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 un-ambiguous 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

6.2 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

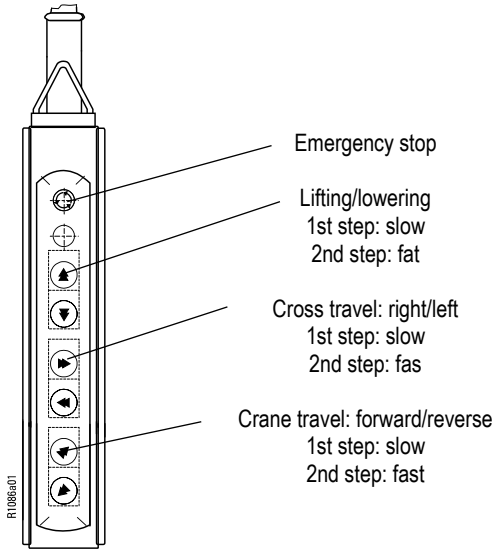


Fig. 31

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

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.

7.2 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

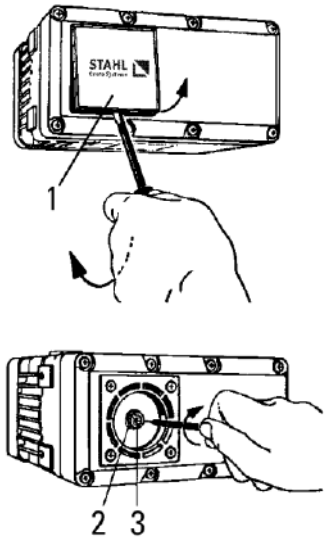


Fig. 33

ST10/ST20/ST30

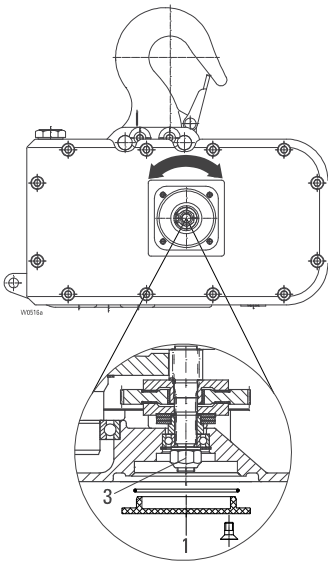


Fig. 34

ST32/ST50/ST60

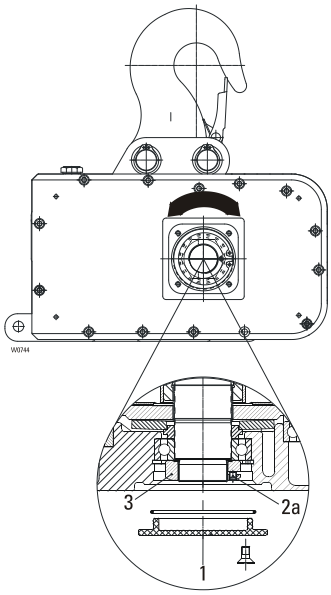


Fig. 35

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

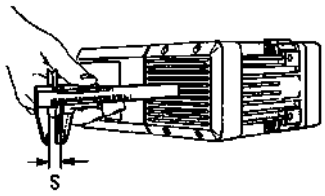


Fig. 36

- 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.

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.

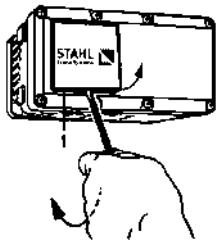


Fig. 37

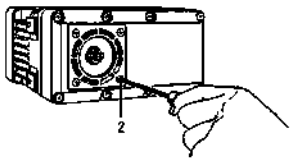


Fig. 38

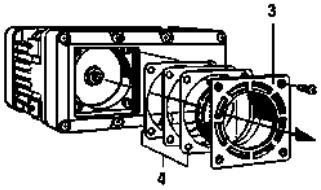


Fig. 39

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.

