

OWNER'S MANUAL

CESAN CRANES

Yeni Sahra, Barbaros Mah. Kent sk.

No: 13/a 34746

Atasehir / Istanbul - TURKEY

Tel: +90 (216) 472 83 02

Fax: +90 (216) 317 48 98

E-mail: cesan@cesan.com

Web: www.cesan.com/



Table of content

1. INTRODUCTION.....	4
1.1 Instructions.....	4
1.2 Symbols.....	4
2. SAFE OPERATION.....	5
2.1 Intended use of the hoist and ambient conditions.....	5
2.2 Sound intensity level.....	5
2.3 Service classification of hoist.....	5
2.3.1 Load Spectrum.....	5
2.3.2 Average daily operation time.....	5
2.3.3 Determining the operating group of the hoist.....	5
2.4 Safe Working Principles.....	6
2.5 Using the pushbutton controller.....	6
2.5.1 Using the pushbuttons (two steps, contactor control).....	7
3. HOIST MANUFACTURER.....	9
3.1 Hoist identification data.....	9
3.2 Directives and Standards.....	9
3.3 Manufacturer's contact details (Cesan Cranes).....	9
3.3.1 Spare Parts.....	9
4. CONSTRUCTION.....	10
4.1 Low headroom trolley hoist.....	10
4.2 Trolley buffers.....	10
4.3 Hoisting Machinery.....	10
4.4 Hoisting Gearbox.....	11
4.5 Hoisting motor and brake.....	11
4.6 Hoisting limit switch.....	11
4.6.1 Adjustment.....	12
4.6.2 Fine adjustment.....	12
4.7 Hoisting limit switch.....	13
4.7.1 Adjustment.....	14
4.8 Pushbutton Controller.....	15
4.9 Travelling Machinery.....	15
4.10 Inverter for Travel.....	16
4.11 Rope Drum.....	16
4.12 Rope Guide.....	17
4.13 Rope Clamps.....	17
4.14 Rope Anchorage.....	18
4.15 Hook-block, rope reeving and return sheaves.....	18
4.16 Wire Rope.....	19
4.17 Overload Protection.....	19
5. INSTALLATION.....	19
5.1 Prior to Installation.....	19
5.2 Low headroom trolley.....	19
5.2.1 Outfitting the hoist.....	19
5.3 Connecting to the mains network.....	19
6. COMMISSIONING.....	20
6.1 Inspections without load.....	20
6.1.1 Inspecting the connections of electrical equipment.....	20
6.1.2 Inspection of pushbutton controller and directions of rotation.....	20
6.1.3 Checking operating sound.....	20



6.1.4	Inspection and adjustment of the hoisting limit switch.....	20
6.1.5	Inspection and adjustment of the limit switch for travel (not in all models).....	21
6.1.6	Inspection of hook and operation of rope sheaves.....	21
6.1.7	Inspection of rope.....	21
6.1.8	Inspection of overload protection.....	21
6.1.9	Inspection of trolley.....	21
6.1.10	Inspection of brake operation.....	21
6.2	Inspections with test-load , %100 of the rated load of the hoist.....	22
6.2.1	Inspection of motor current.....	22
6.2.2	Inspection of running temperature.....	22
6.2.3	Inspection of travelling machinery.....	22
6.3	Inspections with overload, 110...125% of the rated load of the hoist.....	22
6.3.1	Inspection of overload protection.....	22
6.3.2	Inspection of brake operation.....	22
6.3.3	Inspection of rope.....	22
6.4	After the inspections.....	22
6.4.1	Cleaning.....	22
6.4.2	User training.....	22
6.4.3	Hand-over documents.....	22
7.	MAINTENANCE.....	23
7.1	Daily inspections.....	23
7.2	Periodical inspections and servicing.....	24
7.3	Calculation of Safe Working Period (SWP)	25
7.3.1	STEP 1: Operating hours per inspection interval.....	25
7.3.2	STEP 2: Actual load spectrum factor per inspection interval.....	26
7.3.3	STEP 3: Partial duration of service [hours].....	26
7.3.4	STEP 4: Actual duration of service [hours].....	26
7.3.5	STEP 5: SWP% and remaining service life.....	26
7.4	General Overhaul, GO.....	27
7.5	Recommended tightening torques.....	27
8.	LUBRICANTS.....	28
8.1	Lubricant types.....	28
8.2	Lubricant quantities.....	28
8.2.1	Lubricant Volumes, hoisting gears.....	28
8.2.2	Lubricant Volumes, travelling gears.....	29
8.2.3	Lubricant Volumes, drum rim gear.....	29
9.	TROUBLESHOOTING.....	29
	EC DECLARATION OF CONFORMITY.....	30





1. INTRODUCTION

1.1 Instructions

The instructions for safe and effective installation, operation and maintenance of the hoist are included in the hoist delivery. The hoist itself is also provided with labels and markings. The instructions are issued on paper and/or on CD-ROM. The instructions for using digital CD-ROMs are printed on the packaging. Read the instructions supplied with the hoist before installation and commissioning.

Keep the instructions in a safe place for future references.

1.2 Symbols

The following symbols are used in the instructions:



WARNING



CAUTION





2. SAFE OPERATION

2.1 Intended use of the hoist and ambient conditions

The hoist is intended for lifting and moving goods. The hoist may not be used for lifting and moving people. The hoist is intended for indoor use or for use in outdoor premises when specially equipped for the purpose. The ambient temperature should be $-10 \dots +40^{\circ}\text{C}$ ($14 \dots 104^{\circ}\text{F}$), with explosive proof hoists $-20 \dots +40^{\circ}\text{C}$ ($14 \dots 104^{\circ}\text{F}$), or, if specially equipped, $-20 \dots +50^{\circ}\text{C}$ ($-4 \dots 122^{\circ}\text{F}$). The relative humidity of the ambient should be less than 90%. If the hoist is used in exceptional ambient conditions (such as in a windy area, a corrosive atmosphere or in an area prone to earthquakes) or is used to handle dangerous materials (such as molten metal), any need for special equipment must be determined with the manufacturer or the manufacturer's representative.

2.2 Sound Intensity Level

The sound intensity level of the hoist in an operating location will not exceed 70dB (A).

2.3 Service Classification of hoist

Safe and effective operation of the hoist is dependent on correct classification of the hoist's operating group. According to FEM9.511 standard the hoist's operating group can be determined from its:

- A. Load spectrum
- B. Average daily operating time

2.3.1 Load Spectrum

LIGHT

Occasional full load.
Usually light load
Small fixed load

MEDIUM

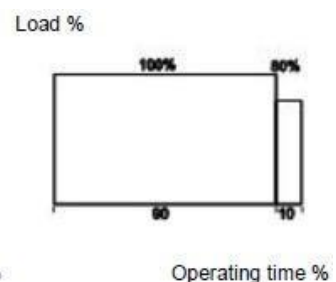
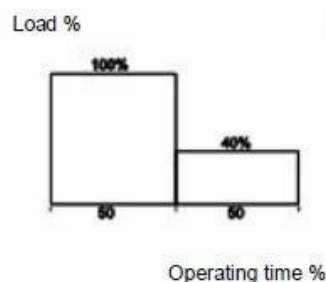
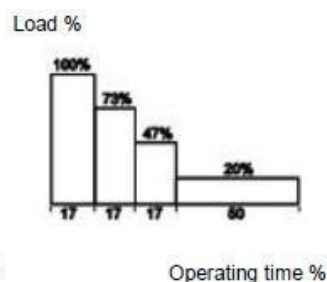
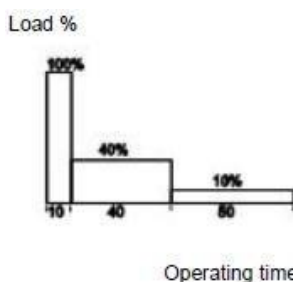
Occasional full load
Usually light load
Average fixed load

HEAVY

Repetitive full load
Usually average load
Heavy fixed load

VERY HEAVY

Usually almost full load
Very heavy fixed load



2.3.2 Average daily operating time [hours/day]

The average daily operating time of the hoist can be calculated from the running time of the hoisting machinery

H: Average hoisting height (m)

N: Number of work cycles per hour [cycles/h]

T: Daily working time (h)

V : Hoisting speed (m/min)



2.3.3 Determining the operating group of the hoist

When the load spectrum and the average daily operating time of the hoist are identified, the hoist's operating group is obtained from the table below.

