# CMK SERIES

**4th Generation High Technology Electric Wire Rope Hoist**

# MAINTENANCE AND OPERATING MANUAL

**CMAK Crane Systems**
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Dear Customer,

Thank you for choosing CMAK's premium electric wire rope hoists. We would like to present you this manual in order to assist you in using your hoist most efficiently which has been delivered to you after having been manufactured in modern facilities with a diligent quality control.

We recommend you to read this manual carefully before using it and keep the manual as a source of reference in the future.

At the same time, this manual has been prepared to guide crane operators in order to; consider details, remind of working safety issues, inform about periodic inspections and ensure that periodic inspections are performed on time, before or during the operation of crane.

Kind Regards,

**Çakmak Vinç San. Ve Tic. A.Ş.**

## Terms of Warranty

1- The periodical inspections and maintenances of the lifting machines of occupational safety and quarterly periodical maintenances should be performed as required in order to serve your crane for a long time and to be valid of warranty of CMAK, the maintenances of your crane that are stated in the maintenance catalogue and needed to be performed by your firm.

2- Your crane, including all manufacturing parts, is under the warranty of CMAK and its partner companies against manufacturing and assembly faults.

3- Warranty period starts on the date of invoice and valid for 24 month.

4- The warranty period for replaced or repaired parts are 12 month from the date of repair or replacement. However, this warranty period will end at the latest when the warranty period of original delivered object expires.

5- Within the warranty period of CMAK product, malfunctions due to both material and manufacturing will be eliminated without any maintenance, repair, labor and spare part fee in the relevant servicing stations. Transfer of the product to our servicing station will be ensured by the customer if necessary.

6- In the event that sold products break down, due to manufacturing fault, within warranty period and their repair is not possible, replacement will be done free of charge in the direction of the report to be delivered by our servicing stations. Any replaced parts become the subsequent property of CMAK, and they have to be sent back to the CMAK for inspection without delay.

7- Electric wire rope hoist or crane has to been maintained and periodically serviced after the delivery and each service needs to be recorded in documents. The machinery must be serviced by CMAK or CMAK's authorized service partner company. Otherwise, the warranty is void.

8- Electrical control panel must not be adjusted/altered by the person(s) whom are not authorized by CMAK or its partner companies.

9- CMAK can not be hold liable for any electrical damage due to unstable voltage and feeding (phase fluctuations).

10- If CMAK components are installed and operated without original CMAK electrics, frequency inverters or other CMAK control systems, CMAK assumes no liability for damages, consequential damages and losses to machine or personal injury resulting from the non-use of original CMAK control systems.

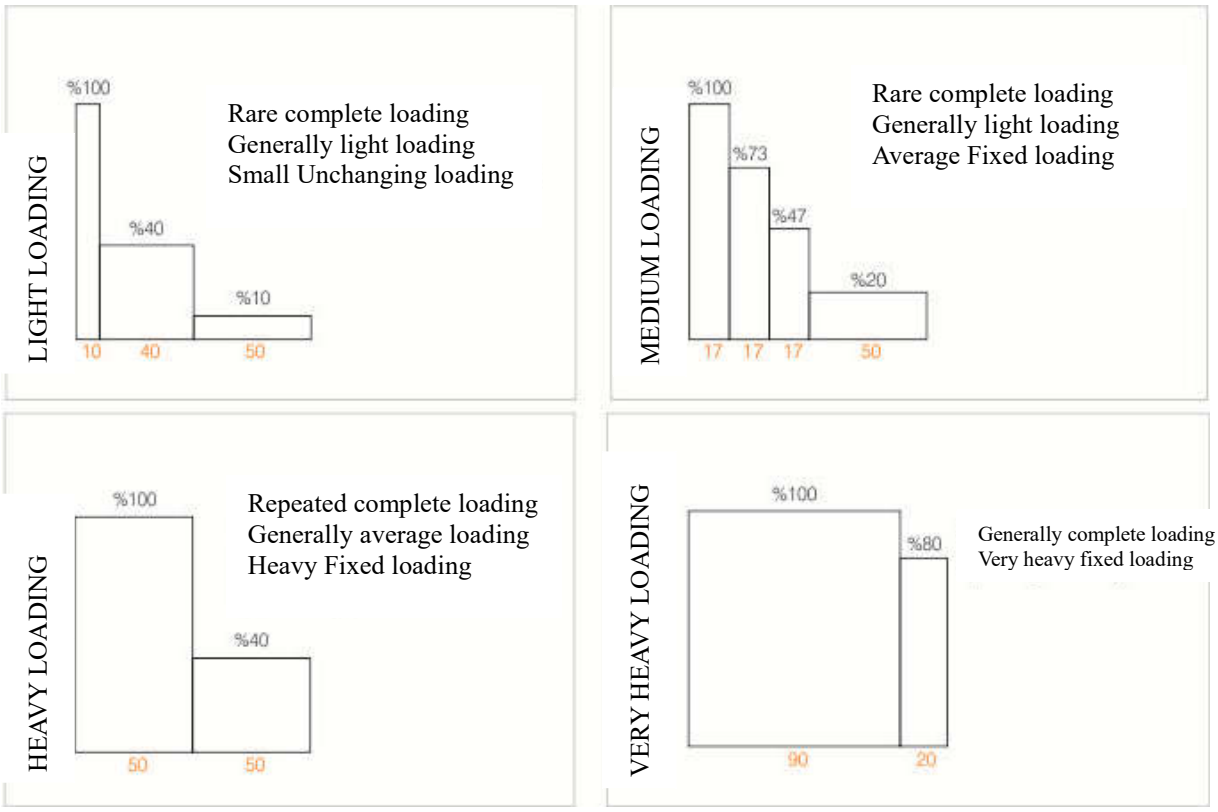
11- Defects in deliveries, especially a construction defects or poor material, which prove to be defective within the period of this warranty as a result of circumstances existing prior to passing of risk, shall be, at the discretion of CMAK, repaired or replaced free of charge.

# GENERAL INFORMATION

## Safe Usage

Crane is a material handling equipment; in other words a main material handling machine for loads. It can not be used for lifting or carrying humans. Crane should be installed and assembled as per its purpose both indoors and outdoors. Ambient temperature should be between -10 and +50$^0$C ( for standard cranes; can vary with the specific applications ). Humidity ratio of the ambient should be less than 90%. For the safe and efficient operation of the crane, working group of the crane should be classified correctly. Regular operation of the crane as per FEM9.511;

- Loading Spectrum
- Daily Average Run Time



## Daily Average Run Time

The daily average run time of the crane can be calculated with the running time of crane machines.

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

H: Average Height of Lift (m)
N: Number of Starts per Hour ( starts/h)
T: Daily Run Time (h)
V: Crane's Speed (m/min.)

## Determining the working group of the crane

When the loading spectrum and daily working hour of the crane are determined, you can see the working group of the crane from the following table.

| SPECTRUM | DAILY AVERAGE RUN TIME ISO/FEM | | | | | |
|---|---|---|---|---|---|---|
| LOADING | <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 | | |

| CUBICLE MEAN LOAD | DUTY | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | M1 | M2 | M3 | M4 | M5 | M6 | M7 | M8 |
| | **Theoritical Service Life ( hours )** | | | | | | | |
| $k \leq 0,5$ **Light** | 800 | 1600 | 3200 | 6300 | 12500 | 25000 | 50000 | 100000 |
| $0,5 \leq k \leq 0,63$ **Medium** | 400 | 800 | 1600 | 3200 | 6300 | 12500 | 25000 | 50000 |
| $0,63 \leq k \leq 0,8$ **Heavy** | 200 | 400 | 800 | 1600 | 3200 | 6300 | 12500 | 25000 |
| $0,8 \leq k \leq 1$ **Very Heavy** | 100 | 200 | 400 | 800 | 1600 | 3200 | 6300 | 12500 |

## Safe and Healthy Operation Principles

Efficient operation carefully follows safe working principles in order not to damage the environment and personnel. Operator and service personnel should know the safe working principles of the crane. Having the crane repaired by someone else terminates the contract and guarantee scope. Using the crane wrong or delivering inappropriate service might cause accidents. Operation and safety training will introduce the operator to the essential safe handling of loads with the hoist equipment and safety procedures to follow.

Safe and healthy operation should cover following principles:

1- You should observe all safety rules while operating crane and follow these rules.
2- All lifting equipment operators should be appropriately trained physically and mentally.
3- You should make sure that load is not obstructed by a personnel or an object during lifting, lowering and transporting.
4- You should not use the crane to lift load above its nominal capacity.
5- All personnel should be warned and informed about approaching the overhead crane and load.
6- There should be at least 3 times wrapped safety winding of wire rope on the drum.
7- You should not distract the crane operator.
8- You should make sure that all safety latches, slings and other hook connections are available for the safe operation.
9- All loads should be lifted in a vertical direction and the rope should always be kept in drum grooves. If the rope gets out of the groove, immediately stop and fix the issue before continuing the operation.
10- You should make sure that the load is attached to the hook tightly, secured and balanced appropriately.
11- You should not use the rope as chassis for welding or for any damaging practice.
12- You should not make any adjustment or repairs without getting authority or confirmation from the authorities.
13- You should avoid colliding the electric wire rope hoist or crane with any object.
14- You should not leave the load suspended on the electric wire rope hoist/crane unattended.
15- You should make sure that limit switches are functioning and operational before starting hoisting and you should not use limit switches for standard/normal stop. You should take your hand off the button after a regular stop.
16- Crane should not be operated when there is a personnel on runway/tracks or service platform.
17- You should make sure that all equipment is functioning and operational as desired before starting hoisting action. When a malfunction is observed, you should call the maintenance for service.
18- You should make sure that indicated directions on the button and crane are the same and matching.
19- You should make sure that hook can rotate 360° freely.
20- You should avoid swinging and shaking the load.
21- You should not operate the crane with twisted, entangled and wrecked wire rope.
22- You should not remove/cover the labels and signboards on the crane and crane equipment.
23- Make sure the periodical maintenance/checks of your crane are performed by authorized companies/personnel and keep track of the maintenance/repairs done by date.

# COMMISSIONING

## Commissioning Principles

Before starting electrical works related to commissioning, the crane system should be rendered voltage-free. For this purpose, mains switch or insulating switch should be turned off and secured against unauthorized operation. More than one padlock can be put on these switches at the same time. Everyone working in the crane can secure the crane against unauthorized operation with his own lock.

Commissioning should cover following principles:

1- While commissioning the crane, make sure that crane's voltage and mains working voltage are the same. Make connections according to the electrical projects of the crane, which can be found in the control panel.

2- Panel is 3 phase 1 neutral feeding or 3 phase 1 earth feeding ( depending on the ordered configuration ). The system is earthed within the panel. Earthing system will be activated with the earthing of the chassis on which crane operates. If the user company doesn't establish earthing system, the responsibility will be taken by the owner.

3- The first thing to be done when electricity is supplied to the crane is the inspection of control button. When up button is pressed, it should be checked for lifting action. Otherwise, phase array should be checked/corrected; if not, up-down limit protection system will not work and this will cause mechanically and electrically dangerous results.

4- If the system is not working when electricity is supplied to the crane for the first time, the phase protection and sequencing relay in the system will prevent the crane from working. It will be necessary to correct the phase array.

5- The feeding mains voltage, maximum 3% voltage drop will be permitted while the crane is being operated, Otherwise, it is dangerous to operate the electric wire rope hoist or crane.

## Crane Acceptance Tests

If Crane Acceptance Tests are not performed by the qualified personnel of the crane manufacturer but by third parties assigned by the crane system owner, the owner of the crane system is solely responsible for the selection of suitable personnel and test preparation/application.

Qualifications of the test personnel:

- Comprehensive knowledge about the crane electricity system and machine structure
- Sufficient experience about crane operation, assembly, maintenance and repair
- Technical rules about acceptance, regulations and safety instructions if needed, for instance extensive information about the legislation pertaining to the prevention of accidents. The requirements of relevant national regulations should be taken into account.

## Acceptance Test Before the First Commissioning

The acceptance test before the first commissioning should be conducted in all cranes that are ready to be operated under normal operation conditions by the test personnel.
It should be ensured that no one is under excessive danger during testing.
Personnel like crane operator should have the necessary qualifications for these operations during testing and should be made available by the owner of the crane system.