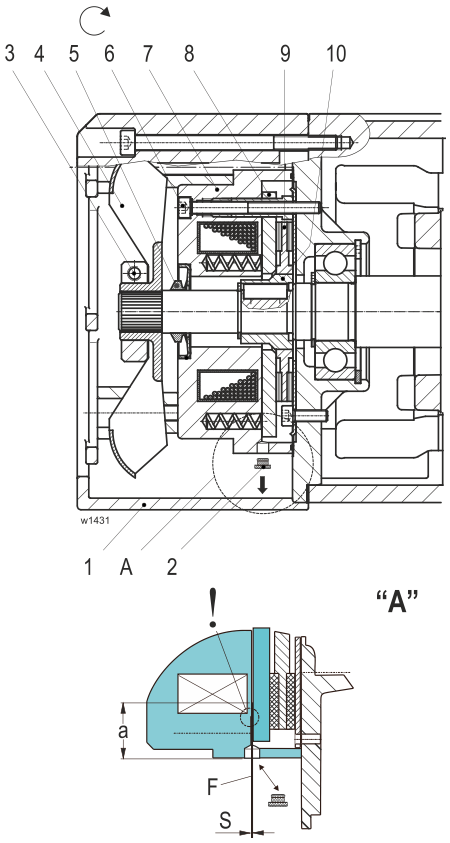


Abb. 40

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.

7.6 Travel motor brake

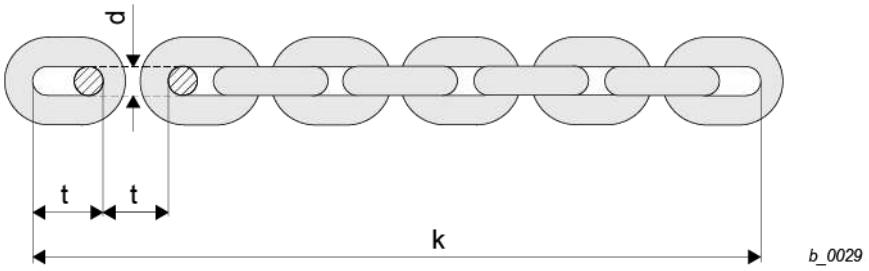
See operating instructions of travel drive

7.7 Checking chains

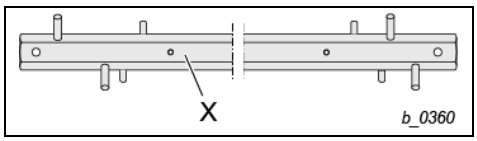
7.7.1 Check condition of the chain

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.

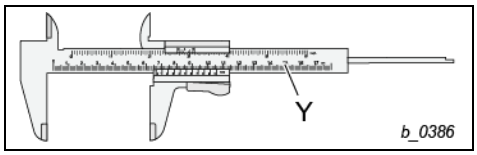
7.7.2 Check wear of the chains



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.

7.8 Lubricate the chain

1. Have suitable lubricant to hand (see chapter “Lubrication points/lubricants”).
2. **NOTICE** Insufficient lubrication can lead to premature chain wear.

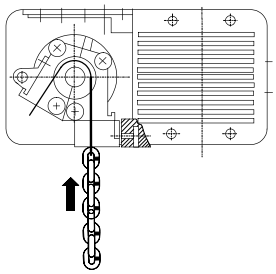
➢ Lubricate the entire length of the chain and all chain links.

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

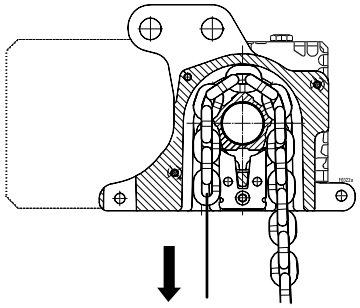


Fig. 42

ST10 - ST32
short headroom with double chain guide

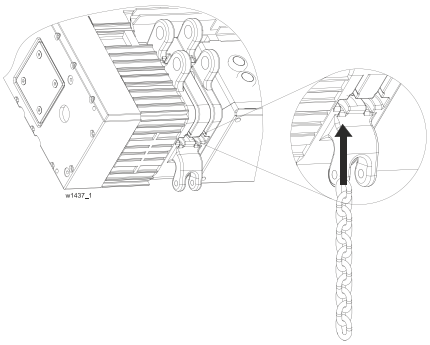


Fig. 43

⚠ 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.