Load spectrum	Average daily operating time (hours per day)					
	ISO/FEM					
	≤ 0.5	≤ 1	≤ 2	≤ 4	≤ 8	≤ 16
LIGHT			M3 1Bm	M4 1Am	M5 2m	M6 3m
MEDIUM		M3 1Bm	M4 1Am	M5 2m	M6 3m	M7 4m
HEAVY	M3 1Bm	M4 1Am	M5 2m	M6 3m	M7 4m	
VERY HEAVY	M4 1Am	M5 2m	M6 3m	M7 4m		

2.4 Safe Working Principles

Carefully following safe working principles is one of the most effective ways of preventing damage to property and injury to personnel. The operator, serviceman and work manager for the hoist should be familiar with the safe working principles for the hoist. A service organization authorized by the manufacturer can provide training for operating the hoist and any maintenance services needed under a separate agreement.

Misuse of the hoist or improper servicing may result in an accident that cannot be prevented by the safety equipment. Crane Operator, operation and safety training will introduce the operator to the essential safe handling of loads with the hoist equipment and safety procedures to follow. Service training can also provide the preventive maintenance requirements of the hoist to prevent equipment failure effecting production and/or safety.

Work management has an important role in implementing the principles for using the hoist safely. Work management must ensure that the hoist and its accessories are fit for the intended purpose, and that servicing and maintenance of the equipment is carried out as scheduled. Management must also ensure that personnel are adequately trained in the safe operation of handling loads.



The hoist operator, the hoist serviceman and personnel in charge of the hoist operation shall be familiar with and comply with the safe working principles described.



Read all safety instructions supplied with products.

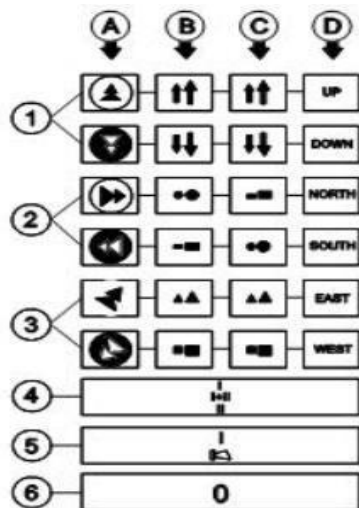


Study meaning of stickers on products.



2.5 Using the pushbutton controller

The hoisting and travel motions of the hoist as well as crane travel motions are controlled with the pushbutton controller or by remote control. Some pushbutton controllers and remote control units are provided with a selector switch that allows the same controller unit to be used to control several hoists and/or cranes. If the hoist has remote control (infrared or radio control) separate operating instructions for the remote controller are provided with the hoist. The direction symbols on the pushbutton controller conform to local requirements.



A. Markings in compliance with FEM and DIN standards

B. Markings in compliance with SEN standard

C. Markings in compliance with SFS standard

D. Markings in compliance with ANSI standard

1. Up/Down pushbutton 2. Right/Left pushbutton for trolley 3. Forwards/Backwards pushbutton for bridge of crane

4. Hoist selection pushbutton (only if the pushbutton controls several hoists) 5. On pushbutton and warning signal

6. Emergency stop pushbutton (released by turning, lockable in some models)

Use the following procedure to start up a hoist that is in standby mode:

- Release the emergency stop pushbutton (6) by turning it. Use a key to release if it is the lockable type.
- Press the On pushbutton (5). The hoist is now ready for operation.

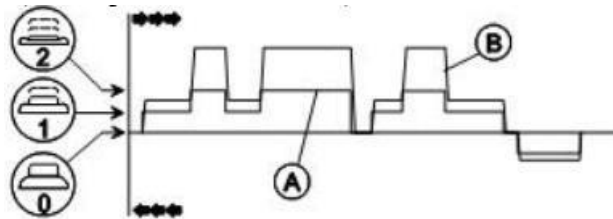


If the pushbutton controller includes a selection switch, check that the hoist selection switch (4) is in the correct position before using pushbuttons (1), (2) and (3).

After operating the hoist, return it to standby mode as follows:

- Run the hoist to the correct parking position. Stop all hoist motions.
- When all hoist motions have ceased, press the emergency stop pushbutton (6). The pushbutton will lock.

2.5.1 Using the pushbuttons (two steps, contactor control)



A. Position of pushbutton (0, 1 and 2) B. Speed

The position of the pushbutton affects the speed as follows: Position 0 Neutral / Position 1 Slow / Position 2 High

A skilled operator always uses the low speed (step 1) when starting to hoist. Slack is taken out of rigging and the wire rope is subject to the load in the low speed. Be aware of load balance as the load is hoisted from floor level. Proceed to high speed (Step 2) when the load is clear of all obstacles. When lowering the load, a skilled operator controls the lowering speed from High to Low speed when setting the load. Low speed allows time to maneuver load into position. Minimal jogging (or inching) may be required. **DO NOT JOG FROM NEUTRAL TO HIGH SPEED POSITION OR VICE VERSA.**

3. HOIST MANUFACTURER

3.1 Hoist Identification Data

The type marking and serial number of the hoist are shown on the rating plate attached to the hoist and in the inspection records supplied with the hoist.



Always state the serial number of the hoist when ordering spare parts or service.

3.2 Directives and Standards

The hoist and hoist components meet the requirements of the relevant FEM standard. The hoist complies with the European legislation and harmonized standards currently in force.

3.3 Manufacturer's contact details (CESAN CRANES)

Contact details for the manufacturer of the hoist:

Manufacturer's name and address:

Cesan Cranes
1..Organize Sanayi Bolgesi
11030 / BILECIK
TURKEY
Telephone number: +90 (228) 216 02 01 – 216 01 34
Fax number: +90 (228) 216 00 90
cesan@cesan.com
<http://www.cesan.com/>

For further information about the product, operational training and servicing, please contact the manufacturer's representative located closest to you.

3.3.1 Spare Parts

Spare parts for the hoist are specified in the separate spare parts catalogue delivered with the hoist. Always state the serial number marked on the rating plate of the hoist when ordering spare parts. Always use genuine spare parts and lubricants approved by the manufacturer of the hoist.