People participating in the test should be able to communicate perfectly. If direct communication between people rigging the load and people operating the crane is not possible, suitable equipment should be made ready by the crane system owner.
Acceptance test should especially cover the following:

- Checking the Inspection Handbook taking into account the Contents section
- Checking whether assembled system is in accordance with the technical data
- Checking whether CE mark and declaration of conformity are in place (applies only for EU region)
- Checking whether current safety regulations, e.g. the legislation pertaining to the prevention of accidents, are followed or not
- Checking all safety equipment and safety measures are taken and also checking all brakes in terms of efficiency
- Checking all required safety distances
- Dynamic testing with loading the crane with 1,1 times nominal rated load.
    - Testing should be performed for all inappropriate load positions at the rated speed. Inappropriate load positions are as follows:
        - In rotating cranes: hoist position at the greatest extension distance
        - In other cranes such as gantry, overhead or jib cranes: At the middle of crane aperture and hoist approach dimensions.
- If the controlling circuit of the crane allows more than one movement at the same time (for instance lifting and long-travel), the test should be performed in combination with these movements.
- Static test loading (without applying any shocks to the crane). This should also be performed in the most inappropriate load positions.
    - In cranes where all movements are ensured with manpower:
        - With 1.25 times rated load of the crane;
    - With 1.25 times rated load of the crane in all other cranes. Load should be lifted slowly in such a way to be left hung closest to the floor. There shouldn't be permanent deformations and visible damages on the crane.
- Test results should be documented on the inspection handbook.
- Test personnel should make decision about commissioning.
- If there is any deficiency during testing, crane system owner is responsible for eliminating them; test personnel should decide if a test is required or not after the deficiencies have been
- eliminated.
- Dynamic test loading should be done with 1.1 times the rate load of the crane. Each mechanism of the crane should be tested several times. Dynamic test loading contains rising and lowering of cargo, as well as checking the actions of all other mechanisms after combined working actions as specified in the crane manual instruction.

The acceptance test as per this section doesn't exempt the owner from tests that are required

additionally as per national regulations.

- If national test regulations foresee test loads higher than those described in this section for dynamic and static test, the seller of the crane should be consulted before applying this article.

## Acceptance Test After Important Changes

An acceptance test should be done by a test personnel before re-commissioning after important changes.
Examples of important changes:

- Changing the current type
- Changing the hoists
- Repairing or replacing the drive motors
- Increasing the carrying capacity of a crane system
- Extending the rail of a crane
- Conveying the cranes in fixed crane systems to other crane rails
- Welding works in carrying structure components
- Structural changes in carrying construction
- Repairs in carrying construction components. These include;
    - Crane rail carrier, crane rail support part, crane carrier, end truck carriage, service platform, etc.
- Changing the working conditions in terms of run time and crane system load spectrum.

## Periodical Inspections

System should be inspected by a test personnel every year but **at least once** according to requirement depending on the usage conditions (loading spectrum, operation frequency and ambient conditions).
A system with high run time and which is operated with full load occasionally should be inspected more frequently compared to, e.g., a crane that is used occasionally for assembly works and for which annual inspection is sufficient. Dusty or aggressive environments can also shorten the inspection time interval. For this reason, the testing times different that annual maximum inspection time should be determined together with the manufacturer by owner of the crane system taking into account usage conditions.
The results of the inspections should be documented in the crane inspection handbook.

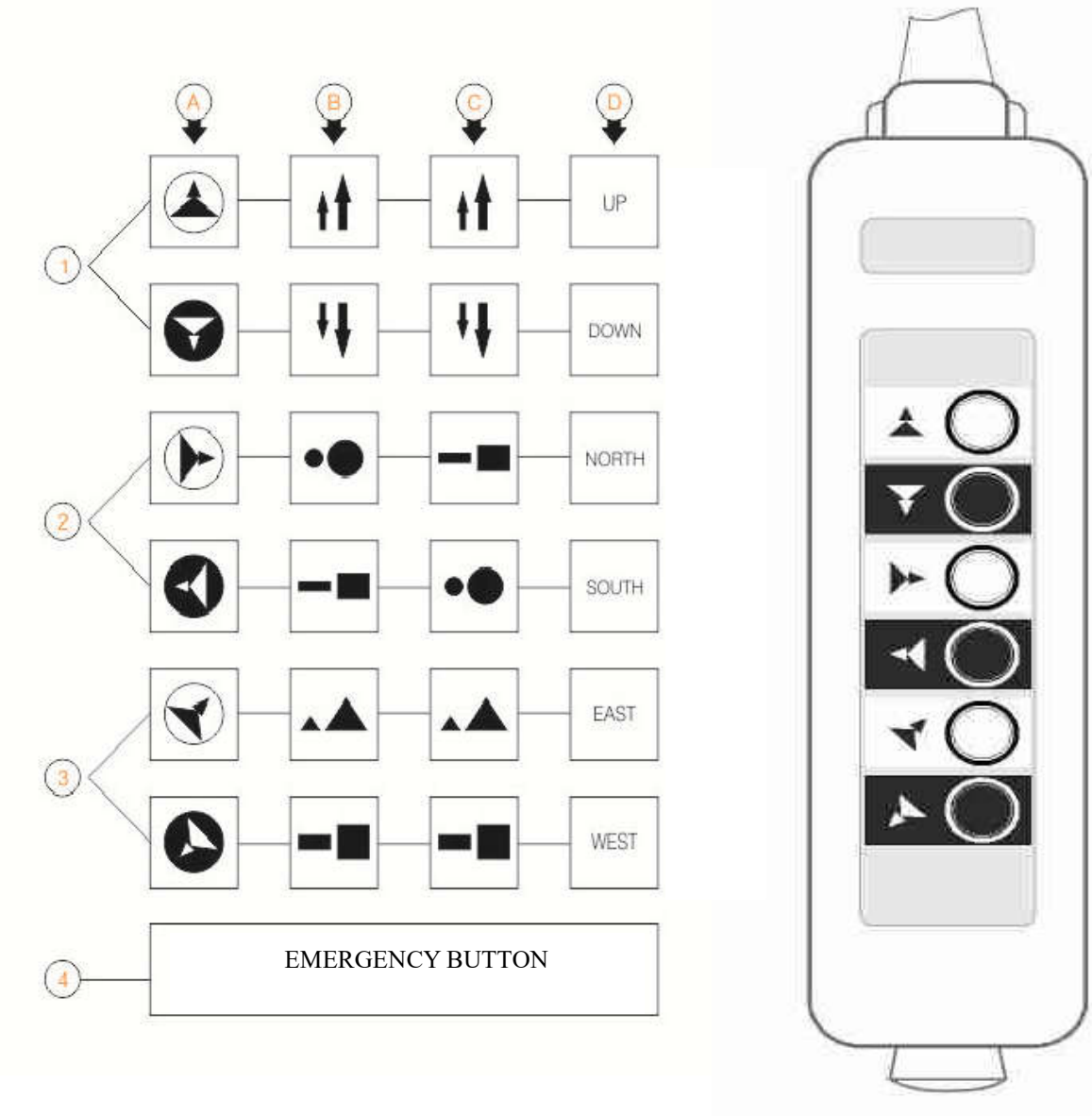
Periodical inspection should cover following:

- Checking whether the data in the inspection handbook is available on the system or not
- Checking the structural parts and equipment against damage, wear, corrosion and other modifications.
- Checking whether anything is deficient in safety equipment/switches and brakes and efficiency of them
- Checking the crane rail together with the supports and connections
- In electric wire rope hoists: determining the part that has been consumed from theoretical usage life.
- Additional inspection when deficiencies limiting safety occur and when they are eliminated.

## OPERATION

### Using Button Controls

All traveling operations of the crane are controlled by means of these controls. There are directing symbols on the controls. If the hoist has remote control (radio control) separate operating instructions for the remote controller are provided with the hoist.




A. Symbols comply with FEM and DIN standards
B. Symbols comply with SEN standard
C. Symbols comply with SFS standard
D. Symbols comply with ANSI standard

1. Up / Down push button
2. Right / Left push button (for Trolley) (North / South)
3. Forward / Back push button (for Bridge and Crane) (East / West)
4. Emergency Stop (released by turning, locked in some models)

- Release the emergency stop button after turning. (4) Use the key if it is locked.
- Choose the right position before using the buttons (1), (2), and (3).
- Choose the correct parking position for lifting.
- When all material handling with crane is done, press on the emergency stop button (4) button to free the crane drives from electrical current.

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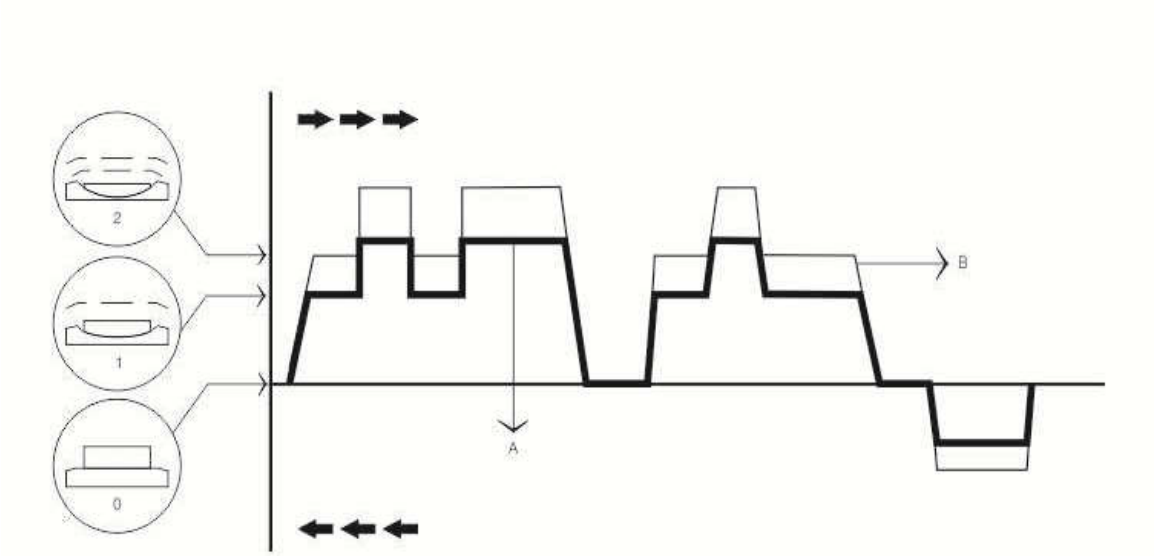
**Using Buttons**




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

Position of the pushbutton affects the speed as follows

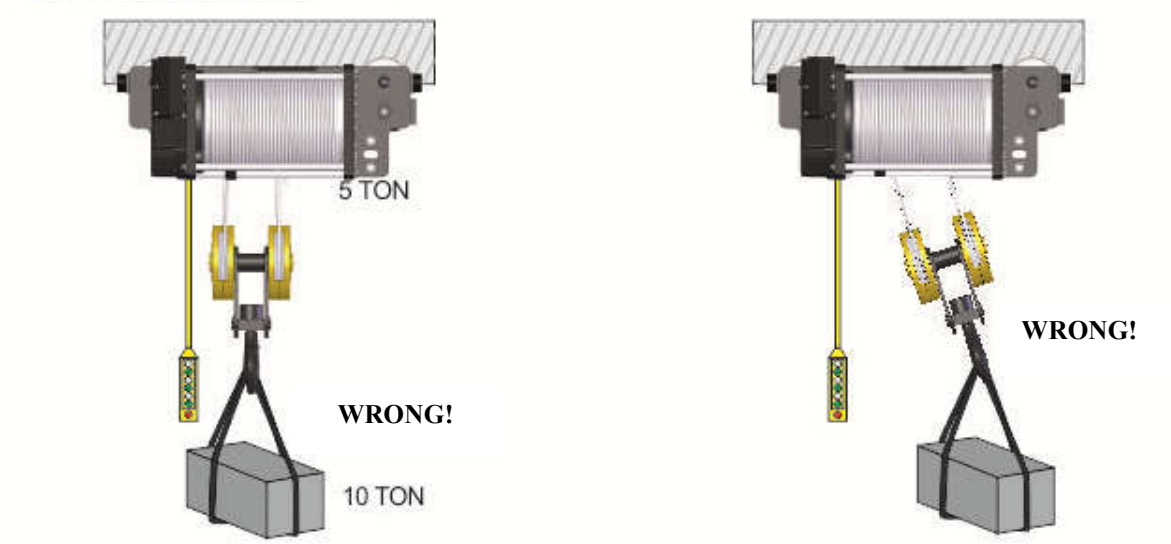
- Position 0: Zero position. Motion stops.
- Position 1: Slow Speed
- Position 2: High Speed

When the crane is started, an operator with a good technical knowledge accelerates slowly. If the direction of the crane is suitable, it passes on to high speed.

