35/15	120/240	1.6/1.3	1.4/1.1	1.1/0.9	4.0/1.5	3.5/1.3	2.8/1.0	0.88/0.83	6	6	6
ST 0503-6	2A04	0.48	40	240	1.6	1.4	1.1	4.0	3.5	2.8	0.88	6	6	6
ST 0503-6/1	2/8A04	0.48/0.12	35/15	120/240	1.6/1.3	1.4/1.1	1.1/0.9	4.0/1.5	3.5/1.3	2.8/1.0	0.88/0.83	6	6	6
ST 1005-8	2E21	0.96	60	360	2.2	2.0	1.6	13.2	11.5	9.2	0.79	6	6	6
ST 1005-8/2	2/8E21	0.96/0.24	40/20	120/240	2.5/1.4	2.2/1.2	1.7/1.0	10.5/2.6	9.3/2.3	7.3/1.8	0.89/0.73	6	6	6
ST 1005-12	2E22	1.4	60	360	3.6	3.1	2.5	18.6	16.2	13.0	0.85	10	6	6
ST 1005-12/3	2/8E22	1.4/0.36	40/20	120/240	4.7/2.5	4.1/2.2	3.3/1.8	13.6/4.5	11.8/3.9	9.4/3.1	0.93/0.77	6	6	6
ST 2006-12	2E31	1.8	60	360	4.1	3.6	2.9	19.1	16.6	13.3	0.82	10	10	6
ST 2006-12/3	2/8E31	1.8/0.44	40/20	120/240	4.5/2.4	3.9/2.1	3.1/1.7	16.9/4.8	14.7/4.2	11.8/3.4	0.92/0.80	10	6	6
ST 2010-8	2E31	1.8	60	360	4.1	3.6	2.9	19.1	16.6	13.3	0.82	10	10	6
ST 2010-8/2	2/8E31	1.8/0.44	40/20	120/240	4.5/2.4	3.9/2.1	3.1/1.7	16.9/4.8	14.7/4.2	11.8/3.4	0.92/0.80	10	6	6
ST 2010-12	2E32	2.8	60	360	6.6	5.7	4.1	28.2	24.5	25.6	0.90	10	10	10
ST 2010-12/3	2/8E32	2.8/0.68	40/20	120/240	6.6/3.5	5.7/3.0	4.6/2.4	28.2/7.0	24.5/6.1	19.6/4.9	0.90/0.79	10	10	10
ST 3016-8	2E32	2.8	60	360	6.6	5.7	4.1	28.2	24.5	25.6	0.90	10	10	10
ST 3016-8	2/8E32	2.8/0.68	40/20	120/240	6.6/3.5	5.7/3.0	4.6/2.4	28.2/7.0	24.5/6.1	19.6/4.9	0.90/0.79	10	10	10
ST 3212-16/4	2/8E42	4.6/1.1	33/17	100/200	10.6/4.6	9.2/4.0	7.4/3.2	36.8/9.4	32.0/8.2	25.6/6.6	0.86/0.82	16	16	16
ST 3216-8/2	2/8E42	2.9/0.72	40/20	120/240	6.6/3.5	5.5/3.0	4.6/2.4	28.8/7.1	25.0/6.2	20.0/5.0	0.87/0.74	16	10	10
ST 3216-12/3	2/8E42	4.6/1.1	33/17	100/200	10.6/4.6	9.2/4.0	7.4/3.2	36.8/9.4	32.0/8.2	25.6/6.6	0.86/0.82	16	16	16
ST 5025-6/1	2/8E42	3.6/0.91	40/20	120/240	8.4/4.4	7.3/3.8	5.8/3.0	36.8/9.4	32.0/8.2	25.6/6.6	0.78/0.49	16	16	16
ST 5025-8/2	2/8E42	4.6/1.1	33/17	100/200	10.6/4.6	9.2/4.0	7.4/3.2	36.8/9.4	32.0/8.2	25.6/6.6	0.86/0.82	16	16	16
ST 6032-6/1	2/8E42	4.6/1.1	33/17	100/200	10.6/4.6	9.2/4.0	7.4/3.2	36.8/9.4	32.0/8.2	25.6/6.6	0.86/0.82	16	16	16

9 Technical data

9.3 Specifications for mains connection

- All poles of the mains cable must be disconnected by a lockable switch.
- The mains voltage must correspond to that stated on the rating plate.
- Fixed installed cables e.g. NYM, NYY
- Flexible cables e.g. RN-F, NGFLGöu, H07VVH2-F
- Cable cross-section min. 1.5 mm²
- Mains voltage 380-415 VAC, 50 Hz
- Other mains voltages are available as options.
- In accordance with EN 50014 a radio interference suppression module FEM1 must be installed for all motors ≤1 kW
- If a current-operated circuit-breaker is used, a fault current of approx. 17 mA must be taken into account for each FEM1.