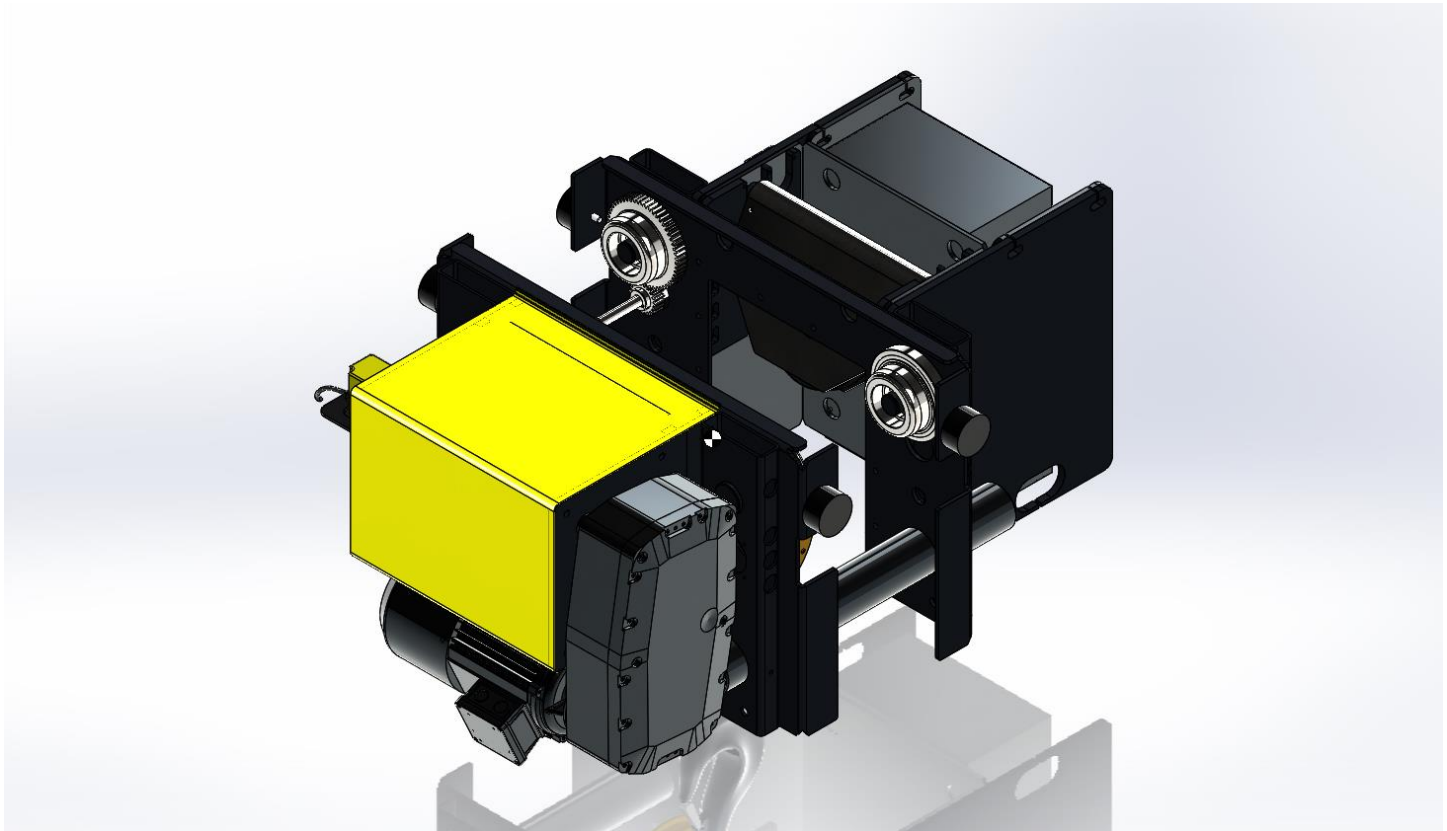




Cesan Cranes reserves the right to revoke warranty terms when non original parts are used.

4. CONSTRUCTION

4.1 Single Monorail Hoist



4.2 Trolley buffers

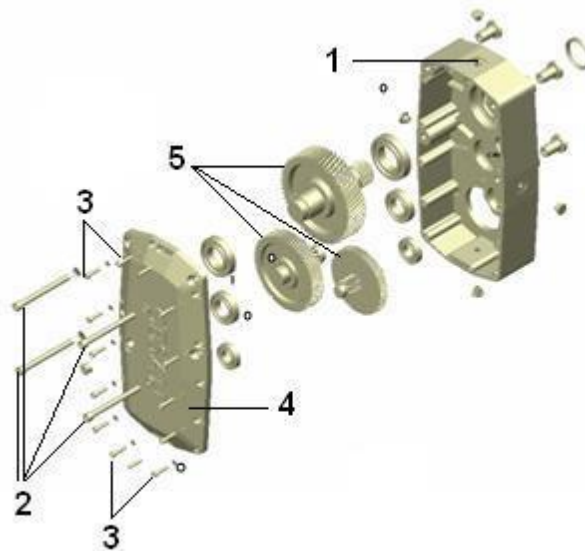
The hoisting trolley is provided with rubber buffers. Some models are equipped with buffer extensions.

4.3 Hoisting Machinery

The main components of the hoisting machinery are the hoisting motor, gear and rope drum. Power from the motor is transmitted via the rim gear of the transmission to the rope drum. One end of the transmission train that is comprised of the hoisting motor, gearing and rope drum is fixed to the end flanges of the hoisting machinery.

4.4 Hoisting Gearbox

The hoisting gearbox comprises multistage spur gear transmission. The lubricant for the hoisting gear is semi-fluid grease. When used in conformance with the operating group classification of the hoist, the gearbox lubricant does not need to be changed during the Safe Working Period (SWP). If the hoist is operated in extremely cold conditions, the factory-installed grease must be replaced with synthetic transmission grease. Refer to the section "Lubricants" for further instructions.



1. Breather Plug
2. Fixing Screws
3. Fixing screws for gearbox cover
4. Gearbox cover
5. Gears

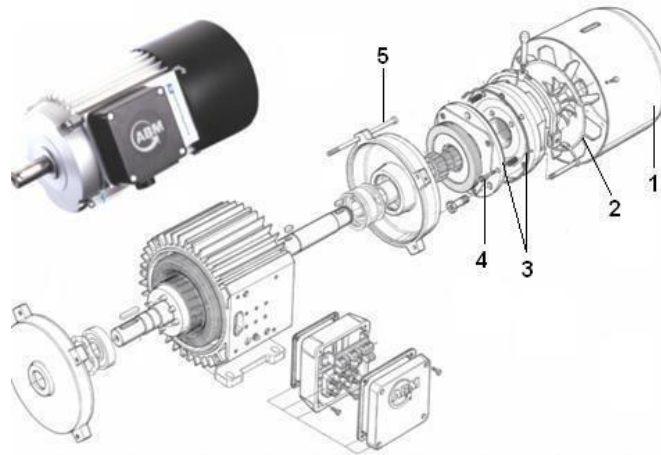
4.5 Hoisting motor and brake

Standard hoists are equipped with two-speed squirrel-cage motors, which are especially designed and manufactured for hoisting duty. The motors incorporate a cylindrical rotor and class F insulation, and are conform to the protection standard IP54/DIN40050.

Optionally, the hoist can be equipped with an inverter and specially designed motors for this duty. These are one-speed squirrel-cage motors with increased insulation of the windings. In addition, these motors are equipped with a speed sensor as a standard.

The hoisting brake is an electromagnetic safety brake that is closed by spring force.

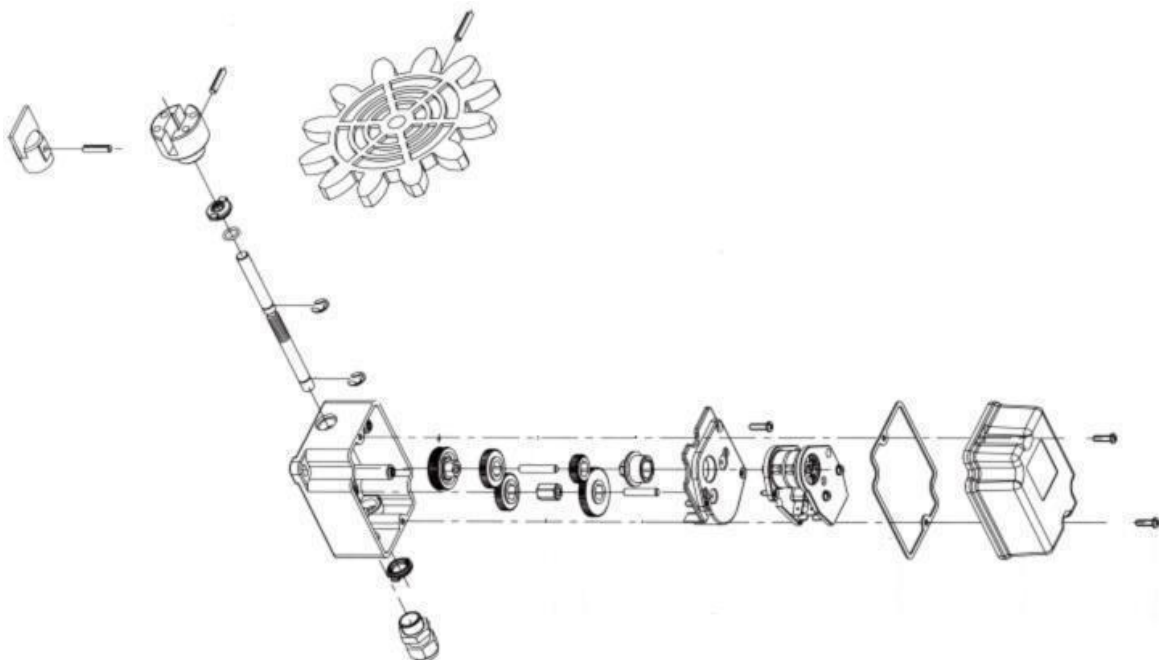




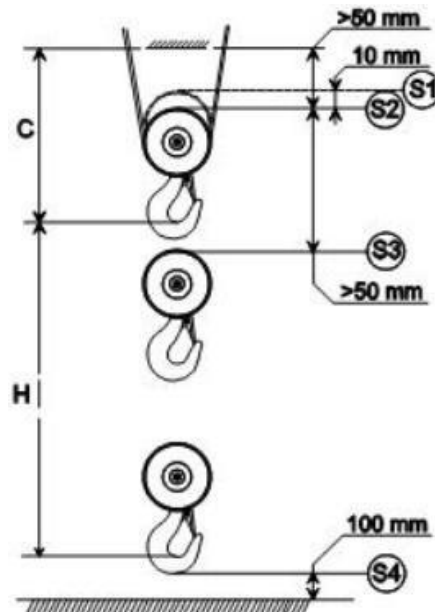
1. Fan Cover
2. Fan
3. Brake
4. Brake Disc
5. Fixing Screws for motor