Do not position your crane from zero position to directly high speed.

## Lifting The Load

- Electric wire rope hoist should always be above the load before lifting.
- All of the load should be lifted vertically with no inclined lifting.
- Equipment should never be used in order to lift a load above its nominal capacity.

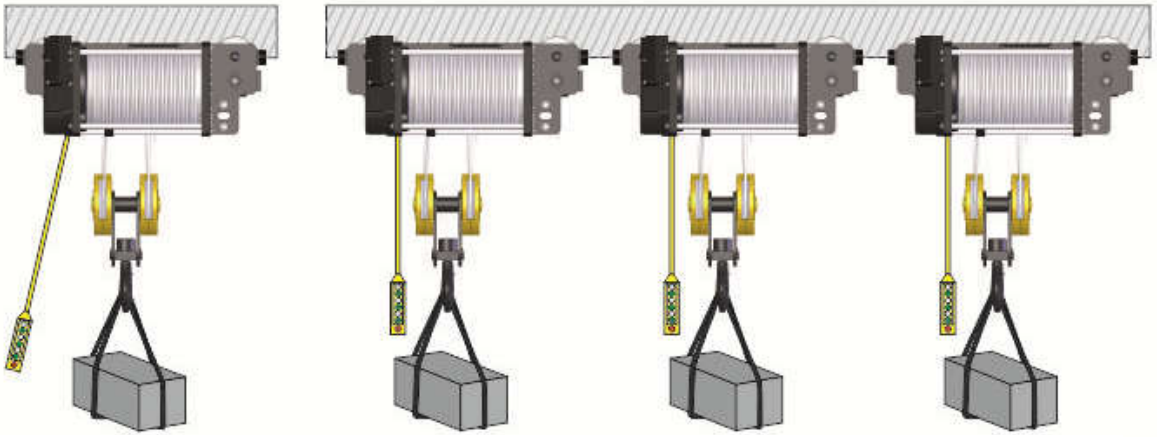



## Using The Sling

70% of accidents occur while working with the sling. Attach the sling to the suitable place safely. Use an appropriate sling.

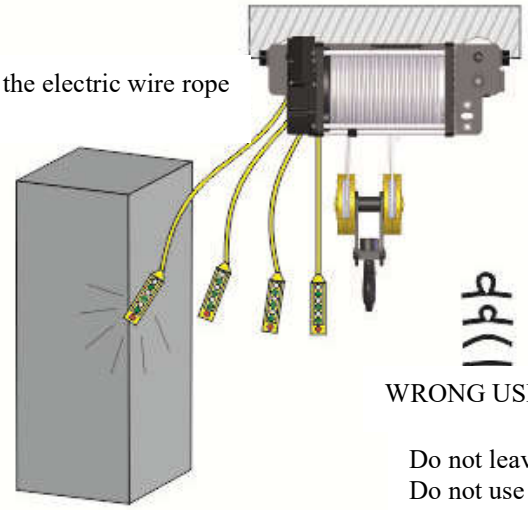
**Basic points for using sling**

- Check the weight and center of gravity of the load
- Choose the most suitable sling for the weight and shape of the load.



Do not lift when the sling is stretched. Stop and ensure suitable conditions for the lifting of load.

Do not stand below the electric wire rope hoist and load.



WRONG USE!

Do not leave the push button to swing freely.
Do not use entangled, smashed, bent ropes.
Replace them before operation.

## Environmental Inspection During Lifting

- Before starting to work with the electric wire rope hoist and during operation, the environment should be inspected.
- Do not pass the load over personnel.
- Electric wire rope hoist can not be used for the transportation or lifting of personel.
- Lifting and transportation should be done safely with minimum load.

## Wire Rope

**Points to be taken into account during the usage of rope**

Ropes should be used, assembled and maintained with extreme care just like other machinery components. The wire that comply with the working conditions should be chosen.

- Excessive loading should be refrained.
- Sudden loading shouldn't be done in cold air.
- Frozen ropes should never be used.
- Rope should be prevented from changing direction in sharp corners or edges.
- Sudden and impact loading of the rope should be refrained.
- Excessive bending should be refrained.
- Lubrication should be regular.
- Regional wears on the wire rope should always be inspected.

**Wire Rope Inspection**

In order to ensure operational safety of wire ropes, they should always be kept under control. The visible problems as a result of visual inspection and their effects on the lifespan of the wire rope are as follows:

- Broken wires
- Worn and eroded wires
- Reduction in rope diameter
- Rope elongation
- Corrosion
- Insufficient lubrication
- Wear at the connections on wire rope ends
- Smashing, flattening or jam in cords
- Deterioration of pitch and elongation in the cord
- Formation of bird cage
- Excessive worn sections
- Temperature damages, burnt and electric arc welding damages

**MAINTENANCE**

## Operating and Maintenance instructions of the crane

### 1- Operator

a. The crane should be used by the personnel who has electrical and mechanical background and who is trained and aware of safety precautions.
b. The duty of the crane operator is to ensure that maintenance and repair are done on time and the crane is ready for operation without any problem and accident.
c. In case of malfunction, electricity should be cut off from the main and other switches and precautions should be taken not to deliver electricity.
d. While working on the crane, no tools should be dropped and anything left over should be collected after the maintenance/repair.
e. Before movement, crane tracks should be checked. No person should stand under the load in any case.

### 2- Load Lifting and Lowering Measures

a. Loads shouldn't be lifted with unwind, bent, smashed, broken or fibrous ropes. Sling shouldn't be made of these ropes.
b. It should be ensured that new rope complies with the standard values of the previous rope.
c. During lifting, firstly slow and then fast lifting should be performed. During lowering process, firstly low speed and then high speed should be taken. Standard motors are inverter controlled and the utilization of low speed should be 1/6 to high speed.
d. Load should be lifted by bringing the lifting hook to exact center of gravity. It should be used for lifting loads always vertically and not used for horizontal or inclined loads.
e. Load shouldn't be lifted extremely high and it should be transported low, as soon as possible.
f. Load shouldn't be passed over the personnel and locations with desks. In the event that this is obligatory, safety measures should be taken.
g. Sharp and sudden movements should be avoided in the all movements of the crane while the hoisting operation takes place.
h. Load shouldn't be kept hanging for a long time and crane shouldn't be left unattended while there is a load attached to the hook.
i. Transportation of humans with the crane should not be allowed.

### 3- Measures During Travelling

a. While crane is moving in a certain direction, it shouldn't be moved in the reverse direction unless it stops.
b. While you can pass from low speed to high speed suddenly, you shouldn't pass from high speed to low speed suddenly. It is suitable to wait for the moving masses to slow down. The inverters will be helping the operator to avoid shocks to the system.
c. At the end of the task, electricity should be cut off or main switch or other switches should be turned off.

**4- Hook Block**

a. While on the floor, review the hook and connections of the crane. There shouldn't be any crack or break on the hook. Connections shafts and bearings should be positioned firmly, be lubricated and solid.
b. Rope roller shaft should be correct and lubricated. It shouldn't be shifted, bent, stuck, etc.
c. Ropes shouldn't be smashed or broken. Hook block connections should be safe.

**5- Rail and Connections**

a. Crane track and rails should be clean and they shouldn't be bent, smashed or cracked.
b. The aperture at the joints should be checked and bolts should be inspected.

**6- Wheels and Gears**

a. Wheels and gears on the rail should be reviewed and cracked or broken parts should be replaced as per their importance.
b. Center dimensions, wedge and gears should be checked and gears should be lubricated. Bolts and nuts should be tightened.

**7- Drums and Steel Ropes**

a. There shouldn't be any bending, smash or squeezing in the drums. Grooves should be lubricated.
b. Rope shouldn't overlap or shouldn't get out of the grooves.
c. Rope connection and connectors should be solid.
d. Previous lubricants and rust on the rope should be cleaned with diesel oil and dried and lubricated with grease.

**8- General Maintenance**

a. The lubricants around the crane should be wiped and dust should be removed by means of compressed air.
b. Grease should be pumped into grease cups, malfunctioned ones should be replaced, the old and dirty lubricants on the gearboxes should be replaced.
c. Deteriorated paints should be repaired, corrosion shouldn't be allowed.
d. The maintenances should be recorded in the maintenance table and maintenance instructions should be reviewed at least once a month.

**9- Maintenance Planning**

a. All electricity connections should be cut off and there should be no load on the electric wire rope hoist for the maintenance of your electric wire rope hoist.
b. You can perform maintenance of your electric wire rope hoist within very short intervals in long periods.
c. The maintenance of your electric wire rope hoist should be performed by an authorized person.

## Maintenance Checkpoints

| | MAINTENANCE CHECKPOINTS | INSPECTIONSDAILY | MONTHLY | QUARTERLY | HALF YEARLY | YEARLY | 24 MONTHS |
|---|---|---|---|---|---|---|---|
| DAILY | Check whether there is any obstacle in the work area. | X | | | | | |
| | Check vertical and horizontal movements of the crane. | X | | | | | |
| | Check whether limit switches functions correctly or not. | X | | | | | |
| | Check the hoisting, cross-travel and long travel brakes | X | | | | | |
| | Check for excessive or abnormal noise. | X | | | | | |
| | Check hook block and traverse rollers | X | | | | | |
| | Check whether rope has been wrapped on the drum correctly or not. | X | | | | | |
| | Ensure that rope guide works correctly | X | | | | | |
| | Check damage to the rope or whether its thin wires have become fibrous or not. | X | | | | | |
| GEARBOX | Check the lubricants and lubricant levels of gears and gearbox. Complete if needed. Use the appropriate lubricants that are stated on the gearboxes. ( See the lubrication chart ) | | | X | | | |
| | Lifting gearbox lubricant doesn't require change. | | | | | | |
| | Check whether gearbox lubricant seals leak or not. | | X | | | | |
| LIFTING GROUP | Lubrication of ring gear. ( See the lubrication chart ) | | X | | | | |
| | Lubrication of drum bearings. ( See the lubrication chart ) | | X | | | | |
| | Axial load guide maintenance | | X | | | | |
| | Lubricating the rope guide. ( See the lubrication chart ) | | X | | | | |

| | MAINTENANCE CHECKPOINTS | INSPECTIONSDAILY | MONTHLY | QUARTERLY | HALF YEARLY | YEARLY | 24 MONTHS |
|---|---|---|---|---|---|---|---|
| | Check whether rail, working profiles have bent or cracked. | | | X | | | |
| | Check any loosening of rails, under rail plates and bolts. | | | X | | | |
| | Check the loosening and deformation of assembly bolts and stoppers. | | | X | | | |
| | Check the corrosion of rails. | | X | | | | |
| | Check the joints of rails. | | | X | | | |
| | Check the loosening and bolts of carrier main head and girders. | | X | | | | |
| | Check the wear and deformation of rails on the girders | | | X | | | |
| | Check the trolley stoppers | | | X | | | |
| | Check the lubricants of travel gearbox.(See the lubrication chart ) | | | X | | | |
| | Check the wear and deformation of wheels | | | X | | | |
| | Check the connection bolts of trolley wheel heads. | | X | | | | |
| | Check the loosening of motors and gearboxes assembly bolts. | | X | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| GIRDERS AND TRAVELLING | Check the plates of trolley wheel shafts and any loosening. | | | X | | | |

| | MAINTENANCE CHECKPOINTS | DAILY INSPECTIONS | MONTHLY | QUARTERLY | HALF YEARLY | YEARLY | 24 MONTHS |
|---|---|---|---|---|---|---|---|
| BRAKE | Check brake functions and adjustments (whether they miss loads or not) | | | X | | | |
| | Check any loosening of brake connection bolts. | | | X | | | |
| | Check whether it brakes on time. | X | | | | | |
| | Check the wear of brake linings and pressure discs. | | | X | | | |
| | Check brake pressure spring. | | | | X | | |
| ROPE | Check the break, wear, entangle or fibrous state of steel ropes. | X | | | | | |
| | Check the deformation and rust of steel ropes. | | | X | | | |
| | Check connection points and connection components of steel ropes. | X | | | | | |
| | Check the lubricant layer on the rope. Lubricate if necessary. | | | X | | | |
| | Check whether cross section of rope has reduced or not. | | | | X | | |
| END TRUCK CARRIAGES | Check the assembly bolts of trolleys. | | | X | | | |
| | Check and lubricate trolley wheels worn parts and gears. | | | X | | | |
| | Check the ball bearing of trolley wheels. | | | X | | | |
| | Check that trolley wheel rail is not oily. | | | X | | | |