9.3.1 Max. length of supply cable 50 Hz

Direct control

50 Hz		Max. cable length with direct control [m]											
Chain hoist		Stationary *1						With trolley along runway *2					
Cable cross-section		1.5 mm ²			2.5 mm ²			1.5 mm ²			2.5 mm ²		
		230 V	400 V	500 V	230 V	400 V	500 V	230 V	400 V	500 V	230 V	400 V	500 V
Hoist motor type *	2A04 2/8A04	57	170	269	94	283	-	29	80	120	49	-	-
	2E21 8/2E21	17	50	79	28	84	131	10	30	47	17	50	79
		18	55	87	31	92	144	11	33	52	18	55	87
	2E22 8/2E22	13	38	60	21	64	99	8	23	36	13	38	60
		14	42	65	23	70	109	8	25	39	14	42	65
	2E31 8/2E31	11	34	53	19	57	89	7	21	32	11	34	53
		11	34	53	19	57	89	7	21	32	11	34	53

Contact control

50 Hz		Max. cable length with contactor control [m]											
Chain hoist		Stationary *3						Stationary *3					
Cable cross-section		1.5 mm ²			2.5 mm ²			1.5 mm ²			2.5 mm ²		
		230 V	400 V	500 V	230 V	400 V	500 V	230 V	400 V	500 V	230 V	400 V	500 V
Hoist motor type *	2A04 8/2A04	113	340	531	-	-	-	71	214	334	118	-	-
	2E21 8/2E21	36	109	170	60	181	283	27	81	126	44	134	210
		40	122	190	67	203	317	29	89	139	49	148	231
	2E22 8/2E22	27	81	112	45	135	121	20	61	96	34	102	159
		30	90	141	50	150	234	22	67	104	37	111	174
	2E31 8/2E31	24	73	113	40	121	189	18	55	86	30	91	143
		24	73	114	40	122	190	18	55	86	30	91	142
	2E32 8/2E32	-	45	60	21	75	99	-	34	46	16	57	77
15		45	70	25	75	117	11	34	54	19	57	90	
8/2E42	-	36	56	20	60	93	-	28	43	15	46	72	

* Allocation to chain hoists see "Motor data" table

*1 Voltage drop 2.5 %

*2 Voltage drop 1.5 %

*3 Voltage drop 5.0 %

*4 Voltage drop 4.0 %

9 Technical data

9.3.2 Max. length of supply cable 60Hz

Direct control

60 Hz		Max. cable length with direct control [m]											
Chain hoist		Stationary *1						Stationary *1					
Cable cross-section		1.5 mm ²			2.5 mm ²			1.5 mm ²			2.5 mm ²		
		230 V	400 V	460 V	230 V	400 V	460 V	230 V	400 V	460 V	230 V	400 V	460 V
Hoist motor type *	2A04 2/8A04												
	2E21 8/2E21	14 16	44 48	58 64	24 27	73 80	97 106	9 10	26 29	35 38	14 16	44 48	58 64
	2E22 8/2E22	12 12	30 36	39 48	20 20	49 61	65 80	7 7	18 22	23 29	12 12	30 36	39 48
	2E31 8/2E31	10 10	30 30	40 40	16 16	50 50	66 66	6 6	18 18	24 24	10 10	30 30	40 40

Contactor control

60 Hz		Max. cable length with contactor control [m]											
Chain hoist		Stationary *3						Stationary *3					
Cable cross-section		1.5 mm ²			2.5 mm ²			1.5 mm ²			2.5 mm ²		
		400 V	460 V	575 V	400 V	460 V	575 V	400 V	460 V	575 V	400 V	460 V	575 V
Hoist motor type *	2A04 8/2A04	113	340	531	-	-	-	71	214	334	118	-	-
	2E21 8/2E21	36 40	109 122	170 190	60 67	181 203	283 317	27 29	81 89	126 139	44 49	134 148	210 231
	2E22 8/2E22	27 30	81 90	112 141	45 50	135 150	121 234	20 22	61 67	96 104	34 37	102 111	159 174
	2E31 8/2E31	24 24	73 73	113 114	40 40	121 122	189 190	18 18	55 55	86 86	30 30	91 91	143 142
	2E32 8/2E32	- 15	45 45	60 70	21 25	75 75	99 117	- 11	34 34	46 54	16 19	57 57	77 90
	8/2E42	-	36	56	20	60	93	-	28	43	15	46	72

* Allocation to chain hoists see "Motor data" table

*1 Voltage drop 2.5 %

*2 Voltage drop 1.5 %

*3 Voltage drop 5.0 %

*4 Voltage drop 4.0 %

9 Technical data

9.4 Tightening torques for bolted connections



▲ WARNING

parts can loosen and fall down due to incorrect tightening torques. Severe injuries or death can be the result.

- Tighten bolted connections to the prescribed tightening torques with a torque wrench.