4.6 Hoisting Limit Switch

The rotary hoist limit switch contains four contacts, with the below described default functions. The rotary limit switch unit for hoisting is located in the connection box on the hoisting gearbox.

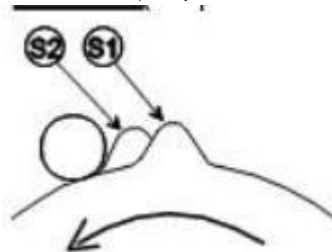


4.6.1 Adjustment



S1. Measurement for phase sequence supervision limit S2. Measurement for upper limit of hoisting S3. Measurement for slowdown limit of hoisting S4. Measurement for lower limit of hoisting
C. Minimum distance of hook from bearing surface of hoist travel wheel
H. Maximum lifting height

- Lower the hook to approx. 100mm above the floor.
- Turn the screw "S4" until the limit switch "S4" is just activated.
- Test the operation. The downward motion must stop at the described distance.
- Raise the hook until the top of the hook-block is approx. 100mm under the bottom flange of the main girder or other fixed structure.
- Turn the screw "S3" until the limit switch "S3" is just activated.
- Test the operation. The upward motion must slow down to Low speed at the described distance.
- Raise the hook until the top of the hook-block is approx. 50mm under the bottom flange of the main girder or other fixed structure.
- Turn the screw "S2" until the limit switch "S2" is just activated.
- Test the operation. The upward motion must stop at the described distance.
- Raise the hook to the up most position, until the motion is stopped by the upper limit switch "S2".
- Turn the screw "S1" so that it will activate just after "S2" (in upwards direction).



- Close the connection box.

4.6.2 Fine Adjustment

If maximum height of lift is needed, fine-tune the upper and lower limit of hoisting.



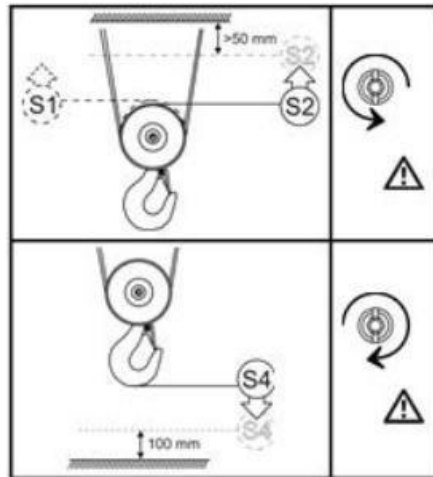
Do not exceed the minimum distances



Notice the right direction of adjusting screw rotation



Read just "S1" only if "S2" is fine-tuned



Upper limit of hoisting upwards.

Lower limit of hoisting downwards.

S1 : Supervision limit for phase sequence of hoisting (or hoisting safety limit).

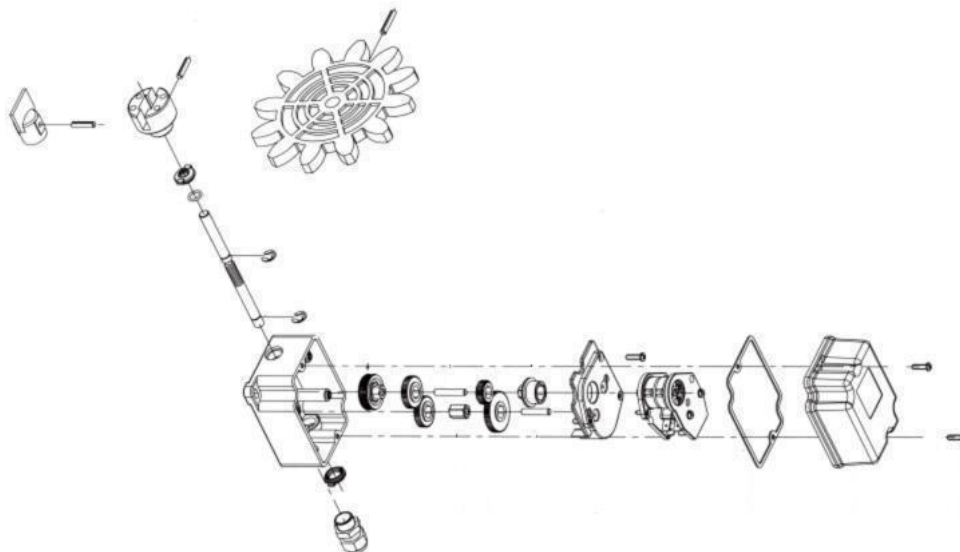
S2: Upper limit of hoisting.

S3: Slowdown limit switch for hoisting

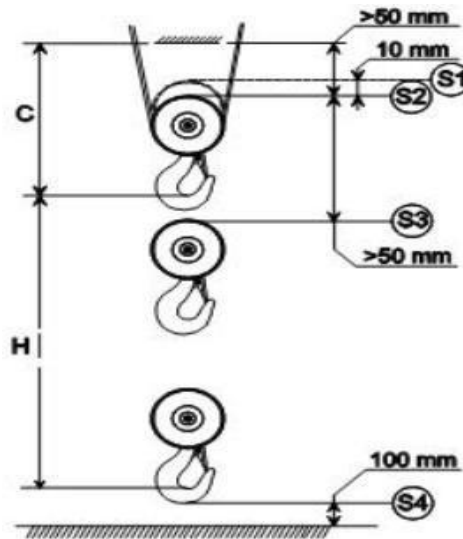
S4: Lower limit of hoisting

4.7 Hoisting limit switch

The rotary hoist limit switch contains four contacts, with the below described default functions. The rotary limit switch unit for hoisting is located in the connection box on the hoisting gearbox



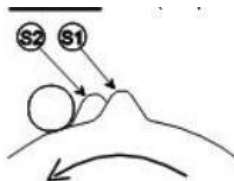
4.7.1 Adjustment



- S1. Measurement for phase sequence supervision limit
- S2. Measurement for upper limit of hoisting
- S3. Measurement for slowdown limit of hoisting
- S4. Measurement for lower limit of hoisting
- C. Minimum distance of hook from bearing surface of hoist travel wheel
- H. Maximum lifting height

Lower the hook to approx. 100mm above the floor.