| | MAINTENANCE CHECKPOINTS | DAILY INSPECTIONS | MONTHLY | QUARTERLY | HALF YEARLY | YEARLY | 24 MONTHS |
|---|---|---|---|---|---|---|---|
| HOOK BLOCK | Check the deformation of hook cover and rollers. | | | X | | | |
| | Check the ball bearing of rollers of hook block | | X | | | | |
| | Check the hook safety catch. | X | | | | | |
| | Check the loosening and wear of hook covers, wedges and plates. | X | | | | | |
| | Check the wear, cracks and deformation of hook mouth. | X | | | | | |

| | MAINTENANCE CHECKPOINTS | DAILY INSPECTIONS | MONTHLY | QUARTERLY | HALF YEARLY | YEARLY | 24 MONTHS |
|---|---|---|---|---|---|---|---|
| ELECTRICITY SYSTEM | Check the abnormal situations seen on the control button. | X | | | | | |
| | Check the connection points of control cables. | X | | | | | |
| | Check the switch connection points and cables. | | | X | | | |
| | Check the loosening of tightening screws of contactor and control cables. | | | X | | | |
| | Check the damages in the electricity panel. | | | X | | | |
| | Check the connection points and damages of contactors. | | | X | | | |
| | Check the function of contactors. | X | | | | | |
| | Check the lifting switch and its function. | X | | | | | |
| | Check the connection points and bolts of switches. | | | X | | | |
| | Check the energy intake systems and cables. | X | | | | | |
| | Check the current intake and cable trolleys. | X | | | | | |
| | Check any deformation of energy intake systems. | | X | | | | |
| | Check the position adjustments of limit switches. | X | | | | | |
| | Check whether overload switch works or not. | X | | | | | |
| | Check the connection points and damages of inverters. | | | X | | | |
| | Check the function of inverters. | X | | | | | |

The charts are prepared in accordance with 1Am or DIN120.
These intervals should be shortened in higher duty class electric wire rope hoists.
This maintenance time that is necessary to carry out, is recommended by CMAK.

## Causes of Malfunction – Trouble Shooting Tables

| MALFUNCTION | POSSIBLE CAUSE | TROUBLE SHOOTING | NOTE |
|---|---|---|---|
| **CRANE IS NOT WORKING** | No mains voltage | Check the current collector<br>Check Emergency – Stop button and contactor K1 | |
| | Phase/Voltage Safety limit relay of the electric wire rope hoist/crane has been activated | Check the phase position<br>Check the function of emergency limit switch | |
| | No Control Voltage | Check the control fuse in the control transformer | |
| **WHEN A BUTTON ON PUSHBUTTON PENDANT IS PRESSED, MOTOR DOESN'T ROTATE** | No mains voltage<br>Electrical connection doesn't conform to rules | Check the voltage<br>Connect all 3 phases correctly | |
| | Fuse is faulty<br>Plug socket connections, cabling and push buttons are not attached correctly. | Replace the fuses<br>Fix the plug socket connection component and secure with safety catch | Take into account wiring plan |
| | Contact fault at push button pendant.<br>Broken cable cores at feeding cable or button box or travelling group | Check against cable connection sections for interruptions. Replace the control cable if needed | Warning!<br>All works should be carried out in voltage-free environments. |

| MALFUNCTION | POSSIBLE CAUSE | TROUBLE SHOOTING | NOTE |
|---|---|---|---|
| **MOTOR DOESN'T ROTATE HOWEVER IT PURRS WHEN A BUTTON ON PUSHBUTTON PENDANT IS PRESSED.** | Faulty cabling or broken fuse | Check the cabling and check for the fuses. | Warrning! The stator of the motor might get damaged. |
| | Contactor is faulty | Replace the contactor | Warning! All works should be conducted in voltage-free state. |
| **MOTOR ROTATES VERY DIFFICULTLY** | Brake doesn't activate and the motor works against closed brake | Check for brake faults | Refer to the wiring diagram. |
| | Crane is working over the tolerated values | Check the wheel grooves and rails. | |
| **TRAVELLING IS POSSIBLE ONLY ON ONE DIRECTION** | Switchgear on the pushbutton is faulty | Check or replace the switchgear component against malfunction | |
| | Broken cable cores | Check the control cable | |
| | Contactor is faulty | Replace the contactor | |
| | Crane rail has too much inclination | Correct the position of crane rail | |
| | Travel limit switch (if any) has been activated | Check the limit switch | |

| MALFUNCTION | POSSIBLE CAUSE | TROUBLE SHOOTING | NOTE |
|---|---|---|---|
| **BRAKE DOESN'T ACTIVATE** | No tension in brake coil. No alternative current in redresser entry. | Check and repair connections. Check the motor. | Warning! Unplug the cables before starting to work |
| | Redresser is not connected right or faulty | Check the correct current voltage in brake coil (approx. 90 V DC); connect the redresser correctly or replace | Follow wiring diagram |
| | Brake coil doesn't allow any electricity transition or is faulty | Replace the brake coil | Follow operation instructions |
| **BRAKE DOES NOT STOP THE CRANE or THE MOVEMENT CONTINUES ABIT AFTER BRAKE CLOSES** | Maximum air space has been reached (wear limit has been reached) | Adjust the brake | Follow operation instructions |
| | Inclination of crane rail is too much | Correct the position of crane rails | |
| **ELECTRIC WIRE ROPE HOIST DOESN'T LIFT THE LOAD** | Overload safety has been activated | Check or correct the adjustment. Bring the load to the permitted carrying load weight | |
| **HOOK BLOCK IN 2/1 FALLS ROTATES WHILE LOWERING THE LOAD** | There is an extension bending in the rope | Eliminate extension bending Follow steel rope assembly instructions and replace the wire rope. | |
| **MOTOR MAKES CLICKING NOISE** | Inverter Parameters are wrong | See inverter parameters and correct them | |
| **MOTOR MAKES ABNORMAL NOISE AND GET OVERHEATED IN SHORT PERIOD OF TIME** | Motor connections are loose and arching | Check Motor terminal box Check relays from electrical cabinet for loose connections | |
| | Feeding Voltage is low | Check and fix the feeding voltage when the hoisting operates with full load | |

## LUBRICATION / ADJUSTMENT / REPLACEMENT

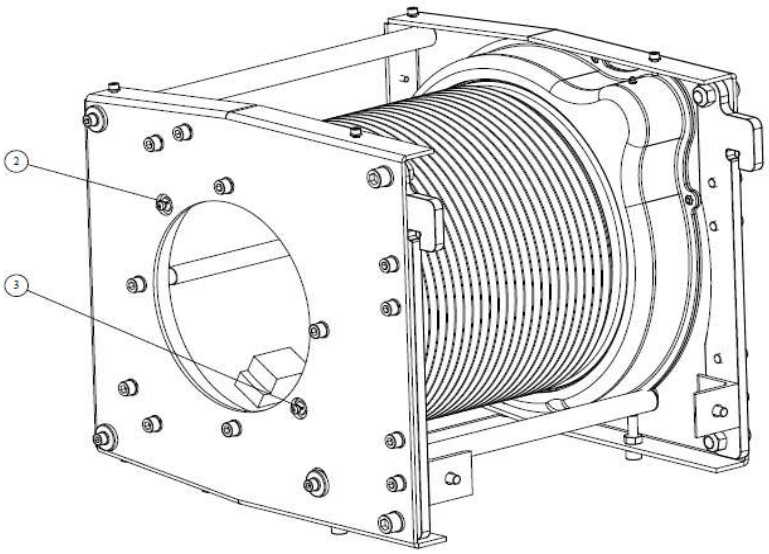
### 1. Lubricants

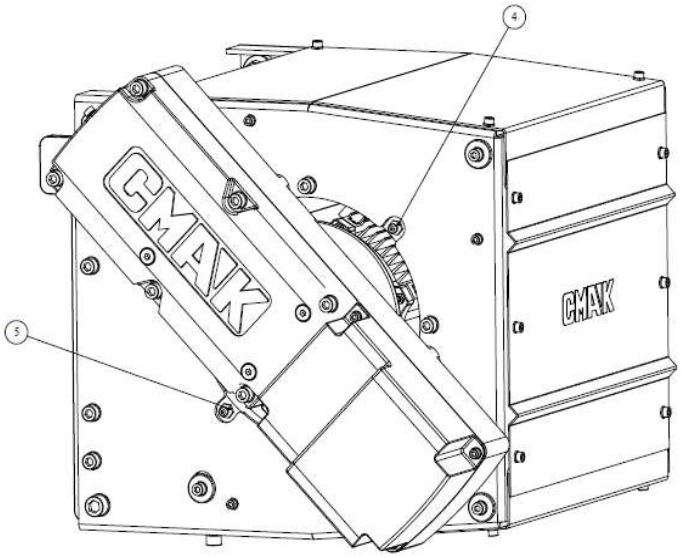
A low-grade lubricant can damage the gears or bearings. Use only the original lubricants recommended by CMAK.

| Usage | Brand / Model |
|---|---|
| **Hoisting Gears (Synthetic oil)** | **TOTAL** Carter SH 320 |
| **Trolley & Long-Travel Gearbox (Mineral Oil)** | **SHELL** Omala Oel 220<br>**MOBIL** Mobilgear 630<br>**MOBIL** Energol GR-XP 220 |
| **Single Girder Hoist Trolley pinion<br>Rope Guide** | **AXEL** Yellow grease – Synth LI-EP 222 |
| **Hoisting Bearings and Drum Outer Gear** | **VISCOL** Molysfer AW EP 2 |
| **Corrosion Prevention ( for transportation)<br>Wheels<br>Drums<br>Wire Rope** | **CORFINOIL** Prolit – 500 |

## a. Hoisting bearings

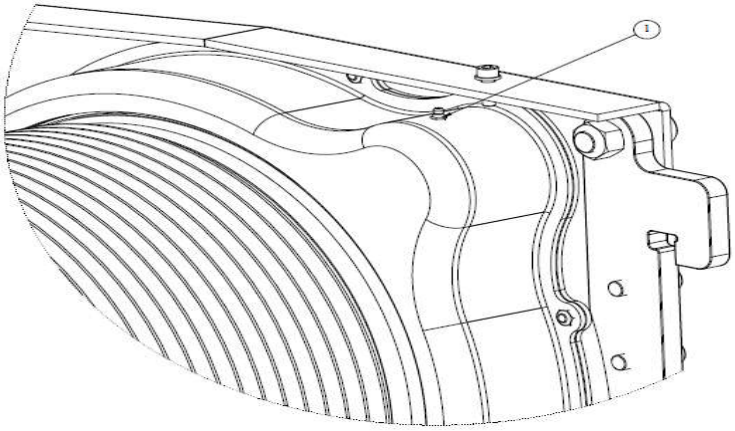
Refer to the lubricants chart, and lubricate from the location 2-3 & 4-5 with grease gun.