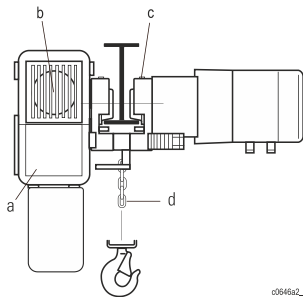
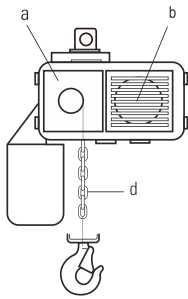
Thread size	Property class				
	08.8 [Nm]	8.8 [Nm]	010.9 [Nm]	10.9 [Nm]	VERBUS RIPP® 100 [Nm]
M5	--	6	--	--	11
M5 ¹⁾	--	1	--	--	--
M6	8,2	10,3	--	--	19
M8	20	25	28	35	42
M10	39	49	55	69	85
M12	69	86	98	122	130
M14	109	136	152	190	--
M16	170	210	240	300	330
M18	232	290	328	410	--
M20	330	410	472	590	--
M22	448	560	632	790	--
M24	570	710	800	1000	--
M27	832	1040	1168	1460	--
M30	1130	1410	1600	2000	--
M33	1528	1910	2160	2700	--
M36	1970	2460	2800	3500	--

¹⁾ electrical connectors

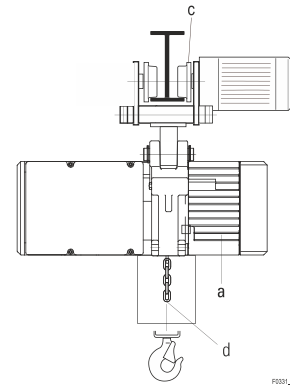
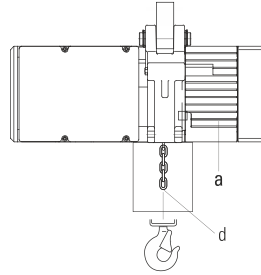
9 Technical data

9.5 Lubricants

ST 05



ST 10 - ST 60



Item	Lubrication point	Lubricant type	Lubricant product name		Quantity
			Factory filling	Alternative	
a	Hoist gear	Oil	MOTUL, DEXRON III ¹⁾	TOTAL, ATF DEXRON III ¹⁾	ST 10: 700 ml
			Bremer & Leguil, Rivolta F.L. 500 ²⁾		ST 10: 1000 ml ³⁾
					ST 20: 1200 ml
					ST 20: 1500 ml ³⁾
					ST 30: 1200 ml
					ST 30: 1500 ml ³⁾
					ST 32: 1600 ml
					ST 32: 2500 ml ³⁾
					ST 50/60: 1600 ml
		ST 50/60: 2500 ml ³⁾			
b	Hoist motor bearing	Grease	FUCHS, RENOLIT FLM 0	Shell, Gadus S2 V220 0 ²⁾	ST 05: 200 g
			FUCHS, RENOLIT RHF 1 ¹⁾	Castrol, Viscogen 0 ²⁾	
			Bremer & Leguil, Rivolta F.L.G. 3-1 ^{1), 2)}	Klüber, Klüberplex AG 11 ²⁾	
c	Travel wheel (gearing) Return sheave	Grease	Mobil, MOBILUX EP 3	FUCHS, RENOLIT DURAPLEX EP 3	100 g
			FUCHS, RENOLIT RHF 1 ¹⁾	BP, Energrease LS-EP 3	
			Bremer & Leguil, Rivolta F.L.G. 3-1 ^{1), 2)}	Klüber, Klüberplex BEM 41-132 ¹⁾	
d	Chain	Grease	FUCHS, RENOLIT LZR 000 ¹⁾	Aral, Fließfett N ¹⁾	as required
			Bremer & Leguil, CASSIDA GREASE RLS 1 ²⁾	FUCHS, GEARMASER ZSA ¹⁾	
			Bremer & Leguil, Rivolta F.L.G. 3-1 ^{1), 2)}	Klüber, CENTOPLEX GLP 500	

¹⁾ Lubricant suitable for low application temperatures, max. -40 °C

²⁾ H1 - lubricant for the food industry

³⁾ Short height, double chain hoist

9.6 Lubricants for travel drive

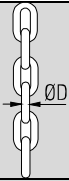
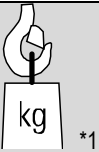
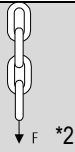
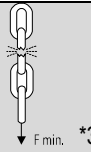
See instructions of travel drive.

9.7 Circuit diagrams

See separate enclosure.

9 Technical data

9.8 Chain certificate

Type		Order no.			
ST 05, STD 05, STK 05	4	3310059	320	12,5	20
ST 10, STD 10, STB 10	5	3310069	500	20	32
ST 20, STD 30, STK 30, STB 30	7	3310019	1000	40	60
ST 30, STD 50, STK 50, STB 50 ST 32, STD 60,	9	3310049	1600	63	100
ST 50	11.3	3310139	2500	100	160
ST 60	11.3	3310239	3200	100	160

See factory certificate for chain length required

*1 Tractive force on chain

*2 Test load

*3 Minimum breaking load

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