- Loosen the locking screw (5)
- Turn the screw "S4" until the limit switch "S4" is just activated.
- Tighten the locking screw and test the operation. The downwards motion must stop at the described distance.
- Repeat step 1...4 until the correct setting is achieved.
- Raise the hook until the top of the hook-block is approx. 100mm under the bottom flange of the main girder or other fixed structure.
- Loosen the locking screw (5)
- Turn the screw "S3" until the limit switch "S3" is just activated.
- Tighten the locking screw and test the operation. The upwards motion must slow down to Low speed at the described distance.
- Repeat step 6...9 until the correct setting is achieved.
- Raise the hook until the top of the hook-block is approx. 50mm under the bottom flange of the main girder or other fixed structure.
- Loosen the locking screw (5)
- Turn the screw "S2" until the limit switch "S2" is just activated.
- Tighten the locking screw and test the operation. The upwards motion must stop at the described distance.
- Repeat step 11...14 until the correct setting is achieved.
- Raise the hook to the upmost position, until the motion is stopped by the upper limit switch "S2".
- Loosen the locking screw (5)
- Turn the screw "S1" so that it will activate just after "S2" (in upwards direction).
- Tighten the locking screw and close the connection-box





1. Movement pushbuttons
2. Hoist selection pushbutton (only if pushbutton controls several hoists)
3. On pushbutton and warning signal
4. Emergency stop pushbutton
5. Display (optional)

4.9 Travelling Machinery

The travelling machinery provides the cross-travelling motion of the trolley. The traveling machinery consists of a squirrel-cage motor and a gearbox. The motor can be either a 2-speed motor, controlled by contactors or a 1-speed motor controlled by an inverter. The 1-speed motors have a built-in compact brake, whereas the 2-speed motors are equipped with an external electro-mechanical brake. The gearbox comprises multistage spur gear transmission, running in grease lubrication. When used in conformance with the operating group classification of the hoist, the gearbox lubricant does not need to be changed during the Safe Working Period (SWP). If the hoist is operated in extremely cold conditions, the factory-installed grease must be replaced with synthetic transmission grease. Refer to the section "Lubricants" for further instructions.

Motor , Gearbox and Junction box

4.10 Inverter for travel

The electrical cubicle on the hoist contains a inverter that controls the speed of rotation of the travelling motor, according to the commands given by the operator.

The inverter has a signal LEDs (2) indicating its operating status and eventual malfunction.

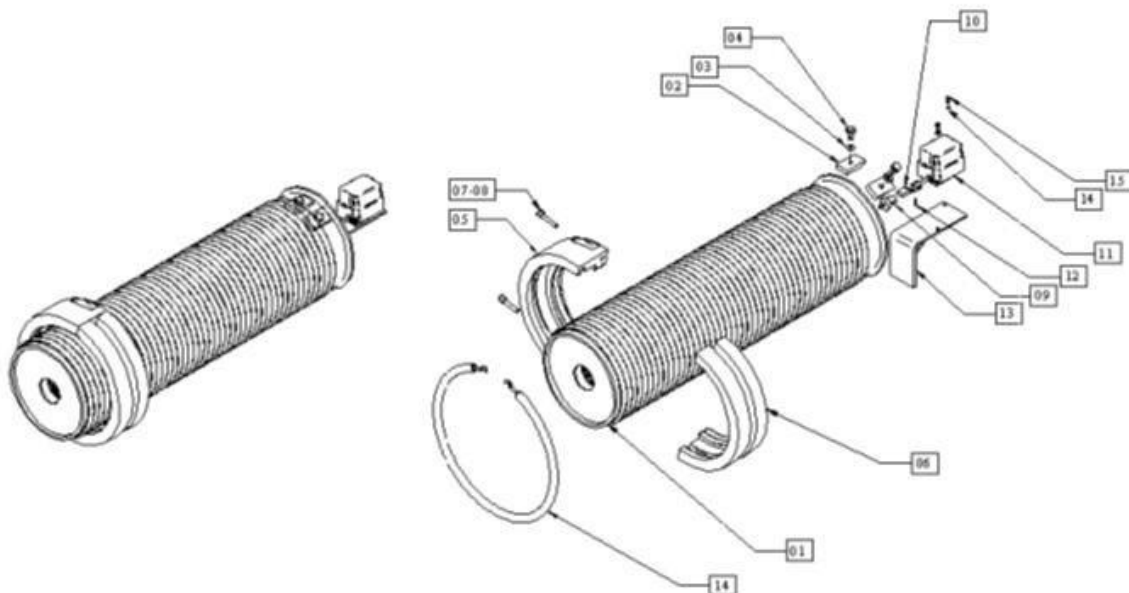
The parameters of the inverter are pre-set at the factory, and usually do not require re-adjustment. In case readjustment is needed, please refer to the Service Manual of the respective inverter for details, or contact a representative of the manufacturer.

All electrical connections to the inverter are made via connector(s) (1).

Inverter



4.11 Rope Drum

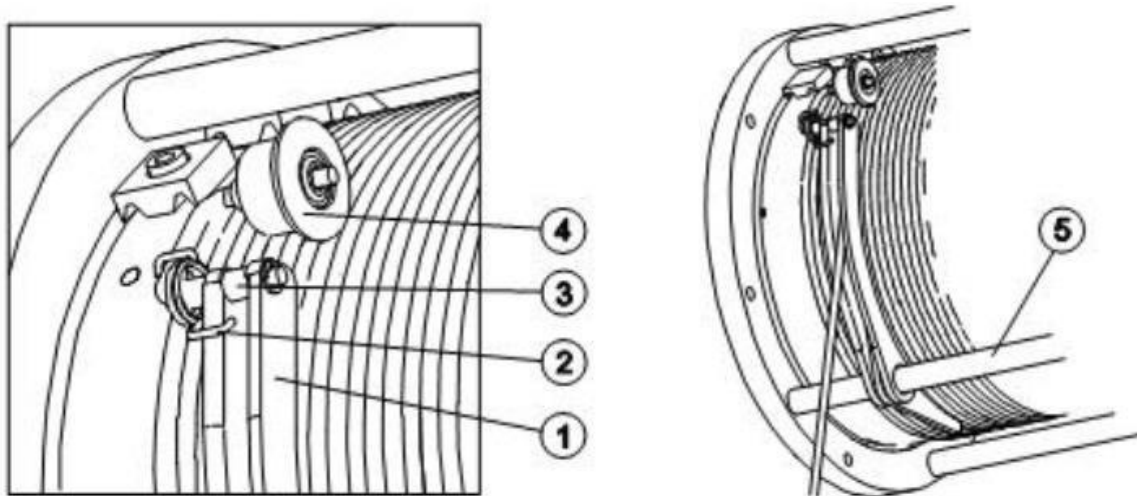


1. Drum / 2. Rope Clamp / 3. Drum Shaft / 4. Bolts / 5. Wire end shaft / 6. Wire Rope Guide / 7 and 8. Bolts / 9 and 10 Rondela / 11. Switch / 12. PIM / 13. Switch Table / 14. Wire Rope Spring / 15. Drum Bearing

4.12 Rope Guide

The rope guide ensures that the wire rope winds on the drum correctly and prevents the wire rope from jumping into the wrong groove.





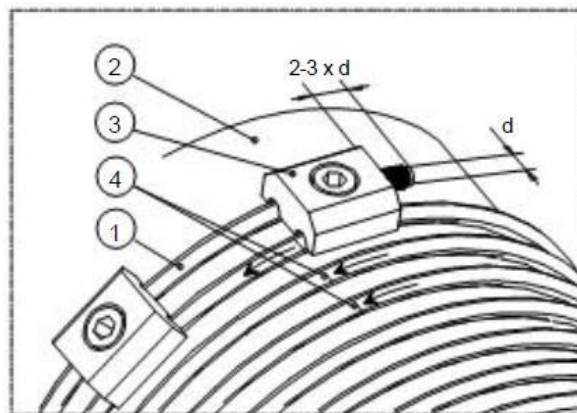
1. Rope Guide / 2. Rope Press Roll Spring / 3. Rope Press Roll Axle / 4. Rope Press Roll / 5. Connector Rod

4.13 Rope Clamps

The rope is fixed to the rope drum with rope clamps. The number of rope clamps varies with the type of hoist.



In addition to the clamps on the rope ends, there must always be at least two full turns of rope on the drum when the hook is at its lowest position in order to provide friction.

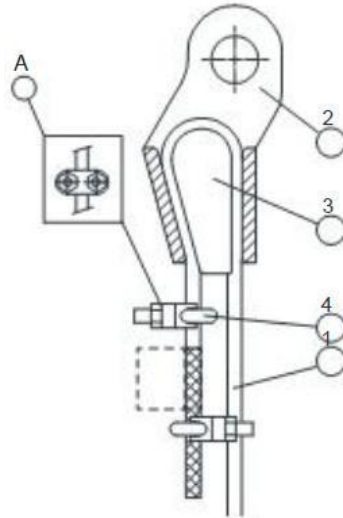


1. Rope / 2. Rope Drum / 3. Rope Clamps / 4. Friction Turns

4.14 Rope Anchorage

The free end of the rope is fixed in a suspended rope anchorage. The rope clamps ensure that the rope cannot accidentally slip through the rope anchorage.