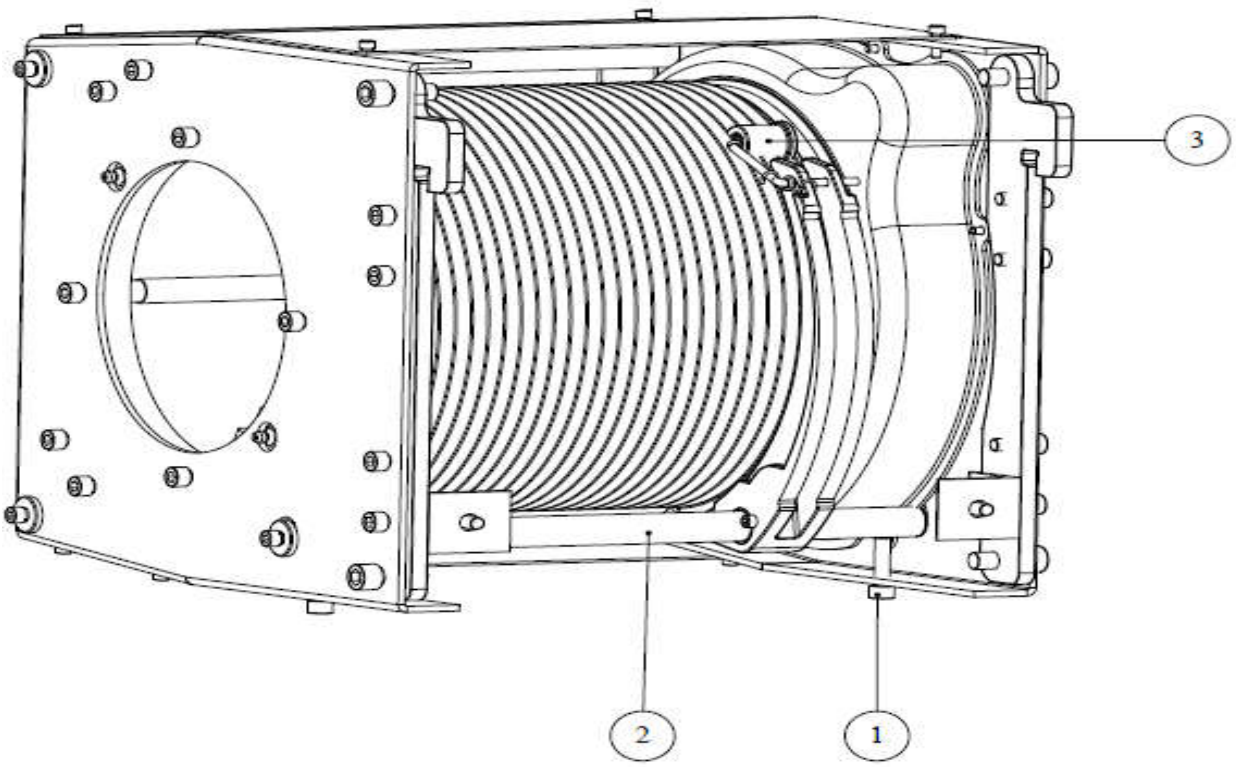




## b. Hoisting Drum Gear

Refer to the lubricants chart, and lubricate from the location 1 with grease gun.



## 2. Rope Guide




### Disassembly

1. Remove cap screws and lock washers .(No:1)
2. Remove drum frame rod. (No:2)
3. Remove the bolts and clamp springs. The rope guide body can now be pulled off the drum. (No:3)

### Assembly

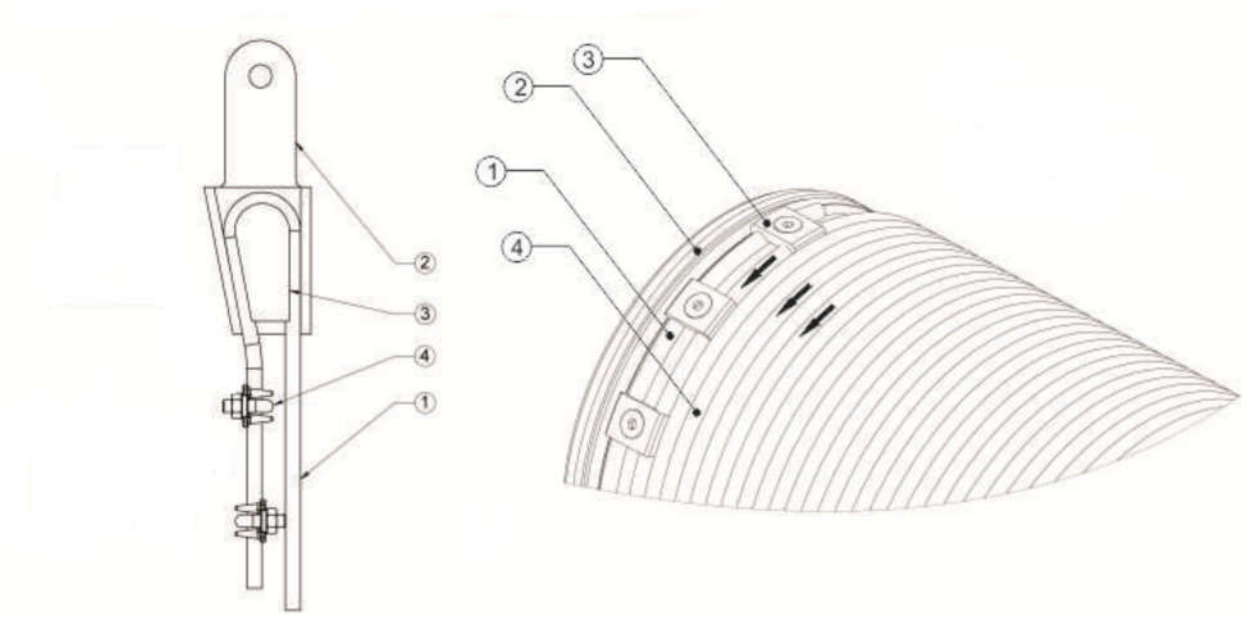
1. Tighten the bolts and clamp springs and attach the rope guide body on the drum. (No:3)
2. Assemble drum frame rod. (No:2)
3. Tighten cap screw and lock washers. (No:1)

### Lubrication

Rope guide must be lubricated with lubricant ( Refer to lubricants chart) from parts where the rope guide runs over the shaft and rope guide touching the drum.

## 3. Wire Rope

1. Rope
2. Drum
3. Rope Connector
4. Rotation Direction




1- Rope
2- Rope Wedge Slot
3- Wedge
4- Rope Connector

**Disassembly**

1. Lower the hook down to the floor.
2. Disassemble the rope guide.
3. Disassemble the wire rope connector in the drum and remove the rope fixing wedge.

**Assembly**

1. Spread the new rope in such a way not to be bent or folded under the electric wire rope hoist.
2. Wrap one of the ends of the rope on the drum twice.
3. Tighten the connectors in such a way to assign two ropes to each connector.
4. Start the motor and assemble the rope guide , after the wire rope is winded 7-8 rounds.
5. Prepare the rope equipment and fix the tip of it in such a way to correspond to the wedge slot.
6. Lubricate the rope and wind it by means of the motor.
7. Adjust the hook up-down limit switch.

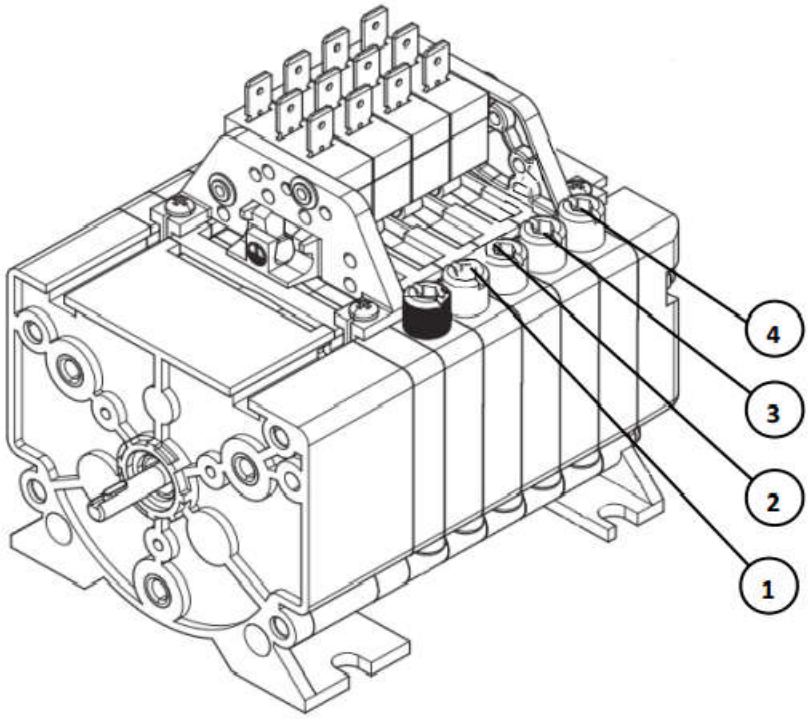
Use the new rope firstly with light load and then gradually with heavy loads so that rope fits on the drum with normal tension. The rope is steel as per 6*36 Standard.

**Lubrication**

Ropes should be lubricated with recommended lubricants (Refer to lubrication chart) and within a certain program. A good lubricant should have following features:

- Should be corrosion-resistant
- Should retain water
- Should be fluid
- Should be neutral chemically
- Shouldn’t lose its features under high pressure

## 4. Rotary Limit Switch

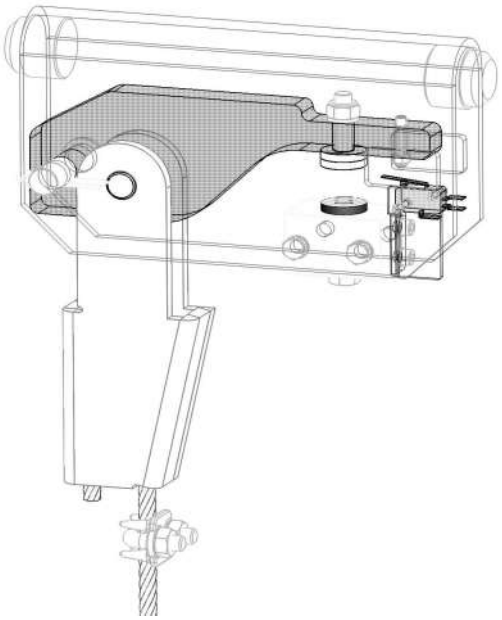



Adjust the operating point of each single cam by turning its screw;

1. Bottom Slow Down (which is right behind the black cam)
2. Top Slow Down
3. Bottom stop
4. Top stop

- Use a battery powered screwdriver to set the limits.

## 5. Overload Device



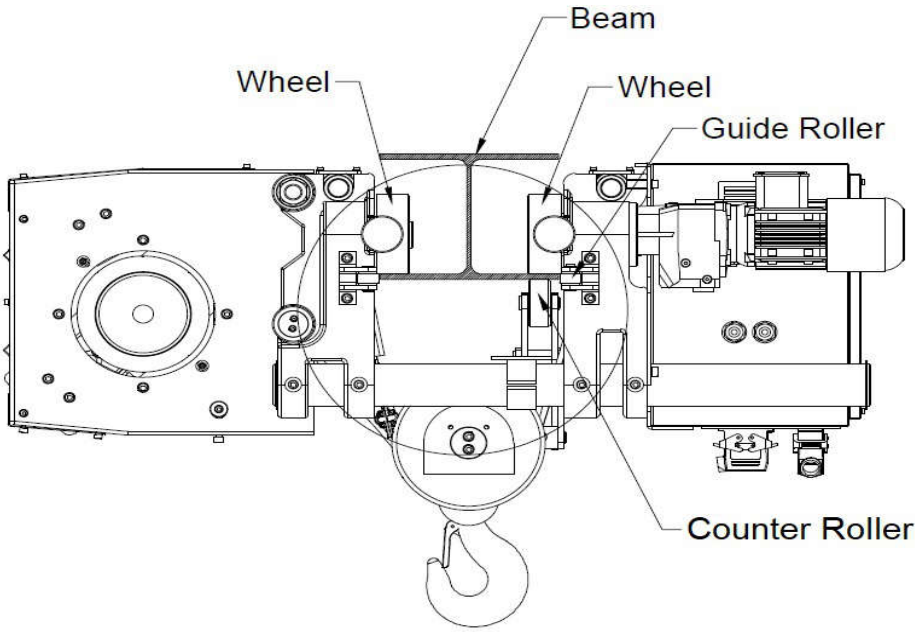
Adjusting the electro-mechanical overload device:

1. Reach the traverse where the overload device is located at.

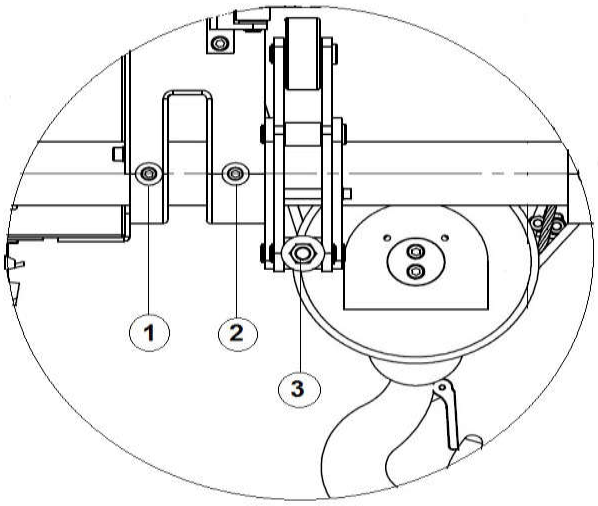
2. Use an allen wrench to adjust DIN916 type M6 socket set screw. Note that this is actually widening or closing the gap between the micro switch and bolt, thus widening the gap means the threshold torque is increased thus the overload limit is increased.