7.10 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

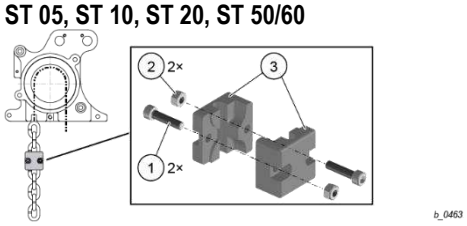


Fig. 44

ST 30, ST 32

(1) Screw
(2) Nut

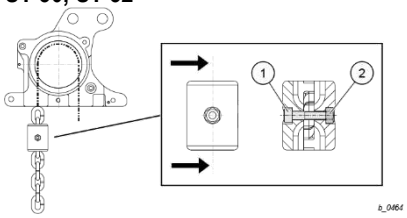


Fig. 45

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

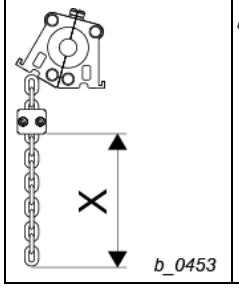
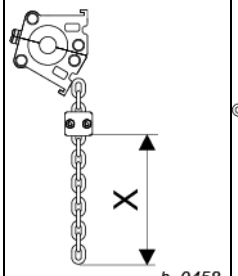
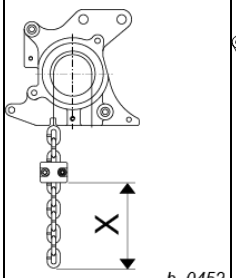
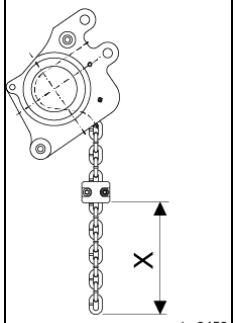
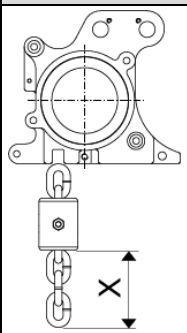
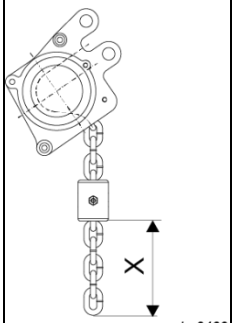
ST 05 Stationary Normal height	ST 05 Short height	ST 10, ST 20, ST 50, ST 60 Stationary Normal height	ST 10, ST 20, ST 50, ST 60 Short height	ST 30, ST 32 Stationary Normal height	ST 30, ST 32 Short height
					

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 Normal height Short height	130	12				
ST 10	Stationary Normal height	110		8			
	Short height	140		10			
ST 20	Stationary Normal height	110			6		
	Short height	150			8		
ST 30	Stationary Normal height	100				5	
	Short height	150				7	
ST 32	Stationary Normal height Short height	150				7	
ST 50 ST 60	Stationary Normal height Short height	160					6