1. Rope / 2. Rope Anchorage / 3. Wedge / 4. Rope Clamp

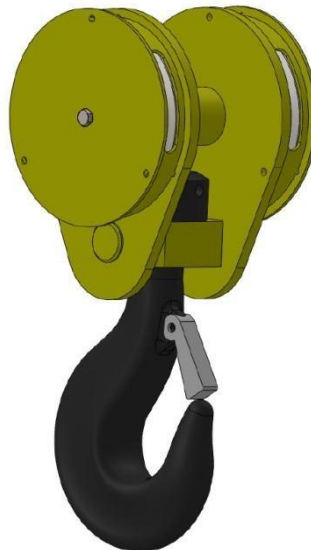
4.15 Hook-block, rope reeving and return sheaves

The hook-block consists of the hook forging, hook forging suspension and rope sheave(s). The hook forging is supplied with a safety-catch. The hook forging rotates in a pressure bearing. Optionally in some models, the hook block can be supplied with a rams-horn forging, a locking device to prevent the forging from rotating, hook forging insulation or non-standard forging dimensions.

A trolley with a hoist that has four or more rope falls is equipped with a rope sheave beam including one or more return sheaves.

The reeving depends on the type of hoist, the amount of ropes on the drum and the amount of rope falls. The reeving scheme is shown in the picture.

4-Falls, 1 Rope reeving



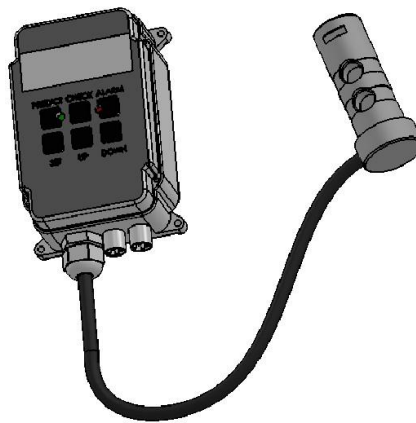
4.16 Wire Rope

The rope of the hoist is a wearing, load-bearing part. In order to ensure safe and efficient operation of the hoist, it is essential to follow the safe working principles described in the safety instructions. Regular inspection of the rope is a vital safety procedure requirement.

4.17 Overload Protection

The overload protection prevents hoisting motion when there is an excessive load. The operating point of overload protection is stated in the written records for the test drive of the hoist. Overload protection is achieved by either a mechanical switch or an electronic load sensor. The mechanical switch is connected to the hoisting circuitry, and controls the hoisting contactor.

The load sensor is connected to a separate condition-monitoring unit. The condition monitoring unit prevents hoisting motion when there is an excessive load. The overload protectors with a load sensor are equipped with an additional safety limit-switch.



5. INSTALLATION

Familiarize yourself with the installation instructions delivered with the hoist before commencing. Pay attention to the instructions on safe operation of the hoist.

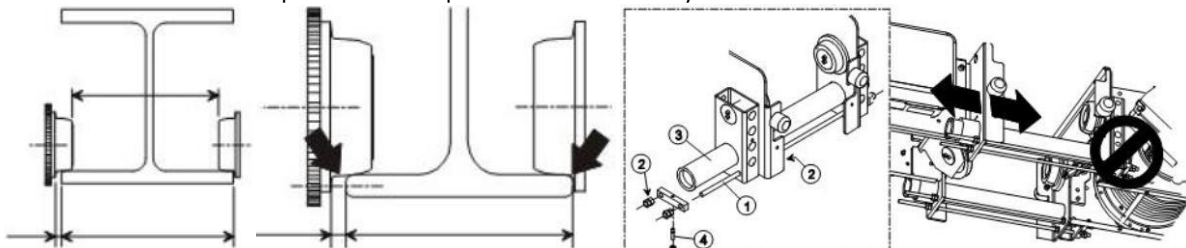
5.1 Prior to installation

Check the following basic requirements before commencing installation of the hoist:

- Adequate personnel resources, such as competent fitters and work supervisors, have been allocated to the work.
- Sufficient and appropriate tools and equipment are available, such as lifting equipment and a test load.
- Sufficient time has been reserved for installation and testing.
- The hoist being installed is suitable for the application and operating environment.



It is recommended that qualified service personnel authorized by the manufacturer of the hoist do the installation work





6. COMMISSIONING

Before handing over the hoist, at least the inspections and adjustments listed below should be carried out. In some cases it is appropriate to carry out a more thorough inspection. The scope of the inspection depends on the operating range and application.

6.1 Inspections without load

6.1.1 Inspecting the connections of electrical equipment

Check that the connections of electrical devices comply with the wiring diagrams and meet local requirements. In particular, check connections that affect safety and control of the hoist.

Check the cableways for electrical wiring. Make sure that wires do not snag on structures when the hoist and trolley are in motion.

6.1.2 Inspection of pushbutton controller and directions of rotation

Check that the pushbutton controller and pendant cable are in good condition. Check that the pushbutton controller is at the correct height.

Press the direction buttons on the pushbutton controller and check that the resultant motions occur in the correct direction.



Check the resultant motion by pressing first the UP direction button even though the hook is near the upper limit.

If there is an error in the direction of all movements it can be corrected by changing the sequence of two phases of the power supply. Change the phase sequence of the input power leads to the hoist.

Check the operation of the emergency stop button.



Do not depress the emergency stop button unnecessarily.

6.1.3 Checking Operating Sound

- Listen to the sound made when travelling and hoisting and assess whether the sound indicates an installation error.
- Check the vibration made when travelling and hoisting by feeling the hoist with your hand.

If the hoisting motor makes a loud intermittent noise and the hoist vibrates strongly, the problem may be in the power supply. Check and correct all phases in the power supply. If travelling motion produces a loud noise or strong vibration, the trolley is probably incorrectly installed on the track. Check the trolley is properly mounted on the track.



Do not use the hoist before you identified the cause of excessive noise/vibration.

6.1.4 Inspection and adjustment of the hoisting limit switch

Adjust the limit switch for hoisting. Check the operation of the limit switch by running the hoist to the top and bottom limits. Adjustment of the hoisting limit switch is described in the section "Hoisting limit switch"



For safety reasons the hoisting limit switch must always be adjusted before the commissioning tests.





6.1.5 Inspection and adjustment of the limit switch for travel (not in all models)

Adjust the triggering locations of the limit switch. Check the operation of the limit switch by running the hoist to the triggering locations.



For safety reasons the triggering locations of the limit switch for travel must be adjusted before the commissioning tests are continued.

6.1.6 Inspection of hook and operation of rope sheaves

- Check that the rope sheaves rotate freely.
- Check the general outlook of the coating in case of bronze coated hooks.

6.1.7 Inspection of rope

- Check that the rope has not been damaged in transport.
- Check that there is no slack rope on the rope drum.
- Check that the rope is correctly reeved.
- Check the fixing of the rope ends.



Ensure that the rope is assembled inside the rope anchorage correctly.

New wire rope shall be taken in use by a load, which is of approx. 10 % of the nominal load. This load shall be lifted to the total lifting height 5 - 10 times. If the hook tries to turn around during the lifting, place the hook in the lowest position without load, open the rope end wedge housing and rotate the wedge housing until the hook is straight.



Note the correct position of the wedge housing

6.1.8 Inspection of overload protection

Check that the overload protection mechanism operates correctly. Check that the rope anchorage and support beam move freely

6.1.9 Inspection of trolley

- Check that the wheelbase of the trolley is correctly adjusted.
- Check the tightening and locking of all screws for trolley adjustment.
- Run the trolley at least 3...5 times over the whole length of the girder.

6.1.10 Inspection of brake operation

Check that the hoisting brake operates correctly in both up and down directions.