3. While doing this make sure to have a test load that the overload should be set at. Repeat step 2 until, the hoist does not lift the overload but the SWL.

## 6. Single Girder Low-Headroom Trolley Adjustments

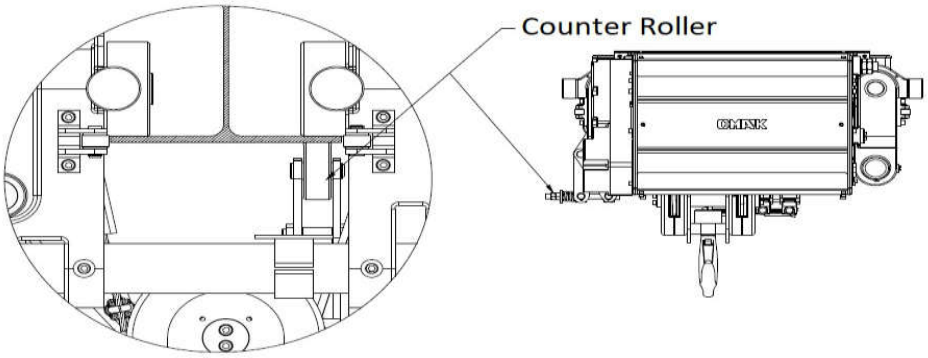



### a) Flange width Adjustment




- Loosen the set screws via an allen wrench which exist on control panel side. (No: 1-2)
- Loosen the spring loader nuts on counter roller. (No: 3)
- Adjust the trolley to the required flange width via using the rods.
- Tighten the set screws and the spring loader nuts. (No: 1-2-3)

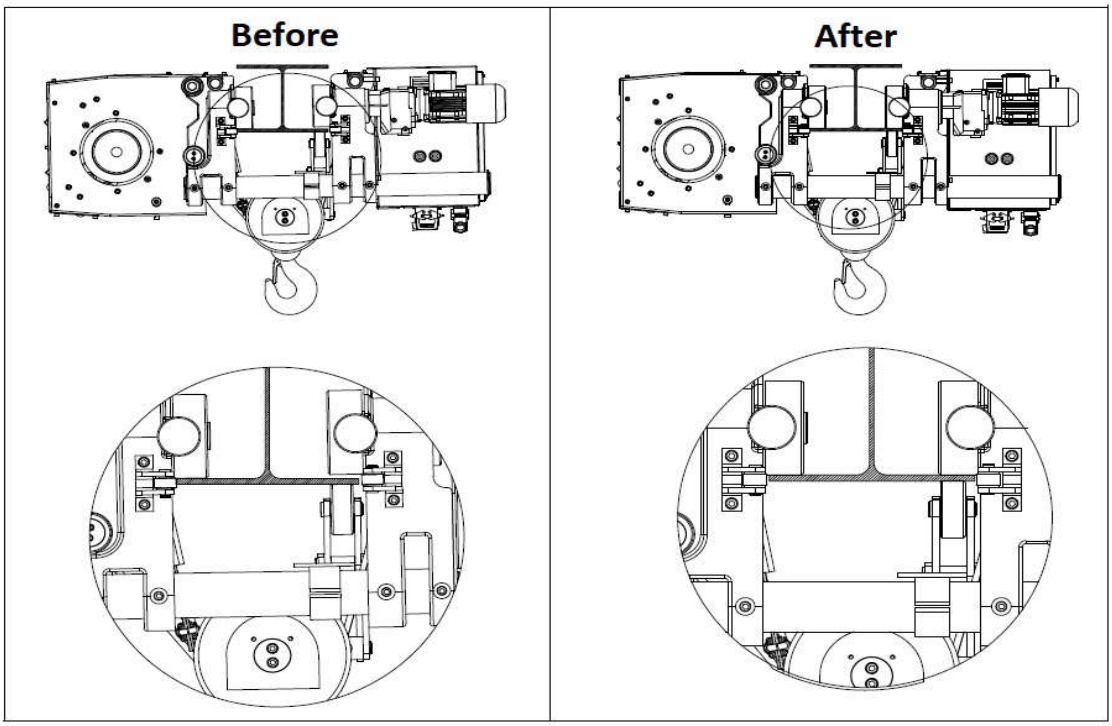
**b) Counter Roller Adjustment**



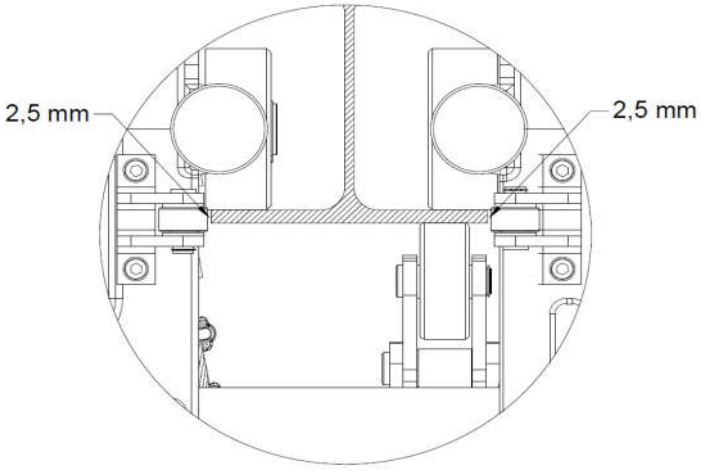

- Adjust the counter roller via tightening its adjustment nuts until the wheels of the trolley on both side are fully contact to the upper side of the bottom flange and also, the trolley is in balance when there is no load on the hook.
- Be sure that the counter roller contacts the under side of bottom of flange properly; not very tight or loose. If it contacts very tightly, it will cause abnormal noises and also, damage on the counter roller.

***Caution**

- To provide precise contact of the trolley wheels, do not paint the upper part of the bottom flange where the trolley wheels run.
- Consider the slight deviation on the girders while adjusting the counter roller as it might cause the counter roller contacts very tightly in the deviated parts of the girder.



**c) Side Roller Adjustment**




- Adjust the side rollers when the wheels of the trolley on both side are fully contact to the bottom flange and also, the trolley is in balance when there is no load on the hook.

- Be sure that the distance between the side roller and flange is 2.5mm on each side ( 2.5mm + Flange width + 2.5mm ). If they contact tightly, it will cause abnormal noises and damage on the side rollers.

***Caution**

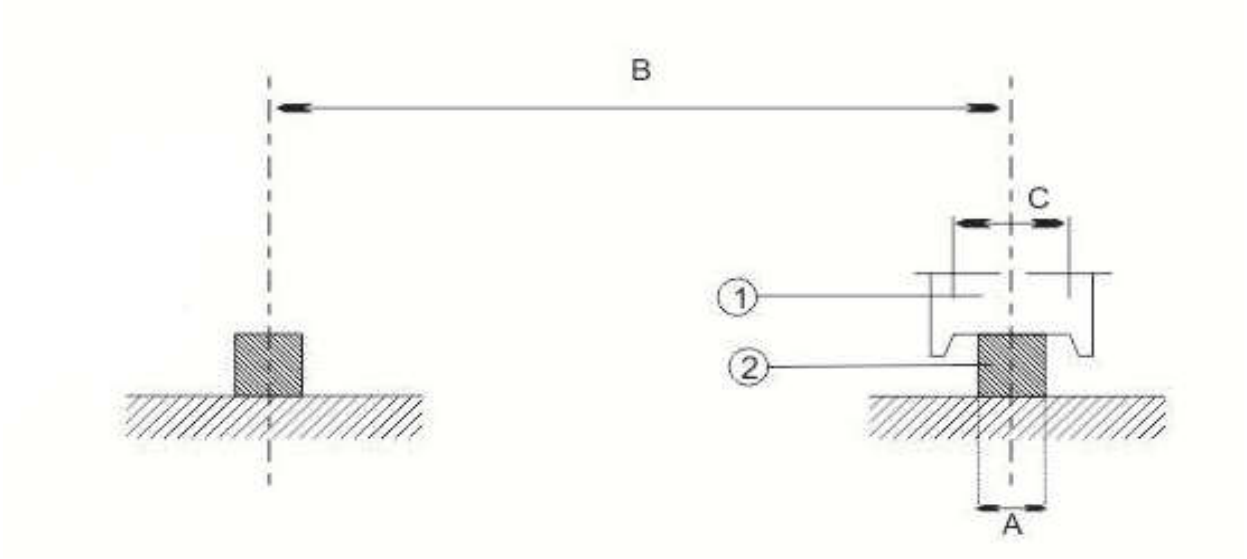
- To provide precise operation of the side rollers, do not paint the side part of the bottom flange where the side rollers run.

- To provide precise contact of the trolley wheels, do not paint the upper part of the bottom flange where the trolley wheels run.

- All surface of the side rollers do not need to contact flange. Even if a part of the side roller contacts the flange, that will be enough for the operation.

- Consider the slight deviation on the girders while adjusting the side rollers as it might cause the side rollers contact tightly in the deviated parts of the girder.

## 7. Double Girder Trolley and Rail Dimension Cross-check




1 - Trolley Wheel

2 - Rail

- Check from its own axis and rail axis centers (B).
- Width of rail surface where wheel travels (A) should be 15mm smaller than traveling surface of the wheel (C).
- Lift the hoist trolley onto the track.
- Check the proper installation and position of runway end stops.
- Check that the hoist buffers can bump into the runway end stops or buffers of other trolley.

## 8. Cross-Travel and Long-Travel Drives (CD/CKD Series)

This brief has been compiled by the manufacturer to provide information, maintenance,repair, disassembly and dismantling of the gear units.
Life cycle of gear unit / geared motors is ten years and guarantee period is two years.


1. Breather valve with transport fixture
2. Remove the transport fixture
3. Breather valve activated

| NO | CRITERIA | MANUFACTURER | AUTHORIZED SERVICE | CUSTOMER |
|---|---|---|---|---|
| 1 | Disassembly of geared unit | X | X | - |
| 1.1 | Case changing | X | X | - |
| 1.2 | Gear changing | X | X | - |
| 1.3 | Solid/Shaft changing | X | X | - |
| 1.4 | Changing of all consumable material except sealing materials | X | X | - |
| 2 | Oil cup changing | X | X | X |
| 3 | Seal changing | X | X | X |
| 4 | Oil changing | X | X | X |
| 5 | Assembly of motor to IEC adapter type | X | X | X |
| 6 | Assembly of motor to PAM type | X | X | X |
| 7 | Assembly of geared unit with W cylinder type | X | X | X |
| 8 | Disassembly of motor from IEC/PAM type | X | X | X |

### Prerequisites of assembly

The entries on the nameplate of the gearmotor match the voltage supply system. The drive has not been damaged during transport or storage. Make certain that the following requirements have been met: Ambient temperature according to the table of lubricants in Sec. Lubricants. The drives are not allowed to be installed under the following ambient conditions:

- Potantially explosive atmosphere, oils, acids, gases, vapors, radiated interference.
- In direct contact with loose food products

Gear units / gearmotor are designed according to ambient condition at special operation. You must throughly clean anti corrosion agents, contamination and the like off output shafts and flange surfaces. Use a commercially available solvent. Do not let the solvent come into contact with the sealing lips of the oil seals-danger of damage to the material! If the ambient conditions are aggressive, protect the oil seals on the output end aganist wear.
Make use of tapped hole (DIN 332) to suit fastening to the shaft end. The gear unit or gearmotor is only allowed to be installed in the specified mounting position. The foundation (base) should be of adequate size and vibration-proof.
The support structure must have the following features: Flat; vibration damping; torsionally rigid. Ensure that the structure to which the gear unit is to be mounted is sufficienty robust and rigid to support its weight and operating stresses.Check that time machine on which the gear unit is to be

installed is switched off and cannot be accidentally switched on again. Fit suitable guards to protect against the external moving parts of the gear unit.