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

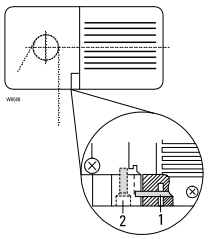


Fig. 47

ST10 - ST30

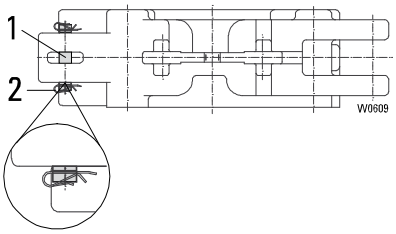


Fig. 48

ST32/ST50/ST60

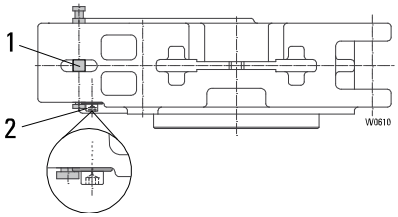


Fig. 49

⚠ 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

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

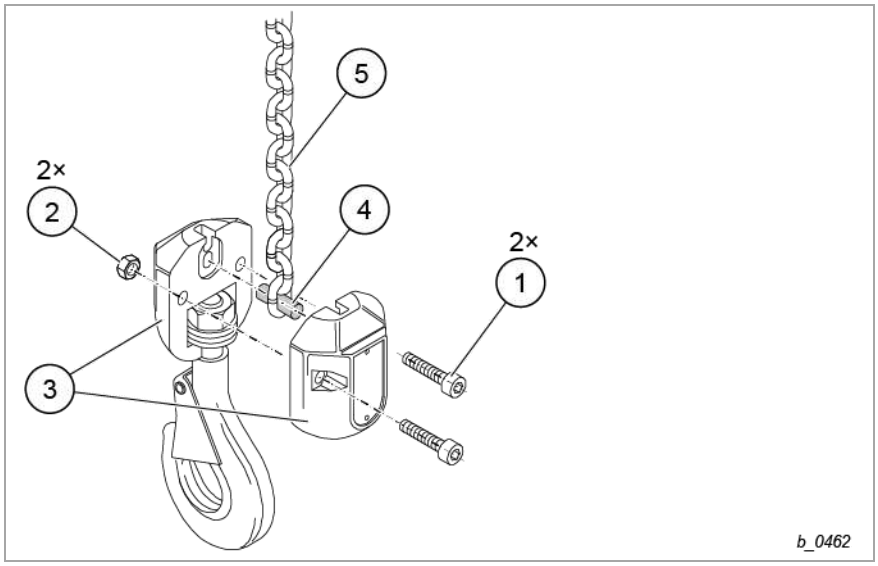


Fig. 50

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.

7.12.2 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

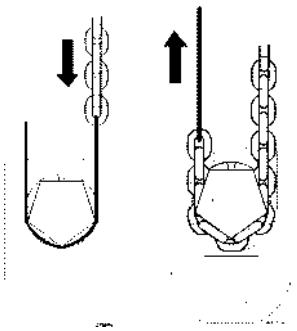


Fig. 51

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

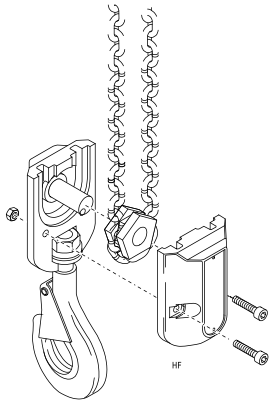


Fig. 52

7.15 Checking hook for wear

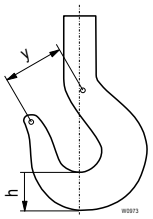


Fig. 53

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_{perm} = ≤ 1.1 x y_{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

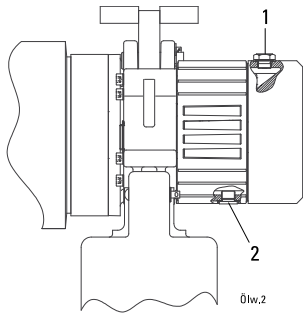


Fig. 54

- 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

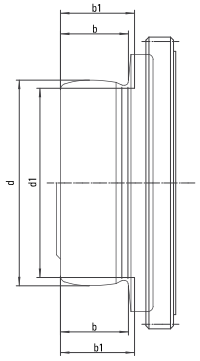


Fig. 55

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	
Ø d [mm]	b [mm]	Ø 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