6.2 Inspection with test-load, %100 of the rated load of the hoist

6.2.1 Inspection of motor current





Check the motor current in each phase during hoisting motion with rated load.

The current should be in balance in all phases and may not exceed the ratings for the motor. Check the current at both hoisting speeds.

6.2.2 Inspection of running temperature

If the thermal protection halts hoisting prematurely, identify the reason for overheating before continuing the commissioning tests.

6.2.3 Inspection of travelling machinery

Check that the acceleration and braking motions operate smoothly.

Run the trolley at least 3...5 times over the whole length of the girder. Remove the paint coming loose from the runway of the trolley.

6.3 Inspection with overload, 110...125% of the rated load of the hoist

6.3.1 Inspection of overload protection

Check that the overload protection mechanism operates with an overload. The overload protection must prevent hoisting motion when the load exceeds the trigger load for the overload protection mechanism that is stated in the test drive. If the hoist is provided with a condition-monitoring unit, refer to the separate operating instructions for commissioning the condition-monitoring unit.

6.3.2 Inspection of brake operation

Lower the load in slow speed and stop. Ensure that the brake is able to stop the motion adequately

6.3.3 Inspection of rope

Ensure that the rope has not slipped in the rope anchorage by comparing the measures with the stated measures in the table. (see section Rope anchorage)

6.4 After the inspection

6.4.1 Cleaning

Check that all tools and materials used during installation are removed from the hoist and track.

6.4.2 User training

Ensure that the hoist operator and supervision personnel are aware of the need for user training.



The authorized service organization of the hoist manufacturer can arrange user training by separate agreement.

6.4.3 Hand-over documents

Check the documents delivered with the hoist. Ensure that entries in the documents are properly recorded and that the reference data in the documentation matches that on the type rating plates



Compile a commissioning log for the hoist and keep it with the other documentation for the hoist.

7. MAINTENANCE



CESAN CRANES | Your Partner in Lifting

The lifetime of the hoist is divided into Safe Working Periods (SWPs). At the beginning of the Safe Working Period, a new hoist has an SWP% of 100. A Safe Working Period ends when the SWP% of the hoist is zero. When a Safe Working Period ends, a General Overhaul (GO) must be conducted, after which the hoist is assigned a new Safe Working Period, refer to the section 'General Overhaul, GO'.

During the SWP, the safe and efficient operation of the hoist is contingent on regular servicing.



For the safety carry out the inspection and servicing procedures for the hoist inaccordance with the table below.



To avoid any risk of spark with explosive proof hoists due to the friction of two mechanical parts, it is important to follow strictly the maintenance intervals. The safety of the equipment could be compromised if not.

7.1 Daily inspections



Carry out following daily inspection on start of each work shift. Do not use the hoist unless it is in proper condition. Contact a service agent authorized by the manufacturer immediately in case of doubts! The usage of a defective hoist can result in serious damages, injuries or death.

1	Inspection of the wire rope <ul style="list-style-type: none"> Check the wire rope visually for kinking, crushing, corrosion, broken wires and broken strands Check visually that the rope lays in the grooves of the drum and in the rope sheaves
2	Inspection of the hook block <ul style="list-style-type: none"> Check that the hook moves freely in every allowed direction Check the presence of the safety latch and it's functioning Check the free and smooth rotation of the rope sheaves
3	Inspection of the hoist limit switch <ul style="list-style-type: none"> Verify that the upper limit switches operate properly Verify that the lower limit switch operates properly
4	Inspection of the pushbutton controller <ul style="list-style-type: none"> Check the pushbutton controller for cracks or other signs of wear in the housing, and for loose or broken buttons Verify that all pushbuttons and switches correspond to their intended functions and directions Check the operation of the emergency button.



Do not depress the emergency button while the hoist is running during this test. Instead, depress the emergency button and verify that no movement can be activated with the pushbuttons.

7.2 Periodical inspections and servicing

The servicing intervals for the hoist are defined as SWP% periods. The actual operation of the hoist is taken into account in SWP%. If the hoist is provided with a condition monitoring unit, the SWP value can be read from the SWP-data counter display of the unit. Refer to the more detailed instructions given in the separate operating instructions for the condition monitoring unit. The SWP% corresponding to the SWP value can be found from the table below. Check the rating plate fixed to the hoist for classification of the hoist's operating group.





SWP VALUE IN RELATION TO THE SWP %						
Operating group of the hoist ISO (FEM)						SWP%
M3 (1Bm)	M4 (1Am)	M5 (2m)	M6 (3m)	M7 (4m)	M8 (5m)	
400	800	1600	3200	6300	12500	100%
360	720	1440	2880	5670	11250	90%
320	640	1280	2560	5040	10000	80%
280	560	1120	2240	4410	8750	70%
240	480	960	1920	3780	7500	60%
200	400	800	1600	3150	6250	50%
160	320	640	1280	2520	5000	40%
120	240	480	960	1890	3750	30%
80	160	320	640	1260	2500	20%
40	80	160	320	630	1250	10%
20	40	80	160	320	625	5%
4	8	16	32	63	125	1%
0	0	0	0	0	0	0%

The table below shows the service intervals for the hoist in SWP% periods and in calendar months. Items for inspection and servicing refer to the servicing procedures described earlier in these operating instructions. The servicing procedure must be carried out latest at the end of a SWP% period, or by the end of the stated number of calendar months. Hoists without a condition-monitoring device must follow a servicing procedure guide by calendar months. For ensuring the usability of the hoist the servicing intervals can be shortened.



Hoists used under harsh conditions may require a shorter servicing interval than stated in the table below. Consult with a representative of the manufacturer for a tailored service agreement.



If ambient temperature is frequently over 40 °C (104 F) the servicing interval is half of the interval stated in the table below.



Periodical inspecting and servicing procedure may only be carried out by a serviceman authorized by the hoist manufacturer or service personnel adequately trained by the hoist manufacturer.

Items for inspection and servicing		Interval		
SWP% Reduction		10%	40%	80%
Hoist classification		all	M5/M6	M3/M4
Calendar period [years]		1	4	8
1	Inspection of trolley wheels	X		
2	Inspection of buffers	X		
3	Inspection of hoisting machinery and coupling		X	





4	Inspection of hoisting gear	X	
5	Inspection of hoisting motor and brake	X	
6	Inspection of hoisting limit switch	X	
7	Inspection of pushbutton controller	X	
8	Inspection of travelling machinery	X	
9	Inspection of frequency controller	X	
10	Inspection of rope drum	X	
11	Inspection of rope guide	X	
12	Inspection of rope clamps	X	
13	Inspection of drumbrake	X	
14	Inspection of rope anchorage	X	
15	Inspection of hook block	X	
16	Inspection of rope sheave beam	X	
17	Inspection of wire rope	X	
18	Inspection of overload protector	X	
19	Inspection of condition monitoring unit	X	
20	Annual inspection according to local requirements	X	

Please note that not all hoist types include this equipment

7.3 Calculation of Safe Working Period (SWP)

If the hoist is not provided with a condition-monitoring unit, the end of the Safe Working Period must be calculated in accordance with standard FEM 9.775. Calculation has to be carried out during each recurring inspection and servicing. The end of the Safe Working Period can be calculated as follow:

7.3.1 STEP 1: Operating hours per inspection interval, T

H: Average hoisting height [m]

N: Number of work cycles per hour [cycles/h] T=daily working time [h]

V: Hoisting speed [m/min]

J: Working days during inspection interval [days]

$$T_i = \frac{2 * H * N * T * J}{V * 60}$$



7.3.2 STEP 2: Actual load spectrum factor per inspection interval

Load spectrum factor can be calculated using following table:

Load %	Lifting Time %	Factor	Load spectrum factor
100%	<input type="text"/>	*	<input type="text"/>
	+		
80%	<input type="text"/>	*	<input type="text"/>
	+		
60%	<input type="text"/>	*	<input type="text"/>
	+		
40%	<input type="text"/>	*	<input type="text"/>
	+		
20%	<input type="text"/>	*	<input type="text"/>
	+		
0%	<input type="text"/>	*	<input type="text"/>
	=		
Sum:	100%		<input type="text"/>
		Divide by 100:	/100=
		Load Spectrum factor	<input type="text"/>

7.3.3 STEP 3: Partial duration of service [hours]

When the load spectrum factor of inspection interval K_{mi} and the operating hours per inspection interval T_i are identified, the Partial duration of service, S_i can be calculated as follow: $(S=12*K*T)$

7.3.4 STEP 4: Actual duration of services [hours]

Actual duration of service can be calculated when the earlier partial duration of inspection intervals is known. $(S=S_1+S_2+S_i)$

7.3.5 STEP 5: SWP% and remaining service life

SWP% and estimated remaining service life can be obtained from table below.