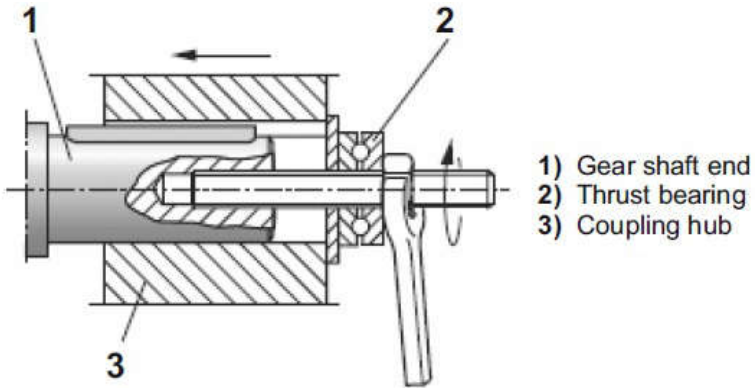
If the breather valve is not activated, you must remove the transport fixture from the breather valve before starting up the gear unit, install gear unit or geared motor rigid and braceless. Ensure sufficient ventilation, avoid shocks on shafts (bearing damage!) preferably use flexible coupling between output shaft and driven machine. Fit output elements to shafts end or secure feather key before starting the motor use torque arm with rubber buffer on shaft mounting gearboxes.

**Painting the gear unit:** If you paint over all or part of the drive, please take care to mask the mask the breather valve and oil seals carefully. Remove the masking tape once you have completed the painting work

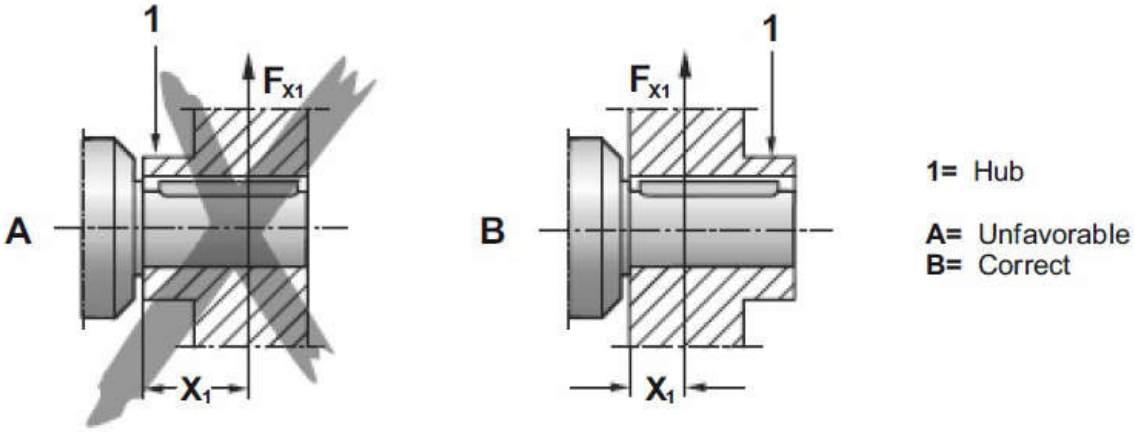
## INSTALLATION

### Installing input elements

Use the following illustration to assemble ouput shaft units




To avoid impermissibly high overhung loads: Install gears or sprockets as shown in Fig.B.
Only use a mounting device for installing input and output elements. Use the center bore and the thread on the shaft end for positioning purposes.

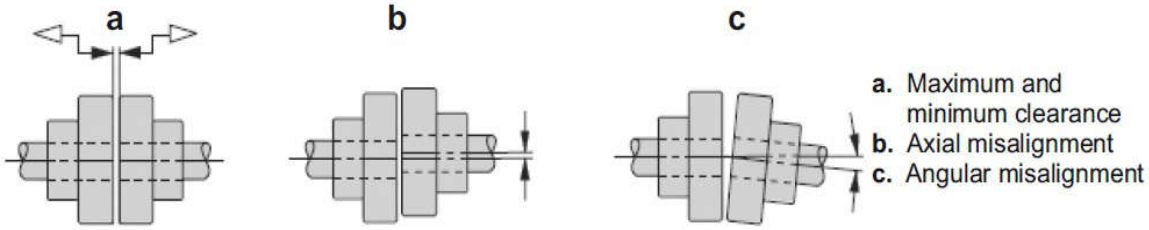


Never strike belt pulleys, couplings, pinions, etc. with a hammer when pulling them onto the shaft end. This could result in damage to bearings, the housing and the shaft. In the case of belt pulleys, make sure the belt is tensioned correctly in accordance with the manufacturer's instructions.

Power transmission elements should be balanced after fitting and must not give rise to any impermissible radial or axial forces. Mounting is easier if you first apply lubricant to the output element or heat it up briefly (to 80...100°C).

**Mounting of couplings**

Couplings must be mounted and balanced according to the information provided by the coupling manufacturer:



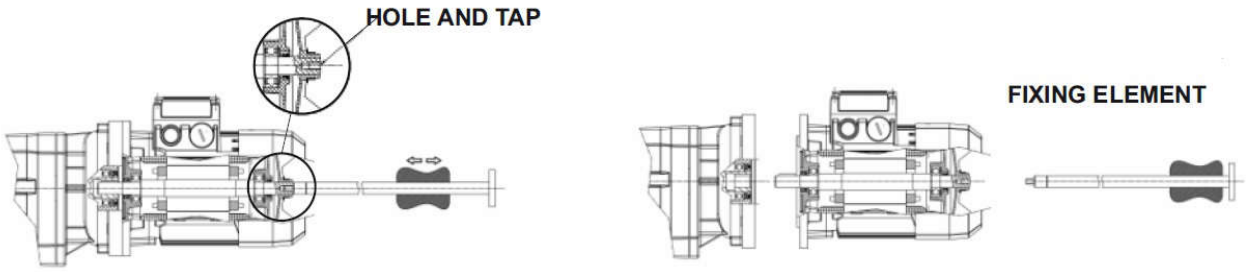

Clearance and misalignment for clutch mounting.

**Assembling of Electrical Motors to IEC Adapter**

1. Clean the motor shaft and flange surfaces of the motor and the adapter. Ensure that, taking care about undamaged to motor shaft while metal coupling is mounted.
2. Heat the coupling half to approx 80-100°C, push the coupling half onto the motor shaft. Up to the stop on the collar of the motor shaft.
3. Tight screw which is used for fixed on metal coupling (half of coupling).
4. Use a suitable sealing compound seal the contact surfaces between the adapter and the motor.
5. Mount the motor on the adapter. When doing this, make sure the coupling dogs of the adapter shaft engage in the plastic spider.

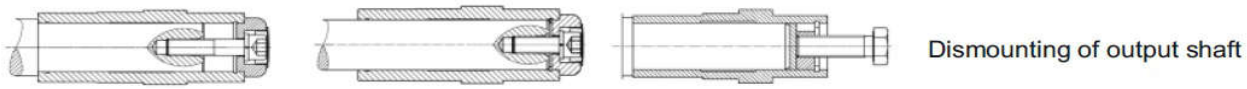
**Taking apart of the PAM, IEC Standard Flanged Motor**

If, during operation, the coupling area of the motor and gear unit has not rusted significantly, it should be possible to remove the motor without applying excessive force.
If, on the other hand, it proves difficult to remove the motor, do not use screwdrivers or levers to apply force as this can damage the flanges and coupling surfaces, but proceed as indicated below.



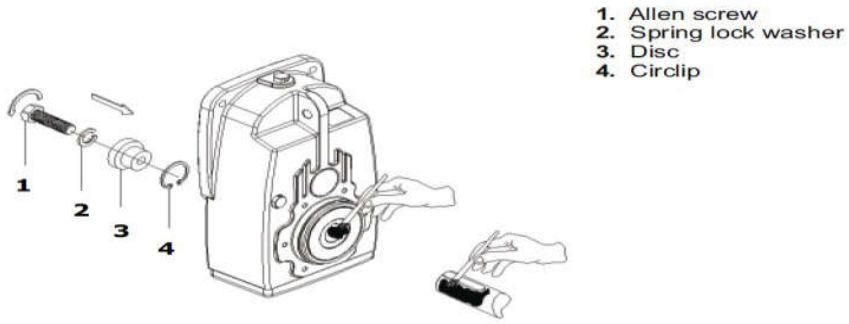

1. Drill and thread the motor shaft (fan side).
2. Screw an impact extractor tool into the tap.
3. Undo the screws fixing the motor to the gear unit.
4. Remove the motor by means of the indertial force of the extractor.

**Solid Shaft Mounting and Dismounting for Solid Shaft Gear Units**

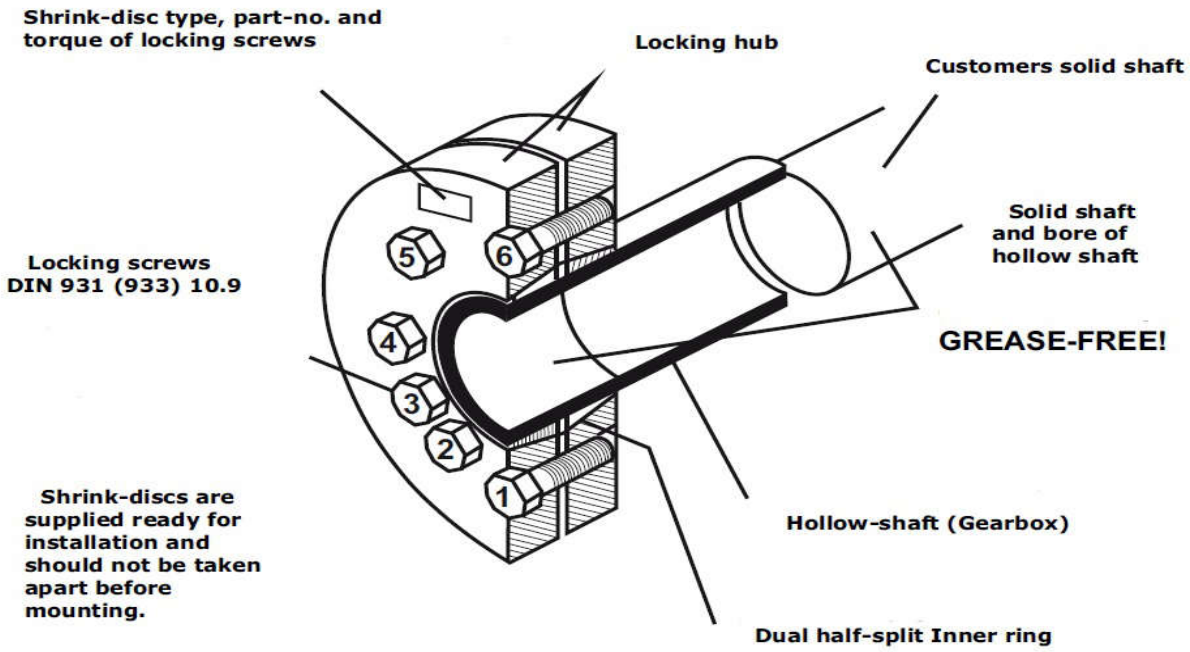



**Assembling and Disassembling of Solid Shaft Which Have Shoulder or Without Shoulder (CD type)**

For solid shaft at the figure use grease or equivalent products due to protecting against rust. Use grease or equivalent products for protecting rust to onsolid shaft.



## Hollow Shaft With Shrink Discs - Assembly - Dismounting Suggestions and Maintenance




### Shrink Disc Installation Instructions

1. Remove transportation spacers ( if provided ) located between outer collars.
2. Lightly handtighten locking screws to eliminate play between outer collars and inner ring. You should stil be able to easily turn inner ring.
3. Lightly lubricate the bore of the shrink-disc to facilitate easy mounting onto hollow-shaft of reducer.
4. Fit shrink-disc onto hollow-shaft and mount hollow shaft reducer onto solid shaft.