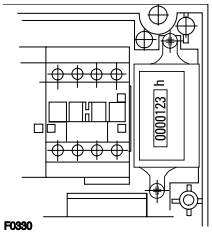


Fig. 56

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

8.1 Hoist

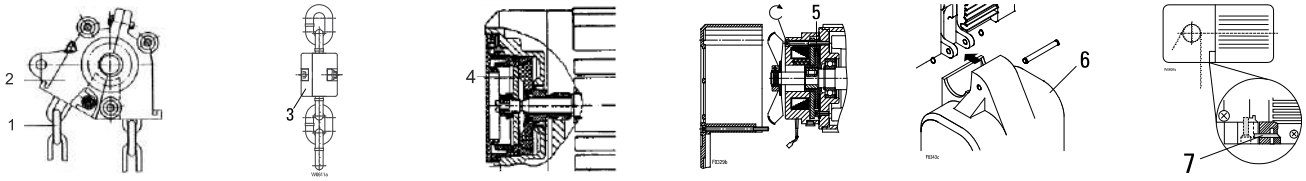


Fig. 57

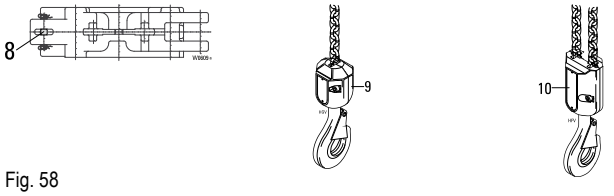


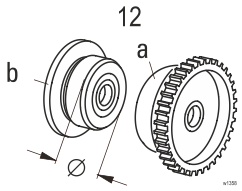
Fig. 58

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

9.1 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.	32.0/8.2	25.6/6.6	0.86/0.82	20	16	10

ba-o.1.8.0-en-4.1

9.2.2 Hoist motor data 60Hz

60 Hz														
Type	Hoist motor type	kW	DC %	c/h	In			Ik			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

9.3 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 mm²			2.5 mm²			1.5 mm²			2.5 mm²		
		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 18	50 55	79 87	28 31	84 92	131 144	10 11	30 33	47 52	17 18	50 55	79 87
	2E22 8/2E22	13 14	38 42	60 65	21 23	64 70	99 109	8 8	23 25	36 39	13 14	38 42	60 65
	2E31 8/2E31	11 11	34 34	53 53	19 19	57 57	89 89	7 7	21 21	32 32	11 11	34 34	53 53

Contactor control

50 Hz		Max. cable length with contactor control [m]											
Chain hoist		Stationary *3						Stationary *3					
Cable cross-section		1.5 mm²			2.5 mm²			1.5 mm²			2.5 mm²		
		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 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 %

9.3.2 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 mm²			2.5 mm²			1.5 mm²			2.5 mm²		
		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 mm²			2.5 mm²			1.5 mm²			2.5 mm²		
		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 %

9.4 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

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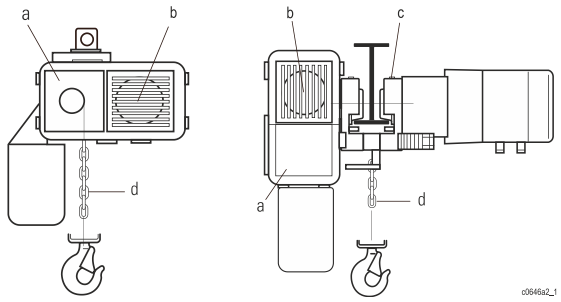
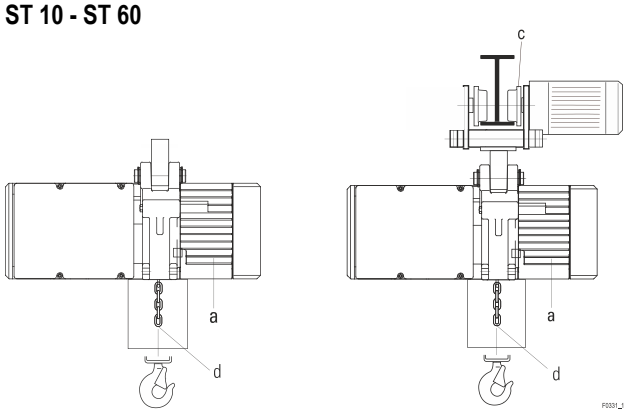
9 Technical data

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]
		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]	
b	Hoist motor bearing	Grease	Mobil, MOBILUX EP 3		ST 05: 50 g
			FUCHS, RENOLIT RHF 1 [1]		
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, GEARMASTER 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

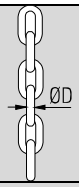
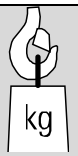
See instructions of travel drive.

9.7 Circuit diagrams

See separate enclosure.

9 Technical data

9.8 Chain certificate

Type		Order no.	 *1	 F *2	 F min. *3
	[mm]		[kg]	[kN]	[kN]
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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