Hoist operating group marked on hoist's rating plate				SWP %	Estimated remaining service life [years]
M4 (1Am)	M5 (2m)	M6 (3m)	M7 (4m)		
Actual duration of service [h]					
0	0	0	0	100%	10
80	160	320	630	90%	9
160	320	640	1260	80%	8
240	480	960	1890	70%	7
320	640	1280	2520	60%	6
400	800	1600	3150	50%	5
480	960	1920	3790	40%	4
560	1120	2240	4410	30%	3
640	1280	2560	5040	20%	2
720	1440	2880	5670	10%	1
800	1600	3200	6300	0%	0

When SWP% is zero, a General Overhaul (GO) must be conducted. Refer to section 'General Overhaul (GO)'.



7.4 General Overhaul [GO]

Once the SWP% of the hoist reaches zero, the hoist has exhausted its theoretical lifetime. The probability of a defect in the hoist is therefore higher and operating safety is jeopardized. When the theoretical lifetime is exhausted, a General Overhaul (GO) of the hoist must be conducted. Only the hoist manufacturer or a service organization authorized by the hoist manufacturer may conduct a GO. The components in the hoist that have an impact on hoist lifetime are inspected in a GO and critical components are replaced. A new theoretical SWP is given to the hoist after completion of a GO.



When the Safe Working Period (SWP) of the hoist is exhausted, the hoist may only be used after a GO has been conducted.

If the hoist is not provided with a condition monitoring unit, the end of the Safe Working Period must be calculated in accordance with standard FEM 9.775, refer to section "Calculation of the Safe Working Period"

Recommended tightening torques for screws and nuts in the hoist.

Size	TIGHTENING TORQUE			
	Strength 8.8		Strength 10.9	
	[Nm]	[Ft lb]	[Nm]	[Ft lb]
M4	2.7	2.0	4.0	2.9
M5	5.4	4.0	7.9	5.8
M6	9.3	6.8	14	10.3
M8	23	17.0	33	24
M10	45	33.0	66	48.5
M12	77	56.6	115	84.6
M14	125	92	180	132
M16	190	140	280	206
M18	275	202	390	287
M20	385	283	550	404
M22	530	390	750	552
M24	660	485	950	699
M27	980	721	1400	1030
M30	1350	993	1900	1398



It is recommended that the self locking nut (Nyloc nut) is always replaced when removed. Self locking nut can be reused max 5 times.



8.0 LUBRICANTS

8.1 Lubricant types

Usage	Installation	Trade name and number	Type	Operating temperature °C	Operating temperature °F
Hoisting Gears and Travelling Gears	Factory Installed	Mobilux EP 004		-30...+120	-22...+248
	Alternative	Shell Alvania GC		-15...+80	+5...+176
	Alternative	Shell Alvania EP00		-15...+80	+5...+176
	Alternative	Shell Tivela Grease GL00	Synthetic	-30...+130	-22...+266
	Alternative	Neste Center Grease 00 EP		-35...+100	-31...+212
	Alternative	Castrol EPL00		-35...+100	-31...+212
	Alternative	Mobilith SHC 007	Synthetic	-50...+230	-58...+446
Hoisting Gears	Factory Installed	Mobil SHC 632	Synthetic	-35...+100	-31...+212
	Alternative	Neste Vaihteisto S 460 EP	Synthetic	-30...+100	-22...+212
	Alternative	Shell Omala HD 460	Synthetic	-25...+130	-13...+266
Bearings Couplings	Factory Installed	Mobilith SHC460	Synthetic	-40...+235	-40...+455
	Alternative	Shell Albida Grease PPS	Synthetic	-30...+150	-22...+301
	Alternative	Neste Synlix	Synthetic	-40...+150	-40...+301
	Alternative	Castrol S	Synthetic	-40...+140	-40...+284
Ropes	Alternative	Shell Tellus 32		-	-
	Alternative	Bel Ray Wire Rope Lubricant		-	-
	Alternative	Bel Ray 6 in 1 Fluid		-	-
	Alternative	Brilub 50		-	-
Open transmissions Drum rim gear	Factory Installed	Almagard 3752		-40...+250	-40...+482
	Alternative	Shell Albida GC		-40...+120	-40...+248
	Alternative	Neste Avora		-30...+150	-40...+301

Factory installed lubricant is being used unless otherwise specified by the customer.



If the transmission oil has to be topped up, make sure that the lubricant being added is compatible. If transmission oil has to be replaced, flush out the gearbox before filling up.

If the hoist is operated for long periods in extremely cold conditions (colder than -25 °C/-13 °F) or extremely hot conditions (hotter than + 55 °C/+131 °F), it is recommended that a synthetic lubricant is used.

8.2 Lubricant quantities

8.2.1 Lubricant volumes, hoisting gears

Drum size	Gear Type	Volume	
Ø243 mm	GEN0	300ml	10.6 fl.oz (Imperial)
Ø303 mm	GEN1	600ml	21.1 fl.oz (Imperial)
Ø355 mm	GEN2	900ml	31.7 fl.oz (Imperial)
Ø406 mm	GEN3	1400ml	49.3 fl.oz (Imperial)
Ø608 mm	GEN4	2500ml	88.0 fl.oz (Imperial)



8.2.2 Lubricant volumes, travelling gears

Hoist Trolley type	Drum Size	Gear Type	Volume	
Low headroom Normal headroom	all	GEK1	20ml	0.7 fl.oz (Imperial)
Double Girder	Ø303 mm	GS2/GS3	400 ml	14.1 fl.oz (Imperial)
Double Girder	Ø355/406/608 mm	GES3	250 ml	8.8 fl.oz (Imperial)
Double Girder	Ø608 mm	GES4	500 ml	17.6 fl.oz (Imperial)
Double Girder	Ø608 mm	GES5	1000 ml	35.2 fl.oz (Imperial)

8.2.3 Lubricant volumes, drum rim gear

Drum Diameter	Volume	
Ø243 mm	50 ml	1.8 fl.oz (Imperial)
Ø303 mm	70 ml	2.5 fl.oz (Imperial)
Ø355 mm	100 ml	3.5 fl.oz (Imperial)
Ø406 mm	150 ml	5.3 fl.oz (Imperial)
Ø608 mm	500 ml	17.6 fl.oz (Imperial)

9. TROUBLESHOOTING

The table below lists some of the faults and malfunctions that may occur in the hoist, their causes and the corrective actions needed to eliminate them.



If you are unable to identify and eliminate the fault using this table, contact a service agent authorized by the manufacturer.

Fault	Probable Cause	Corrective Action
The hoist is not operative	Main supply power is not connected	Switch the main power supply on Release the Emergency Stop button Press the start button See section "Using pushbutton controls"
	A fuse has blown	Replace the fuses
	The hoisting motor has overheated and the temperature sensor is preventing the operation	Wait for the motor to cool. Avoid unnecessary and repetitive short starts.
	A motion has reached its limit	Drive away from the limit
	One phase is dead (no voltage)	Repair the power supply. See section "Connecting to the mains network"
The hoist is operative but does not hoist the load	The hook is holding an overload	Check that the load on the hook does not exceed the maximum permitted load
The load slips downwards	The hoisting brake is worn	Contact a service agent of CESAN CRANES and/or authorised dealer
Hoist motions are in the wrong direction	The phases of the power supply are connected wrongly	Interchange the sequence of 2 phases of the power supply. Check the directions of motion. See section "Connecting to the mains network"
Travel motion is not operative or makes a load noise	There are obstructions on the track	Clear the track
	Travel control is malfunctioning	See section "Inverter for travel"