Hollow and solid shaft must be clean and free from many lubricant.
Exception: Grease solid shaft at end where it will make contact with bronze bushing of the hollowshaft when it is mounted. Never grease the front of the solid shaft which makes contact under the shrink-disc. Tighten locking screws only after mounting the hollowshaft onto the solid shaft.

5. Now tighten locking screws only lightly to position outer collars.
6. Use torque wrench and equally tighten all screws one after another ( never cross wise ) in a clockwise or counter clockwise sequence by approximately 1/4 to 1/2 turn until specified tightening torque (per table) is reached.

### Removal

1. Loosen locking screws in sequence in several steps by using approximately 1/4 turns. Danger - Do not remove locking screws completely.
2. Loosen the outer collars from the double tapered iner ring.
3. Remove hollow-shaft reducer from solid shaft.

**Maintenance**

An installed shrink-disc is maintenance free.
Before reinstalling (after prolonged use) it should be taken apart and througly cleaned.
Relubricate the taper of the outer collars and of the inner ring with Molycote G-Rapid plus or equivalent. Regrease screw threads and head contact area with multipurpose grease.

**Anchoring the Rubber Buffer (CD) / the Torque Arm (CKD)**

Use the original vibration - damping kit to ensure optimal operating of the assembly (etc. locitite 510).
Our company is not responsible for fault about using different parts that are written on gear units/geared motors.

**Basic Motor / Brakes Connection**

- Connect motor according to diagram.
- Connect motor according to basic motor connection wiring diagram.
- Make sure that mains voltage/frequency are in accordance with nameplate information.
- Make secure protective conductor conection.
- If motor is running in reverse direction, interchange two phases.
- Close unused cable entrances holes and the box itself in a dust-and watertight manner.
- Install protection
- Set motor protection switch to nominal current.

The electric connection must be done by experienced electric technician. The gearbox and the motor must be grounded to prevent potential differences of earth and gearbox/motor.

**Starting up**

- Check position of oil - level plug with help of mounting position tables in applicable catalogue.
- Check oil-level.
- Prior to starting-up, remove vent plug from vent screw if necessary.
- If not specified otherwise, first oil filling as is shown in list of lubricants.
- Air-cooled motors are designed for ambient temperautres between -20°C and +40°C and for installation at altitudes 1000 m above M.S.L.

## Maintenance

### A) Gearbox

- Regular oil level check.
- Change lubricant every 10.000 working hours or after two years at the latest.
- Combine the lubricant change with through cleaning of gear unit.
- Lubricant changing intervals will be twice as long if synthetic products are used.
- Extreme working conditions (high air humidity, aggressive media and large temperature variations) call for reduced lubricant changing intervals.

### B) Motor

- Remove dust deposit (overheating).
- Dismount anti-friction bearings for cleaning and refill with grease.
- Ensure that the bearing cage is packed to about 1/3 with grease, distribute evenly.
- Select proper type of lubricating grease from following table

Synthetic and mineral lubricants must not be mixed either for filling or for disposal.

Before doing any work on the unit, the operator must first switch off power to the gear unit and ensure that it is out of service, as well as taking all necessary precautions against it being accidentally switched on again or its parts moving without warning (due to suspended loads or similar external factors). Furthermore, all additional environmental safety precautions must be taken (e.g. elimination of residual gas or dust, etc.).

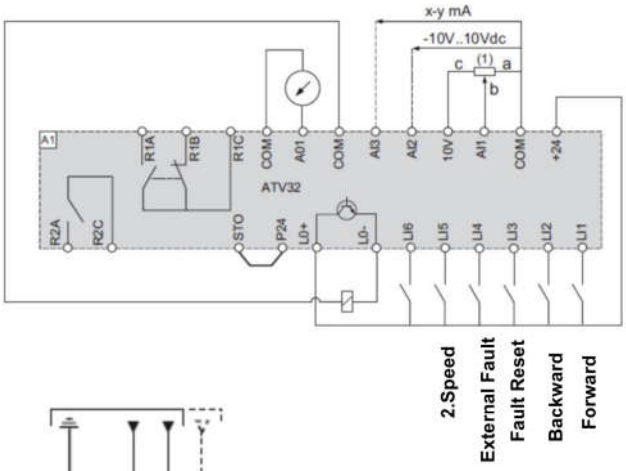
## LUBRICANT TABLE

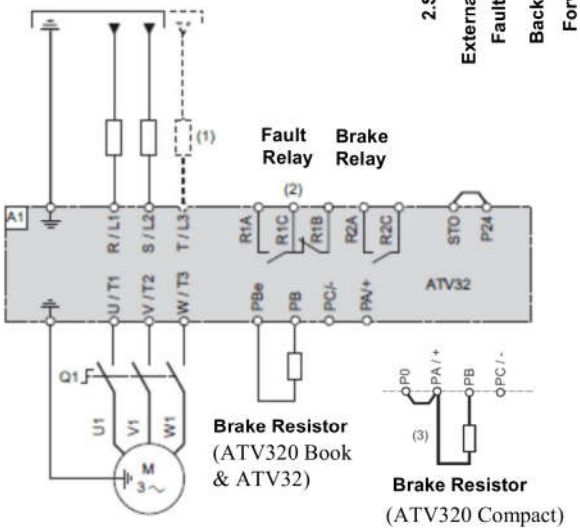
| Type of Lubricant | Ambient Temperature | ARAL | BP | Castrol | ESSO | FUCHS | KLÜBER LUBRICATION | Mobil | Shell |
|---|---|---|---|---|---|---|---|---|---|
| Mineral Oil | **0.....40°C** ISO VG 680 | Degol BG 680 Degol BG 680 plus | --- | Alpha SP 680 | Spartan EP 680 | Renolin CLP 680 CLP 680 Plus | Klüberoil GEM 1-680N | Mobilgear: -636 -XMP680 | Shell Omala 680 |
| | ISO VG 220 **-5.....40°C** Normal | Degol BG 220 Degol BG 220 plus | Energol GR-XP 220 | Alpha SP 220 Alpha MW 220 Alpha MAX 220 | Spartan EP 220 | Renolin CLP 220 CLP 220 Plus | Klüberoil GEM 1-220N | Mobilgear: -630 -XMP220 | Shell Omala 220 |
| | ISO VG 100 **-15.....25°C** | Degol BG 100 Degol BG 100 plus | Energol GR-XP 100 | Alpha SP 100 Alpha MW 220 Alpha MAX 100 | Spartan EP 100 | Renolin CLP 100 CLP 100 Plus | Klüberoil GEM 1-100N | Mobilgear: -627 -XMP110 | Shell Omala 100 |
| | ISO VG 15 **-45...-15°C** | Vitamol 1010 | Bartran HV 15 | Hyspin AWS 15 Hyspin SP 15 Hyspin ZZ 15 | Uniyis J13 | Renolin B15 HVI | ISOFLEX MT 30 ROT | Mobil DTE 11M | Shell Tellus T 15 |
| Synthetic Oil | **-5.....60°C** ISO VG 680 | Degol GS 680 | Energol SG-XP 680 | — | — | Renolin PG 680 | Klübersynth GH 6-680 | Glygoyle HE 680 | Shell Tivela S 680 |
| | ISO VG 220 **-25.....80°C** | Degol GS 220 | Energol SG-XP 220 | Alphasyn PG 220 | Glyclube 220 | Renolin PG 220 | Klübersynth GH 6-220 | Glygoyle HE 220 | Shell Tivela S 220 |

## GREASE TABLE

| Type of greases | Ambient temperature | BP | Castrol | KLÜBER LUBRICATION | Mobil | Shell |
|---|---|---|---|---|---|---|
| Mineral-basic | **-30.....60°C** | Energrease LS 2 | Spheerol AP 2 LZV-EP | Klüberplex BEM 41 - 132 | Mobilux 2 | Shell Alvania R2 |
| | **-50.....40°C** | Energrease LS EP 2 | Spheerol ELP2 | — | Mobilux EP2 | Shell Alvania RI 2 |
| Synthetic-basic | **-25.....80°C** | — | Product 783/46 | ISOFLEX TOPAS NCA 52 PETAMO GHY 133N | Mobiltemp SHC 32 | Aero Shell Grease 16 oder 7 |

**CONNECTION SCHEMES:**




ATV320 Book & ATV32

ATV320 Compact

SETTINGS;

In the first stage, if the drive is used with different settings, it will be returned to the factory settings;

1 Drive Menu (DRI) - 1.3 Configuration (CONF) - Factory Reset (FCS) menu

Setting source (FSCI) = Macro-Setting (InI) - after selection is made, press the ESC key once.
Parameter Grp.List (FRY) = (ALL ") - after selection is made, press the ESC key once.
Go to Factory Settings (GFS) = Select YES - after selection is made, press the ENT and hold for 2 seconds.

Expert level access is selected to reach all parameters;

1. Drive Menu (DRI) - 1.3 Configuration (ConF) - Full (FULL): menu
Access Level (LAC) = Expert (EPr)

(Graphic Operator Panel: 3 Interface (ITF) - 3.1 Access Level (LAC) = Expert (EPR)

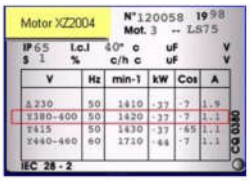
*** The settings specified in this guide are advisory and can be used in common applications, and some application may require different parameter settings.

The lifting macro is selected, the motor plate values are entered and the auto-tuning is done;

**1. Drive Menu (DRI) - 1.3 Configuration (CONF) - Full - Fast Commissioning (SIM) menu**

**Drive Settings (CFG) = Lifting (HSt)** (Press ENT for 2 seconds)

**Nom. Motor Power (nPr)** =Nominal Motor Power
**Nom. Motor Voltage (UnS)** =Nominal Motor Voltage
**Nom. Motor Current (nCr)** =Nominal Motor Current
**Nom. Motor Frequence (FrS)** =Nominal Motor Frequence
**Nom. Motor Speed (rev/min)** =Nominal Motor Speed (rev/min)




**Auto-Recognition (TUn)** = Make setting (YES)
**Motor Thermal Current (Ith)** = Nominal motor current

**Acceleration Time (ACC)** = 3.0 the desired acceleration time value is entered
**Deceleration Time (dEC)** = 3.0 The desired deceleration time value is entered

(Note: Values entered as the acceleration and deceleration times are the speed at which the driver moves from zero speed to the nominal speed of the Motor and the time it takes to run.)

**Low Speed (LSP)** = 20.0 Hz Slow Speed (1st Speed) value is entered
**High Speed (HSP)** = 50.0 Hz High Speed (2nd Speed) value is entered

Error reset and External error can be canceled if not used;

**1 Drive Menu (DRI) - 1.3 Configuration (CONF) - Full (FULL) - Fault Management (FLt) menu**

**Fault Reset (rSt) - Fault Reset (RSF)** = Not Selected (nO)
**External Fault (EtF) - External Fault Assignment (EtF)** = Not Selected (nO)

The speed conversion coefficient is set;

**1. Drive Menu (DRI) - 1.3 CONFIGURATION (CONF) - FULL - Settings (SEt): menu**

**Speed Conversion Factor (SFC)** = 0
**Gain Rate (SPG)** = 20%

Application settings are made;

**1 Drive Menu (DRI) - 1.3 Configuration (CONF) - Full (FULL) - Application Selection (FUn): menu**
**Preset Speeds (PSS) -**

**2 Preset Speed (PS2)** = LI5 High Speed (2nd Speed) assign
**Preset Speed 2 (SP2)** = 50.0 Hz High Speed (2nd Speed) value is entered

**Brake Logic Control (bLC) -**

**Brake assignment (bLC)** = assign the brake relay at R2
**Movement type (bST)** = "Vertical (UEr)" for lifting motion, "Horizontal" for bridge or trolley movement
**Brake Strike (bIP)** = "Selected (yEs)" for lifting motion or "nO" for trolley movement
**Brake release current (Ibr)** = Motor nominal current value for lifting motion,
For the bridge or car (Motor nominal current / 5) must be entered.
**Brake release time (Brt)** = 0.05 s
**Brake Hold. Delay (tbE)** = 0.0s
**Brake Hold Time (bEt)** = 0.50 s
**Restart Time (ttr)** = 0.50 s

Note: It is important for the lifting drive to move up (+) frequency upwards, (-) frequency downwards.
If the direction is reversed, the direction of the motor must be changed.

*** The settings specified in this guide are advisory and can be used in common applications, and some applications may require different parameter settings.